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RIGHT GRANTORS AND RIGHT SEEKERS: A THEORY FOR UNDERSTANDING THE COMPARATIVE DEVELOPMENT OF INTELLECTUAL PROPERTY RIGHTS

by

JEFFREY S. SCHROEDER

A DISSERTATION

Presented to the Department of Political Science
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

March 2001

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"Right Grantors and Right Seekers: A Theory for Understanding the Comparative Development of Intellectual Property Rights," a dissertation prepared by Jeffrey S. Schroeder in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Political Science. This dissertation has been approved and accepted by:

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An Abstract of the Dissertation of

Jeffrey S. Schroeder for the degree of Doctor of Philosophy

in the Department of Political Science to be taken March 2001

Title: RIGHT GRANTORS AND RIGHT SEEKERS: A THEORY FOR UNDERSTANDING THE COMPARATIVE DEVELOPMENT OF INTELLECTUAL PROPERTY RIGHTS.

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Intellectual property rights are created by the interaction of right-seeking by individuals and firms and the right-granting role of the state. However, coercive diplomacy literature characterizes the development of intellectual property institutions as resulting from compliance with international norms, as enforced by powerful states, and the diffusion of ideas through complex interdependence fostered by international institutions. I demonstrate the significance of right-seeking behavior and subsequent effective grants of intellectual property rights in the United States, Japan, Korea, the Republic of China, and the People's Republic of China from 1975 through 1990 – the period which is the focus of coercive diplomacy theorists regarding diplomatic activity by the U.S. In each case, right seeking and granting increased prior to the deployment of diplomatic pressure and the resolution of the disputes.

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The theoretical implication for the comparative analysis of intellectual property development is that domestic demand is the dominant causal factor, while the effectiveness of diplomacy is contingent on economic development. The policy implication is that fostering economic and technological development is more effective than the application of external diplomatic pressure on developing states.

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ACKNOWLEDGEMENTS

Many thanks to all the good people who assisted and supported me in the preparation and defense of my dissertation. I would like to especially thank my wife Amy and son Luke for their patience and understanding; my parents and sister for their encouragement and support; and my mother-in-law Arlene, Beth Kurilo, and the Dominican Brothers for the use of their respective retreat homes where many pages were composed. A special thanks to my good friends from the Department of Political Science who provided editorial support and empathy: "H", Wags, Justin, Joe, Tullio, and Stan.

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CHAPTER 1

INTRODUCTION

Why do intellectual property institutions comply with global agreements in some states and not others? Does diplomatic action create and protect intellectual property rights? Maximized utility, represented by a functional intellectual property system, is why an intellectual property system works rather than through the application of coercive diplomacy. The use of coercive diplomacy by developed states does not directly cause effective intellectual property rights (IPR) to form in developing states. Intellectual property rights development can be better understood by shifting the framework of analysis from the role of diplomatic pressure and global economic institutions to a framework that considers the comparative development of property rights. I will outline an approach for understanding how effective intellectual-property institutions form in specific polities by delineating the political, historical, and economic factors that create property rights and compare that to the use of coercive diplomacy in creating effective intellectual property institutions.[1] My dissertation will demonstrate that the coercive use of diplomacy is not the primary cause for the development of intellectual property

[1] See Ryan (1998) and Sell (1998) for examples of coercive diplomacy theories on IPR. Their ideas will be more fully explained in the literature review of Chapter One.

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institutions, but rather the outcome once basic political and economic development is achieved.

Intellectual property institutions form as the result of not only right-granting actions of the state (issuance of patents and copyrights), but also by the right-seeking actions of firms and inventors. It requires both right grantors and right seekers, who are maximizing their utility and operating under conditions of scarcity, to develop an effective institution that grants property rights.[2] The implications for foreign policy regarding trade-related intellectual property is that developed states that favor strong IPR institutions should be transformed so that the development of a right-seeking class of firms and individuals is as important as the promulgation of laws. However, my dissertation will not be a normative examination on what particular IPR system is best, but rather provide the tools for a positive analytic approach to intellectual property development.

Intellectual property institutions maximize utility for both the state and right seekers in the context of a capitalist economy. As a capitalist economy becomes more complex and grows, the demands placed on the state for reliable economic institutions increases domestically. Right seekers develop and begin to pursue protection and property rights from the state. Turned around, officials may have seen the success of other state's systems of IPR and how reliable patent systems increase technological development, economic growth, and subsequently increase tax revenue while reducing

[2] My theory is derived from William Riker and Itai Sened (1991) theory on the origin of property rights. They combine neoclassical economics contributions on property right theory with political motivations and actions of right seekers and right grantors. These ideas will be more fully explained in the literature review section of Chapter One.

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conflicts that need adjudication. While IPR institutional forms may be borrowed from other cultures, the grantor's and the seekers' interests converge and third parties are forced to comply with the new institutional arrangement. Right seekers' utility is maximized by new property rights; the state's utility is maximized by decreasing disputes while increasing technological and economic growth; the third party infringer's utility is decreased due to lost profit and penalties; and the other third parties in the polity have their utility increased by more available technology and general economic growth.

The theory of coercive diplomacy as a means for creating IPR institutions has its basis in the treaties forming the World Trade Organization (WTO). Coercive diplomacy theory posits that the causal arrow points from developed states towards less developed states (Ryan, 1998; Sell 1998). The development of multilateral and bilateral agreements on IPR over the past century are cited as evidence that developed states have exercised power over less developed states. However, the treaties themselves indicate that more is going on than simple applications of power. The production and use of intellectual property, illegally obtained or not, indicates that a developing state is generating basic market institutions including private property. Before a state becomes a member of the WTO it must have basic institutions governing property and intellectual property.

The WTO has incorporated into the Trade Related Intellectual Property (TRIPS)[3] agreement the concept that intellectual property is private property. Intellectual property, whether generated by private individuals and firms or public entities such as universities and government bodies, is now recognized as legally excludable private property by

[3] The TRIPS agreement refers to the Marrakesh Agreement Establishing the World Trade Organization, Annex 1C "Agreement on Trade-Related Aspects of Intellectual Property Rights," GATT (1994).

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every member of the WTO. The acceptance of private property concepts is prior to membership and that indicates other factors which create market institutions are as important as coercive diplomatic actions. There are few states remaining that do not have market-oriented economies, and significantly those that do not, such as North Korea and Cuba, are not targets of coercive diplomatic action over IPR. Alternatively, my theory posits that the causal arrow begins in markets, flows through the developing state toward the IPR agreement. Developing effective IPR institutions originates at the domestic level. Joining a multilateral organization or embarking on a bilateral IPR agreement can be a goal of a developing state, but what comes first: compliance with WTO rules and foreign diplomatic demands or a viable intellectual property right granting system? Joining a multilateral trade organization can be one incentive for a state to develop market-based institutions nested among general goals of developing a capitalist economy. However, I will demonstrate that joining an organization such as the WTO is dependent on internal domestic development of market institutions and that diplomatic actions and membership in global institutions follow internal development, not precede it.

Coercive diplomacy theorists have posited that states are transformed by global economic institutions that have been shaped by the power and interests of strong states, particularly in intellectual property. Their analyses are one-sided, assuming causality in IPR agreements flows only from the developed world to the developing world, while ignoring the economic and technological changes in the developing world that have been creating effective IPR institutions. Evidence to the contrary of the theory of how strong states impose their will is that despite constant diplomatic pressure being applied to many

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developing states such as the People's Republic of China (PRC), but earlier Japan, Korea and the Republic of China (ROC), progress in developing IPR is less correlated with diplomatic pressure than with the general liberal economic development of these states. In the cases examined, diplomatic pressures and sanctions have been applied for more than forty years with minimal results, yet as these states develop economically they demonstrate a capacity to comply thereby reducing IPR-related conflicts. The following chapters will demonstrate that IPR institutions develop as a means to manage and promote intellectual property generation. Capitalist development creates demands and new goals for right seekers and grantors that create IPR institutions.

In fact, diplomatic pressures have recently eased on IPR for the above cases, yet the WTO's TRIPS agreement will not be fully implemented, at the earliest, until the first part of the next decade and up to ten years after a WTO membership is approved.[4] This may indicate that compliance with the treaty is not a primary cause for creating a viable IPR system. Treaties can create statutory standards in a developing state, but internal economic development creates right-seekers who can then lobby for an IPR institution that can effectively promote and protect intellectual property. For example, the PRC may not have to abide by the WTO agreement for up to ten years after its membership application is approved, which will now be at least into the second decade of the new millennium, yet the PRC has been in compliance with legal standards of the TRIPS agreement (Schlesinger, 1995). The PRC's difficulty has been the enforcement, not the promulgation of IPR statutes and regulations.

[4] GATT (1994) pp. 398-399.

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Similarly, the ROC has experienced difficulty in becoming a full member of the WTO due to its difficulty receiving diplomatic recognition, yet it is in nominal enforcement and statutory compliance with the TRIPS agreement (Sun, 1997). For over thirty years the ROC has been the target of sanctions by more developed states on IPR piracy, and the PRC for almost two decades, yet now there are indications that these states are providing better IPR protection. What is also seemingly ignored by coercive diplomacy theorists is that the TRIPS agreement stresses national treatment in which treaty members citizens are treated equally under each member's IPR regulations and judicial systems.[5] The TRIPS agreement is not radically changing domestic IPR statutes as much as requiring equity for all treaty members: far from the posited claims of overarching applications of power by the U.S. to impose a standard global IPR regime.

Property Rights

Why comply now and not in the past? This puzzle can be better understood by shifting the framework of analysis from the role of diplomatic pressure and global economic institutions to a framework that considers first the comparative development of property rights. A property-rights approach will provide a different conclusion: global economic institutions, such as the WTO, are less agents of change and more a reflection

[5] GATT (1994): Article 3 of the TRIPS agreement. Also see Samuelson (1999) on the lack of standardization of IPR regulations under the TRIPS agreement. The case studies will demonstrate the continuing differentiation of IPR systems based on the historic interaction of right seekers and the right grantor.

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of achieved economic development for member states.[6] My framework of analysis indicates that the process of modernization has some universal elements regarding property right formation. The review of the property rights literature and the examination of the cases in later chapters will indicate that property rights form due to the choices made by states and the specific demands placed on the state by right seekers.

Property right and IPR systems do differentiate across states, but as states increasingly develop liberal economic systems they choose to adhere to the basic principles that create property rights due to converging goals that define utility. For the goal of increasing the effectiveness of IPR-granting systems, utility is defined by increasing technology output, increased profits, increased national wealth, and reducing conflicts that are produced by effective IPR systems. Maximized utility, represented by a functional intellectual property system, is an alternative reason why an intellectual property system works rather than as a response to coercive diplomacy.

My theory of the origin of intellectual property rights requires investigation into the components that compose a property rights system. This is not a deterministic model seeking to show a path towards an ideal IPR regime, but rather illustrates the potential outcomes of an IPR system. The IPR system will reflect the active interaction of the model's components. My theory is based on William Riker and Itai Sened's (1991) theory on the origin of property rights. The importance of their theoretical contribution to the property rights literature that emphasizes economic scarcity, which will be more

[6] Fukuyama (1997) argued that "while modernization can take many detours, alternate routes, and backward steps, there are in fact good empirical grounds for thinking that modernization is a coherent process that produces a certain uniformity of economic and political institutions across different regions and cultures." The broader issue of modernization will be developed in Chapters Three and Four.

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fully explicated below, has been the addition of the political roles of the right grantor (the state) and those who seek property rights. By adapting Riker and Sened's origin of property rights theory to intellectual property formation, my dissertation will analyze cases and generate a series of hypotheses to be tested by regressions that illuminate why a state's domestic factors are more important in this debate than external diplomatic pressure.

The dependent variable is the domestic intellectual property institution. The independent variables are the right grantors and the right seekers. Intellectual property rights form as a result of the interaction of both a right grantor (the state) and right seekers (inventors and firms), rather than by just one or the other. Diplomatic pressure at best can only influence the state as right grantor, but not necessarily cause compliance of right seekers and would-be violators. In the following discussion I will first define intellectual property, then I will evaluate the literature on property rights and IPR. I will then fully develop the model for IPR formation and evaluate the independent and dependent variables.

What is Intellectual Property?

Before analyzing the IPR literature and its competing theories, I will define what intellectual property is and how it will be altered by the WTO agreement. Intellectual property rights are essentially a property right in a novel invention. Members of the WTO have agreed to general conventions to protect proprietary rights in ideas, but what is an idea? Ideas legally gain definition in the ability of a concept to be copyrighted, patented, or trademarked in a specific legal jurisdiction. In liberal economies, intellectual

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property is embodied in a wide range of products from literature, music, technology design, software, trademarks, genetic material, industrial designs, business methods and even prime numbers. The WTO agreement attempts to reconcile domestic laws and practices with the requirements of a globalized economy that trades intellectual property across multiple legal jurisdictions. One goal of the WTO's IPR agreement is to foster technology transfer to less developed states while protecting inventors' incentives to continue creative endeavors.[7]

Defining intellectual property as private implies that an idea can be exclusively held by an individual, firm, or even a public institution such as a government bureaucracy or an university. The idea thus becomes a commodity that can be sold or licensed. However, intellectual property is difficult to maintain ownership over because once an idea or bit of knowledge has been revealed, it becomes difficult to exclude others from its use (Boyle, 1992). Filing for intellectual property protection requires the applicant to reveal the details of the product to a government body who then publishes the innovation in exchange for a property right. Government grants of intellectual property protection are encompassed legally as not only patents and copyrights, but also as trademarks, trade secrets, and know-how. The growth in technology and global trade has increased the difficulty of protecting these forms of intellectual property as firms increase their activities outside of their home states.

A primary motivation for the TRIPS agreement was to simplify the procedures associated with the international trade of intellectual property (GATT, 1994, 366). The

[7] Preamble of Annex 1C of the WTO Agreement, GATT (1994) pp. 366-367.

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WTO agreement attempts to reconcile the different views of appropriating information across jurisdictions by providing a legal blueprint for IPR protection that builds on previous international agreements.[8] These conventions that have culminated in the WTO agreement represent the evolution of IPR protection. Empirically, I will focus on patents as an example of how the WTO is affecting IPR codes in specific polities.

Patents

Patents impose constraints on creativity because while they protect exclusiveness in their use and right to profit, they are by their very nature limited by time. In the United States prior to the WTO, patents had been protected for 17 years after date of issue. Under the WTO's harmonization of rules currently being implemented, exclusive rights to patents will be protected for 20 years from date of application. Previously, U.S. patent laws reflected a longer time frame by allowing development periods to elapse before patent issuance, thus increasing the number of actual years of the patent to 17 years plus reasonable development time from the date of application. In many cases this translated to more than the 20-year limit of the WTO. Because requirements of excludability vary

[8] Paris Convention originally signed in 1883 and periodically amended through 1979 allowed signatories to institute any patent system it wanted, but must not discriminate against foreign applicants. Paris Convention also established priority date of filing in the case of disputes over first filing. The Patent Cooperation Treaty (PCT) was signed in 1970 and is administered by WIPO. Essentially the PCT allows for a patent filing in a member state to seek simultaneous recognition of the filing in other member states. If the application is approved in the first state, then application materials are sent to other states as requested by the patentee. While it does not guarantee approval of the application in each state, it does streamline the application process. Other IPR agreements include The Berne Convention 1886 plus amendments (literary and artistic works); The Madrid Agreement 1891(trademarks); The Hague Agreement 1925 (industrial designs); The Rome Convention 1961 (music); The Geneva Convention 1971 (phonogram duplication); the Budapest Treaty 1977 (microorganisms).

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across industries,[9] some intellectual property generating firms and individuals in the U.S. have protested this new limit because some inventions, such as pharmaceuticals, may take many years to bring from patent to actual product, thus limiting the number of years of actual income earned from direct sales and royalties through licensing before patent expiration.

Duration is therefore a defining criterion of the right in intellectual property as it relates to patents (and other forms of intellectual property as well). The members of the WTO have an interest in protecting ideas to reward inventors to encourage them to keep inventing, but the WTO also has an expressed interest in limiting the amount of time an idea is patented so as not to curtail other useful spin-offs from the patent. Considering both benefits, patents are a form of limited-property rights granted by a state in exchange for disclosure. Limiting the time a patent is valid ensures the incentive to create, while lowering future transaction costs in utilizing ideas. As the American jurist Richard Posner mused, "Were patents perpetual, how many contemporary manufacturers would owe royalties to the descendants of Leonardo (Posner, 1972, 33)?"

[9] Industries and researchers have varying goals regarding excludability. Pharmaceutical firms require secrecy and time-limits to exclude others because innovative breakthroughs and subsequent direct marketing of the pharmaceutical directly to the consumer is the primary source of profit. Other patented innovations may be intended for others to create more innovations and the patentee to derive profit through royalties. Public sector research may be patented in order to derive royalties to fund more research, but nonetheless be oriented toward revealing the innovation to increase knowledge in society at large. Excludability thus varies widely between industries and the goals of the research effort. A good general discussion of these issues can be found in Rosenberg (1994) pp. 139-158.

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WTO, WIPO, and Patents

Despite the development of the WTO's TRIPS agreement, patent laws will continue to vary across countries. Like previous IPR agreements, TRIPS provides only general guidelines that accommodate a variety of domestic patenting systems. The two most important elements of the agreement, in my opinion, are transparency and national treatment. The TRIPS agreement requires that each state publicly publish IPR laws, regulations, judicial decisions, and administrative rulings (Article 63). Just as importantly, the TRIPS agreement requires that member states not discriminate between nationals of other member states and its own citizens. While each member state agrees to standardize some procedures such as time-limits (Article 33) and the right to license (Article 31), member states are essentially free to develop specific bureaucratic procedures that best conform to their own legal and political system. What the TRIPS agreement does standardize is how states settle specific disputes via WTO dispute resolution procedures if disputes over patent protection are not first adequately resolved inside the particular state (Article 64).

For example, after a lengthy legal battle or unheeded complaints over piracy, state A's company believes it is not receiving adequate protection in state B; then state A's company asks its home state's government to intervene on its behalf. If the two states are unable to resolve the dispute on a bilateral basis, then appeals are made to the WTO, the last resort for dispute resolution.[10] If state A's company wins its case before the WTO,

[10] See www.wto.org/ddf/daily/ for a list of disputes resolved and under consideration by the WTO.

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then state B must either remedy the IPR violation or face sanctions.[11]

There are no schedules of penalties for disputes between states, only a mechanism for resolution of disputes that can either reject or endorse sanctions imposed by a member. If a case is won, sanctions can be levied on a range of products produced by the violating state in proportion to the adjudged loss claimed by the plaintiff state. In theory, approved sanctions could be levied on unrelated products such as agricultural commodities in retribution for IPR violations.

The rise of patent-generating industries globally has resulted in a greater standardization of patenting procedures through the World Intellectual Property Organization (WIPO).[12] In turn, lower transaction costs as a result of disputes regularizes patenting procedures in order to avoid the lengthy dispute resolution process. So while patenting is more standardized across states, it is nonetheless the purview of each state on how to actually implement its own patenting system, and each state may decide what compliance is worth: face sanctions or support a weaker IPR system.

How a patent is utilized is important in understanding the effects of the global patenting regime. While a wide variety of firms engage in patent-generating activities, certain industries are more dependent on patent protection than others. For example, the pharmaceutical and chemical industries are more dependent on exclusive patent protection due to the sunk costs in research and development (Mansfield, 1986). As a

[11] See WTO agreement Annex 2 "Understanding on Rules and Procedures Governing the Settlement of Disputes" for specific dispute resolution mechanisms (GATT, 1994, 404-433). Retaliatory sanctions may be applied to any type of product, not just intellectual property (Samuelson, 1999).

[12] WIPO is the multilateral organization under the United Nations that administers global agreements on IPR. For more information on its internal organization and the treaties it administers see www.wipo.org.

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result, patent-dependent industries vigorously pursue patent protection globally in order to recoup research and development expenditures via exclusive sales or licensing. Pharmaceuticals are uniquely dependent primarily because the purpose of the patented drug is to sell the product directly to consumers often under their own brand name or by licensing the drug design to other producers who sell directly in a consumer market.

Most patents utilized by industry, however, are seldom recognized by the end consumer and represent how technology is transferred in every day economic activity. Licensing strategies and direct sales reveal how a patent is utilized by a firm or institution. For most manufacturing activity, patents are the core of industrial activity, not the end game. A product generally is the result of thousands of patents from a variety of manufacturing and research processes. An aircraft, for example, contains millions of parts produced by thousands of manufacturers that represent a multitude of patents. The aircraft manufacturer may patent its overall design, any manufacturing procedures it develops, and particular parts, yet the aircraft itself contains patented goods from seats, toilets, and advanced avionics that it may not have generated itself. Indeed, even the engines are generally made by yet another firm. How are these patents protected?

Patents are protected through the outright sale of the parts to the aircraft manufacturer or by licensing technologies and processes from other companies. If the aircraft manufacturer does not want to pay for the innovative part from another firm, then it must develop such parts without infringing upon the patented processes or parts or otherwise face potential legal action by the patent holder. Potential legal action is one incentive for a firm to avoid IPR violations and even more directly another incentive is the efficacy of contracts in modern business transactions. If a contractor or vendor is not

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reasonably certain its inventions will be properly compensated for, then the incentive for the sale of the patented good is diminished.

Patents therefore reduce transaction costs in technology transfer by increasing confidence that intellectual property is worth selling to a potential client. While aircraft represent one of the most complicated technological products in modern civilization, the utilization of patents is really no different for most manufacturers of less complex products. Direct purchase of a patented good or licensing implies that property has been properly transferred to the end user by the patent-generating firm, under terms agreeable to both parties: the right purchase price based on the market value of the patented good. Most patented goods, even between developed and underdeveloped states' firms, are properly transferred and paid for.

While it is difficult to measure, states that experience greater imports of manufactures and foreign direct investment in manufacturing indicate confidence in transferring technology (Maskus & Penubarti, 1995). The purpose of the TRIPS agreement is for cases when the patented goods are not properly paid for, or even outright pirated. The IPR literature will indicate that states may have differing incentives to comply with the TRIPS agreement. Normative questions aside, many states are increasingly willing to develop stronger IPR regimes in order to regularize and increase business activity. I will demonstrate why and how a state complies with the TRIPS agreement.

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The IPR Literature:

Coercion or Utility?

I will group the relevant literature into three categories to explain my theory of IPR development: international relations; property rights and New Institutional Economics (NIE); and the efficacy literature on the benefits and costs of a weak versus strong enforcement system. First, I will explain the theory that coercive diplomacy has been the primary factor in developing IPR institutional effectiveness followed by a brief overview of diplomatic actions and negotiations. Second, I will review the literature on property rights and the New Institutional Economics school that forms the basis of my alternative theory for IPR development that focuses on domestic factors. Third, in order to better understand the choices that states make on the institutional strength of IPR, I will examine the efficacy literature that focuses on the benefits and costs of a weak versus a strong IPR system. For practical purposes, I will more fully develop the legal and area studies literature on specific states and regions as case analyses warrant.

The coercive diplomacy literature generates a puzzle to consider when determining what factors cause an effective IPR institution to develop. The coercive diplomacy approach emphasizes the primacy of states utilizing coercive diplomacy as the cause of developing IPR institutions. Powerful states are posited to act on behalf of their firms who seek to protect their intellectual property in developing states thereby causing IPR institutions to form in targeted developing states. However, coercive diplomacy was utilized against the states selected for this study for decades before effective IPR systems were developed. The fact that the time frame for creating effective institutions was so

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long opens speculation that other factors are as responsible for the development of IPR institutions as diplomacy. Rather than viewing diplomacy as a causal factor, I will argue that diplomacy is in fact an arena where states resolve disputes and that disputes are resolved when states possess the capacity and desire to comply. Satisfactory compliance with IPR agreements has been contingent on the development of market-based economies and that requires effective property rights.

The property rights literature provides an alternative explanation that IPR are essentially property rights and therefore behave in fundamental ways in accordance with economic theory, while the NIE school explains how institutions develop and function over time. The examination of the property rights literature generates an alternative hypothesis that capitalist economic systems create the conditions for effective IPR institutions to develop are prior to effective diplomatic agreements. Finally, the efficacy literature broadly examines the costs and benefits of weak versus strong IPR institutions which allows for a better understanding of the policy choices that a state may make regarding the institutional enforcement of IPR codes and agreements. The review that follows generates the general hypothesis that domestic factors and choices on IPR are more important than external pressure for developing an effective IPR institution and that effective IPR agreements are only possible when the state has the capacity to comply.

Power and Diplomacy

Political science has largely ignored the development of property rights when addressing IPR and when it has addressed IPR, the literature utilizes neoliberal institutionalist theories from the field of international relations. IPR provides a difficult

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case for both international relations schools of realist and neoliberal institutionalist theory because despite decades of global institution building and the application of diplomatic pressure by developed states, the development of effective domestic IPR regimes has correlated more with domestic economic development. In the following discussion, I will contend that current international relations theories are inadequate for IPR analysis because they focus on international factors driven solely by developed states and their firms' interests while ignoring domestic factors that are transforming developing states and therefore do not adequately explain why IPR institutions become effective.

Typical of current international relations approaches to IPR are recent works by Susan Sell (1998) and Michael P. Ryan (1998). Ryan and Sell are oriented towards the neoliberal institutionalist school which focuses on the nature of international politics as one of power relationships among states and the function of international institutions in fostering cooperation on issue areas such as IPR. Neoliberal institutionalists build on realist notions (Waltz, 1979; Grieco, 1988) that the international system is typified by anarchy and that states will use their economic and military resources to exact treaties and agreements that typically favor "powerful" over "weak" states. Furthermore, neoliberal institutionalists (Keohane, 1987; Goldstein, 1993) acknowledge the predominance of power in international outcomes, but posit that genuine cooperation can develop as a result of international institutions that can foster complex interdependence through the diffusion of ideas and the repeated interaction of diplomats in specific international institutions. While individual interests can have a marginal effect on outcomes, the primary actors are states who decide, implement or even coerce policy choices.

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Coercive Diplomacy: the Background

Recent theories that have been developed regarding IPR diplomacy and the results of the WTO' TRIPS agreement are rooted in the American domestic political climate of the early 1980's.[13] Spanning three presidential administrations during the 1980's and 1990's, U.S. diplomats were directed to pressure states that had poor records of intellectual property protection and to lobby for a global agreement on IPR tied to the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations. While the theories are based on U.S. diplomatic actions of this period, in Chapters Three and Four I will demonstrate that diplomatic pressures applied by the U.S. are not new and in fact were regularly applied to the cases selected for my study for decades prior to the 1980's.[14]

During the early 1980's, the U.S. State Department was in the process of negotiating a revision of the Paris Convention (1883, as amended) at the Diplomatic Conference for the Protection of Intellectual Property which lasted from 1980 to 1984 with minimal results. In June 1985 at the meeting attempting to revive the stalled talks, the conference was terminated due to intractable differences and future negotiations were turned over to committees renegotiating the GATT under the auspices of the Uruguay Round. The original demands for the negotiations were not rooted in the developed world, but by developing states known as the Group of 77.

[13] Background for this section is drawn from: Ostry and Nelson (1995); Rosenberg, Landau, and Mowery (1992); Ryan (1998); Sell (1998); and Tyson (1992).

[14] Sell (1998) does recognize the role of earlier diplomatic efforts, but nonetheless focuses upon the impact of the 1984 Trade Tariff Act and subsequent diplomatic actions while de-emphasizing past actions as less important.

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Revising the Paris Convention was seen as a way to more readily transfer technology to developing states because the current patent system favored limited monopolies for developed states firms.[15] Essentially, developing states argued that in order to catch up to the technological leads of developed states, IPR laws should be weakened in order to keep developed states firms from dominating markets with monopoly-like patents. The demands of developing states gained momentum for revision as early as 1969 with the Treaty of Cartegena and India's demands in 1974 for revising the Paris Treaty.[16] The failure of the conference resulted in perhaps exactly what the developing states least wanted: demands for stronger protection by developed states and their firms.

As the renegotiations of the Paris Convention broke down, the U.S. congress strengthened the hand of the president for dealing with global IPR issues. The most frequently cited example of strengthening U.S. diplomacy is the amendment to Section 301 of the 1974 Trade Act. As amended in the 1984 Trade and Tariff Act, Section 301 powers were granted to the president by congress to make intellectual property protection and generally favorable trade terms a global priority. The president was empowered to remove tariff preferences and/or provide other sanctions against states deemed to have limited protection for U.S. intellectual property.

The office of the U.S. Trade Representative (USTR) was given authority to determine which states violated Section 301 by first proving that the offending state was

[15] The Paris Convention's basic principles: national treatment and nondiscrimination against foreign patentees; the right of priority for the patentee, I.e.: monopoly use for a limited time.

[16] See Sell (1998), Chapter 4 for a discussion of the origins of the demand for renegotiating the Paris Convention.

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in violation of basic GATT rules. Then the USTR would attempt to compel compliance by threatening trade sanctions if negotiations failed to remedy the lack of perceived IPR protection.[17] With limited resources, the first USTR target was the Republic of Korea. In Chapter Three I will provide more details of the process with Korea, but essentially the USTR began a series of negotiations with Korea utilizing the threat of Section 301 sanctions to get results. The process lasted from 1985 with the initial talks and lasted until 1992 when it was deemed that Korea had a viable IPR system by the U.S. Notably, Korea was placed on the first list of violators in 1989, as provided by the Trade Act of 1988.[18]

International Relations Theory and IPR

The diplomatic activity of the 1980's and 1990's is central to international relations theorists analyses of IPR issues. Sell (1998) builds on neoliberal institutionalist theory by positing that the global IPR regime has been formed through the diffusion of "ideas" in concert with coercion which created the demand for negotiations, while coercive diplomacy explain the results of the negotiations. The reason for a relatively strong IPR regime being established in the WTO agreement was because powerful states desired to impose a liberal economic order. While developing states have changed their policies, Sell argues that developing states have not changed their "minds" fully in favor of a strong intellectual property regime. Sell outlines the historical push by the United

[17] In 1984, the USTR did not have an IPR specialist on staff and hired an intellectual property attorney to advise on the issues (Ryan 1998, p. 73).

[18] Other states on the first list issued by the USTR under Section 301were Brazil, India, Mexico, China, Saudi Arabia, Taiwan, and Thailand for a variety of trade offenses.

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States government in creating a strong IPR regime via unilateral diplomatic activity such as the Section 301 of the U.S. Trade Act.

An interesting fact to consider is that while Sell outlines diplomatic efforts by specific developing states to comply with U.S.-IPR dictates, one need consider that the effect of coercive diplomacy on IPR issues cannot be described as successful. Sell's work effectively demonstrates how developed states' policies are reflected in diplomatic arenas, but fails to quantify the economic changes in developing states that transform the interests of developing states in these diplomatic encounters. Over decades, does a developing state concede to a developed state's demands due to fatigue, or are there other domestic factors not examined by Sell that can explain a state's adherence to IPR agreements?

Determining when a state has complied with an IPR agreement is a subjective enterprise that overly focuses on diplomatic activity and simply does not focus on the internal development of IPR in targeted states. The following case studies will demonstrate that many former Section 301 targets have been quietly forgotten while IPR institutions developed along with their economic and legal systems. When the targeted state had not developed the means to produce and protect intellectual property, diplomatic agreements failed. This raises the possibility that successful IPR agreements are not causal in creating IPR, but are more likely the outcome of the process of development.

Ryan (1998) also utilizes elements of neoliberal institutional theory with results similar to Sell. Ryan extends the neoliberal idea of "complex interdependence" to include not only states, but also further develops the role of firms in the development of

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intellectual property institutions. Complex interdependence is fostered by the interaction of diplomats, firms and experts associated with international regimes, in this case global IPR organizations such as WIPO and trade organizations such as the WTO. Interaction creates a convergence of interests that mediate the application of power and goals toward common interests.[19] Due to diplomatic pressure and interaction, developing states join an IPR regime and then impose IPR institutions in their polity. The causal arrow points from the international regime towards the domestic level in creating effective domestic IPR institutions.

The importance of firms in creating IPR diplomatic policy is an important contribution, but Ryan emphasizes the importance of developed state's firms and particularly the interests of U.S.-based firms over developing states' firms. Intellectual property generating firms are important, particularly firms from the developed world, but nonetheless the importance of international regimes mediating intellectual property disputes, and therefore causing effective IPR institutions to form, is critical to Ryan's reasoning. Like Sell, Ryan assumes that the demands for effective IPR institutions originate solely in the developed world that pass through international organizations or bilaterally, while ignoring the role of developing states' firms which are increasingly important in the generation of intellectual property that I will detail in the following chapters. Their analyses are one-sided, assuming causality in IPR agreements flows only from the developed world through the global IPR regime to the developing world, while

[19] Ryan (1998) p. 3.

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ignoring the economic and technological changes in the developing world that have been creating effective domestic IPR institutions.

Contrary to the assumption that diplomats are pursuing their state's firms interests at the expense of the underdeveloped state's firms, the cases that follow will illustrate that diplomatic efforts are frequently centered on establishment of the rule of law and concepts of equity before the courts regarding IPR issues. The benefits of achieving such goals are not limited to foreign interests, but have wide-ranging impact on the societies as a whole. Indeed, the record will demonstrate that diplomats were generally unsuccessful in securing rights for their citizens until such rights were widely available to all citizens in the targeted polity. I will concede that diplomats sometimes act as agents on behalf of their state's firms, but the thrust of IPR-related diplomacy is most often centered on securing national treatment of their citizens under most-favored-nation principles common to modern trade agreements. The goal is to create legal standing in the foreign state that is similar to any other right-seeker in the polity that seeks equitable treatment under existing statutes and regulations. In essence, the diplomat of the developed state is acting to allow the foreign right seeker to act as a domestic right seeker.

Ryan begins to get at the core of the IPR development problem by raising the importance of IPR-seeking firms but, like Sell, places too much emphasis on the role of international regimes and diplomacy. Diplomats face limits on their available time, resources and institutional constraints when managing IPR issues. While it is theoretically (and normatively) attractive to argue that international regimes have been intentionally formed as a way to mitigate international tensions, my analysis will

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demonstrate that IPR are the result of active property-right seeking in order to exclude others from misappropriating the use of one's intellectual property unless compensated.

When international relations analyses are applied theoretically to IPR development, the conclusions are that powerful states, such as the United States, have forced IPR to be recognized and incorporated by less developed and less powerful states. Normative development is then subsequently caused by the constant interaction of these states' diplomats and bureaucrats in international arenas, such as the WTO, and therefore future compliance is assured at the domestic level. Firms and individuals may also help to spread the normative value of Western IPR concepts further aiding in the acceptance of Western values of IPR.

The assumption made is that the reason a weaker state would join a global IPR regime is to avoid sanctions, but this ignores the benefits that a strong IPR institution may facilitate in maximizing utility, such as technology transfer and incentives for internal intellectual property development (See the efficacy literature review below). Neoliberals argue that coercion helps to create complex interdependence, but considering that in my selected cases coercion required more than 40 years to succeed, it is as likely that compliant membership in global institutions developed for domestic economic reasons. Form may follow function, and it is reasonable to assert that IPR and other global institutions are simply high in utility because they reduce transaction costs. Certainly diplomats from developed states were greatly influenced by their own domestic constituents, some who strongly believed action was required to alleviate losses of their intellectual property and others who favored weak compliance in order to obtain intellectual property from abroad.

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Unitary Actor or Markets?

An alternative theory by Susan Strange (1996) posits that analysis of diplomatic disputes on economic issues can be better understood if international relations theorists focus on the role of markets rather than on the role of powerful states. Strange argues that international relations theorists place too much emphasis on the state as a unitary actor based on the national interests of the state derived from internal consensus on issues. Interests can be spread across states and issue areas and can be shared by firms from different states, even firms and individuals from developing states.

The emphasis on the state in IR theory overlooks historical problems of diplomatic outcomes, not only in economic issue areas, but also in security issues and the resolution of military conflicts. Wars can be inconclusive and the diplomatic conferences that resolve hostilities are not always one-sided affairs for the victor over the defeated. Furthermore, evaluating the effectiveness of a diplomatic conference is fraught with historical conjecture. A multitude of interests can affect the outcome of a diplomatic conference concerning a war, and no less so for one regarding economic issues, especially over many years as agreements take effect.

Strange asserts that analyzing international issues requires an understanding of the structures that influence outcomes and the market is of paramount importance. The U.S. has favored the development of market economies throughout the world, but that very promotion has created circumstances that weaken the ability of the U.S. to utilize unitary power over diplomatic outcomes. By promoting markets, the U.S. has added to the complexity of international interaction not only internally, but in other states as well. For

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example, promoting IPR issues of behalf of U.S. intellectual property firms in the PRC adversely affected the interests of retail firms in the U.S. who hoped to import inexpensive consumer goods as well as the interests of aircraft manufacturers who hoped to make sales in the PRC. The actions of the U.S. diplomatic corps affected other firms and industries who then agitated to ease pressure on IPR issues in order to protect their own interests.

The development of market economies globally over the past century makes decision-making at diplomatic conferences complex and the reality is that while the U.S. gets concessions on some issues, it must also concede on other points. Not only did the development of market economies around the globe create wealth for U.S. firms, it created firms outside the U.S. who benefit from market economies that lobby to protect market access, even inside the U.S. Determining who gets what is important in understanding the outcomes of diplomatic processes on economic issues.

Examining global markets for goods, especially intellectual property, generates the possibility that IPR agreements are not simply a causal relationship between U.S. firms and their diplomats coercing developing states, but that the developing states are developing domestic right seekers who mitigate or even happily accept IPR agreements. States are comprised of a multitude of interests and "they may be merely the arena, the stage or the circus roof beneath which the action is played out. That is not the same as being always and all important issues the primary actors, as writers on international relations have often claimed."[20]

[20] Strange (1996) p. 70.

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Coercion or Agreement?

While it is compelling to view diplomacy as effective, it is important to note that sanctions have never been directly applied to a Section 301 target. Rather, the threat of sanctions was utilized and for over a decade. The trend is similar with other IPR cases examined in my dissertation for this period. The carrot and stick approach of the Section 301 sanctions was utilized, but ample time was given in order for subjected states to find ways to comply with IPR agreements. While coercive diplomacy theorists do not claim that effective diplomacy takes time, threats of sanctions for more than ten years indicates that diplomacy has been far less effective than posited and the succeeding chapters will illustrate that often the targeted state exacted as much as the U.S. demanded. Three reasons for compliance have to be considered other than diplomatic pressure.

First, the end of the 1980's saw the beginning of the difficult transition of nearly all the communist states to capitalism. By the early 1990's the dynamics of the Cold War had receded and states were by and large building capitalist economic systems.[21] The resulting economic growth changed the requirements of states that had favored specific firms and industries to more general development of capitalist institutions that relied on the rule of law and transparency. Second, the negotiations of the Uruguay Round took on a broader scope with the end of the Cold War. With hostilities receding, states became more interested in issues such as transparency and with national treatment of their firms.

The United States was not the only state with firms investing and making sales

[21] See Strange (1996) p. 185 "We have a world market economy in which most of the people who live in the state system earn their living in that market economy...yet the market is overlooked [by IR theorists]."

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abroad. Firms with global interests and their own intellectual property had an interest in the talks. In short, the demands for reliable market institutions had increased throughout the world, not just in developed states. Perhaps it is no historical accident that the WTO was established in 1994, five years after the fall of the Berlin Wall and eight years after the Uruguay Round had begun. The world had been transformed. Thirdly, the rise of technology-generating industries not only in the U.S., but globally increased the demand for reliable intellectual property institutions in market-based economies. In light of these three points, IPR diplomacy can best be argued to have been effective, only associatively with the general economic development of the targeted states. Diplomats and IPR-generating firms definitely lodged complaints and lobbied for their interests, but effective IPR agreements and institutions became possible only after each targeted state had the capacity to comply.

The role of diplomacy is dramatically overstated in its significance on IPR issues. I am not disputing that diplomats were quite busy over the past 30 years, but the theory that diplomacy provided the incentives to create the global IPR regime needs to be reevaluated in light of the evidence that will be outlined in the case studies. Despite constant disputes and complaints, IPR disputes were resolved when the targeted state had the institutional capacity to comply. The capacity to comply with global IPR agreements requires a market economy, development of a pool of scientists and engineers, and the use and production of technologically advanced goods. Essentially, the capacity to comply requires the domestic development of right seekers who seek IPR and that they have an interest in developing effective IPR institutions. The following section will

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develop the theoretical alternative to coercive diplomacy by examining the creation of property rights and institutions in a market economy.

Property Rights and the New Institutional Economics

My theory for the development of intellectual property rights relies on the contributions of the New Institutional Economics (NIE) school which combines the insights of both economists concerned about the historic role of institutions in economic growth and the rational choice theorists' views of how the individual acts within the constraints of an institution.[22] Institutions are broadly defined by the NIE as formal rules (constitutions, laws, rules) and informal rules (conventions, codes of conduct, norms) that constrain or motivate behavior (North, 1997).

Institutions are historical artifacts of human interaction. Institutional development is path dependent from its origin to present form reflecting human interaction over time. Furthermore, institutions affect transaction costs and can be either efficient or inefficient (North, 1981). The NIE school focuses upon the role of property rights and individuals inside of institutions as a counter to neoclassical theories of equilibrium and the power of institutions over individual action. Essentially, the NIE approach is a critique of neoclassic economics tendency to aggregate the behavior of individuals. Individuals act within institutional frameworks and individuals can alter the rules of the institution via innovation.

The New Institutional Economics is based on four methodological assumptions

[22] A good anthology representing the NIE school is Drobak & Nye, 1997.

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(Furubotn,1991). First, the NIE assumes methodological individualism which means the state, society and the firm are not simply collective entities that behave as individual actors, but rather are understood in the actions of individuals acting inside the particular institution.[23] Second, individuals seek their own interests and to maximize their own utility. Individuals act within the rules of the system to maximize their goals. Third, information is limited (bounded rationality) and individuals can only possess a limited amount of information. There are limits to rational action. Finally, since all information cannot be known and some can be simply dishonest or not forthcoming, problems with opportunistic behavior can occur. An institution is instrumental for counteracting the problems of opportunistic behavior and bounded rationality thereby lowering transaction costs. It is important to note that the preceding methodology is for viewing a snapshot of historical time. For the NIE school, time is an important element in understanding the dynamics of change for an institution and the actors within it. Understanding history is therefore critical in the NIE approach for understanding the role of individuals acting within and changing the institutions in which they participate (Fogel, 1997).

In this context, intellectual property rights are better understood in terms of institutional change as posited by the NIE school's methodology rather than theories on coercive diplomacy. IPR systems have formal and informal rules that are affected by the individuals administering the rights and by the individuals seeking an intellectual property right. The historical evolution of IPR systems will be delineated in this dissertation and will emphasize the role that individual action has in shaping them, not

[23] Methodological individualism has its roots in the Austrian School of Economics, such as Hayek (1948).

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just the formal rules of the IPR system. An important caveat is that the NIE school has its roots in trying to understand the role of institutions in economic growth, particularly of market economies. As such, the evolution towards market systems in the cases selected for this study make this methodology more salient. An important element in the NIE understanding of economic growth is the establishment and protection of property rights. To answer the questions that I have raised, I will combine the NIE methodology with a property rights emphasis derived from both the NIE tradition and traditional work focused on how property rights form and function in an economy.

Property Rights and the Political Model

My use of the property rights approach draws largely on the contributions of theorists from economics and the NIE schools. Essentially, subtle changes in property rights in a particular economic system can greatly affect its economic performance. Redefining the structure of a property rights system by the state will cause wealth effects creating winners and losers. It is important to note that the property rights approach accepts the notion that property rights exist in all economic systems. Even centrally-planned economies, such as the former Soviet Union, allocate property rights, albeit with strong constraints imposed by central planners. The difference between centrally planned economies and market economies is the degree of involvement of the state in defining the value of the property right in day to day transactions. A market economy may possess private property and firms, but also state-owned railways, airports, and common fishing grounds. Property rights are usually restricted or partitioned by means ranging from

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regulating the fishing season in the common fishing grounds or the allocation of landing rights at the state-owned airport.

Essentially, economic theory explains the value of property rights and its function in a market, but politics explain how property rights come to exist and are enforced. Theories of property rights have a basis in the premise that property's value is in its exchange (Alchian & Allen, 1967; Furubotn & Pejovich, 1972; Mitchell & Simmons, 1994). The value of the right to property is thus well defined in the context of a market-driven economy. The problem of this period of globalization is that markets undergoing reforms and development may be ill-defined resulting in distorted or confused prices associated with property. Negative externalities may require more attention by the state in determining the value of the property right due to misappropriation, misuse of the commons and technological change. Therefore, the state may be required to play a more significant role in internalizing the externalities to define the value of the right (Demsetz, 1967; North, 1981). Regarding IPR in developing states, the state may lack the ability or the desire to intervene to provide definitions and structure to emerging markets. Who desires the right to property, including intellectual property, is thus very important to how the polity reacts and defines its role.

Riker and Sened (1991) propose a model that explains the formation of property rights in the context of political structures. Riker and Sened posit that economic relations are embedded in political structures and that "property rights influence the operation of an economy as much as technology, demography, and competition (Riker & Sened, 1991, 953)." The political model takes into account the economists' contribution of scarcity in property right formation (Coase, 1960), while providing a means to understand how

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property rights originate in political structures. The value of the right must be higher than zero for the right seeker, or ownership of the right will not be worth pursuing. For example, intellectual property often has very high value relative to enforcement costs, thus the holders of IPR pursue protection from violators. Similarly, potential violators of a property right must perceive that the penalties for encroachment will exceed the value of the theft. If the claim to a property right is not seen as politically legitimate, encroachment is likely.

Political activity, as manifested in government and law, provides the definitions and legitimacy of property rights. "Rulers themselves (legislatures, executives, judges) have generated property rights, hoping to encourage efficiency, and doubtless also, to increase tax income (Riker & Sened, 1991, 952)." Property rights are therefore an output of the interactions of right grantors, right seekers and potential violators. The following chapters will analyze the different approaches that each case has pursued as a result of the interaction of these key elements of property right formation in the context of differing phases of economic and political development.

The political model for the formation of property rights by Riker and Sened is composed of a series of postulates and conditions for property rights formation. These postulates can be legitimated by political systems of any kind including social contracts, natural law, custom, and communism. Equally as important as the right holders' desire for property rights is that officials make rules that are respected by right holders as well as grantors. Riker and Sened's model is as follows (Riker & Sened, 1991, 954-955):

POSTULATE 1: Political actors maximize utility. This includes government officials, right holders, and other members of the polity. Government officials maximize toward a

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goal including power, taxation, or benevolent public service. They may utilize appeals to ideology, to outright grants of subsidies, privilege, and property rights.

POSTULATE 2: Government officials have more resources than other members of the polity and their power is legitimized through laws and regulations, the police, and the military. If government is not the strongest and most legitimate, challengers will form a new government or may simply ignore them. Government as a right enforcer has the ability to coerce respect for a property right. For example, if you copy software and do not pay the royalties, a legitimate official can impose criminal or civil penalties.

Given these postulates, the following conditions must be met for a property right to emerge:

CONDITION 1: Scarcity. The value of the right must be higher than enforcement costs. For right seekers, "Postulate 1 implies that scarcity is necessary for the emergence of rights (Riker & Sened, 1991, 954)." If the property right is free, ownership is not readily sought after. For example, if one can copy software without costs, including potential penalties, producers may not desire the property right and forgo production or sales in a market: ownership becomes difficult to define (and defend), and the property right becomes less valuable.

CONDITION 2: Right holders desire the right. If private property rights are not valued by a potential holder, they will not emerge. Software manufacturers desire intellectual property protection because income from software is higher when piracy is controlled, making IPR both a national and global issue.

CONDITION 3: Rule makers desire to recognize the right. An unproclaimed right is unenforceable. This differentiates it from a purely economic analysis of property rights.

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Rule makers must gain some sort of advantage in granting and enforcing the right. For example in the PRC, right granting could be an effort to increase its utility by avoiding trade sanctions or to encourage technology transfer that increases its national wealth. CONDITION 4: Other participants in the polity respect the right. Without general support for a right, enforcement may be too costly for rule makers to support. If software piracy is accepted as a normal mode of technology transfer, then it may require too many resources to halt piracy, relative to the value of the right.

Riker and Sened contend that their model explicitly requires that the emergence of property rights, "originate in a historical event. As such, there are identifiable actors with identifiable motives who create rights (Riker & Sened, 1991, 955)." If a state does not protect the right to intellectual property, the right is not likely to have much value due to the fact that respect for such a right is purely voluntary for other members of the polity. If individuals and firms desire protection and the state has the ability to grant the right, IPR can be protected from infringement by third parties by realistic expectations of punishment, both civil and criminal. Normative development of the right may then be possible in the polity as a whole if all conditions of the "political model" can be fulfilled. In this context, international pressure may have little impact on IPR protection if internal, domestic political conditions cannot be met which is a powerful foil to coercive diplomacy reasoning. A rapidly developing state may thus have difficulty enforcing IPR, even if it legitimately desires to enforce it.

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Efficacy Literature: To Cheat or Not to Cheat?

The balance of the literature I will examine regarding IPR largely focuses on the efficacy of cheating on IPR agreements by developing states and their domestic firms. The importance of the efficacy literature to my property-rights approach to IPR development is that a developing state can benefit from developing a viable IPR system on its own merits. The reasoning of the coercive diplomacy theorists is that acceptance of a strong IPR institution is the result of foreign demands. The efficacy literature raises the possibility that a state may choose to develop an effective IPR granting institution because it is utilitarian. The literature will demonstrate that a strong IPR institution can increase indigenous technology production while increasing flows of investment and technology from abroad.

The literature frequently makes reference to the debates that grew out of the negotiations for the WTO and frequently attempts to test the validity of theoretical claims on IPR regime strength. There is a strong theoretical framework that is being tested by economic models that seeks to delineate which is in the best interests of the developing state: strong or weak IPR regimes that facilitate technology transfer and indigenous technology production. The literature has strong links to a more general debate on technology transfer that has implications for the IPR debate by addressing the utility derived for a developing country by protecting intellectual property.

Technology transfer is seen as an economic good that is needed in accelerating an economy towards developed-world status. This would imply that the issue of IPR systems is linked more closely to stages of economic development, rather than coercive

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diplomacy. States are more concerned with internal policy choices that may affect the transfer of technology or their own internal development of technology-generating industries.

The importance of this body of literature for my dissertation is that states in this study have made policy choices in order to achieve their goals in technology generation and transfer from abroad, typically ignoring diplomatic threats in order to pursue their technology policies. Both the theoretical and empirical literature on these topics indicate that it is often in a developing state's interest to have weak IPR regimes in order to transfer technology from abroad and in order to develop indigenous industries. However, the literature also indicates that pursuing policies for weak IPR regimes can damage both the ability to transfer and produce technology over the long haul. In the discussion that follows, I will first evaluate the literature that advocates a weak IPR system, followed by positions in favor of a strong IPR system. I will conclude by evaluating two of the few empirical studies completed to date and the implications for further research.

Weak Regimes

The literature in favor of weak IPR regimes argues that there are tangible rewards in technology transfer for weak enforcement, but with some reservations on how weak the system ought to be (Chimni, 1993; Chin and Grossman, 1990; de Almeida, 1995; Frischtak, 1995; and Marjit, 1994). Common to this literature is the premise that the developed states and their firms' technological know-how needs to be transferred to less developed states in order to facilitate economic development. The theoretical approaches are based on a thriving debate inside the economics literature on IPR. The general

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theory, tested with economic models, posits that gains can be made in technology transfer when weak enforcement of the IPR regime is employed by a developing country. Low-cost transfer is achieved because firms are able to avoid the costs of research and development (R&D) associated with product development by copying patents without paying customary royalties, as is common in developed countries. The secondary literature develops normative premises that justify this behavior by developing countries and their firms. Both trends in the "weak IPR regime" literature posit that utility is maximized for the developing country by maximizing technology transfer through weak enforcement.

The economic models favoring weak regimes have a theoretical basis that models the effects of global IPR systems relative to the benefits of cheating or compliance. Chin and Grossman (1990) are representative of this approach. They model the effects of a weak IPR regime in a developing state in order to discern the negative and positive consequences. Their assumption is that firms from both the developed and underdeveloped states have access to previously available technologies, but the firm from the developed state has access to greater R&D potential. If an IPR regime is weak, the developing state's firms may freely pirate technologies in order to equalize its loss of competitiveness due to weak R&D capabilities. Chin and Grossman further argue that this has a corresponding effect which lowers prices of the finished good in both states and also disperses income to the less developed state, thereby enhancing overall global welfare. Marjit (1994) reinforces the premise that a weak regime aids in lowering prices of the finished good, making the product more readily available in the developing state. On the other hand, strong regimes allow the patent holder to maximize income by

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increasing prices by limiting would-be competitors. This hinders local producers from market entry due to potential penalties meted out by the strong IPR regime, giving justification for a weak IPR regime in order to foster indigenous IPR-generating industries.

Economic modeling suggests that a weak regime can be beneficial for technology transfer, but there is some general agreement that this is so only up to a point. Marjit (1994) points out that a weak regime may negatively influence a developed country's firm from locating R&D facilities in the developing country, which may hinder technology transfer and local development of R&D personnel. Chin and Grossman also critique the weak regime theory by pointing out that at some stage, a developing country's firms may start raiding each other's intellectual property, negating the benefits of a weak regime. The juxtaposition of costs versus benefits typifies the arguments in favor of weak IPR regimes. The reasoning assumes a continuum of development, and the relative position of the developing country on this continuum determines the appropriate IPR regime for the state.

Normative justifications for weak regimes dominate the balance of the "weak IPR regime" literature. Because of the premise that developing countries are behind on the continuum of development, this literature posits that the strength of the IPR regime of a developing country is justified relative to its stage of development. An example of this premise is that patent time limits are not always in the best interest of developing countries. Chimni (1993) critiques the fundamental premise of the IPR agreement of the WTO by positing that time limits on patents do not increase disclosure. One of the primary arguments in favor of patent filing is that the protection offered allows inventors

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to publicly disclose their findings. Chimni counters this premise by arguing that patent filings rarely provide all of the insights that may aid other inventors in producing other socially beneficial goods. Marjit (1994) reinforces this argument by positing that the uniform 20-year patent provision of the WTO is not optimal for every product. Particularly, goods such as pharmaceuticals are priced out of the range of the disposable income available to many citizens of developing countries due to the length of patent protection offered to foreign firms.

Other aspects of the WTO agreement are critiqued in similar ways by "weak IPR regime" literature. Premises such as the 20-year time limit have been called a form of protectionism benefiting technologically-advanced states. This position has been articulated by de Almeida (1995), who posits that developed states are overly protecting multinational corporations by imposing a technology transfer regime via the WTO that imposes greater costs on developing states' firms. This will increase the flow of real income to developed countries, rather than produce a Pareto effect where all will be better off as a result of a strong regime. Frischtak (1995) agrees with this premise and suggests that a differentiated system of IPR, rather than a homogeneous system, may better serve the interests of developing countries in their efforts to transfer technology. Essentially, countries are at different levels, "of technological and productive competence (Frischtak, 1995, 201)" and therefore require IPR systems that complement their level of development. Furthermore, he argues that economic literature provides little justification for converging IPR systems on a global level. The problem lies in that there is little empirical work that currently supports the theoretical development of the weak regime literature. However, there is a body of literature that posits a countervailing argument to

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the weak regime theorists, arguing that there is justification for converging IPR systems at the global level.

Strong IPR Regime Literature

"Strong IPR regime" literature is dominated by economic theorists who are reaching a consensus that a strong regime fosters technology transfer to less developed countries more readily than a weak regime (examples include: Rivera-Batiz and Romer, 1991; Diwan and Rodrik, 1991; Taylor, 1994; and Vishwasrao, 1994). While model building is common to the literature, empirical work is lacking. Models posited range from bilateral concerns to broader global welfare benefits. Generally, strong IPR regimes produce gains not only for the patent holder, but for the developing country that honors IPR agreements. This contrasts with the weak regime literature by pointing out that the gains from weak protection are lost to the foregone gains from investment and technology transfer. While weak regime theorists such as Chin, Grossman and Marjit agree that some benefit can be gained from protection, the strong regime theorists contend that the overall consequences of a weak regime outweigh the gains of strong enforcement.

Risk plays an important element in strong IPR regime theorists' models. Vishwasrao (1994) looks at the choices that innovating firms must make relative to their intellectual property: licensing to a foreign firm, licensing to a subsidiary, or exporting directly into the market. Weak IPR regimes may result in the firm choosing to bypass direct licensing schemes because of the risk of losing future value from the patentable good due to piracy. While this approach may reduce the amount of technology

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transferred to indigenous industries, it hampers the technological development of R&D personnel in the developing state.

Diwan and Rodrik (1991) argue that weak protection will also deter investment in R&D, and by deterring transfer of available technologies, create shortages of technology specifically needed in both the developed and developing countries. They acknowledge Chin and Grossman's position, but develop an alternative theory that technological needs vary across countries and weak enforcement of developed countries' patents results in a free-riding problem causing inadequate development of local technologies. For example, developed states have a greater need for labor-saving technologies that may not be as beneficial in developing countries where labor costs are lower. By pirating a technology, the developing country's firm may forgo innovative activity that improves their own efficiency relative to their needs. The result is that overall global welfare may be diminished since the potential technologies and products suitable to specific countries and innovations suitable for global needs generally, may not be reaching full potential in a system of weak IPR regimes.

Another related problem within a weak IPR regime may be reductions in trade, thereby reducing local, as well as global, welfare. Taylor (1994) investigates the theoretical problem that weak IPR regimes will reduce the confidence of potential investors in developing countries. The concern for lost patents due to piracy reduces both investment potential and technology transfer resulting in the loss of available tools to potential innovators in developing countries. Taylor further argues that this reduces worldwide aggregate investment in R&D, resulting in a reduction in global economic growth potential. Rivera-Batiz and Romer (1991) support the theory that weak IPR

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regimes reduce growth among similar regions as well as globally. A weak IPR regime may not only reduce the transfer of technologies between developed and developing countries, but will also reduce the transfer of technologies between countries at similar development levels. Weak IPR regimes may inhibit appropriate technologies from being transferred thus reducing global and regional welfare due to reductions in potential productivity.

Empirical Work

Although empirical work is lagging behind theoretical and normative discussions on IPR, there is some empirical work that supports strong IPR regime theorists. Teitel (1994) utilizes several groupings of states and regresses patents granted to residents on research and development (R&D) expenditures and the stock of potential scientists and engineers with positive correlations. Also regressions are run that control for per capita income and population size that result in statistically significant results that indicate support for strong IPR regime theories. The problem with Teitel's model is that it is unclear whether or not the regressions are significant due to association with diplomatic pressure or actual correlations of the variables as posited. I will address this problem in Chapter Five. Teitel's conclusions that indigenous variables (research and development expenditures and science and engineering personnel) are statistically significant challenges both Ryan's (1998) and Sell's (1998) conclusions that diplomatic pressure and international regimes are causal.

Maskus and Penubarti (1995) develop an econometric model that attempts to solve the problems of patent protection, manufacturing imports, and income. They have

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found strong IPR regimes in a developing state "result in larger-than-expected flows of imports (Maskus & Penubarti, 1995, 229)," compared to developed states. They also demonstrate a strong positive relationship between a strong IPR regime and income. While these results support some of the general theories favoring strong IPR regimes, Maskus and Penubarti are careful to point out some of the weaknesses of their work. First of all, they acknowledge the subjectivity of how IPR regimes' strengths and weaknesses are measured. Secondly, they recognize that exports of patent-sensitive goods may be offset by directly investing in a market in order to ensure control over the processes and distribution. While this may create distortions in their findings, nonetheless this is significant work because there is some empirical work to support theory. Furthermore, empirical work like this helps to discern where research is needed in order to substantiate general and specific hypotheses on IPR.

Why Utilize Property Rights for Analysis?

The lag between IPR agreements and effective enforcement at the domestic level requires an alternative approach that examines the development of property rights in a polity. Compliance with diplomatic agreements is contingent on the internal development of property rights in the context of a market economy. The factors that drive right seekers to claim intellectual property rights are contingent on the development of market economies, scientists and engineers, and the use and production of technologically advanced goods in a state. Upon developing these factors, a state is able to consider complying with global IPR regimes.

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The efficacy literature helps to understand why a state would choose a utilitarian path that supports stronger IPR institutions that have been demanded from right seekers: increased flows of technology, investment and indigenous production. The causal arrow flows from the developing state and converges with the goals of developed states, rather than the coercive diplomacy theory that causality flows from a developed state through an international organization to the developing state. When a developing state possesses a market economy and protects property rights generally, the state is better able and self-interested in protecting IPR both domestically and abroad.

What is generally not addressed by the IPR literature as a whole is how systems for allocating intellectual property rights form in the first place. My hypothesis, derived from NIE and property rights theories, explains how IPR systems form and may prove to be beneficial in empirically solving the issues posed by the literature. The focus on how property rights form may shift the debate to a more meaningful one concerning not only what shape IPR institutions may take, but also the costs and benefits of such a system and whether or not members of a polity can or will protect IPR regardless of diplomatic pressure. Determining who wants the rights to intellectual property will aid in discerning who gets what.

IPR institutions are for the granting and protection of private property: the ability to exclude another from profiting from one's invention. A firm or individual that desires IPR protection must pursue a variety of strategies to ensure protection including filing for patent protection in targeted states, licensing, joint ventures, and if all else fails, legal action or even abandoning the market. When these basic notions are considered along with the long-term failure of IPR diplomacy in causing the development of indigenous

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IPR institutions, it becomes clear that analyses must examine the role of property-right seeking by not only international interests, but also indigenous right seekers. The role of international regimes and diplomatic pressure does have an effect, but I contend that it is certainly less than posited and represents the end game when all else has failed. Diplomacy and international regimes are effective when a targeted state has the ability to comply.

I will demonstrate that IPR institutions form as the result of domestic factors and explain why states and their citizens would choose to comply with the TRIPS agreement to increase utility. Remember that the coercive diplomacy literature contends that it is the powerful interests of outsiders, not domestic factors, that cause compliance, while the efficacy and NIE literature provides some answers beyond simple coercive diplomacy. The efficacy literature makes clear economic arguments that even if a state chooses a path with minimal compliance, it will pay a price in lower technology transfers and investment over the long haul, despite short term gains from piracy. That makes a strong case that compliance maximizes utility for the state and society as a whole by implementing effective IPR institutions.

Furthermore, the NIE literature indicates that without well developed market institutions with well defined rules and expectations, the chances for long term economic growth are hindered. The NIE literature indicates that individuals will agitate for more effective institutions, and that they may fail in the face of other interests. However, this dissertation will demonstrate that IPR institutions are forming in my selected cases, that they are in general compliance with the TRIPS agreement, and that these institutions are evolving in their complexity, diversity, and effectiveness. The goal of my dissertation is

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to provide a historical and empirical understanding for showing how an IPR institution forms and evolves, in the context of a market system, while disproving the thesis of coercive diplomacy. While the selected cases will indicate a variety of evolving market economies, the need for reliable market institutions trump the demands for weaker internal IPR systems as markets for intellectual property evolve. "The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process...Capitalism, then, is by nature a form or method of economic change and not only never is, but never can be stationary (Schumpeter, 1942: 82)."

Organization of the Dissertation

The question that I seek to answer is whether or not diplomatic pressure and international regimes cause the development of domestic intellectual property institutions. My answer is that diplomatic pressure and international regimes are primarily outcomes because domestic intellectual property institutions comply with international standards after significant economic development has been achieved. I will generally focus on data from the period 1975 to 1990 for my analysis because of the period's importance in the coercive diplomacy theorists claims, but where relevant I will utilize data from both prior and after the primary historical period of examination.

Answering the question will require two methodological approaches. I will utilize my theory that relies on the theoretical contributions of Riker & Sened (1991) and the New Institutional Economics school and I will test the assumptions through unraveling the historical development of IPR in case states (Chapters Two, Three and Four) and statistical tests (Chapter Five). I propose that the analysis of intellectual property right

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formation requires investigations into the components that create property rights, and therefore IPR.

The dependent variable examined is the intellectual property right (patents). Patent granting by the state is dependent on the filing of an application by the right seeker, hence a reasonable measure of both right seeking and right granting behavior. Patenting activity indicates not only creative activity, but also reasonable expectations for protection against violations or an attempt by a right seeker to initiate protection of their intellectual property. For example, if reasonable protection is not expected, firms may not market the product, or even attempt costly patent-filing procedures in states where protection is questionable (Knight, 1996; Bertin & Wyatt, 1988). The lack of patenting in a particular state not only can indicate a lack of creative output, but also low expectations of reasonable protection by potential right seekers.

The independent variables are the right grantors (the state) and the right seekers (inventors and firms). Right seekers can be domestic or foreign and their relative importance will be delineated in the case chapters that follow. The theory generates the hypothesis that intellectual property rights form as a result of the interaction of both right grantors and right seekers, rather than just one or the other. In Chapters Two, Three and Four I will comparatively analyze the relationship of diplomatic pressure and its actual outcomes relative to internal IPR development by investigating the development of patent institutions, historical records on diplomatic pressure and actual IPR enforcement in selected cases.

Chapter Five will statistically test that the role of right seekers and right grantors are more important than the role of diplomatic pressure by demonstrating the relationship

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between economic development (and hence the development of right seekers) and intellectual property generation. The purpose of the dissertation is to demonstrate the role of right seekers and grantors is more significant than the role of diplomatic pressure and international regimes. Furthermore, trade agreements and issues regarding compliance are better understood as an outcome related to factors associated with internal capitalist development rather than as a causal factor in creating domestic institutions.

The cases that have been selected are the United States, Japan, Korea, the Republic of China (ROC), and the People's Republic of China (PRC). The United States will provide a control because, as one of the most developed states, it has pursued the vigorous enforcement of IPR globally and specifically with each of the selected cases. Interestingly, the United States patent system has evolved over the past few decades and has become more important as the United States' technology industries have taken a larger share of the domestic economy. This behavior is expected given the model; IPR formation is dynamic and accounts for the increased (or decreased) role of right seeking.

The other cases have been chosen because of their importance in IPR diplomatic activities since World War II, their importance in U.S. security, and their comparative qualities as "Asian" states. While Japan is now a leader in technology generation, it was once a target of diplomatic pressure by the international community on IPR protection which now has eased with post-war development. Similarly, Korea also had trade sanctions threatened yet has seen an easing correlated with economic and technological development.

Finally, by examining the Chinese polities, a further control is applied by claims that historical and cultural legacies have hindered compliance with global IPR

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agreements. It will be shown that even in these difficult cases, IPR protection is gaining a foothold that is strongly correlated with economic and technological development rather than diplomatic pressure or despite cultural legacies. These cases will provide the statistical data and historical evidence necessary in refuting the claims of coercive diplomacy theorists and provide ample evidence that my theory of IPR formation can increase our understanding of how IPR systems form and how better to implement policy choices given this understanding.

Right-seeking behavior is as important as the right-granting apparatus of the state in IPR formation, and this will aid in better understanding why violations occur. My goal is to demonstrate why variability occurs among states. I will not answer the normative questions regarding cheating, nor will I answer the efficacy questions on particular IPR regimes. I will, however, answer why and how a patent institution forms, and that will benefit such discussions by delineating why specific normative approaches and why particular IPR systems may be adopted. If the WTO agreement recognizes "that intellectual property rights are private rights,"[24] so too should the role of property rights formation in IPR be recognized.

[24] GATT (1994) p. 366. The quote is from the preamble of the TRIPS agreement stating the principles agreed to by the members of the WTO.

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CHAPTER TWO

THE ORIGINS AND DEVELOPMENT OF THE U.S. PATENT SYSTEM

Globally, intellectual property theft results in billions of dollars of losses to writers, artists, musicians, software manufacturers, pharmaceutical firms...the list goes on and on.[25] The list of states that have extraordinarily high rates of theft is also quite extensive. One such state's citizens are well known for flagrantly violating IPR codes and therefore global intellectual property agreements. The range of intellectual property piracy extends from intellectual elites copying software and textbooks to the average person illegally copying films and music. The rate of theft is so extensive, that it has been difficult to put a precise price tag on the losses to intellectual property producers. This rogue state is the United States.[26]

It has been posited that the global intellectual property system has developed through the influence of powerful western interests, particularly American power and

[25] The International Anticounterfeiting Coalition (www.ari.net/iacc/) estimates counterfeit goods from apparel to aircraft and automobile parts cost U.S. businesses $200 billion annually in lost sales. The International Intellectual Property Alliance (www.iipa.com) estimates direct losses from copyright piracy to be near $10 billion annually. Since these figures are from industry associations, the figures are perhaps on the high end of estimates of IPR theft. But, these figures are often utilized by bureaucrats and elected officials when formulating policy.

[26] See Aoki (1993/94). Oksenberg, Potter, and Abnett (1998) argue that U.S. consumers are the largest users of pirated goods in the world in terms of total value. Also the Business Software Alliance (www.bsa.org) estimates $11 billion in losses worldwide from illegal copies of software. Of the $11 billion in losses, $2.9 in losses are from the U.S.

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economic interests (Sell 1998 & Ryan 1998). But just what are American "interests" regarding intellectual property? The intellectual property regime in the United States has been nothing short of contentious and litigious. Constantly undergoing change reflecting the dynamism of technological change, U.S. intellectual property laws are undergoing yet another subtle shift due to the WTO agreement and advances in biotechnology, yet one need go no further than a U.S. college campus to see violations of copyright and software laws.[27] Unfortunately, many readers of this dissertation may have to admit that they have violated federal law and global IPR agreements once or twice at the library copying machine or their office computer.[28]

Compliance with the WTO and various WIPO agreements on intellectual property is contingent on internal economic development and vigorous defenses by right holders, rather than diplomatic pressure.[29] The following chapter will delineate the development of intellectual property rights in the United States in order to compare that development to that of Japan, Korea, the ROC and the PRC in the succeeding chapters. While these

[27] Current domestic demand for debate in the U.S. could lead to changes in patenting genetic data (Wall Street Journal 3/15/2000, p. A3) and duration for technology patents (Wall Street Journal, 3/10/2000, p. B3).

[28] The Business Software Alliance (an industry group) estimates that 25% of all business software in the U.S. is illegally obtained, see www.bsa.org .

[29] The WTO is an independent UN agency with its own governing assembly. Guiding principles are generally decided by consensus of the members, although voting mechanisms are available. The WTO agreement provides guiding principles that member states must use when creating statutes and regulations governing trade. Disputes are first handled on a bilateral basis and if unresolved, can be heard by panels under the Dispute Resolution Mechanism in Annex 2 of the WTO Agreement (GATT, 1994). WIPO administers IPR related treaties and the PCT system for filing patent applications. While WIPO is also an independent agency of the UN, it oversees issues related to implementing the WTO's TRIPS agreement, but disputes follow WTO procedures under the Dispute Resolution mechanism.

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states have developed unique systems for managing intellectual property, what is striking is the similar trajectories they have encountered in developing effective intellectual property regimes. What will be clarified is that IPR systems are relatively new and evolving institutions, even in the U.S., and that their development into effective IPR regimes is correlated with the emergence of private property rights associated with capitalist economic development. While each case has unique origins and legal systems, what will be striking is that the historical development of IPR corresponds to each polity's development of private property rights, not necessarily the degree of diplomatic pressure applied by the United States.

Property Rights

As noted in Chapter One, commentary on the development of IPR in recent years has focused upon theories of coercive diplomacy and complex interdependence. What will be clarified in the following case studies is that current theory in international relations is inadequate for explaining why diplomacy has required decades to be effective, and why an alternative explanation is required. The development of intellectual property rights in a polity has never been a direct path from the origin to the ideal, whatever that ideal IPR system may be. In fact, when investigating the comparative development of intellectual property regimes, what becomes clear is that the systems are evolutionary and are not comparatively uniform in every respect. Even when considering the array of global agreements on intellectual property over the past century, the development of WIPO, and the standardizing procedures of the WTO, differentiation continues to be the norm, not the exception.

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Riker and Sened's theory on the development of property rights provides an explanation that property rights, and therefore intellectual property rights (the dependent variable), form as a result of the interaction of the two independent variables – the actions of right grantors and right seekers (Riker & Sened, 1991). Right grantors are defined generally as the state, but more specifically as the formal mechanism of granting and protecting a patent: typically via a patent office and the domestic legal system.[30] Right seekers are defined as firms, individuals, or even public entities like research consortia or universities that seek intellectual property protection. The interaction of the independent variables does not stop when the right is formally granted, but rather continues to evolve as conditions change and the interaction of right-seekers and grantors continues through their historical interaction in an institutional framework.

Intellectual property rights are by definition a form of property rights. A viable system of property rights is integral for economic development and each case that will be observed will indicate the importance of developing a property rights system prior to the development of a viable intellectual property rights regime. Property rights systems provide the institutional incentives for growth by allowing the holder of a property right to use the property, exclude others from utilizing it without being compensated, and to legally exclude others from its use (North and Thomas, 1973). A legal system is critical for the enforcement of private property and a viable legal system that protects property rights leads to economic growth. Growth itself provides the incentive for governments to develop viable property rights and legal systems. "Like most of the greatest insights in

[30] I will focus my research on patents, but other types of intellectual property include copyrights, trademarks, utility models, and industrial designs.

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social science, in retrospect the point is nearly obvious: growth requires incentives, and incentives generally require rights to use, to exclude, and to transfer."[31]

Property rights originate in historical events (Riker and Sened, 1991) and historical processes drive the institutional efficiency of intellectual property rights systems. First, a polity must have developed a property rights system that is protected by a legal system and the state generally. In the context of a viable property rights system, the institutional framework then helps to create economic growth.[32] The institutional framework provides the rules of the game, while allowing individuals and organizations to pursue their economic objectives.[33] Organizations exist because of the opportunities that the incentives of the institutional framework provide. Where economies are driven by scarcity and competition, organizations are in a competition for survival. Competition creates the incentives to innovate and change institutional frameworks.

The Invention of IPR Institutions

Historically, intellectual property rights systems are an artifact of technological development which is an artifact of economic growth during the past century and a half. Kaufer (1986) argues that modern patent laws represent a complex of property rights that are embedded in institutional frameworks. Of historical importance were the evolution of

[31] Ramseyer (1996) p. 2.

[32] See North and Thomas (1973); Rosenberg and Birdzell, (1986); and North (1990) for more on how institutional frameworks and property rights cause economic growth.

[33] North (1990) defines organizations as economic (firms, trade unions, and cooperatives), political (parties, legislatures, regulatory agencies) and social (churches, clubs, athletic associations).

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modern legal systems and the development of commercial law. The new legal systems allowed for the emergence of the limited liability corporation and transferable stock ownership. The development of stock exchanges and new capital markets drove technological development by rewarding entrepreneurs who innovated while simultaneously reducing the risks associated with innovation processes.

By the end of the 19th century, Kaufer argues that the "invention of how to invent"[34] then allowed corporations to begin the modern era of company-driven research and development. Competition was central to the innovation and the development of the patent institution.[35] Patents were generally viewed as property rights by 1800 in the West, but the market limited the patentee's rewards by time-limits and competition. While patents went to the "first" inventor, the inventor had to glean value from the patent as quick as possible before the expiration or a better alternative replaced the innovation. The value of the patent was only as strong as the ability for the patentee to turn a profit and stay ahead of competitors. Rosenberg and Birdzell (1986) argue that the development of market economies in the West spurred a new relationship with science, which had developed independently up to 1800. "[T]he industrial research laboratory, toward the end of the nineteenth century and the beginning of the twentieth, systematized the links between science and industry and made it much easier for the West to nourish economic growth by drawing on a growing body of scientific knowledge."[36] In the case

[34] Kaufer (1986) p. 240. Alfred North Whitehead (1925) argued that the greatest invention of the 19th century was the invention of how to invent.

[35] See Rosenberg and Birdzell (1986) p. 23.

[36] Rosenberg and Birdzell (1986) p. 23.

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of patents, the chicken or the egg analogy is quite clear: property rights came first then patents, but the patenting institution continued to evolve considerably over the next 200 years.

The demand by right seekers for IPR protection was stimulated by the growing innovative processes in the19th and 20th centuries. The era of the gentleman inventor was passing into an era where corporations sunk large sums of capital in the innovation process. Rewards for a creative individual were also multiplied, yet competition was central to the innovative process. The question remains, how did the existing IPR system evolve to meet new demands of right seekers for intellectual property protection? Also, what role did the right grantor (the state) play in the development of IPR? In the West, property rights systems helped to create a period of unprecedented technological innovation and the institutional frameworks that governed IPR in the West also underwent change. In the following discussion, I will show how the IPR system evolved in the West, and how it developed particularly in the United States. I will then compare the development of the intellectual property system in the United States to the cases of Japan, Korea, the ROC and PRC in Chapters Three and Four. What will be confirmed is the relationship among property rights, economic development and then the emergence of viable intellectual property right systems.

Each case will demonstrate the role of property rights development that leads to intellectual property right development by determining the roles of right seekers and right grantors in the historic process. Then, each state's system for IPR protection will be described, illustrating the points of convergence and divergence with other national systems. Finally, I will evaluate each case in terms of the theoretical debates surrounding

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each state's IPR system. The evaluation will include critiques of coercive diplomacy and cultural specific arguments made regarding IPR. I will demonstrate that the role of right seekers and right grantors matter more than coercive diplomacy and culturally specific arguments.

The Origins of Patents as Property Rights

Why does a particular state develop intellectual property institutions? I have argued that intellectual property institutions develop in a particular state due to the increased demand of right seekers and their interaction with the state who grants the right and then the subsequent development of IPR institutions due to the continuing interaction of these independent variables. I will demonstrate that IPR are not dependent on cultural values or on coercive diplomacy. The United States' IPR institutions have European origins, and importantly, these IPR institutions were very slow to develop. The U.S. case will illustrate the difficulty of establishing IPR institutions, and the time required to develop a complex of property rights regarding inventive activity. The correlation between right seekers and the right grantor required evolutionary factors that include the development of basic property rights, capitalist economic development, and the subsequent technological upsurge of the late 19th and 20th centuries. In this light, the development of IPR was contingent upon these factors and therefore a relatively modern development. As the U.S. case is developed, keep in mind the demands that initiated development as these factors are relevant in comparing the somewhat later development of the other cases' IPR institutions. Capitalist and technological development increases the demand for reliable IPR institutions.

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Undignified Labor

The historical origins of intellectual property rights in the United States can be traced to Renaissance Europe and England. The institutional evolution of IPR prior to the Renaissance was particularly slow. The ancient Greeks possessed no legal protection for authors or inventors. Bugbee (1967) contends that manufactures and novel inventions could be freely copied in both ancient Greece and Rome because the civilizations placed a higher premium on thinkers/philosophers rather than on physical labor. Manual labor was carried on by slaves and later by serfs which not only placed little emphasis on technological advances due to an ample labor supply, but also reduced the status of inventors as laborers. Both Plato and Aristotle placed artisans and merchants below philosophers and ruling class members and barely above the class of slaves.[37] The influence of these two early philosophers is well documented on the subsequent periods of Western development, and especially on the successive Roman Empire.

No legislation existed in the Roman Imperial era for protecting intellectual property.[38] Any workshop or manufacturer was able to freely copy or imitate a rival's invention or product because manufacturing barely developed beyond a local workshop or artisan. Also, the level of technological and economic development created little demand for IPR protection. However, there were the beginnings of debates on protecting literary works. Martial asserted that he had property in the verses he wrote and that their

[37] See Plato's Republic (translated 1973) and Aristotle's Politics (translated 1959).

[38] See Boak & Sinnegen (1971).

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value could be sold in the first century C. E.[39] Martial has been credited with coining the term *plagium*, which had been used to describe kidnapping to include the theft of literary works. From this Latin rendering the modern term "plagiarize" evolved. The decline of the Romans and the onset of the Dark Ages resulted in little innovation in forming the conditions for intellectual property rights development.

Due to political fragmentation and technological stagnation before the Renaissance, the development of IPR was slow, yet rules did develop to protect certain literary works in the Middle Ages. Monasteries created rules for copying texts from their libraries by other monastic and early university libraries. Permission was required by the particular order to copy texts, but it was not copyright in the modern understanding.[40] Importantly, Kaufer (1986) argues that the same monasteries produced, albeit slowly, a new conception of man. The 6th century Benedictine rule "*ora et labora* stands for a new cosmological conception: man is free, not a slave."[41] In a mere 500 years from the origin of that rule, the break from the ancient views of labor being below the dignity of a noble or philosopher, took root more generally in Europe. From the 11th century on, despite occasional setbacks from the plague and war, common property and the nobility slowly declined and private property in houses, gardens and creative output increased, especially in Renaissance Italy and Northern Europe.[42]

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[39] Bugbee (1967) p. 13.

[40] Bugbee (1967); Kaufer (1986).

[41] Kaufer (1986) p. 234.

[42] See Kaufer (1986) who argues that the evolution from communal property to private depended on the growth of population and economic development generally. Also see Rosenberg & Birdzell (1986) and Braudel (1979) who discuss the role of population, property rights, and economic development as well as other causes of growth in Europe.

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Early Patents

Venice is usually given the honor of inventing a modern form of the patent. In 1297 the Major Council of Venice formally linked guild protection of a physician's medicine to legal restraints, forbidding the copying of a formula.[43] Elsewhere in Europe, King Wenzel of Bohemia in 1315 granted a form of patent for the discovery of ore deposits and a mining process of ore that removed water from the mine.[44] A pattern of granting exclusive privileges by royalty and city states became more common throughout the period. Venice developed a system that rewarded cannon makers in 1453, granting them positions in the city's arsenal with pay and position to reward creative new designs. The next 20 years witnesses a rapid development in the Venetian patent system that includes time-limits, extensions of grant periods, and penalties for infringing on patent grants that includes the destruction of counterfeit goods and 1000 gold ducat fines for violations. By 1460 infringement penalties were regularly accorded with a patent grant.[45]

The subsequent invention of patent systems quickly spread throughout Europe both as a means for developing military technology and other inventions, but also as a means for royal grants in exchange for tax purposes. It must be pointed out that the institutional development was neither smooth, or quick. From the 11th to the 15th centuries IPR development was very slow. The diffusion of the ideas regarding IPR that developed in Venice took until the late 18th century to be generally utilized in the West.

[43] Bugbee (1967).

[44] Kaufer (1986).

[45] Bugbee (1967) pp. 20-21.

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Furthermore, these early IPR systems were fragile in terms of royal whims, civil wars, and simple protection of infringement-not all that different from a modern patentee's complaints.

An inventor or writer could not expect intellectual property protection beyond their state's borders and limited protection inside it. The concept that a commoner had individual property rights was revolutionary in itself, let alone a complex notion of property rights in inventive activities. Most significant is that demand for IPR by right seekers increased as the late Middle Ages economic expansion increased and right grantors, in the form of city states and royalty, saw advantage in granting intellectual property rights to increase revenues, and also to increase military security.

British Influence: the Common Law

The institutional innovation in IPR was slow from its historic origins, but by the 17th century, patent systems were introduced by the British in the American Colonies. The British experience from the Tudors to the Restoration, not only saw turbulent political periods, but also innovations and the establishment of the common law system (Plucknett, 1956). The common law is the British legal system, widely adopted by its former colonies including the United States, and which is concerned with legal rulings regarding property, contract, and torts. The common law system starts with the rights of the individual and places the political demands of the state second. Criminal law was not as innovative in the common law, except with developing systems of compensation for crimes. Primary in its innovations was in creating a reliable court system, independent (usually) from the whims of the crown. Precedent became central to the common law

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tradition, further strengthening the judicial system's independence from the crown. The civil law system widely used on the European continent and in case states for this study, has its roots in Roman law and the subsequent Church's canon law. Civil law systems rely more on the dictates of the state, more readily utilizing statute and legislation as a guide compared to the common law's emphasis on individual rights and precedent.

With its origins in the Middle Ages as a defense for the nobles and gentry against the king, the common law gradually evolved to encompass the rights of free men in the aftermath of the War of the Roses. The Tudors utilized the common law to balance the nobles against the commoners, but after the Stuart abuses of statecraft to control its opponents, the common law survived Cromwell and by the end of the 17th century the common law was firmly entrenched in Britain and subsequently in the American colonies. The common law survived the Middle Ages and the powerful crown in the 16th and 17th centuries to provide an institutional legal framework for the proto-industrial economy emerging in England and later the American colonies. As the idea of individual rights and obligations were extended to the commoner, the parallel emergence of the courts provided a degree of reliability in contract and other economic activities that had been largely absent since Roman times.[46] Furthermore, the idea of individual rights in property provided a legal standing for right-seeking individual inventors and artists to ask for protection from right-grantors in England and the colonies for intellectual property protection.

[46] See Aoki (1996) and Kaufer 1986) both discuss the emergence of a strong distinction between the public and private emphasizing the rights-bearing individual during the Enlightenment through the 19th century.

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IPR in the Colonies and the Constitution

The development of intellectual property systems in the American colonies followed British forms of patents and copyright, following conceptual rules such as originality, time-limits, and monopolistic control by the right holder. The primary difference was that in Britain, patents were granted by the crown, and as such were dependent on the good graces of the monarchy during Tudor and Stuart rule. Due to distance and turmoil in England, 17th century patents in the colonies were granted by colonial governments and the grant extended only as far as each colonial jurisdiction's borders. The first patent in the colonies was granted by the Virginia House of Burgesses for a brewing process developed by George Fletcher in 1652.[47] Of note, the patent was inheritable by his direct heirs, had a duration of 14 years, and imposed a substantial fine for would-be infringers.

The next 50 years witnesses the development of a system of right-seeking with colonial governments granting patents for a variety of processes and inventions from salt-making to manufactures. Importantly, no formal system emerged for IPR protection, rather each right-seeker was required to lobby the local colonial government for protection that varied in duration and methods for deterring infringement for each patent grant. As the colonies transitioned to nationhood, the Articles of Confederation allowed each state to regulate patents and copyrights. North and South Carolina, Virginia, and Connecticut each had passed formal statutes formalizing rules for IPR by 1784, but other

[47] Bugbee (1967), p. 58.

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states were either drafting rules or still only allowed petitions for patents and copyrights to legislatures by the time of the Constitutional Convention in 1787.[48]

When the Constitutional Convention convened, what had been widely dispersed colonies with small populations had grown into a young nation-state with growing urban areas shifting from an agrarian emphasis to a proto-industrial society. Economic growth was creating a wider variety of inventive technologies and coupled with the emergence of stronger philosophical notions of the individual right holder, demands for a more sophisticated and reliable IPR system increased to supplant the lobby-method of IPR grants. Furthermore, the Articles of Confederation allowed for a wide variety of commerce regulatory systems that did not provide protection for an IPR holder outside of the state that had granted the right. The growing sophistication of the economy resulted in more interstate trade, and IPR standardization was one priority for consideration at the Convention along with addressing other interstate commerce problems created by the Articles. Finally, the state legislatures were simply becoming too busy as the states grew in population and economic diversity to hear every petition for a patent or copyright.[49] The right-grantors also required a new system for IPR protection that transferred the function to the central government.

[48] Bugbee (1967), p. 127.

[49] See Dahl and Tufte (1973) for a discussion on the demands of political structure of a state as its physical size increases.

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The First U.S. Patent Laws

It is of no small point that the men who met in Philadelphia in 1787 were also men influenced by the Enlightenment. The nexus of ideas regarding individual rights embodied in the common law and scientific explorations came together to create an institutional innovation in IPR protection that for the first time was enshrined in a constitution that was premised on private property rather than on royal privilege. The U.S. Constitution empowered the federal government to issue patents and to provide copyrights for authors in Article I, Section 8 stating, "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." That is by no means the end of the story for developing the patent system in the United States.

The first act passed by congress to formalize rules for patents was in 1790. The power to grant patents was given to a board consisting of the Secretary of State, the Secretary of War, and the Attorney General. Owing to the still relatively small size of the federal government in 1790, Thomas Jefferson personally examined all applications for patents, in addition to his duties in foreign policy as the Secretary of State. The demands of the three departments required a revision by 1793 that placed patent applications exclusively under the Secretary of State, but essentially all that was required to acquire a patent was to submit an application with drawings, a model, pay a fee and then receive the patent grant. The lack of review, of course, led to disputes, but no examination process was established until 1836 when patent grants were being issued at a rate of 600 per year.

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The Patent Act of 1836 established the examination system which has been widely adopted worldwide. Applications were reviewed by staff under a patent commissioner reporting to the Secretary of State, who could refuse a patent subject to appeal, another new innovation. The Act of 1836 lasted until 1870 when it was entirely rewritten to conform to the new demands of industrialization. The Act of 1870 would have over 60 revisions before the Patent Act of 1952 (Title 35 of the U.S. Code) was passed, which is still in force, as amended.

It is important to note that despite the early establishment of intellectual property protection in the U.S. Constitution, IPR protection in the U.S. was not effective for over a century from its establishment. The rules were vague and required constant revision as new challenges to the patenting system emerged.[50] A further muddling of the patenting system in the U.S. was the legal system that actually was helping spur the growth of the industrial economy: the common law. Patents have been a property right in the U.S. since the country's founding, yet there has never been criminal penalties for infringing on a patent. If a patentee believes that their patent has been infringed upon, they must make their case in a federal court who will decide any damages to be awarded. In the past, damages were widely disparate by court, and appeals were not an organized body of precedent due to the lack of appeal procedures to the Supreme Court. The following section will detail how the courts interact with the IPR system in the U.S., but what is important is that the common law, with its basis on precedent and procedure, has played an important role in IPR development, especially in the last half of the 20th century.

[50] Lindblom (1959) argues that bureaucracies and governments do incremental changes to achieve stability because choice is determined by the order in which options are considered.

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The historical roots of patents are at least 500 years in the making in the West, but the momentum for a complex IPR system is actually a modern phenomenon, less than one hundred years old in its modern format in the United States and even less so in other states. Industrialization created new classes of patent seekers beyond the Enlightenment's gentleman farmer. Firms and individual inventors had more at stake in the growing wealth of the industrial world and patents were a means for securing and creating some of the new wealth. Therefore, as the late 19th and early 20th centuries progressed, the demands for rights in intellectual property increased as inventors and firms attempted to realize more wealth from their inventions. While the U.S. developed its IPR system, other Western states developed similar IPR institutions to administer patents. Differences were often based on the specifics of each state's legal system resulting in a number of different systems, while similar in their utilitarian functions for creating and protecting property rights for useful inventions.

Most significant is that despite claims that other cultures did not have a tradition in intellectual property protection, the truth is that the West did not have much of a tradition either. One can point to early developments of IPR in the West as evidence of a long tradition, yet much of the development of Western IPR institutions evolves with technological development associated with capitalism in the late 19th and 20th centuries. As capitalism evolved, new demands for functional IPR institutions emerged that fulfilled utilitarian needs such as incentives to create and adjudication of disputes. When I compare the modern U.S. system below with the cases I selected from Asia, it will become clearer that these states are not that far behind the curve of American intellectual property development and also are products of domestic utilitarian demands for a reliable

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IPR institution. The differences historically for protecting IPR are really a difference of decades, not millennia. While the U.S. did enshrine IPR first constitutionally, recall that Thomas Jefferson reviewed patent applications in his spare time and that no one reviewed patent applications for the subsequent 40 years. IPR became important when possessing IPR had value. In this context, the most significant changes to U.S. patent laws came after the turn of the 20th century and that is where my analysis now turns.

The Modern U.S. Patent System

The previous section described the historic origins of the right-granting functions for patents in the United States. The function of patent right granting in the United States is currently under the rubric of the Commerce Department. The long journey from Thomas Jefferson's office in the State Department led through the Department of the Interior in 1849 then transferred to the Department of Commerce in 1925. The historical development of the patent granting institution in the U.S. is intimately tied to industrial and economic growth that created demands for regularized procedures and reasonable protection for patents.

The following section will describe the basic patent system procedures for obtaining a patent grant and the legal system utilized to protect the grant in order to provide a basis for comparison to the other cases.[51] Of particular importance, the U.S. patent system has unique qualities in comparative context. As will be described, these procedures have been largely unaltered by the WTO agreement, not because of U.S.

[51] The following section was developed from information provided by the U.S. Patent and Trademark Office homepage (www.uspto.gov); Bugbee (1967); Doi and Shattuck (1977); and Aoki (1993/94).

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hegemony, but because the WTO is not requiring as much as is often perceived by some analysts. The critical issue for WTO members is that domestic institutions provide basic IPR protection and national treatment for all treaty members' citizens. The following sections on the modern U.S. patent system will be utilized as a basis for comparison in the case chapters, both as a means to demonstrate utilitarian functions that are similar, but also the differences that each state's IPR system possess due to different institutional/evolutionary factors.

Right Grantor: The USPTO

The primary function of the U.S. Patent and Trademark Office (USPTO) is the examination of patent applications and to determine if the applicant is entitled to a patent. The office is required to publish specifications and drawings of patents granted in the *Official Gazette*. The USPTO also administers the federal trademark law, a typical function of patent offices around the world, but does not administer copyrights which are the purview of the Library of Congress. The current patent law in effect is Title 35 of the U.S. code, originally passed in 1952, but amended frequently since then. Notably, the patent office has no jurisdiction over infringement and cannot provide technical advice or development assistance. Simply put, the USPTO only examines patent applications and publishes the patents that are granted.

The procedure for granting a patent does follow certain basic principles in determining the worthiness of the application. Patents are granted for the invention of

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processes, machines, manufactures, or compositions of matter.[52] Only the actual inventor(s) can apply for a patent, with the assistance of a patent attorney if necessary. The application contains a written description of the invention, technical drawings, an oath of inventorship, and a filing fee. The invention must be "novel" and to this end the code provides that the patent cannot be obtained if the invention was known or used before the invention was made by the one seeking the patent.[53] This is a critical distinction from many of the world's patent systems: the U.S. system is based on the first to invent, not the first to file. Other states generally use the first to file rule, but the U.S. does allow for challenges at a proceeding known as an interference by other inventors if they believe they first developed the patentable idea. Appeals are made to the judicial system if unsatisfactorily resolved by the USPTO.[54]

Patents are granted after the examination process by specialists at the USPTO. The examiner first researches prior U.S. patents and other states' databases to be certain of the novelty of the invention. In addition to novelty, the examiner then determines that the application meets the requirements of subject matter, utility, and non-obviousness.[55] A decision is sent to the applicant on the patentability by the examiner; if the application is rejected, the applicant can appeal the decision to the USPTO. If the internal Board of Appeals rejects the application, the process may be appealed to the federal court

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[52] Section 101, Title 35 of the U.S. Code.

[53] Novelty is legally defined in Title 35 of the U.S. Code, Section 102.

[54] One change that the WTO TRIPS agreement has changed is that prior to the agreement, a foreign filing was not sufficient for determining novelty. Now, per section 104 of Title 35, if the filing is in a WTO or NAFTA member state, it will be deemed worthy of first to file status. The new requirement is based on the national treatment of all members of the WTO of any patent applicant, Article 3 of TRIPS.

[55] See the Title 35 of the U.S. Code for legal definitions of subject matter, Section 103.

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system.[56] If the application is accepted, a filing fee must be paid within six months to secure the grant, after which the formal grant is issued. At that time, the patent is published along with relevant drawings and descriptions.

A primary condition of protection is the public disclosure of the patent so that others may learn useful applications from it. The patent holder retains property rights in the patent after the disclosure for a period of 20 years. In the United States prior to the WTO, patents had been protected for 17 years after date of issue. Under the WTO's harmonization of rules, exclusive rights to patents will be protected for 20 years from date of application.[57] Previously, U.S. patent laws reflected a longer time frame by allowing development periods to elapse before patent issuance, thus increasing the number of actual years of the patent to 17 years plus reasonable development time from date of application. In many cases this translated to more than the 20-year limit of the WTO. Some intellectual property generating firms and individuals in the U.S. have protested this new limit because some inventions, such as pharmaceuticals, may take many years to bring from patent to actual product, thus limiting the number of years of actual income earned from direct sales and royalties through licensing before patent expiration.

The property right then is for a period of 20 years. During that time period, the patent holder may exclude others from utilizing the patent. In some cases a patent holder

[56] The Board of Patent Appeals is comprised of at least 3 members drawn from the Commissioner, a deputy commissioner, assistant commissioners and administrative patent judges (Section 134). Appeals beyond the board are sent to the Court of Federal Appeals for the Federal Circuit for a ruling without a hearing. If civil action, it is sent to the U.S. District Court of the District of Columbia, naming the commissioner as plaintiff (Section 141).

[57] The WTO agreement resulted in amending Title 35 of the U.S. Code, Section 154 for the 20 year limit.

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may produce goods for sale or license the product or procedure to another firm or individual. As a property right, the patent can be transferred through direct sale to another party, can be inherited by the patentees heirs, or even mortgaged. The patent right extends throughout the United States and its territories. If a patentee wishes to protect the patent in other sovereign states, applications must be filed in those states or through the PCT system administered by WIPO.[58] While Title 35 of the Federal Code provides the procedures for patent issuance and the basic framework of rules governing the nature of the patent, the USPTO provides no further assistance in protecting the right. Defending or challenging a patent right falls to the litigants in the federal court system.

The Role of the Judiciary

Unlike many states, the United States provides no criminal penalties for infringing upon a patent right. A U.S. patent is essentially a bargain between the patentee and the state allowing the patentee to sue in the case of infringement in exchange for disclosure. As a common law state, disputes are resolved in the court system under the rules of precedent and interpretation of the governing statutes. Title 35 defines infringement as the unauthorized making, using or selling of the patented invention during the 20 year term of the patent.[59] If a patent is infringed, the patentee's remedy is to file suit in a federal district court. The court may award the patentee damages up to three times the

[58] The Patent Cooperation Treaty (PCT) was signed in 1970 and is administered by WIPO since 1978. Essentially the PCT allows for a patent filing in a member state to seek simultaneous recognition of the filing in other member states. If the application is approved in first state, then application materials are sent to other states as requested by the patentee. While it does not guarantee approval of the application in each state, it does streamline the application process.

[59] Section 271 of Title 35.

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amount found by the judge or jury to compensate for infringement which can include profits made by the infringer.[60] The court may also grant an injunction to prevent continuation of the infringement while the case is heard.

Conversely, the defendant has the right to raise the question of whether the patent is valid or not. The court can find that the patent is invalid, only on the grounds that it does not meet the code's requirements for patentability. A ruling of invalidity only holds for the parties in the suit and does not generally apply to other parties who the patentee may bring suit or those who may litigate the patentee. If the U.S. government infringes, the case is heard at the U.S. Court of Federal Claims. The government may infringe on any patent, but consistent with "the takings" clause in the Constitution, just compensation must be made to the patentee.[61]

The 1980's was a period of institutional reform for how patent disputes were adjudicated. Prior to reform, patent cases were heard in any federal district court and parties to the suit "would often go 'forum shopping'"[62] for a favorable venue. Damages were often no more than reasonable licensing fees. Infringement was therefore a reasonable opportunity cost for a would-be violator. Furthermore, the technical nature of patents resulted in poor development of legal precedent, varying widely among appellate courts because the Supreme Court did not hear appeals of patent cases. By the 1980's the advances in technological complexity created new demands for a stronger and more

[60] Section 284 of Title 35.

[61] Governments worldwide reserve the right to infringe any patent, however compensation is not always readily guaranteed.

[62] Chiang (1995), p. 40.

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unified dispute resolution mechanism. As of 1982, appeals would be heard only in the Court of Appeals of the Federal Circuit (CAFC) where the court would possess more technical expertise.[63]

By centralizing the appeals with the CAFC, a stronger body of precedent was established for the federal district courts to use when hearing patent cases. A strong deterrent against potential infringement was created due to the propensity for the CAFC to uphold appeals for preliminary injunctions in cases where a high probability that infringement was occurring required a firm to cease production regardless of the costs. Standardizing precedent also has resulted in the CAFC upholding four-fifths of the appeals from the lower courts as well as an increase in the size of the awards for damages.[64] Due to the high cost of a preliminary injunction and monetary awards, out of court settlements have increased and undoubtedly better risk management by firms in heading off potential disputes.[65] Strengthening patent enforcement through the judiciary has increased the value of patents in the U.S. thereby increasing the incentive for a patent holder to engage in litigation to protect the patent right. Both patentees and would-be infringers are forced to be more attentive to the inventive and manufacturing activities inside the firm in order to either gain from zealous protection or lose from costly litigation for infringement.

While the strengthening of the U.S. courts for patents has been a source of complaint by some firms and other nations, the impact on the U.S. economy may be as

[63] See (www.uspto.gov) and Chiang (1995).

[64] See Berkowitz (1993).

[65] Chiang (1995), p. 41.

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important. Clearly the last two decades in the United States has been one of incredible technological change with more technological innovation ahead.[66] Reasons include the end of the Cold War, the long term trends in technological development, and the availability of venture capital.[67] But it must be considered that the continual strengthening of patent protection has also had a role in creating the incentives for technological and economic growth. Rise of the technology industries in the United States over the past two decades also coincides with the most recent innovations in the IPR granting system: a combination of the right granting role of the state interacting with the new right seekers. This increasing value of patents and IPR generally has helped to produce a new class of right seekers.

The Right Seekers

Right seeking can be measured simply by the raw numbers of patents applied for and granted in the United States. Between 1975 and 1990 (the period that Chapter Five concentrates on for statistical tests) roughly two-thirds of all patent applications were approved by the USPTO.[68] There were a few exceptional years where the approval rate was anomalous due to backlogs at the USPTO created by budget shortfalls.[69] The economic malaise in the late 1970's caused a modest decline in patenting activity in the

[66] See Schwartz, Leyden, and Hyatt (1999) for a futurists view of technology and its implications for economic growth currently and in the decades ahead.

[67] Ibid. Also see Rosenberg, Landau, and Mowery (1992).

[68] Estimates compiled from patent tables in Industrial Property Statistics published annually by WIPO.

[69] National Science Foundation (1993), p. 172 notes the following outlier years: 1979: USPTO budget shortfall; 1986, 87, 88 fluctuates due to budget constraints.

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United States, but by 1983, patenting had begun to consistently increase. The general upward trend was consistent for both American and foreign patentees between 1983 to 1991, with foreign right-seeking growing at a faster annual rate: 8.2% annual growth for foreign patentees compared to 5.2% annual growth for American patentees.[70] Patenting increased and therefore right-seeking increased, but who patents?

Patenting in the United States is largely carried out by corporations, but a surprising number of patents each year are granted to individuals. Between 1978 and 1991 patents issued to corporations accounted for a low of 69% to a high of 73% of patents granted annually, with 71% of patents granted to corporations in 1991.[71] By 1995 corporate patenting accounted for nearly 79% of the patents granted in the United States.[72] Despite the high percentage of corporate patents, a significant number of patents are granted to individual inventors because overall patenting has increased. Individuals' percentage of patent grants has decreased as a share of the total, but nonetheless have enjoyed real gains in total patent grants during the past three decades.[73]

The remaining 20% of patent grants also do not represent a significant percentage of government employees, who often account for around 1% of the total patent grants in the U.S. in recent years. Federal employees are allowed to apply for a statutory invention registration (SIR), which has lower application fees and is not subject to an examination. A SIR does allow the inventor to exploit the invention, but does not prevent others from

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[70] National Science Foundation (1993), p. 172.

[71] National Science Foundation (1993) p. 172.

[72] National Science Board 1998 p. 6.18.

[73] Patent and Trademark Office (1992).

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legally utilizing the information developed in the SIR grant for their own purposes without licensing.

By 1994 the U.S. had reached 100,000 patent grants per year for all types of applicants, representing a steady increase over the past twenty-five years for patents granted.[74] Similarly, patent granting has increased steadily in the United States and globally over the previous 100 years.[75] While it is instinctive to believe that patents represent advanced technological breakthroughs, in reality, patents represent a broad range of novel and innovative products and a wide range of monetary value per product produced. Patent classes include amusement (toys) and exercise devices, locks, machine tools, semiconductor device manufacturing processes, and pharmaceuticals.[76] In the first half of the 20th century, patents were typically issued to manufacturing-related enterprises, like the automotive and appliance industries, and also the classic tinkerer hoping to be the next Thomas Edison. As the 20th century developed, more complicated technologies and breakthroughs in such fields as chemistry, pharmaceuticals, and biotechnology became important patenting classes in order to recoup valuable R&D sunk in the product development cycle.

The upward trend of patent granting includes patents owned by universities and colleges, which are included in the corporate patent-grants total. In 1991, university and college patent grants accounted for 2.6% of all grants and had increased to 3.3% of all

[74] See World Intellectual Property Organization (1975-1990) Industrial Property Statistics, an annual publication; also see (www.wipo.org) for more recent annual updates posted on the web for all WIPO members.

[75] World Intellectual Property Organization (1983).

[76] See Patent and Trademark Office (1992).

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patent grants by 1995.[77] Considering the general upward trend in total patents, academic patenting is experiencing significant real increases. Academic patenting has increased not only due to the simple increase in technological breakthroughs, but also due to the increased savvy of academic administrations to capture revenue from their faculty's achievements through patent portfolios. Typically, many academic institutions have established intellectual property offices that encourage faculty to patent their discoveries and inventions by providing legal assistance as well as seed money for further development of economically promising research.[78]

The practice of academic patenting has been somewhat controversial with critics assailing the loss of academic openness due to the secrecy required during the patent application process and the pursuit of profits by faculty; while supporters point to the revenue generated from research and the retention of "star" faculty who would otherwise leave for private industry, not to mention the revenue further supporting public research.[79] However, while patenting is still clearly broad-based in terms of patent classes, some patent classes have become increasingly valuable to not only academic institutions, but also the private sector.

[77] See National Science Foundation (1993) p.172 and National Science Board (1998) p. 6.18.

[78] For two examples of how universities utilize intellectual property, see the homepages for Iowa State University's Office of Intellectual Property and Technology Transfer at (www.public.iastate.edu/isurf/) and the University of Oregon's Office of Technology Transfer at (www.darkwing.uoregon.edu/techtran/).

[79] See The Chronicle of Higher Education 2/19/1999, p. A64 for discussion of how proprietary knowledge affects academia and also see article from 3/3/2000, p. A16 on the new wealth of entrepreneurial faculty and its effects on academic institutions.

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Value Added

The general rise in patenting correlates with the rise in technologically-based industries. Before the 1980's, firms rarely included intellectual property as an asset on their balance sheets, but as the direct sales of intellectual property (adjusted for inflation) increased from $8.2 billion in 1986 to $12.6 billion by 1992, firms "gradually recognized and harnessed the financial power of their intellectual property."[80] By 1995 U.S. firms were responsible for 1/3 of the world's production of high technology products and were generating over $3.3 billion in direct licensing fees for their technological know-how overseas.[81] Furthermore, these figures represent only the direct sales and licensing of intellectual property, the numbers are not available for intellectual property's value incorporated as a component in the direct sale of goods.

The demand for IPR protection has also been raised due to the increasing sunk costs in the research and development of new products. Despite the decline in defense related R&D due to the end of the Cold War, overall private sector R&D has been increasing steadily since the end of the 1970's in inflation adjusted dollars and as a percentage of GDP. Between 1978 and 1990 overall R&D expenditures as a percentage of GDP rose from 2.2% to 2.7% despite declines in defense R&D during the latter part of the period.[82] Industrial R&D rose to 71.4% of total R&D by 1990 in the U.S. indicating

[80] U.S. Congress (1994) p. 90.

[81] National Science Board (1998).

[82] National Science Foundation (1993) and Tyson (1992) p.33.

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that it has become more important due to the increasing value of commercial ideas.[83] The share of R&D that the service sector expends has also risen significantly from approximately 4% in 1982 to 24% by 1992, notably in software development and communications services.[84]

The rise of the service sector indicates a new dimension of right-seeking by these industries as they have greater stakes in the IPR system in the U.S. The formation of software, computing and communications industry groups and their active lobbying of elected officials is increasingly evident in the recent reforms of telecommunications regulations and standardizing the appellate process in the CAFC.[85] As the new technological firms have developed, the urgency for relationships with right grantors (the executive and the legislative branches) has increased as evidenced by both 2000 presidential aspirants Al Gore and George W. Bush who actively solicited hard and soft campaign money in Silicon Valley and Redmond, Washington for their campaigns.[86] Even the day after Microsoft's historic antitrust negotiations had failed, Bill Gates kept his appointment to meet with President Clinton the following day. The value for IPR has increased in specific high tech sectors and as Riker and Sened posited, scarcity increases

[83] National Science Foundation (1993) p. 115.

[84] National Science Board (1998) p. 6.2.

[85] Examples of service industry associations include: the International Intellectual Property Alliance; Software Publishers Association; and the Business Software Alliance.

[86] For example, Cisco Systems CEO John Chambers held a fundraiser for George W. Bush with goals to raise over $2 million similar to an April 2000 fundraiser in Silicon Valley for Al Gore that raised $2.5 million. Cisco employees have contributed individually $443,310 for this presidential campaign to both parties through May 2000. Al Gore counts among his Silicon Valley supporters Netscape founder Marc Andressen and venture capitalist John Doerr while George W. Bush has garnered the support of Dell founder Michael Dell and Microsoft executive Robert Herbold. See Wall Street Journal 6/8/2000, p. A26 and (8/28/2000) pp. B1-B6.

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the demand for a property right, "if goods are free, rational holders forgo ownership."[87] Technology has created new right seekers who have and will continue to demand protection of their IPR with the right grantor, and doubtless the right grantors will seek their financial support to remain in office.[88]

As technological complexity has increased, the requirement of expensive R&D capabilities has also increased by firms in order to stay ahead of the competition. This in turn has created demands for greater IPR protection due to the increased cost of developing new products over the past 20 years. Sunk costs in research require years to develop into meaningful products that may recoup the costs of R&D, requiring patience by investors for larger long term returns on investment. For example, patents were first granted for plant varieties in 1930 as breakthroughs in hybrid genetics began to emerge. By the 1990's, biotechnology firms were increasing their research in mapping the plant and human genomes. The related litigation, legislation, and executive branch musings on the extent of IPR protection has not been yet resolved. The resulting controversies from protecting breakthroughs in genetic research are ongoing in the U.S.[89]

For example, during March of 2000 President Bill Clinton and British Prime Minister Tony Blair issued a joint statement that human genome research should not be patentable and turned over to the public domain. The resulting flight by investors from publicly-traded biotech firms caused steep short-term declines in stock prices and

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[87] Riker & Sened (1991) p. 954.

[88] For example, a new high tech industry group, Association for Competitive Technology, has over 9000 corporate members that pursues lobbying on high tech issues (Wall Street Journal 6/8/2000 p. B5).

[89] See Aoki (1993/94) pp. 209-213 for a summary of the debates regarding patenting and genetics.

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resulted in some subsequent backpedaling by the president clarifying that the joint statement pertained to publicly funded research only.[90] Without doubt, biotech firms as right seekers will more vigilantly lobby congress and the executive branch in order to protect their investments and in hopes of monetary rewards in future legislative debates regarding patents and the human genome.[91]

Right-seeking firms vary in their approaches for basic IPR protection in the U.S., but the higher the cost of development, the greater the deterrence for infringement.[92] For example, due to the complexity of genome research, a violation of a patent will favor the patentee in a court case because the defendant would have to either prove the invalidity of the patent or reveal how they arrived at such a complex patent-related product without extensive research. The costs for infringement in such a case is therefore very high. The question in a case like genome research is whether the right grantor is going to maintain its policy of right granting, not as much on piracy or infringement due to the cost of market entry.

While it is possible that the courts could rule that certain genome breakthroughs are indeed in the public domain, until such a ruling, legislative changes to the U.S. Code would be required, regardless of the president's statements to the press. For other high tech firms, like pharmaceutical and microprocessor manufacturers, patent infringement cases often hinge on the minutia of the product in question due to the increased use of

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[90] Wall Street Journal (3/10/2000) p. B3 and (3/15/2000) p.A3.

[91] See the Wall Street Journal (3/16/2000) and Scientific American (7/2000) pp. 48-69 for overviews of the issues emerging on patents and the businesses involved in human genome research.

[92] See Ryan (1998) pp. 4-6 and Chiang (1995) pp. 40-41.

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precedence in the CAFC and the willingness to impose preliminary injunctions as discussed previously in this chapter. The cost is sufficiently high to deter infringement for these industries in the U.S. because of the cost imposed by a potential punitive preliminary injunction. High sunk costs in R&D behooves the firm to be relatively certain that they are developing a novel invention.

Consumers and IPR

Another factor that is critical in understanding the drive of right seekers to demand intellectual property protection in the U.S. is the increased demand by consumers for products based on intellectual property. Despite domestic piracy in the U.S., the duty bearers posited in Riker and Sened's model (Condition 4) are generally recognizing the right for intellectual property as a part of a complex bargain where IPR are granted by the state in exchange for a stream of products that satisfy domestic consumer demand. High technology production in the U.S. grew at an inflation adjusted rate of 6% annually between 1980 and 1995, compared to a 2.4% rate for all other manufactured goods during the period.[93]

The almost unbroken period of growth in GDP in the U.S. since the 1980's has resulted in low unemployment, more disposable income, and increasing sales of intellectual property to consumers, both individuals and corporate. The increasing size of the markets for intellectual property has also corresponded with decreasing costs due to the increasing economies of scale. The phenomenon of growth has not been limited to

[93] National Science Board (1998) p. 6.21.

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the U.S. and, despite the recent financial crisis in Asia, domestic demand for intellectual property has risen in many states creating non-U.S. firms that seek IPR for their inventions.

Foreign Right Seekers

Right seeking by foreign firms in the U.S. has been significant because of the benefits of being active in the world's largest consumer market. Under U.S. law, a foreign firm or individual has the right to be treated similarly as a U.S. firm or individual when applying for a patent and seeking redress in the federal court systems, if necessary. Furthermore, any member of the WTO enjoys the same privileges as a U.S. citizen under Article 3 of the TRIPS agreement, i.e.: national treatment. Also, if the state is not yet a WTO member, yet enjoys MFN status (like the PRC), or is governed by other bilateral agreements (like the ROC), then their citizens also enjoy national treatment in the U.S. With exceptions like Cuba and North Korea, nearly every state in the world is covered by a reciprocal IPR treaty with the U.S. The result of nearly any foreign firm being able to apply for patents and access to the U.S. market has created an even greater variety of choice for U.S. consumers in high tech, as well as other less complex intellectual property generated goods and services.[94]

Foreign-based patentees have grown in concert with U.S. patentees as a percentage of total U.S. patent grants since the late 1970's, with foreign patenting

[94] See U.S. Congress (1994) Chapter 6, for a summary of multinational firms and international trade with the U.S. and how it affects the flow of goods and FDI. Also see Tyson (1994) who while not an advocate of free trade, nonetheless provides a wealth of statistical information detailing the web of high tech product flows in and out of the U.S. by foreign and domestic firms.

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growing at a slightly faster rate.[95] The role of foreign right seekers in the U.S. is increasingly important and they have gained financially from national treatment in the U.S. For my cases selected (Japan, Korea, ROC and the PRC), each state has increased its patenting in the U.S. at steady rates between 1975 to 1990. Before 1973, for example, Japan had no firms in the top ten firms receiving U.S. patent grants. By 1995, eight of the top ten firms receiving U.S. patent grants were Japanese.[96]

While only four firms approached 1% of all patent grants in the U.S. in 1995, including IBM, it nonetheless indicates that the Japanese are indeed active right seekers in the U.S. Before national panic sets in, an explanation for the concentration of Japanese patenting at the top of the list indicates a level of concentration of intellectual property generating firms in Japan as fostered by government policies and the nature of large conglomerates commonly operating in Japan. In fact, Japan's overall share of patent grants is declining in the U.S. relative to other states' firms and U.S. firms' share of patent grants. The number of firms receiving patents is actually diversifying in total patent grants, patent classes and country of origin. What explains this rate of increasing patenting by foreign and domestic patentees?

Summary

A significant reason foreign and domestic patenting in the U.S. is steadily increasing is because the U.S. patenting institution has evolved into a reliable

[95] Data compiled from Patent and Trademark Office (1992).

[96] See National Science Foundation (1998) p. 6.19.

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institution.[97] As technological complexity has increased, so too has the value derived from novel inventions increased which thereby increases the demand for a more reliable patent system. Institutional development of patenting was slow in the United States during the 19th century, despite its inclusion in the Constitution. After World War II, the flood of goods utilizing intellectual property steadily increased as the century unfolded.

The wealth generated for technologically-based firms created demands for standardization in the patent institution. First, the establishment of Title 35 of the U.S. Code in 1952, with frequent amendments over the years, codified the procedures and bureaucratic practices of the USPTO. Secondly, the reforms of the CAFC in the 1980's which centralized appeals on patent cases increased the reliability of precedent in legal rulings. While it has been debated whether or not the reforms have given too much to patent-generating firms and individuals, the development has created a system where both the patentee and potential infringers have reasonable expectations regarding the costs and benefits of intellectual property generation.

Reacting to the demands of right seekers, the right granting apparatus of the state has developed a patent-granting system in the United States with clear goals in creating new inventions by rewarding the inventors with a time-limited property right. Utility is maximized by the state (increased technology and national wealth) and the inventors (a property right to exploit), and the duty bearers realize the costs of infringement. The

[97] Recalling the NIE school's views regarding institutions (Chapter One), an institution can be efficient or inefficient. The existence of an institution does not necessarily imply efficiency. An "efficient " institution is one that counteracts the problems of opportunistic behavior and bounded rationality thereby lowering transaction costs. The U.S. patent institution is "reliable" precisely because it counteracts the problem of opportunistic behavior and bounded rationality.

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system works well enough that firms based all over the world are actively seeking property rights in U.S. patents that not only increase their wealth, but transfers technology, and provides lower cost goods to U.S. consumers. Undoubtedly, as technology changes, so too will the demand to alter the system. By understanding the demands of right seekers and the goals of the right grantors, future changes in a patenting system can be anticipated.

On the impact of the WTO and the TRIPS agreement, the overall changes to the U.S. patent system are minor. The impact is low not because of hegemonic power, but because the basic agreement does not radically alter any state's IPR system. Changes to the U.S. patent system include the twenty year time limit (from 17 years plus development), national treatment (recognizing filings in other states), and perhaps most importantly, changes how disputes are resolved. The hegemon's teeth have been pulled where, prior to the TRIPS agreement, the U.S. could apply sanctions on IPR issues as it deemed necessary, it must now clear sanctions with the WTO before applying sanctions on another member. Other than those changes, the patent system has not been radically altered by the TRIPS agreement.

It is reasonable to argue that it was easier for the U.S. to comply with the TRIPS agreement because it was developed economically and has a longer history in intellectual property systems. As I have argued, the modern U.S. patent system is not as ancient an institution as some theorists have posited, and that other newly industrialized states are not that far behind in IPR institutional development. Additionally, the following chapters will demonstrate that even developing economies have had domestic demand for creating reliable IPR and in this context, capitalist states were developing patent institutions to

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reduce transaction costs in developing new inventions in any case. Even tough cases, like the PRC which is still transitioning from communism, has developed a patent system suitable for WTO membership, albeit with its own unique characteristics.

The reason is simple: the TRIPS agreement does not radically alter a state's patent statutes. A state is free to determine the procedures, the legal system that guides it, and their own national interests in IPR. However, the TRIPS agreement does enjoin the member to treat all members' citizens as its own before the law and that those laws be transparent — a result of coercive diplomacy, or a solution based in utility for both the foreign and domestic applicants? The U.S. and other patent systems have evolved because of the constant interaction of the right seekers and grantors and the demands for reliable IPR systems that generate technological and economic growth. The following chapters will demonstrate that in some cases the right grantor plays a larger role than in others, but like the U.S. it requires both right grantors and right seekers to develop a patent system.

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CHAPTER THREE

SEEKING AND GRANTING IPR:

JAPAN AND KOREA

The post-World War II era has been marked by a number of disputes over intellectual property protection, particularly between the United States and the cases selected for this study: Japan, Korea, the ROC and the PRC. U.S. firms have claimed repeatedly over the decades that their patents have been infringed upon and copyrights violated. By the year 2000, nearly all of the targeted states in my study have viable intellectual property right systems, or, in the case of the PRC, nearly so. Why do the case states protect intellectual property better in the present than they did in the past? The following discussion provides introductory material relevant to all four cases.

Theorists have posited that states comply with global IPR standards because they have been forced to comply with diplomatic actions applied by the United States and other developed states.[98] While the U.S. has been active in pursuing IPR protection on behalf of its firms, the U.S. has been pursuing such diplomatic efforts for well over forty years. If the coercive diplomacy hypothesis is correct, we should expect to see resolution of IPR issues more quickly than decades, and certainly in favor of the interests of the

[98] See Ryan (1998) and Sell (1998) for general overview of global diplomacy as cause for IPR compliance.

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U.S. and other developed states to possess relatively more power. If diplomacy has been the key, why has it taken so long to bear fruit?

Intellectual property is a complex of property rights that have evolved in concert with capitalist economic growth and technological development. As a form of property rights, my theory of IPR formation contends that IPR development requires the active interaction between those who seek property rights and the state that grants a property right (Riker and Sened, 1991). First, the property right must have value or right seekers will not pursue protection of the right. As the independent variables of right seekers and the right grantor interact, institutional development of the right is established and evolves. When the right to intellectual property is firmly established, third parties who may violate the right are compelled by the state to refrain from infringement by penalties or civil actions via the judiciary or the bureaucracy. Third parties may even respect the property right because of the general utility enhanced in the state that IPR protection can provide, such as increased flows of technology from abroad and internal development of technology.[99]

[99] See Maskus and Penubarti (1995) for technology flows from IPR protection; Rosenberg and Birdzell (1986) on the causes of technological and economic growth; and Ryan (1998) p. 5 who concludes that "Blatant piracy of intellectual property is bad business strategy."

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Historical Patterns

Chapters Three (Japan and Korea) and Four (ROC and PRC) will demonstrate that the historical development of intellectual property rights has been correlated with the development of property rights generally in the case states and the resulting economic development has increased right seeking and right granting of IPR. Furthermore, the development of patent institutions will demonstrate a historical progression: as the level of economic development increased, the level of diplomatic pressure for reliable patent institutions decreased. Coercive diplomacy was not as important as domestic economic and political development.

The cases examined in the following sections have experienced both unique and similar historical patterns in their development trajectories. All four cases had developed property right systems under traditional systems that transitioned with their capitalist development. While each case had feudal or land-tenure right systems, merchant classes developed property right systems amongst themselves to facilitate trade and commerce, sometimes with or without the blessing of government officials.[100] Reforming feudal systems was as difficult as it was in the West, but in the cases selected the process of reform was more rapid due to the economic and military challenges posed by Western interests during the 19th and 20th centuries. The following comparative case analyses will demonstrate the rapid adaptation of capitalist property right institutions, but under unique circumstances.

[100] For Korea see McNamara (1996); Japan see Pratt (1999); and China see Rowe (1984).

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Japan developed modern market institutions during the last half of the 19th century and rapidly developed an industrial base that rivaled early 20th century powers. Following World War II, an important period of IPR development globally, Japan possessed a property right system that allowed for its emergence as an economic power and as a producer of intellectual property. Diplomatic issues over IPR were technical in nature due to Japan's IPR system development prior to the war, but the issues were not purely on creating an IPR system more quickly as the other cases experienced. The analysis of Japan's IPR system will demonstrate that many issues were similar to demands placed on the United States' IPR system precisely because both states' possessed advanced capitalist systems. Capitalist economies are not similar in every respect, but they can generate similar demands on the right grantor. Japan sometimes adopted European IPR innovations and often created unique procedures for IPR institutional operation.

Korea's development created different issues in its IPR institutional development than Japan's path. When Japan invaded and occupied Korea during the first half of the 20th century, it ended centuries of isolation from the outside world. Japan transformed Korea's property right system and economy from feudal to more capitalist forms. As an occupying power, Japan imposed its legal system including its codes governing intellectual property. While Korea's economy did develop during the occupation, it had not developed to the level as a producer of intellectual property on a significant scale until decades after the occupation and civil war. Korea introduces a problem in IPR development common to the ROC and the PRC where rapid industrial development in the last half of the 20th century occurred and questionable application of civil rights retarded

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the development of IPR. Achievements in Korea's economic development created the demands for more civil liberties consistent with effective IPR institutions.

China's experience with IPR also has comparable issues with Japan and Korea. Prior to the conclusion of the civil war, property right systems had been developed under feudal systems, but the chaos of the late 19th and early 20th centuries retarded economic and political development which limited the role of right seekers in creating intellectual property and IPR institutions. After the civil war, the two governments of China diverged down different development paths.

The ROC possessed a military government and a more market-based system comparable to Korea's situation. As the economy developed during the latter half of the 20th century, political demands to increase individual rights and participation in the political system also developed. The extension of individual rights combined with capitalist economic growth created similar demands that Korea experienced from right seekers to protect property rights in creative output. The PRC diverged considerably from the ROC's path by instituting a communist economic system after the civil war that limited both market economic development and individual expression. Economic reform was initiated during the 1980's, but individual expression has lagged to date. IPR development in the PRC has been a source of diplomatic pressure, but the similarities of the factors that develop IPR institutions in the other cases are slowly emerging.

My analysis will help to explain the differences and the similarities that comparing the cases will create. Intellectual property essentially requires a market-based economy and substantial individual rights in property and personal expression. Each case has unique aspects due to historical factors during their development. However, there are

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also patterns that are common to each state's development that created the factors necessary for the development of IPR. I will demonstrate the efficacy of my theory by examining the patent institution's historical development in each state in the following chapters, including the form assumed by the institution from the interaction of the right seekers and grantors as well as the role of diplomacy. Developing property rights are central to my thesis for IPR institutional efficacy which I have juxtaposed to the role of coercive diplomacy. Comparativists also raise important questions on cultural factors in the cases selected for my study.

Cultural Legacies or Rational Action?

The relevant literature on intellectual property development in Asia tends to focus on either the cultural differences of Asians to understand the Western concept of intellectual property or the role the state plays in creating economic growth. The first argument is typified by theories that posit that Asian states possess specific cultural legacies that hinder an Asian's ability to conceptualize the Western view of capitalism and therefore intellectual property and the Western view of intellectual property is a form of imperialism imposed by outsiders.[101] The puzzle revolves around the problem of traditional notions of Confucianism on the public nature of knowledge and the tendency of individuals to privatize knowledge.

Historically, it has been contended that Asian cultures did not have the long

[101] For example, see Wang (1993); Wojik and Osty (1993); and Yang (1993) for examples of the cultural/historical legacy argument for Chinese polities. Johnson (1995) and Pascale & Athos (1981) for Japan. Kim (1994) and Amsden (1989) for Korea.

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period of development of intellectual property that the West had and therefore the West should exercise patience when dealing with intellectual property issues. Confucianism provided an intellectual basis for all of the cultures examined and this belief system viewed knowledge as a public good that scholars and inventors ought to reveal without cost to the rest of society. Increases in technological proficiencies, that in turn created wealth, increased the propensity to privatize inventiveness in order to profit. I will develop this issue more fully when addressing each case, but as I posited in Chapter Two, intellectual property institutions are a modern phenomenon in the West with little in the way of deep cultural reverence, especially in the U.S. Furthermore, "once we look for cultural differences, we can too readily take surface variations as fundamental, and explain artifacts of institutional differences as cultural."[102] Gaps existed between philosophy and commercial activity in Asia as well as the West. The development of an IPR institution has identifiable actors with identifiable goals, who are seeking to maximize their utility.

Given that my model assumes a property right is sought by an individual or firm, and subsequently granted by a state, it makes sense that the cultural argument fades as a market economy develops and the rules of the institution are established. Under these circumstances, right seeking and granting increases and the institution develops rules and procedures to manage the procurement of intellectual property protection. In the selected cases, infringement of patents and other IPR made perfect sense to a rational third party seeking to maximize their utility as posited by Riker and Sened (1991).

[102] Ramseyer (1996) p. 7.

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The infringers' utility is maximized because they make profits without the costs of research and development and in many cases gain some technological know-how from the infringement practice. Potential penalties are low or absent from the state, further lowering the cost of infringement and thereby providing more incentive for infringement. Infringement can be profitable, especially if the state is uninterested in forcing compliance. It is not a cultural legacy that causes an infringement of a patent, it is the drive for profit that is well understood by a firm or individual regardless of their cultural identity. Clearly, an infringer is a rational actor, maximizing their utility under the rules of the game (or lack thereof).

By comparing the cases during the formative period of their capitalist economies, the state is less interested in issues that only affect a small number of individuals or groups out of political favor, especially if they are not actively petitioning for protection relative to other interests. Recall the U.S. patent institution where patent applications were reviewed by Thomas Jefferson in his spare time. As a capitalist economy becomes more complex and grows, the demands placed on the state for reliable economic institutions grow. Right seekers develop and begin to pursue protection and property rights from the state. Turned around, officials may have seen the success of other state's systems of IPR and how reliable patent systems increase technological development, economic growth, and subsequently increase tax revenue while reducing conflicts that need adjudication.

While IPR institutional forms may be borrowed from other cultures, the grantor's and the seekers' interests converge due to market forces and third parties are required to comply with the new institutional arrangement. Right seekers' utility is maximized by

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new property rights; the state's utility is maximized by decreasing disputes while increasing technological and economic growth; the third party infringer's utility is decreased due to lost profit and penalties; and the other third parties' utility is increased by more available technology and general economic growth. The cultural/historical argument for lack of intellectual property protection becomes a justification for continued infringement, not an explanation for why a state is unable to develop intellectual property institutions.

Historically, it is indeed true that many Asian polities had little to no intellectual property protection before the middle of the 20th century, but neither did the U.S. during its capitalist expansion during the 19th century. Even in the U.S., the institutional development of IPR was transformed and accelerated during the 20th century. An important factor for weak IPR institutional development with the other cases is that these polities were typified by internal conflicts or authoritarian governments with economies oriented towards state goals in wars and retaining power rather than developing market economies. They had little incentive or interest, therefore, in granting IPR.

All three cultures examined (Japanese, Korean, and Chinese) had imperial governments that lasted into the 20th century. Furthermore, these polities were originally agrarian-based, not capitalist where IPR institutions are required for the allocation and protection of the property right. Where are the right seekers who seek patents in authoritarian, agriculturally-based societies? They exist, but not on a critical level to create an influential interest group. Instead, right seekers during pre-industrial periods are interested in property rights associated with agricultural lands on such issues as imperial land grants, tenure, and hereditary rights. As previously argued, intellectual

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property development is contingent on economic development, and despite cultural/historical legacies the cases examined have economically developed the means and desire to support intellectual property institutions as the 20th century progressed.

For example, as the Meiji reforms (1868 to 1912) in Japan took hold in the latter part of the 19th century, so too does the seeking and granting of patents. As the economy modernized, incentives evolved for both the right seekers in Meiji Japan (to make profits) and the right grantor (to foster technology transfer and development). A similar pattern will be demonstrated for each case below, albeit in a shorter time-frame as they rapidly developed towards the end of the 20th century. Cultural arguments on the lack of intellectual property protection describe the pre-industrial and transitional periods to capitalism well, but a similar reconstruction can be made for any Western state, as I did with the United States in Chapter Two. Capitalism is a dynamic economic system that changes traditional notions of property by transforming traditional systems of property allocation that will be examined in each case.[103]

The modern world is now largely a capitalist one, and more attention ought to be paid to basic market institutions such as property rights. Property rights and the market are integral to economic and technological development and therefore IPR development. IPR institutions are modern phenomena in both Asia and the West. I have chosen to review each case in a specific order that explains the role of property right development and market capitalism in the development of IPR. Each case section in the following

[103] Schumpeter (1942) borrows from Marx that capitalism transforms and creates new interests by transforming the way that societies allocate goods. Shifting from agrarian to capitalist economics creates a society that defines itself by constant change. Economic growth subsequently transforms the political system to meet new demands. The growth of demands for IPR protection is a part of this process.

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chapters will contain a historical summary of the development of IPR in the context of each state's economic development, the role of diplomacy, and a detailed description of their current IPR system. In Chapter Three, Japan will be examined first because of Japan's longer history of capitalist development since the Meiji Reforms. Korea will follow in order due to the Japanese occupation in the first half of the 20th century and the simultaneous U.S. occupation of Korea and Japan after World War II. Furthermore, Korea introduces the problem of rapid development and IPR growth.

Finally in Chapter Four, I will examine the Chinese polities of first the ROC, then the PRC in order to demonstrate the function of property right development versus cultural legacies for IPR development as well as the problems associated with rapid economic development. Each state developed an IPR system as its economy became more advanced and, as each case developed economically, foreign diplomatic pressure eased. The emergence of property rights "originate in a historical event. As such there are identifiable actors with identifiable motives, who create rights."[104]

Japan

The origin of intellectual property rights in Japan dates to the 1880's when Japan's first patent statutes were devised. The impetus for the emergence of modern Japan is often historically tied to the arrival of Commodore Perry's squadrons in the 1850's. The subsequent last half of the century is termed the Meiji Reforms (1868 to 1912) where Japan reformed its economy and political system while ending hundreds of

[104] Riker & Sened (1991) p. 955.

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years of isolation with the outside world.[105] Before the establishment of the patent system, Japan rapidly developed basic industries in order to be better prepared to face the outside world and the perceived notion that they were behind potential military rivals from the West. The example of China being divided up among Western military powers drove a period of industrial expansion and modernization in Japan.

Merchant classes had developed during feudal Japan and were exerting pressure for more rights during the Tokugawa period (1600 to 1867) which preceded the Meiji Reforms. The Tokugawa period was one of relative peace internally that allowed for expansion of the merchant class and internal trade with emerging market institutions to service the growing commercial activity (Arnason, 1988). Marshall (1967) notes that the merchant classes and emerging business elites faced hurdles with the ruling classes who traditionally viewed the merchant class with disdain. Not that dissimilar to the tensions between nobles and the emerging commercial classes in the West two hundred years earlier as discussed in Chapter Two. The ideological motivation of the Meiji Reforms "was that national wealth (*fukoku*) is the basis of national strength (*kyohei*)."[106] The ideology was necessary because of the need to convince hereditary elites that commercial activity would strengthen the nation and themselves, not just the emerging commercial interests.

Perhaps because research often focuses on the state, research on Japan often places the emergence of market economic principles after the success of the reforms.

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[105] See Marshall (1967); Samuels (1994) Chapter 2; Allen (1981).

[106] Samuels (1994) p. 36.

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Undoubtedly, the Meiji reforms produced a period of rapid development and enhanced the status and fortune of the merchant classes, but recent research has posited that markets and property rights had emerged much earlier in feudal Japan than widely thought. Ramseyer (1996) argues that local militias had developed property rights in many areas of the economy protected by customary law, especially land and water so that food could be efficiently produced. By the mid-18th century, individuals, male or female, held property rights in themselves and their labor; an innovation from feudalism that is not historically too far behind such rights in the West.

So it would seem that before the Meiji Reforms, Japan had developed basic property rights and markets for basic goods and services with an emerging commercial class. Pratt (1999) delineates the increasing role that the merchant class played in developing institutions favorable to commercial activity that increased throughout the 19th and into the 20th centuries. While still facing entrenched interests, the reforms helped to accelerate mass industrialization in late-19th century Japan which by any measurement of time was little more than sixty years or at least only a few decades behind industrialization in the West, especially the United States.

I have argued that IPR institutions require first the general existence and protection of property rights followed by economic and technological sophistication that creates right seekers who agitate for IPR, a more complex property right, from the state. By the 1880's Japan had achieved enough indigenous technological expertise that a patent system was required to meet the demands of inventors and firms, but also to meet the demands of the right grantor, the state, to transfer military technology from abroad.

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The Modern Japanese Patent System

The Japan Patent Office (JPO), in various forms, has been in existence since the late Meiji reform era. The first effective patent law was the Patent Monopoly Act of 1885 incorporating elements of both the U.S. and French patent laws of the time.[107] The Patent Act was revised in 1888 after further study of other developed states' systems, especially Germany. By 1899, Japan joined the Paris Convention whereby the rights of foreign applicants were recognized for the first time. The Paris Convention did not require conformity with any global regime for IPR protection, simply national recognition of a fellow treaty-state's citizens status and non-discriminatory treatment in the patent-granting process domestically. The break from traditional Confucian notions of knowledge as a public good was not a significant factor as Japan developed institutions to regulate intellectual property.[108]

Sixty years after Perry's visit, Japan was sufficiently industrialized to support military operations beyond its borders and it began a period of territorial expansion and colonization. While the demands of colonial expansion aided the development of military technologies in Japan, the general economic expansion resulted in the

[107] See the JPO home page (www.jpo.miti.go.jp) and Kotabe (1991).

[108] My review of the literature provided no evidence of cultural conflicts associated with Confucian philosophy with the establishment of IPR institutions in Japan during the Meiji Reforms. While the modern Chinese polities have claimed the lack of effective IPR institutions as the result of Confucian influences, the Japanese experience indicates that such claims may be justifications, rather than a cause of ineffectual IPR institutions in modern Chinese polities.

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development of consumer markets and demands for a wider variety of goods.[109] Increased consumption, factor inputs, and colonization created a wealthier, and increasingly innovative Japan.[110] The descent into global war and increased control of the military over the economy in the 1930's had effects on not only the patenting system, but the operation of the economy itself.

The coming of World War II fundamentally changed Japan's economic system. The war mobilization law of 1938 placed legal restrictions on dividends and restricted shareholder rights. Workers were restricted from changing jobs and wages were controlled. This was the forerunner of the post-war seniority wage system.[111] Subcontracting was encouraged for parts in order to speed the delivery of war-time materiel. Also of lasting importance was the banking law enacted in 1942 governing the Bank of Japan which relied on Nazi Germany's Reichsbank Act which is still the governing statute, as amended. Companies were forced to borrow from government-controlled banks rather than capital markets to ensure war-time objectives. As Johnson (1982) and other theorists detail, the post-war era enhanced the government's role in the economy due to the demands of post-war reconstruction and the American occupation government's desire to rebuild Japan at the expense of freer markets to counter the expansion of communism.

The implications for IPR institutional development was that the state was to continue to play as large a role as it did during the war years. The result was that the

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[109] Allen (1981).

[110] Nariai (1984).

[111] Johnson (1995) pp. 31-32.

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right grantor was willing to utilize a patent system that reflected its post-war development goals. For example, recall that the origin of the patent law was based on German models and a civil law system, rather than common law. The German model differentiates between patent and design grants, where the U.S. system incorporates design models in the patent, if it is deemed to be novel.[112] The difference is that incremental design improvements to existing patents and designs are acceptable in Japan whereas in the U.S. they are not generally allowed. As Japan rebuilt its economy after the war it proceeded to allow closer cooperation between Japanese firms and also to allow an aggressive policy of licensing technology from abroad.[113] As will be detailed below, the goals of the Japanese government to allow licensing and to not enforce patent statutes readily for foreign applicants resulted in a number of diplomatic disputes. By the 1980's Japan's economy was as large and sophisticated as any in the world and gradual reform of the patent system occurred as its economy emerged from the war.

Post-War Patent Law and Procedures

The patent-right grantor in Japan is the Japan Patent Office (JPO) under the administrative auspices of MITI, with its commissioner regularly rotated from other MITI administrative divisions to head the office. The involvement of MITI exemplifies the relationship between economic development goals of the state and technological development. The patent law currently in force is Law Number 121 of 1959 and has

[112] Finnegan, Toyosaki, and Conlin (1977).

[113] See Chiang (1995) p. 42 and Samuels (1994) pp. 270-278.

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been amended regularly since its promulgation. The law's objective is "to encourage inventions by promoting their protection and utilization and thereby contribute to the development of industry."[114] Note that the U.S. objective stated in the Constitution is "to promote the progress of...useful arts,"[115] The differences between the two principles also demonstrates how the Japanese law was tied more to goals of development, compared to U.S. views of patents as a private property right for an inventor. While undoubtedly the U.S. patent system promotes economic development implicitly, the Japanese law states it explicitly.

The Japanese patent system from its origin placed a higher priority on economic development than in the U.S. and was seen as a means for transferring technology more quickly to benefit economic development as reflected in its patent-granting procedure.[116] It should be noted that the U.S. patent system was established in the 1790's when patent regulations were a lower priority, but in the last decade of the 19th century patents also were an emerging priority in the U.S. as well as Japan. In an institutional context, the U.S. system had deeper roots in common law traditions, and once established, shaped the subsequent institutional development of IPR granting systems and the judiciary's role in adjudicating disputes. U.S. patent system rules are more broadly defined than Japan's, allowing the U.S. federal court system to develop the details via the rules of precedence. Conversely, Japan's patent system, based on civil law procedures, places its emphasis on

[114] Article 1, Patent Law of Japan.

[115] Article 1 of the U.S. Constitution.

[116] See Samuels (1994) Chapter 2 for historical background on the relationship between the Japanese government and technological development. Also see Finnegan, Toyosaki, and Conlin (1977) for a discussion of the different goals of the patent laws.

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detailed legislation by the Diet, and therefore requires strict applications of regulation and bureaucratic control by the JPO compared to the USPTO.[117]

By establishing the Japanese IPR system a century later than the U.S. and with the significant innovations of the Meiji reforms, the Japanese law was able to get right to the point on its goals explicitly and the effect was that patents could be utilized more directly as a tool of development policy. The tradition of the USPTO's relative independence - rooted in its constitutional origins, official neglect, and strengthened by the development of stronger antitrust traditions during Theodore Roosevelt's administration, has resulted in IPR rules not linked as closely to industrial policy goals. On the other hand, the right grantor and right seekers in Japan had a much closer relationship in the early phases of IPR system development than in the United States, and this is reflected in the basic operation and procedures of the JPO.

Significantly, Japan has a first-to-file patent system rather than the U.S. system of first-to-invent.[118] First-to-file systems rely on the patentee to file their application in a timely manner thereby ensuring proper disclosure in exchange for patent protection. This is believed to limit the number of lawsuits related to patents, unlike in the first-to-invent system, a challenge could occur after the patent has been issued.[119] The inventor, it is reasoned, would have the advantage in making the first application in any case, a first-to-file system therefore reduces spurious lawsuits. However, with the sunk costs of modern

[117] See Kotabe (1991) p. 150, Finnegan, Toyosaki, and Conlin (1977) p.5; and Ryan (1998) p. 39.

[118] See www.jpo.miti.go.jp for patent filing procedures and "first-to-file" regulations. Kotabe (1991) p. 150 indicates that the only states with "first-to-invent" rules are the U.S., Canada, and the Philippines.

[119] Ryan (1998), p. 38 and Kotabe (1991) p. 151.

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R&D, an inventor would still have the opportunity for a hearing if the inventor lacked the legal department to initiate first-to-file applications as quickly as a better-endowed competitor. Furthermore, a first-to-file system requires more secrecy during the initial phases of research because publishing aspects of the research in a journal would not disallow another firm's application in a first-to-file system.

While the potential for litigation exists in the U.S. first-to-invent system, publication for research breakthroughs are not penalized for tardy patent applications. The U.S. allows one year from publication for a proper patent application, otherwise the information is viewed as prior art and then fair game for any applicant to utilize.[120] The implications for university and non-profit research are that first-to-file systems require a level of secrecy, if the researcher wishes to acquire a patent for the research. Clearly both systems require a certain level of secrecy prior to application, but first-to-file systems on the surface require more secrecy. One aspect of the WTO agreement and the PCT is that members must acknowledge applications filed in other states or at the PCT clearing office at WIPO, requiring states to ensure more secrecy in guarding applications in general than in the past. Prior to 1994, Japan "laid open" the patent application for eighteen months for public scrutiny, but since then has kept applications in strict secrecy for the first eighteen months after application, then laying it open for public scrutiny.[121]

As previously discussed, the JPO has allowed the scope of the patent law to be more narrowly defined in terms of the novelty of the patent. If a patent can be incrementally improved upon, a new patent may be granted more easily than under the

[120] Aoki (1993/94) p. 211.

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U.S. system. From a policy perspective, the two main reasons for this difference were that patents were viewed as a means to transfer technology and that it was hoped a wider variety of goods would be produced thereby increasing sales and national wealth. Furthermore, it must be noted that while more liberal than many Western states in the interpretation of patentability, Japan's novelty rules are more similar to most developed states than the U.S. system.

In this sense, it is my opinion that the first-to-invent system in the U.S. was a historical accident, not an intentional policy of the founders. U.S. rules were formed in the 1790's when acquiring military technologies was not a high priority as it would be in the late 19th century when European (and Japanese) patent laws were reformed to emphasize the first-to-file system in their eagerness to build sophisticated militaries during their descent to regional and global conflicts. Despite the historical legacies, narrowing the scope of the patent in Japan has created disputes from abroad and internally in the modern era. First-to-file systems only favor the fastest to file, not necessarily the inventor. Adjudicating such disputes is another source of differentiation from the U.S. system, yet is not all that unique from many other states' patent institutions.

Infringement and the Role of the Judiciary

Unlike the U.S. lack of criminal penalties and similar to most members of WIPO, Japan provides for criminal as well as civil penalties for patent infringement. Criminal

[121] Article 64, Law 121, Patent Law of Japan. Changed per Article 39 of the TRIPS agreement.

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penalties include up to five years of imprisonment with labor and fines up to 5,000,000 yen.[122] A patentee has the right to initiate civil litigation, claim damages, and the defendant's profits.[123] However, punitive damages are up to the discretion of the court based on willful negligence. Furthermore, the court can order the removal of infringed items from the market and that the infringement cease, but unlike the U.S. such injunctions are rarely imposed in Japan and do not necessarily order the cessation of manufacturing during the period that the case is heard.[124]

The Japanese legal system is based on civil law procedures that place more emphasis on statute and regulations than on common law attention to legal precedent. The origins of the current Japanese legal system has a basis in customary law and the subsequent reforms of the Meiji period in the latter half of the 19th century.[125] Legal reform was high on the list of actions taken by the Meiji leadership in order to demonstrate to Western powers that their court system was reliable.[126] Treaties had removed some foreigners from the jurisdiction of local courts (extraterritoriality), and to revise the terms Japan needed to demonstrate reliability and fairness in its legal proceedings. Throughout the late 19th century, Japan built a court system that relied on training judges, prosecutors and attorneys at the developing university system.

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[122] Article 196, Law 121 as amended.

[123] Article 102, Law 121 as amended.

[124] Article 100, Law 121 as amended. See Helfgott (1990) and Chiang (1995) on use of injunctions.

[125] Nakamura (1964).

[126] Ramseyer (1996).

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The legal system borrowed from European civil law systems that generated statutes and complex codes to guide legal administration. Property rights and IPR both were developed during the late 19th century formation of the Japanese legal system, but with continental tones. The U.S. and British common law practice relied on the courts and legal action to determine the detail of the patent system such as validity, injunctions, and remedies. The Japanese system relied on the leadership of statutes as executed by the JPO, with the courts as a last resort arbitrator.[127] The common law is a system of implied rights, defensible in the courts, while the civil law system of Japan is made of specific rights, executed by the JPO.

As a result of relying on the JPO, the Japanese courts lack the technical expertise that U.S. patent courts possess and therefore have less reliable legal precedence in patent issues.[128] Examiners at the JPO are often relied upon by the courts when dealing with patent issues. Rather than different examiners being required by the court to review rejected applications that are contested, the courts rarely reverse the decisions of the JPO.[129] Recalling the procedure of the U.S. with reexamination by an appointed committee comprised of USPTO career bureaucrats, administrative judges and presidential appointees; the Japanese reexamination process limits the legal options available to the applicant and in fact, legal challenges regarding patents are rare in Japan,

[127] Finnegan, Toyosaki, and Conlin (1979) pp. 5-6.

[128] Helfgott (1990).

[129] Chiang (1995) p. 43.

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especially by Japanese firms.[130] With the courts lacking expertise, the Japanese patent system is dependent on the decisions and policies of the JPO which has been characterized as chronically understaffed which has led to numerous diplomatic disputes.

Disputes and Diplomacy

Criticisms of the Japanese patent system often are leveled at the JPO directly due to its execution of patent statutes and the low rate of judicial review of JPO decisions. Getting a patent grant in Japan has been difficult and time consuming for both foreign and domestic applicants and subsequently a diplomatic point for disputes. Since the 1960's it has been argued that the JPO has been chronically understaffed as a means to discriminate against foreign applicants by excessively long pendency periods.[131] For example, U.S. patent grants typically require no more than two to three years from date of application regardless of nationality of the applicant, where in Japan pendency periods required three to five years from date of application prior to the1990's.

Significantly, before reform of the JPO's secrecy regulations in 1994, a patent was laid open for anyone to review and since the Japanese patenting system allows for more patentable-incremental innovations than the U.S. and other states' systems, it was an unending source of friction between Japanese and foreign states' firms. For example, the rules for patent applications in Japan versus the U.S. resulted in U.S. patents

[130] Out of a comparatively low 288 total patent cases adjudicated in Japan during 1996, 30 criminal and 43 civil cases were affirmed. See JPO patent cases statistics at www.jpo.miti.go.jp/.

[131] See Ryan (1998) p. 39; Chiang (1995) p. 42; Kotabe (1991).

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possessing 35% more claims per patent than a typical Japanese patent grant.[132] This does not necessarily imply discrimination, but rather a set of different rules that U.S. firms' innovation patterns were not attuned. Nonetheless, while the patent rules were different, staffing was a chronic problem for decades at the JPO.

There are two main reasons for the lack of staffing at the JPO. The first is Japan's dramatic economic growth that resulted in a quadrupling of domestic patent applications between the late 1960's through the 1980's.[133] In 1986 the workload for JPO patent examiners was 152.2 applications per examiner compared to 54 applications per examiner at the USPTO. This reflects numbers after the JPO efforts to increase the number of examiners.[134] On the surface the ratio provides a straightforward explanation for the multi-year delays on patent approvals compared to the one to two year rate of approval in the U.S. Due to more patent applications as a result of the narrower scope, the workload is higher in Japan, but considering that U.S. patent applications are more complicated with more claims per application raises more questions. For instance, it can be contended that staffing at the JPO was low as a function of informal development policy.

Due to the JPO laying open the patent application upon receipt and allowing incremental improvements, there were incentives for both the Japanese right seekers and the grantors to maintain the understaffing of the JPO so that patent application

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[132] Ryan (1998) p. 39.

[133] Derived from WIPO's annual patent statistics published in Industrial Property Statistics.

[134] Data obtained from (1988) "The Effect of the Japanese Patent System on American Business: Hearing Before the Subcommittee on Foreign Commerce and Tourism of the Senate Committee on Commerce, Science, and Transportation," 100th Congress, 2nd Session.

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information could be obtained by domestic industry to file patents derived from the open patent applications. By the late 1970's, however, even domestic right seekers were calling for improvement in the delays in patent grants. The reasons included that Japanese firms were now first-rate producers of technology and advanced products and they desired more secrecy and speedy pendency for their applications in order to derive more income from their innovations. Combined with the fact that Japanese firms' innovations could be also incrementally improved upon by competitors, demands increased for reforms. This fulfilled the requirement of Riker and Sened's model that a property right must be high in utility and have value or it will not be pursued.

As all reforms take time to implement, it required years for the JPO to improve its turn-around rate by training new examiners, but by the mid 1990's steady improvement in approval time was achieved, as well as new regulations requiring secrecy of applications for a period of 18 months. Furthermore, a five year extension could be obtained if it was proven that the pendency period was unnecessarily delayed by the JPO.[135]

An extreme example of the slow rate of approval by the JPO tied to development policy is the case of Texas Instruments. In 1960, Texas Instruments applied for a patent for its integrated circuit, but it was not until 1989 that the grant was given by the JPO, valid until November 2001.[136] Clearly, diplomatic pressure did not provide speedy redress in this case. Complaints had been lodged for over 30 years over pendency

[135] See (www.jpo.miti.go.jp/).

[136] Johnson (1995) p. 74-75.

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periods, but as the Japanese economy became more sophisticated, albeit with MITI's protection, domestic-right seeking coupled with foreign-right seekers resulted in changes to the JPO and its management of patent applications.

Cross-licensing Issues

Similar complaints about Japan's patent system were tied to cross-licensing requirements. Japan has had a system that required compulsory licensing for decades where the U.S. system has very narrow compulsory licensing procedures. In Japan, competitors were allowed to utilize the laid-open applications for not only incremental improvements, but also were able to engage in research without paying royalties or penalties from utilizing the open application.[137] Competitors forced the inventor in Japan to cross-license for its incremental improvements to the patent, contrary to U.S. common law that has, through a series of rulings, made compulsory cross-licensing illegal.[138]

MITI frequently utilized patents and cross-licensing as a component of its development strategy before the 1970's. For example, when IBM wanted to establish a subsidiary in Japan in 1960, MITI required that IBM sell its related patent portfolio to several Japanese firms as a condition of incorporation.[139] Similarly as part of a four year dispute ending in 1968, Texas Instruments was required by MITI to form a joint venture

[137] Kotabe (1991) p. 155. Licensing issues have been left up to the individual WTO member state's policy.

[138] Case resolved in 1963, U.S. v. Singer Manufacturing Co., 374 U.S. 174.

[139] Anchordoguy (1989).

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with Sony, limit its production and provide cross-licensing of its technology to its main competitors including NEC, Mitsubishi, Toshiba, Hitachi and Sony.[140]

Since 1988 multiple claims in patents have been allowed resulting in fewer cross-licensing disputes in Japan since a patent may assume more claims than had been previously allowed. Nonetheless, Japan had reduced the incentives for foreign applicants to apply for patents in Japan until the late 1980's, undoubtedly reducing the potential flow of technology. Also, Japanese firms were protected during a development phase and after achieving a level of technological competency, required more stringent patent rules to keep Japanese innovations from being obtained in the way they had obtained the technologies to get themselves started.

Japanese Versus English

Another source of diplomatic friction was that Japanese patents were required to be prepared in the Japanese language creating added costs and delays for not only a native speaker of English, but for many other nationals who use English as a language of commerce. On the surface, the requirement of only utilizing one's national language seems to be perfectly reasonable, considering that is the same as the American requirement. However, like Latin in past eras, English is a recognized language of commerce throughout the world and is utilized, for example, in business transactions between Chinese and Korean business people. For decades, English has been recognized

[140] Helfgott (1990).

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by many states for patent applications as a speedy means to process applications from around the world.

Furthermore English had been a recognized language of the PCT and various WIPO conventions more for its high utility in communication rather than an imperialistic legacy. The use of Japanese exclusively in patent applications undoubtedly caused delays and hence advantages to Japanese patentees, especially when considering the first-to-file system and laying open the application. Similar to other reforms, the JPO agreed, after decades of complaints from around the globe, to accept English for patent applications in 1995.[141] The decision to utilize English was less an acquiescence to diplomatic pressure as a function of seeking higher utility.

By the 1980's in order for a Japanese inventor to compete quickly and efficiently in the global intellectual property market, Japanese firms and inventors were preparing applications in English as well as Japanese in order to file timely with the PCT and such large markets as the U.S. The use of English was an efficient means to have a patent application ready for submission all over the world and Japanese right seekers were already preparing English language patent applications in any case well before 1995. The JPO simply agreed to a global IPR standard established well before the WTO treaty agreement. English is not required by the TRIPS agreement, but the PCT does accept English as do many states other than just English-speaking states.

Undoubtedly during its development, Japan utilized many strategies including open applications, cross-licensing, and language to favor Japanese firms over foreign

[141] See (www.jpo.miti.go.jp/).

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firms giving them advantages in acquiring and utilizing intellectual property. What is less persuasive is that diplomatic pressure was effective in creating a standard IPR-granting system in Japan for both domestic and foreign applicants. In fact, even when diplomatic pressure was brought to bear on specific cases such as IBM and Texas Instruments, it simply failed and the U.S. firms had to accept the conditions as a requirement for doing business in Japan. Why has the JPO undergone more reform in the late 1980's and the 1990's? IPR reform has been a function of internal reform and economic restructuring inside of Japan, not the effect of outside diplomatic pressure. During the MITI-led post-war period, large firms were favored over smaller firms and IPR policy clearly favored large firms. The right seekers were firms tied to the fascist war-time government and they continued to benefit from government tutelage, but over time, the economy was transformed and new right-seekers emerged.

Right Seekers

Right seeking steadily increased in Japan during the study period rising from 40,728 patent grants in 1975 to averaging over 60,000 patent grants by the end of the 1980's.[142] Anomalous years where total patent grants fluctuate are attributed to problems associated with understaffing at the JPO that resulted in backlogs for applications and increased pendency periods. As in the other cases selected for this study, economic growth is strongly associated with increases in the number of patents granted (see

[142] Source: World Intellectual Property Organization (1975-1990).

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Chapter Five). As noted in the previous section, diplomatic disputes over patenting in Japan were long-term and not readily resolved from the 1960's through the 1980's and patent granting increased regardless of the status of the diplomatic disputes. Right seeking, by both foreign and domestic sources, has driven the demand for improved patent-granting procedures. An important aspect of Japan's patenting system is that large firms have been favored by MITI and therefore the JPO which is subject to MITI's control.

In Japan, the right seekers are, for the most part, large industrial conglomerates compared to a more diverse number and size of firms and individuals who seek patents in the United States. The reasons for the differences in patenting activity are traced to the role of MITI and its emphasis on promoting large firms after World War II and the differences in the sources of finance in the two states. Despite recent financial reforms, Japanese firms rely more on obtaining capital through bank finance rather than capital markets which is more common in the U.S. Since it may be difficult for a start-up firm or an entrepreneur to gain the confidence of a bank's loan department compared to a large firm's assets available for collateral, Japanese banks tend to favor large corporate customers over more risky start-ups.

Historically, the venture capital market in Japan has not been comparatively active as other states and has not promoted the creation of new innovative firms as quickly or as abundantly compared to the U.S.[143] The result has been that innovation is tied to large conglomerates and their closely related affiliates who are more readily able

[143] See Rosenberg, Landau and Mowery (1992).

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to finance innovative activity in house or via their banking relationships. The implications for patenting has been a long term trend of the majority of patent awards being granted primarily to large firms in Japan that has only recently diversified to a broader range of firms by the end of the 1980's.[144]

Patent Flooding

Patent flooding, associated with the past limits on the scope of patentability, also favored large firms over smaller firms. Recall the practice of allowing open applications and limited scope of patents discussed in the previous section, prior to reforms the rules resulted in increasing the number of derived applications per patent application which allowed firms with more resources (large conglomerates) to create more patents downstream per application. Smaller, innovative firms were unable to match the rate of applications of the large conglomerates thereby decreasing future financial gains from its sunk R&D costs which deterred market entry.[145] The philosophy of MITI favoring large firms leading general economic development goals encouraged large firms to engage in patent flooding at the expense of other potentially innovative firms in Japan.

Patenting in Japan, therefore, has been dominated by large firms at the expense of smaller innovative firms. Statistically, a small number of firms are responsible for a majority of patents not only in Japan, but also overseas. Typifying the concentration of patent activity in a small number of firms in Japan has spilled over to the U.S. where in

[144] Management and Coordination Agency (1991).

[145] See Ryan (1998) p. 39; Kotabe (1991) pp. 153, 159, 165; Johnson (1995) p. 75 for discussions of patent flooding.

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1995 eight of the top ten firms patenting in the U.S. were Japanese-based.[146] The data indicates that this concentration is not the result of Japanese domination of patenting in the U.S. which accounts for around one percent of total patents granted, but rather indicates that a smaller number of firms are engaged and concentrated in innovative activities in Japan. Since the 1980's the concentration of patenting has diversified to more firms than the traditional champions promoted by MITI, but still has a long ways to go to meet the level of diversity of firms in the U.S.[147] One reason for the increasing diversification has been reforms in allowing a patent application to contain more functions than previously allowed so smaller firms can recoup R&D costs.

Another important reason is that as the Japanese economy grew during the post-war era, so too did the raw number of science and engineering personnel grow.[148] Simply put, more science and engineering personnel created more potential right seekers who may potentially patent. Not all science and engineering personnel working on research directly apply for patent protection, however the increase in this aspect of the workforce increases the potential for public or private organizations to generate more patents. This relationship will be demonstrated statistically in Chapter Five. The patent application may only name the lead patentees and their firm, but nonetheless modern research often requires more personnel than actually cited in the patent application. Typically in all five cases examined, the lead researchers are cited in the patents along with their corporate entities, unless they are applying as individuals. As discussed in Chapter Two, corporate

[146] See National Science Foundation (1998) p. 6.19.

[147] Management and Coordination Agency (1991).

[148] See National Science Foundation (1993) p. 122; Baba and Suzuki (1995) pp. 277-278.

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entities are the majority of applicants in the U.S. as well as in all five cases, but individuals also are an important source of patenting activity generally. In any case, even corporate applicants for patents require science and engineering personnel in order to conduct research so therefore it is a reasonable independent variable to investigate.

The economic malaise of the 1990's in Japan created for the first time in the post-war era layoffs and hiring freezes at many large conglomerates. Coupled with reforms in the patent and financial system, a greater diversity of innovative firms began to slowly take advantage of a more mobile labor pool.[149] General economic growth that created more potential right-seekers combined with economic and patent system reforms should continue the trend of diversifying the pool of patent applications and innovative activity, should right-seekers continue to pressure for reform.

Japan Summary

Japan's patent system is rooted in the Meiji reforms when the right grantor sought to increase the flow of technology and innovative activity in Japan to meet the challenges of Western expansion. Right-seeking classes developed in Japan as it quickly modernized and developed an industrial base. The rise of the military government on the eve of World War II increased the role of the state in managing the economy that had lasting effects on the patent system throughout the second half of the 20th century. Under the guiding hand of MITI, innovative activity was focused on targeted firms that grew into some of the largest technology-generating firms in the world at the expense of a

[149] Wall Street Journal (12/29/2000) p. A1.

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more diverse technology-generation base. Nonetheless, as the economy grew to developed status, so too did the raw number of potential right seekers in the form of science and engineering personnel and firms.

The JPO developed along side the economy under the guidance of MITI and met the demands of more diverse class of right seekers in Japan. While undoubtedly favoring large conglomerates and Japanese-based firms in particular, the JPO's rules and administration of patent statutes developed in complexity and utility between the 1960's and 1990's. Diplomacy had negligible effect in creating the reforms of the patent system as typified by decades-long disputes on cross-licensing, staffing and patent pendency, scope of patentability, language, and secrecy issues. The key point for understanding the reforms of the Japanese patent system is that when Japan had reached a level of technological competency and diversity, reforms became necessary to meet the demands of Japanese firms conducting business in the global marketplace.

The demands of foreign right seekers converged with domestic right seekers because Japan's right seekers required a patent system that was easier to navigate, did not discriminate against non-MITI backed firms, and reduced legal claims. Reform implementation has been slow, but by the mid-1990's the Japanese patent system has largely met basic global standards of effectiveness on its own terms and diplomatic complaints have practically disappeared. Another reason that diplomatic pressures decreased was that foreign patent applicants have educated themselves to better

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understand how the Japanese patent system works.[150] By the 1980's, Japan possessed one of the largest consumer markets in the world and foreign applicants have become more savvy in their entry to the Japanese market.

While undoubtedly Japanese internal economic reforms have aided foreign market entry in Japan, reduced foreign pressures to reform the Japanese patent system can be understood in a choice framework. With increased certainty in the equal application of the rules of the Japanese patent system, foreign right seekers adjusted to the rules of the game rather than expending energy vainly trying to recreate a patent system in their home state's image. Once the rules governing patents were clarified and implemented under domestic pressures, navigating the system was easier and higher in utility and financial rewards. The historic trend is clear for both the United States and Japan: first industrial economic development occurs followed by technological development and sophistication. During the process of developing a diversified economy, viable institutions and rules are developed that protect and foster property rights and then intellectual property rights systems develop. The development of property rights and reliable institutions are critical in developing intellectual property and in order to further test my theory, the analysis will now turn to a late developer, the Republic of Korea.

[150] See Kotabe (1991) p. 165-166 for an excellent analysis that argues that Japanese firms had to understand the U.S. patent system for over 40 years to survive while U.S. firms have only recently begun to learn the rules of the game in Japan.

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Korea

The Korean intellectual property system provides different aspects to test my theory of comparative intellectual property development. My theory indicates that first, a basic property rights system must be established that propels capitalist development. As capitalist development increases, technological sophistication increases that subsequently increases the demand for reliable institutions that grant and protect intellectual property rights. If the coercive use of diplomacy was causal in Korea, then I would expect U.S. diplomatic actions to have greater effect than what had occurred due to the influential role that the U.S. has played in peninsula affairs since the civil war. My analysis will demonstrate that despite U.S. influence, the effectiveness of Korea's intellectual property system was linked to its internal economic and political development.

From a political and economic perspective, Korea provides a more difficult test for a number of reasons. First, both the U.S. and Japan experienced longer time-frames to develop basic capitalist institutions and therefore IPR institutions than Korea due to its late economic development in the last few decades of the 20th century. Second, due to the Korean Civil War in the early 1950's and ongoing division of the peninsula since, the government of the Republic of Korea was nominally a republic in name only until the late 1980's. From the civil war through the 1980's, civil liberties and the rule of law were often shunt aside in the name of national security.

Korea's development process proceeded under close government supervision that favored key champion industries known as chaebols. The policies favoring chaebols resulted in the development of some of the largest industrial firms in the world, and a

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standard of living that rivals many developed states. The cost of rapid development was a suspension of civil rights that eventually created its own demise by creating an educated middle class and other internal dissent that was particularly active during the 1980's. Another cost was that favored industries were also allowed by the government to engage in copyright and patent infringement during the 1970's and the 1980's that was as widespread as any state during the period. Korea's path to economic development was more rapid than perhaps any state up to that time and as a consequence, the basic institutions of the rule of law and subsequently intellectual property institutions were poorly developed. However, during the late 1980's and the early 1990's, Korea's intellectual property system became firmly established, also perhaps faster than any other state up to that time. Why did Korea's IPR system lag in its development, but in the space of only a few years emerge as an effective institution?

Korea possessed no tradition of intellectual property protection prior to 1970 and only a limited-industrial base. In less than a generation, a viable IPR system emerged parallel to industrial development. Complaints from abroad regarding infringement were increasingly vocal from the 1970's through the late 1980's. For over twenty years diplomats were lodging complaints and following up their home-state's firms IPR interests with minimal effect. Rapidly in the late 1980's, Korea reformed its IPR system and seemingly capitulated to foreign demands. Why comply in the late 1980's and not before? Basically, Korea had rapidly developed and diversified its economy so that by the late 1980's domestic pressure to reform the political and legal system was initiated.

Compliance became possible only when Korea had achieved a critical level of right seekers that the right grantor could no longer afford to ignore. General reforms led

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to more specific reforms including the IPR system that now possessed a diverse pool of firms and individuals who sought intellectual property rights. It is persuasive to view diplomatic success as a cause rather than a consequence, but IPR effectiveness occurred for Korea when it achieved a critical level of economic and political development. Development itself created new right seekers who had generated intellectual property to protect inside the state and abroad.

Historical Origins

The path to an independent intellectual property institution in Korea has its 20th century origins in two foreign occupations and the subsequent rapid economic development after the civil war of 1950 to 1953. Traditional Confucian concepts of knowledge as a public good rather than as private property were likely to have been prevalent prior to the occupation. However, there is no evidence presented in the literature that modern copyright or patent concepts were controversial topics prior to the 1970's in Korea. Utilizing Confucian ideology to oppose IPR reform after the 1970's is linked to problems of justification of non-compliance rather than deeply held cultural values of intellectual property in Korea.

A reason that Confucian philosophy on IPR was unimportant during the industrial transformation of Korea is that property rights in intellectual property were unimportant in pre-industrial Korea. Commercial activity in Korea had been largely agriculturally based prior to the occupation. Confucian ideology became important in Korean IPR issues when Korea was producing intellectual property on a large scale beginning in the 1970's. Intellectual property becomes important in an economy when industrial

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development creates valuable inventions worth defending in order to garner profit. Korea's experience is therefore consistent with IPR institutional development in the U.S. and Japan, albeit more rapidly and nearer to the present time. The use of Confucian ideology was a modern reconstruction in order to justify exclusion of foreign intellectual property holders from market access and to protect domestic production of intellectual property based on foreign sources. The history of IPR development in Korea demonstrates the efficacy of my contention.

Prior to the 20th century, Korea was frequently divided into smaller kingdoms or decentralized under feudal structures that were largely isolated from foreign influences and can be characterized as a pre-industrial agrarian society.[151] Property rights during the Yi Dynasty (1392-1910) were based on hereditary rights to land that concentrated ownership in elites which were largely unchanged until the 20th century. Merchant classes increased their foreign trade activity during the last half of the 19th century which subsequently increased general commercial activity.[152] The increase in trade provided capital and incremental improvements to the technological capabilities in Korea. Market-based institutions governing commerce improved in their efficiency in the late 19th century, but the economy was still overwhelmingly agrarian and industrial activity was not greatly expanded until the beginning of the Japanese occupation.

[151] For historical background on Korea see Rees (1988) and Eckert, et al (1990).

[152] See McNamara (1996).

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Occupation, Civil War and Modernization

Early in Japan's 20th century imperial expansion, Korea was formally annexed in 1910 and Japanese legal structures were imposed, including the patent laws which were applied under the occupation government.[153] Recalling that the Japanese patent law had been revised in 1888 after German patent statutes under a civil law system, it is reasonable to posit that the Korean patent system has little in the way of indigenous influences at that time. The occupation by Japan resulted in industrial, educational, and basic infrastructure development that laid the foundation for post-civil war development. Liberation from Japan was tempered by the U.S. occupation from 1945 until the establishment of the Republic of Korea in the southern half of the peninsula in 1948.

Under the U.S. occupation, the Patent Bureau was established in 1946. The Patent Act of 1946 was promulgated by the U.S. military government, but with the establishment of the Republic, the patent laws were revised once again under German and civil law parameters.[154] The patent law currently in effect was established in 1961 and has been regularly amended since then. Note that Korea's modern patent law was established within a decade of both the U.S. (1952) and Japan (1959) modern counterparts. However, the Korean patent law underwent many more revisions before 1990, parallel to its own remarkable economic development of industry and its own consumer market growth.

[153] Gadbaw (1988) p. 292.

[154] See KIPO's web page (www.kipo.go.kr) and Gadbaw (1988) p. 292.

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After the civil war, Korea was devastated and had possessed a limited industrial capacity before the war. Building on its colonial base, the Korean textile industry emerged as a leader in revitalizing the economy during the 1950's. While not as technologically sophisticated as later industries, textiles allowed for export-led growth and financed the expansion of key chaebols such as Hyundai, Samsung, and Daewoo who later diversified into areas such as consumer electronics and heavy industry. U.S. military and economic aid were important in their post-war reconstruction. The U.S. provided more aid to Korea than any other state except Israel and South Vietnam between 1946 and 1976. The aid was provided in the form of grants so that Korea could avoid accumulating debt during the early phases of its industrial expansion.[155]

The U.S. government provided aid and market access as part of its strategy in containing communism and as a result allowed Korean firms import preferences under the General System of Preferences (GSP) which lowered tariffs as well as increased textile quotas. The U.S. also encouraged its firms to invest in Korean manufacturing ventures which increased the flow of technology and expertise to rapidly modernize Korean industry. Finally, Korea benefited from supporting the U.S. effort in Vietnam by supplying 300,000 troops in exchange for over $1 billion in construction contracts and other assistance to firms such as Hyundai and Hanjin.

Internally, the Korean government followed development policies similar to Japan's MITI that targeted key manufacturing areas for growth and a general policy of import substitution. A difference from Japan was that land reform was more important in

[155] Eckert et al (1990) p. 396.

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Korea because the landed aristocracy maintained its hold on land through the colonial period. The turmoil of the civil war convinced many of the landed elites to initiate sales of their lands to tenants and relatives before the government initiated sales. This secured their position as capital holders and entrepreneurs in the emerging industrial order. The government also sold lands that had been held by the Japanese colonial government further diversifying the owners of property and therefore ensured a broad base of private property owners in the period immediately after the civil war. Other government policies encouraged the development of an entrepreneurial class by favoring domestic allies with foreign exchange privileges, import licenses, public contracts and aid funds. To promote exports after 1961, firms were granted special export licenses, tax breaks and financial privileges with government-backed banks.

While policies directed at the private sector provided the profits and capital for increasing industrial capacity, the government improved the education system that had been established under the Japanese colonial administration. By expanding the primary schools, technical institutes and universities, the labor pool became more literate and able to master the influx of new technologies quickly during the development phase. Korean students studied at major universities around the world and returned with research skills that propelled the growing technological sophistication. The influx of engineers, scientists and managers coupled with industrial growth and the availability of capital created perhaps the most dramatic industrial and technological development process the world has yet seen. By the 1980's, Korea had become a diverse and broadly-based economy with global leading industries producing a spectrum of advanced goods and a workforce capable of producing complex technological goods. A base of right seekers

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had been created and they began to agitate for more rights, the rule of law, and increasingly in the area of IPR, a reliable institution.

The Modern Patent System: Growing Pains and Diplomatic Pressure

According to coercive diplomacy theory, U.S. diplomatic activity should have been capable of exacting favorable treatment of U.S. IPR holders due to its position of influence outlined above, yet IPR-related complaints did not result in significant changes to the Korean IPR system until economic and political reforms transformed Korea in the late 1980's. The development of the IPR system in Korea parallels the rise of demands for more civil liberties and a responsive political system by the Korean citizenry. During the late 1970's, civil unrest increased, especially at the universities and by the labor movement. Since the end of the civil war, Korea basically had a military-backed government with briefly elected governments followed by coups.

Korea developed a national security state that pried into the private lives of its citizens, arrested and jailed dissidents, suppressed the labor movement and curtailed freedom of speech. The justification for the measures was based on the ongoing threat from the division of the peninsula, but had as much to do with the hold on power by military elites and business groups that benefited from government tutelage rather than the threat of encroaching communism. Despite the repression of dissent, the Korean economy flourished and the growing middle class and the less-favored business interests began to join the chorus for general political reform.

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The increased sophistication of Korean industry and the increased purchasing power of Korean consumers resulted in more diplomatic complaints by foreign competitors as they sought to enter Korean markets. It is important to note that Korea was undergoing a broad-based appeal for more rights and the rule of law and that the reform of the IPR system was a direct beneficiary of the process. When analyzing the responsiveness of Korea to diplomatic pressures for IPR reform throughout the 1970's and 1980's, the issues are resolved as more general rights and the rule of law are established. As in all the cases examined, the U.S. utilized bilateral negotiations via the diplomatic corps under Section 301 of the 1974 Trade Act.

Through periodic amendment, the USTR was empowered to investigate complaints and suggest sanctions if cases were unsatisfactorily unresolved. Korea had six IPR-related cases initiated against them under the statute during the 1980's (Table 1). All the cases were withdrawn without sanctions levied and, despite constant diplomatic pressure, Korea was cited on the priority watch list as recently as December 2000, providing scant evidence of effective diplomatic action.

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Table 1

USTR Section 301 Cases Initiated/Withdrawn Against Korea[156]

Date Initiated	Subject	Date Withdrawn
9/10/1985	Films: distribution	10/25/1985
11/4/1985	IPR: general protection	6/13/1988
10/5/1987	Patents: protection	11/16/1987
4/13/1988	Patents: protection/statutes/policy	5/26/1988
4/29/1988	Patents: protection	no action taken
9/15/1988	Films: distribution/importation	10/28/1988

Foreign copyright holders complained steadily during the 1970's about copyright infringement as Koreans increased their ability to buy and consume publications from overseas. The publishing industry was acting out of purely rational, utility-maximizing goals of making money and since the government favored the publishers, little action was taken to stem piracy. While it may be claimed that scholars were flattered at being copied without remuneration, publishers were motivated by making money at the expense of copyright holders.[157] After more general rights were extended and supported by the government, Korean copyright laws and practices complied with foreign and new domestic demands. By the 1990's, Korean publishers and music producers were licensees

[156] Source: www.ustr.gov/html/act301.htm.

[157] Yin (1987) claimed that authors in Korea believed it was a great honor to have their work copied.

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of American companies with new incentives to protect their licensed intellectual property.

The patent system had similar problems with foreign demands for protection from infringement. Prior to reforms of the patent laws in the late 1980's, patent protection was for a period of twelve years from its publication. For goods such as pharmaceuticals, which require years to develop and test for safety and effectiveness, the patent was practically useless.[158] In fact prior to the mid 1980's foreign applicants often bypassed obtaining patents in Korea due to the costs of applying for a patent that were difficult to recoup costs before expiration. Needless to say, American manufacturers with valuable patent portfolios agitated for more protection and pressured the USTR to name Korea under Section 301 of the Trade Act. Complaints had been lodged since the 1970's on IPR issues by the U.S. government with little result. By threatening the use of Section 301 sanctions, it has been argued that the Korean code was brought up to an acceptable American standard and an effective regime was born.[159]

Diplomatic agreements are not causal factors that create reliable IPR institutions in the Korean case. Diplomatic agreements are outcomes from disputes contingent on the prior internal development of IPR. The copyright system did improve after the revisions of the copyright laws in 1985 and 1986 and improved enforcement took place over the next decade, and these changes benefited Korean as well as foreign copyright holders. But, it must be remembered that the protection of copyrighted material also coincides

[158] Ryan (1998) p. 74.

[159] Gadbaw (1988); Ryan (1998); and Sell (1998) all contend that diplomatic pressure was central in Korean IPR compliance. All three indicate that Korea was either in statutory compliance by 1988 and generally enforced by 1990.

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with the general protection of free speech generally for the first time in Korean history. Unless one was an apologist for the government, the value of a copyright for many authors was low. For the most part, Korean copyright laws were revised after the pressure for political rights was being realized and Korea had a viable class of right seekers as well as consumers of copyrighted materials.

In regard to patents, diplomatic agreements also represent the outcome of disputes rather than a causal factor. The Korean patent system underwent a gradual evolution and repeated revisions as its economy became more sophisticated after the Japanese occupation and the civil war. Korean right seekers during the first phases of industrialization had much to gain from lax patent regulations such as the twelve year time limit. Foreign-sourced pharmaceuticals and other manufactured goods could be more quickly copied and sent to market, maximizing right seeker's and the government's utility for growing the industrial base and increasing profits at that time. By the 1980's, the only major domestic opposition to reforming the patent statutes came from the pharmaceutical industry whose markets were limited to Korean consumption. Other industries were less endangered by the changes to the patent law as Korea emerged as a major producer of electronics, automobiles and other consumer goods with important markets overseas and its own innovations that right seekers sought protection for in longer time limits and more reliable patents.

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Right Seekers

Right seeking by patent-generating firms was increasingly important in both domestic and overseas markets. Hyundai, Samsung, Daewoo, and Lucky Goldstar had their origins in traditional heavy industries, but were all producers of key computer components and high tech consumer goods by the 1980's and competed in domestic and foreign markets against each other. Domestic patenting steadily increased from 442 patent grants in 1975 to 7,762 patent grants in 1990 as the chaebols and other Korean firms increased their high technology manufacturing capacities.[160]

Participating in foreign markets that utilize intellectual property increased the incentives domestically to seek patent protection by technology-driven firms. Clearly, Korean firms had pirated technologies created abroad, but as their own capacity to create and manufacture such goods increased, demands for more effective patent rights for themselves helped to strengthen the Korean IPR institution for domestic interests as well as foreign. Competing in overseas markets, such as the U.S., increased technology-driven firms' knowledge of IPR institutions and practices. By the end of the 1980's, patenting had increased in Korea and Koreans were patenting abroad. These factors are economically driven, not diplomatically driven incentives.

An example of increased patent right seeking overseas is the U.S. market where between 1963 and 1982 Koreans firms or individuals were awarded a total of 102 U.S. patent grants.[161] However, from 1982 to 1995 Korean firms or individuals were awarded

[160] Source: WIPO (1975-1990).

[161] See National Science Board (1998) p. 6.21 for discussion of increased Korean patent-related technological expertise.

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over 4,500 U.S. patent grants with top patenting categories being in television technologies, electrical products, advanced materials and computer technologies.[162] By 1995, high tech manufacturing accounted for 15% of Korea's manufacturing output, similar to Japan's and the U.S.' percentages. Right seeking changed from preserving the status quo of simple reverse engineering to an emphasis on new innovations to keep ahead of the competition domestically and globally. Korean firms increasingly required a more reliable patent institution and longer-term protection to recoup research costs like other advanced economies.

The role of diplomacy in shaping the patent institution must be questioned in the case of Korea for another important reason. For at least two decades diplomatic pressure was applied, with increasing threats by the U.S., but sanctions were never actually applied. For sure pressure was steadily maintained, especially in the 1980's, but as I outlined above, compliance neatly converges with the emergence of a liberal democracy and general political rights in Korea. The gradual elimination of favoritism of government-targeted industries and the extension of rights allowed the Korean intellectual property system to adapt, once again, to the new demands of a sophisticated high-technology based economy. Diplomacy may have shaped some of the details of the patent statutes, but compliance with foreign demands improved in a direct correlation with the emergence of generalizing rights across Korean society. The details of how the patent institution evolved to enforce the patent statutes further demonstrates the role of domestic right seeking in shaping the present form of the Korean IPR system.

[162] See National Science Board (1998) p. 6.8 and 6.22.

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The Right Grantor: the KIPO

The right grantor in the Republic of Korea is the Korean Industrial Property Office (KIPO). KIPO has been an independent agency since 1977, but prior to this period the patent office was under the direction of the Ministry of Trade, Industry and Energy – a counterpart to MITI in Japan. The independence of the patent office from the ministry was important symbolically because it encountered similar conflicts of interest as MITI had in Japan in overseeing the patent system. Patents and the transfer of technology were seen as integral aspects of a development policy that favored champion firms like the chaebols. The decoupling of the agencies began a multi-year process of professional development and convergence with global IPR standards of KIPO that was completed in the early 1990's. The process includes joining WIPO in 1979 and the PCT system in 1984.

Like many states, the Korean patent system differentiates between patents and utility models, granting a twenty-year term for patents from the filing date in accordance with the TRIPS agreement.[163] Korea administers a first-to-file system which is similar to Japan's system, but contrary to the U.S. first-to-invent system.[164] Utilizing the first-to-file system is a vestige of the Japanese occupation and in its modern form borrowed heavily from the German code when the law was promulgated in 1948. Despite significant revisions of the patent law in 1973, the basic concepts retained the first-to-file

[163] Patent Law of 1961, as amended (Article 88).

[164] Ibid. (Article 36). For a discussion of the merits and disadvantages of the first-to-file versus the first-to-invent systems, see the previous section on Japan in this chapter.

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system due to its usefulness in benefiting Korean inventors and industry that could quickly capitalize on innovations from overseas.[165] Upon joining the PCT system in 1984, however, the KIPO was required to recognize patent applications filed properly with the PCT as a first-to-file application eliminating that advantage to Korean-based firms. KIPO employees are enjoined from divulging secrets through prison and financial penalties during the application process which provides further protection for the applicant, consistent with global standards, until the patent grant is issued and publication is required.[166]

The language of the application and supporting documentation must be in Korean and presented by a Korean agent or the applicant be domiciled in Korea for KIPO to initiate processing.[167] While a PCT application is recognized for first-to-file status, nonetheless the applicant must prepare a Korean language application in order to continue with processing the application to obtain a Korean patent grant. The acceptance of PCT applications since 1984 has eased complaints by foreign applicants regarding language restrictions and since the 1980's generally more foreign firms are domiciled in Korea with local staffs to manage applications. While the language requirement does create difficulties for foreign applicants, KIPO has created English language instructions and legal texts in printed format and on the internet in order to comply with the TRIPS agreement's provision for transparency of laws and regulations.

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[165] See Gadbaw (1988) for a historical overview of the development of the patent law of Korea.

[166] Article 225.

[167] See (www.kipo.go.kr) for application process.

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Adjudication

Dispute resolution in Korea is now actually more developed than Japan's, but had lagged for decades prior to the 1980's. During the Japanese occupation the administration of justice was carried out by the Japanese colonial government and Korean bureaucrats who collaborated with the Japanese. Japan's civil law was imported into Korea, supplanting customary law developed over centuries of feudal government. Local officials held significant sway over the legal process providing summary judgements to support colonial government decisions to maintain order. After the colonial period, the U.S. occupation continued to maintain a system that favored strong-central control of legal issues administered by local judges to maintain order in the face of civil unrest rather than imposing a common law system.[168] The result of maintaining civil law trappings under ostensibly military rule until the 1980's caused the legal system to be highly centralized with judges acting on behalf of the central government's decrees, often rejecting the rule of law in favor of centralized government dictates. Furthermore, government policies of rewarding its allies with contracts and favoritism in economic decisions left the legal system as a rubber stamp for the emerging business elites favored by the military government.

Despite the strong government/business relationships, capitalism generally took root and as the economy grew so too did a wider variety of political interest groups and political demands for a more reliable and less arbitrary legal system grew throughout the

[168] See Eckert, et al (1990) Chapter 17 for Japanese legacies; chapters 18 and 19 for post-1945 developments.

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post-civil war period. Prior to the 1980's, patent cases were rarely heard and when they were, favored the protection of local industry who were actively involved in the infringement of patents and copyrights of foreign firms.[169] Since the elite business interests had close ties to the government, further obstructions were placed in the path of foreign firms seeking to utilize the legal system for adjudication, particularly by the Ministry of Finance and its control of business licenses.

While it is attractive to associate the reform of the legal and patent systems due to outside pressures, the role of domestic political pressure cannot be ignored.[170] By the late 1970's growing dissent was chafing against the authoritarian government with massive student and civilian protests throughout the 1980's demanding basic civil rights and the rule of law. By the mid-1980's, Korean society would no longer accept the arbitrariness of the legal system that favored elites at the expense of civil liberty and it is this pressure, not external diplomatic pressure, that caused reform of the legal and political system from the 1980's through the 1990's. The lack of observing the role of domestic pressure for reform by many IPR theorists is simply lackadaisical attention to the realities of Korean history. The development of an equitable and reliable legal system in Korea came at great personal costs to many Korean activists, and if overlaid with the reform of the legal and subsequently the patent systems, diplomatic agreements were secured for foreign interests only after the price of reform had been paid by the Korean populace. Consistent

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[169] Gadbaw (1988) p. 273 and Ryan (1998) p. 75. Foreign copyright violations resulted in claimed losses of $150 million annually by the early 1980's.

[170] See Ryan (1998); Sell (1998); and Gadbaw (1988) are examples that reform was the result more of external pressures than domestic pressure for reform.

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with Riker and Sened's model, rights are the result of the interaction of the right seekers and the right grantors, but sometimes the process can be very difficult indeed.

By the mid-1980's the influence of the military government eased and the agitation for reforms took hold in the legal system as a professional legal profession emerged. The increasing independence of KIPO and the judiciary over the decade resulted in a more equitable distribution of justice that was better able to execute and enforce the patent laws. Like Japan but unlike the U.S., penal provisions were established for patent infringement that included up to a five year prison term and fine not to exceed 50,000,000 won.[171] Civil litigation is also allowed with damages based on profits derived from infringement as well as punitive damages based on willful infringement determined by the presiding judge.[172] Prosecution is initiated with the filing of complaint and the patentee ask for a preliminary injunction and destruction of the goods prior to final judgment – more similar to U.S. injunctions than Japanese law allows.[173]

Disputes prior to patent granting over the examination or application process are resolved at the Industrial Property Tribunal similar to the U.S. system of providing an impartial review process, but lacking in the Japanese system.[174] Recall that the Japanese system's judicial-appellate system relied heavily on the advice of professionals from the JPO and that patent appeals were rare due to this relationship. Similar to the U.S.

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[171] Article 225.

[172] Article 128.

[173] Article 126.

[174] Article 132.

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appellate system, Korea established the Patent Court of Korea which hears both normal disputes regarding infringement as well as appeals from the rulings of the Industrial Property Tribunal.[175]

Appeals to the Patent Court of Korea can also be heard if the injured party believes that the compensatory damages are inadequate from the lower courts. The establishment of the rule of law during the mid-1980's and its subsequent evolution in the next decade has played an important role in making the patent-granting system more reliable and consistent for both foreign and domestic applicants alike. By the early 1990's both theorists and the U.S. government agree that the basic patent granting system not only met global IPR standards, but also is relatively fair in its application.[176]

Korea Summary

The history of the Korean patent institution lends support for my theory for the development of intellectual property rights. Before the 20th century, Korea possessed limited industrial and technological capability and therefore no IPR system due to the lack of right seeking. Confucian ideology has no apparent role in IPR institutional development until the 1970's. Prior to the Korean Civil War, the right grantor, the Japanese and American occupation governments, provided patent statutes and an administrative bureau that was lightly utilized because Korea lacked a significant right-seeking class due to its agrarian-economic base.

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[175] Article 186.

[176] Ryan (1998) p. 78;

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After the civil war, Korea rapidly developed both industrially and technologically, especially after the mid 1960's. However, as industrial complexity increased the domestic-right seekers were seeking an intellectual property system that lacked strong penalties to ease reverse engineering and rules that shortened patent duration so that they could be utilized more quickly by Korean industry. Due to the government's goals of rapid development and favoritism to targeted industries, the right grantor provided the means via lax rules and enforcement to meet the demands of the right seekers.

By the 1970's lax rules and enforcement brought the Korean government under increasing pressure from foreign firms and their diplomatic corps to provide better protection. Confucian ideology plays a small role during this period to justify the exclusion of foreign IPR-holders from market access and for domestic industry to copy foreign-produced intellectual property. Coercive diplomacy theorists claimed that the cause of major reforms was diplomatic pressure over the previous twenty years, culminating in the mid to late 1980's, that forced the Koreans to comply and create the modern IPR system in Korea.[177] While such diplomatic pressure was constant and increasing, coercive diplomacy theorists ignore the tremendous change that Korean civil society was undergoing parallel to the improvements in the IPR system. The establishment of the rule of law and political rights during the late 1980's increased the institutional effectiveness and fairness of general government ministries and IPR institutions.

Furthermore, while some IPR rules converged, the Korean system is differentiated

[177] Ryan (1998) and Sell (1998).

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from both the U.S. and Japanese systems that had been previously examined. The Korean patent system is a first-to-file system like Japan, but provides more secrecy for the applicant which is more similar to the U.S. The appellate system for pre-grant and post-grant disputes is more independent than Japan, but more like the U.S. The legal system is a civil law system rather than a common law system while the criminal penalties for patent infringement are strong, like Japan but absent in the U.S. system, yet the civil penalties and injunctions are relatively stronger than Japan's, but somewhat weaker than the U.S. Such differentiation can be expected since the model for IPR development is dynamic and accounts for the varied goals of the right seekers and the right grantor in the process.

The general ability of right seekers to obtain basic rights was essential in the formation of the basic IPR system which required the actions of right seekers and the grantor to create intellectual property rights. The rules of the game changed with the changing nature of the Korean economy and political structure. Right seekers had new goals as technology producers and the economy was more broadly based allowing for a wider base of right seekers who had valuable innovations and increased their utility by defending their intellectual property. The success of diplomatic pressure converged with the ability and desire of the Korean polity to provide the protection of intellectual property. The following chapter will further attempt to validate my theory by examining the Chinese polities of the ROC and the PRC. Like Korea, both polities have undergone rapid economic development and the statutory establishment of intellectual property rights. An added test of the role of culture will be examined to determine if IPR forms as the result of the interaction of right seekers and the right grantor or diplomatic pressure.

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CHAPTER 4

SEEKING AND GRANTING IPR:

THE ROC AND THE PRC

No two states have symbolized the difficulty of establishing an IPR system and associated diplomatic disputes as the ROC and the PRC.[178] Both states have experienced rapid economic development in the latter part of the 20th century and right seekers have had to deal with varying levels of authoritarian government. The PRC and the ROC provide a salient test for my property rights approach for intellectual property rights development which requires the active interaction of the right grantor and right seekers. My theory indicates that first a basic property rights system must be established that propels capitalist development. As capitalist development increases, technological sophistication increases which subsequently increases the demands by right seekers for reliable institutions that grant and protect intellectual property rights.

[178] Both the ROC and the PRC claim to be the legitimate government of all China. The United States has diplomatically recognized the PRC as the legitimate government of China since 1979, but also has steadfastly protected the ROC's right to exist, despite non-recognition as a state. Diplomatic issues aside, both republics function independently from each other in both external affairs and internal management of their territory. Until it is demonstrated that either government effectively governs the other's territory, I will refer to both the PRC and ROC as "states," regardless of current political definitions espoused on either side of the Strait or my state of citizenship.

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If the coercive diplomacy hypothesis is correct, then we would expect to see more responsiveness from the ROC because of their dependence on the U.S. for security after the civil war. Similarly, coercive diplomacy should be effective when utilized against the PRC because of its desire to join the WTO to aid in its rapid economic development. However, my analysis will demonstrate that IPR protection has improved parallel with each state's internal economic and political development and both have often utilized IPR as a bargaining chip with the U.S. to further their own diplomatic goals.

The following section will detail the common origins of both states' IPR systems and how it affected the subsequent development of IPR in each state after the military conclusion of the civil war. As the products of civil war, both the ROC and the PRC share a common history of imperial government, revolt and the Republican government prior to the civil war. While the ROC pursued more capitalist development after 1949, the rule of law and democratic reforms required decades to be achieved, and subsequently affected the development of the ROC's IPR system.

Complicating IPR development of the PRC was the fact that the period following the civil war resulted in the establishment of communism which purposefully destroyed basic individual property rights. Even with the economic reforms initiated since the 1980's, individual property rights, and therefore IPR, have experienced difficulties in their establishment and clarity. However, despite the common historical legacies and the difficult path each state has experienced since 1949, viable intellectual property rights are emerging in both states. The process for establishing IPR will demonstrate the viability of the role of right grantors and right seekers in generating intellectual property rights despite late economic development and legacies of communism and authoritarianism.

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History, Confucius and Profits

The development of IPR implies that capitalist notions of self-interest have become more important relative to traditional belief systems that may have different values attached to creative output. Theoretical discussions on the development of intellectual property rights in the Chinese polities often center on the deep cultural influences of Confucian thought which posits that Chinese intellectuals did not view knowledge as a property right.[179] Essentially, the Confucian tradition distinguishes between a positive or negative moral value attributed to knowledge.[180] Positive knowledge is critical for the moral goodness of society and it is the duty of the scholar to disseminate positive knowledge to the society. Preventing the spread of positive knowledge or excluding others with a property right is immoral, and therefore a property right granted for knowledge would be incompatible with Chinese cultural values. Furthermore, the Chinese intellectual tradition has deep roots in pedagogy. The understanding of the classics and wisdom is based on the accumulated knowledge of the society and "For innovators to claim credit and to seek profit from their creation is selfish and an act of ingratitude."[181]

Another important aspect of the Confucian impact on IPR development that has

[179] For example, see Alford (1995); Wang (1993); Wojik and Osty (1993); and Yang (1993) for examples of the cultural/historical legacy argument on intellectual property for Chinese polities. Alford sees an important legacy from Confucianism, but does conclude that the modern market economy does transform conceptions of intellectual property.

[180] Excellent summaries of the Confucian tradition effects on Chinese views of intellectual property is in Oksenberg, Potter, and Abnett (1998) pp. 10-13 and Alford (1995) pp. 9-29.

[181] Oksenberg, Potter, and Abnett (1998) p. 11.

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been posited is that the Emperor and the state had a duty to disseminate positive knowledge and protect society from negative knowledge. As a result, the state basically claimed ownership and/or control over all knowledge in the empire. The state could appropriate any new knowledge or innovations under the justification of protecting the society from negative-valued knowledge. The general Confucian argument paints a picture that these complex intellectual ideas were widely held by the public at large. Of course, the history of China from the end of the 18th century indicates that society was quite willing to revolt and that merchants and artisans were not always willing to give their technological innovations and creations to the state in the name of Confucian cultural continuity.[182] "In reality, this situation produced a tendency for merchants to hoard commercial knowledge and for private artisans to keep their techniques secret."[183] The merchants and artisans eschewed their Confucian traditions to protect their own interests and property by forming guilds to protect themselves from the reach of the state and each other.

Would Confucius Apply for a Copyright?

While modern Chinese trade negotiators on both sides of the Straits have claimed that piracy is to be expected due to traditional Confucian values, a gap exists between what intellectuals believed and what average people practiced in the past and the present. The error of such reasoning stems from how intellectuals view themselves and the

[182] Rowe (1984).

[183] Oksenberg, Potter, and Abnett (1998) p. 11.

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importance of their viewpoints and how the rest of society gets along on a daily basis when confronted with issues of self-interest. This is not merely a Chinese problem, but perhaps more importantly a Western intellectual problem, which clouds the theoretical understanding of how intellectual property rights form.

For an historical example of theory versus practice, Ginzburg (1980) provides an excellent study on the gaps between intellectuals' and the commoners' worldview in the West during the Counter Reformation. The Inquisition was completely confounded by the religious views of a commoner that resembled little of orthodox theology. The gap between the religious orthodoxy believed by the inquisitors and the commoner revealed that the commoner's worldview was shaped by his daily life more than complex religious/philosophical ideas of his educated inquisitors. Comparatively in China, Confucian scholars certainly held beliefs that knowledge was to be controlled by state authority and utilized for the public good, but as evidenced above, the commoner was willing to create property rights in their inventions and willing to exclude others unless compensated in order to create personal wealth. Both historical cases indicate that there can be considerable gaps between what the elites envision the world to be and how the commoner gets along on a daily basis.

Quentin Skinner (1969) cautioned theorists to be careful when attributing modern understandings, the mythology of doctrines, to the intellectual work of historic figures. A theorist must be careful not to attribute concepts that the historic figure failed to mention in their works, such as Confucius not anticipating complex intellectual property rights. As a modern institution even in the West, patents or their use were not envisioned by Confucius nor did he foresee the machinations of a future capitalist, technologically

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advanced society. This is not meant to diminish the fact that trade negotiators may actually have believed their contentions that Confucian doctrine is a cause for piracy by domestic publishers or compact disc manufacturers, but rather theorists should be more skeptical of such claims and attributing past views as cause in the present. Theorists and negotiators claiming that the Confucian tradition causes intellectual property violations in the late 20th century underestimates the role of relevant, modern variables because otherwise, "History then indeed becomes a pack of tricks that we play on the dead."[184]

Whether in early modern Europe or China, or even the present, the average person may have an understanding of complex philosophical systems, but will nonetheless adapt themselves to their situation in order to survive.[185] More realistically, the average person may not subscribe or perhaps even understand the nuances of orthodox thought or intellectual reasoning and will likely develop their own path relative to their own goals. As indicated above, merchants and artisans in 19th century China protected their innovations and creations from the state and from each other, regardless of the Confucian tradition.

While Confucianism makes an excellent justification for the appropriation of others' intellectual property, those appropriating intellectual property by copying books, software, and compact discs are not doing so for the advancement of Confucian traditions, but for profit. In this context, identifiable actors violate intellectual property rights for the identifiable goal of profit. Intellectual property violations then can be better

[184] Skinner (1969) p. 14.

[185] Berger (1967) discusses how worldviews can be changed by new information challenging the established order.

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understood as actors maximizing toward their goal of profits and not maximizing their intellectuals' traditions. In fact, the Confucian justification indicates that Chinese polities lack the means to prevent intellectual property theft and desire the appropriation of intellectual property from abroad. This twofold problem stems from the low level of indigenous right seekers, as well as the right grantor's inability to govern during turbulent political periods, authoritarianism, and the problems associated with developing a capitalist economy. Neo and classical Confucian scholars, and the governments that relied on their philosophy, may have favored public control and use of knowledge, but for centuries many Chinese have demonstrated a proficiency to privatize knowledge.

The Origins of IPR in China

As a modern capitalist concept, formal IPR institutions developed slowly in the Chinese polities due to the upheaval of revolution, violent religious movements, foreign interventions, and civil war.[186] As an agrarian economy, the decline of the Qing Dynasty throughout the 19th century resulted in disruptions to the political order and industrialization that was slow to take root. Under the emperor, the imperial state provided no intellectual property protection under the Confucian justifications indicated above, while right seekers organized into guilds to protect what little intellectual property was being generated. Furthermore, the influence of foreign intervention during the 19th and early 20th century created the first statutes and regulations for intellectual property.[187]

[186] For a review of the turmoil from the Qing Dynasty through the 20th century, see Spence (1990), Fairbank and Reischauer (1988), and Wakeman (1975).

[187] Alford (1995) Chapter Three.

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Foreign interests were able to claim extraterritoriality in specific cities in China due to the weakness of the Qing government.[188]

As patents and trademarks become more important to the emerging capitalist economies in the West in the late 19th century, demands were made in the treaty ports to extend western concepts of intellectual property protection in those localities. It is important to note that the drive for intellectual property protection on a reciprocal basis between states had only recently been developed at the Paris Convention of 1883. As I have argued, the concept of intellectual property protection did not have deep cultural roots in the West or in Asia.

While some economic historians have contended that China lacked a tradition of basic property rights which retarded economic growth while the West developed capitalist economies, recent scholarship posits that China had developed property right systems prior to the 20th century.[189] Even with the establishment of property rights in China and substantial merchant activity, the turmoil of the late Qing Dynasty retarded institutional development favorable to capitalist development. Chinese civilization did create substantial scientific and technological advancements prior to the 19th century that rivaled Western advances.[190] However, the desire to maintain political and social control by the Qing facing Western encroachment, coupled with the resulting turmoil to

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[188] Thomas (1984).

[189] See North & Thomas (1973) and Rosenberg and Birdzell (1986) on the West's unique institutions such as property rights that fostered economic and technological growth. For the view that China was not as institutionally different from the West, see Rowe (1984) and Wong (1997).

[190] Needham (1969).

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overthrow them internally, retarded institutional innovations for IPR and other capitalist institutions until the second half of the 20th century.

Western development of intellectual property rights parallels the development of complex capitalist economies which were only generally emerging in the West in the second half of the 19th century. In fact, Western demands for intellectual property protection in China materialize around the turn of the 20th century precisely because Chinese manufacturers were only then becoming sophisticated enough to copy and profit from patent and trademark violations.[191] Chinese manufacturers had to first develop the capability to copy a patent or trademark before right seekers (foreign, in this case) agitated for protection. Confucian thought did not cause the lack of intellectual property protection, but rather the lack of demand for IPR until this period.

Gunboat Diplomacy and IPR

Prior to the Boxer Uprising in 1900, the Qing afforded no specific legal protection for patents or trademarks. Treaty negotiations concluding the conflict were based on each state's specific commercial demands rather than general protection of intellectual property.[192] The treaty negotiations between Britain and China resulted in limited references to trademark protection under the control of the Imperial Maritime Customs Service, but provided little in the way of specifics. Japan's commercial treaty with China at the conclusion of the Boxer Uprising only noted the protection of trademarks, but

[191] Alford (1995) p. 34.

[192] Alford (1995) p. 36-39.

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provided no regulatory framework. The U.S. treaty concluding the hostilities with China mentions trademarks, copyrights and patents, but also provided little in the way of specific rules. The U.S. treaty was only for extension of protection to its citizens and did not require China to enforce the treaty until it established a patent office, which was not established until the 1930's. While these treaties were concluded by 1903, the following two decades included the foreign powers advising the draft of intellectual property codes in China, but no agreement or approval by any of the parties of the IPR codes, including China itself.

The vagueness of the demands resulted in little progress in developing Chinese codes that governed intellectual property until 1923.[193] Obviously the turmoil associated with the establishment of the Republican government in 1911 and the subsequent warlord period lasting until 1927 retarded economic growth and made the execution of IPR treaties a low priority for not only the new government in China, but also for the foreign treaty powers who experienced World War I and its aftermath. An important point, however, must be reiterated: intellectual property protection was evolving in the West in the early 20th century parallel with its own capitalist development. While important for the firms and individuals who sought protection through patents and trademarks, intellectual property protection was a developing idea even among Western states and was completely within its infancy in terms of statutes, treaties and concepts of the reciprocity of rights for foreigners.

[193] Alford (1995) p. 41.

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Right seekers and grantors of the West were still internally developing their own IPR codes, legal precedents and procedures in the context of their own capitalist modernization. The West was creating its own IPR institutions and among the list of priorities of states modernizing, the foreign protection of intellectual property was not at the top of the list, especially when considered against the backdrop of the decent to the first world war. For example, the U.S. at the turn of the 20th century was establishing modern commercial codes and legal precedent for antitrust, food and drug safety, workplace safety, labor regulations, income tax codes as well as intellectual property protection.

In context, it is not surprising that IPR development in China, while negotiated in trade treaties, was not successfully implemented as a matter of priority. Furthermore, in accordance with my theory, the development of IPR via diplomacy is not supported precisely because China did not have the right seekers, or even an established right grantor in the early 20th century. Coupled with the fact that Western states were developing their IPR institutions, drafting a viable IPR code for the Imperial or Republican governments by foreign powers was simply unsuccessful. With a weak right grantor and few right seekers, a viable property right to anything would be difficult to achieve. It's a simple question of priorities.

The First IPR Statutes

By 1928 the Nationalists took power exclusively by purging the communists after the unified government had essentially retaken nominal control from the warlords and regional authorities after two decades of turmoil following the demise of the Qing.

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Despite the Japanese invasion of Manchuria in 1931, the Nationalists attempted to establish a viable legal system. Unfortunately the use of copyright laws was utilized to control internal dissent during the 1930's and 40's, and in fact, copyrights have remained under the control of cultural ministries to the present day in both polities.

Copyright in both the ROC and the PRC is linked to its origins in the Imperial period. As Riker and Sened (1991) posited, property rights emerge in historical events, and copyrights were seen as a useful means to control publication through censorship. Despite the development of more individual rights in the ROC, copyright is still controlled outside of commercial codes. The U.S. similarly manages copyrights outside of commercial codes through the Library of Congress: while the function and purpose of copyrights have evolved differently in the U.S. and the Chinese polities, historic origins point to a historic period for each when copyrights were not viewed primarily from a commercial perspective.

The patent and trademarks laws of the Republican period on the mainland were generally more effective and were primarily a function of the commercial code.[194] The first specific patent law in China was the Measures to Encourage Industrial Arts of 1932 in which inventions were generally protected except for chemicals, pharmaceuticals and food. Like Western states, patent protection was stronger for Chinese citizens than for foreigners and foreign rights continued to be contingent on reciprocal agreements. The patent had to be utilized within three years of the patent grant and was subject to

[194] See Alford 1995) p. 50-52 and Oksenberg, Potter, and Abnett (1998) p. 12.

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compulsory licensing while infringement was punishable by both civil and criminal penalties in the court system.

Thus after nearly 30 years of diplomatic demands, the Chinese government established a patent law. Despite the establishment of the patent law, the ongoing civil war and the Japanese invasion precluded the development of viable patent-related property rights. The domestic courts were poorly developed and central government administration was preoccupied with internal dissent and foreign invasion. Then, by the end of 1949, the Nationalists were forced to flee the mainland for Taiwan whereby having to start over once again.

The Republic of China

The development of individual rights in the ROC in the 1980's and 1990's was critical for the development of effective intellectual property rights. Like Korea, the ROC has recently developed a viable democracy with individual rights emerging from dissidents' struggle with the authoritarian government under the Nationalist Party on Taiwan. The ROC's development on Taiwan was far different than what occurred under the communists on the mainland and as a result, viable intellectual property rights have emerged more rapidly since the 1980's in the ROC due to the development of right seekers and the role of a responsive right grantor.

In the context of the ROC's internal development of property rights, external pressure brought by foreign interests have had a minimal impact despite more than 30 years of diplomatic efforts. In fact, the ROC has managed to delay full implementation of global IPR agreements until the ROC is accepted as a full member of the WTO. The

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development of IPR in the ROC can be traced to four key influences: the Japanese occupation; the ROC's commitment to capitalist development; lack of diplomatic recognition; and the struggle for democracy.

Internal Factors

The defeat of the Republican government on the mainland in 1949 resulted in the evacuation of the government and remnants of the army to Taiwan. Prior to the Nationalist occupation, Taiwan had been occupied by the Japanese for most of the first half of the 20th century. Japan's occupation provided political and economic stability that was lacking on the mainland during the period. Furthermore, the Japanese occupation created extensive infrastructure improvements of roads, power grids, and industrial capacity.[195] Education was compulsory under the Japanese which by 1945 had provided the island with a more highly and thoroughly educated populace than existed on the mainland. Taiwan was far more developed, both economically and politically, than other mainland provinces when the ROC took over from the Japanese after 1945.

The arrival of the armies and government of the ROC from the mainland in the 1949 evacuation caused a period of upheaval on Taiwan. Inhabitants had little political connection with the Republican government during the civil war. Nearly two million mainlanders arrived on Taiwan in the immediate aftermath of the civil war where nearly six million Taiwanese lived at the time. Since the mainlanders were well armed and the Taiwanese virtually unarmed due to the Japanese occupation, mainlanders were given

[195] See Gold (1986) for summary of the Japanese occupation in Taiwan's economic development.

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priority in government office holding and in economic affairs. Furthermore, since the ROC had recently been fighting a civil war, the methods for controlling dissent were extreme in many instances including repression of the press and individual expression, and restrictions on the use of the Taiwanese dialect. Taiwanese spoke their own distinct Chinese dialect as well as Japanese that they had learned in the occupation-constructed schools. The arrival of the ROC government resulted in the schools requiring the teaching of Mandarin and repression of Taiwanese cultural expression. Throughout the first four decades of the ROC on Taiwan, dissidents were jailed and sometimes killed until the reform-presidency of Lee Teng-hui beginning in 1988.

Prior to 1987, the ROC was under martial law so that the Nationalist Party led by Chiang Kai-shek and his son, Chiang Ching-kuo, could maintain political control. The maintenance of authoritarian control allowed members of the Nationalist party to gain a prominent economic position on Taiwan through the award of government contracts, favorable public policies, and outright shareholding by the Nationalist party in key enterprises. Despite the advantages given to members of the party, capitalist development occurred generally with a firming of property rights for the general populace after 1960. The subsequent economic growth, while favorable to mainlanders, benefited the general populace. Three government policies between the 1950's and the 1980's helped to create stronger property rights and economic growth that led to stronger intellectual property rights in the 1990's: land reform, import substitution and export promotion.

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Capitalist Economic Reforms

Despite the Nationalist repression of dissent, the ROC did institute land reform that strengthened basic property rights for native Taiwanese. The redistribution of land to tenants from large landowners was initiated by the Japanese, but the Nationalists accelerated the process during the 1950's with just over 37% of the land redistributed to Taiwanese tenants.[196] Increased diversity in land ownership provided the economic incentives that not only increased production, but also resulted in the buying and selling of land that created cash wealth thereby increasing the availability of capital to the average Taiwanese. Due to the increase in local capital, small-scale manufacturing enterprises developed rapidly during the 1960's and 1970's which increased the capacity to export. Coupled with government policies favoring export promotion and import substitution, basic manufacturing industries thrived, despite favoritism afforded to the politically-connected mainland elites.[197] Industrial development occurred at a rapid rate giving the ROC one of the better records of economic growth among developing states in the post-war period.

Land reform thus aided in the development and protection of basic property rights by allowing the increase of the manufacturing base that is critical for a firm to be able to produce intellectual property. While the first phase of development resulted in more intellectual property violations than actual intellectual property production, nonetheless,

[196] See Ishikawa (1967) p. 312.

[197] Wade (1990) pp. 75-88.

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the ROC was beginning to develop a base of potential right seekers necessary for later IPR development.

Import substitution and export promotion policies had both negative and positive effects on economic development. Both policies resulted in the government looking askance at IPR violations of foreigner's rights as long as violations aided domestic economic development. For example, ROC publishers actively pirated English-language copies of dictionaries, encyclopedias and dictionaries among other works for domestic and export markets as early as the 1950's.[198] The illicit acquisition of patented intellectual property from abroad included pens, watches, automobile parts, chemicals and pharmaceuticals that were manufactured and exported despite bilateral agreements with developed states.[199]

The increased illicit acquisition of technology from abroad did increase industrial capacity and national wealth for the short term, but increased other costs which will be detailed below. As discussed in Chapter One, a government allowing IPR violations to occur may have short term gains both economically and in technology acquisition, but over the long term may actually retard economic growth. I will outline the changes in the manufacturing base that increased the number of right seekers in the ROC below, but suffice it to say, by the 1980's the ROC had developed a basic property rights system and

[198] Alford (1995) p. 96.

[199] Freemantle (1986).

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a manufacturing base that subsequently created economic growth that in turn created a greater agitation for more individual rights.

Democracy and IPR

The development of democracy, the extension of individual rights, and the rule of law was a gradual process that accelerated through the 1980's in the ROC. An intervening factor was the loss of diplomatic recognition throughout the 1970's as more states favored the recognition of the PRC as the official representative of China. The loss of diplomatic recognition for the ROC started with the United Nations expulsion in 1971, followed by non-recognition by the United States in 1978, and finally the loss of IMF and World Bank membership in 1980. This exclusion from the international community had two effects on the development of IPR in the ROC. The first and most direct effect was that the ROC was effectively shut out of all global agreements on IPR to the present day. The ROC is not a member of WIPO, PCT, or the WTO. If the ROC's application for the WTO is accepted in the near future, then they will finally be a member of at least one body that does standardize some rules on IPR. Until then, all IPR disputes and agreements are on a bilateral basis and of a reciprocal nature only by agreement. More detail on the effect of non-recognition on IPR codes will be detailed below, but the lack of recognition has made the violations of foreign right holders easier by ROC manufacturers.

The second effect of non-recognition has been that the ROC has had to focus more on its own self-reliance and internal political development. Despite the disconnect from the international community by 1980, the development of democracy since non-

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recognition has been steady and rapid. The ROC government had expended great energy to control the political allegiance of the masses by controlling all media outlets, ideological training at all school levels, military officers present in every department of the universities, and requiring permits for any gathering of more than two people.[200] Nonetheless dissidents were publicly active, and actively jailed, yet the government increasingly allowed more reforms aimed at appeasing demands for more democracy and the rule of law. Upon the ascendance of Chiang Ching-kuo to the presidency in 1978, a steady extension of rights ensued throughout the 1980's including the arrest of corrupt public officials, an easing on media entities, the creation of opposition parties in 1986, and the lifting of martial law in 1987. The ROC had developed a middle class and this new set of right seekers demanded change and received it.

The boldest move by Chiang Ching-kuo was to appoint a native Taiwanese, Lee Teng-hui, as his vice president which signaled to native Taiwanese their inclusion in the political system. Lee became president after Chiang's death in 1988 and began an even more accelerated reform of the ROC political system. Dramatic change was apparent when on the national holiday Double Ten (October 10, 1989), President Lee addressed the nation in the Taiwanese dialect rather than the official Mandarin. From that point, reform of the political system resulted multi-party elections for local offices and direct presidential elections by 1996. The extension of basic civil liberties and democratic rights coincides with the legal reforms that have overhauled the patent statutes in the ROC.

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[200] Wade (1990) pp. 237-246.

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Disputes and Diplomacy

While diplomatic pressure was utilized on the ROC for decades to develop effective IPR codes, diplomatic pressure was not as important as internal political development. Beginning in the late 1950's, foreign publishers complained about the rates of piracy on foreign copyrighted materials. Under U.S. pressure, the ROC amended their copyright statutes in 1959 and 1964 with minimal enforcement of the statutes. The loss of diplomatic recognition throughout the 1970's added to the lack of interest by both the state and the domestic populace in enforcing foreign copyright protection. For example, in 1975, the ROC had over 1400 publishers yet only had fewer than 1000 copyrights registered that year.[201] As diplomatic recognition was lost, the ROC produced counterfeit books, music, and software that was sold throughout the world, including the U.S. and Europe.

On patent protection, protection of foreign patents was not any better. Prior to the 1980's, the ROC was one of the leading sources for counterfeit goods in global markets including pharmaceuticals, watches, clothing, cameras, and spare parts for aircraft and automobiles.[202] The U.S. frequently demanded throughout the 1960's and 1970's that foreign patents be protected, but again little action was taken by the ROC, especially after the loss of diplomatic recognition. Despite special treaties with the U.S. for defense and commercial treaties that did guarantee reciprocal protection of IPR, patent violations continued at high rates until the 1990's.

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[201] Alford (1995) p. 98.

[202] Alford (1995) p. 98.

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Central to U.S. actions was the use of the Trade Act of 1984 which allowed U.S. diplomats to utilize the General System of Preferences (GSP) privileges as leverage in their talks. The GSP allowed a developing state to exempt certain goods from U.S. tariffs in order to aid their economic development. In the 1980's, the ROC received approximately $3 billion in benefits on an annual basis.[203] Despite the pressure, the ROC refused major action and lost its GSP privileges in 1988.

In 1989 the U.S. placed the ROC on the U.S. Trade Representatives Special 301's "watch list" where if the ROC did not improve its IPR protection it could face more sanctions including retaliatory tariffs on its producers' goods.[204] The pressure resulted in another bilateral U.S./ROC agreement on June 5th, 1992 covering intellectual property protection that has remained in effect to this day. Since 1992, however, complaints by the U.S. Trade Representative have been lodged without actual application of sanctions, but overall complaints and foreign pressure have diminished. The ROC remained on the "watch list" throughout the Clinton administration.

Coercive Diplomacy or Internal Development?

What has occurred since 1992 to reduce the charges of IPR violations by foreign right-holders? First, the statutes were radically overhauled during Lee Teng-hui's presidency. The statutes will be detailed in the following section, but what is important is that the statutes are in general compliance with the TRIPS agreement. Yet, the updating

[203] Alford (1995) p. 99.

[204] See www.ustr.gov/ for annual watch lists.

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of the codes have occurred nearly five years after the main thrust of U.S. pressure ending in 1992. Second, the ROC by the mid 1990's was a fully developed modern economy, and under Lee Teng-hui's leadership, civil liberties and the rule of law were extended more generally than in any previous Chinese polity. "The changes under way are clearly without precedent in Chinese (and for that matter, much of world) history and are seemingly irreversible."[205]

Since the arrival of the nationalists in 1949, the ROC had been transformed from an agrarian society and authoritarian government to a thriving capitalist, democratic society with one of the best educated populaces in the world. Rights seekers had emerged and the right grantor agreed that the rule of law was more favorable than authoritarian arbitrariness. Diplomatic pressure played a role, but much less of a role compared to the ROC's own transformation of its political and economic environment. In fact, despite the agreement between the U.S. and the ROC on its IPR statutes, the ROC is withholding its full implementation of its statutes until it is granted membership in the WTO which proves that coercive diplomacy is far less effective than posited.

The Modern IPR Institution

The Patent Law of the Republic of China has had six major revisions since its promulgation in 1944. Of importance were the revisions made in 1994 when the patent law was overhauled to bring it up to the standards of the TRIPS agreement in anticipation

[205] Alford (1995) p. 109.

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of its application to the WTO being approved at a future date.[206] The current statute was most recently amended in 1998, but will not be enacted fully due to its perceived value for trade negotiations until the ROC application for the WTO is approved.[207] Similar clauses exist in other IPR codes of the ROC, granting final approval of all changes to the Executive Yuan. Essentially, unless a state has a bilateral agreement with the ROC, full extension of the intellectual property protection is not reciprocal.

Actual patent examinations and issuance are administered by the Intellectual Property Office (IPO) which was reorganized in 1999 from the Patent Department of the National Bureau of Standards. The IPO falls under the administrative umbrella of the Ministry of Economic Affairs.[208] Control of the patent-granting system under the Ministry of Economic Affairs is similar to both Korea and Japan's patent office being under the tutelage of the economic ministry's policy-making apparatus. Since the ROC possesses a civil law system, statutes and administrative rulings have relatively greater importance than in a common law system and therefore are more amenable as a tool of economic policies such as trade negotiations and development goals.

While some theorists noted above asserted that the ROC has altered their IPR system to suit powerful foreign interests, the ROC has nonetheless hedged full implementation until it gets what they want from the international community: diplomatic recognition via membership in the WTO. Despite delaying full implementation, the ROC

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[206] Sun (1997) p. 14.

[207] Article 139 of the 1997 Patent Law Amendment.

[208] For structure of administration of the Intellectual Property Office, see www.moeaipo.gov.tw/eng/.

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does possess a far more effective system of intellectual property protection than it had prior to the 1980's.

The ROC's patent system is a first-to-file system, similar to both Japan and Korea's patent systems. The basic argument for a first-to-file system, as noted in the previous chapter, is to eliminate the number of legal disputes on who actually created the patentable product or idea. Since most states are members of the PCT and WIPO, most inventors are protected from dubious filings because member states recognize the application filings in other states who also are members of these IPR organizations. Since the ROC is not a member of international IPR organizations, reverse engineering or outright copying of a patent can have a domestic payoff in the ROC. The exception would be for states that have existing bilateral agreements with the ROC such as the U.S. and Japan.

The flip side of non-recognition is that a citizen of the ROC is also excluded from use of the PCT in first-to-file states that do not possess bilateral agreements with the ROC. Instead, a citizen of the ROC must file separate patent applications as quickly as possible in each state where they seek patent protection. Considering the talented pool of right seekers from the ROC, who will be detailed below, the costs of non-recognition has been high for ROC patent-right seekers abroad as it had been for foreign patent-right seekers in the ROC. Despite the current differentiation in protection for both ROC citizens and foreign right seekers, the ROC patent system is generally in compliance with global IPR standards.

An ROC patent application is examined by the IPO and if approved, the patent is granted for a term of 20 years from the original filing date in accordance with the TRIPS

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agreement.[209] Similar to U.S. law, the only extensions allowed are for pharmaceuticals and other complicated manufacturing processes where one extension may be granted equal to the IPO review period, but no more than five years.[210] Patentable subject matter is also in compliance with the TRIPS agreement with a notable exception, microorganism strains, which are not recognized as patentable for foreigners unless under a bilateral agreement and will be extended generally when the WTO application is approved. Generally, the patentee has the ability to exclude others from unlawful use of the patent grant. Due to ineffectual protections for foreign patentees in the past, the 1997 amendment provides licensing protection for patentees by mandating a royalty from the licensee to the patentee from the date of written authorization.[211]

Infringement and Adjudication

Patent infringement in the ROC is a criminal and civil offense and therefore as a criminal case, prosecutors may pursue penalties while civil litigation is pending. Criminal penalties for product patent infringement include a fine up to NT$600,000 for manufacture, NT$60,000 for sale and intent to sell of infringed products, and NT$300,000 for infringement of a process patent.[212] Unlike Japan and Korea's use of prison terms, the ROC's Patent Law Amendment of 1997 repealed prison terms for infringement citing the lack of U.S. prison terms for patent infringement. Recall that the

[209] Article 50.

[210] Article 51.

[211] Article 57.

[212] Articles 123 and 124.

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U.S. lacks both prison terms and criminal penalties for patent infringement, leaving penalties solely to the civil litigation process. The ROC also allows civil litigation which can include lost profits plus punitive damages not to exceed double the actual damages.[213]

The 1997 Amendment further strengthens the patentee by allowing the patentee or exclusive licensee to apply for the destruction of goods made with infringed patents which complies with the TRIPS agreement.[214] These amendments add to the 1994 revision of the Patent Law that made parallel importation of patented goods illegal. Prior to the law change, some ROC trading companies engaged in parallel importation and distribution of patented goods circumventing the exclusive licensee or distributor and thereby avoiding paying royalties to the manufacturer. For example, in 1994 Ralston Purina discovered that some of its patented and trademarked pet products were being imported by an unauthorized trading company who avoided licensing fees by purchasing the product lines in the U.S. from a wholesaler. The wholesaler then shipped the goods by sea container in inexpensive westbound vessels, thereby realizing a significant profit. The new law revisions allowed ROC Customs to seize the disputed goods and end the circumvention of domestic licensees' rights.[215]

Remedies and appeals for infringement and patent disputes are now obtained through a variety of methods from the IPO, the judiciary, and the Customs authority. As a civil law state, legislative statute and administrative rulings have precedent over judicial rulings. As a matter of practice, patent examination/grant disputes are first handled

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[213] Article 89.

[214] Articles 88, 105 and 122.

[215] Interviews with Reed Stevens, Country Manager of Ralston Purina Taiwan, 4/94.

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within the IPO. If legal standing is established under reciprocal rights as a foreigner or as a citizen of the ROC, then a patentee may contact the prosecutor if it believes that its goods are being infringed upon. The prosecutor's office then may file charges if it believes the case has merit. If an infringement case includes importation, the Customs authority may also be contacted for legal actions including seizure and destruction of the goods. Criminal penalties outlined above then may be applied in addition to civil litigation. Appeals can be made in the judicial system, but depend on statutory standing. The judicial system has evolved in recent years so that decisions that have been made by the Constitutional Court and the Supreme Court have binding authority, similar to common law practice.[216] This development in the courts has been an important development in the rule of law in the ROC.

Another example, Apple Computer in 1983 was able to win legal standing for an infringement case based on existing statutes governing patents thereby gaining the same treatment as an ROC plaintiff. The basis of the appeal was the 1946 Sino/U.S. treaty where Apple claimed reciprocal rights between the states and Apple won its case after gaining legal standing in ROC courts.[217] The increased use of the rule of law by the courts parallels the development of general individual rights in the ROC since the easing of martial law and the presidency of Lee Deng-hui. However, as the Apple case implies, full legal rights are dependent on the reciprocal diplomatic relationship between the ROC

[216] Sun (1997) p. 14.

[217] Sun (1997) p. 11.

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and other states. Nonetheless, the ROC in the 1990's has developed an extensive IPR code and a more effective means for protecting intellectual property.

Right Seekers and Violators

The two main reasons that intellectual property protection has improved in the ROC for both foreign and domestic right seekers has been the extension of individual rights in the 1980's and 1990's and rapid economic development in the ROC. Prior to 1990, the ROC was one of the leading sources for counterfeit goods in global markets including pharmaceuticals, films, watches, clothing, cameras, and spare parts for aircraft and automobiles.[218] ROC manufacturers were cited by the U.S. International Trade Commission in 1984 for being one of the leading producers of counterfeit goods globally, yet by the early 1990's had substantially reduced their production of counterfeit goods. Only two formal cases have been initiated against the ROC related to IPR with neither resulting in the application of sanctions (Table 2).[219]

[218] Alford (1995) p. 98.

[219] See U.S. International Trade Commission (1984) and Yu (1993).

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Table 2

USTR Section 301 Cases Initiated/Withdrawn Against the ROC[220]

Date Initiated	Subject	Date Withdrawn
12/19/1983	Films: distribution	4/17/1984
5/29/1992	IPR: protection	6/5/1992

A visitor to downtown Taipei in 1989 would have seen blocks of stores and numerous street vendors where one could purchase any book, Rolex watch, software or electronic good at very low prices due to infringed foreign intellectual property rights. By 1994 the visitor would notice the absence of cut-rate bookstores and the legal sale of electronic goods and software.[221] While illegal copies can still be obtained, the reduction of pirated goods has been dramatic. A critical reason for the reduction of illegal intellectual property in the ROC has been the transformation of the domestic right seeking base.

As outlined in the previous section, rights generally have been extended to all ROC citizens. This extension of rights has benefited those who seek IPR protection because the court system relies more on the rule of law than before 1990. The development of domestic industry coupled with an education system has produced a well-educated workforce capable of generating complex intellectual property. For example, in 1980 the ROC produced 22 doctoral degrees in the fields of science and engineering, but

[220] Source: www.ustr.gov/html/act301.htm.

[221] Analogy based on personal trips to the ROC from 1989 to 1998.

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by 1990 had produced 269.[222] Similarly, the percentage of twenty-two year olds with bachelor's degrees in science and engineering fields rose from 2.59% in 1976 to 4.17% in 1990, a percentage similar to the U.S. in 1990 of 4.52%.[223] Chapter Five will more thoroughly demonstrate the relationship between patenting, a highly educated workforce, and the economy, whose rise of patent granting in the ROC since 1975 has been meteoric. In 1975 there were 8,812 applications for patents and 2,159 patent grants. By 1990 the ROC had 34,343 applications and over 22,601 patent grants.[224] Right seeking behavior by citizens and foreign applicants had significantly increased, especially by domestic right seekers demonstrating not only capability to patent, but confidence in right seeking.

Patenting at Home and Abroad

Not only were citizens of the ROC increasingly patenting intellectual property in their home market, but in overseas markets as well. Due to the lack of diplomatic recognition, ROC citizens must patent in each state in which they seek protection since they are not afforded protection through the PCT system. An analysis of the patenting activity in the U.S., the ROC's largest export market, demonstrates the industrial and technological change that the ROC experienced from the 1970's through the 1990's. Between 1963 and 1982, ROC inventors were awarded only 316 U.S. patents. As the

[222] National Science Foundation (1993) p. 76.

[223] National Science Foundation (1993) p. 93.

[224] See the ROC official patent statistics at www.moeaipo.gov.tw/eng/.

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ROC industrial base grew and diversified, the period between 1982 and 1995 resulted in nearly 9,000 U.S. patent grants to ROC citizens.[225]

U.S. patent grants to ROC citizens in 1980 were primarily in categories such as toys and amusement devices. By the 1990's the most active patent classes for ROC citizens in the U.S. were in communications technologies, semiconductor manufacturing processes, and internal combustion engines. Before 1985, ROC inventors had no U.S. patent grants in computer storage and display devices, advanced materials or transistors, yet by 1995 were actively patenting in these classes.[226] The ROC economy had been transformed from being primarily a producer of light industry to one diversified into high technology. Not only was ROC industry producing high tech goods, under license or illicitly, but by the 1990's was a generator of intellectual property that created new goods for global markets.

Patenting in the ROC increased dramatically from 2,159 total patent grants in 1975 to 22,601 total patent grants in 1990, the period that will be examined in greater detail in Chapter 5.[227] What is significant about this increase in patenting activity is that it occurred when the ROC was diplomatically isolated and in the absence of any ROC membership in a multilateral IPR organization. The ROC increased its patenting activity, a measurement of increased right seeking, absent the conditions posited by the coercive diplomacy theorists.

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[225] See National Science Board (1998) p. 6.21.

[226] For summary of ROC patent activity in the U.S., see National Science Board (1998) p. 6.22.

[227] Source for ROC patent data: www.moeaipo.gov.tw.tw/eng/.

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Multilateral and bilateral agreements on IPR were systematically ignored, yet right-seeking increased. Reform of the patent institution in the ROC is associated with increased right seeking rather than diplomatic actions. The ROC provides a case where right seeking and reform increased in a developing state and that diplomacy had almost no effect. This fact provides evidence to support my theory that economic factors and right seekers are more important than coercive diplomacy. Chapter Five will further quantify the relationship between patenting and economic factors, not only for the ROC, but for all the case studies.

ROC Summary

ROC citizens' right seeking had increased and the content had changed not only in domestic patent applications, but they also had become foreign right seekers in their own right. The timing of changes to the ROC intellectual property codes during the 1990's generally occurred five years after one of the most active periods of U.S. IPR diplomatic actions against the ROC. Revision of the IPR codes coincided with the extension of basic individual rights to all citizens of the ROC, the increased reliability of the legal system, and the transformation of the ROC economy from light industry to a more diversified technology production base. In fact, the reliability of the ROC patent-granting system improved after the U.S. backed off its demands for protecting its citizens claims while Lee Deng-hui's reforms took root.

While aspects of the IPR codes in the ROC reflect some of the demands of the U.S., the ROC developed many contrary aspects to their IPR code from the U.S. including a first-to-file system, adoption of utility models, and dropping criminal

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penalties despite U.S. demands. Finally, the efficacy of the theory of powerful states causing IPR protection to develop is also diminished by the fact that the ROC will not fully implement its IPR code until it is granted membership in the WTO. Thirty years of diplomatic pressure yielded an IPR code acceptable to foreign interests, and yet, not all rules will be implemented until the ROC gets what it wants in exchange for IPR protection. In this context, the U.S. will not get everything it wanted from its diplomats until the ROC receives what it wants. U.S. diplomatic goals were better served by the ROC internal development rather than its diplomatic actions.

It cannot be argued forcefully that cultural and historic legacies of Confucianism have been as important as posited in the case of the ROC. Alford (1995) recognizes, despite his reliance on cultural issues in his initial argument, that the internal economic and political development is changing the way that IPR issues are managed in the ROC.[228] What the cultural/historical theory explains better is how intellectual property was viewed in previous historical periods and why changing IPR was difficult during transitions to a modern economy. Furthermore, explanations that Confucianism is a cause for IPR violations provides insight on the justifications that infringers proffer and that diplomats may use during negotiations.

What my theory explains is that there are identifiable actors with identifiable goals and that intellectual property violations in the ROC were made by individuals and firms with an eye to making a profit, that the right grantor was not as interested in protecting foreign intellectual property, and that there did not exist a sufficient base of

[228] Alford (1995) p. 108-109. Chiang (1995) views IPR violations in the ROC as a function of a developing economy and makes no reference to cultural issues related to Confucianism.

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right seekers in the ROC to generally seek the protection of intellectual property until the 1990's. When the ROC had sufficiently developed its economy so that it was a producer of intellectual property and its right seekers agitated for protection, the right grantor became willing and able to extend general rights, then the ROC developed a viable intellectual property granting system.

The People's Republic of China

The People's Republic of China divergent path from the ROC provides a challenge to my theory on the development of intellectual property rights because unlike the other cases examined, the PRC actively did away with basic property rights, and especially intellectual property rights, in order to maintain ideological obedience so that a communist society could be established. Since Imperial China had little interest or incentive to establish IPR and the Civil War period was too turbulent to establish a viable IPR institution, the PRC had no basic IPR system upon its establishment in 1949. Furthermore, the establishment of the Communist party on the mainland resulted in the active repression of intellectuals and the eventual revocation of all intellectual property rights by the early 1960's.

Since 1984 the PRC has reestablished IPR, but with great difficulty including rampant piracy, inadequate legal protection, and frequent diplomatic disputes. The following section will demonstrate that my theory, which posits that IPR institutions are formed by the interaction of the right grantor and right seekers, has explanatory power. My theory explains the PRC's IPR institution despite late economic development and lack of basic property rights as recent as the 1980's. It will also demonstrate that neither

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cultural factors nor diplomatic pressure was significant in the current establishment of the PRC's IPR system.

Repression of Individual Expression

The PRC traveled down a different path than the ROC after the defeat of the ROC forces on the mainland. While the ROC had an authoritarian government, it pursued capitalist economic development, including the extension of property rights, upon its arrival on Taiwan. The establishment of property rights in the ROC created the wealth and the basis for a transition to democracy that later enhanced the viability of IPR. The PRC also was authoritarian, but utilized communist ideology as its guide for economic development. Pursuing communist economic development required that private ownership be curtailed which included the confiscation of private lands in order to create agricultural collectives as well as the collectivization of private industrial firms under state ownership.[229] The process of collectivization resulted in the deaths of millions of people and the repression of dissent was required to ensure ideological adherence. For all practical purposes, concepts of private ownership were suppressed for over thirty years.

Private concepts of intellectual property were simply not allowed in the PRC prior to Mao's death in 1976. The intellectual property regime, poorly established as it was by the Republican government, was abolished on the completion of the civil war. The PRC established a patent system based on the Soviet model that granted certificates of invention that bestowed honor and financial rewards based on savings the invention

[229] See Spence (1990) Chapters 19, 20, and 21 for a review of the costs of the collectivization in the PRC.

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provided.[230] Actual patents could also be obtained allowing the patentee the right to negotiate with the state for royalties, but any invention created at a state-owned enterprise could not be patented, where only a certificate of invention was allowed. Since the state owned most productive enterprises and the campaigns against intellectuals soon followed the implementation of the law, private intellectual property was essentially a moot point after the Anti-Rightist movement of 1957 and the Great Leap Forward of 1958-60.[231] No patents were issued during the turmoil and ideological repression between 1957 and 1963. Finally, the State Council revoked both the patent and certificate of invention regulations in 1963, effectively ending any patent statutes until 1984.[232]

Furthermore, the PRC nationalized media outlets and censored expression to ensure ideological purity. Between 1954 and 1976 the state also engaged in various campaigns against intellectuals, writers, and artists including the thorough repression of intellectuals generally during the Cultural Revolution.[233] Another effect of the repression was that universities were frequently closed or in turmoil so that the production of potential IPR-generating individuals was greatly curtailed. Patent statutes became non-existent and intellectual activity of any kind was simply hazardous from the 1950's through the mid-1970's.

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[230] Alford (1995) pp. 57-58.

[231] During the "Anti-rightist" movement, perhaps as many as 300,000 intellectuals were either jailed, sent to labor camps, or sent to the countryside to work on remote farms after being branded "rightists" by the CCP after Mao had encouraged them to freely criticize the party (Spence, 1990 p. 570-573). The "Great Leap Forward" has been estimated to have caused more than 20 million deaths and dissidents were even more repressed in its aftermath (Spence 1990, p. 583).

[232] Alford (1995) p. 62.

[233] See MacFarquhar (1974) on the origins of the Cultural Revolution and Thurston (1988) on the Cultural Revolution's effect on intellectuals.

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Utilizing my theory for IPR to analyze the PRC, the state was not interested in granting patents or other IPR, it refused to and often punished creative endeavors. From the right-seekers' perspective, seeking an intellectual property right could be fatal or at least high in personal cost. In fact, individuals often would not acknowledge their role in creating inventions to protect their personal safety.[234] There were no incentives for seeking or granting of IPR between the establishment of the PRC in 1949 and the reform period beginning after Mao's death in 1976. By 1976, communists had destroyed individual incentive, utilized the legal system to repress individual expression, and as a result, the PRC was struggling to produce basic economic needs, let alone intellectual property.

Recreating Intellectual Property

For all practical purposes, the PRC did not possess an intellectual property institution when Deng Xiao-ping ascended to power after Mao's death in 1976. In order to emphasize the importance of science and engineering and to revitalize the intellectual base of the PRC, Deng called a National Science Conference in 1978 as part of his overall drive for economic reform.[235] Since intellectual activity and IPR prior to the reform era were viewed as a bourgeois activity, Deng redefined intellectuals as members of the working class and therefore IPR became a product of labor, allowing a justification for developing an IPR code.[236] While it required a few years to develop a statute that was

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[234] Alford (1995) p. 64.

[235] Suttmeier (1980).

[236] Oksenberg, Potter and Abnett (1998) p. 13.

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compatible with Chinese communist ideology, the Patent Law of 1984 was finally promulgated. The patent law was promulgated as an act motivated by the interests of the right grantor since no active right seekers existed. The goals for creating a patent system were to motivate individuals to innovate, but also to increase the confidence of foreign investors who were wary of the lack of IPR protection. As a part of Deng's overall economic reforms, the Patent Law of 1984 was the first significant step towards encouraging a concept of private property associated with intellectual activity since the communist takeover in 1949.

Creating a patent law was only the first step in developing an IPR granting system in the PRC. While the statute was promulgated in 1984, individuals and firms did not have legal standing to defend a patent until the adoption of the General Principles of Civil Law in 1986. It was not until the passage of the 1991 Civil Procedure Law that citizens and foreigners were allowed to litigate in court in order to halt infringement and sue for damages.[237] Foreigners also had more rights than PRC citizens under the Patent Law of 1984 in areas such as priority filing in other states; compulsory licensing was extended to foreigners, but not citizens; and the government could order a citizen's or collective's patent be licensed to the state if deemed valuable for state interests, while foreign joint ventures could protect their patents from compulsory licensing.[238]

The incentives for right seeking by PRC citizens were few during the initial reform period because of past practice by the state in repressing intellectual activity, a

[237] Schlesinger (1995).

[238] Articles 14 and 29 of the Patent Act of 1984.

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poorly developed intellectual infrastructure, and lack of incentives in the 1984 patent statute for citizens. It is possible that one reason intellectual property manufacturing went underground at the outset of reforms was not only the obvious reason of financial gain, but also that dealing with the state in intellectual property matters had been futile, if not dangerous. The right grantor had an inadequate system to protect IPR and working with them under a more capitalist system was too costly in terms of delays and inadequate protection, even if a patent was issued. During the first year of reporting patent grants to WIPO, only 44 patents were granted in 1985 with a modest rise by 1989 to 2,303 of which over half were granted to foreign patentees.[239] As a result of the ineffectiveness of the first statute, further revisions were implemented in 1992 and 1993, gradually bringing the basic statute up to the standards of the TRIPS agreement thereby extending general rights to the PRC's own citizens, at least on paper.

While the statutes were regularly revised and a legal system was slowly established, economic reforms have developed since the late 1970's creating a period of dramatic economic growth in the PRC, nearly doubling GDP between 1978 and 1990.[240] My theory requires capitalist development in order that a significant pool of right seekers is created. While the PRC economic performance is well documented, the PRC experience with IPR violations is similar to the Korean and the ROC experiences at similar phases of development, only on a much larger scale (one billion citizens). The PRC has rapidly developed an industrial base that has the ability to manufacture high

[239] World Intellectual Property Organization (1985) and (1989).

[240] National Science Foundation (1993) p. 126.

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technology goods and other products with intellectual property value. The illegal manufacture and appropriation of intellectual property protected by patents and copyrights has created diplomatic disputes that follow similar patterns of Korea and the ROC.

Diplomacy and IPR

During the early stages of Deng's economic reforms, charges of intellectual property piracy have been leveled against PRC firms and charges of lackadaisical enforcement by responsible PRC agencies. Considering that economic reforms and the IPR system had been established during the early 1980's, IPR infringement losses to U.S. firms were claimed to be over $400 million by 1989 and over $1 billion by 1994, a mere 10 years after the PRC's first patent statute.[241]

Ironically, the current patent statutes of the PRC are among the most modern in the world because the statutes were formed without historical legacies shaping the system due to the lack of IPR during the imperial and communist eras. Simply put, the PRC statutes were created after a period when no IPR system existed, allowing for the implementation of a patent statute that did not suffer from the patent institution developing over the past century. For example, unique practices were created in the U.S. where legal precedent and historical forces played a larger role in the long-term development of its patent institution. The existence of modern patent statutes, however, did not cause effective IPR to exist in the PRC.

[241] Ryan (1998) pp. 80-81.

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The PRC possesses a modern patent statute, but suffers from a poorly developed patent institution that has created diplomatic friction due to its lack of meaningful enforcement. The first major diplomatic dispute between the U.S. and the PRC was in 1989 with the PRC being named to the priority watch list by the USTR under Section 301 of the 1988 Omnibus Trade Act. Being named to the priority watch list is the first phase of U.S. diplomatic actions that could lead to retaliatory sanctions if the offending state does not remedy the perceived violation of trade-related activity. Lack of intellectual property protection in a foreign state was categorized as trade-related under the1988 trade act by the U.S. Only two cases against the PRC have been initiated under the statute, however both cases were withdrawn before the application of sanctions (Table 3).

Table 3

USTR Section 301 Cases Initiated/Withdrawn Against the PRC[242]

Date Initiated	Subject	Date Withdrawn
5/26/1991	IPR: protection/statutes/policies	1/17/1992
6/30/1994	IPR: protection	6/12/1996

During initial negotiations with the U.S., PRC officials did not claim that cultural legacies caused the piracy, but rather they stressed the differences between the advanced U.S. economy and the developing PRC. Furthermore, links between corrupt local officials and firms engaging in piracy have been constant throughout the period since

[242] Source: www.ustr.gov/html/act301.htm.

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reform, indicating a lack of political control from the central government in Beijing to protect IPR.[243] The timing of the first organized U.S. action in 1989 coincided with the domestic political turmoil culminating in the demonstrations in Tiananmen Square. Despite the reassertion of political control from the Communist Party since then, and active repression of dissent, the lack of concerted efforts to stem IPR piracy by the central government resulted in a decade of constant diplomatic disputes between the PRC and the U.S.

Despite ongoing negotiations, the PRC was named a priority country again in 1990 and in 1991 by the USTR, but no specific sanctions were levied. During 1992 the U.S. threatened to raise tariffs on PRC-origin goods ranging from footwear to electronic goods. The PRC agreed to better police IPR violations including the establishment of a special court to hear copyright and trademark cases as well as revising the patent statutes. The Clinton administration initiated another investigation under Section 301 late in 1994 after complaints by U.S. industry on the slow progress of the PRC enforcement of its own IPR codes. The tone of the negotiations became more combative throughout 1995 with the U.S. threatening sanctions on over $2.8 billion worth of PRC imports to the U.S. The PRC responded with threats to exclude U.S. firms from major contracts and joint venture licenses. Despite the rhetoric on both sides, an agreement was reached in which the U.S. would provide support from law enforcement agencies, such as the FBI and Customs

[243] Ryan (1998) p. 81;

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Service, while the PRC would strive to improve enforcement of IPR statutes by creating task forces to coordinate and strengthen key enforcement agencies.[244]

Unbiased Piracy

Piracy has not been limited to foreign holders of IPR, in fact it has also been a problem for PRC producers of intellectual property. Trademarks held by PRC firms have been regularly violated by competing manufacturers on goods including bicycles, cigarettes, liquor, and foodstuffs. PRC-produced patents have also been violated in pharmaceuticals, computer equipment and software. There exists one case where a PRC patent holder found 45 factories in one county violating his patent six months after it was issued.[245] While other developed states have IPR violations domestically, involving consumers either illegally copying intellectual property for personal use or localized distribution, in the PRC the output of violated intellectual property is usually carried out by manufacturers who often possess legitimate business licenses. Use of violated intellectual property has not been limited to average citizens, but also government ministries. It is estimated that nearly all PRC ministries have utilized illegally copied software from both foreign and domestic IPR-holders.

Domestic producers of intellectual property face similar problems as foreigners in enforcement of their IPR. While the statutes ostensibly protect IPR, firms based in one province have difficulty enforcing their rights in other provinces where violations occur

[244] See www.ustr.gov for a range of documents on the disputes from agreements to details on the priority watch list and other actions under Section 301.

[245] Alford (1995) p. 87-90; Sell (1998) p. 193-194.

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due to regionalism and the dependency of courts on local tax revenue.[246] The PRC government has attempted to remedy the problem of local enforcement (which will be detailed in the following section), but suffice it to say, protection of IPR has been difficult for both foreign and domestic intellectual property producers.

Is Coercive Diplomacy Effective?

Despite the U.S./PRC agreement in 1995, IPR violations continued to mount. In May 1996 the U.S. threatened retaliatory tariffs on $3 billion worth of PRC imports. The PRC responded by threatening curtailment of U.S. investment and increased tariffs on U.S. imports, and by awarding 30 jets to European-based Airbus rather than U.S.-based Boeing. Despite the brinkmanship, an agreement was reached in June 1996 that emphasized improving enforcement and no further revisions of the IPR codes. PRC officials closed government-authorized and unauthorized factories that were producing CD's, CD-ROM's, videos, and music and had them publicly destroyed, while over 5,000 theaters that showed films without proper licensing were closed.[247]

Since the 1996 dispute, U.S. diplomats have been taking a less confrontational approach on IPR while focusing on the overall negotiations with the PRC regarding its application for the WTO. Nonetheless they have had moments of confrontation since 1996. President Clinton's 1999 annual report on trade agreements indicates that the 1995 and 1996 agreements resulted in dramatic drops in pirated goods both made and

[246] Alford (1995) p. 92.

[247] U.S. Trade Representative (6/17/1996).

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exported.[248] The report indicates that progress has been made that has satisfied the U.S. government, but IPR protection still merits attention as the PRC application to the WTO is being reviewed. Sixteen years after the PRC's first patent statute and nearly constant diplomatic pressure applied, the U.S. is officially satisfied with the PRC progress on IPR protection. While it may be claimed that diplomacy has been effective in stemming IPR violations, during June of 2000 the European Union asked the PRC to investigate more than 400 firms that it claims are violating the IPR of European firms.[249] European states often refuse to actively support U.S. positions on IPR policy in order to garner contracts that U.S. firms have lost as a part of the PRC's leverage with the U.S. over the past decade.

While the PRC has developed a basic IPR system since 1984, it is clear that the institutional development is still not up to the standards of most members of WIPO and that diplomatic efforts have been only marginally effective, if not only associative with actual long-term institutional development. In fact, the U.S. experience with mobile phone standards indicates that for the U.S. at least, diplomacy has frequently been leveraged against themselves on IPR and trade issues.

Throughout 1999 and 2000 the U.S.-based firm Qualcomm had been lobbying the PRC and U.S. officials to utilize the mobile phone digital standard called CDMA that favored Qualcomm's patented technologies.[250] Premier Zhu Rongji had promised U.S.

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[248] See www.ustr.gov, "2000 Trade Policy Agenda and 1999 Annual Report of the President of the United States on Trade Agreement Programs."

[249] Wall Street Journal (7/26/2000) p. A18.

[250] Wall Street Journal (7/13/2000) p. A1.

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trade negotiators in March 2000 that it would adopt CDMA for its mobile phone systems in exchange for U.S. support of its application to the WTO. Within two weeks of the May 2000 U.S. Congress approval of the trade agreement, the state-owned mobile phone firm Unicom announced it was going to utilize patented technologies developed in Europe resulting in the loss of over 70% of Qualcomm's stock market value after the announcement.

By the end of 2000 when Unicom partially reversed its decision after increased U.S. complaints on the mobile phone standard, Qualcomm recovered some of its previous stock value. Unicom purchased a CDMA-based mobile phone provider that was owned by the People's Liberation Army that served major markets including Beijing and Shanghai.[251] Qualcomm's technology presently has a chance to expand in the PRC, but the market share held by the new acquisition represents less than 5 percent of China's 70,000,000 users of mobile phones. As of January 2001, Unicom was considering adopting Qualcomm's CDMA technology, but has made no guarantee of whether it will adopt it as a national standard or if CDMA will be utilized only on partial market basis.[252]

The Qualcomm dispute is indicative of two important issues. First, diplomatic pressure throughout the reform period has been only partially successful and often embroils the U.S. in disputes that range beyond the basic IPR issues. The PRC has been willing to utilize foreign investment and awards of major contracts to retaliate against diplomatic actions initiated by the U.S. While agreements are made, generally the PRC

[251] See www.wsj.com 1/3/2001 archive.

[252] See www.wsj.com 1/17/2001 archive.

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has held the upper hand in these disputes because even if it agreed to remedy disputes, it has often proved unable to stem overall IPR piracy. Secondly, economic and political reform has caused firms to be more independent from central authorities. In the case of Qualcomm, Zhu Rongji was only able to ask that Unicom consider the technology while Unicom made its decision independent of the Premier's request. This concept can be extended to firms that pirate IPR as well. Economic reform has created wealthier, decentralized firms that the central government does not control like it once did and probably will not in the foreseeable future. Favoritism by the central government of key firms, without the proper regulatory independence, has resulted in the central government being used more for the interests of the firms rather than advancing overall state interests such as the goal of joining the WTO.

While it is attractive to view foreign pressure as effective in helping to create the PRC's IPR system, a review of the history of the IPR system's origins draws the conclusion that many of the violations, and subsequent bureaucratic progress to eliminate them, created the IPR system. Recall that first a statute was created in 1984 where none had existed for decades. Then, further revisions of the general legal code required another five years to create proper legal standing of individuals and firms, both foreign and domestic, thereby developing the legal system generally. More revisions of the patent statute were required in 1992 and 1993 to fix problems in the original statute. The IPR-granting institutions from laws to administrative agencies and law enforcement also were required to develop procedures to administer previously non-existent capitalist concepts of intellectual property. The result was the bureaucracy muddling through to solve problems once each new challenge emerged.

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In the context of overall economic reform and intellectual property development in the PRC, it is reasonable to posit that foreign intellectual property protection has increased at a reasonable pace relative to the basic institutional development of IPR in the PRC. Protection of IPR generally has improved somewhat for all IPR seekers in the PRC not because foreign pressure has been successful, but because of the fifteen years of work to develop the basics of an IPR system, including the legal system, more right seekers, and a patent-granting institution. Relative to the other cases examined, the PRC's patent institution developed at a comparatively rapid pace, and its basic institutional structure and enforcement procedures are still developing.

The Right Grantor

At first glance, the intellectual property institutions in the PRC are spread across multiple bureaucracies in the government. The primary right grantor in the PRC is the China Patent Office (CPO). Copyrights fall under the umbrella of the State Press and Publication Administration which oversees the State Copyright Administration (and censorship) while the Trademark Office is supervised by various foreign trade bureaucracies with origins linked to the imperial era and treaty ports. Enforcement of IPR statutes is furthered carried out by several other agencies under various national umbrella ministries which will be further outlined below.

While complicated in tracing IPR policy responsibilities, the control of IPR agencies in the PRC being spread across the national government is actually similar to other states examined in this study. Recall the U.S. system where patents and trademarks are issued by the USPTO under the Commerce Department; copyrights under the Library

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of Congress which reports directly to the U.S. Congress; and justice carried out in Federal Courts. Copyright violations are investigated by the FBI under the Justice Department, while illegal imports of patentable goods are punished by Customs under the Treasury and foreign IPR issues are pursued both by the State Department and the USTR reporting to the president. Like the U.S., the PRC patent system is administered by a variety of agencies governed by the basic patent statute.

The current patent statute, promulgated in 1984, is the Patent Law of the People's Republic of China, as amended.[253] For all practical purposes, the patent statute is in statutory compliance with the TRIPS agreement in anticipation of the PRC's WTO membership application being accepted in the near future.[254] Since the PRC is not yet a member of the WTO, national treatment is assured for only citizens of states who have rights via multilateral and/or bilateral agreements, such as the U.S., Japan and Korea.[255] The PRC became a member of WIPO in 1980 and joined the Berne Convention on copyrights and the Geneva Phonogram Convention in 1992, placing the PRC in the major IPR conventions which require substantive statute compliance with convention agreements.

[253] Details of the Patent Law of the PRC were obtained from English translations from the CPO home page on the internet at (www.cpo.cn.net).

[254] Schlesinger (1995) contends that the PRC IPR statutes are in compliance with TRIPS while institutional development has lagged.

[255] Patent Law of the PRC, Article 19.

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Patenting Procedures and Adjudication

Like most states, the PRC has a first-to-file system where the first application received is considered for immediate review.[256] The PRC is a member of the PCT thus recognizing the filing of applications in other PCT member states as a priority date for filing. The date the application is received at the CPO is the effective date of the patent grant, valid for a period of twenty years, which is in compliance with the WTO agreement.[257] Furthermore, CPO employees are required to keep all applications in strict secrecy until the publication of the patent.[258] Recall that the secrecy issue was part of the final TRIPS agreement of the WTO and had been a major point of contention in U.S./Japanese patent disputes.

If the patent application is rejected by an examiner, the applicant may request a hearing with the Patent Reexamination Board.[259] Infringement complaints are handled by filing a complaint with the CPO or initiation of legal proceedings in a People's Court that has jurisdiction. Intellectual property tribunals have been established at the provincial and national levels and hear infringement cases that can levy fines and imprisonment, if findings support the plaintiff. Recall that the USPTO does not investigate any claims of infringement which are only handled in federal civil courts in the U.S. The JPO's Counterfeit Office assists law enforcement in identifying infringement cases after the

[256] Article 9.

[257] Article 45.

[258] Article 21.

[259] Article 43.

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plaintiff initiates action in Japan. In Korea, KIPO retains a level of independence from legal proceedings with membership only in the Industrial Property Tribunal. The high number of infringement complaints in the PRC has resulted in a higher level of coordination between state agencies in order to stem piracy.

The Ministry of Public Security investigates and may arrest violators of IPR statutes and then it turns the evidence over to the People's Procuracy to prosecute cases in the intellectual property tribunals which are part of the national and provincial court system.[260] The courts have levied fines, imprisoned hundreds of infringers, and even applied the death penalty to four individuals, yet have continued to struggle with enforcement.[261] Apparently, the ability to profit from infringement has created enough incentive for would-be infringers to risk prison and even the death penalty. Another key agency that is attempting to enforce patent statutes is the State Administration of Industry and Commerce which licenses corporations to operate and is empowered to revoke licenses for infringement. A second agency, the Customs Administration, is required to seize and destroy counterfeit goods, exported or imported, and levy fines against the producers of the goods.

The effectiveness of litigation and basic enforcement was not evident between the establishment of the patent statute in 1984 and its revision in 1992. The CPO reported less than 2,000 administrative actions and 500 lawsuits during the period when U.S. manufacturers alone had estimated more than $1 billion in losses annually from IPR

[260] Oksenberg, Potter, and Abnett (1998) p. 20.

[261] Alford (1995) p. 91.

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infringement.[262] Despite high profile factory closures and destruction of pirated goods, especially during the diplomatic disputes during 1996, the right grantor has struggled to enforce the rights that it grants in intellectual property. With the European Union recently citing over 400 specific factories violating European firms' intellectual property, it appears that the PRC still has a long way to go towards establishing a viable system. One factor that helps to explain the problem of poor enforcement is the role that right seekers play in the PRC-patent granting system.

Right Seekers

Riker and Sened posit that a property rights system requires the active interaction of both the right seekers and the right grantor. In the PRC, the right grantor took the lead in creating the basic IPR system in the 1980's, but the right grantor had also actively spent decades repressing potential right seekers. Campaigns against intellectuals and the closing of many universities during the Cultural Revolution resulted in the significant loss of a generation of potential intellectual property producers, even when the government decided it was in its best interests to encourage it. For example, both the U.S. and Japan possessed around 75 scientists and engineers per 10,000 of the labor force in 1990, while the PRC had just over five scientists and engineers per 10,000.[263]

While the manufacturing base increased as a result of basic economic reforms, the right seekers lagged in development during the last two decades of the 20th century.

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[262] Alford (1995) p. 89.

[263] National Science Foundation (1993) p. 123.

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Certainly the raw number of right seekers increased in the period, but the overall wealth and influence of manufacturers involved in piracy increased more rapidly. The result has been that local officials have not been as actively involved in addressing IPR issues as the central government due to the benefits derived from local taxation and outright corruption. Nonetheless, both foreign and domestic right seeking has increased and it is reasonable to submit that they may become more important relative to those who violate IPR.

Who Patents?

Patent right seeking has increased in the PRC dramatically since the 1980's for both residents and non-residents as indicated from patent applications. In 1989, patent applications numbered 9,659 in the PRC, evenly split between foreign and domestic right seekers.[264] From 1985 to June 1992, the 12,000 largest state-owned firms had on average filed only one patent application of any type on an annual basis.[265] By 1998, right seeking in China increased dramatically to 82,289 applications for patent grants. However, actual patent grants for 1998 were 1,653 for residents and 3,082 for non-residents.[266] While the total applications of patents increased, the backlogged review of patents pending by the CPO lagged the desire for patent-right protection. This indicates that the basic patent-granting apparatus of the PRC still dramatically lags in development relative to the right-seeking activity of both citizens and foreigners.

[264] World Intellectual Property Organization (1989).

[265] Alford (1995) p. 84.

[266] Patent data for 1998 in the PRC derived from www.wipo.org.

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The types of industries that produce intellectual property have also increased, thereby increasing the potential pool of right seekers. In 1980, high technology production was around 4% of the PRC manufacturing output. By 1995 high tech output had reached 12.5% of manufacturing output, approaching the 15% level of both Japan and the U.S. in that year.[267] The PRC high tech output of 1995 accounted for 6% of global output of high tech, indicating that the PRC increasingly had IPR interests not only domestically but in foreign states as well.[268] The PRC has actively restructured state-enterprises and research institutes in technology-related fields to induce more firms capable of producing intellectual property. Initiatives include the development of venture investment companies and the Bank of Science and Technology to provide funds to promising enterprises.[269]

The telecommunications industry has led the way in changing the right seeking base of the PRC. For example, the Nanjing Panda Electronics Company has traditionally been a producer of televisions which as an industry suffers from thin margins and barely broke even in 1999.[270] Utilizing new policies to encourage high tech development, Panda built a mobile phone and internet equipment unit utilizing its pool of engineers and high tech-trained employees by selling its debt to the government and creating joint ventures with Ericsson of Sweden, Sharp of Japan, and the LG group of Korea. Domestic growth of the mobile phone and internet sectors doubled in 1999 and other major state

[267] See National Science Board (1998) p. 6.8.

[268] See National Science Board (1998) p. 6.9.

[269] Zhou Yuan (1995) p. 222.

[270] Wall Street Journal (5/24/2000) p.A17.

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enterprises followed similar strategies to take advantage of the growth, including TCL Holdings and the Konka Group. The strategy of teaming with foreign high tech firms increases the incentive for domestic firms to protect both foreign patents, from which they benefit, and also new patents that joint research and development produces. This is a normal business practice throughout the West in manufacturing processes.

A final factor that may affect the future make-up of the pool of potential right seekers is the overall improvement of education of PRC citizens in technology fields and increased economic opportunity generally. The reform period in the PRC has steadily increased the number of people seeking higher education than in previous ideologically-charged periods discussed above. In fact, the PRC has difficulty finding space for all of the prospective college-bound students because the current system can accommodate only 10% of high school graduates.[271] Recent reforms allowing private-for-profit schools has caused the establishment of over 60,000 such schools from elementary through college levels in only a few years. Combined with PRC citizens obtaining post-secondary and graduate degrees abroad, the potential pool of right seekers ought to be increased substantially over the next two decades. While PRC officials have not been pleased with graduate students remaining overseas, especially in the U.S. where the rate was as high as 80% for science and engineering doctoral students in 1991, it stands to reason that if greater personal liberty can be extended that some of these potential right seekers will eventually return to the PRC with substantial skills.[272] As noted in the cases

[271] Wall Street Journal (5/9/2000) p. A21.

[272] National Science Foundation (1993) pp. 130-131.

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of the ROC and Korea, the extension of general rights has been beneficial to developing a general respect for IPR.

Prospects and Comparisons

Since IPR institutions are the result of the interaction of right seekers with the right grantor, historical interaction of the variables causes IPR bureaucracy to form when issues arise that demand attention. The PRC's patent system has evolved in recent years due to the needs of a polity moving from communism to more capitalist functions in their economy. As noted above, the patent statute was first promulgated in 1984 because the state, under Deng Xiao-ping's initiatives, desired to establish incentives for scientists and engineers to create new ideas and technologies. The right grantor had developed an interest in granting a property right where none had previously existed in order to speed modernization. Unfortunately, the right seekers had been thoroughly discouraged over the previous three decades from seeking a property right for their creative endeavors. Furthermore, the state promulgated a patent law, but had not developed other legal institutions to administer the law, including the lack of legal standing in the courts. Considering that the patent institution was non-existent prior to 1984, the progress to develop statutes, courts, a patent office, and coordinate law enforcement for a new policy, the past fifteen years have actually seen astonishingly fast development of the PRC's patent institution.

While some theorists claimed that the IPR system in the PRC was formed under pressure from foreign interests, the track record on disputes indicated that the PRC has often held the upper hand in negotiations and had frequently reneged or delayed the

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implementation of agreements when it suited its interests. What is missed by theorists emphasizing the role of diplomacy is that the PRC's oft stated goal has been to establish an effective IPR system in order to modernize its economy. When the PRC has actually fulfilled foreign expectations in agreements, it has been when the PRC has had greater institutional capability to do so. Considering that the patent and other IPR institutions have existed only since the early 1980's, expectations should include more failures to achieve the full spirit of bilateral and multilateral agreements with the PRC on IPR. Comparatively, the cases examined (Japan, Korea and the ROC) all experienced diplomatic pressure similar to the PRC and that such pressure was effective when each state had the capacity to comply. Such state capacity included general capitalist development; the extension of general civil liberties and the rule of law; and an active interaction of the right seekers with the right grantor.

Unfortunately, it is the state capacity issues that cause continued pessimism for the overall development of a viable IPR system in the PRC. While the PRC is developing a capitalist economy, it still controls vast areas of the economy through state-owned enterprises, unlike any of the cases examined. The government is leading an effort to force the mergers of many state-owned firms with hopes that they will be more competitive with foreign firms, but consolidation has often reflected government policy more than economic logic.[273]

Current goals include reducing ninety auto and truck manufacturing firms down to ten; hundreds of local-government controlled firms to two dozen major power

[273] Wall Street Journal (8/10/2000) p. A14-15.

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companies; and thirty-four airlines to three major airlines with limited local carriers. Other targeted sectors for future consolidation include the oil, electronics, appliances, and shipping industries. The task ahead is large for government regulators and policy-makers and the consolidation will reduce the resources available to develop the IPR system in the near term. Furthermore, focusing on developing large firms from state assets may constrict the ability of entrepreneurial firms to access capital and restrict competitiveness because policy makers may favor new consolidated firms over entrepreneurs.[274]

The establishment of individual rights and the rule of law will be critical for the full development of intellectual property rights in the PRC. The experience in Korea and especially the ROC may prove to be instructive for those who wish to extend the development of IPR in the PRC. Effective IPR in both Korea and the ROC required the general extension of rights to all citizens. Intellectual activity requires freedom from state repression, whether it be basic rights to free speech, religious or philosophical expression, and the unfettered distribution of information. If persons do not feel safe to express their new ideas or to reveal innovations, it is reasonable to posit that filing for a copyright or a patent could quickly become dangerous in a state where such rights are arbitrary. Considering the PRC's past experience with repressing intellectual activity and its current campaigns against dissidents and meditative groups like Falun Gong, it may be some years before basic rights are extended and protected in the PRC and therefore the general protection of IPR will likely lag as well.

[274] Hayek (1944, 1994) warned when a state is actively involved in the management of firms, corruption or authoritarianism can result.

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A capitalist society requires the rule of law so that contracts are secure, government officials are kept in check ,and regularization of basic economic activity that is premised on secure property rights. The PRC has come a long way in its economic, political, and social life since 1978 but it has farther to travel before a dispute over IPR is about the content of the patent rather than the outright illegal manufacture of a patented idea. If the overall rule of law continues to improve and the government extends civil liberties while maintaining economic growth, the PRC's IPR system will be as effective as any state examined in this study.

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CHAPTER 5

PATENTS, RIGHT SEEKERS AND ECONOMIC GROWTH

The development of intellectual property institutions has been characterized in coercive diplomacy literature as an issue of compliance as enforced by powerful states and the diffusion of ideas through complex interdependence fostered by international institutions (Ryan, 1998; Sell 1998). Unfortunately there has been little focus on whether an intellectual property regime should exist at all in specific polities. Members of (and applicants to)[275] the World Trade Organization define intellectual property as private property.[276] When a state has joined the WTO it must have demonstrated that its economy is essentially market-based with private property protection prior to membership in the trade body. Property rights form as a result of the interaction of right seeking by individuals and firms and the right-granting role of the state (Riker & Sened, 1991). Logically, intellectual property institutions develop as the result of not only right-granting actions of the state (issuance of patents), but also by the right-seeking actions of

[275] As an applicant to the WTO, a state must have a market-based economy. Few states remain that do not utilize markets and these states are not applying to the WTO. It is recognized that a "market-based" economy can possess a wide variety of state-interventions from basic regulatory functions to state-owned enterprises.

[276] Intellectual property is recognized as legally private in the TRIPS agreement Preamble (GATT, 1994:366). This legal notion includes intellectual property that is generated by public institutions such as universities and government bureaucracies and as such, in a court of law the public institution's intellectual property is regarded as "private" and excludable from infringement.

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firms and inventors who desire protection from would-be violators of their inventions (patent applications).

Coercive diplomacy theorists place too much emphasis on the right-granting role of the state and how it responds to external diplomatic pressure and almost no attention to the right-seekers necessary for the development of a viable IPR system. This chapter will demonstrate the statistical significance of right-seeking behavior and subsequent effective grants of intellectual property rights (IPR) for the cases of the United States, Japan, Korea, and the Republic of China (ROC) are prior to compliance with international regimes for IPR. In each case, right seeking and granting increased prior to diplomatic pressure and resolution of the disputes. The implications for IPR-policy choices are that fostering economic and technological development are at least as important as the application of external diplomatic pressure on developing states. The primary study period (See Chapter One) will focus upon the years 1975 through 1990 on the diplomatic activity of the U.S. on IPR issues with the cases selected. Due to minimal patenting during the study period for the PRC, I will utilize the results to discuss the PRC development of its IPR system and potential policy choices as a result of the findings.

Coercive Diplomacy

If the coercive diplomacy theory is correct, we would expect to find a relationship between diplomatic actions and the development of IPR institutions. The theory generally posits that diplomatic pressure is a causal variable in creating viable IPR institutions. There have been numerous diplomatic agreements, both multilateral and bilateral, between the U.S. and all of the cases examined on IPR over the past century

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that indicate as many failures as success. Success is defined by the coercive diplomacy theorists that the agreement itself indicates effectiveness. However, compliance with IPR agreements has been difficult to enforce, leading to subsequent agreements to remedy failed agreements. An important problem with coercive diplomacy theory is that signing an agreement indicates capitulation by the developing state, yet all of the cases violated treaty terms repeatedly and in some cases still violate agreements.

Evidence of agreements indicates to the coercive diplomacy theorists that developed states have successfully utilized their power over developing states. My analysis in the previous chapters indicates that IPR agreements were numerous and typically the targeted state was not able, or was unwilling, to comply with agreements. In some instances, such as the ROC and the PRC, the targeted state was able to exact terms favoring their own interests. Furthermore, measurement of the agreements effectiveness relies on standards of decades to measure compliance with original agreements. As outlined in previous chapters, the time lag raises questions as to whether or not the agreements were causal and if other factors were more important in developing IPR institutions. The evidence presented in the previous chapters indicates that quantifying the role of coercive diplomacy is arbitrary and limited in determining causality. The historical evidence indicates that all of the case states were presented with demands to improve their IPR institutions and that they agreed to such improvements. Each case state then typically failed to comply with agreements or simply chose not to enforce IPR agreements. The pattern then repeats itself on a range of IPR issues that are agreed, then the targeted state is forced into more rounds of negotiations and rounds of non-

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compliance. Why, after many decades and repeating of this pattern, does a state become compliant with IPR agreements?

One possibility is that diplomatic agreements take time to be fully effective. While this is plausible, neither Ryan (1998) or Sell (1998) make this claim. Both theorists point to the demands of the U.S. during the 1980's as a pivotal period in creating the global IPR regime that has been imposed on targeted states. Both argue that the use of new trade laws allowed for more effective agreements under the auspices of the U.S. Trade Representative. Chapters Three and Four both present evidence that the targeted states often reneged on agreements throughout the 1980's and into the 1990's, especially Korea, the ROC, and the PRC. As recently as 1996 the U.S. threatened sanctions on the PRC over IPR and the European Union has lodged complaints during 2000. Empirically it is not clear, and perhaps not even possible, that causality exists between diplomatic actions and the creation of effective IPR institutions.

Another possible way of proving that coercive diplomacy causes effective IPR institutions to form is that a targeted state may perceive a benefit from joining a multilateral body or complying with a bilateral agreement. Certainly the benefits of joining the WTO are an incentive for a state to develop market-based institutions. Such benefits would include increased flows of investment, technology transfer, and access to developed states' markets as indicated in the efficacy literature in Chapter One. But this is a different argument than saying coercive diplomacy is causal. The coercive diplomacy argument posits that targeted states have limited options when being confronted with a more powerful state's demands. The theory does not posit that targeted states join IPR agreements because it increases their utility, but rather that they may, after

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repeated interaction, decide it is in their interests to comply thereby increasing their utility. Ryan (1998) asserts that this is a possible reason for compliance, while Sell (1998) contends that most targeted states agree only because they have no choice.

While increased benefits from compliance is a plausible argument, it is also a subjective enterprise in determining what causes compliance. Diplomats and bureaucrats may actually learn from the ideas presented to them over the years, and actually come to agree that an IPR institution that complies with the WTO agreement is useful for their state. Yet, targeted states have often agreed with foreign demands, but have had difficulty in enforcing the agreements once implemented. We cannot know for certain that diplomats and bureaucrats actually agree with foreign demands for utilitarian reasons, nor can the argument that IPR agreements require years to properly function be properly proven or falsified.

For as many agreements that have been made, there have been nearly as many episodes of non-compliance. Furthermore, when has a targeted state actually complied? Theoretically this leads to the possibility that diplomacy is not causal and that other factors not examined or considered by the coercive diplomacy theorists are causal. Coercive diplomacy theory posits that causality flows from the powerful state towards the targeted state through bilateral and multilateral agreements. I will demonstrate that domestic factors are statistically significant in developing an effective IPR institution. I posit that right seeking is a function of domestic factors that are independent of diplomatically induced IPR agreements.

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Hypotheses, Variables, and Cases

The historical research in the previous chapters indicates a general hypothesis that right seeking for patents increases in a state because of economic growth, a greater level of technological sophistication in research activity and possessing the personnel capable of engaging in such activity. When a state possesses these attributes, an effective patent institution can evolve to meet the new demands that such activity requires. My hypothesis is juxtaposed to the hypothesis that effective intellectual property institutions are the result of active diplomatic action to ensure domestic compliance through statutory enforcement. For my analysis, I will utilize regressions (ordinary least squares) that will examine patent granting as a function of economic factors by examining the role of per capita economic measures articulated in two models as follows:

Model 1: Patenting (PAT) is a function of the ratios of the independent variables: aggregate number of scientists and engineers (SE); aggregate R&D expenditures(R&D); aggregate gross domestic product (GDP). The variables are divided by population (POP) to create ratios.

$$PAT/POP = (Constant) + SE/POP + R\&D/POP + GDP/POP$$

Due to the varying size of each state, both in populations and stages of economic development, I will run the model above with a dummy variable (1 if true, 0 if false) that will test if structural differences between the states are significant. For example, Japan is

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physically larger than the ROC, thus there may be more (or less) influence from each expenditure increase, or more personnel, etc. Dummy variables will be designated by letter codes for each state: JP for Japan; ROC for Republic of China; and KR for Korea. The U.S. serves as the reference category for Japan, Korea, and the ROC in this model.[277]

Model 2: Patenting is a function of the ratios from Model 2, but add a dummy variable for each state.

PAT/POP = (Constant) + SE/POP + R&D/POP + GDP/POP + JP + KR + ROC

Dependent Variable

Theoretically, my model assumes that right seekers are as important a factor as the right-granting apparatus of the state. Right seeking by both domestic and foreign applicants and right granting will be measured by total patents granted in each polity. Patents have been chosen as a measure over other intellectual property due to the availability of data and their usefulness as an indicator of inventive output (Griliches, 1990). A patent can be useful in many differing polities and markets because patents may be useful regardless of language or cultural barriers unlike other types of intellectual property such as copyrights. Furthermore, patent granting by the state is dependent on the filing of an application by the right seeker, hence a reasonable measure of both right seeking and right granting behavior. Patenting activity indicates not only creative

[277] See Pindyck and Rubinfeld (1991) p. 106.

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activity, but also reasonable expectations for protection against violations or an attempt by a right seeker to initiate protection of their intellectual property. For example, if reasonable protection is not expected, firms may not market the product, or even attempt costly patent-filing procedures in states where protection is questionable (Knight, 1996; Bertin & Wyatt, 1988).

The rise of patent-generating industries globally has resulted in a greater standardization of patenting procedures through the World Intellectual Property Organization (WIPO) to lower transaction costs in disputes by regularizing patenting procedures, and more importantly, centralizing first-filing for patentees of member states. So while patenting is more standardized across states, it is nonetheless the purview of each state on how to actually implement and regulate its own patenting system.

The advantages of patents as a dependent variable are that they are high in international comparability with general economic indicators, research and development, and right seeking behavior. The disadvantages are that not all inventions are patented or are patentable; not all patents are utilized by the innovator; and industrial sectors differ in their propensity to patent (Archibugi & Pianta, 1996). For this study, however, patents provide a measure of basic right-seeking and right-granting behavior: the fundamentals of a viable IPR system.

An undeclared right is unenforceable, therefore patents are the first step in declaring a right (Riker & Sened, 1991). First, a patent must be applied for in order to then gain protection. Patents do not measure violations, but they do indicate that a right-seeker is willing to defend the right to property in their creative endeavors whether through the civil courts or administrative agencies. Patents provide a reasonable

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measurement for a dependent variable that explains the levels of creative activity by right seekers, the willingness to protect their property right and the state's granting of the property right. While it does measure right-seeking behavior, granting a patent cannot explain how effectively it will be protected.

Independent Variables

Independent variables will measure indicators that likely increase right seeking. Intuitively, in order for a state to possess potential right seekers, it must have an endowment of scientists, engineers, and other potential patent-generating individuals measured by the total number of scientists and engineers and as a ratio of the population. More importantly, a state will require higher levels of organization that generate intellectual property – especially firms, but also universities and research consortia – that support and invest in research and development which will be measured by aggregate research and development expenditures and as a ratio of the population. It follows logically that in order to have such endowments of right seekers, a state will likely have achieved a critical level of economic development measurable as gross domestic product (GDP) and per capita gross domestic product. Per capita GDP may indicate that citizens also have more purchasing power for patent-related products and may indicate potential for investments in research by both industry and the government.

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Cases

The cases that have been selected are the United States, Japan, Korea, and the Republic of China. Due to a lack of patent data for the People's Republic of China for the period, I will discuss the implications of the findings of the other cases for the PRC's IPR development. The data is drawn from the years 1975 to 1990 for two reasons: first, the data was readily available; and second, this is a particularly active period for the U.S. in IPR-related diplomatic activity.[278] The United States was chosen as a control because, as one of the most developed states, it has pursued the vigorous enforcement of IPR globally and particularly on each of the selected cases. Interestingly, the United States' system of IPR has evolved with its own difficulties over the past few decades, but has become more important as the United States' technology industries have taken a larger share of the domestic economy (Aoki, 1993/94). This behavior is expected given that the model for IPR formation is dynamic and accounts for the increased (or decreased) role of right seeking.

The other cases have been chosen because of their importance in IPR diplomatic activities since World War II, their importance in U.S. security, and their comparative qualities as "Asian" states.[279] While Japan is now a leader in technology generation, it

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[278] Schumpeter (1942) argued that capitalism is an evolutionary process under constant change and is never stationary. Hayek (1980) contended that economic systems are under continuous change and data cannot be treated as constant over time. The data collected for this study reflects the above points: each Asian case has experienced dynamic growth in the period observed and factors of growth influenced the IPR system. For this reason, generalizations about future trajectories may be limited, but the Austrian School and Schumpeter would agree that as a historical tool, regression analysis may be adequate.

[279] It is frequently argued that Asian states possess historical and cultural legacies that make them unique in their development trajectories from Western states. See Pye, (1985); Wade (1990); Johnson (1995).

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was once a target of diplomatic pressure by the international community on IPR protection that has eased with post-war development (Kotabe, 1992; Doi & Shattuck, 1977). Similarly, Korea also had trade sanctions applied later than Japan, yet has seen an easing associated with Korean economic and technological development in recent years (Bloom, 1992; Gadbaw, 1988). Finally, by examining the Chinese polities, a further control is applied by claims that historical and cultural legacies have hindered compliance with global IPR norms (Alford, 1995; Chiang, 1995). The recent diplomatic difficulties between both the PRC and the ROC with the U.S. over IPR also provide salient tests of the data. It will be demonstrated that even in these difficult cases, IPR protection is gaining a foothold that is associated with economic and technological development rather than diplomatic pressure. These cases provide the statistical significance necessary in refuting the claims of international relations theorists and provide ample evidence that a political model of IPR formation can increase our understanding how IPR systems form in the first place and how better to implement policy choices given this understanding.

Data Sources

The data utilized for this analysis is available in the Appendix. For the dependent variable (total patent grants), patent data was obtained from WIPO's annual publication Industrial Property Statistics (1975-90) for grants made in each polity.[280] Despite variation in patenting procedures and the fact that the TRIPS agreement is not fully implemented across states, members of WIPO and previous treaty unions have been

[280] The data of WIPO members for the period was generously provided by Lise McLeod of WIPO's library staff. Annual data since 1996 is posted on WIPO's web page at www.wipo.org.

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reporting this data regularly for most of this century.[281] Patent data for the Republic of China was provided by the Economic Division of the Taipei Economic and Cultural Representative Office in the United States because it is not a member of WIPO due to its lack of diplomatic recognition.[282] While the patent data does not indicate how difficult each particular state's procedures may be, patents granted to residents and nonresidents are an indication of the level of protection sought.

One problem with the selected cases for the period 1975-1990 has been the diplomatic problems associated with the PRC and the ROC. The ROC was never a signatory of the major conventions regarding intellectual property and thus did not report any patent statistics to WIPO. Furthermore, as diplomatic recognition shifted from the ROC to the PRC in the late 1970's, the ROC was unable to join WIPO, even when its own compliance with international standards improved. The PRC's communist legacies and turmoil from the Cultural Revolution resulted in low inventive output and relative isolation from international institutions. Therefore, there were no patent reports for some years to WIPO, low patent output, and unreliable data in other years resulting in insufficient data for meaningful comparisons for the study period.[283] Nonetheless, the lack of patent data from the PRC lends support to my theory of IPR development because

[281] See the World Intellectual Property Organization's 100 Years of Intellectual Property Statistics (1983) for overview.

[282] As of the year 2000, ROC patent statistics are also available on the IPO's web page at (www.moeaipo.gov.tw/eng/).

[283] The Cultural Revolution lasted from 1966 to 1976 which greatly diminished intellectual activity including closing of universities and "rehabilitation" of intellectuals in the country-side. For more details see MacFarquhar (1974) and Thurston (1988).

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the lack of support for patent grants by the right grantor and the repression of potential right seekers created a poor environment for IPR production.

The independent variables, science and engineering personnel and R&D expenditures were obtained from the National Science Foundation's 1993 special report Human Resources for Science and Technology: The Asian Region (NSF 93-303). In order for a state to first have right seeking behavior by its citizens, it must possess a pool of potential right seekers. In the case of patent generation, a basic requirement is a significant number of science and engineering personnel who are likely to be engaged in research and development. While the aggregate number of science and engineering personnel in a state has an effect on overall patent seeking (Teitel, 1994), a more interesting measure (and a measurement for this particular study) is the overall increase of science and engineering personnel relative to the population.[284] In other words, have the right seekers increased their overall potential relative to the total population?

In order to measure the statistical significance of personnel with patent generation, data from NSF 93-303 measuring the aggregate number of scientists and engineers in research and development for each state was utilized. While utilizing such data improves understanding on how increase (or decline) of personnel may increase (or reduce) patenting, the data nonetheless has some problems. First of all there are no standard definitions for scientists or engineers across states. Secondly, from some states the data is drawn from employment surveys and others from census data. Nonetheless,

[284] The exception to this is the PRC, which due to its large population possesses a very large pool of science and engineering personnel (391,100 total personnel compared to Japan, 477,900 personnel in 1990). Yet, the PRC has a low ratio of science an engineering personnel to its overall labor pool (5.61 per 10,000 compared to Japan 74.21 per 10,000). See Table A-19, p. 122 of NSF Human Resources for Science and Technology: The Asian Region.

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the data was first filtered and edited by the National Science Foundation, and represents perhaps the best available measurement of science and engineering personnel.

Related to the relationship between personnel and patenting is the funding of the personnel. Patents are most often sought for goods of higher commercial value and due to the time-consuming and costly nature of protecting a patent, the value (or potential value) of the patented good usually exceeds such costs (Archibugi & Pianta, 1996; Grenzmann & Greif, 1996). This suggests that the pool of potential right seekers would require significant funds in order to develop patentable innovations.[285] In order to measure the relationship, data was drawn from NSF 93-303 for aggregate research and development expenditures, 1975-1990.

One problem for analysis will be the lag between the actual expenditure on R&D and patent issuance. Studies indicate that the lag can be between one and two years from expenditure to patent application (Greif, 1985) or may be more directly correlated with expenditure (Griliches, 1990). Furthermore, R&D expenditures will likely continue during the application process while fine-tuning the invention or process during and after patent issuance (Knight 1996). Also, R&D expenditures may not directly become a patentable product and funding may be for pure research of which it is difficult to quantify the relationship to patent generation. Since it is reasonable to assume that expenditures on R&D will occur prior and after patent application and issuance; lags between expenditure and application will vary; and expenditures may not lead to any

[285] Research and development costs can vary widely by commercial product. For example, development of basic machinery can be relatively low in total R & D relative to patent output while automobiles have higher costs due to development of stylistic differences. Similarly aerospace has high R & D costs due to testing prototypes. Regardless of R &D costs, patenting has a strong relationship with commercial intent (Sirilli, 1987).

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patentable results at all; therefore data for expenditures and patents will be tested on a year by year basis in my analysis.

Finally, aggregated economic measures will be utilized in order to measure the relationship between economic growth and IPR. Related data drawn from NSF 93-303 will be total GDP and per capita GDP for testing the relationship of economic development with right-seeking behavior. For consistency, I will utilize data drawn from NSF 93-303 since R&D expenditures and GDP measurements have been calculated in purchasing power parity ($PPP) 1987 dollars.[286] GDP per capita provide a measure of aggregate expenditure of both the private and public sectors of a state and insight on comparable levels of development and IPR (Maskus & Penubarti, 1995; Teitel, 1994). Population data for Japan, Korea, and the ROC has been drawn from NSF 93-303 and for the United States from the Bureau of the Census, U.S. Department of Commerce.

Dependent Variable Variations

Inspection of the raw data indicates that significant historic factors of the data collected for the U.S. has some negative impacts on the models' potential explanatory power. In particular, patent grants (dependent variable) dipped in 1979 and surged in 1980 because the U.S. Patent and Trademark Office lacked the funds to publish all the patent grants from fiscal year 1979. Similarly, further funding shortfalls at the USPTO resulted in fewer patents issued during 1986 and more patent grants in 1987 and when the

[286] From NSF 93-303, p. 1: "Purchasing power parity dollars ($PPP) are used to convert a country's national currency expenditures to a common currency unit that allows real international quantity comparisons to be made. $PPP are based on 'market basket' pricing exercises. All dollar amounts in this report are in 1987 constant $PPP." The sources for $PPP are drawn from the Penn World Tables and the UN's International Comparison Program (National Science Foundation 93-303, 1993: 48).

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backlog was alleviated by 1988, patent grants declined as the workload normalized.[287] These fluctuations in the dependent variable for the U.S. were not dependent on the lack of inventive output, but rather caused by U.S. federal budgetary issues. Previous chapters indicate that each case state has experienced some annual fluctuations in patent granting related to economic factors, budgetary issues and staffing issues at their respective patent offices due to growth of applications requiring review. However, over the time period examined, all of the cases experienced general increases in the dependent variable, patent grants (Table 4).

[287] National Science Foundation (1993) p. 172.

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Table 4

Total Patent Grants[288]

Year	U.S.	Japan	Korea	ROC
1975	71,994	46,728	442	2,159
1976	70,236	40,317	479	1,499
1977	65,269	52,608	274	1,205
1978	66,102	45,504	427	1,795
1979	48,853	44,104	1,419	3,686
1980	61,827	46,106	1,632	6,633
1981	65,770	50,904	1,808	6,256
1982	57,889	50,601	2,609	7,462
1983	56,862	54,701	2,433	7,096
1984	67,201	61,800	2,365	8,592
1985	71,661	50,100	2,268	9,427
1986	70,860	59,900	1,894	10,526
1987	82,952	62,400	2,330	10,615
1988	77,924	55,300	2,174	12,355
1989	95,539	63,301	3,972	19,265
1990	90,366	59,401	7,762	22,601

Comparing Independent Variables

The data indicates that the ROC and Korea, compared to the U.S. and Japan, possess different attributes due to their respective levels of development. For example, the ROC and Korea have rapidly developed their industrial and technological bases since the 1960's. Public policy in these two states have focused on increasing the educational

[288] Source: WIPO (1975-1990) for U.S., Japan, and Korea; for ROC see www.moeaipo.gov.tw.tw/eng/.

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levels obtained by citizens thereby increasing the base of potential right seekers more rapidly in order to achieve the level of developed states. Both states have increased their GDP rapidly since the 1960's and the subsequent economic growth was strongly associated with the rise of patent grants as their economies grew. Second, since both the ROC and Korea have rapidly developed, the base level of patenting was low to begin with, as well as other basic data for the independent variables, and they steadily increased all independent and dependent variables during this period relative to rates of growth for the developed states. The implications are that rapidly developing states may increase right seeking more rapidly than developed states, and smaller economies may be more affected by factor changes than a larger developed economy.

Comparing Internal Economic Development Factors

The independent variables each provide insight into the role of economic growth and public policy choices and the corresponding effects on patent grants. Examining the raw data for per capita GDP indicates that a lower impact of per capita GDP in the U.S. can be partially explained by the large standard error expected between developed and less developed states as well as the recessions in the U.S. when GDP contracted for both 1980 and 1982 (Table 5). Despite the recessions, there was a general increase in patenting since the 1960's, except the years of budgetary shortfalls as explained above. While modest, I expect the coefficients to indicate that increasing the GDP generally does have an impact for increasing patent grants.

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Table 5

Per Capita GDP (U.S. Dollars)[289]

Year	U.S.	Japan	Korea	ROC
1975	14,918	8,858	2,174	2,186
1976	15,505	9,201	2,427	2,503
1977	16,044	9,551	2,648	3,181
1978	16,637	10,016	2,855	3,542
1979	16,869	10,448	3,031	3,757
1980	16,583	10,816	2,920	3,954
1981	16,711	11,160	3,077	4,131
1982	16,195	11,398	3,255	4,207
1983	16,673	11,683	3,589	4,488
1984	17,552	12,188	3,875	4,883
1985	17,947	12,660	4,088	5,042
1986	18,302	12,929	4,552	5,564
1987	18,698	13,439	5,051	6,176
1988	19,258	14,119	5,574	6,551
1989	19,555	14,691	5,894	6,961
1990	19,544	15,296	6,342	7,193

The cases of Japan, Korea, and the ROC will likely indicate significantly more impact on patent grants with per capita GDP. Japan's per capita GDP did generally increase throughout the period 1975 to 1990 and there was a corresponding continuous rise in patent grants, though a more modest gain relative to other variables. Korea

[289] Rounded to the nearest dollar. Source: National Science Foundation (1993) p. 94 and pp. 127-129. The NSF adjusted the GDP numbers to reflect Purchasing Power Parity which is described in footnote 286.

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experienced the greatest impact from GDP as a function of patent generation, even more so than the ROC. Korea experienced greater growth in its per capita GDP than the ROC, while the ROC experienced greater growth in the dependent variable of patent grants. The ROC possessed a higher per capita GDP than Korea at the beginning of the period ($3,953 vs. $2,920 in 1980) indicating that patent generation is associated with an achieved level of per capita GDP as associated with the growth itself. The developed states of the U.S. and Japan support the point that an achieved level of per capita GDP correlates with more patent generation. However, for a less developed state desiring to increase its patent production it may be expeditious to support general economic growth over other factors.

For example, the increase in the per capita GDP of Korea over the period resulted in the number of scientists and engineers per 10,000 of the labor force (Table 6) to nearly equalize with the ROC by 1990 (37.22 to 38.12). Korea increased its GDP rapidly which is associated with increases in the technical capabilities of its labor pool. However, while Korea had nearly equalized its percentage of scientists and engineers with the ROC, the ROC patent production was nearly double Korea's grants by 1990 despite the ROC possessing half of Korea's population. One possible explanation is that the ROC generally possessed a higher per capita GDP than Korea throughout the period adding support to the role of per capita GDP in patent generation. Another possible explanation could be that the state has been more involved in managing Korea's economy, while the ROC has encouraged entrepreneurial firms to lead its economy. As more up-to-date data becomes available for future analysis, it stands to reason that patent production will

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equalize over time if ratios of scientists and engineers remain similar for the two states and Korea continues to encourage market reforms of its economy.

Table 6

Scientists and Engineers per 10,000 of Labor Force[290]

Year	U.S.	Japan	Korea	ROC
1975	55.25	45.55	7.89	-----
1976	54.71	47.03	8.74	-----
1977	55.69	47.08	9.33	-----
1978	56.56	48.26	10.46	-----
1979	57.67	51.26	10.91	-----
1980	59.98	53.10	12.49	9.36
1981	61.93	53.96	13.67	13.96
1982	63.63	55.19	18.26	14.97
1983	66.38	59.11	20.11	16.59
1984	69.21	60.27	22.65	23.47
1985	71.83	63.74	24.66	26.24
1986	73.81	65.22	27.38	27.01
1987	74.85	68.48	30.10	28.77
1988	75.16	71.04	31.54	31.04
1989	75.61	74.21	32.81	33.63
1990	-----	74.21	37.22	38.12

A similar argument can be made for Japan and the U.S. In 1990, Japan had a similar level of scientists and engineers per 10,000 of its labor pool (75.61 for the U.S. and 74.21 for Japan), but Japan equalized with the U.S. over the period. The significance

[290] Source: National Science Foundation (1993) p. 123.

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of the variable was greater for Japan than for the U.S. Interestingly, the state to benefit most significantly from R&D expenditures per scientist and engineer (Table 7) was Japan who steadily increased expenditures the most compared to the other cases. Both the public sector and private sector in Japan almost doubled its expenditures in R&D between 1975 and 1990 while patent generation increased significantly. U.S. expenditures were stable with minor annual fluctuations while patents generally increased. Korea and the ROC experienced annual fluctuations, but increased expenditures significantly towards the end of the period, consistent with a rapidly achieved level of per capita GDP.

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Table 7

R&D Expenditure per Science and Engineering Worker (U.S. Dollars)[291]

Year	U.S.	Japan	Korea	ROC
1975	137,004	72,177	-----	-----
1976	140,256	72,291	32,349	-----
1977	136,921	74,205	45,104	-----
1978	136,543	76,718	45,134	-----
1979	136,884	79,190	40,268	-----
1980	134,643	83,623	33,677	79,631
1981	133,858	90,207	35,459	72,558
1982	134,292	93,751	37,743	65,314
1983	136,123	94,665	43,251	63,066
1984	139,339	100,248	48,259	50,071
1985	143,327	105,031	57,571	49,338
1986	139,711	103,548	65,051	50,480
1987	137,720	105,191	68,908	58,671
1988	138,950	108,378	75,997	63,596
1989	136,825	113,039	78,767	69,864
1990	-----	117,068	73,297	77,032

Research and development expenditures have proven to be a less reliable indicator of patent generation because the variable can be greatly effected by government policy making. For example, despite Japan's concerted efforts to increase its expenditures, the U.S. still spent significantly more per worker in 1990 ($136,825 vs. $117,068). Big ticket items, such as public expenditures for defense or space projects,

[291] Source: National Science Foundation (1993) p. 124.

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can further skew the data while recessions or lower tax receipts can cause retrenchment or termination of some projects. The smaller states of the ROC and Korea also experienced deeper fluctuations for similar reasons, therefore the coefficients that follow indicate that R&D was not as significant as I first theorized for all states, with the exception of Japan when directly compared.

Regressions: Methodology and Results

The hypotheses have been tested utilizing linear regression methodology (ordinary least squares) on the data described above. Regression analysis implies no causality, but what is determined is the statistical significance of the explanatory variables. The strong interrelationships between the independent variables (GDP and R&D expenditures; R&D expenditures and science and engineering personnel, etc.), result in some multicollinearity. Near multicollinearity will bias coefficients on variables, but does not bias the models. Furthermore, the variable size of each state increases the likelihood of heteroscedasticity from dissimilar variances in the error term.[292]

Serial correlation in the error term was caused due to the small sample size and the relationship of adjacent time periods causing correlations with the succeeding time period. To estimate the effect, the models were run with a counter variable which ordered each year (1 through 16) for each case. The results were inconclusive regarding

[292] Heteroscedasticity is defined as the non-constancy of the conditional standard deviation (Agresti & Finlay: 1986, 385). Essentially, the data derived from the cases (ROC, Korea, Japan, and the U.S.) are variable in both real terms and in per capita terms creating the potential for heteroscedasticity.

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the impact of serial correlation on the coefficients of the original regressions. The results reported below do not include the models with counter variables. Future research could attempt to account for the serial correlation by expanding the sample size through expansion of the years observed and the number of cases examined. Nonetheless, the results indicate some significant findings, despite varying phases of economic development, economic size and the problems noted above. The results presented in Table 8 indicate that the per capita measures are significant at the 0.05 level, particularly when controlled for state variation. As well, there are some interesting findings when the individual variables are examined.

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Table 8

Regression Results

	Coefficients (Standard Error)	* indicates if significant at .05 level
	Model 1	Model 2
Constant	-.109 (.103)	-.595 * (.278)
SE/POP	279.627 * (74.398)	184.728 (108.792)
R&D/POP	-3.604 * (.984)	-2.139 * (.662)
GDP/POP	6.487E-02 * (.027)	7.183E-02 * (.035)
JP		.250 (.154)
KR		.317 (.215)
ROC		.728 * (.181)
F-Test	7.716 *	42.637 *
Adjusted R2	.265	.817
n	57	57

Both models indicate overall confidence that the per capita measurements do have a significant impact on the seeking and granting of patents. The linear relationship is not as strong in Model 1 as it is in Model 2, which is consistent with my hypothesis. The inclusion of dummy variables in Model 2 indicates that there is a significant relationship between patent generation and the per capita measures when each state's impact is controlled. I expected that per capita measures would have more impact than aggregate measures because an achieved level of development may produce more patents per

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capita. Examination of the coefficients also indicates that not all the independent variables are as important as theorized. Coefficients are compared as a means of assessing the impact of the independent variables on the model. The coefficients for scientists and engineers per capita and GDP per capita were significant in both models. Most surprising, the coefficients for R&D expenditures in the models were negative.

This finding may indicate a number of issues regarding R&D and patent generation. First of all, R&D may not readily result in patent generation, but have payoffs that occur much later than the expenditure, which is not captured in the model. Second, R&D may have diminishing returns for government-led R&D and patent generation because some research is done without a direct goal of patent generation or sometimes is performed purely for aesthetic reasons.[293] Finally, R&D can be sensitive in both the private and government sectors due to budgetary objectives and economic conditions.

GDP per capita was consistently significant in its relationship to the dependent variable in both models. Whether in an established or rapidly growing economy, patent generation has a significant relationship with economic growth and achieved economic status. For example, in Model 2 the coefficient of GDP per capita (7.183E-02) indicates that increases in GDP will result in a positive relationship with patent generation. The relationship between patenting and the coefficient of scientists and engineers per capita (184.728) is also significant. Effective IPR-granting systems not only require the

[293] For the period examined (1975 to 1990) all four cases experienced a significant increase in the expenditure of R&D resources by industry relative to government. For the period examined, industrial R&D for the cases as a percentage of total expenditures (1975,1990): Japan (62%, 78%); U.S. (45%, 52%); Korea (35%, 84%); and ROC fluctuated between a low of 50% in 1984 and a high of 62% in 1989. Source: National Science Foundation (1993) Table A-17.

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economic wherewithal, but the individuals who create patentable ideas and products. In each state examined, the growth of scientists and engineers has had a profound effect on patent generation. This strongly lends support to my theory that the development of right seekers has a strong influence on patent granting.

Further investigation may provide a possible explanation that the lack of robustness in Model 1 is caused by a nonlinear relationship among per capita data, patenting, and the achieved level of development of a state. For example, as the U.S. achieves a higher level of development, there may be less impact from the growth of per capita measures as it stabilizes in year-to-year growth. In general, growth in per capita measures may rise rapidly during early periods of rapid development then be more stable as a state develops which may flatten out per capita measurement growth. This may result in a non-linear relationship over time. Population growth may also slow with development or other factors resulting in negative or positive effects on per capita measures. Aggregate data can continue to grow and generate more patents, even if per capita growth falters.

Discussion: Diplomacy or Development?

Overall, the models indicate that the independent variables do affect the level of patent grants positively with certain variations. Developed states experience less influence from the independent variables, while developing states experience a stronger association between patent grants and the independent variables. Not only is the growth of the economy, as measured by aggregate GDP, significant in generating patents, but an

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achieved level of per capita GDP results in more patent generation. Rapidly increasing the labor pool of potential right seekers also was significant, while R&D expenditures were less significant with the exception of Japan. There is a strong association between patent generation and the independent variables over the period, but what of the relationship with patent generation and diplomatic actions (Table 9)? Were diplomatic actions aimed at IPR issues successful in creating effective IPR systems prior to the development of vibrant patent systems for these cases?

Table 9

IPR-related Section 301 Cases Initiated by the USTR[294]

State	Subject	Year Initiated	Year Withdrawn
ROC	Films	1983	1984
Korea	Films	1985	1985
Korea	IPR	1985	1988
Korea	Patents	1987	1987
Korea	Patents	1988	1988
Korea	Patents	1988	1988
Korea	Films	1988	1988
PRC	IPR	1991	1992
ROC	IPR	1992	1992
PRC	IPR	1994	1996

[294] Source: www.ustr.gov/html/act301.htm

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As discussed in Chapters Three and Four of my dissertation, the U.S. was actively pressuring each case state, some states as early as the 1960's, on IPR issues. The regressions indicate that increased patenting was significant with domestic variables and that the Section 301 cases frequently cited by coercive diplomacy theorists were initiated and resolved after the establishment of effective patent institutions. The evidence indicates that trade-related IPR agreements are not prior to the establishment of effective IPR institutions, but are an outcome contingent on domestic factors.

The U.S. has generally resolved its IPR issues with each case examined in this chapter. However, as the previous chapters reported, diplomatic actions were not especially effective, unless effectiveness is measured in decades. Frequently, threats of sanctions resulted in agreements, but each state was also able to exact terms that were favorable to its own interests. Japan was pressured by the U.S. on licensing, infringement and the JPO's pendency periods from the 1960's which essentially became non-issues by the early 1980's. Korea was under pressure throughout the 1980's, but was able to delay any actual direct application of sanctions. By 1990, Korea was considered to be in general compliance with U.S. demands without direct sanctions ever being applied. Furthermore, the ROC was able to delay full implementation of agreements until its membership in the WTO is approved, yet it was considered to be in general compliance of U.S. demands without fully implementing the agreements.

When the constant diplomatic disputes, that were never directly resolved, are compared to the significance of the overall long-term capitalist economic development and the subsequent development of right seekers in these cases, the role of diplomacy is greatly diminished in the development of effective indigenous IPR systems. Patent

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generation is strongly associated with general economic and right seeker development, especially with the most diplomatically targeted states of the ROC and Korea. By 1990, the U.S. was generally satisfied with Japan, Korea, and the ROC regarding IPR issues. During the period examined, 1975 to 1990, right seekers as measured by scientists and engineers per 10,000 of the labor pool, rose by more than a third in the U.S.; doubled in Japan; and more than quadrupled in Korea and the ROC. The existence and growth of right seekers in a capitalist economy (developed or developing) is associated with patent generation and increased patent generation is associated with the decline of diplomatic disputes.

The implications for U.S. foreign policy, particularly regarding the PRC which has been the most recent target of threatened sanctions, is that fostering viable capitalist institutions which encourage economic growth and the growth of right seekers is more important than the pursuit of diplomatic sanctions. Furthermore, the examination of each case in previous chapters indicates that for right-seeking to be successful, the extension and protection of individual rights was also strongly associated with the viability of IPR institutions. The TRIPS agreement states that intellectual property rights are private rights and my theory requires the active interaction of right seekers and right grantors to produce intellectual property rights and then the development of an effective IPR system. If the U.S. oft-stated goal of protecting the intellectual property of its citizens overseas is to be achieved, it may require a refocusing of its energies in fostering basic rights, capitalist economic development, and encouragement of the training of scientists and engineers.

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CHAPTER 6

CONCLUSION

My dissertation has demonstrated that compliance with the WTO and various WIPO agreements on intellectual property is contingent on internal economic development and vigorous defenses by right holders, rather than the result of diplomatic pressure. Intellectual property is a bundle of property rights that have evolved in concert with capitalist economic growth and technological development. Right seekers pursue intellectual property rights in order to maximize their utility. Maximizing utility entails the acquisition of a patent, copyright or trademark from a government (a time-limited property right) in order to profit from a creative output. My theory of IPR formation demonstrates that effective institutional development requires the active interaction between those who seek property rights and the state that grants a property right.[295]

What has been confirmed is the relationship among property rights, economic development and then the subsequent emergence of viable intellectual property institutions. Satisfactory diplomatic agreements are achieved only after the state had established an effective IPR system. Effective statutes and enforcement are a function of right seeking and granting that form institutions which attempt to solve problems as they arise.

[295] See Riker and Sened (1991).

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Diplomacy or Capitalism?

Conclusive diplomatic agreements on IPR issues are dependent on domestic factors related to internal capitalist development. The post-World War II era has been marked by a number of disputes over intellectual property protection, particularly between the United States and the cases selected for this study: Japan, Korea, the ROC and the PRC. U.S. firms have claimed repeatedly over the decades that their patents have been infringed upon and copyrights violated. By the year 2000, nearly all of the targeted states in my study possess effective intellectual property right systems, or, in the case of the PRC, nearly so.

Coercive diplomacy theorists have posited that states comply with global IPR standards because they have been forced to comply with diplomatic actions applied by the United States.[296] The pressure applied by diplomats helps to foster concepts of complex interdependence that subsequently facilitates developing states' diplomats to accept the norms of more developed states' diplomats. Normative development at the international level is then transmitted via the diplomatic realm to the average citizen in the targeted state. It is posited by coercive diplomacy theorists that IPR agreements accepted by the developing state are evidence of normative development.

While it is attractive to view international institutions as causal in the development of effective IPR institutions at the domestic level, there is no substantive evidence that norms and belief systems have been adopted. Perhaps future longitudinal

[296] See Ryan (1998) and Sell (1998) for general overview of global diplomacy as cause for IPR compliance.

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studies studying opinion in developing states may indicate that such norms have been transmitted and received, but to date the only significant evidence presented are the agreements. Furthermore, if IPR agreements are the primary documentary evidence to support coercive diplomacy theory, then my case chapters raises a salient question regarding that evidence. Which of the many IPR-related agreements caused normative development and/or compliance?

While the U.S. has been active in pursuing IPR protection on behalf of its firms, the U.S. has been pursuing such diplomatic efforts for well over forty years. If diplomacy has been the key, why has it taken so long to bear fruit? My dissertation has demonstrated that intellectual property rights are first an issue of effective property right protection. When property rights are effectively established and protected, then there is a higher probability that IPR can be protected. Diplomatic issues regarding IPR are resolved when the state has developed the capacity to support effective intellectual property rights. The case analyses confirm that as a state becomes more developed, the content of the IPR disputes are transformed from issues of enforcement to nuanced subtleties of the patent statutes.

My statistical analysis demonstrates that right seeking and granting of intellectual property is driven by increases in economic factors. The regressions indicate that increased patenting was significant with domestic variables and that the Section 301 cases frequently cited by coercive diplomacy theorists were initiated and resolved after the establishment of effective patent institutions. The evidence indicates that trade-related IPR agreements are not prior to the establishment of effective IPR institutions, but are an outcome contingent on domestic factors. Furthermore, the statistical evidence

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presented in Chapter 5 establishes a statistically significant relationship between fundamental economic variables. In particular, increases in economic growth (GDP) and increases in the potential pool of right seekers (science and engineering personnel) have a positive relationship with patent granting. The positive relationship between these variables is prior to conclusive diplomatic agreements.

The U.S. has generally resolved its IPR issues with each case examined in my study. However, as the previous chapters reported, diplomatic actions were not especially effective, unless effectiveness is measured in decades. Frequently, threats of sanctions resulted in agreements, but each state was also able to exact terms that were favorable to its own interests. Japan was pressured by the U.S. on licensing, infringement and the JPO's pendency periods from the 1960's which essentially became non-issues by the early 1980's. Korea was under pressure throughout the 1980's, but was able to delay any actual direct application of sanctions. By 1990, Korea was considered to be in general compliance with U.S. demands without direct sanctions ever being applied. Furthermore, the ROC was able to delay full implementation of agreements until its membership in the WTO is approved, yet it was considered to be in general compliance of U.S. demands without fully implementing the agreements.

When the constant diplomatic disputes, that were never directly resolved, are compared to the significance of the overall long-term capitalist economic development and the subsequent development of right seekers in these cases, the role of diplomacy is greatly diminished in the development of effective indigenous IPR systems. Patent generation is strongly associated with general economic and right seeker development, especially with the most diplomatically targeted states of the ROC and Korea. By 1990,

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the U.S. was generally satisfied with Japan, Korea, and the ROC regarding IPR issues. During the period examined, 1975 to 1990, right seekers as measured by scientists and engineers per 10,000 of the labor pool, rose by more than a third in the U.S.; doubled in Japan; and more than quadrupled in Korea and the ROC.[297] The existence and growth of right seekers in a capitalist economy (developed or developing) is associated with patent generation and increased patent generation is prior to conclusive IPR agreements in each case.

Evidence

My dissertation has accumulated evidence that diplomacy is not the primary cause for the development of intellectual property institutions. In each case examined, effective IPR institutions developed after capitalist economic development had been initiated. Comparatively, the cases examined (Japan, Korea, ROC, and PRC) all experienced diplomatic pressure during their development and that such pressure was effective when each state had the capacity to comply. State capacity included general capitalist development; the extension of general civil liberties and the rule of law; and an active interaction of right seekers with the right grantor. Regressions indicate that a relationship existed between economic development and the granting of IPR that was prior to diplomatic agreements on IPR.

The U.S. was examined first because it provided evidence that concepts of IPR are not deeply rooted in culture, but are artifacts of capitalist development that have

[297] Source: National Science Foundation (1993) p. 123.

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constantly evolved as right seekers have interacted with the right grantor. Patents were first personally examined in the U.S. by Thomas Jefferson as a secondary priority in addition to his duties as Secretary of State. As the industrial revolution proceeded in the U.S., more formal rules and legal precedence were developed in order to manage the increase of applications and the increased value that an industrializing economy placed on IPR. Repeatedly over the 20th century, the U.S. intellectual property institution was transformed by new demands of right seekers and innovations by the right grantor that included numerous reforms of the USPTO procedures, patent statutes and the legal system. By the end of the 20th century, the U.S. possessed a complex and relatively reliable patent-granting system with transparent rules and established legal precedence. However, the establishment of the WTO created some compromise in the U.S. patent institution.

The WTO agreement was a result of compromises, that in many ways effected the U.S. IPR system as much as other states. Changes to the U.S. patent system include the twenty-year time limit (from 17 years plus development), national treatment (recognizing filings in other states), and perhaps most importantly, changes how disputes are resolved. The hegemon's teeth have been pulled where, prior to the TRIPS agreement, the U.S. could apply sanctions on IPR issues as it deemed necessary, but it must now clear sanctions with the WTO before applying sanctions on another member.

It is reasonable to argue that it was easier for the U.S. to comply with the TRIPS agreement because it was developed economically and has a longer history with intellectual property institutions. As I have argued, the modern U.S. patent system is not as ancient an institution as some theorists have assumed, and that other newly

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industrialized states, especially the other cases examined, are not that far behind in IPR institutional development which also correlates with their capitalist economic development.

Japan's IPR system has roots dating to the late 19th century, but during the immediate post-war era Japan's IPR system favored its domestic industries over foreign interests. Diplomatic disputes arose over compulsory licensing of foreign technologies; laying open patent applications before patent approval so that domestic industries could make incremental patent applications; and the JPO's pendency period for applications was excessively long. By the mid-1970's Japan's patent-generating industries were world class and domestic right seekers began to agitate for reform of the JPO's practices. During the 1980's Japan's patent statutes were reformed and JPO procedures were streamlined and made more efficient. A complex, technologically-advanced state and its right seekers required a more stable and reliable patent system. It was achieved and long before the conclusion of the WTO negotiations.

Korea was a late developer, experiencing dramatic economic growth, but with limited political rights after the civil war. The patent statutes were based on laws drafted during the Japanese and American occupations, but after the civil war Korea slowly amended its patent statutes as new challenges were met. Despite a relatively modern statute, IPR were slow to develop as the Korean government favored champion industries (chaebols) that engaged in reverse engineering of foreign patents. Regulators were not active in protecting foreign patents or copyrights while individuals and firms out of political favor also faced infringement. During the 1980's Korea began to reform its political system that resulted in the extension of civil liberties to all citizens.

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As the rule of law and extension of civil liberties were being established in the late 1980's, Korea experienced a number of diplomatic disputes with the U.S., including being named to the USTR's watch list and threats of trade sanctions due to its firms' IPR infringement practices. Rapid development, however, had also created an economy that had quickly developed technological expertise in a number of intellectual property-producing areas. The arrival of democracy and the rule of law to Korea in the late 1980's and early 1990's allowed right seekers to pursue the defense of their intellectual property more readily in the courts. Democratic reforms also reduced the power that chaebols had possessed with regulators and the courts and by 1995, Korea was no longer a primary target of U.S. diplomatic action on IPR. Recent disputes with Korea over IPR have been regarding the nuances of statutes under the TRIPS agreement, rather than lax enforcement.

The ROC, like Korea, rapidly developed its economy after its civil war and with a lack of basic democratic and individual rights. Throughout the second half of the 20th century, ROC manufacturers actively engaged in intellectual property infringement of patents, trademarks and copyrights. The result was that the U.S. constantly lodged diplomatic complaints unsuccessfully with the ROC government to improve its protection of IPR. During the 1980's the ROC engaged in a series of political reforms that resulted in democratic elections and the extension of individual rights. By the 1990's, ROC citizens' intellectual property right seeking had increased and the content had changed not only in domestic patent applications, but they also had become foreign right seekers in their own right. The timing of changes to the ROC's intellectual property codes during the 1990's generally occurred five years after one of the most active periods of U.S. IPR

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diplomatic actions against the ROC. Revision of the IPR codes coincided with the extension of basic individual rights to all citizens of the ROC, the increased reliability of the legal system, and the transformation of the ROC economy from light industry to a more diversified technology-production base.

The PRC provided a challenge to my theory because the PRC effectively eliminated IPR from the late 1950's through 1984. The difficult transition from a command and control economy to market-oriented principles resulted in lax institutional control over piracy. Reforms can be considered to be rapid in light of communist legacies, but slow statutory and institutional development has resulted in a number of disputes with developed states on IPR protection. In the last half of the 1990's a number of IPR-related agreements have been forged in anticipation of the PRC's entry to the WTO. The PRC's statutes are in general compliance with the TRIPS agreement and pressure from the U.S. on protection and enforcement have eased despite recent complaints from the European Union.

When the PRC has actually fulfilled foreign expectations in agreements, it has been when the PRC has had greater institutional capability to do so. Considering that its patent and other IPR institutions have existed only since the early 1980's, expectations should include more failures to achieve the full spirit of bilateral and multilateral agreements with the PRC on IPR issues. Comparatively, the cases examined (Japan, Korea and the ROC) all experienced diplomatic pressure similar to the PRC and that such pressure was effective when each state had the capacity and internal demands to comply. Such state capacity included general capitalist development; the extension of general civil

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liberties and the rule of law; and an active interaction of the right seekers with the right grantor.

Finally, the regression analysis demonstrates that development has a significant impact on IPR development. The development of overall GDP and the creation of right seekers are the most significant factors in the increase of patent generation in the states examined in this study. While R&D expenditures have a lower impact than theorized, nonetheless general economic development coupled with increases in the pool of scientists and engineers has a strong association with patent generation. When the results are compared to the history of IPR-related diplomatic actions, it was clear that internal development caused an increase of patent generation and compliance with foreign diplomatic demands after the establishment of significant patent generation. The implications are that diplomatic actions were less effective than the internal development of each case's economy and pool of potential right seekers.

Property Rights, Theoretical Implications and Policy Choices

The development of intellectual property rights in a polity has never been a direct path from the origin to the ideal, whatever that ideal IPR system may be. In fact, when investigating the comparative development of intellectual property institutions, what becomes clear is that the institutions are evolutionary and are not comparatively uniform in every respect. Even when considering the array of global agreements on intellectual property over the past century, the development of WIPO, and the standardizing procedures of the WTO, differentiation is the norm, not the exception. As Hayek and the Austrian School argued, institutions are the result of human action, not design. Trade

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agreements, like all institutions, are ultimately transformed by the participants interaction with the rules and each other.[298]

Riker and Sened's theory on the development of property rights provides an explanation that property rights, and therefore intellectual property rights (the dependent variable), form as a result of the interaction of the two independent variables: the right grantors and right seekers (Riker & Sened, 1991). Right grantors are defined generally as the state, but more specifically as the formal mechanism of granting and protecting a patent, typically via a patent office and the domestic legal system. Right seekers are defined as firms, individuals, or even public entities including research consortia or universities that seek intellectual property protection. The interaction of the independent variables does not stop when the right is formally granted, but rather continues to evolve as conditions change and the utility-maximizing interaction of right-seekers and grantors in an institutional framework.

A viable system of property rights is integral for economic development and each case observed indicated the importance of developing an effective property rights system prior to the development of a viable IPR institution. Property rights systems provide the institutional incentives for growth by allowing the holder of a property right to use the property, exclude others from utilizing it without being compensated, and to legally exclude others from its use. A legal system is critical for the enforcement of private property and a viable legal system that protects property rights leads to economic growth. Growth itself provides the incentive for governments to develop viable property rights.

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[298] Ebeling (1991).

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Property rights originate in historical events and historical processes drive the institutional efficiency of intellectual property rights systems. In the context of a viable property rights system, the institutional framework then helps to create economic growth by providing the rules of the game that allow individuals and organizations to pursue their economic objectives.

Markets and Diplomacy

The theoretical implication of my study is that theories of international relations should be transformed to fully consider the role of capitalism and utility maximization in the development of capitalist institutions. Capitalism requires reliable institutions that lower transaction costs. Lowering transaction costs increases profitability, and profits drive interests regardless of citizenship. While it is normatively attractive to view diplomats as agents of change and transmitters of values, such theoretical constructs overlook the importance of interests in both developed and developing states who value reliable market institutions. Such theories also attribute far too much independence of professional diplomatic corps from the control of their home governments' executive branches.

Intellectual property institutions are capitalist institutions. Right seekers lobby governments who create IPR institutions in response to those demands. International relations theorists should be transformed from analyses focused upon diplomatic conferences to one that analyzes the demands behind the interests of not only developed states, but also the capitalists from developing states. Recall that one of the most basic aspects of the TRIPS agreement is the concept of national treatment. By shifting analysis

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towards the market, one can quickly discern that demands for national treatment are not just beneficial for developed states' firms, but even more so for firms and individuals from smaller or less developed economies desiring access to developed state's markets. For example, the ROC's Acer Computer access to intellectual property protection and the market of the United States is critical to the firm's long-term existence. Compared to Apple's access to the ROC, the local market is important to Apple's long-term interest to stem piracy and local profit streams, but Apple's access in the ROC has no where near the importance economically that access to the U.S. does for Acer.

All aspects of trade policy analysis can benefit from refocusing on the role of the market over the emphasis of aggregated interests of states in diplomatic arenas. States are not unitary actors, but are polities made up of diverse interests. Any action at a trade conference can have negative or positive effects on individuals and firms in capitalist societies. Therefore, groups and firms organize to lobby to protect their interests. When it comes to making or losing money because a property right's value may be affected, the incentives are high to ensure one's interests are promoted. Nearly all states are capitalist or are reforming to create capitalist economies and institutions. Understanding markets is central for discerning what motivates states to reform their economic institutions.

Maximizing utility also explains why an individual would be motivated to pirate intellectual property and why a holder of an IPR would attempt to curb piracy. Piracy of intellectual property is not an artifact of deep cultural beliefs or a reaction to a form of imperialism. Pirating IPR is driven by making profits with small investments, avoidance of taxes, and often with the aid of corrupt officials. Piracy of IPR harms indigenous as well as international right seekers and retards innovations and productivity. Agreements

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on IPR are not driven by diplomats being fatigued or threatened into submission. Conclusive IPR agreements occur when the interests of indigenous right seekers are able to overcome the interests of pirates in their own polities.

Policy Choices

When compared to the internal development of a state's economy, right seekers and the extension of civil liberties and the rule of law, the coercive use of diplomacy has had minimal effect. Diplomacy, rather than coercive diplomacy, has had one positive effect in that all of the states examined have joined or are negotiating to join the WTO and the TRIPS agreement.

Joining the WTO requires that a state possess a market economy prior to membership. Once negotiations begin, the process has been one of give and take, not simply the powerful over the weak. It has been argued that the WTO agreement has resulted in the triumph of coercive diplomacy, yet even the U.S. (Chapter Two) has had to change aspects of its IPR system as a result of the agreement. Furthermore, I demonstrate that both the ROC and the PRC have utilized their applications to the WTO in order to gain advantages in overall trade negotiations, to the extent that full implementation of bilateral agreements with the U.S. on IPR will not occur until their applications to the WTO are approved.

In light of the evidence, alternatives to coercive diplomatic actions may result in better overall development of intellectual property rights. Alternatives to coercive use of diplomacy could utilize my theory on IPR development which indicates several alternatives from right grantor development to creating more right seekers. Rather than

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focus on particular enforcement problems, the U.S. should instead emphasize legal development and the development of individual rights when focusing on the role of the right grantor in IPR development.[299] To be sure, blatant piracy, especially when condoned or ignored by government officials, ought to be vigorously pursued by diplomats. However, the examination of the U.S. case indicates that piracy by individuals is difficult, if not nearly impossible, to control. Instead, focusing on the right grantor as the protector of general rights and the rule of law may result in overall better enforcement.

The cases of Korea and the ROC, in particular, indicate that effective IPR institutions evolved when the rule of law and general civil liberties were extended throughout their polities. Protection of basic rights has not always been at the top of the U.S. trade agenda, but there appears to be a significant historic relationship among the protection of basic rights, the rule of law, and effective IPR protection. Legal standing of a firm in court may be much more related to the standing of the individual than is often assumed. Policies focused on developing legal institutions would benefit both foreign and domestic right seekers.

Equally important is the development of an effective class of right seekers as the development of the right grantor's capabilities. Foreign policy of the U.S. may be more effective by focusing on the long-term development of a class of right seekers in a targeted state. For example, Chapter Five demonstrates that IPR generation has a

[299] Recent policy towards the PRC indicate that the U.S. is placing more emphasis on developing the abilities of the right grantor to enforce IPR statutes such as assistance in training from the FBI and Customs, but lags in aiding the development of right seekers. See Oksenberg, Potter, and Abnett (1998).

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statistical relationship with the development of scientists and engineers. Policy efforts aimed at the development of scientists and engineers could include easing visa restrictions for visiting students, technology-based workers, and scientific exchanges. While not all of these potential right seekers may return to their state of origin, there is a growing body of evidence that many students and workers intend to return to their home state to be workers, entrepreneurs and educators.[300]

Another policy choice with long-term impact on developing right seekers could include development funds for all levels of education in the targeted state. Considering the significance of patent-generation with well-educated workers, the U.S. would likely reap greater long-term benefits from aiding the development of the targeted state's educational system than the development of a state's police force.

The U.S. should also unilaterally ease all trade barriers for technology-based goods. The recent WTO agreement on tariff-free trade of information technology goods currently includes nearly 40 states, which is an important step, but more developing states ought to be encouraged to follow this lead.[301] The increase of technologies available to U.S. citizens would improve productivity domestically and encourage other developed and developing states to do the same would improve the flow of both exports and imports of technology-based goods. This thereby improves the availability of information, increases global productivity and creates more potential right seekers with a wider variety of tools to produce more innovations. Increasing the global supply of right seekers will

[300] National Science Foundation (1993) pp. 130-132. Wall Street Journal (5/9/2000) p. A21.

[301] For a text of the treaty covering the tariff-free trade in information technologies see www.wto.org.

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create long-term benefits for the U.S. because the increased pool of right seekers would not only create more innovations, but more potential users of innovations which strengthens IPR institutions.

The development of effective intellectual property institutions in foreign states should not be the sole responsibility of the U.S. government. Private sector initiatives would greatly benefit U.S. and other developed state's firms that increase the effectiveness of the right grantor and right seekers in developing states. Initiatives could include funding non-governmental organizations or charitable institutions that promote and support the development of educational institutions in developing states; legal training for the judiciary; promotion of human rights; and technology transfer. Many firms already support such endeavors, but initiating or increasing support can transform their public relations image from merely the possessor of a time-limited monopoly to a promoter of intellectual property that can benefit a developing state both now and in the future. As a property right, intellectual property protection will only be effective when not only the right grantor perceives a benefit from protecting IPR, but when the society as a whole perceives a benefit.

I believe that U.S. government and IPR-producing firms' policy on intellectual property rights would benefit from a long-term view of developing the right grantor and right seekers in states that lack effective intellectual property institutions. Analysis of the cases examined indicate that bilateral and multilateral agreements were effective when the targeted state had the capacity to comply. The capacity to comply includes a right grantor that supports individual rights and the rule of law. The capacity to comply also includes the development of right seekers who have the training and economic

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wherewithal to create new innovations and expect reasonable protection by the right grantor. It would seem U.S. policies that focus on the basic components that comprise an intellectual property rights system would be more effective than policies that emphasize enforcement.

Summary

Maximized utility, represented by a functional intellectual property system, is why an intellectual property system succeeds rather than through the application of coercive diplomacy. Intellectual property rights development can be better understood by shifting the framework of analysis from the role of diplomatic pressure and global economic institutions to a framework that considers the comparative development of property rights. Diplomacy is effective in exacting an agreement, but it is not effective in ensuring compliance. Developing right seekers combined with the general development and protection of individual rights is critical in order to create effective intellectual property rights.

The world has been transformed from one where the primary focus of the diplomatic community was to mediate and prevent military conflicts to a world where diplomats are charged with mediating the minutia of policy governing trade. Theory analyzing diplomatic activity similarly needs to be transformed from relying on Cold War analogies to recognizing the role that markets and property rights have played in developing trade policy, and in particular intellectual property policy and institutions. In

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order for the signatories of the WTO to agree that "intellectual property rights are private rights,"[302] the states were required to possess an economic system based on private property. Diplomatic conferences on trade are the outcome of the long-term development of capitalism. This fundamental aspect of capitalism, the allocation of property rights, is the first step toward understanding the development of intellectual property rights.

[302] GATT (1994) p. 366. From the WTO Agreement, Annex 1C "Agreement on Trade-Related Aspects of Intellectual Property Rights."

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APPENDIX

VARIABLES AND DATA

Explanation Key

Case/Year: Each case is designated by state and year vertically on the left side of the page. States are abbreviated as follows: United States = US; Japan = JP; Korea = KR; Republic of China = ROC. The years examined are 1975 through 1990 and each year is placed next to the state designation. For example, United States, 1975 is designated as US75.

Total Patents: represents the total patents granted by the state during the year. Source: WIPO (1975-1990).

GDP: Gross Domestic Product (millions) adjusted for purchasing power parity. Source: National Science Foundation (1993) Table A-22.

R&D: research and development expenditures (millions) adjusted for purchasing power parity. Source: National Science Foundation (1993) Table A-16.

S&E: scientists and engineers (thousands) engaged in R&D. Source: National Science Foundation (1993) Table A-19.

Pop: Population of each state (thousands). Source for Japan, Korea, and the ROC: National Science Foundation (1993) Table A-14. Source for United States: U.S. Census Bureau.

NA: indicates data not available for that year.

Case/Year	Total Patents	GDP	R&D	S&E	Pop
US75	71994	3221834	$72,256	527.40	215973
US76	70236	3380639	$75,065	535.20	218035
US77	65269	3533417	$76,758	560.60	220239
US78	66102	3703251	$80,091	587.60	222585
US79	48853	3796537	$84,115	614.50	225055

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Case/Year	Total Patents	GDP	R&D	S&E	Pop
US80	61827	3776377	$87,666	651.10	227726
US81	65770	3843013	$91,452	683.20	229966
US82	57889	3760255	$95,589	711.80	232188
US83	56862	3906666	$102,310	751.60	234307
US84	67201	4148490	$111,137	797.60	236348
US85	71661	4279676	$120,624	841.60	238466
US86	70860	4404292	$123,267	882.30	240651
US87	82952	4539930	$125,353	910.20	242804
US88	77924	4718710	$128,848	927.30	245021
US89	95539	4836774	$129,888	949.30	247342
US90	90366	4885036	$129,545	NA	249949
JP75	46728	991523	$18,296	253.60	111940
JP76	40317	1038774	$19,048	263.20	112892
JP77	52608	1087411	$19,677	264.80	113852
JP78	45504	1150049	$20,959	272.80	114820
JP79	44104	1209870	$23,031	291.20	115797
JP80	46106	1263089	$25,382	303.20	116782
JP81	50904	1312072	$28,054	310.90	117566
JP82	50601	1348982	$30,093	321.00	118355
JP83	54701	1392067	$32,888	347.40	119149
JP84	61800	1461916	$35,830	357.40	119949
JP85	50100	1528697	$39,992	380.80	120754
JP86	59900	1568354	$40,692	393.00	121302
JP87	62400	1637586	$43,712	415.60	121853
JP88	55300	1728242	$47,106	434.60	122406
JP89	63301	1806380	$51,718	457.50	122961
JP90	59401	1889285	$55,943	477.90	123519
KR75	442	76710	NA	10.30	35281
KR76	479	86982	$378	11.70	35832
KR77	274	96362	$577	12.80	36392
KR78	427	105503	$663	14.70	36960
KR79	1419	113783	$632	15.70	37538
KR80	1632	111333	$620	18.40	38124
KR81	1808	118895	$734	20.70	38646
KR82	2609	127506	$1,072	28.40	39175
KR83	2433	142540	$1,388	32.10	39711
KR84	2365	155969	$1,790	37.10	40255
KR85	2268	166812	$2,383	41.40	40806
KR86	1894	187516	$3,057	47.00	41197
KR87	2330	210066	$3,638	52.80	41591
KR88	2174	234066	$4,294	56.50	41989
KR89	3972	249834	$4,726	60.00	42391
KR90	7762	271426	$5,045	68.80	42797
ROC75	2159	34976	NA	NA	16000
ROC76	1499	40843	NA	NA	16316
ROC77	1205	52917	NA	NA	16637
ROC78	1795	60094	$388	NA	16965
ROC79	3686	64998	$539	NA	17300
ROC80	6633	69744	$494	6.20	17641
ROC81	6256	74061	$685	9.40	17930
ROC82	7462	76669	$681	10.40	18224
ROC83	7096	83140	$760	12.10	18523

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Case/Year	Total Patents	GDP	R&D	S&E	Pop
ROC84	8592	91925	$880	17.60	18826
ROC85	9427	96471	$990	20.10	19135
ROC86	10526	107748	$1,083	21.50	19365
ROC87	10615	121035	$1,381	23.50	19598
ROC88	12355	129927	$1,629	25.60	19833
ROC89	19265	139717	$1,974	28.30	20072
ROC90	22601	146119	$2,476	32.10	20313

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