

The Stability of Coerced Economic Reform: The Case of IPR

by

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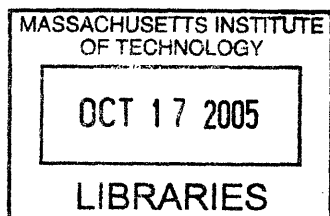
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on May 6, 2005 in Partial Fulfillment of the
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ABSTRACT

Theories in international relations posit, and empirical evidence has verified, that unwilling states can be compelled by another state or by an international institution to enact domestic policy reform. However, these theories ignore the important follow-on question of whether such externally imposed reforms can be expected to stick. Using intellectual property rights (IPR) reform as a policy case, this dissertation seeks to explain why imposed reform stabilizes in some states but not in others. Here, stable policy means a government demonstrates credible and ongoing commitment to the reform after enacting new law. For example, the state passes additional legal measures to extend the reform, and provides ample support for domestic institutions necessary for the law's implementation.

This dissertation presents a comparative study of IPR reform in Brazil and South Korea, covering seven years in the former case and sixteen years in the latter. The Korean government acquiesced to U.S. pressure in 1987 and strengthened its national IPR regime. Brazil undertook IPR reform in 1996, owing in part to its obligation to abide by the directives of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Accord).

The argument put forward is that states commit to imposed reforms once they capture or create reform benefits, and that it is the state itself, not interest groups, that is the principal architect of domestic policy reform. Though states often yield to external pressure and enact policy reform, they are conceding formal compliance (via ratification) but may be feigning functional compliance (i.e., on-the-ground enforcement). In short, the decision to commit to, or backtrack on, imposed reform is made after enactment. Relative gains concerns figure prominently in a state's calculation of what to do post-ratification. Given that the welfare effects of IPR reform are zero-sum in the short term and indeterminate in the long term, states will backtrack on IPR reform to avoid absorbing the concomitant welfare losses. If the state is able to turn unwanted reform to national advantage, then the state commits and the policy stabilizes despite the fact that the reform lacks widespread local acceptance.

Principally an empirical study, this research adds needed depth to the current literature on IPR reform in emerging economies.

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Professor Kaysen is a patient and attentive advisor. He meticulously read several drafts of this manuscript, and told me when my argument was vague and my writing repetitive. He encouraged me to cut entire sections and, in one case, half of a chapter when I veered off-topic. I followed his advice and the thesis is the better for it.

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For the last eight years, Professor Kenneth Oye has been my intellectual mentor. It was from him I learned my way around theories of international relations and began to appreciate the entrenched political issues underlying global economics. I was a teaching assistant for his popular and intensely demanding course on Science, Technology and Public Policy at MIT, an experience I thoroughly enjoyed. Nothing helps a writer improve her writing more than reading and critiquing stacks of undergraduate papers.

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Chapter 1: Introduction

Existing theories in international relations posit, and empirical evidence has verified, that unwilling states can be compelled by another state or an international institution to enact new domestic policy. This thesis addresses important follow-on questions about whether such externally imposed reforms can be expected to stick. When forced to adopt economic reform policies they would not voluntarily assume, why do some states subsequently commit themselves to these policies while others do not? Why do coerced changes in domestic policy become stable in some countries and not in others? By “policy stability” we mean that the government demonstrates credible and ongoing commitment to the reform after enactment of new law. Additional measures to strengthen the reform are pursued and passed, and ample support is provided to domestic institutions necessary for the law’s implementation. An unstable policy outcome means the state, by issuing decrees designed to dilute or negate the new policy, has backed off from fulfilling the fundamental tenets of the reform.

GOAL

Over the last twenty-five years, an assortment of domestic market reforms, ostensibly devised with the world’s economic interests in mind, has been recommended by economists and policy experts, urged by the United States government, or mandated by international institutions such as the World Bank, the International Monetary Fund, and many of the world’s trading regimes. These reforms, which constitute the global economic policy agenda or economic liberalization generally, have been introduced to states in two discernible phases.

In this thesis, we focus on the second phase of the global economic policy agenda. This specific set of economic reforms has as an end objective uniformity in national rules governing the local market. (On account of this end objective second phase reforms are sometimes called the rules of globalization.) The policies comprising the initial or first phase of economic liberalization reform were directed at macroeconomic stability and microeconomic structural

reform and are often referred to as the Washington Consensus.¹ Phase two reforms, which include labor and environmental standards, competition policy, government procurement policies, anti-corruption measures, and intellectual property rights, among others, are highly controversial and together represent a fundamental shift in the course of economic liberalization. Whereas first phase reforms aim to create a climate favorable to national economic growth and development, phase two reforms are intended to “level the global playing field” and intensify cross-border commercial activity.

States that adopt phase two reforms often experience immediate and substantial welfare losses, with future welfare effects largely unknown. Consequently, these reforms are not taken up voluntarily; resistant states are forced to adopt them. Though these policies deal solely with the functioning of the state’s internal market, phase two reforms typically lack domestic support and are often formulated by outside advisors. These “alien” reforms, which in some cases are handed to states to legislate word-for-word, have considerable reach into what was traditionally the realm of state jurisdiction. Second phase reforms, moreover, lack the theoretical footing that is evident, admittedly in varying degrees, with first phase liberalization policies such as those aiming to reduce state involvement in the market (via deregulation and privatization), remove relative price distortions (e.g., trade and financial liberalization), or stabilize the economy (e.g., fiscal discipline, low marginal tax rates, and competitive exchange rates).

Scholars studying economic reform have been concerned foremost with policy choice; the central question being why do countries pursue one economic policy over another? However, the particular characteristics of second phase reforms – primarily, that these policies are imposed on states – prompts an entirely different set of questions. Under what conditions will countries commit themselves to phase two reforms, and under what conditions will they functionally implement or enforce them? What are the long-term prospects of policy that states have been

¹ For a summary discussion of the ten reforms that comprise the Washington Consensus, see Williamson (1989).

coerced into adopting? That is, are imposed reforms sustainable? Rather than focus on the means of policy choice, we focus on the stability of involuntary reform post-enactment.

COERCION AND POLICY (IN)STABILITY

The stability of coerced economic reform should be of special interest to political scientists. States that refuse to commit themselves to internationally mandated rules may undermine the collaborative strength and unity necessary to put together future multilateral agreements. Rejection of an international economic accord by one or two states may affect a roll-back of other previously agreed upon rules. A signed international treaty does not necessarily indicate that the signatories are ready, willing, and able to abide by the treaty's mandates. In 2001, the WTO convened for the first time a special meeting to reconsider several articles in the Agreement on Trade-Related Aspects of Intellectual Property (TRIPS hereafter).² One upshot of this meeting was that it served as an inducement to several WTO members to reopen and renegotiate other formalized trade agreements.

Countries that waver on implementing policies as outlined in global conventions call into question the notion that international institutions can and do constrain domestic outcomes. National governments still have "considerable latitude" in domestic policymaking, as some scholars have noted (Berger 1994). Moreover, whether or not a state pledges itself to economic policy it has been forced to adopt can serve as a gauge of its threshold and desire for integrating further into the global economy. That is, it demonstrates how willing a country is to forfeit some of its autonomy for the long-term benefits associated with linking up to the world market.

Unstable policy has demonstrable domestic consequences too. Businesses are unwilling to make investments or follow through on long-range plans if they sense the government's economic policy may change. One criterion of the Business Environment Risk Intelligence report

² Changes to the trade accord agreed to at this special session included extending the deadline for TRIPS compliance from 2011 to 2016 for least developed countries. For details, see Chapter 4.

(BERI), widely used by firms wanting an assessment of a country's business climate, is *policy continuity*. Policy continuity has, in fact, the heaviest weighting of all BERI criteria, more than monetary inflation, currency convertibility, labor cost and productivity, and overall economic growth. This reflects the importance that firms place on the clarity and stability of state policy. Policy credibility may be more significant than the actual policy itself. Deborah Norden (1996) writes that, though "Latin American business leaders increasingly advocate neoliberalism, they seem at least as concerned with the consistency of economic policy...[because] without a stable policy framework, any long-term investment becomes excessively risky; both economic and political stability suffer." Governments that falter after their pledge to undertake policy reform create two undesirable consequences. First, any positive market effects stemming from policy change are delayed or precluded. Second, businesses may become more reluctant to commit resources *after* the new policy is enacted than before if they believe the government's stance may change again. For the private realm especially, there is signaling value in a government's determination, or lack thereof, to stay committed to policy it has been compelled to adopt.

Finally, given that the set of policies we are interested in have considerable domestic reach, a government's vacillating will reveal the points of dispute between states and global institutions over where to delineate municipal and international jurisdiction. The policies under discussion are, of course, *national* laws. International accords specify property and contract laws that all signatories must enact. The standardization of law has proven problematic because the states involved are highly heterogeneous – economically, politically, and culturally. Harmonization of policy may result in diverse outcomes across states due to unpredictable shifts in incentive structures. The correlate is that imposed reforms that "...materially change prevailing incentive patterns could perversely destabilize workable (if imperfect) [domestic] arrangements without assuring the appearance of more effective alternatives" (Bratton and McCahery 2001). In other words, if unpopular reforms are continually foisted upon states, the power and legitimacy of ruling elites diminishes, and precarious, though functioning, political

arrangements could be knocked off balance. Furthermore, domestic laws imposed by outsiders ignore the particular legal and economic milieu of individual countries, and as a result, are often ill-conceived. Legal scholar Katharina Pistor contends that the problem of legal “fit” should not be downplayed. She writes, “where expert recommendation forms the basis for standardization, this may raise the overall level of the standard, but sometimes at the cost of remoteness from political and legal practice” (2002). Though states may surrender policy discretion initially, their subsequent faltering conveys the limit of their willingness to relinquish municipal jurisdiction to international authority and their ability to absorb the political consequences of doing so.

APPROACH

This thesis uses intellectual property rights (IPR) reform as a policy case in order to understand why some states remain committed to coerced reform while others do not. Specifically, a comparative study of IPR reform in Brazil and South Korea (Korea hereafter) is presented, covering seven years in the former case and sixteen years in the latter. (Brazil reformed in 1996, Korea in 1987.) Detailed longitudinal case study analysis was employed, first to understand the basis of opposition to IPR reform, and second to identify the presence or absence of reform stability (or commitment to policy post-ratification).

Intellectual property rights refer to patents, copyrights, trademarks, trade secrets, as well as *sui generis* (or unique) forms of protecting intangible property. These are ownership rights that governments grant to originators of new ideas or expressions of ideas giving them an *exclusive right* to use, sell, or work their inventions. Intellectual or intangible property under an IPR regime is treated much like tangible property such as land. A title to a tract of land signifies proof of ownership. The holder may sell the title or use it as collateral to borrow money. The same is true for patents and copyrights. The patent itself may be worked by the owner, or sold, or used to raise capital. Copyrights can be transferred or sold outright. One important difference

between tangible and intangible property rights is that patents, copyrights, and other forms of intellectual property have legally defined terms or durations and expire after a period of years.

Protection of intellectual property is weak in developing countries.³ Reform of IPR entails raising or strengthening the protection governments confer on intangible property. This includes greatly expanding what ideas, products, or processes qualify for patent or copyright protection, extending the length of patent and copyright terms, limiting the government's right to seize patents (akin to the US Constitution's Fifth Amendment's takings clause for real property), and reversing the burden of proof in legal proceedings from the defendant (or patent holder) to the plaintiff.

IPR reform has not been pursued voluntarily by developing countries. Many states have been forced to pass highly protective IP laws, first through unilateral pressure from the United States, and later via forced compliance with an international treaty. The latter refers to the Trade Related Aspects of Intellectual Property (TRIPS) Accord, one of the three pillar agreements – along with the General Agreement on Tariffs and Trade (GATT) and the General Agreement on Trade in Services (GATS) – administered by the WTO.

This thesis examines the process of reform in Korea and Brazil under these two methods of coercion. The policy changes both countries were required to adopt were identical whether the pressure to reform came from a single country or from an international institution.

ARGUMENT AND FINDINGS

Why do externally imposed reforms stabilize in some countries and not in others? We argue that states commit to fully implementing involuntary reforms only after they are able to capture economic benefits from the new policy. Most phase two reforms, and in particular IPR

³ The same has been said about the protection of real property in the developing world. De Soto (2000) argues that poor countries remain persistently underdeveloped because of weak property rights regimes. The idea of private property is so basic to capitalist economies, he asserts, that scholars and policymakers assume that all countries – excepting communist countries – provide at least basic or minimum property rights. This is not the case.

reform, lack the reciprocal welfare advantages that are intrinsic to trade liberalization, for example. With IPR, reform benefits accrue to either the reforming state itself or to other countries. Enhanced profits, from monopolistic pricing while a patent is active, accrue either to a domestic firm or to a foreign firm. The right to exclude others from using or selling one's invention renders larger shares of the market to the patent holder – either a domestic firm or a foreign one. Thus, in internalizing reform benefits, the reforming state also prevents other countries from capturing economic benefits at its expense. We contend that states are extremely sensitive to relative gains concerns, and, though eager to improve domestic economic welfare (i.e., increase domestic wealth), reforming states are equally concerned with limiting the economic gains of other countries at the reforming state's expense. The welfare- (or wealth-) improving properties of phase two reforms are zero-sum at least in the near term.⁴ A state forced to enact new IPR policy will commit to the policy only after capturing reform benefits for itself.

Korea and Brazil illustrate two outcomes of coerced reform. In Korea, reform stabilized, but in Brazil it did not. What makes these country studies of special interest is that Brazil was particularly well positioned to benefit from IPR reform according to conventional theories of innovation. There was a rich scientific tradition in the country, a number of world class research universities, a sizable pool of highly educated scientists and engineers, and a long history of recognizing and protecting the ownership rights of inventors.⁵ In Korea, academic research in the sciences and engineering was undeveloped and inadequate, so much so that the government stepped in and established Government Research Institutes (GRIs) which took over the bulk of technology R&D in the country (Kim 1997b; Schoening et al. 1998). This state-sponsored impetus still did not stimulate technology generation in the private sector; firms continued to

⁴ Advocates of IPR reform dismiss the zero-sum descriptor and maintain that the reforming state enjoys other benefits, such as obtaining cutting edge technology from multinational firms and increased flows of FDI. These advantages are said to outweigh the costs associated with tighter IPR, which include higher local prices and the possible shift of market share from national to foreign firms. We evaluate the veracity of these claims in Chapter 2.

⁵ For details on science and technology in Brazil, we refer the reader to Chapter 4, pp 98-102.

concentrate on commercializing existing technology. A deep and seemingly intractable cultural mindset against patents and copyrights also suggested an unstable outcome in Korea. Yet it was Korea that committed to IPR reform and Brazil that did not.

We provide evidence that Korea captured benefits *before* it committed to IPR reform; in other words, the government of Korea expanded and deepened the legal protections it conferred on intellectual property *because* the country as a whole stood to gain from committing to IPR. Brazil did not capture benefits after reforming; these market gains instead accrued to other countries. IPR reform was not rescinded – it was compulsory under the TRIPS Accord, of which Brazil was a signatory – but the government of Brazil began to chip away at the reform using executive decrees to counter specific parts of the new law and through passive resistance such as withholding support for the national patent office. Brazil, in other words, backtracked. The empirical confirmation of commitment and backtracking is presented in the case studies; evidence of Korea’s capturing or internalizing reform benefits (and of Brazil’s not) is presented in the final chapter, Chapter 6.

The answer to why reform stabilized in Korea and not Brazil is clear, and the evidence is compelling. But another question remains. Why *could* Korea capture reform benefits while Brazil could not? There was a great deal of practical improvisation on the part of Korean firms that enabled them to turn radical policy change to their commercial advantage. These firms were experienced at quickly adapting to a capricious policy environment, as we document in the case study. There is no evidence to support the view that Korean firms suddenly became highly innovative and now benefited from a protective IPR regime in the same way that Japanese innovators benefit from Japan’s patent regime. Korea continues to use technology produced elsewhere rather than generate technology anew.

At the end of Chapter 6, we offer a provisional answer to why Korea could turn reform to its benefit while Brazil could not. We are mindful that our descriptive statement that Korea captured reform benefits does not provide us with adequate grounds for reaching a conclusion on

what Brazil and other countries ought to do to turn imposed reform to their advantage. We nevertheless speculate on what lessons can be mined from the Korean case study about the conditions that predispose a state toward capturing or creating reform benefits, and then, committing to policy.

We should stop here and clarify what we mean by a state's *commitment* to involuntary reform, and explain why we think it should be distinguished from legislative action or ratification. We argue that states advance through three identifiable stages before full implementation of new policy is realized: 1) formal compliance vis-à-vis ratification of new law, 2) commitment to the new law, and 3) functional compliance or on-the-ground enforcement of the new law. Given that scholars concentrate on *voluntary* reform, they tend to conflate these distinct stages and label the policy process vaguely (e.g., treaty implementation) or focus narrowly on either formal compliance or policy enforcement especially when the impetus for reform originates outside the state. Simmons (1998a) maintains that the ambiguity of the terminology used, or what she calls "the conceptual difficulties in identifying compliance itself," stems from the range of disciplines scholars writing on the subject represent, including political science, sociology, and law. Though many scholars (Young 1979; Keohane 1984; Chayes and Chayes 1993) resist distinguishing between treaty ratification on the one hand and enforcement on the other, other scholars are attempting to define what they mean by "conformity to prescribed behavior" as Young calls it. Victor et al. (1998) differentiate between treaty ratification (formal compliance) and compliance behavior (i.e., conformity of state behavior to international directives). Others note that actual formal compliance reveals little about the effectiveness, or end outcome, of the treaty itself (Jacobson and Weiss 1995). Fisher (1981, as noted in Simmons) discriminates between compliance to international directives and compliance with an authoritative and formal dispute settlement body. But none draws a distinction between voluntary and involuntary reforms, and

because of this, they ignore the fact that states decide whether to comply with compulsory reform *in deed* after they have complied *in word* through ratification.

One resultant problem of this omission is that weak enforcement is attributed to ambiguous policy directives (due to the language of the treaty, for instance), or to a lack of adequate local resources needed for effective implementation, when the actual issue in fact may be weak resolve or even a reversal on the part of the reforming state. It is assumed that states that have enacted reform have been persuaded of the merits of the new policy or have been strong-armed into accepting it. Because ratification (stage one) and the decision by the state to commit to reform (stage two) are not usually thought of as two discrete actions occurring in this exact order, passage of law has been construed as state capitulation or consent. The actions Brazil and Korea took after enacting reform illustrate the difference between ratification of policy and the decision to commit.

We define commitment to reform along three dimensions: the direction and substance of supplemental legislation, the support (or lack thereof) given to domestic institutions necessary to execute the new policy, and the state's public stance on reform after ratification. A state's commitment to reform becomes evident when it passes additional laws or issue decrees aimed at strengthening and extending the new policy, when it demonstrates a willingness to shore up appropriate local institutions, and when the substance of its public statements indicate support for the reform. Lack of commitment, or what we term *backtracking*, is shown when the state pursues measures to temper the new policy, fails to support domestic institutions necessary for reform implementation, and publicly denounces the reform after its ratification.

Capturing or internalizing reform benefits are the key to state commitment. But which benefits? To construct a list of costs and benefits, we drew upon long-established academic work (what we call the classic literature) on the market effects of patents as well as current research on IPR and innovation. The effects ascribed to strengthened or expanded patent rights which were repeatedly cited in both the classic and current literature were identified. The benefits include

ownership control of new technology, expanded market share for rights holders, and positive balance of payments (BoP) effects for the country receiving royalty payments or holding patent rights on exported goods. The last benefit was not addressed in the classic literature due to the presumption of a closed market, but we include it here because IPR reform as mandated by TRIPS occurs in countries linked to the global economy. The costs of IPR reform are simply the inverse of the benefits: loss of control of technology, diminishing market share, and a negative effect on the BoP, in addition to the expense of administering the new law. Given that the costs of reform are always absorbed by the reforming state while the benefits can be captured either by the reforming state itself or by another country, we look only at reform benefits. Using this conservative list of benefits, data was collected for the two countries. The results are presented in Chapter 6.

A few words about our unit of analysis are in order. The argument we present is state-centric and runs contrary to current trends in the study of policymaking. Many scholars (Rogowski 1989; Frieden 1991; Gourevitch 1991; Hathaway 1998; Kingstone 2000) reject the idea that the state itself is a unitary actor with distinct preferences; rather, they see the state as representing or reflecting an aggregation of domestic interests. Because much work has been done to lay open the state and reveal the internal pressures that might result in policy, the idea of the state as an analytical unit in and of itself has lost favor over the last two decades. We contend that the state has interests which cannot be described adequately or fully in terms of local preferences. States act out of self-interest. “[T]he state has purposed of its own,” Krasner writes, noting that “the national interest does have an empirical reality...even the largest and most powerful private corporations were not able to turn instruments of state power to private purposes when this would violate the national interest, the aims sought by central decision makers” (1976, p330-31). Ikenberry also claims that taking states as unitary actors is legitimate, noting that “the preferences and choices of government officials, particularly political and administrative officials

of the executive branch, may be considered an analytic surrogate for state behavior” (1986, p106). And Mann argues that “the state...is a different socio-spatial organization...[a]s a consequence we can treat states as actors, in the person of state elites...” (1984, p201).

While there has been justifiable debate over *which* interests states want to advance – wealth, power, or security – the economic policies states pursue are geared foremost to increasing domestic wealth.⁶ States are charged with advancing domestic – and to the extent that it has local effects, global – welfare. How the national economy is performing vis-à-vis other national economies is of prime interest to the state *but may be of little interest to individual domestic interest groups*. We often see a divergence between private and social or public interests in the formulation of trade policy and other first phase liberalization policies. A domestically oriented business sector favors protectionist policies, and, even if this sector is politically astute and organized, the state, putting the welfare of the entire economy first, opts for openness and compensation for the losing sector. In other words, policies related to the first phase of liberalization are often *intranationally* redistributive, but their overall effect on the economy, positive. There is less divergence between private and social interests over the second phase of liberalization policies because these policies are *internationally* redistributive. This explains why “losing” states are not voluntarily instituting second phase reforms, and why there is an absence of domestic support for legislating second phase reforms. The apparent unanimity between state and private interests should not cloud the fact that state preferences, more so than interest group pressure, informs the overall direction of policy.

⁶ Stephen Krasner (1985) blurred the distinction between power and security and argued forcefully that developing countries in particular want power and control *as much as* wealth. But he starts from the (implicit) premise that economists understand with certainty which policies will result in increases in domestic material well-being. This leads him to conclude that developing countries “fundamentally challenged the liberal order” in order to advance their own power and influence (p6). Another interpretation is that developing countries were unconvinced about the actual effect on the domestic economy of some liberal policies, and were concerned about a widening wealth gap between industrialized and developing countries as global economic interdependence progressed.

There is another reason why we are justified in taking the state as our unit of analysis. The state acts as the international negotiator; not national firms or industry associations or labor groups. The state agrees to treaties, signs treaties, and uses tactics to limit the public's role in translating treaties into domestic law. The state enforces those same treaties. The state, not firms or other domestic groups, appears in front of dispute settlement panels at the WTO. Though local interests influence and guide state behavior at the international level, the state itself has an agenda it pursues, which cannot be completely understood in terms of individual, private, domestic interests.

IPR AS REPRESENTATIVE OF PHASE TWO REFORMS

IPR laws are national laws; they apply up to a country's borders and not beyond. Property rights in general play a pivotal role in the functioning of the market, and are defined and sometimes codified within a country's legal system. Formal or legally protected property include titles, records, promissory notes, bills of exchange, shares of corporate stock, trademarks, copyrights, and patents. Country practices differ widely over the protections governments grant to different types of property, with divergent legal customs the most pronounced in the case of intellectual property.⁷ Government safeguarding of private property was taken up in the first phase of liberalization reform, though policy experts were mute about how different forms of property ought to be legally protected. This rather loose policy recommendation was intended primarily to get governments to establish property rights in the informal sector, but given the lack of policy specificity and any obligation on the state to reform, heterogeneous property laws have persisted. In contrast, the TRIPS Accord sets down specific rules about the protections states

⁷ As an example, Hong Kong had a strong tradition of protecting tangible property (e.g., land could be bought, sold, and traded). Hong Kong was averse, though, to the idea that inventions or innovations were a protectable form of property and that the knowledge embodied in inventions could be bought, sold, and traded. One author notes that IPR is "part of a wider debate about general property rights for foreign firms, contract and bankruptcy law, and other legal infrastructure for the transition economies" (Markusen 2001, p190).

must confer on intangible property. In keeping with the overarching goal of phase two reforms, the objective of the TRIPS agreement is to achieve uniform or consistent IPR policies across countries.

Some phase one reforms are dealt with directly via international treaty; that is, the policy recommendation is itself mandated by international law. Trade liberalization is of course addressed by two separate treaties, the GATT and the GATS. Fiscal discipline, another phase one reform, is advanced by the International Monetary Fund (IMF) and often is required before IMF loans are released. Whether mandated in certain situations or deliberately pursued by states, all phase one reforms have strong theoretical or empirical foundations. In nearly every case, experts agree on the appropriateness, even the optimality, of these reforms. Though scholars have not settled on one particular theory to explain why countries trade with one another, the benefits that accrue to states when they link up to the global economy are nonetheless observable and measurable.⁸ Rigorous macroeconomic theory underlies the phase one recommendations of fiscal responsibility, tax reform, and competitive exchange rates. Comparable theoretical grounding does not exist with phase two reforms. There is no *accepted* theoretical or empirical basis for IPR reform as it is outlined in the TRIPS Accord. Like other phase two reforms (e.g., laws dealing with labor, the environment, competition, government-procurement, corruption, etc.), IPR reform advocates construct their arguments in subjective terms (i.e., fairness, equity, or protection) rather than in the language of economic advantage.⁹

⁸ At least six separate theories have been developed to explain why countries trade. Three theories highlight differences between countries, either in factors of production (i.e. Heckscher-Ohlin) or in technology; technology disparities may be exogenous (Ricardo) or endogenous (Grossman-Helpman). Increasing returns, external (Graham) or internal (Helpman-Krugman), also have been offered as reasons why firms sell overseas. And last, one theory posits that the oligopolistic behavior of firms drives trade (Brander-Krugman). Specification of theories was drawn by Paul Krugman. See his course material at <http://www.wws.princeton.edu/~pkrugman>.

⁹ To be clear, economists do not accept the *market-based* arguments given as justifications for phase two reforms. We do not mean to suggest that no cogent rationales for phase two reforms have been made. Arguments for tighter environmental regulations have a solid scientific basis; and labor standards have an ethical underpinning. But in order to tie environmental and labor standards to commercial treaties, through the WTO for example, these reforms must be framed in terms of their favorable effects on commercial activity. Though these arguments have been made (and have been made for IPR reform as well), they are

The policies that interest us are ones that countries have been *coerced* into adopting. As we implied above, this means domestic support for reform is absent. IPR reform in the two case countries was resisted from the state itself (both executive and legislative branches) and from a number of domestic interest groups. Opposition came from industry, from grass-roots organizations, from public bureaucracies, and from state managers. Opponents saw IPR reform as primarily redistributive, funneling scarce capital from poorer to richer countries and removing one of the few comparative advantages developing countries possessed. These same arguments are used by opponents of labor and environmental regulations and other rules the advanced industrialized countries want to impose on developing countries through linkage to trade. Government policymakers typically will not pursue regulations that raise costs for domestic firms. IPR reform increases costs for domestic firms, as will other phase two reforms.

Singular action by the state was required to pass new IPR laws. By singular action we mean the executive relied on extraordinary political and/or procedural devices in order to get reform ratified. All states use special tactics to push through mandated trade-related policy that might otherwise get mired down by warring domestic factions. In the United States, Trade Promotion Authority (TPA) is given to the president to speed congressional passage of trade agreements negotiated by the country's trade representative. Under TPA, Congress is precluded from adding amendments to the trade bill (representing the fruits of international negotiation), thus hastening its way through the conference committee. Other countries use presidential decrees to comply with international agreements and avoid legislative bottlenecks. Brazil used leadership agreements and Korea used administrative guidance to circumvent all-out legislative voting on IPR reform. It is likely that similar executive maneuvering would be needed by other countries in order to enact second phase reforms.

empirically unsupported and renounced by the majority of mainstream economists. Interestingly, advocates of second phase reforms structure their arguments in terms of equity, fairness, or protection when addressing the like-minded; but when promoting second phase reforms to unwilling countries they provide market-based justifications instead. We return to this point in the next chapter when, as part of the literature review, we evaluate several of the economic justifications given for IPR reform.

The focus of this thesis is on IPR reform *as seen within the larger context of the second phase of liberalization*. If IPR reform is archetypical of phase two reforms, as we argue it is, we may assume that the process and outcome of IPR reform is representative of the fate of other rules of globalization. Its weak theoretical footing, the strong domestic opposition mobilized against it, its mandate by international treaty, and finally, the political and procedural maneuvering required for passage suggest that any lessons learned from the IPR case are applicable to other phase two reforms.

In sum, we seek to make three contributions to the literature on economic reform and policymaking in general. First, we differentiate lack of state resolve from problems of on-the-ground enforcement. The prevailing view regarding policy stability assumes that once the hurdle of ratification has been cleared it is improbable that the state will try to repeal new law. This has been called the “locking-in effect” or “policy feedback” and refers to the incentive created by policy change for effected parties to form new interest groups or to revive old ones.¹⁰ These emergent interest groups can set off broader domestic support for reform, assuming that the Olsonian collective action problem thwarts counter efforts to repeal reform. Compliance problems post-ratification, accordingly, stem from lack of resources (i.e. human resources, money, technology) needed for enforcement rather than a lack of resolve on the part of the state. Evidence from the case studies contradicts this view. We find that domestic interest groups who favor reform are slow to emerge post-ratification and, further, that an active decision by state elites to stay pledged to the new policy is crucial for the policy’s long-term stability and later enforcement irrespective of public sentiment.

¹⁰ The concept of “locking-in” originated with economists attempting to explain sub-optimal outcomes (here, technology outcomes) in a market environment. See David (1985) and Arthur (1989). Pierson (1993) provides an excellent summary of recent work by political scientists applying “locking-in” to public policy.

The benefits states gain and the costs they absorb subsequent to reform may differ considerably from the costs and benefits anticipated or promoted by reform advocates and opponents. Because most phase two reforms are built on dubious theoretical grounds, a new way of calculating the actual effects of second-order reforms is needed. We disregard justifications for reform given by policy entrepreneurs, and instead return to classic, seminal texts on the market effects of changing specific market rules (e.g., raising the legal protections granted to intellectual property) to construct an accepted and uncontroversial matrix of reform costs and benefits. These measures can be used to evaluate the consequences of coerced policy immediately following ratification. If the conclusion drawn in this thesis is correct, then countries able to capture reform benefits will stay pledged to the reform regardless of their initial opposition to the new policy or who pressured them to reform in the first place, and despite continuing domestic opposition.

Finally, the point should be made that this thesis is principally an empirical study. It adds depth to the current literature on IPR reform in emerging economies, but more country studies on the effects of reform are sorely needed.

LAYOUT OF THESIS

Chapter 2 follows this introduction and provides a review of the literature on the politics of economic reform and on policymaking in general, and explores what these theories predict for policy stability post-enactment. We present succinct summaries – essentially, a taxonomy – of a number of theories on policy reform applicable to phase two reforms, but we evaluate in detail the five theories that either explain enactment of reform in the two country studies or are mainstays in the political economy literature. We expound on why existing theories do a good job of explaining the enactment of reform in Brazil and Korea but fall short in predicting or explaining stability later on. At the end of the chapter, we describe and defend the methodology

used in the thesis and explain the reasoning behind our selection of material for the country studies.

The argument that was summarized in brief in this introduction is restated in Chapter 3. We make explicit the premises that underlie the argument we espouse, as well as map out the differences between first and second phase economic reforms that make state commitment to phase two reforms so important an issue. Our main contention is that a stable policy outcome cannot be coaxed out of an unwilling or uncooperative state no matter how much external pressure is applied.

Chapter 4 is the Brazilian case study, and Chapter 5 is the Korean case study. The chapters are organized in the same way, beginning with an overview of the economic development strategies pursued by the government in the decades prior to IPR reform. We look for any indication that state elites or policymakers were predisposed toward patent reform. That is, were state development strategies aimed at stimulating inventive activity and technology generation long before the issue of patent reform surfaced? Or did the country follow a strategy, common in emerging economies, of using and/or adapting technology developed elsewhere? Keeping this question in mind, we next assess the capacity for innovation by local firms and entrepreneurs by looking at national science and technology indicators and by reviewing the industrial structure and technical sophistication of three industries: pharmaceuticals, microelectronics, and software. These sectors were affected directly by IPR reform, and we briefly reflect on how well they adjusted to the new policy. How IPR reform was pushed through the legislature and became law is recounted next. And finally, the stability or instability of IPR reform post-enactment – that is, whether the state committed to or backtracked on reform – is addressed in depth using the measures introduced in this chapter.

Chapter 6 concludes the thesis. In the first half of the chapter we present evidence of Korea's ability to capture and create benefits from IPR reform, and evidence of Brazil's failure to capture similar benefits after reforming. In the second half we speculate on why Korea was

successful in turning IPR reform to its advantage, and why Brazil was not. We note the lessons that can be extracted from this policy case and applied to other phase two reforms.

The framework presented in this thesis for understanding what happens when countries are coerced into adopting highly unpopular domestic reform is skeletal. Still, there are clear and concise concepts which are intended to (and can) open fresh lines of thinking and stimulate additional research into the long-term consequences of pressuring states to reform domestic law. With this in mind, we lay out two promising lines of research to build on the “pre-theory” presented in this thesis. All of this, of course, is with the aim of deepening our understanding and ability to formulate politically sustainable economic policy.

Chapter 2: Literature Review and Methodology

This chapter reviews the literature on economic policymaking applicable to second phase reforms; specifically, we summarize the theories political scientists and economists have developed to explain the formulation, implementation (whether gradual or abrupt), and result (whether more liberal or less liberal rules) of economic reform. Our aim is to determine whether existing theories of policymaking convincingly explain why some countries commit to imposed reform while others do not. Economic reform refers to a broad range of policies aimed at reducing the role of government in the market. Scholarly work on policymaking tends to focus on the initial stage of the policy process – that is, scholars identify the impetus for reform and try to account for the substance and timing of the policies states enact. The long-term stability of reform, the focus of this thesis, is addressed only implicitly in the literature. We extend and apply the major theories of policymaking to the question of stability post-enactment and evaluate the explanatory power of these theories for reform in general and for IPR reform in particular. At the end of the chapter, we describe and defend the methodology employed in this thesis and the material selected for inclusion in the case studies.

The literature on policymaking is extensive. For reference, Table 2.1 provides an overview of the theories that are applicable to IPR reform and other phase two reforms. We group these theories according to the impetus for reform (e.g., society, the state itself, or an external source), and summarize their predictions for legislative action and for stability of the policy later on. The last two columns report whether each theory plausibly explains the passage of new IPR laws in Brazil and Korea and the subsequent stability of the policy in Korea. IPR reform is imposed on states; the impetus for policy change is external. But we include societal and statist theories as possible explanations for later stages of the policy process. Note that our listings in Table 2.1 are not meant to be all-inclusive; theories inapplicable to the case studies are excluded. Neither the Brazilian nor Korean legislature held open roll-call votes on IPR reform, for instance, so we omit the median voter theorem. There was no expert consensus on best

TABLE 2.1: THEORIES EXPLAINING THE TIMING, SUBSTANCE, AND STABILITY OF ECONOMIC REFORM

impetus for policy reform	state does/(does not) enact reform	theorists	reform stability post-enactment	explains IPR reform	
societal factors				enactment	
				stability	
pressure group politics*	reforms/(does not reform): depends on influence of domestic interest groups seeking liberalization/(protection)	Rogowski; Frieden; Rodrik; Hiscox; Hathaway	stable due to "positive feedback loop" on domestic policy preferences	NO	NO
statist factors					
"strong" state [autonomous executive]	reforms: policymakers insulated from, or unresponsive to, constituency	Krasner	stable; interest groups unable to launch effective challenge to policy	YES [Korea]	NO
political regime					
--autocratic	reforms: able to suppress domestic resistance	Mansfield et al; Haggard & Webb	stable; continued suppression of opposition to reform	NO	NO
--democratic	reforms/(does not reform): depends on domestic pressure politics		stability of reform depends on domestic interests	NO	NO
political leadership	reforms: ideational change; often persuades public of merits of reform	Goldstein; Keohane	stable, assuming ideational change is real	Partly [Brazil]	NO
utility maximization*	reforms/(does not reform): expects (rejects) promised reform benefits	Alesina & Drazen; Rodrik & Fernandez; Drazen	unstable if promised reform benefits not forthcoming	NO	NO
external stimuli					
crises [internal or external]	reforms: payoffs associated with reform greater than status quo	Naim; Drazen & Grilli; Haggard & Maxfield	likely stable after crisis (state risk averse, avoids further policy changes)	YES [Brazil]	NO
hegemonic influence* [several variants]	reforms: public goods issue solved OR yields to hegemonic pressure	Kindleberger; Gilpin; Gowa	stable only if hegemon continues to exert influence	YES [Korea]	NO
international institutions*	reforms: public goods issue solved AND/OR cooperation brings larger gains	Ruggie; Keohane	stable as long as cooperation is advantageous to the state	NO	NO
foreign private interests**	reforms: needed FDI made conditional on reform; bargaining power with MNCs	Vernon; Strange; Zysman; Putnam; Busch	likely unstable; bargaining power shifts to host country (obsolescing bargaining)	YES [Brazil]	NO

* dominant theory in the literature

** variant of pressure group politics

policy and no evidence that an epistemic community, what Peter Haas argues is often responsible for major shifts in policy, played any role in IPR and so it is skipped. Peter Evans' hypothesis of bureaucratic coherence as a source of reform is also incompatible with the evidence so it is excluded. Several of the theories listed in Table 2.1 complement and often are applied in combination with other theories (we speak to this in a moment), therefore we limit our discussion to the dominant theories which are in widespread use by political scientists and economists. These are utility maximization, pressure group politics, international institutions, and hegemonic stability. We add foreign private interests, a variant of pressure group politics, because this theory partially explains Brazil's reform. We note these five with an asterisk (*) in Table 2.1. We consider the remaining theories listed in the table only in conjunction with the principal theories we discuss in depth.

Most policy studies begin with some variant of one of the following questions: Who is responsible for policy decisions? Why do governments prefer one policy option over others? Why are supposedly beneficial policies resisted by the state and/or by local interest groups? Though different conceptual approaches are employed to understand the process of domestic policymaking, all share similar overlapping assumptions about the state and society which we make explicit here.

- when it comes to policymaking, states are risk averse and prefer the status quo
- policy changes that reorder domestic winners and losers will be resisted
- policy changes at odds with time-honored state policy stances will be resisted
- policy changes pushed by outsiders (a hegemon or an institution) will be resisted

We rely on these assumptions to help draw out predictions of policy stability when it cannot be determined easily from the theory. In some cases, extending theories to foretell policy sustainability is straightforward, and in other cases, it is a highly interpretative and error-prone task. To illustrate the difference, recall that some scholars attribute a state's acceptance of financial liberalization policies to an internal or external crisis so severe that the government is driven to act. The state adopts financial reform because the payoffs associated with policy

change exceed the status quo. Once the precipitating crisis has passed, does the policy stabilize? If we assume that states are risk averse, prefer not to initiate policy change, undertook financial liberalization voluntarily instead of being coerced into it, then the reform likely stabilizes. This is a straightforward extension of the theory. The prospect of long-term policy stability is ambiguous, however, in theories of pressure group politics since scholars have not spelled out how interest group preferences form and what causes them to vary. Theorists might argue that policy reform persists as long as the broader market environment that resulted in new policy remains fundamentally unchanged. Alternatively, policy is unstable if domestic groups who lose out after reform (e.g., declining sales experienced by the US steel industry, for instance, after new trade liberalization measures are enacted) are able to surmount collective action problems and effectively lobby for new protective policies. Hathaway (1998) presents still a different scenario documenting a “positive feedback effect” on policy preferences regardless of the immediate welfare diminishing prospects of reform. She writes “contrary to widely accepted theories of interest-group demand for protection, industries that experience high and rising import competition after a reduction in trade barriers often become less rather than more protectionist in the long run.” Many businesses apparently thrive under intense competition. Her argument follows from the assumption that further changes in policy, if it results in new sets of winners and losers, are improbable. We conclude, then, policy reform is stable and note this on the table, even though alternate interpretations are possible.

We should point out that a number of the theories we include in Table 2.1 have been tested and refined over the years and as a result are quite robust, while others tend toward conjecture. Some theories are logically coupled, even overtly so. The hypothesis that the thrust of economic policy is attributable to regime type is speculative and relies heavily on the insights and ideas of other theories of reform. Democratic regimes are said to prefer liberalization policies, but this is attributed to the influence of interest groups who favor openness and are able to lobby unimpeded under a democratic system (Haggard and Webb 1994; Mansfield et al. 2000).

On the other hand, it has been argued that autocratic regimes are more prone to adopt economic reforms because the government is able to suppress local opposition.¹ This essentially extends Krasner's (1976) hypothesis of the strong state: an autonomous executive where policymakers are insulated from or immune to the political pressures associated with rent-seeking and can pursue unpopular reform policies at will. Another example of the connectedness of these theories is the view that effective political leadership drives new policy. With respect to trade policy reform, the role of political leaders to usher in new policy is related to Goldstein's (1988) theory of ideational change as well as the hypothesis that politicians are (or should be) utility maximizers who by definition support free trade (Alesina and Drazen 1991). Similarly, political leadership plays a crucial role in crises hypotheses because it is the president or the economic planning minister who successfully drives market reform in response to an economic catastrophe. A prime example is Bolivia's President Estenssoro whose market reforms were aimed at breaking the country's hyperinflation of 24,000 per cent per year during the mid-1980s. We make the foregoing point because we found that principal or dominant theories *when considered in conjunction with other theories* offered convincing explanations for the enactment of unpopular reform in Brazil and Korea.

Still, theories of reform focus on the origins and determinants of major shifts in policy while we are concerned with the aftermath of the policy process – precisely, whether or not the state commits itself to a new policy course irrespective of the impetus for reform. With the literature on policymaking as our point of departure, we set out with two purposes in mind: to assess theories of policymaking applicable to our case studies and to carry these theories forward to predict state commitment or backtracking post-reform. The theories are reviewed in order of increasing applicability to IPR reform: utility maximization, pressure politics, international institutions, hegemonic stability, and foreign private interests.

¹ Speculation on why dictatorial regimes would favor liberalization policies over market intervention is wide-ranging and inconclusive.

Utility maximization

The theory of utility maximization places the impetus for policy change on “rational and forward-looking” political leaders or agents “with expectations that are consistent with the properties of the...model” underlying optimal policy, and who, deliberately and knowingly, adopt optimal policy (Sturzenegger and Tommasi 1998, p4). Reform occurs when policymakers have been persuaded by experts that one policy above others provides the best welfare enhancing prospects, and the proposed reform benefits are in-sync with expectations of policymakers. The particulars of the policy, then, are germane. “The question of why some policies which appear to be optimal are not adopted, while other policies which appear to be suboptimal are adopted is, in fact, at the heart of political economy,” Sturzenegger and Tommasi write (p39). Scholars advocating this view, who are by-and-large economists, attribute suboptimal policy outcomes to government myopia or to some perversion of the political system, such as the rent-seeking behavior of interest groups or politicians vying for reelection. Though this theory appears to mirror pressure group politics, its focus on “best policy” requires a theoretical defense of reform, often constructed “backward from [the] desired policy conclusion to a simple economic model that supports it” as Romer asserts (1992). Hence, it is *deviation from ideal policy*, which scholars attribute largely to political malfeasance and short-sightedness, that is of interest.

The normative component of utility maximization – that there is an optimal policy that rational policymakers ought to embrace – is at the heart of this theory; it is a premise, moreover, held by no other theory. Given that policymakers’ expectations are assumed to be inline “with the properties of the underlying [reform] model,” we focus our discussion on identifying and evaluating the expectations connected with IPR reform and assess whether there is evidence of ideational acceptance of patent reform in Brazil and Korea. We have two questions we want to answer. What were the expected benefits of IPR reform posed by policy advocates? Did Brazil and Korea anticipate obtaining these benefits post-reform? Three main benefits were named: an

increase in foreign direct investment, in technology transfer, and in the rate of domestic economic growth. We examine each in turn.

FDI

One benefit of IPR reform is the proposed effect of reform on levels of inward foreign direct investment. When a country strengthens domestic patent laws, full legal protection is granted to foreign owners of intellectual property thus removing an obstacle (i.e., the risk of local misappropriation) to direct investment. This legal protection is particularly important to high-tech sectors, the very sectors coveted by developing countries and viewed as their prospective engines of growth. Even though some reform advocates do not distinguish between surges in overall FDI and surges in direct investment in specific sectors, rising levels of FDI are deemed desirable regardless of the industry.

Does IPR reform lead to increases in inward FDI? In an empirical study of transitional economies in Central and Eastern Europe, Smarzynska (1999) found that “the lack of adequate protection of intellectual property rights deter FDI inflows into the region.”² The majority of scholars, however, are more circumspect. Rodrik (1991) argued that the level of FDI is influenced by several factors including firm entry costs, the level of regional tensions, and IPR. Maskus and Yang (1997) concurred with Rodrik’s contention stating that “[IPR] is only a component of a far broader set of important influences [to induce inward FDI].” Correa (1995) avoided making general inferences on the covariation of IPR and FDI asking instead whether the withdrawal of patent rights in a specific industry (pharmaceuticals) led to the expected decline in foreign investment in that sector. In Turkey, Italy, and Brazil – all of whom abolished drug patents for some period of time during the last 70 years – inward FDI in the sector increased

² Smarzynska also found that larger market size, increases in GDP per capita, and lower trade barriers correlate to higher levels of IFDI, while entry costs and regional tensions discourage direct investment. Considering this assortment of factors affecting FDI, the leverage offered by stronger IPR is ambiguous at best. Even so, Smarzynska definitively concludes that “weak [IP] protection deters foreign investment.”

substantially *during the decades that drug patenting was barred*.³ Recent data on the level of FDI in Argentina and Brazil by US chemical and pharmaceutical firms between 1997 and 2000 showed firm investment rising 48% in Argentina, but remaining unchanged in Brazil.^{4,5} This was during the time that Brazil was granting chemical and drug patents while Argentina was banning these patents. Correa ultimately concluded that “[a]vailable evidence on pharmaceutical patents...is insufficient to prove that the existence of (product) patents is a condition for FDI,” adding that “the lack of evidence is even more acute for other IPRs and sectors.”

The confounding issue is whether IP reform in the host country has market expansion effects for foreign firms (resulting in boosts to inward FDI), market power effects (dampening inward FDI), or relatively little effect. Direct investment decisions are based on a number of factors; though the influence of IPR on these decisions is not well understood, available evidence strongly suggests that IPR trails other factors that induce direct investment. For example, in John Dunning’s Ownership, Location, Internalization (OLI) model for FDI, strong patent and trademark protection weighs positively in the decision to invest abroad, assuming of course that the firm owns a specific advantage (e.g., patented technology, brand name, etc.). But the location component of his model emphasizes country specific advantages (e.g., factor advantages) as determinants in *where* to invest. His framework depicts a complex set of circumstances firms

³ Interestingly, foreign investment in the pharmaceutical sector in Brazil outpaced nearly all other industries even though foreign drug firms were unable to obtain patent protection. See Correa (1995) page 191.

⁴ Data from the US Commerce Department, Bureau of Economic Analysis, *US Direct Investment Abroad: Benchmark Survey*, Total Assets in Chemicals and Allied Products, Table III.A.5, 1997 and 2000. Data for 2000 are preliminary estimates. Actual dollar amounts are: Argentina, US\$3,480M in 1997 and US\$5,139M in 2000; Brazil, US\$11,543M in 1997 and US\$11,610M in 2000. Differences in FDI growth between 1994 and 2000 are even more striking. Foreign investment in chemicals and allied products jumped 316% in Argentina and 127% in Brazil. Note that IPR reform in Brazil re-introduced both product and process patents in chemicals *and* pharmaceuticals. The pharmaceutical subgroup represents 22% of chemical FDI in Brazil, but 37% of chemical foreign investment made by US firms worldwide. European countries receive the lion’s share of US FDI in pharmaceuticals. The 2002 PhRMA Annual Membership Survey states that 74.9% of the \$4.561B R&D money spent abroad went to Europe, Japan, and Canada.

⁵ Total inward foreign direct investment to Brazil from the rest of the world doubled between 1997 (US\$16B) and 2000 (US\$33B). Much of this foreign money was attracted by the privatization of Brazilian state enterprises. Nonetheless, we wish to underscore the point that foreign money was flowing heavily into Brazil during the four years that FDI in chemicals and pharmaceuticals were stagnant.

consider before moving overseas that goes far beyond the desire to protect firm knowledge via IPR.⁶

technology transfer

There are two ways for countries to obtain technology: generate it or acquire it.

Conventional theories of IPR focus on generation; patent protection provides the incentive for firms to conduct R&D and thus generate new technology for themselves. Reform proponents downplay the role a stronger IPR regime might have on knowledge generation, focusing instead on ways that reform helps a developing country get their hands on technology produced elsewhere.⁷

Several options are available to countries seeking new technology. They can attract the right kind of foreign investment and acquire the technology indirectly, as an externality of FDI. Local firms can enter into licensing agreements with the foreign technology owner, or form a strategic alliance with a foreign high-tech firm.⁸ Private or public R&D laboratories can join in cooperative agreements. Last, a country can reverse engineer to gain, or pirate, the desired technology. Obviously, the goal of IPR reform is to proscribe the last option, and we have already discussed reform and FDI flows. Does strengthening patent protection impact the other ways of acquiring technology? And are licensing and joint ventures (JVs) effective means of transferring technology?⁹

⁶ See Dunning, John H. (1993). *Multinational Enterprises and the Global Economy*. Reading, MA, Addison-Wesley.

⁷ Technology transfer is deliberately highlighted as a key advantage of reform even in the legal text of the TRIPS Accord. Article 66.2 states “Developed country Members shall provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base.”

⁸ In 1986, Elliott Hurwitz, a Special Assistant to the Under Secretary of State for Economic Affairs, wrote an opinion piece for the *New York Times* that summarized the widely held claim of reform proponents. “[US] trading partners have come to realize that protecting intellectual property affords them important benefits. For example, effective patent protection is a strong incentive to foreign technology owners to license products or participate in joint ventures in [developing countries].” October 5, 1986.

⁹ Ironically, the claim that tighter IPR gives rise to technology diffusion is based not on the full disclosure of the invention on the patent application, but on secondary mechanisms - licensing, alliances, or FDI. The

In a frequently cited article, Mansfield (1994) surveyed 94 manufacturing firms to determine if a link existed between foreign IPR and firm licensing decisions and found that “over 30% of the US firms felt that intellectual property protection in India, Nigeria, Brazil, and Thailand was too weak to permit them to invest in joint ventures there [p2]” or “...to license its newest or most effective technology to unrelated firms in that country [p5].” Mansfield was led to conclude that weak IPR regimes discouraged cross-border strategic alliances and licensing. A recent econometric study, however, has shown that only countries that already have achieved moderate levels of IP protection see any positive change in rates of technology licensing after strengthening patent rights. Though generally in favor of IPR reform, Maskus (1998) suggests that other factors such as “competent indigenous technological capacity” are more critical to licensing and strategic alliance decisions.

Maskus put his finger on the obvious. Suppliers of technology want to profit in the host country, and the probability of commercial success increases with a ready stock of capable business partners. If technology is diffused through JVs and licensing, then high or moderate technological competency in the host country is what ultimately draws in foreign firms who in turn transfer their know-how to the local economy. Lall (2001) points out that foreign pharmaceutical firms have been contracting out R&D to India’s national laboratories since 1985, even though the government of India does not grant drug patents.

This “local capacity” argument mirrors the case made by states seeking new technology. They maintain that a certain level of industrialization needs to be reached before a host country can soak up technology developed somewhere else. According to this view, the focus on IPR to facilitate cross-border alliances and licensing to gain foreign technology *before* assessing indigenous technological competency is putting the cart before the horse. Technological

usefulness of full disclosure in patents to promote the flow of knowledge was challenged early on by Sanders, et al. (1958) and Gilfillan (1964). See Nordhaus (1969), page 89.

competency is achieved through imitative activity and held back by strong local patent rights.

Linsu Kim (2002) writes

IPR protection would hinder rather than facilitate technology transfer and indigenous learning activities in the early stage of industrialization when learning takes place through reverse engineering and duplicative imitation of mature foreign products [p5].

This is, of course, the reasoning developing countries had used to justify misappropriating foreign technology. Yet it does have some theoretical basis. Bell and Pavitt (1993) have shown that for developing countries “[local technological] capabilities will usually have to be accumulated before the full, dynamic benefits from technology diffusion can be realized [p162].”

How technology is transferred to, and accumulated by, developing countries is still poorly understood. There is agreement that wide variations exist, with some developing countries benefiting from the introduction of ready-made technology, others unable to profit from it, and still others doing well without it. But it is hard to reach any definitive answer on how central licensing and JVs are to facilitating the flow of technology from industrialized countries to developing ones. Based on available data, we can conclude only that IPR is one of many factors that play into a firm’s decision on whether to pursue commercial ties abroad.¹⁰

economic growth

The promised boost to economic growth after reforming IPR is perhaps the least supported benefit claim. Scholars that make this assertion revert back to conventional theories of IPR and how patents serve as an incentive to firms and individuals to innovate. The reasoning goes something like this. The traditional theory of factor accumulation cannot by itself explain the growth of per capita income in countries over time. Another variable – call it total factor productivity, technological knowledge, or technological accumulation or change – is responsible

¹⁰ A measured conclusion on the relationship between IPR and technology transfer was posed by Michael W. Nicholson, an economist with the Federal Trade Commission. Nicholson (2002) wrote “IPRs are an important determining element in the activity of FDI and licensing, as well as with other forms of technology transfer. While IPRs may tend to increase direct forms of transfer, they also leave proprietary control in the hands of the innovators. Consequently, the impact may be that IPRs diminish the transfer of *usable* technology [emphasis in original].”

for a large proportion of growth.¹¹ Technological knowledge is generated through the innovative process. A number of factors facilitate the innovative process, among them, education, investment in R&D, and a strong IPR regime. Thus, strengthening local patent rights will boost economic growth by boosting the rate of local innovation.

Several scholars have attempted to show a correlation between strong IPR and economic growth. Rapp and Rozek (1990) compare levels of economic development with levels of patent protection and find “a causal linkage between economic modernization and the presence of efficient property rights, including intellectual property rights” (p101). The study leaves the causal linkage claim unsupported, but the paper does show a positive correlation between growth and property rights. Park and Ginarte (1997) supply an explanation for the linkage: IPR stimulates the accumulation of factor inputs such as R&D and physical capital. Here, IPR has a secondary role, improving factor inputs primarily through investment activities, which in turn fuel economic growth.¹² Gould and Gruben (1996) ask whether stronger patent rights always promote innovation and economic growth. They find that a country’s level of openness (i.e., its level of trade liberalization) determines the degree to which IPR has a positive effect on both the potential to innovate and the increase in per capita income. These studies share a common problem, which is establishing directional effects. IPRs are endemic to advanced industrialized countries. Does this mean patent rights are responsible for the economic growth performance of AICs, or are

¹¹ Technological knowledge or accumulation is “the engine of growth” in Paul Romer’s endogenous growth theory (1990), is central to Paul Krugman’s new trade theory (1979), is the explanatory factor in the existence (or nonexistence) of convergence patterns among advanced industrialized countries, is a determinant of the resiliency of firms in competitive markets, and, according to Michael Porter, ought to be addressed by governments via national policy (1990). There is another point of view regarding the role of technology accumulation to explain differences in growth rates across countries. Technology is assumed to be highly mobile, diffusing easily across national borders; accordingly, investment in capital better explains variations in national incomes. See Barro and Sala-i-Martin (1992).

¹² An important distinction is also made between developed and developing countries. The authors state “...while R&D is an important determinant of developed and developing country growth rates, IPRs matter for the R&D activities of the developed economies but not for those of the less developed economies. This suggests that, for the latter group of economies, either their R&D responds to different incentives (such as cultural rewards) or a significant part of their R&D activity is imitation.”

patent rights – along with a stable judiciary and other institutions that grease the wheels of market economies – a distinguishing attribute of a modern industrialized state?

The theory of utility maximization contends that rational and forward-looking policymakers adopt optimal policies such as IPR reform unless some perversion of the political system prevents them from doing so. Explaining different outcomes for IPR reform in Brazil and Korea is straightforward. Korea committed to reform because the state, grasping the potential benefits from altering national IP laws, quelled domestic dissent and forced reform on an unwilling constituency.¹³ Brazil lacked what has been called a “strong state”, bowed under interest group pressure, and backtracked on reform. This argument hinges on the assumption that policymakers believed in the underlying principles of IPR reform and expected the abovementioned benefits.

There is little evidence that Korea expected these benefits or saw them as primarily welfare enhancing. Tan Hee Lee, a patent attorney, wrote in 1986 that “the [Korean] government is aware that weak copyright laws may discourage foreign licensors from bringing desirable [software] technology to Korea,” yet this awareness did not inspire the government to make even minor concessions, such as joining the Berne Convention or the Universal Copyright Convention, two comparatively weak international copyright treaties mandating national treatment. Amendments to the Korean Copyright Act, proposed just two years before major IPR reform, included marginal legal expansions of IP protection. Copyrights could be obtained by foreigners as long as they were residing in Korea, and foreign copyrights would be honored as long as they had been granted to Koreans. But even these small concessions were not put through the legislature. There was no indication in Korea of ideational change and acceptance of the underlying principles of IPR reform.

¹³ Amsden (1989), in fact, makes this general argument, not about IPR, but about how Korea was able to adopt and adhere to largely unpopular national development strategies.

Brazilian policymakers, on the other hand, appeared to expect some of these benefits though with some reservations. One official said “I do not believe that core research activities of international companies will be relocated to Brazil. In the short-term, may be some specific research or phases of broader research are going to be transferred to Brazil, such as the clinical tests, but not the core activities of R&D.”¹⁴ In a November 2000 statement, Simone H.C. Scholze of the Ministry of Science and Technology claimed that reform would “strongly encouraged [sic] the support for technology transfer and joint research projects in the framework of international cooperation.” However widespread these views were among policymakers, they were not enough for the government to stay the course after ratification.¹⁵

Additionally, inward direct investment in Brazil did not rise in the sectors most affected by reform, nor was FDI impacted in Korea.¹⁶ And variations in economic growth around the time of reform are better explained by macroeconomic conditions rather than whether either country had broadened patent eligibility. Naim (2000) correctly observed that states who accept the principles prompting reform are likely to commit themselves to the new policy no matter what the initial costs. But so, too, will states “reject the underlying principles if the theoretical model is weak, the empirical evidence lacking, or if the ideological consensus seems prejudiced”, as was the case here.¹⁷

Pressure group politics

The most prolific work in state level explanations for policy reform falls under the rubric of public choice theory, a branch of economics that takes its inspiration from rational choice but focuses on collective decision-making rather than the actions of individuals. Participants are

¹⁴ This excerpt is from an interview conducted electronically with a Brazil governmental official in December 2000, who was directly involved in reforming Brazilian IP policy. He requested that he not be named. Transcript of interview is available from the author.

¹⁵ We would also argue that Brazil was skeptical but hopeful that reform would attract IFDI because the balance of payment issue dominated political discussions in the mid 1990s; any measure to induce foreign investment was considered if not pursued.

¹⁶ Korea did not liberalize FDI until the 1990s.

¹⁷ Kenneth Oye, 1997.

assumed to be rational and acting in their own self interest. Political scientists usually refer to these theories as pressure group models since changes in policy are attributed directly to the lobbying skill of domestic factions who favor or oppose policy depending on the policy's welfare effects. In many cases, domestic fights over the distributional consequences of reform result in policy sclerosis or in what Drazen (1996) calls "distortions away from optimality result[ing] from the mechanisms for making collective choices." There are several versions of this model, each reflecting different ways of isolating and identifying political interest groups.

Rogowski's model (1989) proved groundbreaking because of its predictive value and its use of the factor price equalization model to objectively formulate interest groups in advance rather than identify them after the fact. Addressing trade policy, Rogowski distinguishes interest groups using the Heckscher-Ohlin factor endowments theory of comparative advantage and the Stolper-Samuelson theorem. Differences in the domestic cost of production are due to the relatively abundant or scarce supply of land, labor, and capital. Countries export goods produced using the country's most abundant resource. Increases in the price of a good boosts the income of the owners of the inputs (land, labor, or capital) used most intensively to produce the good. Trade increases the demand for products using the abundant factor, and the income of owners of the abundant factor rises commensurately. Openness results in a rise in a country's overall wealth, though income gains are unevenly distributed between owners of the factors of production. Thus, owners of the abundant factor used to produce exported goods will favor trade liberalization; owners of the scarce factor used for goods sold locally will lobby for protectionist policies. He argues that changes in trade policy are traceable back to the preferences of these non-state local actors. Rogowski constructed a generic model with good theoretical footing, but his formulation of interests does not map to policy areas like IPR – where issues such as R&D intensity, product versus process specialization, and how easily goods can be imitated – are much more important for determining interests than is export or domestic market orientation. We can not simply remove trade policy from Rogowski's model and plug in IPR.

A perpetual problem with this theory, then, is in sharpening how we identify particular groups that would (or at least should) favor reform over the status quo. For ideas, we might look to how scholars are manipulating or reformulating interest categories in trade policy. Not surprisingly, there has been little deviation from the factor motif since this is where the model gets its theoretical one-two punch. For example, some authors have tried to construct groups with enhanced prognostics simply by improving and refining Rogowski's model (Milford 1993, for example, introduced an eight factor model) or by rejecting the presumption of mobile factors and making one production input immobile or "specific" to its sector, usually land or capital (Frieden 1991; Alt et al. 1996; Krueger 1997; Rodrik 1997). Others combine the abundant factor and specific-factor approach (Milner 1988; Gourevitch 1991; Hiscox 2001). None of these formulations offer ideas on how to go about identifying promising interest groups for IPR. Would a drug firm manufacturing copies of branded drugs switch to producing generic (off-patent) drugs after reform and become neutral on IP policy? Or would the firm ramp up its R&D efforts instead and support reform because it stood to benefit from tighter legal protections on new drug compounds? In the absence of a theory of property rights, we are left to stake out categories of political interest groups subjectively on our own.

There are other problems with this theory. Since preferences are assigned according to static market characteristics, pressure politics provides little predictive insight into the outcome of reform post-enactment when it is likely that interests have shifted. Though preferences follow from expectations of gains, how does one predict which industries stand to win after legislated reform? Gaubatz (1996) argues that policy imposed from the outside tends to stabilize because the public favors the status quo even if it means sticking with unpopular policy. "Democratic states...[get] frozen into undesirable policies by the inability to mobilize public support for change" (p120-1). Fernandez and Rodrik (1991) contend that "reforms...once adopted will receive adequate political support [even though they] would have failed to carry the day ex ante." Hathaway (1998) and Rodrik (1996) more specifically argue that new domestic interest groups

will emerge post-ratification who benefit from the new policy and favor its continuance and expansion.

These authors assume that the political system is open and democratic, and can tolerate and respond to interest group pressure; and further, that like-minded firms can surmount Olsonian collective action problems and lobby effectively. At a minimum, it assumes a state in which domestic groups can petition the government and influence the policy process even though they may experience varying degrees of success.

Brazil had a democratically elected president and legislature at the time of reform, an active party system, and numerous avenues at the federal and local level for impacting the policy process, yet no domestic group was able to stop, slow, or limit the breadth of IPR reform. No laws to supplement the reform have been passed. The problem we face is how to determine if Brazil's lack of commitment to reform is due to the absence of local support for expanding IPR, or whether support for IPR is emerging but is politically weak and ineffective (both would give some oblique support to this hypothesis). An even more obvious problem is explaining how and why a public galvanized against IPR reform but unable to prevent it in the first place, somehow gained the political wherewithal to destabilize the reform post-ratification. There is evidence that at least two industry groups have surfaced in Brazil post-reform that favor an extension of IPR but have been unable to affect further policy change. A niche industry in microelectronics has emerged – designing semiconductor layouts or mask works – that has been clamoring for patent rights protections for its designs. The lobbying efforts of this nascent sector have been unsuccessful. The Brazilian software industry is another industry that favors broadening the reach of IPR, but their requests have been rebuffed by the state thus far. As these groups gain political influence, they may be successful in getting IPR extended into new areas in the future. If this happens, then the theory of pressure group politics may explain the move toward policy stability post-enactment; as it stands now, the theory has little explanatory power for Brazil.

In Korea, democracy did not take hold in the country until after reform. Unlike Brazil, Korean business had a notable influence on national industrial policy even though it was unable to block patent reform at the end of 1986. It is plausible that Korean firms reversed their position post-ratification and spearheaded the expansion of IPR, lending support to the role of interest group politics. There is a sticking point here as well, though. By the late 1980s, Korean conglomerates dominated portions of the global Dynamic Random Access Memory (DRAM) market. DRAMS are commodity chips that require little design. As such, lead-time to market advantage is more important to profit generation than are patents, which are usually used to protect commercialization and licensing earnings. Specialty chips, such as Application-Specific Integrated Circuits or ASICs, are complex to design and produce and require the innovative effort we normally associate with semiconductors. Korea did not enter this field in any substantial way until the 1990s, taking out its first international patent in chip design in 1998.¹⁸ We ought to say, then, that Korean firms *followed* the government's policy lead and began to break into this specialty sector after the state expanded the country's patent law. This corresponds with industry's timing in entering other sectors: *following* the government's announced industrial policy. Industry's influence on the policy process in Korea is better described as firms' attempting to maintain or gain market advantage stemming from existing policies rather than leading the state to adopt new policy. Interest group pressure cannot explain why patent reform in Korea deepened and stabilized.

The main weaknesses of pressure group politics, subjective determination of interest groups and an inability to foretell shifting preferences, are exacerbated in narrow policy areas,

¹⁸ Samsung was granted a US patent for chip design in 1998. Goldstar (later renamed LG), received a patent for the manufacturing process and for the chip design in 1995. Patents may be listed in a number of different technical classes, but the first class listed indicates the primary technical claim of the patent. Samsung's 1998 patent was the first primary design patent. It is important to point out that Korea had been applying for international process patents since 1986, and that 12% of all US patents obtained by Koreans between 1986 and 2003 were for the semiconductor manufacturing process. (Only 3% of US patents obtained by Japanese inventors were for the manufacturing process.) Korea was already capturing benefits from IPR reform when protection was extended to chip designs.

such as intellectual property. For most firms, IPR is a trivial issue, one they are reluctant to spend time or money lobbying for or against. For other firms, weak IPR could undermine firm viability. In specialty policy areas like IPR, preferences can change rapidly and radically. Local firms in the pharmaceutical sector may all oppose IPR reform initially because of the likelihood of losing market share to patent holding firms. Yet some local firms, on the verge of formulating new products, may suddenly switch their position on IPR if their in-house research suddenly bears fruit.¹⁹ These newly innovating firms would favor the expansion of reform, while other firms, unable to adapt to a new business environment, would continue their opposition. Pressure group politics explains neither the stability nor the backtracking on reform in the case studies.

International institutions

The supranational-oriented scholar presupposes that the international system of states heavily influences or shapes the direction and substance of domestic policy. Generally, system-level theorists believe that the costs and risks to the state that are associated with changing domestic policy are what thwart reform. Once these costs and risks are curbed or removed, states are more inclined to endorse reform provided that the policy change is seen as welfare enhancing. The inner workings of the state (e.g., the bureaucracy, interest group pressure, politicians appealing to the median voter, etc.) are downplayed and often completely ignored. Costs here denote economic, transaction, and communications costs and not the domestic political costs associated with pursuing unpopular policy. Thus, the high cost of providing international public goods, such as a lender of last resort, and the risks associated with information asymmetries, noncompliance, and settling disputes between countries – issues that are part and parcel of a linked global economy – serve to frustrate the adoption of domestic reform. Two competing theories offer different stories about how to reduce these costs and clear the way for national

¹⁹ Local firms uninterested in IPR may do a quick turnabout after entering into a joint venture with a foreign multinational that relies heavily on patents. Several Brazilian firms, after collaborating with US firms, exhibited this reversal in policy preference.

governments to implement reform: international institutions and hegemonic stability theory. We describe both theories, provide examples, and then apply each to IPR reform in Brazil and Korea.

The theory that international institutions impact domestic policy decisions is based on the belief that institutions benefit individual states in direct and observable ways, and that states are willing to forfeit sovereignty over some aspect of national legislative matters because doing so brings the state greater rewards in the long-run. In the anarchy of the international community of states, cooperation is a preferable strategy to that of self-help because it elicits desirable concessions from states that would not be obtainable otherwise unless perhaps through force. There are two views on what specific benefits institutions present. Starting from premises similar to hegemonic stability theory, one view maintains that international institutions provide critical collective goods and thus ease the risks associated with joining the global economy. These include lowering transaction costs, lessening information asymmetries, making transparent the regulatory policies that affect business dealings (Keohane 1984), and establishing dispute settlement processes to arbitrate clashes between member states (Yarborough and Yarborough 1990). Institutions are said to be most valuable when they are independent, possess expertise in the area of interest, and/or provide scarce and necessary information to states that could not be obtained otherwise without great expense and effort. Examples are environmental institutions such as the UN Convention for the Law of the Sea, and banking regulations such as the capital adequacy rules laid out in Basel II.²⁰ A more abstract view of the advantages of institutions centers on their ability to persuade states to reject zero-sum strategies and instead to favor and pursue mutual or positive-sum gains. This is accomplished by tying together unrelated policy issues in order to forge an agreement or compromise between states that would not be achievable without the issue-linkage. Common examples are labor and trade or the environment and development (Martin and Simmons 1998). We should state at the outset that evidence supporting

²⁰ We define institutions as any set of rules or procedures that structure the conduct of actors. An institution can be, at one extreme, a loose group of uncodified rules that states follow, all the way to a formal organization comprised of a physical building with staff and a set of codified rules and procedures.

the effects of institutions on domestic policymaking is weak, yet the role of institutions (along with the pressure group model) continues to be a mainstay of the political economy canon and for this reason we apply the theory to IPR reform.

Brazil and Korea are signatories to the TRIPS Accord and are obliged to bring their national IPR laws into compliance with the private property protections as laid out in the agreement. Institutionalists would argue that both countries, keen to cooperate with the international trading community and continue to reap the benefits of GATT/WTO membership, formally complied with the Accord by passing tighter IPR laws even though doing so was highly unpopular politically. Korea reformed before the TRIPS Accord was finalized, but the impact of the institution on Korean domestic law is evident nonetheless; the duration of Korean patents was lengthened to 20 years in 1996 explicitly to conform to TRIPS, for example. Still, there is no evidence that the majority of legal and policy measures taken post-enactment were in any way precipitated by TRIPS, or more accurately, by Korea's desire to abide by its treaty obligations. Many supplemental laws were passed before the TRIPS Accord went into effect, and other measures taken by the government were not mandated by the treaty at all. The story is a bit murkier for Brazil. An argument can be made that the timing of reform was due to TRIPS, and there is evidence that Brazilian policymakers had this in mind when they legislated an entirely new national patent regime. But the substance of the reform went well beyond the directives of TRIPS and the accelerated passage of the laws – in 1996 instead of 2000 – can not be explained by institutional influence of the treaty. (A thorough discussion of the timing of Brazil's "TRIPS-Plus" reforms is presented in the case study.)

We might get better traction with this theory if we look more closely at the question of the causal direction of influence: do institutions merely reflect the policy preferences of their constituencies or do they directly affect or shape the policy choices of members? Were Brazil and Korea simply ready for IPR reform in the late 1980s and early 1990s, and TRIPS reflects their movement toward tighter IPR, much like WTO membership reflects their commitment to

free trade? Several authors maintain that institutions encapsulate the norms, principles, and interests of their constituencies, whether individuals or states (Krasner 1982).²¹ Those who view preferences as exogenous (like most economists) will perceive institutions as aggregating and amplifying (or muting) the policy voices of different constituencies, functioning as a conveyance or coordinating mechanism (Eichengreen 1998). Another view posits that institutions influence, sometimes profoundly, how political actors define their interests and goals thereby reversing the causality. North (1990), for instance, defines institutions as “the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction.” In other words, institutions achieve much more than simple preference aggregation, they constrain and refract political strategies, and in doing so, produce policy change in countries not likely to initiate reform on their own. Noland notes that “progress in policy reform is greatest when international involvement is highest” (2002).²² Do institutions facilitate policy stability?

Though IPR reform did not reflect the preferences of the majority of WTO members, it seems plausible that TRIPS (or for purposes of argument, its equivalent, US imposed reform) shaped how Korea subsequently defined its interests vis-à-vis IPR and technology ownership and contributed to the policy’s stability there. The rules imposed on Korea effectively redefined what strategies the country could pursue to maximize its interests. Outright pirating of chip technology was no longer feasible after reform, but amassing patents in microelectronics to barter for foreign technology was a viable alternative. The end goal of appropriating foreign technology remained the same, but the choices available to Korea to pursue this goal were constrained by changes in external rules (i.e., US imposed reform), which compelled Korea to recast its strategy to exploit

²¹ On the whole, political scientists contend either that institutions get created by powerful states for their own gain (often to the disadvantage of weaker states), or that institutions are a natural product, or a logical outcome, of self-interested states in pursuit of welfare-enhancing objectives.

²² Institutions, whatever benefits they may bring, also have a host of associated problems; for example, organizational failures, outliving their usefulness and an inability to adjust to a changed environment (path dependency), and most damning, being tools of the rich and powerful. Optimists such as Keohane believe that inefficient and unresponsive institutions eventually will be competed out of the “‘institutional’ market” much like an unprofitable firm competed out of business.

the new institutional context. Scholars have argued that institutions contribute to state learning, cognitive or affective, but we should add that institutions also impact how a state identifies and calculates relative gains.

This is a simple extension of the theory of institutions, but it does not tell us much about the future actions of states. Much depends on state improvisation and strategy post-enactment, the specifics of which cannot be envisaged by reform advocates. Policymakers respond to situational exigencies, whether internal or external crises, lobbying from interest groups, or the constraints on policy choice occasioned by institutions. The problem is no one knows to what extent events, groups, and institutions outside the government bear down on policymakers and influence the substance and stability of new policy. There is nothing unique about the pressure international institutions put on the policy process that merits special attention. In fact, many political scientists, particularly those of the realist school, see institutions as inconsequential players in the international system, and remain “skeptical of the achievements to be expected of international organizations...[and] continuing to look to the state and to national governments as the final determinants of outcomes” (Strange 1982, p480). Moreover, the assumption that institutions alone can produce cooperative outcomes between states when relative gains are at stake has been rigorously challenged (Grieco 1988; Mearsheimer 1994). But if one accepts the view that institutions influence the actions (and beliefs) of states, we need to take matters further and ask why a particular policy is endorsed by an international institution in the first place. Though it may be obvious when the policy has robust theoretical underpinnings, it needs explaining in cases where the underlying theory is embryonic at best, or dubious at worse, such as the push for harmonizing domestic market rules. Institutions may facilitate a stable policy outcome in cases where experts agree on and prescribe specific reforms; but absent a convincing theory to legitimize reform, institutional pressure has little effect.

Hegemonic stability

The theory of hegemonic stability is commonly used to explain trade and finance liberalization, but its basic logic can be applied to phase two reforms. This theory provides a plausible explanation for IPR reform in Korea.

Kindleberger (1973; 1981) proposed the idea that a “stabilizer” – a country willing and able to provide the public goods necessary for maintaining the world economy – is essential for sustaining an open international trading system. Whereas national governments provide a set of collective goods necessary for the domestic market to function, so too must some entity (a hegemon, a privileged group, an institution, etc.) supply comparable goods at the international level.²³ Provision of these goods by a hegemon (Kindleberger’s stabilizer country) permits other countries to link up to the global economy without directly contributing to, or trying to shirk from, the costs associated with maintaining an open trading system. The hegemon willingly shoulders the full burden because it stands the most to gain from free trade. Governments adopt liberalization policies when leadership necessary for global openness is provided by a hegemon.

Several scholars have offered a twist on Kindleberger’s original hypothesis. Gilpin (1987), for instance, stresses the dominance of the hegemon and its ability to pressure other countries to reform. Weaker countries wanting to avoid the ire of the dominant state will alter national policy, the presence of a hegemon increasing the cost of not reforming. Ruggie (1982) takes a softer view, attributing to the hegemon the ideological impetus that results in countries’ adopting liberalization policies. He sites as evidence the push by the US and UK after World War II for an open international economy moderated by some sort of social policy to tackle the adjustment costs that came with linking to the global market. One might argue that the dominance of American ideas about strong patent rights that began solidifying in the late 1970s

²³ At the local level, these include the provision of a national defense, domestic law and order, the country’s physical infrastructure, a national currency, rules for conducting business (including enforcement of contracts), sound fiscal and monetary policy, and a method to address private negative externalities. Kindleberger asserts that at the global level, five public or what he calls *cosmopolitan* goods are needed: a steady flow of capital for long-term lending; a stable exchange rate system; coordination of macroeconomic policies; and for short-term crisis management, an open market for distress (or extreme excess) goods; and a provision for unlimited liquidity (that is, a lender of last resort).

and early 1980s, prompted first the Europeans, and later, Japan and then others to reform their IP regimes.

The theory that a hegemon, whether by leadership or coercion, could bring about substantive change in the domestic economic policies of states is debated. Some scholars question whether the presumption that a hegemon would favor liberalization policies over optimum tariffs would hold up under scrutiny, and moreover, whether the provision of collective goods would be sufficient to entice other countries to join the global economy. One author highlights what is implicit in the theory but betrayed by the facts that “the balance of costs and benefits would seem to make it unlikely that the hegemon would focus its campaign for openness on Third World countries” (Evans 1989). These criticisms are mostly irrelevant to IPR reform and other phase two reforms, however. That the US favored tighter global IPR, and favors similar reforms aimed at erasing advantages given national firms operating in their home market, is obvious, for example. And the provision of collective goods – here, we would interpret that to be a global patent authority to examine claims and manage an international IP database, both expensive undertakings – might be enough to lure some countries to reform if the issue of technological backwardness did not present the more intractable and daunting obstacle to reform. Even Evans’ argument is not germane to IPR since misappropriation of intellectual property by smaller countries was incentive enough for the US to push for reform in Thailand, Egypt, and even in Costa Rica.

Korea reformed under pressure from the United States and reform stabilized there, but Korea’s subsequent commitment to IPR was not the result of hegemonic pressure. And the political regime in power in Korea at the time of reform, made possible the sweeping changes to IP law that had been demanded. The US had patchy results coercing policy change in other countries, we should note. With arm twisting, Hungary, Singapore, Taiwan, and Korea responded by quickly reforming IPR (Sell 1998). Other countries – namely, India, Mexico, Argentina, China, Egypt, and Brazil – refused to acquiesce. One could argue that Taiwan and

Korea were heavily dependent on the US market and thus more amenable to US demands, but the same could be said of Mexico. In fact, Mexico reformed its IPR regime to conform to the directives of the North American Free Trade Agreement (NAFTA) in 1993, demonstrating that, at least in this case, a plurilateral institution persuaded a state to undertake second-order reform when a hegemon could not. China bowed to US pressure to reform its IPR regime, but the policy has not stabilized. Any discernible influence of unilateral pressure to affect stable policy reform is at best spotty.

Korea was under autocratic rule in 1986 when IPR reform was enacted. Because domestic opposition was widespread, we have to wonder whether outside pressure for reform *on a democratic Korea* would have resulted in the same outcome.²⁴ The government exerted tight control over industry and society in general, and radical changes in policy were not publicly debated. IPR reform passed under administrative guidance, a tactic used by the president to push legislation quickly through the National Assembly. Though it is clear that the stimulus for reform originated with the US, it is doubtful that enactment of the new policy would have been achieved under a more democratic, and open, regime. Brazil, for example, was also pressed to reform but opposition from industry, from the academic community, and from the legislature itself held up passage of IP policy for a decade. Incidentally, concurrent with IPR reform the US demanded access to the Korean insurance market which had been off limits to foreign firms, and within eighteen months the government permitted several American insurance firms to enter the domestic market.²⁵ A policy reversal such as this would be unlikely unless the executive was insulated from and unresponsive to local interest groups and its citizenry. Two theories then explain enactment of IPR reform in Korea: hegemonic pressure as the impetus for policy change and an autonomous executive for its passage.

²⁴ A democratic regime in Brazil partly explains why that country did not buckle under US pressure.

²⁵ Fire insurance was compulsory for all buildings over four stories in the seven autonomous cities of Incheon, Kwangju, Pusan, Seoul, Taegu, Taejon, and Ulsan; and up until 1987, eleven Korean insurance firms were allowed to sell coverage. Two US firms entered the market at the end of 1987. Life insurance was underwritten by six Korean firms, with one American firm permitted to enter the market in 1987.

Despite the success of US negotiators in coercing change in Korea, subsequent stability of IP policy in the country cannot be attributed to outside pressure. Hegemonic coercion explains the timing of reform, but it cannot explain Korea's commitment to IPR later on. For one thing, there were clear limits to US influence and Korean acquiescence; many of the initial demands made by the US were ignored outright. The Korean government refused to extend copyright protection to computer databases, to protect semiconductor maskworks, or to increase copyright protection from 20 to 50 years for sound recordings. Though these protections were later granted in 1992 and 1993, it was *at the discretion of the Korean government* rather than a direct response to external pressure. Other supplemental laws were voluntarily introduced, including conferring patent protection on animal inventions, allowing public universities to obtain and hold patents, and raising trade secret violations to tort – none of which were demanded by the US or any other country. In addition, the year following reform, the political regime had changed; a new constitution was adopted permitting the public greater say in the direction of domestic policy and consequently reducing foreign influence over national legislation. We develop this point further in Chapter 5, but end here by stating that factors other than US coercion gave rise to Korea's commitment to reform.

Foreign private interests

In the Brazilian case study, we argue that foreign private interests – namely, multinational pharmaceutical firms and other foreign owners of IP – played a commanding role in Brazil's decision to reform. Ample evidence confirms that foreign firms directly influenced the policymaking process through aggressive lobbying of the executive and the legislature, and promises of FDI and technology transfer should Brazil reform. MNCs, in fact, wrote the first law in Brazil aimed at overhauling the country's IPR regime. But the source of external pressure alone does not fully explain the timing and substance of the country's reform. Domestic political leadership, specifically, the Brazilian president's efforts to rectify the country's lackluster

economic performance, was also responsible for the change in policy. Previous attempts to alter the legal protections conferred on IP had failed, and pressure exerted by the US government actually slowed the progress of reform. We present the details of the change in policy in Chapter 4; below, we explore three overlapping explanations for IPR reform in Brazil.

Many authors have written about the influence of private interests on the domestic politics of foreign countries, but there is no standalone theory on the mechanisms by which these firms exert power over the political process. Scholars focus on the bargaining process that transpires between host states and multinational corporations (MNCs). Vernon (1971) was one of the early writers on the subject. He noticed that the bargaining power of foreign firms and the host country was protean, and that control migrated to the state from the investing firm over time. The original bargain struck between the state and the MNC, in other words, obsolesced. Other scholars focused on the expanded role of MNCs in the global economy and international politics and, in counterpoint to Vernon, argued that firms siphon power away from nation-states, reducing the state's influence over foreign private actors to mere bargaining and negotiation (Stopford and Strange 1991). Putting foreign firms in the driver's seat so to speak, one scholar wrote that "...the transnational firm has command of an arsenal of economic weapons that are badly needed by any state wishing to win world market shares...[and] the firm has, first, command of technology..." (Strange 1992). Whether or not the clout held by MNCs eventually ebbs, both viewpoints contend that foreign private interests can (and do) influence the political process in other states, and in the case of IPR reform in Brazil, the economic weapons MNCs held that the state wanted was FDI and cutting edge technology.

Regardless of whether one sides with Vernon or Strange, neither offers an explicit and generalizable explanation for how firms extract either favorable bargains or favorable policy from the host state. The literature suggests that the influence of foreign actors can be analyzed using the same theory of pressure politics that is used to analyze the influence of domestic interest groups. But that raises the question of why foreign firms would have more sway with the

government than the state's own constituency, which is what happened in Brazil. One scholar suggests that states respond positively to the lobbying efforts of sectors that exhibit positive externalities, spillovers that are internalized within the nation's borders (Busch 1999).²⁶ This might explain why the promises of pharmaceutical giants Roche, Bayer, SmithKline-Beecham, Hoechst Marion Roussel, and Pfizer to relocate research and production facilities to Brazil after reform prompted the Cardoso administration to act contrary to the preferences of domestic interest groups and replace the national IPR regime.

A more plausible explanation though is that the policy preferences of MNCs and the state merged or became complementary because Brazil now saw IPR reform as a form of industrial policy. Industrial policy has been defined as "government policy aimed at or motivated by problems within specific sectors" as compared to aggregate policies (e.g., fiscal or monetary policies) or market-promotion policies "which seek to improve the workings of the market system" (Zysman and Tyson 1983). The Brazilian government was concerned about the lack of commercial innovation in a number of high-technology industries and began to accept the view that adequate IPR protection was necessary before any serious investment in R&D would be made. Because the goal was to spur growth in particular industries – the high-technology sectors – and take advantage of any backward and forward linkages that might spur growth in other sectors, we can interpret IPR reform as a type of industrial policy targeting specific industries. The literature on industrial policy and government-business relations is extensive. This interpretation suggests that foreign IP firms were able to influence policymaking in Brazil because the reform they favored dovetailed with the general industrial policy goals of the government. But what still needs explaining is the timing of the reform; why did reform pass in 1996 and not earlier or later?

²⁶ Although he was addressing political pressure from domestic firms for favorable policy in their own country, Busch's argument can be extended to firm lobbying in foreign countries.

The political leadership of Brazilian president Fernando Henrique Cardoso is the likely reason. A longtime advocate of *dependency theory*, Cardoso's ideological turnaround and embrace of economic liberalization policies occurred in the early 1990s, and IPR reform followed a series of stability and structural reforms (phase one reforms) aimed at reinvigorating the Brazilian economy and addressing the country's slow growth, hyperinflation, and weak competitiveness. Expressed presidential support for IPR was not enough to persuade the Brazilian Congress to pass reform, however. Astute political leadership and behind the scenes political maneuvering and bargaining is what pushed the IPR bill through the legislature, and even that tactic – forging a leadership agreement among the largest political parties – was, in the words of a Brazilian official directly involved, “a hard-doing sculpture”. Passage of IPR was an impressive accomplishment considering the intensity of Congressional resistance.

We have, then, part of the answer for the timing of reform: the direct influence of MNCs and the political leadership of Brazilian president Fernando Cardoso. Scholars credit visionary leaders with the policies states enact (Harberger 1993; Weyland 1996), but no mention is made about how the preferences of state policymakers or political leaders are formed or why they change. As we noted earlier, the preferences of interest groups are linked to material gain (though the linkage is made by authors *ex post*). Scholars grapple with developing hypotheses to explain the preferences of *individual* decision makers; and it has proven difficult to explain and impossible to predict ideological U-turns, such as Cardoso in Brazil, if that is indeed what occurred. Wise (2004) suggests that reform may be “less a matter of strategic choice on the part of democratizing elites, and more a reflection of the narrow economic policy options” available during economic difficulty. Naim (1993) takes this point further by asserting that states are forced into changing policy by exogenous factors, primarily economic crises or shocks, and by what has been called the “decay of support for the status quo.” He writes that “despair, lack of alternatives, international circumstances, and political realism motivate...reforms – not fresh ideological commitments to capitalism and free trade.” Other scholars agree. Crises is what led

Latin American leaders to change course when “the costs of sticking to populist policies became higher than the costs of adjustment” (Pereira et al. 1993), and Krueger (1997) attributes the utter failure of the import-substitution industrialization model as the factor hastening economic reform. If we accept this line of reasoning, the timing and substance of Brazil’s reform hinged on three overlapping forces: pressure from outside private actors, deft political leadership, and ongoing domestic economic crises that limited the policy options available to the Cardoso administration.

Do any of these theories – foreign private interests, leadership, and crisis – predict a stable policy outcome? We argued earlier that policy change in response to internal crisis is likely to stabilize due to the risk-adverse tendency of states. The literature on the role of MNCs in policymaking though provides little insight into the long-term prospects for imposed reform. On the one hand, Vernon suggests that the political influence of transnational firms after they have invested in the host country decreases over time. We can take this to mean that while foreign pharmaceutical firms were successful in pushing for the passage of more protective IP laws in Brazil, they were less successful in persuading the state to commit itself to reform after enactment. Though foreign drug firms did relocate some production to Brazil after IPR passed, only clinical research was moved overseas, not the preclinical research that comprises more than a third of R&D outlay. In any case, Brazilian officials recognized – or claimed they recognized – pledges of IFDI in the IP sectors to be empty promises. If, on the other hand, Strange is correct about the enduring influence of MNCs, then we would expect Pfizer, Roche, Bayer and other IP firms to be able to pressure Brazil into committing to reform. We know the opposite occurred. Rather than commit, Brazil backtracked. Drawing on three theories we can explain enactment of reform, but these same theories offer unconvincing or contradictory predictions for policy stability.

Research for this thesis initially began with an inquiry into the process of policy reform in Brazil and Korea under the presumption that the source of reform necessarily affected the long-

term stability of the new policy. This presumption turned out to be false. What compelled these states to pass new domestic laws in the first place failed to stimulate state commitment to the policy later on. Different stimuli work on different stages of the policymaking process, a fact that is obscured when the process of reform is not first broken apart into its three distinct stages. We develop this point further and present a clear statement of our argument in the next chapter. But before that, we address our choice of research methodology.

Methodology

In this final section of the chapter, we describe the general research design of the thesis and explain the reasoning behind the inclusion of specific material in each of the case studies. Finally, we detail how we obtained the information and data used in the construction of the thesis.

The puzzle we describe and explain is divergent outcomes in state commitment to involuntary economic reform. The thesis is comprised equally of empirics and theory building, and the empirical part is both descriptive and analytical. Our goal was to determine and identify the basis of opposition to IPR reform, explain why the state eventually acquiesced and reformed, and pinpoint and describe what actions the state took post-enactment. We made use of “event study methodology”, assembling a chronology of events prior to, during, and after the process of reform in Brazil and Korea. The theory building portion of the thesis entailed devising a framework that split the policymaking process apart into three stages in order to assess post-ratification intent. Finally, we defined and operationalized the terms *commitment* and *backtracking*, specifying how each is measured and evaluated.²⁷ To be clear, commitment to reform was our dependent variable and we traced backwards from effects (state commitment) to possible causes.

We argue that states able to capture benefits from involuntary reform will commit themselves to the new policy. To identify and operationalize *reform benefits* we return to classic scholarly texts on innovation and the protection of intellectual property. We adopt the same benefits to states that are cited in those texts, with one notable exception. The classical literature

²⁷ We do not gauge commitment or backtracking by a state’s inclusion on the USTR’s annual 301 watch lists even though many scholars use 301 listings to assess or rank the strength of a country’s IPR regime. We found these watch lists problematic for several reasons. The process by which states are identified as a priority watch country is highly politicized and often reflects the level of involvement (and the competency of the lobbying effort) of the industry lodging complaints about instances of foreign piracy. The US Motion Picture Association (MPA); PhRMA, the drug industry’s trade association; and the software industry are particularly skilled at getting the USTR to include certain countries on 301 reports. Moreover, watch lists often address enforcement issues which are not good substitutes for assessing state intention toward IPR reform. Last, not all states tagged as priority watch countries are guilty of the same severity of infraction. For establishing commitment and backtracking, we rely on actions taken by the reforming state itself rather than using assessments by third parties, such as the USTR.

assumes a closed economy, but IPR reform today occurs in open economies. For this reason we include the net effects of reform on the country's current account. Historical performance data is presented in order to place the trend of reform benefits in perspective. We also make cross-national comparisons as necessary to put state action post-reform in global perspective.

GENERAL RESEARCH DESIGN

A case study approach is more suitable to the answers we sought and the goals we established at the outset. Much of the current research in IPR entails quantitative studies that attempt to tie the level of IP protection in countries to a dependent variable, such as economic development, level of national innovation, or rate of inward foreign direct investment.^{28,29} Formal methods are appropriate for this type of inquiry, but the research question itself is problematic for two reasons. First, it presumes unidirectional causality; that patent laws affect economic conditions rather than the reverse. We reject preconceived notions of IPR and economic effects. The second problem with much of the current IPR literature is the formulation of an objective and meaningful measure of IPR protection; often the number and type of IP laws on the books in each country are simply tallied up. Some studies include the degree of enforcement, but this is a subjective measure expressing the opinion of a government official, a patent attorney, local private parties, or the educated hunch of an insulated researcher. Weak or uneven enforcement has many causes, some unrelated to whether the government intends or wants to enforce the new policy. We steer clear of these problems by employing detailed longitudinal case studies rather than formal analysis. It is doubtful that we would attain a deep understanding of the aftermath of the process of reform using quantitative methods alone.

The advantages and drawbacks of using the case study approach are well-known. Scholars are able to tell rich, nuanced stories and uncover anomalies in the facts that might go

²⁸ For an example, see Park and Ginarte (1997).

²⁹ Many studies of the origins of policy change, particularly those using pressure politics, also rely on regression techniques to establish causality.

unnoticed with formal modeling, even though it comes with the price of reduced generalizability. In post-reform Korea, for example, the rate of domestic patenting surged but contextual details confirmed the rate of national innovation remained flat. Patenting and innovative output should be unlinked then, at least for Korea, but this fact would have escaped notice had raw patent data been dropped into a regression model perfunctorily. Because our goal is to explain why involuntary reform stabilizes, the advantages offered by case analysis outweigh the negatives.

In the introductory chapter, we defended our selection of IPR reform as representative of other second-order reforms or the rules of globalization. But why choose Brazil and Korea as the country cases? The United States instigated the global push towards tighter IPR, beginning in 1984 with unilateral pressure on intransigent governments with weak or nonexistent IP regimes and culminating with the TRIPS Accord in 1995. We were interested in knowing whether the origin of the pressure to reform – that is, direct pressure from the US or pressure to abide by the TRIPS agreement as WTO members – explained the stability of policy post-ratification, and selected two countries with these criteria in mind. Case countries had to be targeted by the US for reform and be members of the WTO at least since 1995. China was pressured by the US to enact tighter IP laws, but did not become a WTO member until 2001. The story is the same with Taiwan, with Chinese Taipei joining the trade organization in 2002. Egypt, India, and Argentina were targeted by the US for weak IP regimes and were WTO members, but Egypt did not reform until 2003, and neither India nor Argentina have passed new IP laws (at the time of this writing anyway). Mexico meets our criteria, but its participation in the North America Free Trade Agreement, which incidentally drove its IPR reform, made comparison with non-NAFTA countries problematic. Brazil, Korea, and Thailand fit our criteria, but Brazil and Korea share commonalities that made them good candidates for study. Both are principle emerging economies with a large percentage of exports bound for the US market. Both had histories of heavy state involvement in the domestic market; both were relatively new democracies. Brazil and Korea, as other developing countries of the 1950s and 60s, adopted the import substitution

industrialization (ISI) model, though Korea abandoned it much earlier (and Brazil much later) than other developing states. Brazil and Korea resisted neoliberal reform in general, but both passed sweeping IPR reform in response to external pressure. While the US attempted to push reform in dozens of countries seen as lacking adequate IP protection, Brazil and Korea and several others were singled out for their egregious piracy of foreign technology. For instance, ten percent of the world's drug manufacturing took place in the developing countries of India, Brazil, Korea, Mexico, Argentina, and Egypt and often involved the copying of branded drugs. The US leaned heavily on these six countries to reform (Santoro and Paine 1995). Because seven or more years have passed since Brazil and Korea enacted new patent policy, both provide a long-term view of policy stability post-reform.

MATERIAL FOR INCLUSION

The Brazilian and Korean case studies are laid out identically, beginning with a survey of the government's growth strategies, an appraisal of the country's know-how in science and technology, an assessment of its high-technology sectors, a chronology of events leading to reform, and evidence of either state commitment or backtracking on IPR reform. Our aim was to probe any recurring relationship between or among extant economic conditions, the material interests of the state as a whole and of sectors and firms, and the beliefs and preferences of public and private actors that might explain the (in)stability of policy after enactment. We present a summary of the state's growth strategies in the decades leading up to reform for two reasons. First, we wondered if ideational change at the executive level was underway and if that explained commitment to reform later on. Had the state fully embraced liberalization policies so that commitment to IPR reform merely reflected the broader shift in domestic economic policy? Second, it is understood that a state's economic development trajectory affects the government's ability to implement structural adjustment. Is it also true that a country's position on its development path affects its ability to adapt to, and even flourish under, a highly protective IPR

regime? We have this same question in mind when we appraise the general level of science and technology in the two case countries using standard indicators, such as public and private spending on R&D. Was the country primed for reform? That is, was Brazil and Korea able to take advantage of IPR reform based on their present level of scientific and technological development?

The analysis of three high-technology sectors— pharmaceuticals, microelectronics, and software – in innovative output and market strength is used to evaluate each country’s standing with respect to cutting edge technology and to identify possible interest groups which might come forward to support IPR post-enactment. “High-technology” refers to those industries whose products involve above average levels of R&D and above the industry average for value-added. The OECD and the US National Science Foundation identify aerospace, computers and office machinery, communications equipment, and pharmaceuticals as high-technology sectors; of these, computers, communications equipment, and pharmaceuticals have high propensities to patent (Albert 1998; Schankerman 1998; Cohen et al. 2000). We narrow these three sectors considerably by concentrating on software, semi-conductors, and ethical drug production. Software, chips, and branded pharmaceuticals have high piracy rates, and a main objective of IPR reform was to extend patent protection into these specific areas. Confining our investigation to these sub-sectors also facilitated the gathering and analysis of industry data (e.g., annual turnover, export and import volume, market concentration, etc.). In short, these industries are research intensive, employ highly specialized workers, rely on some legal form of intellectual property protection (patents, copyrights, or sui generis protection), and are considered global “heavies” because of their impact on national and global income growth. To underscore the economic importance of these industries, we make note of their annual global turnover: for pharmaceuticals, US\$492B; for semiconductors, \$175B; and for packaged software, \$179B.³⁰ US

³⁰ Figures are for 2003. Pharmaceutical sales were obtained from IMS Health; chip sales from World Semiconductor Trade Statistics, and software figures from the International Data Corporation. Packaged

firms control 50 percent or more of the global drug and software markets, and approximately 30% of the total semiconductor market. American, European, and Japanese firms' preferences regarding IPR scope and degree were markedly different compared to their counterpart firms in Brazil and Korea. We were interested in whether these preferences were in any way reordered by reform.

Following this background material, we describe the source or sources of pressure to reform and examine state reaction to external arm-twisting. We look at the reaction of the executive, the legislature, and the public. We explain how the reform was driven through the legislature to become law, and how the substance of the enacted policy compares to what was demanded by outsiders.

The last section of the case studies presents evidence of state commitment or backtracking to reform using legislative and executive order activity, state support of domestic institutions, and the state's public stance on IPR. How we operationalized policy commitment is explained in Chapter 3, and demonstrated in Chapters 4 and 5, the two case studies.

GETTING INFORMATION AND DATA

Information for this thesis came in fragments from a wide variety of sources. Following the normal scientific process of gathering empirical evidence, collected material was then sorted for relevance and importance, and pieced together into a coherent story. We drew on contemporary scholarly work by country experts to flesh out and interpret the political consequences of forcing unwilling states to reform. Country-specific literature also aided our understanding of the potential impact of new IP policy on the government's industrial development goals, how the state reassessed its ability to pull in foreign technology and direct investment, and how reform was likely to alter business-government relations. Data was obtained

software refers to products for mass distribution, not software developed for specific users. Packaged software includes operating systems, utilities, applications, and programming languages.

from the press – local and international – with additional details gleaned from industry sources (publications and websites). Interviews with government officials, industry officials, and patent attorneys were conducted both in person and electronically. Government sponsored reports on industry, science and technology, and other related topics supplied quantitative self-assessment measures of national technological know-how. Reports from governmental or quasi-governmental institutions, such as the World Bank, the IMF, the OECD, and the USTR among others, provided cross-national and time series data and helped us place both cases in global and historical perspective. Industry associations, and more importantly industry watch groups, helped us filter and evaluate information and data obtained directly from firms. In all, we consulted nearly 700 articles, books, manuscripts and other documents in the fields of political science, economics, business management and strategy, industrial organization, trade, finance, international law, world health, innovation, and intellectual property.

Series patent data was obtained from the World Intellectual Property Association (WIPO), which publishes annual patent statistics (applications and grants) for 160 countries dating back to the 1970s, and, often, earlier. WIPO data was then checked against patent data from the national patent offices in Brazil and Korea. When discrepancies existed, data from the national patent office was used. Historical data for Brazil (number of patents granted in the 1930s) was obtained from the Brazilian federal record of national statistics. US patent data was used to proxy total foreign or international patenting by Brazilian and Korean inventors.

Finally, trade and foreign direct investment data were obtained from the UN Statistics Division; the US Department of Commerce, Bureau for Economic Analysis; and from the national statistics offices of the Brazilian and Korean government.

Chapter 3: Argument

Up to this point, we have made a number of claims about policymaking and policy stability. We have maintained that the impetus for economic reform has little to no influence on policy stability post-enactment, and in doing so, we have implied that a government's ratification of reform is unrelated to the state's actual intent of staying the course of reform in the short and long term. We have asserted that domestic interest groups – widely believed to be responsible for stable policy outcomes – play no role in the outcome of reform when policy change has been externally imposed on the state. We also have alluded to important differences between voluntary and involuntary reforms. In this chapter, we elaborate on these claims and restate our central argument.

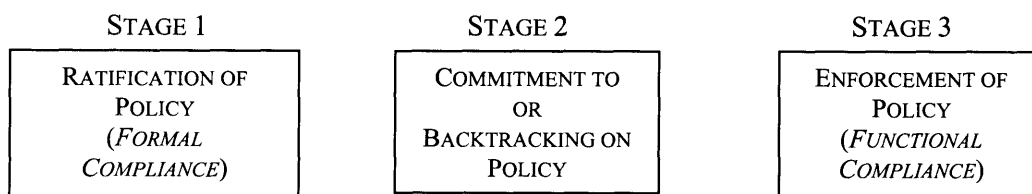
Existing theories of policymaking focus on the impetus for policy change and/or the choice of specific policies. According to the literature, the impetus for reform can originate either outside the state (e.g. a hegemon, an international institution, or foreign interests such as MNCs) or within the state via interest group pressure or from state elites pursuing optimal policy (we called the latter utility maximization, in keeping with Drazen (1996), Sturzenegger and Tommasi (1998), and others). IPR reform was imposed on Brazil and Korea. The stimulus for reform came from MNCs in IP-intensive industries in the case of Brazil, and from the United States government in the case of Korea. But external pressure alone cannot account for the timing and substance of reform in either country. We argued that an autocratic political regime, which precluded public debate on policy and suppressed opposition to reform, explains why Korea enacted IPR reform swiftly in 1986 in response to US pressure – an improbable outcome under a democratic regime. In Brazil, MNCs pushing for reform exerted great influence over the policymaking process, but we maintained that MNCs were successful in persuading the government to reform *because of* Cardoso's political leadership and the economic crises that limited his policy options and made him more receptive to foreign petitioners. These theories explain passage of reform but tell us little about the prospect for long-term policy stability.

The theories we evaluated in the previous chapter (with the exception of utility maximization) depict the state as either mechanically responding to calls for reform or incapacitated and unable to withstand external demands for reform. In contrast, we see the state as a powerful actor in the reform process whether or not it expresses that power by defying the pressure to enact new policy. The real expression of state power and agency is in the decision the state makes to commit to or backtrack on reform post-enactment. States may be obliged to enact reform, but they cannot be compelled to endorse reform, or commit to and fully enforce it.

Three stages of policy reform

Because the political economy literature is primarily concerned with the timing and substance of policy, with few exceptions *policy reform* has been understood to mean *both* enactment of new law and its enforcement by the state. Political scientists who unbundle passage of law and enforcement of law – we mentioned Oran Young (1979) as one of the first to make this distinction – tend to view enforcement as a discrete problem unrelated to ratification or policy choice. Thus, policy stimulus, enactment, and enforcement are viewed either as one and the same (for simplicity and conciseness), or as distinct and dissociated subject matters.

We regard enactment of new policy and its enforcement as separate stages in the process of policy reform. A government carries out a series of related actions when altering national economic policy: it enacts policy or passes new law, it assesses policy effects, it decides whether to commit to policy, and finally, it enforces policy. In other words, states progress through three identifiable stages during the process of reform.



In the first stage, the government enacts law, formally acceding to reform. If reform has been imposed on the state from the outside (e.g., an international treaty or hegemon), then ratification or enactment conveys a state's *formal compliance* with the international edict. Korea consented to IPR reform in a signed agreement with the United States on August 28, 1986. The National Assembly put through the Patent Act on December 31, 1986 signifying the state's *formal compliance* with the terms set out in the August 1986 agreement. Brazil formally complied with the TRIPS Accord on May 14, 1996 when the Brazilian Congress legislated patent and copyright reform.

In the second stage, after assessing the effect of the policy on the national economy, the state resolves either to commit to the reform or to back away from it. A state's commitment is evident when the government passes supplemental laws or issues decrees aimed at strengthening and extending reform. Conversely, lack of commitment, or what we call backtracking, is demonstrated when the state pursues measures to temper the new policy and fails to support domestic institutions necessary for reform implementation. Korea's commitment to reform was apparent when the government began passing a series of new laws that broadened what was eligible for patent or *sui generis* protection, including semiconductor maskworks, computer databases, plant varieties, genetically modified animals, and business methods. The first of these laws was passed about four years after the 1986 Patent Act, enough time for the state to realize benefits from reform.

In the final stage of the reform process, the state enforces the new law unreservedly. Assuming the state possesses sufficient resources to achieve on-the-ground enforcement, we would expect to see prosecution of IP infringers, a concentrated effort by the state to curb piracy, action against patent holders who refuse to work their patents, and the like. We refer to this on-the-ground enforcement as a state's *functional compliance* with an international mandate.

For a simple example of these stages imagine a state obliged by international treaty to enact corporate governance regulations (stage one). After passage of new law, the state assesses

the probable effect on local business. The government then decides either to commit to the regulation or to backtrack on it (stage two). If it commits, the government may pass additional measures expanding or deepening the reach of the new law to include transparency in senior executive hiring and firing decisions, for instance. If it backtracks, the government might exempt a number of corporations or even entire industries from regulation. Enforcement of the new policy (stage 3) is demonstrated when the state fully applies the law to individual and corporate citizens.

We should spell out what we mean by *backtracking* since we use the term rather narrowly. Backtracking indicates a country's reservations about a particular policy. Some scholars writing about national politics have used the words *turnaround* or *reversal* to denote a complete abandonment of specific economic policies, often policies associated with an ideological stance (e.g., the tenets of state-led growth or a free market economy). Chile's abandonment of ISI policies and embrace of neoliberal reform in the 1970s represented a policy turnaround, for example. However, a country's reluctance to stay trained on a policy program, such as tightening the protections conferred on intellectual property or instituting higher labor standards, may be manifested in subtle ways. In view of that, we use *backtrack* to refer to a government's apparent ambivalence about the policy after ratification. The government signals this by deliberately pursuing legal measures to temper the effects of reform; some examples include the issuing of executive decrees that invalidate portions of the new law, or introducing regulation that slows down the execution of the new law. In addition, the state neglects to create, support, or enhance the national institutions that are necessary for full implementation of the reform. Here, we refer to the establishment or maintenance of essential state bureaucracies, the carrying out of needed changes to the judiciary, etc. Finally, the state publicly criticizes and renounces the reform in international fora.

The actions of a government post-enactment might be due to many factors, and it would be a mistake to suggest that a handful of executive decrees necessarily indicates policy

backtracking. Often it is pressure from domestic interest groups that compels governments to take actions aimed at easing the ill-effects of reform (or at least appearing to do so). Good examples abound in the field of trade policy. Compensatory measures for groups that bear disproportionate costs when the domestic market is opened, for instance, may not be and should not be interpreted as evidence of a government's faltering on openness. In many cases, such measures indicate the opposite: the government's long-term commitment to trade liberalization. Conversely, if the state persistently initiates a wide range of actions at odds with the objectives of the reform, backtracking is indicated. We employ, then, a synoptical approach to determine state vacillation; we look for a broad range of governmental actions that *taken together* signify backtracking.

The notion of backtracking is germane to states that have been compelled to reform. When states reform *voluntarily*, the decision to commit is made *before* the state enacts new law. We sketch out differences between voluntary and imposed reforms below.

Voluntary versus involuntary policy reform

In the introductory chapter, we described the global economic policy agenda as a package of domestic market reforms, purportedly devised with the world's economic interest in mind, which are recommended by experts, pushed by hegemony, or mandated by international institutions. The process by which policies "evolve" as part of the global economic agenda tells us much about the likelihood for a stable (or unstable) policy outcome after a state has enacted reform.¹

John Kingdon (2003) writes about agenda-setting at the national level, but his model can be applied at the global level, too. He argues that policy proposals emerge spontaneously (from policy entrepreneurs, think tanks, interest groups, and others) and float around in a "policy

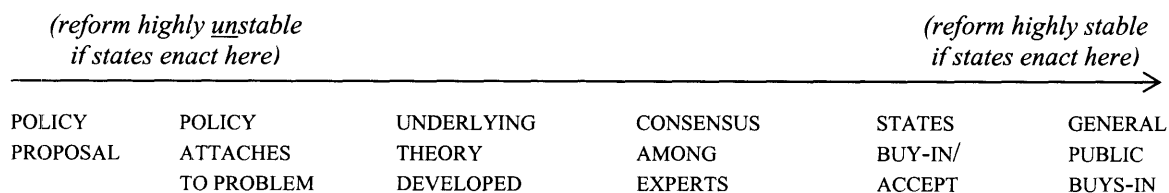
¹ *Agenda* means "a list or outline of things to be considered or done" (Merriam Webster's, 10th Edition). Policies that evolve as part of the global economic agenda refers to policy reforms that are first considered or proposed and proceed toward ratification by states and acceptance by the general public. We are interested in this entire process or progression, which we label the economic agenda.

primeval soup” as policy advocates “lie in wait...with their solutions at hand, waiting for problems to float by to which they can attach their solutions” (p165). Rejecting the view that policymaking is the result of “rational decision-making” – i.e., where problems are first identified, and policy solutions then formulated – he instead emphasizes the central role of “policy advocates” in the agenda-setting process. This shift in focus to policy advocates is particularly appropriate to international politics, where opinions on problems and policies are exceedingly diverse and policy is driven by a handful of countries or promoted by multinational interests.²

We build on Kingdon’s model, and in Figure 3.1 represent the evolution or development of the global economic agenda spatially, on a horizontal line, from the initial policy proposal at the far left (the beginning of the agenda process), to states’ ratification of reform, and finally, to widespread public acceptance of reform at the far right (the end of the agenda process). Kingdon asserts that policy proposals become part of the national agenda after a policy proposal attaches to a problem; we contend the same occurs at the global level.

Generally, reforms imposed on states cluster around the left end of the model, while voluntary reforms cluster around the right end. Note that policy reform undertaken by a state at the beginning of the agenda-setting process, when a policy proposal first attaches to a problem, is

FIGURE 3.1: EVOLUTION OF THE GLOBAL ECONOMIC AGENDA – FROM POLICY PROPOSAL TO STATE ACCEPTANCE



² According to Kingdon (2003), policy advocates “are willing to invest their resources—time, energy, reputation, money—to promote a position in return for anticipated future gain in the form of material, purposive, or solidarity benefits” (p179).

likely to become unstable over time. Reforms enacted by states at this point in the agenda process are lacking an accepted theoretical or empirical base, a consensus on policy among economists and other experts, and approval or buy-in by a majority of states around the world.

A few words should be said about the global economic agenda as exhibited in phase one and phase two liberalization reforms, since we want to locate these reforms in our model. We mentioned that *economic reform* refers to the adoption of market-friendly policies that limit the role of the state in the economy and that are intended to promote economic growth and development. By “first phase of reform” we mean a package of policies that have been promulgated by economists, international institutions (e.g., the WTO, the World Bank, and the IMF), and others, which states have been urged to enact and where the end objectives are macroeconomic stability and structural reform. The justifications given for these reforms, as well as the specific policy areas they address, are summarized in Table 3.1. We intentionally differentiate between stability and structural reforms because “the consensus on what constitutes appropriate structural reform is based on much shakier theoretical and empirical grounds than is

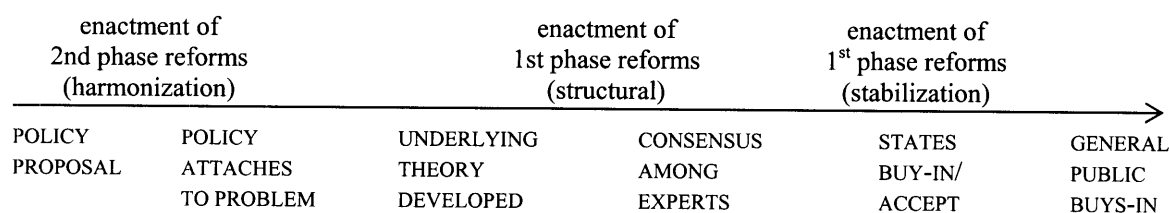
TABLE 3.1: PHASES OF ECONOMIC REFORM

	END OBJECTIVE	JUSTIFICATION FOR REFORM (OVERARCHING GOAL)	POLICY AREA
phase one	macroeconomic stability	achieve sound fiscal/monetary management necessary for economic growth and development	<ul style="list-style-type: none"> • fiscal discipline • public spending • taxation • exchange rate
	structural reform	remove relative price distortions and reduce state intervention in the market	<ul style="list-style-type: none"> • financial liberalization • property rights • trade liberalization • deregulation • FDI • privatization
phase two	uniformity of national rules (harmonization)	remove relative price distortions <u>and/or</u> remove unfair national advantage <u>and/or</u> address fairness and equity concerns; protection of public/society	<ul style="list-style-type: none"> • corporate governance • corruption • environmental protection • government procurement • human rights • IPR • labor

the consensus on the need for macroeconomic stability” (Rodrik 1996, p11). The end objective of phase two reforms is harmonization or uniformity of national market rules, and the justification given for these reforms has varied. We list three. For the most part, phase one reforms have been adopted voluntarily (though not always willingly) by states. IPR reform, a phase two reform, has been imposed on states through the TRIPS Accord.

There are a number of differences between stability (phase one), structural (phase one), and harmonization (phase two) reforms worth pointing out. The policies aimed at macroeconomic stability are by and large accepted by states and taken up voluntarily. The theory supporting these policies is robust, and the welfare effects are positive-sum. For structural reform, some policies are pursued by states voluntarily while others are imposed via issue-linking, e.g., the IMF’s conditionality clause for international loans. The underlying theory for structural reform, and consensus on best policy, is emergent, as Rodrik asserts. The welfare effects are positive-sum. Finally, phase two reforms are likely to be imposed on states. The economic theories supporting phase two reforms are weak or nonexistent. The welfare effects of phase two reforms are zero-sum, at least in the short term. In Figure 3.2, we locate phase one and phase two economic reforms in our model.

FIGURE 3.2: ADOPTION OF PHASE ONE AND PHASE TWO ECONOMIC REFORMS



This representation of phase one and phase two reforms at points on the global economic agenda is obviously rule of thumb. It is roughly correct. Clustered at the far left are phase two reforms. These policies are often imposed on states and are inherently unstable, whether or not

domestic interest groups emerge post-enactment in support of reform. The welfare-enhancing properties of phase two reforms are zero-sum in the short term, and absent any theoretical basis for reform that might assure states of the prospect of future benefits, states will backtrack after enactment *unless the state acts to capture and/or create reform benefits*. It is the action of the state itself that determines whether coerced reform stabilizes in the long run.

Main contentions

States commit to imposed reforms once they capture or create reform benefits. This assertion rests on several premises that we have elaborated on in this chapter. We view the state itself, not pressure groups, as the principal architect of domestic policy reform. Even when the state yields to external pressure and enacts policy reform, it is conceding *formal* compliance but may be feigning *functional* compliance since the state can still decide whether to backtrack, employ dilatory means to forestall reform, or commit to reform wholeheartedly. Relative gains concerns figure prominently in its calculation of what to do post-enactment. Given that the welfare effects of phase two reforms are zero-sum in the short term and indeterminate in the long term, states will backtrack on reform to avoid absorbing the concomitant welfare losses. When states are able to capture or create benefits from reform – that is, when they are able to turn unwanted reform to national advantage – then the state commits and the reform stabilizes *despite the fact that the policy is at an early point in the global economic agenda process* and lacks widespread acceptance or the theoretical footing enjoyed by most phase one reforms.³

We wish to set straight several prevailing views about economic policy reform when reform is being driven from outside the state. One belief is that external coercion works; states

³ We have glossed over the importance of an articulated, established theory that supports policy reform, as well as a consensus on an optimal policy among economists, to facilitate the approval and acceptance of reform among the majority of states. The policy recommendations of economists – if they are in general agreement – have great influence over the policy decisions of states. John Maynard Keynes claimed that “[t]he ideas of economists...both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else...I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas.” Quoted in Kingdon (2003, p125).

reluctant to adopt certain policies can be pressured to enact reform. We counter that there are decided limits to what coercion can achieve. States retain considerable autonomy in determining domestic economic policies, and outside pressure is constrained by the cost of assessing and monitoring tangible reform in recalcitrant states. Enactment of policy does not mean the state will also enforce it.

Second, a principal belief shared by most legal scholars is that states want to cooperate with and obey international rules (Henkin 1968; Chayes and Chayes 1993). We contend that states are supremely self-interested, and will comply with international rules only when to do so is in their national interest. States care less about reputation than their economic welfare.

Last, a popular view among trade scholars and practitioners is that, by using clever negotiating ploys, states can be compelled to adopt policies they find objectionable. Through issue linkage, obstinate states will sign on to policies they would never pursue voluntarily. We see examples of these types of tie-ins in regional and international fora. In APEC, work is underway to link environmental standards to trade. Labor standards may be bundled with trade at the WTO. Provisions for competition policy are ongoing at the EU and the WTO. And perhaps the best example of issue-linkage was when GATT members were required to vote up or down on the creation of the WTO *and* abidance with three agreements on trade in goods, on trade in services, and on the trade-related aspects of intellectual property (TRIPS).⁴ These ploys achieve *formal* compliance, but not the genuine state acquiescence and policy stability that practitioners aim to accomplish.

The substance, timing, and aftermath of IPR reform in Korea and Brazil exemplify the limits of coercive measures to bring about real, lasting reform in states dead set against reform. We present the Brazilian case study next.

⁴ In trade parlance, this is called a “single undertaking.” With one signature, a WTO member accepts *all* trade-related agreements as a single bundle. It is an all-or-nothing deal. It should be noted that TRIPS erased the ‘product versus process’ distinction in trade law, thus paving the way for other regulatory and process standards, including those concerning competition policy, environmental and labor standards, etc.

Chapter 4: Brazil Case Study

Mention intellectual property rights and Brazil in the same sentence and many think of drug patents and access to AIDS antiretroviral medications, especially for the world's poor. Patents on drugs raise the prices of those drugs. Brazil's public posture of forcing several multinational pharmaceutical companies to lower their prices on patented AIDS drugs in 2001 has publicized the tradeoffs many countries face in implementing strong protection of intellectual property and their desire, or constitutional mandate as is the case in Brazil, to minister to the public health. It has also exposed another tension between a country's obligation to abide by the directives of the World Trade Organization and its ability to soften the domestic costs of compliance. This latter tension has been partly obscured by the focus on the price of AIDS drugs and the rhetoric between advocates and critics of tightened intellectual property laws around the world, but it is the underlying theme of the case studies and the thesis.

This chapter is arranged as follows. After the introduction, we present a brief overview of Brazil's economic development strategies from the 1950s forward, giving special attention to the country's acceptance of phase one reforms beginning in the mid 1980s.¹ Intellectual Property Rights (IPR) reform was pursued sporadically by the government from 1987 until its eventual passage in 1996; sporadic because during this time domestic resistance to patent reform was considerable. To understand why, we look next at the industrial structure of the high-tech business sectors most affected by the new policy: pharmaceuticals, microelectronics, and software. Brazil's general level of development in science and technology is also presented. The chapter's third section focuses on the process of IPR reform. A focus on policy *process*, rather than simply stating the outcome, is essential in order to understand how the patent law managed to pass despite strong local protests and to provide deeper insight into why the reform policy became unstable after its ratification. Next, in section four, we document and detail instances where Brazil has attempted to mitigate the domestic costs of reform by adopting new measures

¹ As we noted in last chapter, IPR reform is part of the second phase of economic liberalization. The policy recommendations collectively tagged the Washington Consensus represent the first phase of liberalization.

aimed at tempering the 1996 policy. When taken together, these examples strongly suggest a pattern of backtracking in Brazil, away from an initial commitment to meet or exceed international standards to the country's struggle to soften the local costs of raising IPR protections. Finally, we conclude the case study by proposing a list of conditions necessary, but in Brazil absent, for unpopular reform to become stable.

Brazil actually has a long history of supporting intellectual property rights. Brazil's first patent law was adopted in 1809 when the country was part of the Portuguese Empire. Later, patent and copyright protection guarantees were written into the country's first constitution in 1824. Brazil is a signatory to most international intellectual property (IP) agreements, including the Paris Convention on Patents, the Berne Convention on Copyrights, the Madrid Agreement covering indicators of source on goods, the Rome Convention, and the Patent Cooperation Treaty. Brazil became party to the Paris Convention for the Protection of Industrial Property in 1884, three years before the United States and fifteen years before Japan. Brazil was an early advocate of protecting the intellectual property aspects of computer programs (Law 5988/73 in 1973). And for most of the 20th century, the country allowed and enforced patents on drug products and processes.

In 1969, Brazil's then military government rescinded patent protection for pharmaceuticals and foodstuffs. The government was persuaded to do so on the theory that the royalties the country was then paying to foreign holders of patents would be better spent on R&D in the domestic drug sector (Rubenstein 1996). The idea of stimulating the country's research efforts and at the same time developing the local pharmaceutical sector fit with the state's industrial policy of closed borders and import substitution during the 1950s, 60s and 70s. The world's major drug companies had established subsidiaries in Brazil as early as 1949 and dominated the country's pharmaceutical industry. Few, though, were conducting drug development locally. Peter Evans wrote about the denationalization of the pharmaceutical sector and questioned why "multinationals [were] reluctant to engage in technologically innovative

activities...even in the favorable investment climate of Brazil in the late sixties” (1979). The government reacted to the country’s lack of innovative ability in drug making, and the lack of technology transfer generally, by repealing laws allowing drug patents.

Banning patents on pharmaceuticals and foodstuffs was not a departure from global standards in 1969. The Paris Convention was the only international treaty that dealt with a country’s patenting practices; it allowed signatories great flexibility to craft domestic patent policies as each government wished. For example, exclusion of patent protection in some fields such as pharmaceuticals and chemicals was permissible, and the length of the patent monopoly and the breadth of patent rights conferred to the patent holder were left to the discretion of member states. The Paris Convention did address national treatment; signatories were obliged to grant foreign inventors the same rights and protections granted to local inventors. Differences between states’ IPR policies were not addressed.

The push for harmonizing the world’s patent laws did not get underway until the 1980s. The issue of misappropriation, basically theft of another’s invention or innovation, began to be seen as a problem needing resolution as trade in high-tech goods intensified. Up to this point, firms exporting to developing countries had relied on the lack of local know-how, poor domestic infrastructures, and weak manufacturing capacity as natural barriers to competition. But as developing countries gained the wherewithal to reverse engineer and then cheaply duplicate consumer electronics, drugs, and other high-tech goods, foreign businesses sought legal protection from a growing number of local competitors. Minimum standards of intellectual property protection, including limits of what a government could exclude from patent eligibility and mandatory terms of monopoly rights, would provide legal protection against local misappropriation. It would also substantially raise the rights most states granted to owners of intellectual property. After years of negotiations, the legal protections states conferred on IP were made uniform with the 1995 TRIPS Accord. All WTO members were required to meet the

minimum standards of protection set forth in the Accord. TRIPS served to harmonize the patent laws of trading states.

As a signatory to TRIPS, Brazil had come full circle in the legal protection it would allow pharmaceuticals. Deadlines for members to comply with TRIPS mandates were staggered in order to help developing countries prepare for and accomplish what would amount to a major overhaul of their IPR regimes. Brazil's cut-off date for reinstating drug patents was January 2000. In a surprising move, the Brazilian government reformed its IPR policy four years ahead of schedule and put in place a new patent law that exceeded TRIPS directives.² Legislation was passed despite considerable domestic opposition and the acknowledgement of significant short-term costs. In the ensuing years, however, Brazil has taken measures to mitigate the reform. That is, the country has begun to back down from its initial commitment to strengthen the legal protections available to intellectual property.

We return to the underlying theme of the case study: how does a country square its obligation to meet WTO directives, or more accurately here, TRIPS directives, with its desire to allay the domestic effects of policy reform? What comes *after* a country passes legislation in order to comply with international directives—especially when the policy reform is unpopular? Does the government adhere to the reform or does the government take actions that gradually weaken the reform to make it more palatable domestically? This case study sets out to explain why Brazil reformed patent laws ahead of the TRIPS deadline and above and beyond the agreement's mandates. The case study lists and describes instances where Brazil has strayed or backtracked from an initial commitment to IPR reform. Last, the case study puts forward a hypothesis to explain why IPR reform in Brazil has been unstable.

² Three compliance dates were established under TRIPS. For developed countries, compliance was set for January 1995. Developing countries were given until January 2000, and least developed countries until January 2007 (extended at Doha to 2016). Many developing countries, like Argentina and India, claimed least developed status to delay compliance for as long as possible. Since Brazil could have done the same, one could argue that Brazil reformed eleven years ahead of schedule (i.e., in 1996 instead of 2007).

Strategies for economic growth and development

Brazil has experimented with several growth and development strategies over the last 70 years. The most recent policy course was adopted in the mid 1980s and follows, by and large, the tenets of neoliberalism. State intervention in the economy was curbed, privatization of state-owned enterprises begun, and the domestic market reconnected to the global market. We write *reconnected* because the government had followed an open market model for the first half of the 20th century when the country depended on the export of primary goods, mainly coffee, cocoa, and cotton, for economic expansion. When commodity prices fell at the end of the 1920s at the onset of the depression, the consequences were disastrous for the Brazilian economy; the value of exports shrank from US\$446M in 1929 to \$181M in 1932. Afterward, the country turned inward, but the potentially damaging effects of unpredictable global business cycles on the Brazilian economy preoccupied policymakers for decades. For the next forty years most remained wary, if not hostile, to growth strategies based on integration into the world economy. This wariness partly explains why Brazil was one of the last countries in Latin America to abandon inward-oriented growth and development strategies.

The swing away from the global market and towards the country's vast internal market peaked in the 1950s and 1960s with Brazil's pursuit of Import Substitution Industrialization (ISI hereafter). The intended goal was to create a national industrial base that could produce locally what previously had been imported, thus stimulating the domestic economy. Overall, the goal was to fundamentally change the structure of the economy and move from commodity production to manufacturing, and then eventually to autarky. This would be accomplished by protecting the local market from foreign competition via the imposition of high tariffs, controlling and managing foreign direct investment, subsidizing and promoting critical industrial sectors, creating public enterprises in basic industries and public utilities, and last, establishing a development bank (Banco Nacional de Desenvolvimento Econômico, BNDE) for long-term capital lending. Erecting high trade barriers and using industry to drive growth were common strategies in the

developing world in the 1950s and 1960s, and Brazil, perhaps more than any other country, thrived under it.

Under ISI, Brazil's annual rate of growth was remarkable, averaging over 7% in the 1950s, over 6% in the 1960s, and nearly 9% in the seventies. The country's sectoral make up shifted away from agriculture and toward manufacturing and services (see Table 4.1). In the late 1940s, Brazil's weak industrial base was similar to that of Mexico, Argentina, and other less developed economies. With state support, during a forty year span Brazil experienced rapid industrialization, establishing and promoting a number of heavy manufacturing sectors including automobiles, cement, steel, aluminum, rubber, heavy machinery, and chemicals. In 1950, 80% of the country's exports were long-standing commodity products of coffee, sugar, cotton, and cocoa, and only 13% were manufactured goods. By 1992, the composition was nearly inverted with primary products comprising just 19.8% of total exports and manufacturing products accounting for two-thirds (Randall 1997).

TABLE 4.1: COMPOSITION OF GDP AND EMPLOYMENT, BRAZIL 1950 AND 1990

	GDP		Employment	
	1950	1990	1950	1990
AGRICULTURE	24.3%	9.3%	62%	23%
INDUSTRY	24.1%	34.2%	13%	23%
SERVICES	51.6%	56.5%	25%	54%

Source: Randall (1997).

Despite this success, ISI as a viable development model began to show strain as early as the 1960s though it did not lose widespread appeal until the 1980s. Some of the initial problems with import substitution development were attributed to state incompetence and inefficiency, common complaints with state-led growth. Considerable state resources (monetary and managerial) were necessary to sponsor the construction of new manufacturing plants and other

capital improvements, but the government's difficulty of picking "national champions" – that is, where or to whom to distribute state money – was often solved by corruption and favoritism. The weaknesses of ISI were reinforcing. State enterprises were not permitted to raise prices to reflect increases in the cost of inputs, which lead to deeper government subsidies to cover operating cost differences, which resulted in even greater inefficiencies. Bottlenecks in the production chain and shortages in supplies were common and not self-correcting. A ballooning public sector and generous pension system strained the national budget. And in the second half of 1982, the debt crisis hit.

Brazil borrowed heavily from international commercial banks during the 1970s, and it continued borrowing during the second oil crisis in 1979. The country's foreign debt rose from a little over US\$6B in 1973 to US\$54B in 1980, and then jumped to US\$87B in 1982, representing more than 30% of GDP.³ Most of the international borrowing had been done by state enterprises or by the state itself; 80% of the accumulated debt was sovereign. International bank loans had been issued with floating interest rates, so when US interest rates rose between 1978 and 1980, so too did Brazil's interest payments.⁴ As a consequence, between 1979 and 1982 most of Brazil's borrowing went to cover accrued interest on existing debt rather than to pay down principal or to invest in capital improvements or new industrial projects. Because these loans had to be repaid in foreign currency (75% of the loans were dominated in US dollars), Brazil's foreign reserves dwindled. The resulting currency depreciation led to high inflation. Raising foreign capital via trade was all but impossible as world commodity prices dipped and Brazil's export earnings declined precipitously. (The country's current account deficit grew from US\$1.7B in 1973 to

³ An overview of the 1980s debt crisis is available from the US Federal Deposit Insurance Company (FDIC). Their 1997 report, *An Examination of the Banking Crises of the 1980s and Early 1990s*, Volume 1, is available at http://www.fdic.gov/bank/historical/history/191_210.pdf.

⁴ The US interest rate on 3-month CDs in January 1979 was 10.96%, and rose steadily over the next two years, hitting 20.9% during the first week of December 1980. Regarding Brazil, determining the real interest rate charged on foreign loans during 1982 is difficult because rates were tied to the London Inter-Bank Offer Rate (LIBOR) plus a "spread" based on the market's perceived risk of loaning to the particular country. The LIBOR moved daily.

US\$12.8B in 1980.) All of these factors produced intractable and reoccurring financial crises during the 1980s

To say that the economic policy adopted by the government during the late 1980s and early 1990s was crisis-induced is to state the obvious. First, the government attempted to stimulate the expansion of exports and reduce imports in order to reverse the current account deficit and service the foreign debt. In 1982, debt payments outstripped export earnings by 20%, and by 1990, total foreign debt was nearly 4 times the value of Brazil's exports, declining slightly to 3.4 in 1994. Export growth, then, was one critical part of the economic recovery plan. The second was foreign direct investment which the government now actively encouraged both as a way to raise money for debt servicing and to avoid the inherent volatility of international borrowing. (International finance, moreover, dried up after 1982 – for a short time anyway.) In 1974, foreign lending to Brazil was two and half times the level of FDI and for the first time totaled more than official development assistance to the country. And commercial lending continued to outpace the rate of direct investment until the 1982 debt crisis.⁵ Though FDI was considered risky to the firms investing, the risk to the *host* country was minimal. What then explains Brazil's preference for commercial bank loans over FDI during the 1970s and early 1980s? The country's autarkic goal through ISI and restrictions on foreign firms operating in the domestic market partly explains it. But easy access to foreign money also played a role. Kindleberger asserts "multinational banks...practically forced money on [LDCs]" during the 1970s and early 80s (1989). Thus, the shift in policy away from ISI and toward openness

⁵ There were several reasons why foreign investors preferred bank lending to direct investment. Bank lending was short-term, leading investors to believe that the loans were relatively risk-free since the lender could pull out quickly should the financial environment sour and since most bankers dismissed any notion of government default. The risks associated with direct investment, on the other hand, were numerous: the firm could fail outright, volatile currency fluctuations could severely cut into repatriated profits, the host government could expropriate the business, and downturns in the global business cycle could "adversely affect many foreign owned businesses...especially those concentrated in the export sectors of LDCs." See Dodd, Randall (1989). "Risky Foundations of Development Finance." *Eastern Economics Association*. Baltimore, available at <http://www.financialpolicy.org/dodd1989.htm>.

(especially with respect to FDI) was radical for Brazil and a direct reaction to ongoing economic and financial crises.

TABLE 4.2: INDUSTRIAL POLICY IN BRAZIL

	1955-64	1964-1985	1985-1994	1995-2002
INDUSTRIAL POLICY INITIATIVE	ISI infrastructure (damns, highways); basic industry	ISI large-scale projects (financed by international bank loans); <i>Informatics Law</i>	heterodox stabilization* (raise foreign capital via opening financial market, privatization);	neoliberal reform (export promotion; privatization; opening of domestic market)
PRIMARY GOAL	interior development; shift from commodity production to industrial manufacturing	economic autonomy through autarky (big industrial projects, development of technology sectors)	recovery from the high inflation and slow growth of the "lost decade" (1980-1989); reverse current account imbalance	reduce capital flight by encouraging direct investment
GOVERNMENT	Juscelino Kubitschek (1955-1961) João Goulart (1961-1964)	<i>Military rule:</i> Branco (1964-67) Médici (1967-74) Geisel (1974-79) Figueiredo (1979-84)	Jose Sarney (1985-1990) Fernando Collor (1990-1992) Itamar Franco (1992-1994)	Fernando Cardoso (1995-2002)

*industrial policy indistinguishable from macroeconomic stability goals

Brazil's undertook the first phase of economic liberalization in 1985. While other countries had adopted market liberalization policies seemingly overnight, Brazil's liberalization was slow, sporadic, and unorthodox. The government pursued trade liberalization while also attempting to protect certain segments of the local market from foreign competition. Fiscal discipline, reordering public spending toward education and infrastructure, tax reform, and deregulation were either ignored or minimized. Privatization of state-owned firms was initiated slowly, and accelerated only later, during the mid-1990s.⁶ While industrial policy in Brazil from the 1950s to the 1980s focused on economic growth and industrialization, policymakers in the late 1980s and 1990s set as their main goals reversing the balance of payment crisis and battling

⁶ During the 1990s, privatization in Brazil brought in approximately US\$100B, and foreign buyers accounted for 44% of the shares bought. The state-owned mining firm Companhia Vale do Rio Doce, telecommunications monopoly Telebrás, state banks, public utility Electrobrás, and the country's ports were among the businesses privatized in 1997 alone.

inflation – in other words, industrial policy was indistinguishable from macroeconomic stability goals throughout most of the 1990s. Brazil's promotion of inward foreign direct investment, and IPR reform in 1996 which policymakers hoped would attract FDI, must be viewed with the state's economic situation and its plans for recovery in mind.⁷

Despite the government's heterodox approach to first phase liberalization, and its protracted resistance to changing national patent laws, Brazil nonetheless enacted IPR reform unreservedly in 1996 several years before the TRIPS deadline. Given the economic problems the country faced, one motivation for adopting a new IP regime was to attract FDI. But this does not explain why the government waited ten years before overhauling IPR laws; the push for IFDI had begun in earnest in 1985. Nor does it explain why the new policy conferred tighter protections than what was mandated by TRIPS. Strong patent protection is supposed to foster the development of prosperous IP-intensive industries. Therefore, one would expect support for reform from Brazil's high-tech sectors. We investigate this claim in the next section.

⁷ As proof of Brazil's commitment to foreign direct investment, the Brazilian Constitution was amended on August 15, 1995 (Amendment Number 6) prohibiting discrimination against foreign enterprises.

Science, technology, and industry

Industrial sectors whose competitive advantage lies in intangible assets, like specific knowledge or specialized expertise, want to safeguard those assets from misappropriation. The usual example given is the pharmaceutical industry. The cost of the ingredients, inert and active, of a certain drug formula may add up to pennies, but the cost to discover the drug formula itself is often in the hundreds of millions of dollars. Protecting the fruits of that discovery can be problematic since others can identify the active ingredients in the formula and duplicate the drug without having to pay the research costs. Creating the layout design for an integrated circuit requires significant investment, but the design itself can be appropriated and used at no cost to fabricate copies of the chip. In both examples, the final result of expensive and labor intensive R&D is easily pilfered by others. For this reason, firms in high-tech industrial sectors, commonly called IP-intensive firms, will favor laws that protect intangible assets. In Brazil, then, high-tech sectors should have favored IPR reform, but few of them did. What follows is a brief sketch of the industrial sectors most affected by the new IP policy: pharmaceuticals, microelectronics, and software. Our aim is to understand why domestic high-tech firms did not support patent reform.

PHARMACEUTICALS

The Brazilian pharmaceutical market, at nearly US\$8 billion, is the 7th largest in the world. Seventy-five percent of the domestic drug market is controlled by foreign firms, with 22% of sales accruing to American companies. Imports now account for a quarter of all sales, a rate that doubled between 1995 and 2000. Over the same time period, sales volume steadily decreased, a fact most industry experts attribute to increases in unit drug prices post-reform as well as unfavorable economic conditions in the country. There are approximately 600 private and public pharmaceutical firms in the country; of these, 80 are subsidiaries of MNCs. The industry is dominated by foreign firms and a substantial, and growing, percentage of local demand is met through importation.

TABLE 4.3: BRAZILIAN PHARMACEUTICAL MARKET PROFILE

IN US\$ BILLIONS	1995	1996	1997	1998	1999	2000
GROSS SALES	8.27	9.69	10.35	10.31	7.61	7.48
% CHG FROM PREVIOUS YEAR	33.8	17.2	6.8	-0.4	-26.2	-1.7
VOLUME SALES (BILLION UNITS)	1.77	1.82	1.74	1.65	1.60	1.47
% CHG FROM PREVIOUS YEAR	16.4	2.8	-4.4	-5.2	-3.1	-8.1
IMPORTS US\$M	1,027.4	1,324.4	1,468.7	1,615.9	1,936.7	n/a
EXPORTS US\$M	141.2	151.8	177.4	209.7	236.9	n/a

Source: *Espicom Business Intelligence, 2001 and 2002.*

Despite the large number of drug laboratories, the Brazilian pharmaceutical market has been and still is relatively concentrated with a handful of large manufacturers dominating the market. In the 1980s, eight firms accounted for 64% of sales. Drug discovery activity in the country is minimal despite the presence of large firms. Apart from the efforts conducted at public laboratories and universities, the innovation base is unimpressive. Little research and development is undertaken locally by MNCs, certainly nothing that is commensurate with the magnitude of their sales. The comparatively smaller national firms also shun R&D presumably because drug discovery requires huge capital investments, which are out of reach for most of these firms. Instead, national firms up until patent reform thrived on copying and mass producing the branded drugs of their foreign competitors.

The Brazilian government did not target the pharmaceutical industry for development during ISI, as it did microelectronics and chemicals. Though concern surfaced as early as the 1960s about the diminishing market share of national firms and the dearth of local drug innovation, the coordinated government response was limited in 1969 to revoking the patent protection given to (mainly) foreign multinational firms. Perhaps the government saw the sector as a lost cause in terms of its promise of reaching world production and innovation standards, while optimism remained about the potential of the chemicals and microelectronics sectors. It may also be the case that pharmaceuticals did not have the forward linkages necessary for prolific input to overall national productivity and growth. Whatever the reason, the government's

decision to bypass pharmaceuticals as a key domestic industry to be supported and cultivated meant that foreign firms could continue to supply the local market without restriction. Given that Brazil represented two-thirds of the rapidly growing Latin American market, MNCs were eager to dominate the Brazilian market.

National firms contending with strong foreign competition followed an unsurprising business strategy: concentrate on product marketing rather than product innovation. Copy and manufacture branded drugs. And follow an industrial development model of producing for the internal market. Given this strategy, domestic firms would have two reasons to object to the reintroduction of pharmaceutical patents. First, lacking the practice of drug discovery and development, local firms would have little to gain by new patent rights. And second, patent protection would eliminate a main aspect of their business strategy: imitation.

MICROELECTRONICS

Unlike the pharmaceutical sector, the government through a succession of industrial policies targeted electronics, especially microelectronics, for development. This began with the creation of the federal government's Enterprise for Computer Services in 1970 for the manufacture of computer hardware, and has culminated in the Brazilian National Microelectronics Plan (PNM) initiated in 2000. Throughout the 1980s, the country pursued a set of policies called the Reserva de Informática, essentially a comprehensive framework aimed at building up Brazil's computer sector by protecting every portion of it from foreign competition (Araujo 2002). The National Informatics Policy introduced in 1981 put in place limits on the use of imported parts in computers. Later, a "nationalization index" was established with local content requirements ranging from 80% to 95%. National buying policies were adopted to stimulate internal demand and "market reservation" strictly regulated FDI (Correa 1989).⁸ Cut off from international trade, Brazil still produced for the largest microelectronics market in the

⁸ The market reserve system aimed to decrease technological dependency and was in place from 1978 through October 1992. It was supported by partnerships between local firms and MNC producers.

developing world, and the country became a major semiconductor producer by the mid-1980s even though it represented a mere 1% of world production. If the primary goal of the Reserva de Informática was to establish domestic firm market presence, the policy was a success. By 1989 national firms comprised more than half of the Brazilian market, up from 36% in 1980.

TABLE 4.4: MAJOR PRODUCERS OF SEMICONDUCTORS 1986 (IN US\$ MILLIONS)

1	United States	14.900
2	Japan	12.770
3	Korea	1.905
4	Singapore	1.679
5	Malaysia	1.544
6	Germany	1.332
7	France	1.245
8	Philippines	1.103
9	United Kingdom	1.013
10	Taiwan	941
11	Netherlands	572
12	Italy	484
13	Brazil	418

Source: Mackintosh Yearbook, Electronics Data 1987, cited in UNIDO's Developments in the field of informatics in selected developing countries, 1989.

The industry had, in a sense, the best of all worlds. It was heavily subsidized, its market protected from foreign competition, and because of minimal contact with overseas markets it did not have to heed to global productivity standards. The downside was that “industrialized countries led the innovation process and controlled the marketing and distribution channels for the export of informatics [making] the development of informatics not only technologically, but also commercially dependent” on foreign firms (Correa 1989). This was to prove disastrous when the local market was open to foreign competition in the mid 1990s. Twenty Brazilian firms were manufacturing semiconductors in the late 1980s, but after liberalization nearly all of these firms had been driven out of the market by foreign competitors. The few remaining met just 20% of local demand.

In 2000, the Ministry of Science and Technology (MCT) put together a new industrial strategy, the National Microelectronics Plan (PNM), aimed at reinvigorating the sector. With previous industrial policies, a derivative aim was precipitating the development of downstream sectors. Now microelectronics, and semiconductors especially, were selected as critical sectors not only for the linkages to other industries but also because the sector was the second largest contributor to country's trade deficit, US\$1.8B in 2001 alone. The twin industrial development goals were to be market share and exportation. Important technological changes in the field made the policy goal feasible.

Semiconductors are manufactured in four distinct phases: design, foundry or fabrication, back end, and testing.⁹ Until recently, these four phases of the production process were performed by a single, vertically integrated firm. The industry is now essentially disaggregated, meaning the production phases have been split apart and are being performed by different firms. The high capital costs of chip fabrication are no longer a barrier to semiconductor manufacturing because new firms can enter other phases of the production process, such as design and testing, which require minimal capital investments. The design phase, moreover, has the highest value-added making it particularly attractive to new entrants. It is this piece of the production process, the design phase, in which Brazil plans to establish a global presence.

The creation of Design Houses (DMs) capable of competing in the international chip design market is the main goal of Brazil's new microelectronics policy. The DMs will create IP cores or the block of logic or data that becomes the basis of an integrated circuit.¹⁰ In many countries, the IP core, the logic design itself, can be patented. In Brazil, legislation to extend

⁹ The first phase is the design layout of the microprocessors and other components on the chip itself. The second phase is the fabrication of the wafer. The third phase is the final piece of the production process including wafer backgrinding, wire bonding, x-ray inspection, etc. This is often referred to as the backend phase. Finally, the functionality of the semiconductor is tested in phase four.

¹⁰ There are proprietary rights as well in the fabrication process, but the IP core is the source of most of the patenting in microelectronics today.

patent protection to semiconductors was introduced at the same time as the general patent reform (1996), but the IC bill has languished in the Congress for seven years.¹¹

We suggested in Chapter 2 that the push for patent reform came from foreign IP intensive firms operating within Brazil or exporting to the country. Foreign semiconductor firms did not lobby for the IC bill with the intensity that multinational drug companies lobbied for patent reform even though national semiconductor firms had gained significant market share by the late 1980s. There were several reasons for the difference. First, natural barriers to entry protected the most technologically advanced chip manufacturers from local competitors. Second, local firms, under the framework of the 1980s National Informatics Plan which mandated nationalization indexes for computers, were handed a steady stream of customers. Brazilian computer manufacturers were largely prohibited from importing or purchasing component parts from foreign subsidiaries. And last, national firms produced for the internal market while the foreign subsidiaries handled exports. The technologically advanced multinational had the better incentive to protect their product and processes from misappropriation, but as national firms were supplying an effectively different customer base, IP protection was not deemed vital.

A renewed push for IP protection for semiconductors is being assumed today, not by MNCs, but by Brazilian firms and policymakers in the MCT who see the national benefits of protecting IC designs. This shift in opinion of the importance of IPR provides some empirical support to the notion that at the least a minimal innovative base must be present to provoke local support of strong IPR.

SOFTWARE

Informatics is the term used in Brazil to denote computer hardware, software, and support services. Accordingly, the National Informatics Plan adopted in the 1980s should have aimed at growing the domestic software industry as well as computer hardware. Software, however, was

¹¹ It is common for integrated circuits (ICs) or semiconductors to have sui generis protection and be covered under a separate IPR policy. Monopoly rights for ICs are normally of shorter duration.

treated as an “accessory” and mainly ignored while the hardware sector, thought to be key to turning around the Brazilian economy, was targeted for development (LaRovere and Goodman 1992; Duarte 2002). Throughout the 1980s, software imports were not prohibited per se though tariffs could run as high as 100%. Poor distribution channels in the country pushed software prices even higher. Consequently, “many chose to make pirated software copies” of operating systems and programs developed abroad (Duarte 1996). The Brazilian software market in 1987 was estimated at US\$700 million, and even with the high price of imports, 75% of the market was provided for by foreign firms.

The local software sector was weak, both in market presence and in innovation. This has been blamed variously on the shortage of qualified programmers, poor domestic computing infrastructures,¹² and a lack of support from the federal government in terms of research and educational funds. It may also be the case that the country’s closed market policy which forced Brazilians to buy locally produced, and technologically inferior, computers and peripherals rather than the more advanced products available on the global market, had a deleterious affect on the development of the national software industry.¹³

When the market reserve policy on informatics was lifted in 1992, the MCT worked with industry and university software researchers to develop, at last, a strategic plan for the software sector. Like the industrial goal set down for semiconductor design houses exporting IP cores or layout designs, exportation of software and services was the primary aim. Here again the government concentrated on industrial segments requiring low capital investment with high

¹² Internet Service Providers (ISPs) and portals did not begin operating in the country until 1996.

¹³ LaRovere and Goodman (1992) wrote that the National Institute for Amazon Research (INPA), the largest scientific research center in Amazonas, “pressured to buy Brazilian...purchased an expensive [locally produced] Cobra minicomputer [which] stopped working soon after purchase and has been inoperable ever since. This was the main computer at INPA.” It would be difficult to imagine a thriving, innovative software industry when the computer hardware sector was still plagued by operational problems.

value-added.¹⁴ The industrial policy however has had only modest success, but regardless of this, it came too late to foster strong local support for reform.

There are several important parallels between the software and pharmaceutical sectors in terms of foreign market presence and protection of intellectual property that should be made explicit. In the early 1990s, three-quarters of the local market in both sectors was controlled by foreign firms. Neither sector had a strong tradition of innovation; little money was allocated to R&D. Though the large umbrella sectors with which the two were associated, chemicals in the case of pharmaceuticals and computers and electronics in the case of software, received direct support or protection from the government, drugs and software were seen as ancillary segments of their parent industries. Intellectual property in pharmaceuticals and software could be easily appropriated and piracy rates were high. The Business Software Alliance (BSA), an international business association, claimed that 68% of the software in use in Brazil in 1996 had been illegally copied, and domestic drug firms had prospered by copying branded drugs.¹⁵ The two sectors had large trade deficits. National firms in both sectors shunned IPR reform; in fact, local drug firms lobbied vehemently against it. Foreign drug and software firms, on the other hand, played pivotal roles in pushing the reform through Congress. The two industries split along one common fault line, the line separating national from foreign firms.

SCIENCE AND TECHNOLOGY

A number of theories about IPR and economic development contend that in order to benefit from a strong national patent system a country needs to have achieved a certain level of

¹⁴ The explicit goal of the plan, named the National Program for Software Export (Softex), was quite ambitious: Brazilian firms were to capture 1% or \$2 billion of the \$200 billion global software market by 2000. This would be an enormous leap from the \$800,000 of software Brazil exported in 1992. Actual figures for 2000 summed to \$50 million, a 60 fold dollar increase in software exports over 1992 but far short of the \$2 billion goal. In the same year, Brazil imported \$2.5 billion of software, four-fifths of it from the United States.

¹⁵ Software piracy rates are estimated and published annually in BSA's *The Global Piracy Report*. We consulted the 2002 report which can be obtained online at <http://www.bsa.org/usa/policyres/admin/2002-06-10.130.pdf>.

maturation in science and technology (Frischtak 1995). These arguments in essence flip the causal relationship often put forward by economists, namely, that protection of property rights, including intellectual property, is a *precondition* of development. The purpose of presenting information on science and technology in Brazil is not to enter this dispute, but to concede that a country's current state of innovative development may be a contributing factor explaining why support for strengthening IP protection is either present or absent. To make explicit the assumption, in countries with advanced innovative systems the public would more likely have a favorable attitude towards IPR because technology is homegrown rather than imported. Conversely the opposite would hold in countries still developing a technological base because the bulk of activity would lie in imitation, acquiring know-how, and importing advanced capital goods. Levels of science and technology are commonly estimated by noting the country's spending on research and development, the propensity to patent, and the specifics of a national technology policy.

Brazil spends less than 1% of GDP on research and development, far less than advanced industrialized countries and far less than Korea. Seventy-five percent of the funding for R&D comes from the government; only 20% is supplied by private business. By comparison, the US government provides 40% of R&D funding, and in Korea, 25%. Most of the R&D conducted in Brazil is performed at public universities and national laboratories, though a number of subnational research centers established in the 1970s continue to contribute significantly to the country's scientific production.¹⁶ National laboratories tend to concentrate on particular technology fields, for example, in the areas of space research or agriculture. There is little interaction between state research centers and industry, thus quenching the commercialization promise of technical innovations discovered at public labs.

¹⁶ Examples of substate R&D centers are Cetec in Minas Gerais, Ceped in Bahia, Cientec in Rio Grande do Sul, Itep in Pernambuco, etc. One of the most well-known state laboratories, Far-Manguinhos, under the Brazilian Ministry of Health, gained celebrity recently when the government commissioned it to duplicate and produce generic versions of AIDS antiretroviral medications.

TABLE 4.5: R&D EXPENDITURES AS PERCENTAGE OF GROSS NATIONAL INCOME

R&D AS % OF GNP	1989-2000
BRAZIL	0.77
ARGENTINA	0.48
CHILE	0.56
MEXICO	0.36
KOREA	2.70
US	2.55

Source: *Brazilian Ministry of Science and Technology, UNESCO, and US National Science Foundation.*

Brazil's propensity to patent has remained static over the long term, another indication of an incapacity to commercialize inventions or to create a rich national innovative base. In the decade prior to IPR reform, the average number of patents awarded each year decreased from 3,900 to 2,670, a decline of roughly 30%.¹⁷ Despite unexplained jumps in patenting in certain years, the volume of patents has remained relatively constant for sixty years. Approximately 2,000 patents were conferred by the government each year in the late 1930s, and in the late 1990s, the number was 2,540.¹⁸ The composition of patent holders also suggests an immature national innovation system. A survey of domestic patenting activity from 1980 to 1995 noted a significant number of resident patents awarded to individual Brazilian inventors (Motta e Albuquerque 2000). Typically, in technologically advanced countries, firms not individuals do the majority of patenting. During the entire fifteen year span of the survey, 62% of the firms received just one patent; only 35 firms obtained at least one patent per year. Comparisons between patenting in Brazil and patenting in the US by Brazilian firms including subsidiaries of MNCs, revealed a "predominance of adaptive innovations" by the foreign firms. In other words, it was not cutting edge research being done in the host country, but research directed at adapting a product or process to the local Brazilian environment.

¹⁷ In years 1984-86, the INPI granted 4848, 3934, and 2935 patents respectively; for 1993-95 the totals were 2649, 2469, and 2896. Data from the Brazilian patent office.

¹⁸ The exact numbers are 1975 in 1937, 2221 in 1938, and 2146 in 1939. Data from *Anuário Estatístico do Brasil*, 1939/1940, Instituto Brasileiro de Geografia e Estatística. For years 1997, 1998, and 1999, patent totals were 1615, 2801, and 3202 respectively. Recent patent data obtained directly from the INPI.

The weak innovative base is due neither to governmental indifference nor inattention. As part of an evolving national science and technology development strategy, several institutions were created in the 1950s to facilitate the country's innovative capacity.¹⁹ Initially, Brazil concentrated on funding R&D, via the National Council for Scientific and Technological Development (CNPq),²⁰ and graduate fellowships at public universities, via the Campaign for the Advanced Training of University-level personnel (CAPES). In the 1960s, the government established the National Bank for Economic Development (BNDES) and the Studies and Projects Financing Entity (FINEP) to support technological research in the country's nascent industrial base. The National System for Scientific and Technological Development (SNDCT) was formed in 1974 to concentrate on the scientific component of economic development.

This short, partial list illustrates the government's efforts to stimulate the development of a scientific and technological base in Brazil. Two weaknesses with this strategy became apparent in the 1980s and 1990s. First, the economic crises in the 1980s had the effect not only of diverting the government's focus away from science and technology issues, but also of reducing the discretionary funds available to support research. Coutinho (2000) has claimed that "the gradual dismantling of subsystems of innovation of major state-owned technological centers (aeronautical and defense, the nuclear program, IT and telecom)" in the early 1980s had detrimental effects on innovative capacity in the country (p518). Second, the attention the government gave to public research contributed to the indifference towards innovation displayed by domestic firms protected from foreign competition. Despite the efforts of agencies like the BNED, private firms had been conditioned by ISI to import, not create, technology.²¹ Publicly

¹⁹ Material in this paragraph was obtained from the Brazilian Embassy in London.

²⁰ The National Council for Scientific and Technological Development or CNPq is the research arm of the Ministry of Science and Technology (MCT). It is the Brazilian equivalent of the National Science Foundation in the United States.

²¹ The government did try to boost private R&D investment using fiscal incentives introduced in the 1993 Program for Technological Capability Building (PCT). Some scholars have maintained the program was largely irrelevant since macroeconomic factors, especially in the early 1990s, were what determined firm success.

funded research since it was tied to universities was directed more towards basic science than industrial innovation. And the business community itself, largely alienated from the government and policymaking generally, was reluctant to accept the risks R&D and innovative activity presented especially with uncertainty over the future direction of national policy. Though the government of Brazil pursued a plan for developing science and technology, the emphasis on public research in basic science, the protection of domestic industry, and the endorsement of trade to acquire technology had the effect of dampening any motivation local industry had to innovate on its own.

POLITICAL INFLUENCE OF BUSINESS

Brazil's high-tech industries had little to gain, and in some cases much to lose, if the country's patent laws were reformed. The pharmaceutical sector, correctly seeing a disruption to their livelihood, was hostile to the idea. The local software industry was weak and saw little benefit from new IP laws. Academia was nearly unanimously against IPR reform citing the backward state of innovation in the country and the need to first lift Brazil's science and technology closer to developed country standards. Though their opposition was rigorous, industry, academia, and the scientific community were unable to stop or delay passage of patent reform until the WTO deadline in 2000. Nor were they able to thwart a patent code crafted to surpass TRIPS mandates.

One reason was that Brazil's IP-intensive industries lacked the political influence similar industries enjoyed in advanced industrialized countries. Differences in political influence in the 1990s could be traced to the winners and losers of past development strategies. ISI had targeted steel, energy, machinery, utilities, and electronics, and ignored pharmaceuticals. As a result, national firms controlled the heavier industries; foreign firms dominated the drug sector which further weakened the political power of national firms already sidelined by the state. Hirschman (1968) noted early on that the lack of political influence of some business groups was "explained

by the *kind* of industries most characteristic of first phase ISI...opinions of pharmaceutical industry are unlikely to command as much attention as those of steel and machinery manufacture (emphasis in original).” This early difference in influence had a lasting effect.²²

We should underline that IP-intensive sectors were *comparatively* weaker in influence since politically influential industries did not always have the government’s ear. Hirschman also claimed, for example, that “industrial interests do not wield in Latin America the political influence and social prestige which have been theirs in older industrial countries...” (p426). More recently, Peter Kingstone (1998) wrote on the frayed business-government relations in Brazil which he argued grew out of distortions introduced by ISI. Three things were going on. First, the business community had effectively fragmented between “those who had benefited from ISI and continue to reap rewards or suffer costs” (p91). This foiled consensus and any unified effort to affect the direction of national policy. Second, the political structure itself made collective action by business particularly difficult and costly. There were 19 political parties represented in Congress in the mid-1990s, and the new Constitution pushed power away from Brasilia and towards the states. Often, the potential benefits gained from lobbying did not justify the costs. Third, the state had been able to circumscribe business’s input to national policy by creating institutional obstacles which took form in the country’s corporatist system.²³ Brazil’s political environment served to diminish the influence of local business on national policymaking.

²² The long term effects of ISI are also apparent in a sector’s capacity to innovate, and, one can presume, the sector’s potential to reap benefits from patent reform. For example, investment in the machinery sector, a major patenting sector, declined throughout the 1980s, from an astonishing 24% of GDP at the end of the 1970s to 15% by the early 1990s. Motta e Albuquerque (2000, p1053-4) noted a precipitous drop in the rate of patenting over the same time period. “Machinery, the leading patenting sector, displays a declining trend. It begins the series with 309 patents out of 2179 (22.6%) and ends with 201 out of 1562 patents (12.9%).”

²³ See Kingstone’s excellent discussion of the state’s use of corporatism to sideline industry. Another scholar has written extensively on the issue claiming “the persistence of traditional corporatist structures [in Brazil] ...deterred the build-up of modern systems of interest representation.” Quote from Meyer-Stamer, Jörg (1997). “New Patterns of Governance for Industrial Change: Perspectives for Brazil.” *Journal of Development Studies* 33 (3): 364- 91.

Another reason why domestic interest groups failed to slow or modify patent reform was that industry, academia, and the scientific community presented conflicting arguments against the new policy. Deep distrust between industry and academia precluded the two from joining forces and devising a coherent and cohesive dissent that might have proven mobilizing for the general public. Industry tended to focus on the effect reform would have on the viability of local firms, whereas the academy voiced concern over the possible negative impacts on university research and the overall state of science in the country. The antagonism between academia and industry also prevented the kind of collegial research work that had proven so profitable in developed countries.²⁴ Had an alliance existed, the combined forces of business and university may have indeed affected the scope of the new law.²⁵

Our objective in this section was to explain why high-tech industry in Brazil was hostile, or at best indifferent, to strengthening the national patent regime. We looked at domestic technological capability and the extent of foreign presence in IP-intensive industries. Federal policy aimed at developing these sectors was considered to see if industrial policy practices had predisposed these sectors against reform. Given the positive correlation between the maturity of science and technology and high protection of IPR, we used commonly accepted measures to describe the current state of technological know-how in Brazil. In sum, due to the primitive state of innovation in these industries, domestic support for reform was virtually nonexistent. With the purpose of identifying the impetus for the new law, we turn next to the process of reform.

²⁴ The rivalry was understandable. Industry saw academia as incapable of producing world-class R&D. The *Gazeta Mercantil* on May 7, 2002, reported that “of the 22,000 patent applications received by the [Brazilian patent office, INPI] in 2000 only 0.2% came from universities.” In the US, universities account for nearly 5% of patents obtained by nationals, up from 0.5% in the early 1980s (the change may be due to the Bayh-Dole Act of 1980 which permitted universities to obtain patents on inventions developed under governmental funding). In Brazil, the government tended to favor university research over industry research, contributing to industry’s resentment of the academy. One industrialist claimed that “in this country, basic sciences get much more funding than microelectronics, an amazing distortion for a country that urgently needs industrial innovation.” See Araujo, Guido (2002). “The Brazil IP Network.” Brazil IP. 2002.

²⁵ Though according to recent scholarly work, even well-organized opposition to IPR reform may not have averted adoption of the new law. Recent empirical findings show “that the discernible effects of economic interests on policy are surprisingly small.” See Geddes, Barbara (1995). “The Politics of Economic Liberalization.” *Latin American Research Review* 30 (2): 195-214.

The Process of IPR Reform

The US government forged a tenacious global campaign to increase awareness of IPR issues after being convinced by domestic industry groups that piracy of intellectual property was having a deleterious effect on American productivity and trade. In 1985, few countries conferred patent protection on pharmaceuticals, computer chip design, or software, industries believed to be critical to preserving or restoring American technological superiority. The US wanted patent coverage broadened in other countries to ward off theft of American ingenuity in these high-tech sectors. The campaign began with talks between the US and the UN's World Intellectual Property Organization (WIPO), which administers international patent and copyright treaties. These treaties lay out the minimum standards signatories agreed to abide by, the most important of which is according foreign inventors and authors the same rights and protections accorded to nationals. For the most part, member countries were allowed to formulate their domestic policies as they wished. WIPO expressed no interest in altering its existing international agreements.

Frustrated by the lack of responsiveness from WIPO, the US began to pressure countries deemed most recalcitrant in their disregard for patents, copyrights, and other legal measures for protecting ideas and inventions. The goal was to force singled-out countries to enact new laws to tighten and expand IPR. Ultimately, this meant having these countries adjust domestic policy to permit the patenting of drug and foodstuff products and processes, proscribe the copying and selling of branded goods, increase the duration of patent protection, and enforce patent laws. Brazil, with its lax IPR standards, was so singled out.

The tools the US government had at its disposal were drawn from the 1988 Omnibus Trade and Competitiveness Act. Parts of the trade bill dealt with the behavior of foreign governments in their own domestic market, behavior judged injurious to American firms doing business there, and tasked the US Trade Representative with compiling annual reports identifying the miscreant governments. Section 182, or in the parlance of trade law, "Special 301," addressed IPR infractions, and Brazil, Korea, India, Taiwan, and Thailand were among the group

of priority countries named in the first USTR report issued in 1989.²⁶ Priority listing carried no automatic penalty, but public listing as such gave the USTR authority to impose punitive trade sanctions to compel changes in foreign governments' IPR policy. It should be noted here that the subject of intellectual property was not yet addressed in any international trade agreement, and Special 301 represented the first formal attempt to link IPR to trade.

Special 301 proved to be an effectual tool in some cases. At times, priority listing and its inherent threat of trade sanctions was incentive enough to induce other countries to behave as the US wanted them to. Korea bowed to 301 pressure and reformed domestic IPR policy, as did Taiwan. Brazil did not.

The American government's heavy-handedness with Brazil did little to coerce a change in patent laws; in fact, it may have slowed the reform process considerably. The US broached the issue of IPR with a mildly receptive Brazil in bilateral talks during the summer of 1987, and in early 1988 cables between the American Embassy in Brazil and the State Department indicated that a public relations and lobbying campaign in favor of drug patents was underway in the country. The US kept up the pressure. Though President Sarney's administration was only mildly supportive of the reform, a draft bill prepared by the Brazilian IP Association was introduced to the Brazilian Congress in late spring 1988. Any initial support for the draft however wilted in reaction to threats from the United States about what would happen if the bill did not pass.²⁷ When Congressional action came to a standstill, the US responded. In October 1988, acting under Special 301 authority, President Reagan doubled tariffs on Brazilian paper

²⁶ Brazil has landed on the USTR watch list every year from 1989 to 1996, except for 1995 (the year prior to reform), for inadequate IP protection. Interestingly, the US government couched its complaint against Brazil in concern for the country's "bleak" prospects for innovative activity without implementing adequate IPR. Carla Hills, USTR at the time, stated that Brazil should reform "because it is in the best interest of its own citizens, it will fuel the creativities of its own entrepreneurs, and it will provide a welcome climate for investment from abroad, which will bring in technology." It is difficult to say whether her comment was intended more to placate US MNCs frustrated at Brazil's lack of action, or whether it was imprudent attempt to sway Brazilian policymakers. See Lewis, Theresa Beeby (1996). "Patent Protection for the Pharmaceutical Industry: A Survey of the Patent Laws of Various Countries." *The International Lawyer* 30 (4): 835-865. For quote, see page 860.

²⁷ See Bruce Rubenstein, "Latin America slow to protect patents," *Intellectual Property*, March 1996.

products, non-benzenoid drugs, and consumer electronics items, \$39M of Brazilian exports for the US.²⁸ Brazil ignored IPR reform for the next three years.

In 1990, President Fernando Collor de Mello, elected on a promise to revitalize the economy, began a radical, although uneven, move to open the Brazilian market to competition. He also took an ambitious position on IPR reform. In June of 1991, Collor presented the Chamber of Deputies with bill 824/91 for a new intellectual property code that would extend patent protection to pharmaceutical products and processes, one of the main points of discord with the North.²⁹ The US government praised the government's step towards IPR reform and, opting this time for the carrot, immediately lifted the retaliatory duties imposed in 1988.³⁰ Some of the more controversial parts of the Brazilian bill, such as coverage for foreign-patented products (or pipeline protection) and protection for microorganisms, slowed the approval process in the Chamber of Deputies. The bill finally passed the Chamber in June 1993. Domestic reaction to the bill was nearly unanimously negative, and the draft bill stalled in the Senate.

Arguments against IPR reform tended to cluster around two claims, one advanced by academics and one put forward by local firms. Professors and other researchers working at Brazilian universities claimed that tighter IPR would "put university research at a serious disadvantage in the race to develop new processes and products." In fact, academicians were credited with preventing the extension of patent rights to plants or organisms in the 1993 draft. The Catholic Church was also an outspoken critic of patent protection for living organisms. The main worry expressed was that Brazil's rich biodiversity, which presented a potential goldmine to pharmaceutical researchers, would be exploited by foreign drug companies eager to take ownership of plant species. Once Brazil's pharmaceutical research industry caught up with

²⁸ *US Federal Registry* 53FR41551.

²⁹ See Theodoro Araujo, "Industrial property: Brazil seeks to erase black marks," *International Corporate Law*, May 1993.

³⁰ USTR Proclamation No.5885. Brazil was the only country the US imposed trade retaliation under Section 301. See Sell, Susan (1998). *Power and Ideas: North-South Politics of Intellectual Property and Antitrust*. NY, State University of New York. See p190.

American or European drug technology, so the argument went, it would be too late. Brazilian researchers would be locked out of their own domestic natural resources. Domestic industry had slightly different concerns. Having thrived by copying foreign-produced, branded drugs, most feared being forced out of business if the new bill became law.

The reaction to the Chamber of Deputies bill was unfavorable outside of the country as well. Foreign interests did not believe the draft went far enough. Multinational drug firms viewed it as a watered-down reform effort, and they criticized it as “falling far short of the mark.” Their biggest complaint was that 85% of the foreign-produced drugs then sitting on pharmacy shelves would not be protected from copying, and that “another 1500 items not yet available in Brazil but granted patents abroad [would be] ineligible for protection.” The pipeline restrictions limiting what products qualified for patent coverage most provoked American MNCs.

Any political support the bill had at the beginning of the legislative process evaporated, and Congress abandoned the issue altogether. Another three years lapsed before IPR reform was seriously raised again. In the ensuing years, Brazil continued to land on the USTR’s watch lists for inadequate domestic intellectual property rights.

For nearly a decade, the US government, as the *demandeur*, used both carrots and sticks in an unsuccessful attempt to coerce policy change in Brazil. It was this failure of unilateral action, and the piecemeal approach generally that yielded meager victories, which strengthened US resolve to fashion IPR as an issue of international trade. In other words, what worked with Korea and Taiwan, did nothing to produce policy change in Brazil or India. And the USTR, even with the daunting tools available to it under Special 301, could not be assured of bringing about reform in the formal policies of foreign governments. The GATT however could provide this assurance; policy reform in its signatory countries would be mandatory. For this reason, the US focused its attention on getting the issue of patent, copyright, and trademark protection accepted as an aspect of international trade. Once this linkage between IPR and trade was made, the US government could use the enforcement mechanisms of the world trade institution to compel

foreign governments to tighten their domestic patent laws. American negotiators pushed the matter at the Uruguay Round, finally gaining concurrence from their largest trade allies. When the WTO was created in 1994, membership in the trade organization obliged compliance with its sibling agreements – one of which was the Trade Related Aspects of Intellectual Property or TRIPS treaty. Patent protection had been formally coupled with trade.³¹

MNCs IN BRAZILIAN POLITICS

Up to now we have downplayed the role of American industry in moving IPR to center stage, both at the USTR and at GATT. But its role was crucial. Beginning in the late 1970s, US firms began to press their case for raising intellectual property standards around the world. Industry's initial strategy was aimed at persuading officials in the US government and in international institutions, such as WIPO and the World Bank, that strong IPR policies played an important role in greasing the wheels of international commerce. When persuasion failed, American industry took a direct approach. Working through the federal Advisory Committee on Trade and Policy Negotiations (ACTPN) in the early 1980s, American IP companies started to shape US trade policy via the USTR. Their most visible feat was the inclusion of IPR in the new trade law, that is, Special 301, to advance patent protection in foreign markets.³²

Having succeeded in influencing the agenda of the USTR, American business continued on their mission with an eye towards GATT. In 1986, thirteen knowledge-based companies formed the Intellectual Property Committee (IPC) to monitor and lobby trade negotiators

³¹ Not all trade economists agreed with the conceptual basis for TRIPS. For example, Jagdish Bhagwati, a leading academic and free trade supporter, has stated emphatically that "IPR is not a trade issue. It's a royalty collection issue. It's pharmaceuticals and software throwing their weight around" See *New York Times*, August 13, 2002.

³² These sectors—electronics, software, pharmaceuticals, and entertainment—are important net exporters for the US economy. This explains their extraordinary ability to induce a massive shift in emphasis in US trade policy towards IPR. Moreover, these industries were particularly hard hit by pirating. *Business Week* reported that the software and pharmaceutical sectors lost \$9M and \$4M respectively in 1991. See Pearson, John; Smith, Geri, et al. (1992). "The Patent Pirates Are Finally Walking the Plank." *Business Week*, February 17.

participating in the Uruguay Round then underway.³³ The IPC recruited European and Japanese IP-intensive firms and their trade associations to assist with the lobbying effort.³⁴ When the main trade negotiations stalled for 21 months until the middle of 1988, the European Union of Industrial and Employers' Confederations (UNICE), the Keidanren, representing Japanese firms, and the IPC took advantage of the lull in talks to begin formulating the specifics of their vision of global protection of IP. Working together they produced a 100-page document entitled the "Basic Framework" to be used as a guide by their respective governments' trade negotiators. The document set down minimum standards of protection in six categories of intellectual property: patents, copyrights, semiconductor chips, trademarks, industrial designs and trade secrets (Santoro and Paine 1995, p11). It became the basis of the final TRIPS agreement in 1994.

US multinational firms also attempted to produce IPR reform in foreign countries directly, though their initial efforts in the first half of the 1980s could be characterized as more desultory than concerted. Perhaps these firms believed that pressure from the US trade representative or an international organization was more likely to induce a change in the policy in foreign countries, for until the early 1990s, American MNCs worked primarily through existing institutional fora. When the USTR had produced only patchy results and compliance with TRIPS for the most serious offender-countries was another 6 to 13 years off, US business decided to tackle lax IPR regimes head-on. The shift in approach was pronounced.

US firms, chiefly pharmaceutical companies but also software, the film and music industries, and semiconductor companies, began lobbying foreign governments directly without

³³ The IPC member companies were Pfizer, IBM, Merck, General Electric, Du Pont, Warner Communications, Hewlett-Packard, Bristol-Myers, FMC Corporation, General Motors, Johnson & Johnson, Monsanto, and Rockwell International.

³⁴ The IPC approached the two major business federations in Europe and Japan, the UNICE and Keidanren, each representing a wide spectrum of high-tech (and other) firms. Keidanren (Federation of Economic Organizations) has been called "the most influential peal business association in Japan." Highly influential, the federation of 120 industrial associations represents over 1000 Japanese enterprises. For a discussion of Keidanren's ability to steer trade policy, see Yoshimatsu, Hidetaka (1998). "Japan's Keidanren and Political Influences on Market Liberalization." *Asian Studies* 38 (3): 328-345.

the cover provided by the USTR or the WTO.³⁵ Their overall strategy was two fold. They targeted countries with weak patent protection in order to bring about reform. They also selected countries that might trigger similar reforms in neighboring countries. Their approach was aimed at forcing reform in specific markets *and leveraging the reform in one country to spur reform in other countries in the same region*. Brazil and Argentina were selected in Latin America for this reason. And as Brazil was the largest market in South America it became the initial target country. A vice president from Abbott Lab stated, “If we could solve our problems with those countries [Brazil and Argentina], the rest of the region would fall in line.” After their eventual success in Brazil, *Gazeta Mercantil* reported that the US pharmaceutical industry group PhRMA would “now turn its attention to Argentina.”³⁶

American MNCs employed several tactics in Brazil to achieve their strategic goals.³⁷

First, they fashioned IPR reform as a matter that principally benefited Brazil. Specifically, they maintained that raising patent protection would boost inward foreign direct investment, stimulate the Brazilian economy and advance economic development generally, spur domestic innovation, and prompt multinational drug companies to develop new products for the Brazilian market. Direct investment from IP intensive firms would earn the country special advantages; namely the transfer of critical technology and know-how in high-tech industries. Some drug companies, such as Pfizer, wrote reports extolling the rewards that would accrue to Brazil after intellectual property protection was tightened. To legitimize their claims, US industry groups commissioned studies by economists and others on the adverse effect weak IPR regimes had on developing

³⁵ Of all the IP sectors, pharmaceuticals was the most active in pushing for reform. According to Sandori, during the spring of 1991, executives at Pfizer “were rethinking their strategy for improving protection of IP around the world.” The executives set out a detailed plan for specific countries the aim of which was forcing a change in domestic IP laws. See Santoro, Michael A. and Paine, Lynn Sharp. 1995. “Pfizer: Global Protection of Intellectual Property.” Harvard Business School, 9-392-073.

³⁶ Another reason Brazil was targeted may have been that Mercosul countries were importing the majority of Brazilian manufactured drugs. MNCs with local subsidiaries in Brazil could easily export to other Latin American markets. Quotes from *Gazeta Mercantil*, September 20, 1996, and Rubenstein, Bruce (1996). “Latin America Slow to Protect Patents under NAFTA.” *Corporate Legal Times*. March.

³⁷ Much of the material in the following paragraphs was obtained from transcripts of cables between the US Embassy in Brasilia and the US State Department.

countries like Brazil. The Pharmaceutical Manufacturers Association (PMA) funded a study by two economists from the National Economic Research Associates (NERA), Richard Rapp and Richard Rozek, which appeared in the *Journal of World Trade* in 1990. In their article, Rapp and Rozek asked whether a country's economic development predicted its level of patent protection and concluded that "there [was] a causal linkage between economic modernization and the presence of efficient property rights, including intellectual property rights."³⁸ In another study financed by the PMA, J. Davidson Frame wrote that "disregard for intellectual property rights might also have a chilling effect on the development of indigenous scientific and technological capabilities" and that "original technology [would] not flourish in an environment where there is little regard for IPR."³⁹ The latter argument was the conventional argument for strong IPR policies; that is, protecting the fruits of innovative activity would encourage local innovative activity. Tying IPR explicitly to economic development, to economic growth, and to FDI were new lines of reasoning, and empirically unsupported.

Another tactic used by US subsidiaries in Brazil was direct lobbying of Brazilian officials. The PMA, as early as 1988, had hired the Brazilian public relations firm Semprel to orchestrate the lobbying campaign for patent reform, including the initial draft bill introduced to the Chamber in the spring of 1988. (It was this lobbying effort, sponsored by the PMA, which the US Embassy described in cables to the State Department as a sign that the country was tipping in favor of reform.) Semprel had also been tasked with "Brazilianizing" a 1987 industry report advocating patent reform for circulating in the country.⁴⁰ Additionally, US drug companies

³⁸ Rapp, Richard T. and Rozek, Richard P. (1990). "Benefits and Costs of Intellectual Property Protection in Developing Countries." *Journal of World Trade* 24: 75-102.

³⁹ Frame, J. Davidson (1987). "National Commitment to Intellectual Property Protection: An Empirical Investigation." *Journal of Law and Technology* 2 (209).

⁴⁰ This was the same Pfizer report mentioned earlier that cited the benefits that would accrue to countries adopting tighter patent protection, including the positive effects on economic growth. The report became the basis for Rapp and Rozek's 1990 article as well as the "Brazilianized" report commissioned by PMA and produced by Semprel. Recasting IPR reform as advantageous to developing countries was central to Pfizer's global strategy, and later PMA's strategy, of persuading governments to extend patent eligibility to drugs. The president of Eli Lilly at the time told the US Embassy that Semprel had hired a specific

composed a list of Deputies, Senators, and other government officials most likely receptive to the idea of pharmaceutical patents, including the 51 medical doctors who had been elected to Congress. Robert Postlethwait, then president of Eli Lilly, instructed his company executives as well as colleagues in other firms “to take an active role in lobbying these people.” To facilitate the effort, PMA established a sister industry group in Brazil, Abifarma, to represent local firms, primarily subsidiaries of MNCs. Another industry group, the CIFAB (Anglo-American Pharmaceutical Manufacturers Association of Brazil), hired its own lobbyists to work directly with Congress to ensure no mandates on nationalizing the pharmaceutical industry, or instituting a market reserve system similar to that in microelectronics, was included in the new Constitution. And in 1990, a worldwide industry association, the International Federation of Pharmaceutical Manufacturers’ Association or Interfarma, comprised of 31 MNCs, was created as a global lobbying group advocating patent reform, including the recognition of drug patents in Brazil.

MNCs also sought ways to counter mounting domestic opposition to patent reform. The National Pharmaceutical Laboratories Association (Alanac), the Brazilian Chemical Industries Association (Abiquim), the Brazilian Association for Scientific Progress (SBPC), the National Business Community (PNBE), the Fine Chemical Industry Association (Abifina), and, of course, the domestic pharmaceutical industry were all against a new IPR regime. MNCs conducted a study of the opposition and crafted their own lobbying efforts accordingly. It was anticipated, for example, that a national firm after entering into a joint venture with a foreign drug company would modify its political stance on patent protection. This was the case when the largest national producer, Ache, entered into a joint venture with Merck, Sharpe & Dohme in the late 1980s, and MNCs hoped that Ache would shift its stance and protect patent rights. In fact, two phases of domestic opposition were observed.⁴¹ Initially, all national firms opposed reform; later, these same firms split into two groups, one continuing to reject a new patent law, and the other

Brazilian author to write the February 1988 report because he was known and presumably liked by President Sarney.

⁴¹ Interview with a Brazilian governmental official, via email, December 11, 2000.

group, agreeing to TRIPS mandates with a five year transitional period and without pipeline protection. Many firms from the second group, concerned about their own viability, linked up with MNCs. This is not to say that the joint venture decisions made at the time were due primarily to political considerations, but the politics of IPR reform did become a factor in business decision making.⁴²

Last, MNCs became directly involved in the drafting of Brazilian legislation. The industry hired a top Brazilian law firm to write the IPR draft bill that was introduced to the Chamber of Deputies in the spring of 1988. The CIFAB, as mentioned earlier, hired lobbyists to make certain that the new Constitution did not include measures deemed adverse to the industry. IPR reform that passed the Congress in 1996 contained, point for point, the position of MNCs vis-à-vis patent protection. This direct involvement mirrored the same hands-on approach the industry took at the international level when the IPC, the UNICE, and the Keidanren produced the document which became the TRIPS Accord.

PASSAGE OF REFORM

The new President of Brazil, Fernando Cardoso, who took office in 1995, and the Minister of Industry, Fernando Bezerra, were more receptive to foreign business interests than previous administrations. Bezerra wrote a new IPR draft that essentially met the demands of PhRMA and other foreign IP industry groups. The proposed reform permitted both product and process patents on drugs and foodstuffs, had provisions for pipeline protection (minus the restrictions of the 1993 draft version), added biotechnology protection, banned parallel importing, and increased patent terms to 20 years. It exceeded TRIPS mandates in several areas – including

⁴² MNCs have used commercial alliances with foreign firms for the sole purpose of controlling piracy. For example, Susan Sell (1998) wrote that “in order to curb piracy Texas Instruments, IBM, and Microsoft all have become partners with local industries in Taiwan through licensing agreements for computer hardware, software, and chip production. This suggests that corporations may be better able to create situations of mutual benefit by extracting guarantees of intellectual property protection from parties...in exchange for sharing know-how and technology in joint ventures.” See page 214.

pipeline, patent eligibility criterion, and an accelerated reform – and was thereafter labeled TRIPS PLUS by Brazilian policymakers and the press.

MNCs, for their part, made public their promise to intensify direct investment in Brazil, both investment in production facilities and in research and development. These pledges of forthcoming FDI were part of the government's justification for reform, and Brazilian policymakers hoped foreign investment would provide a boost to the economy and spur the transfer of high-tech expertise to the country. Various reports were circulating about the weakened state of Brazil's high technology industries, and Intel's last minute decision to build its first Latin American microprocessor plant in Costa Rica instead of the northeastern province of Pernambuco was fresh in the minds of policymakers. Brazil feared losing similar future deals, which made the Cardoso administration particularly eager to heed the demand for reform from potential foreign investors in pharmaceuticals, microelectronics, software, entertainment and other IP sectors. Moreover, while foreign lobbying for reform intensified, the government, consumed with macroeconomic crises in the mid-1990s, was unable to formulate "a coherent industrial policy to reorient the country's development strategy." This policy gap "left Brazil dependent on twin centerpieces of the neoliberal blueprint for growth: FDI and exports" (Kingstone 1998, p74). Though it appeared that Cardoso – former academic and contributing author to *dependency theory* in the 1970s – had undergone a dramatic ideological shift, his embrace of neoliberal reform should be seen against the backdrop of the country's ongoing economic crisis, which highly constrained the policy options available to him.

A number of scheduling issues, both legitimate and dilatory, postponed final voting on IPR reform in the Senate and the Chamber of Deputies until 1996. Passage of the new law was eventually achieved through party leadership agreements, brokered by the executive with the

leaders of the largest political parties in Congress.⁴³ The agreements circumvented the need for a general roll-call vote, which was expected to defeat the bill.

After years of being opposed to stronger patent protection, the government of Brazil adopted a national IPR regime that exceeded international standards. Ignoring protests from local interest groups, the government passed the most far reaching patent policy in the country's history. And though Brazil did not bend to pressure from the US government, the country was susceptible to pressure from foreign private interests. For their part, multinational firms proved to be remarkably deft at influencing the legislative outcome in a foreign country. Economic crises and skillful political leadership were contributing factors as well. All three factors – foreign business interests, the country's ongoing financial problems, and Cardoso's leadership – played a role in policy change in Brazil.

The alliance between MNCs and Brasilia was symbiotic.⁴⁴ Foreign firms would bring much needed direct investment to the country. The transfer of technology, know-how, and expertise would result. Domestic industry in high value-added sectors would flourish. Brazil's science and technological base would rise to levels approaching those of the newly industrializing countries. The government in turn would protect the fruits of innovation, both by the foreign firms and, it was hoped, by local firms as well, through stronger IP protection. But there was evidence that Brazil's pledge to IPR reform was beginning to falter soon after the new policy was adopted.

⁴³ The front page of *Gazeta Mercantile*, 1 March 1996, noted that Senate passage occurred just one day before the arrival of US Secretary of State Warren Christopher as if to underline the fact that it was not Brazilian interest groups who were driving reform.

⁴⁴ In many ways the foreign business-local government relationship in the mid 1990s mirrored a similar alliance during the second stage of ISI during the 1960s which Peter Evans documented in *Dependent Development*.

Backtracking on IPR Reform

In Chapter 3, we defined *backtracking* as the government deliberately taking or refusing to take certain actions that signal it is backing down from its initial pledge (via enactment) to reform. These actions include issuing executive decrees to mitigate the effects of reform or failing to pass additional legal measures to strengthen and expand the reform, neglecting to shore up domestic institutions necessary for the reform's full implementation, and publicly defying the tenets of IPR reform. Before declaring that a state has backtracked on reform, we look for evidence of all three phenomena. All are present in Brazil, and we examine each below.

1. MEASURES TAKEN TO TEMPER IPR REFORM

The actions Brazil took to temper the 1996 reform address pharmaceutical patents. This is unsurprising when one considers TRIPS requires drugs be patent eligible, a position anathema to Brazil at least since 1969. Still, one should not conclude that the following reflects Brazil's unwillingness to fully endorse drug patents and nothing more. Policy reform meant to harmonize a country's national laws with international standards is likely to meet with resistance when the reform clashes with domestic interests or runs counter to widely-held local views about the role of government. Reforms that are believed to be either inappropriate or at odds with social values are apt to be met with resistance. The prospects for stable reform and for harmonization more generally can be ascertained by looking precisely at where social interests or social priorities run head-to-head with international directives. The most vigorous objections to the new IPR law in Brazil focused on drug patents. We turn now to the measures the Brazilian government took to temper the new policy.

compulsory licensing

Compulsory licensing refers to the government allowing third parties to work a patent *without the consent of the patent holder*. The inventor is usually paid a predetermined royalty

though often less than what could be obtained under an ordinary commercial exchange.

Governments resort to compulsory licensing under a number of conditions, for example, when the patent holder refuses to work a patent, to rectify anti-competitive behavior, to facilitate the use of dependent patents, for government use, or when doing so is in the public's interest (e.g., to speed production of a needed vaccine). Many states claim the right to use compulsory licensing during health emergencies; and most developing countries routinely issue licenses for medicines. That is, they did until passage of the TRIPS agreement.

The TRIPS accord limits the conditions under which states can permit third parties to work a patent "without the authorization of the right holder."⁴⁵ The four conditions are clearly spelled out: 1) under circumstances of emergency or extreme urgency, 2) to address anti-competitive behavior, 3) for public non-commercial use, and 4) in order to allow working of dependent patents. Compulsory licensing for medicines is prohibited by the agreement. Other conditions, which had been used as justifications for third-party licensing, are proscribed. Most notably, compulsory licensing for the public interest is explicitly prohibited. The ambiguity of *the public interest* and what it might entail would prove to be highly divisive.

On October 6, 1999, Brazilian Health Minister Jose Serra issued an Executive Decree allowing the compulsory licensing of pharmaceuticals in cases of national emergency or the public interest. Serra wrote the decree in the midst of the country's effort to administer to and treat AIDS patients, and at a time, it is worth noting, that negotiations were underway with several MNCs to lower the prices of their anti-retroviral medications. US reaction to the decree was swift; Brazil was included on the USTR's 2000 watch list.

What might have been a point of contention between Brazil and the United States, however, was quickly taken up by NGOs and other public health advocates "over who has the right to produce and market life-saving drugs." The crux of the argument was that TRIPS went

⁴⁵ See the TRIPS Accord, Article 31. Entire text at http://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm.

too far encroaching on the ability of states to deal with domestic health crises by removing compulsory licensing from the government's battery of available policy tools. It was not a new argument; drug patents were as a rule controversial⁴⁶ Because of the publicity surrounding Brazil's position, and the seizing of the issue by outside activists, it may be worthwhile to spend a moment reviewing the details that led up to the presidential decree.

Under provisions of the 1988 Constitution, all Brazilians are guaranteed access to health care. It was under constitutional auspices that, in 1997, Brazil initiated an AIDS program promising access to the most advanced AIDS anti-retroviral drugs (ARV) to anyone who needed them. Patients unable to pay would receive the drugs for free. The cost of the program ran between \$300M and 450M, or about 4% of the entire country's health budget. Ten of the twelve drugs used in the program were off patent in Brazil, and the state-owned laboratories manufactured generic copies of eight of these for local distribution. The two patented drugs, Viracept and Stocrin, were imported and accounted for 36% of the program's expense.

The Brazilian government wanted to reduce the cost of these drugs. Ninety thousand AIDS patients were participating in the AIDS program and receiving medicine in 2000, making the government of Brazil the largest single buyer of AIDS drugs in the world. Negotiating from this vantage point, and with the compulsory licensing decree already announced, the government was able to achieve substantial price reductions from several pharmaceutical MNCs who manufactured or marketed ARVs.⁴⁷ In the fall of 2000, unable to reach an agreement with Merck over the price of Stocrin (efavirenz), the government issued a license for production of a generic equivalent. Several months later Merck agreed to cut prices on Stocrin as well as Crixivan, another ARV already off patent, by 64.66% and 59.02% respectively.⁴⁸ The remaining holdout was Roche, whom Agouron Pharmacia had licensed to manufacture Viracept (nelfinavir). Brazil

⁴⁶ The debate over compulsory licensing of crucial drugs has persisted for a long time. One of the earlier articles, written in 1936, was Frank L. Schechter's "Would Compulsory Licensing of Patents Be Unconstitutional?" published in the *Virginia Law Review*.

⁴⁷ These were Bristol Myers Squibb, Abbott Laboratories, and Glaxo SmithKline.

⁴⁸ Agence France Press, August 23, 2001. See also the Economic Justice Report, V12(1), April 2001.

lifted the nelfinavir patent in August 2001 forcing Roche to reduce its price on Viracept by 40% just a few weeks later.

The threat and actuality of issuing licenses for Stocrin and Viracept enabled the country to obtain huge discounts on these two drugs from the foreign manufacturers. However, the issuance of the decree was more than negotiating strategy. The 1996 law did permit compulsory licensing in cases of national emergency, and the executive could have used this provision as justification for canceling the two drug patents without the public announcement. Moreover, if the sole aim was obtaining price cuts, certainly private negotiations with Roche, Merck, and other firms would have yielded the same result had the threat of compulsory licensing been as effectively used privately. Several African countries had quietly achieved substantial price cuts from the same MNCs and on much smaller drug quantities.⁴⁹ The posturing in Brazil's decree declaration signaled the government's commitment to TRIPS was now *qualified* and secondary to domestic social priorities. Issuing compulsory licenses for anti-retroviral drugs indicated that the state was backing away from full endorsement of pharmaceutical patents, its initial position at the time of reform.

local working

Local working means a patented invention, product or process, must be practiced in the country of registration. For developing countries, the local working stipulation is usually quite specific in that the actual manufacture of the patented product needs to take place in the country for the patent holder to retain monopoly rights. The intended goal of the requirement is to make possible the transfer of technology and know-how to the host country as well as boost domestic industry.

All countries with patent regimes have some type of local working requirement however broadly defined. TRIPS applies the loosest definition stating that local working can be satisfied

⁴⁹ Senegal, Rwanda, Ivory Coast, and Uganda.

by the importation of the patented product.⁵⁰ This follows a trend evident in other WTO agreements that have essentially chipped away at the ways governments attempt to encourage, or strong-arm depending on your point of view, foreign firms into setting up local production facilities or buying from domestic manufacturers. For example, the Trade Related Investment Measures or TRIMS agreement permits MNCs in host countries to source component parts by importing them without having to meet domestic content requirements of the host country. Similarly, TRIPS permits foreign firms to import the patented product rather than manufacture it locally.

Brazilian law, however, stipulates that an inventor holding a national patent may lose monopoly rights if the registered invention is not exploited or commercialized in Brazil. Under Article 68, failure to exploit means the patented product is not manufactured in Brazil, is incompletely manufactured in Brazil, or the patented process is incompletely used. Importation to fulfill exploitation is allowable when local production is not commercially viable, but as Guist (1998) points out, "it is almost impossible to avoid [forfeiture of the patent] unless the patented invention is used or produced in Brazil." Further, "Brazil's law is clearly designed to encourage local manufacture of patented inventions."⁵¹ The practical emphasis here on technology transfer makes sense when one considers the underdevelopment of high-tech industry in the country. Import statistics are illustrative as well: between 1982 and 1998 total imports into Brazil increased 174% while pharmaceutical imports into the country grew 4,752%.

Though Article 68 violated TRIPS's importation rule, neither the US nor other countries contested it at the time reform passed in 1996. After Serra announced the compulsory licensing decree in late 1999, the USTR used Brazil's local working requirement, which was a clearer violation of TRIPS, as justification for Brazil's inclusion on the 2000 watch list. Subsequently,

⁵⁰ TRIPS Article 27 reads "patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology, and whether products are imported or locally produced."

⁵¹ Guist, John (1998). "Comparative Analysis of the US Patent Law and the New Industrial Property Code of Brazil." *Hastings International and Comparative Law Review* 21 (3): 597-637. Quotes taken from p623.

both countries held consultations on the matter with the WTO in June and December 2000, but failed to reach a resolution. On January 8, 2001, the US requested establishment of a dispute settlement panel, which was created the following month.

This bilateral dispute was peculiar because the USTR's objection was really over the compulsory licensing decree not Article 68, and no actual forcing of local production had occurred for the US to finger.⁵² In fact, it seemed Brazil was more eager to encourage joint ventures and other collaborations between multinational and domestic firms rather than strictly impose local working. The *Gazeta Mercantil* noted that the government "[was marshalling] its forces to seal partnerships with local producers" and cited an early success when "Glaxo-Wellcome signaled its willingness to join a local partnership" which did not involve the issue of local working⁵³

The United States withdrew its complaint from the WTO in June 2001 amid growing pressure from international activists intent on scaling back TRIPS rules on drug patents. Brazil agreed to consult the US before canceling patent rights due to the local working provision.⁵⁴

The outcome was generally hailed as a victory for Brazil although the subtext of the incident is perhaps more important than the actual outcome. It illustrated Brazil's tactical decision to align with international NGOs whose objective was circumscribing the scope of the TRIPS Accord. Brazil began to position itself at the forefront of this international movement.

⁵² The Provisional Measure issued by the government of Brazil on December 18, 2000 that introduced price controls on pharmaceuticals probably also contributed to the decision of the USG to initiate dispute proceedings at the WTO in January. In other words, there were a number of actions by the Brazilian government that precipitated the US complaint, but Article 68 was the only "clean" TRIPS violation that the USTR could go after.

⁵³ *Gazeta Mercantil* September 10, 2001.

⁵⁴ WTO documents WT/DS199/1-4, entitled "Brazil – Measures Affecting Patent Protection." In a letter dated 25 June 2001 from Deputy USTR Peter F. Allegeier to Mr. Jose Alfredo Graça Lima from the Brazilian Ministry of Foreign Affairs, Allegeier writes, "I am pleased to report that my government will agree to terminate the WTO panel proceeding without prejudice concerning interpretation of Article 68, based on your government's commitment to hold prior talks with the United States with sufficient advance notice to permit constructive discussions in the context of a specific session of the US-Brazil Consultative Mechanism, should Brazil deem it necessary to apply Article 68 to grant a compulsory license on patents held by US companies. While we had real concerns regarding potential use of Article 68 of Brazil's Industrial Property Law, we note that this provision has never been used to grant a compulsory license."

generics

The Chamber of Deputies approved a Generic Drug bill in November 1998, 17 months after IPR reform was promulgated. The bill, signed into law in January 1999, authorized the Health Ministry to provide incentives for the domestic manufacture of generic alternatives and required governmental health system prescriptions to be written using the generic name. The law also made it mandatory for manufacturers to print the generic drug name under the brand name on all product packages. The explicit goal of the Generics bill was to combat higher drug prices, a result of pharmaceutical patents, by bringing to market cheaper alternatives.⁵⁵ The competitive pressure brought to bear on branded drugs drove prices down; for example, with AIDS drugs, generics were responsible for a 79% decline in the branded equivalent between 1996 and 2000 while prices on drugs with no generic alternative dropped just 9%. As a commentator wrote, “one strategy the government has adopted recently to generate more price competition is to foster a generic drug industry.”

The observer was partly correct. If the primary motive was pushing down market prices, then the origin of generic drugs should not have mattered. But Brazil’s Development Minister, Alcides Tapias, testified before a Congressional committee in 2000, that the law could be interpreted as industrial policy for the pharmaceutical sector, encouraging the development of local manufacturing. Tapias stated flatly he was against the importation of generic drugs, wanting them produced locally.⁵⁶ He urged the Brazilian patent office, INPI, to actively distribute to national firms wanting to produce generic products information on drug formulae contained in patents that had lapsed into the public domain. The government also attempted to

⁵⁵ Other developing countries have also passed legislation aimed at combating the high price of patented drugs. The Philippines ratified the Generics Act of 1988 mandating the printing of the generic name above the branded name on all prescriptions in order to stimulate the purchase of generic substitutes. As a result, the country was listed on the USTR Watch List for unfair trade practices. Brazil had previously tried a tough generics law under Itamar Franco, making it obligatory to list the generic name of the drug in letters two-thirds larger than the brand name on all medicine packaging. The measure was struck down pending the TRIPS accord.

⁵⁶ *Gazeta Mercantil* March 14, 2000.

stimulate the demand side by assisting in the distribution of nonbranded drugs. In the spring of 2000, Health Minister Serra threatened to close or revoke the operating permits of pharmacies refusing to stock and sell generic medications. And when small pharmacies still resisted selling these lower profit margin drugs, the National Health Agency, ANVS, began a campaign to stimulate demand by advertising generics.

Promotion of generics showed some early success. In the area of anti-hypertension medications, three counterpart drugs overtook their branded reference eight months after the generics law was ratified. New generic drug companies were created, many, like Pro-Genericos, connected with Sindusfarma, the Sao Paulo pharmaceutical industry association. But overall the impact of the law was modest. Generic drugs accounted for 1.7% of the market in January 2001, and 5.1% in March 2002. Though the bill was intended to spur the growth of national producers, several multinational drug companies, seeing their revenues drop as soon as generic alternatives reached the market, started manufacturing brandless medicines themselves.⁵⁷ Because MNCs so deftly altered their market strategy, it is too early to tell whether the main beneficiaries of the law will be the national firms as intended.

A collateral consequence of the generic drug policy was that it set in motion a change in international patent rules. Brazil, Canada, and several other countries, persuaded the WTO to modify TRIPS rules to allow clinical trials of generic copies to begin *before* the expiration of the 20 year patent on the reference drug. The decision was issued in 2000. It effectively shortened the duration of a drug's monopoly rights by allowing a way for generics to enter the market within hours of patent expirations.

adding new hurdles

The federal regulatory agency, Agencia Nacional de Vigilancia de Sanitaris (ANVS), was created in December 1999 to oversee the quality of health services and pharmaceuticals. The

⁵⁷ Novartis, losing market share when its two anti-inflammatory drugs, Cataflam and Voltaren, went off patent, established a special division to handle generic drug production in Brazil.

agency was also tasked with approving pharmaceutical patents before their issuance by the Brazilian patent office.^{58,59} This policy of prior regulatory approval differed markedly from procedures followed in other countries. European regulatory authorities ignore the patent process altogether, and drug patents are issued routinely in the US, Australia, Taiwan, and other countries before regulatory approval has been decided. Yale University received a patent for Zerit in December 1990, but the drug did not receive FDA approval until 1994, for example. US patent holders in fact can apply for extensions of up to five years to recover any patent time expended during the regulatory approval process. In establishing ANVS pre-approval, the Brazilian government added a significant new hurdle for pharmaceutical firms to clear.

ANVS was cited by industry as one of the reasons why the Brazilian pharmaceutical market remained sluggish after 1999.⁶⁰ PhRMA, known for overstating the negative effects of policy with which it disagrees, called the ANVS prior approval law “one of the most serious problems facing the pharmaceutical industry in Brazil today.” There may have been some truth to these claims. ANVS approval added further delays to an already protracted process. Between 1995 and 2002, 8,038 applications for pharmaceutical patents had been filed with the patent office and only 402 or 5% had been approved and forty rejected.⁶¹ The accumulation of drug patent applications led US Health and Human Services Secretary Tommy Thompson to ask the Brazilian Health Ministry “to release dozens of hostage patents.” Though the INPI and the ANVS blamed each other, most observers attributed the delay to the ANVS. The measure significantly slowed the granting of drug patents.

⁵⁸ On December 30, 1999, Provisional Measure 2006 added Article 229-c to the IPR law. The *de facto* rule was promulgated on February 14, 2001. “The granting of patents in connection with pharmaceutical products or processes shall be dependent on prior consent from the National Sanitary Supervision Agency (Agência Nacional de Vigilância Sanitária - ANVISA).” This additional hurdle for pharmaceutical patents was also mentioned by the USTR in connection with Brazil’s inclusion in Watch List 2000.

⁵⁹ Interestingly, ANVS had to hire 30 employees to examine patent applications, and the agency staff received 30 days of “training in patent law, prosecution, classification and examination.”

⁶⁰ “According to market sources, the Brazilian market continues to be depressed by the high level of government bureaucracy to requirements to register products and companies in the Ministry of Health.” From Dept. of Commerce, US. 1999. “Industry Sector Analysis: Pharmaceutical Industry.” Page 3.

⁶¹ *Gazeta Mercantil* May 20, 2002.

price controls

The Brazilian government announced a Provisional Measure on December 18, 2000 to set up price controls on pharmaceuticals. It was the first federal price control system for pharmaceuticals in nearly a decade. The decree permitted a maximum weighted average price increase of 4.4% for 12½ months, through the year 2001.⁶²

The price control measure trailed a year long investigation by the Ministry of Justice and a special Congressional Investigating Committee into charges of cartelization and price setting by the largest drug firms in the country, most of them MNCs.⁶³ The investigations were initiated after discovery of a secret agreement between managers of the largest pharmaceutical firms “to force a boycott of all generic products” in Brazil. The inquiries began within a month of the Health Ministry’s compulsory licensing decree and shortly before the provisional measure authorizing ANVS regulatory approval prior to the granting of drug patents. These actions were interpreted by foreign manufacturers as undue intervention in the market by the government, straining an already precarious relationship between the drug industry and Brasilia.

Tensions were further aggravated the first week of May after fifteen pharmaceutical manufacturers simultaneously raised the prices of their products on an average of 65%. The Ministries of Health and Treasury called a meeting with the major drug firms to reach an accord on price stabilization. In August, a voluntary agreement was reached with the government: prices were set back to June 1st levels to remain there through December 31, 2000. The December 18th presidential decree replaced this price stability accord that was set to expire two weeks later.

The price control measure typified the growing discord between the government of Brazil and multinational drug companies over how to handle the domestic impact of tighter IPR. Where industry agreed albeit reluctantly to voluntary price measures, the government opted instead to

⁶² Mario Osava, “Cardoso Defies Pharmaceutical Industry,” *The Economist*, December 2000.

⁶³ Much of the details of the anti-trust case was obtained from David Fleischer, University of Brasilia.

direct market intervention. At the time of reform, pharmaceutical MNCs were hailed as bearers of high-technology, ready to impart critical know-how to the country as soon as the appropriate set of IP laws were adopted. The foreign firms would be partners with the government spurring the domestic development of high value-added industries. As Brazil's position on IPR began to shift, so too did the government's representation of these firms begin to shift. More antagonist than partner, this altered representation of MNCs fostered and validated the government's qualms about patent reform.

2. LACK OF INSTITUTIONAL SUPPORT

A competent, well-staffed patent office is crucial for implementing IPR policy. Besides performing a bureaucratic role, such as deciding on the validity of patent applications, the office also serves an important functional role. Since patents, copyrights, and trademarks are in fact property, they can be bought, sold, or transferred. The national patent office records assignments of intellectual property so that ownership can be easily traced.⁶⁴ Adequate federal support of this vital domestic institution should be interpreted as a commitment by the government to a strong patent regime. Institutional support that is insufficient, slow to materialize, or otherwise ineffectual, may be a sign that the state's commitment to strengthened patent protection is halfhearted.

Instituto Nacional de Propriedade Industrial (INPI)

Brazil's patent office, the Instituto Nacional de Propriedade Industrial (INPI, hereafter), performs functions similar to those of the US Patent and Trademark Office (USPTO). The INPI has been and remains severely understaffed and inadequately funded. Though a major overhaul of Brazil's IP laws was contemplated for years, little was done to equip or otherwise prepare the INPI for the expected onslaught of patent applications. Even after IPR reform was approved by

⁶⁴ Guist, John (1998). "Comparative Analysis of the US Patent Law and the New Industrial Property Code of Brazil." *Hastings International and Comparative Law Review* 21 (3): 597-637., p.612.

Congress, the upgrading of the INPI was piecemeal and incomplete. Two years after passage of the patent law, the president of the Brazilian Intellectual Property Association declared that the INPI was in a state of collapse. And after five years, patent attorney Peter D. Siemsen claimed the “structural problem” created by underfunding the INPI had resulted in “a backlog of 200,000 trademark applications and 60,000 patent applications,” adding that the efficacy of the INPI had “gone backwards.”⁶⁵

INPI has been hindered most by the shortage of trained, skilled employees. The total number of patent examiners has remained essentially unchanged since IPR reform passed in 1996, in the range of 90 to 110 examiners. Sherwood, et. el. (1999) attributed the personnel problem to comparatively low salary levels which had been buffeted by high inflation over the last several years. In 2000, the ratio of examiners to total number of patent applications was exceedingly low when compared to Korea, Japan, and the United States.

TABLE 4.6: RATIO OF PATENT EXAMINERS TO APPLICATIONS, SELECTED COUNTRIES, IN 2000

	USPTO	JPO (JAPAN)	KIPO (KOREA)	INPI (BRAZIL)
APPLICATIONS	295,926	436,865	102,106	64,686
EXAMINERS	2905	1088	462	90 (110)
APPLICATIONS PER EXAMINER	85	177	221 <i>est.</i>	719 (588) <i>est.</i>

Sources: USPTO, KIPO, and INPI publications and pronouncement; JPO data from USPTO.⁶⁶

Brazil has made some strides to bring the patent office up to international standards. The government invested \$20M for computers in 1998, and began to decentralize the activities of the INPI by establishing local offices in several provinces. But this alone was not enough to keep pace with the growing number and complexity of patent applications that began pouring in after reform. Nor was this restructuring demonstrative of a strong commitment to patent reform. To

⁶⁵ Wild, Jeff. “Building the Foundations,” *Latin Finance*. October 1, 2001.

⁶⁶ Note that the USPTO and JPO publish the actual number of applications examined per examiner. Similar data is not available for KIPO or INPI. Nevertheless, an average ratio of around 200 applications per examiner per year is standard at well functioning patent offices. Brazil’s patent office averages nearly three times that or between 588 and 719 per examiner depending on the INPI’s current number of examiners.

make the point, compare the INPI with the Korean patent office (KIPO). Korea, also under external pressure to tighten national patent laws, passed new legislation at the end of 1986. The number of patent examiners at the KIPO increased substantially, nearly seven-fold in twenty years, and doubled in the last 5 years alone. Ten to fifteen percent personnel increases are projected through 2005. The KIPO instituted a model educational system to keep its examiners skilled in current technology and IPR practices. And as proof that the KIPO quickly reached world productivity standards, the patent agency became one of a handful of national offices qualified to perform the obligatory preliminary examination for patent requests under the Patent Cooperation Treaty.⁶⁷

Though both Brazil and Korea were pressured into reforming national IPR laws, there is considerable difference in how the two countries subsequently adapted to TRIPS compliance. Taking first the support given to the domestic patent agency, the Korean office was amply funded, modernized, and kept pace with the growing number of patent and trademark applications. The INPI, on the other hand, remains short of qualified personnel, short of funds, and struggles with a growing backlog of applications. The time to obtain a patent in Brazil is estimated to run as high as eight years compared to twenty-two months in Korea.⁶⁸ Brazil's commitment to reform, despite passage of TRIPS PLUS legislation, must be questioned since so little institutional support for the policy's implementation has been forthcoming.

3. PUBLIC STANCE CHALLENGING IPR REFORM

The last criterion we listed as an indicator of backtracking was the state's publicly recanting an earlier stance on reform. If it is done on the international stage, the retraction is less likely to be an appeasement to local interests and more likely to reflect the present sentiments of key policymakers in the government. Brazil's compulsory licensing decree and local working

⁶⁷ The other accredited offices are in the US, Europe, Australia, Sweden, Russia, and China.

⁶⁸ Neves, Mario (2002). "Designing Policies That Stimulate Foreign Investment in Brazil." George Washington University.

requirement received considerable attention around the world. As such, perhaps these two actions qualify as announcements on the global stage that the country was backing down from an earlier stance to meet or exceed TRIPS standards. Certainly, many observers interpreted them that way. All the same, we wanted clearer evidence that Brazil had begun to take a different stance internationally on IPR reform. Specifically, we looked for public statements made at international conferences, meetings, or within institutional fora.

UNCHR

At the 51st meeting of the United Nations Commission on Human Rights, Brazil put forward a resolution to promote access by all countries to critical drugs especially during health emergencies. *Access to medication in the context of pandemics such as HIV/AIDS*, resolution 2001/33, was adopted by the 53 member commission on April 23, 2001 by a vote of 52 to 0. The United States abstained. The resolution called upon states “to take steps, individually and/or through international cooperation, in accordance with applicable international law, including international agreements acceded to, such as...the applications of international agreements is supportive of public health policies which promote broad access to safe, effective and affordable preventive, curative or palliative pharmaceuticals and medical technologies.”⁶⁹ Essentially, the resolution calls for rescinding those parts of the TRIPS accord that preclude compulsory licensing or the canceling of patents when it is in the public’s interest.⁷⁰

Brazil’s introduction of the UNCHR motion launched the country’s role as a global leader in a movement to make critical medicines ineligible for patent protection. The core of Brazil’s argument was that the monopoly rights conferred by patents resulted in higher drug prices, prices ultimately out of the reach of the world’s poor. This was the same argument posed

⁶⁹ UNCHR, notes from the 51st meeting, resolution 2001/31, approved by roll-call vote on April 23, 2001. Full text available on the UNCHR web site, [http://www.unhchr.ch/huridocda/huridoca.nsf/\(Symbol\)/E.CN.4.RES.2001.33.En?Opendocument](http://www.unhchr.ch/huridocda/huridoca.nsf/(Symbol)/E.CN.4.RES.2001.33.En?Opendocument).

⁷⁰ This led Interfarma’s president, Harvey Bale, to publicly chastise Brazil calling the country’s new IPR stance “industrial protectionism.” *Gazeta Mercantil* June 25, 2001, page 20.

by public health advocates and other NGOs in 1999 when Brazil was sanctioned by the US for issuing the compulsory licensing decree. Brazil, as the self-appointed spokesperson, gave voice and possibly credence to the concern that the consequence of drug patents as mandated by TRIPS differentially affected developing countries. It was a position significantly different from the one held by the government at the time of reform when even pipeline protection for pharmaceuticals was written into the new patent law.

Doha

Brazil's actions at the WTO's Fourth Ministerial Conference in Doha provide further evidence that the country was backtracking on IPR reform. In Qatar, Brazil cemented its role as head of an international faction, of countries and NGOs alike, calling for an amended TRIPS accord. At the November 2001 meeting, Brazil led a coalition of 52 nations who successfully pushed the issue of pharmaceutical patents onto the global trade agenda. Materially, the outcome was a 2-page declaration initiating a new round of trade talks on the sole topic of the appropriateness of drug patents and the right of countries to administer to the public health. A modified TRIPS is a likely result when negotiations conclude in 2005.

The principles of the declaration were established at a special session of the WTO, a precursor to the Doha conference, which convened in July 2001.⁷¹ Initiated by Brazil, the sole purpose of the meeting was to assemble a list of concerns and objections from developing countries over WTO mandated patent rights. During this first round, Brazil put four demands on the table: 1) nothing in the TRIPS agreement should impede the protection of public health; 2) there should be no restrictions on the motives to issue compulsory licenses or the breaking of patents; 3) countries should be free to make parallel imports when necessary; and 4) TRIPS should be interpreted as a balance between the rights and obligations of countries.⁷²

⁷¹ To underscore how contentious the TRIPS accord had become, this special session was the first of its kind since the creation of the WTO in 1995.

⁷² *Gazeta Mercantil* July 23, 2001.

This was an extraordinary set of demands which effectively negated the core tenets of the TRIPS accord. Recall that the agreement removed authority from individual states to decide what could be eligible for domestic patent protection. Recall also that TRIPS severely limited the conditions under which states could issue compulsory licenses; expressly, the accord prohibited

FIGURE 4.1: DECLARATION ON THE TRIPS AGREEMENT AND PUBLIC HEALTH

*From paragraph 5, parts b, c, and d*⁷³

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- b. Each member has the right to grant compulsory licences and the freedom to determine the grounds upon which such licences are granted.
 - c. Each member has the right to determine what constitutes a national emergency or other circumstances of extreme urgency, it being understood that public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency.
 - d. The effect of the provisions in the TRIPS Agreement that are relevant to the exhaustion of intellectual property rights is to leave each member free to establish its own regime for such exhaustion without challenge, subject to the MFN and national treatment provisions...
-

the practice of compulsory licensing of drugs even when it was in the public interest. Brazil, leading an alliance of other developing countries, wanted these WTO mandates rolled back.

The demands set forth by Brazil were eventually met in the final *Declaration on the TRIPS agreement and public health*, signed by the 141 members on November 15th.⁷⁴ The salient parts of the Declaration are excerpted above.

After the Doha conference, a Brazilian newspaper reported that the meeting “reflects a more aggressive presence of the Brazilian Foreign Ministry in multilateral fora. Brazilian diplomacy not only contributed to the creation of a new trade round, it also celebrated the declaration that public health policies are above TRIPS.”⁷⁵ It also signaled quite clearly that the

⁷³ The full text of the declaration can be viewed at

http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_trips_e.htm.

⁷⁴ Some commentators have attributed the United States’ apparent acquiescence on the patent issue to a new focus on building international cooperation to fight terrorism. The Doha Declaration came just two months after the events of September 11th.

⁷⁵ *Jornal do Brasil*, November 16, 2001.

Brazilian government had backed down from its original commitment to TRIPS mandates when it passed the 1996 reform.

In the next and final section of the case study, we explore why Brazil's pledge to IPR reform faltered.

Conclusion

Eight years after enacting IPR reform, Brazil had gained few benefits, prompting Cardoso to declare with some frustration that “Brazil does not value innovation.”⁷⁶ Cardoso was referring to the timid growth of domestic patent registrations post-reform, but the effects of a tighter IPR regime on Brazilian industry and the economy as a whole are more varied than raw patent counts. Reform was supposed to spur FDI and with it the transfer of foreign technology to national firms, yet there is little evidence this occurred in the sectors directly effected by reform. In the knowledge industries importation not direct investment was used to meet local demand. To illustrate, import penetration in the drug sector alone increased from 20.2% to 23.8% between 1997 and 2001, while for all sectors it decreased – from 23.8% in 1997 to 19.6% in 2001.

When foreign companies invested in Brazil, the investment had little effect on local R&D activity, neither expanding it nor advancing it. In fact, foreign firms that bought controlling shares of public utilities or other state enterprises often trimmed the local R&D budget. Szapiro claims that “the increased share of foreign owned firms may reduce the local technological efforts...[since] the main sources of technology for MNC subsidiaries are the foreign ones, basically from their mother companies” (Souza Szapiro 2000). “The connections established by the new MNCs subsidiaries with the other components of the local system,” Souza continues, “are not related to developing and strengthening the knowledge base...[the subsidiaries] concentrate on assembling activities” (p11).

It may be that Brazilian policymakers intended IPR reform to be part of the country’s “risk improvement makeover” (akin to establishing an efficient banking system and transparent regulations) to lure in FDI rather than as a way to persuade Pfizer to set up a state-of-the-art manufacturing plant. Recall that Brazilian officials doubted the promises that multinational firms would build new research and production facilities after passage of new a IP regime. If one keeps in mind that less than a year before enactment of the new patent law, the Brazilian Congress took

⁷⁶ *Gazeta Mercanti*, November 29, 2002.

the unusual step of amending the Constitution to preclude discrimination against foreign firms operating in the country, then the action on IPR could be seen as a way to bolster the reputation of the country as being economically welcoming. The strategy worked. Overall levels of FDI increased substantially during the late 1990s (though FDI growth in the IP sectors continued to be below average); total inward FDI totaled US\$4.4B in 1995, peaked at \$32.8B in 2000, decreasing to \$10.1B in 2003.⁷⁷

Why did Brazil backtrack on IPR reform? Though the motive for reform may have been tied to a broader economic goal, the political and economical costs associated with IPR were high. The presence of national firms in some domestic sectors declined, consumers were forced to pay higher prices on patented goods, and royalty payments to overseas firms increased. Rather than downplay its philosophical disagreement with some provisions of the TRIPS Accord, Brazil locked in on the points of difference. The country had granted drug patents for most of the 20th century, but now took a position essentially ignoring its own historical stance. Brazil was unable to imagine ways to work the unwanted policy to its advantage. Perhaps the strongest argument for why this was so has to do with the legacy effects of ISI. Brazil's adoption of liberalization reform was sporadic and reactive. It was, in the words of one scholar, "commercial liberalization...without coherent policies to guide competitive integration with the global economy" (Kingstone 1998, p88). Michael Porter has argued that "the process of gaining national advantage is one where history matters and where cause and effect become increasingly difficult to separate over time" (1990, p163). The Brazilian government's singular focus on the internal market during ISI produced national firms unable to respond quickly, deftly, and imaginatively to IPR reform and the new peculiar competitive realities of global IP industries.

⁷⁷ Data from Brazilian Central Bank, *Entrada de Investimentos Diretos*.

Chapter 5: Korea Case Study

This case study explores why Korea had to be pushed to alter its patent laws particularly when the country benefited from doing so almost immediately. The consequences of reforming IPR in Korea and the benefits the country garnered will be presented in Chapter 6. We focus here on two main questions. Why did Korea adamantly resist reform? And how did the country manage to turn IPR reform to its advantage so quickly?

To the casual observer, Korea in the 1970s appeared primed to implement a strong domestic IP regime along the lines of what existed in the United States and many European countries. For one thing, the first major economic program taken up after the 1972 Yushin Constitution was aimed at rapidly industrializing the country and targeted sectors particularly well-suited to benefit from a protective IPR regime: the heavy and chemical industries (HCI).¹ Eighty percent of the government's industrial development resources were earmarked for the HCI sectors over the next decade. In other countries, patent rights had spurred growth in most of these sectors – by supplying a steady revenue stream from the commercialization or licensing of innovations and by stimulating and encouraging the transfer of technology from abroad. Granting patents was a relatively minor action compared to the direct monetary support the government was providing already to these sectors.

For another, national economic policy was being formulated by a small circle of foreign-educated economists with a strong preference for market friendly policies. Protection of property rights, whether tangible or intangible, ought to have been part of the overall economic program these technocrats recommended to the president. The influential Economic Planning Board (EPB) enjoyed an unusual degree of autonomy and clout in Korea during the 1960s and 70s. The president implemented their policy proposals including, for example, the abandonment of inward-oriented development and the assumption of export-oriented growth, a rather radical policy shift in the early 1960s.

¹ Six heavy and chemical industries were singled out: steel, petrochemicals, nonferrous metals, shipbuilding, electronics, and machinery. These were the technology sectors of the 1970s.

Last, the traditional Korean business strategy of maximizing sales over profitability made it possible for national firms to support sustained investment in R&D. This was especially true for the large conglomerates. A skilled and educated workforce and spirited entrepreneurship assured that a research-driven business strategy was indeed possible. The creation and commercialization of new products and processes, in turn, would help Korean firms expand their global market share and, ultimately, propel them to the forefront of technology.

But none of these factors – the targeting of IP sectors to lead the industrialization effort, a national economic plan formulated by market-oriented economists, and a business strategy geared towards sales – prompted the state to raise IPR standards voluntarily. Korea refused to reform domestic IPR policy for years until forced to do so in 1987. If these factors indicated a country favorably posed to assume high IPR standards, why didn't Korea reform on its own?

The short answer is that no domestic group or government entity pushed for reform, and the one likely advocate for overhauling national IP policy, the EPB, had lost much of its political power by the late 1970s. One result of the Heavy and Chemical Industries Initiative (HCII) was a concentrated industrial structure dominated by large conglomerates. The monopolistic structure of much of Korean industry meant that measures, such as patent ownership, which permitted firms to garner greater domestic market share were effectively unimportant. Internationally, Korea's comparative advantage rested with its low labor costs; Korean firms did not strive to compete against industrialized countries at the frontiers of technology. Instead, they concentrated on churning out lower priced versions of products developed elsewhere. Little attention was directed toward the creation and commercialization of new products. A strong domestic IPR regime was irrelevant, and in fact, would force many firms to ditch their "copy and mass produce" strategy especially if foreign firms obtained Korean patents en masse.

The Economic Planning Board was a likely supporter of national IPR reform, but their independence and political influence had evaporated by the late 1970s. Functionally, this meant that the Ministry of Commerce and Industry (MCI) now had the greater influence over economic

policy, and the interests of business predominated in the policymaking process. One scholar wrote that the “ineffectiveness of the EPB during [the 1980s] was demonstrated by its inability to pass or even put on the agenda any measures dealing with trade liberalization or monopoly regulation” (Hwang 1996). IPR was below the attention horizon of neoliberal economists before the 1980s, so the EPB ignored the issue as well. IPR became an important component of the neoliberal model at precisely the time the EPB’s influence waned.

For the most part, this chapter follows the layout of the Brazilian case study presented in Chapter 4. We begin by briefly reviewing the economic development strategies pursued by the Korean government since the 1950s. Part two examines the domestic structure and technological sophistication of the high-tech sectors most affected by IPR reform. Additionally, we look at the government’s interest and activity in promoting science and technology in Korea. Part three reviews the process of IPR reform in Korea. The next section, part four, examines the stability of reform after the first major revision of the country’s IP laws. In the final section, part five, we speculate on why Korea was able to capture and create benefits from reform. In this concluding section we ask what lessons can be extracted from the Korean experience, specifically, whether or not the stable policy outcome in Korea can be replicated with other involuntary reforms and in other countries.

Strategies for economic growth and development

Scholarship devoted to explaining Korea's transformation from the third poorest country in 1953 to the 11th largest economy in the world today could fill a small library. This country of 48 million has a GDP per capita of US\$9,800, comparable to many smaller European economies. Forty years ago, the agricultural sector was the largest contributor to the country's output; today, it is manufacturing and services.² The country ranks 7th in value-added in manufacturing. Despite theories that depict technological innovation as the engine of growth, innovation played little role in Korea's rapid industrialization in the 1960s, 70s, and 80s. Nor did it contribute to the country's emergence as one of the world's largest exporters. Korea's strategy for growth turned on pervasive government management of nearly all aspects of the national economy and aimed to achieve global dominance in specific, extant technology sectors.

Similar to other developing countries in the 1950s, Korea adopted an import substitution industrialization model but later abandoned this approach in favor of export-oriented growth. The domestic market, however, remained closed to foreign competitors until the 1990s. The government-business nexus was central to Korea's development. National firms were required to meet ambitious, state-determined exporting targets. In turn, the government assisted local firms in a number of essential ways. Large public industrial projects were commissioned and then licensed out to individual, private firms. Capital resources were managed by the government instead of being left to the dictates of the market. For example, to finance its industrialization push, the state borrowed heavily overseas and then re-lent this foreign capital to selected local firms at reduced interest rates.³ Banks were nationalized to allow the government to control all

² Today, agriculture contributes 4.4% to GDP, industry 41.4% and services, 54.1%; in 1960, agriculture contributed nearly 40% to national income. As late as 1970, agriculture's share of GDP was 26.6%.

³ Foreign capital, in fact, financed 40% of investment in Korea from 1960 to 1975. The Foreign Capital Inducement Promotion Law of 1961 gave incentives to foreign investors, such as tax and remittance benefits. See Hong, Kyttack (1997). "Foreign Capital and Economic Growth in Korea: 1970 -1990." *Journal of Economic Development* 22 (1).

aspects of commercial lending.⁴ Most scholars agree that state intervention in the functioning of the market worked at least in the short-term in Korea. Industries grew rapidly, and national income grew annually at record rates.

The tight alliance between government and business that took root in the 1970s has persisted. Large family-owned conglomerates or chaebols have dominated much of Korean industry. In the late 1970s, chaebols began to wield considerable political influence over economic policy, often to the detriment of labor. This distinctive structural feature of Korean industry, and its impact on the political process, has had its supporters and critics. Both factions agree, however, that the government explicitly promoted the development of the chaebols and relied on them to lead the country’s industrialization effort. One political scientist summarized it succinctly: “Korea’s strategy of export-led growth was built around close partnership between business and government, and exclusionary policies toward labor” (Haggard and Moon 1990).

TABLE 5.1: INDUSTRIAL POLICY IN KOREA

	1950s	1960s	1970s	1980s	1990s
MAJOR POLICY INITIATIVE	Import substitution industrialization (ISI)	Export led development; light industries	Export led development; heavy & chemical industries	Export led development; technology intensive industries	Export led development; technology generation
PRIMARY GOAL	Rebuild industrial facilities post-war	Exploit comparative advantage in labor	Reduce trade deficit due to capital goods imports	Correct structural imbalance in manufacturing	Abandon “imitation” strategy and compete via new products
GOVERNMENT	Syngman Rhee (1948-1960)	Park Chun Hee (1961-1979)	Park Chun Hee (1961-1979)	Chun Doo Hwan (1980-1988) Roh Tae Woo (1988-1993)	Kim Young Sam (1993-1998) Kim Dae Jung (1998-2002)

Scholars have even referred to Korea’s promotion of big business as the “engine of technological learning”(Kim 1997b). The reason stems from the government’s imposed

⁴ The large conglomerates that controlled much of Korean industry were prohibited from owning banks. These firms were privately held, and were highly dependent on the government for the allocation of credit.

production and export targets in selected industries which necessitated rapid learning and assimilation of global manufacturing standards. Chaebols in preferred industries – plywood and textiles in the 1960s, steel, shipbuilding, and machinery in the 1970s – were given unrestricted access to foreign capital goods, encouraged to integrate vertically, and afforded exemptions from value-added tax. Accumulated foreign debt stemming from currency devaluations were offset by additional low-interest rate loans, thus reducing the risks associated with heavy exporting. But Korean manufacturers had to deliver. If these firms failed to meet or exceed the state's explicit annual objectives, support in terms of bank loans or credit would be withheld. Failure to achieve export targets might trigger a careful examination of the firm's tax return (Kim 1997b). These incentives and disincentives worked. The ratio of total trade (exports plus imports) to GNP rose from 12.7 in 1960, to 37.9 in 1970 and 75.5 in 1980.⁵ These figures strongly suggest that by 1980 the chaebols had attained world production standards and had mastered the requisite technology quickly.

The Heavy and Chemical Industries Initiative (HCII) typified the state's reliance on chaebols to drive industrial growth. HCII was introduced in 1972 and had two goals: to develop national defense capabilities and to rectify a growing trade deficit. The former grew out of concern over American intention to draw down military support on the Peninsula. In March 1971, under the Nixon Doctrine, 20,000 US Army troops were to be pulled out of South Korea and sent home in an effort to shift more responsibility for military security to the Koreans themselves. Promotion of the heavy industries would build the nation's military-industrial complex, and HCII was pursued with this in mind. The trade deficit was a major concern as well. Imports rose dramatically between 1955 and 1970, from 282 billion won to 4,880 billion won; the deficit hit 1.9 trillion won 1970, a 6½ fold increase from 1955.⁶ Secondly then, HCII was an intended response to the growing trade deficit. Though the country's overall growth strategy

⁵ Lim, Haeran (1998). *Korea's Growth and Industrial Transformation*. NY, St. Martin's Press. See page 43; data from Korean National Statistical Office.

⁶ Trade data in national currency, constant prices. UN Statistics Division, various years.

remained externally oriented, the new industrial policy had much in common with the ISI policies of the 1950s. Domestic consumers were required to buy capital goods from local producers if these goods were available; firms producing for export were allowed to import capital goods and intermediate inputs if used for producing products to be sold overseas. The domestic market was essentially closed to foreign goods. The government employed a number of other tools to advance the heavy and chemical sectors, including special financing arrangements and erecting entry and exit barriers to control which firms operated in each sector. At the end of the HCI phase, chaebols had a controlling share in all of these industries. And by 1985, their dominance was obvious: thirty chaebols were responsible for over a third of all domestic manufacturing.

The state's direct manipulation of the market during the 1970s had several unintentional and undesirable side effects. One was high inflation. The banking industry's unqualified support of the heavy, chemical, and export industries caused a drain on state resources, precipitated an increase in the money supply, and eventually put upward pressure on domestic prices. The oil crisis, which struck in the mid-1970s, further aggravated macroeconomic instability. In manufacturing, an acute overcapacity problem arose in the capital-intensive goods sectors picked by the government. Another problem was the general imbalance in domestic manufacturing. Conglomerates flourished at the expense of small and medium size firms, heavy industries expanded while light industry declined, and firms in emerging technology-intensive fields were unable to get a foothold either domestically or internationally.

Korea began introducing stabilization measures in 1980 to address the inflation problem. The country also switched the focus of its industrial policy in an attempt to rebalance domestic manufacturing. Technology intensive or specialized industrial goods, specifically, the semiconductor and microelectronics sectors, were now pegged as key sectors for growth. The government began to rely more on the market than on central planning to determine the allocation of resources. The federal budget was cut, wages frozen, and credit allocation restrained. A "price

surveillance” system replaced outright price controls.⁷ Antitrust policy was enacted in the Monopoly and Fair Trade Act of 1980. The government moved to open the domestic market.

TABLE 5.2: COMPOSITION OF KOREAN ECONOMY

	1970	1980	1985	1990	1995
GNP US\$B	8.1	60.6	91.1	251.8	376.9
% PRIMARY	26.6	14.7	12.5	8.7	7.0
% MINING	1.5	1.5	1.2	0.5	0.3
% MANUFACTURING	21.0	28.2	29.3	29.2	26.9
% UTILITIES	6.6	10.1	10.6	13.7	15.8
% SERVICES	42.2	41.7	45.5	46.5	47.9
% LIGHT INDUST	60.8	46.4	41.5	34.1	26.9
% HEAVY INDUST	39.2	53.6	58.5	65.9	73.1

Source: *World Bank, various years.*

The chaebols shifted quickly into the new state selected industries, dominating the microelectronics sector, for instance, almost immediately. Thus, despite the steps the government took toward market liberalization, little changed in the country’s industrial structure, particularly in the technology sectors. The same large conglomerates that had risen to prominence with the promotion of light industry in the 1960s, nimbly shifted into the heavy and chemical sectors in the 1970s and moved again into the high-technology fields in the 1980s. Daewoo, once a major textile manufacturer in the 1960s, emerged as a leading auto manufacturer a decade later, and then appeared in the early 1980s as a primary supplier of microelectronic goods. By 1989, Samsung became one of the largest global suppliers of computer memory, after years of manufacturing simple consumer appliances such as microwave ovens. These firms did not make themselves over, ditching older technologies for newer ones. Rather, they expanded their operations to include the production of high technology goods and grew these new ventures without scaling back older business lines.

⁷ Prior approval from the government needed for setting prices of manufactured goods. This was lifted in June 1981.

A characteristic of Korean industry directly attributable to the state-led development model should be underscored here. The assurance of ready access to financing produced heavy reliance on borrowing over equity finance. Given that the state-controlled banking sector provided loans and credits to the government's targeted industries, firms in these industries did not have to depend on the equity market as a primary source of financing. Thus, unlike public companies beholden to their stockholders, Korean enterprises were able to avoid the unpleasant consequences of poor profitability and persistently high debt to equity ratios. One result was that the chaebols were slow, even hesitant, to change business strategies when, for instance, the effectiveness of direct price competition began to wane in the 1980s. The lack of an independent corporate board and the absence of fiduciary monitoring removed any outside pressure that might have forced consideration of new market tactics. Paradoxically, the same Korean enterprise that demonstrated nimbleness in swiftly expanding into new industrial sectors when state policy changed was stubborn in its market approach. The strategy of run-after, catch-up, compete-on-price remained the set strategy of chaebols *even after major reforms in IPR*. Markets were not created anew by original, innovative products made by Korean companies. In short, Korean firms did not become more innovative after patent reform as some scholars have suggested. We take up this point later in the chapter.

Taken as a whole, the growth strategies pursued by the government from the 1960s on largely followed the early Japanese approach to economic development. The state devised broad, multiyear industrial plans that required the government to closely supervise and guide industry. When economic policies were devised, business goals took precedence. The formation of large conglomerates that were vertically and horizontally linked – in pre-WWII Japan, they were called

zaibatsu – were encouraged.⁸ The production of high value-added goods for export were targeted as much for the positive impact on the country's current account as for their forward and backward linkage potential (that is, their potential to spur growth in related industries). A crucial difference between Japan and Korea, however, was that beginning around the late 1970s Japan voluntarily transformed itself into a country of innovators. Korea did not undergo a similar transformation. Korean industry was quick to respond to market pressures, but always with the same tool: competing on price. It was as if Korean firms were unable to see themselves competing globally through the introduction of new products and the creation of new markets. And while IPR in Japan seemed to induce real local innovation, there is little proof that IPR reform has had a comparable effect in Korea.

To expand on this last claim, we turn now to an appraisal of science and technology in Korea. We take a close look at three IP-intensive sectors and why they were unwilling to support IPR reform in Korea. We report on the material effects of reform on business practices.

⁸ Zaibatsu were formal, government sponsored monopolies specializing in state-targeted industries. They were outlawed in the 1940s, and their function eventually carried out by keiretsu beginning in the 1950s. Keiretsu are informally linked businesses now dominating Japanese industry.

We have made several references to the concentrated structure of Korean industry in the years prior to IPR reform. To underline this fact, note that the top thirty chaebols accounted for 29% of Korea's GDP in 1977, 33% in 1985, and 34% in 1994.⁹ Even after the state introduced measures in the early 1990s aimed at limiting the growth of the chaebol – restricting diversification to two or three business lines, for example – the top 30 chaebols were responsible for 46% of all sales, 47% of all assets, and 22% of all financial loans in 1995.¹⁰ An OECD report claimed that the top thirty chaebol were responsible for 40% of the value added in manufacturing in 1995.¹¹ The structural composition of Korean industry was of course a direct result of governmental policy. Chaebols pursued sales at the expense of profitability and relied on depressed wages and borrowed technology to be competitive. Because these firms produced for the global market, not for domestic consumption, they had to meet *but not necessarily exceed* international production standards. Korean firms often exported under original equipment manufacturer (OEM) agreements since direct foreign investment was severely restricted during the 1980s.¹² Many firms relied on OEM arrangements to compensate for their lack of experience in manufacturing and international marketing.

In this section, we consider three sectors affected by reform: pharmaceuticals, microelectronics, and software. Normally, pharmaceuticals are categorized as a subgroup of the chemical industry. The chemical sector was central to the government's industrial promotion program of the 1970s as mentioned earlier, but the pharmaceutical sector as a whole was ignored. The microelectronics industry was a targeted sector during the 1980s and the recipient of unflinching government interest and backing. Real growth of the software industry did not begin to

⁹ Lee, Chung H.; Lee, Keun, et al. (2000). *Chaebol, Financial Liberalization, and Economic Crisis: Transformation of Quasi-Internal Organization in Korea*. Annual Convention of the Korean Economic Association, Seoul, Korea. March 4, 2000.

¹⁰ Jwa, Sung-Hee (2001). *A New Paradigm for Korea's Economic Development*. NY, Palgrave.

¹¹ OECD. (1998). *Economic Surveys: Korea*. OECD, Paris.

¹² See Pecht, Michael; Bernstein, J.B., et al. (1997). *The Korean Electronics Industry*. Boca Raton, CRC Press., page 10.

take hold until the 1990s. Though software and microelectronics were inexorably linked, the former received uneven support from the government. We have, then, three industries directly affected by IPR reform, each experiencing different degrees of state involvement. Their commonality was their opposition or their uninterest in reform.

PHARMACEUTICALS

The Korean pharmaceutical market is the 11th largest in the world, estimated at US\$7.8 billion in 2001. The industry is dominated by national firms, and even after the 1987 reform, the composition of the sector has changed little. In the early 1980s, local firms controlled around 90% of the market (compared with 22% in Brazil, 30% in India, and 40% in Argentina). Today, national firms hold 81% of the local market, with foreign firms and their imports accounting for 19%. One of the main reasons why national firms continue to dominate is that health tonics and other unconventional pharmaceuticals are used widely in the country and these tonics are produced and distributed by local firms. For years, the top selling “drug” in Korea was Bacchus-F, a combination of taurine, minerals, and fruit juice, distributed by Dong-A Pharmaceutical. It was not until 2001 that Pfizer’s Norvasc, a drug to treat high blood pressure, replaced Bacchus-F as the best selling drug.¹³ If unconventional pharmaceuticals are excluded, some experts put the Korean market at half the stated size, or around US\$4 billion. Other reasons for the small market share held by foreign firms include state-imposed equity ceilings of 49% which discouraged foreign direct investment, and the opacity of state regulations and the shortage of trained employees which served as disincentives to MNCs to set up local operations.¹⁴

¹³ In 1995, eight of the top 10 drug products sold in Korea were health tonics; in 2001, only two out of 10 top sellers were tonics. The remaining eight were modern pharmaceuticals such as Norvasc (to treat high blood pressure), Xenical (for weight loss), and Taxol (a chemotherapy drug). See Bryant, Rob (2003). "Adapting to an Influx of Western Medicine." *Scripps Magazine*, October.

¹⁴ *Ibid.* This is not to say that foreign firms had no presence in Korea. As early as the 1960s, American, European, and Japanese drug companies entered into joint ventures with national firms. The Korean partner, with license in hand, established local manufacturing plants to produce penicillin, antibiotics, and vaccines for the domestic market and for export to regional markets. Bryant claims that the Korean partner

The pharmaceutical sector developed entirely separately from the chemical sector. The drug industry progressed through four development phases: as distributors of pre-packaged imported products; as packagers of imported bulk drugs; as producers of raw materials; and finally, as producers of existing pharmaceuticals, the formulas for which were obtained through reverse engineering. Few Korean companies have produced new drugs or novel compounds, and none have created new ethical drugs capable of generating substantial revenue. Not surprisingly, R&D spending by national drug companies has been low. In 1988, the year after reform, approximately US\$46 million was earmarked by the private sector for R&D, with that amount rising 25% to US\$58 million by 1990. Even with the increase, this represented less than 4% of sales. One major drug company, Dae Wong Pharmaceutical, spent just 3.2% of US\$110 million in sales on research in 1990. In comparison, US drug firms in 1990 spent between 13-15% of revenue on R&D (today, it is around 18%), with Japanese firms spending 11%, and Germans, over 17%.

Drug patenting in Korea reflected the halfhearted commitment to R&D. Between July 1, 1987, when the new patent law took effect, and December 31, 1990, 443 drug product patents were issued, but none of these new drugs were created in Korea.¹⁵ The percentage of pharmaceutical employees working in R&D was less than 2%, versus 23% in the US and 19% in Japan.¹⁶ Chaebols from the chemical industries (fertilizers, oil refinery, and petrochemicals) could afford to run R&D programs. They entered the pharmaceutical, biotechnology, and fine chemical sectors in the late 1980s and early 1990s, but have had little impact on the sector. Samsung set up its own pharmaceutical group, but even as late as 2003 it was less than one-

was so dependent on the MNCs for access to advanced medicinal products, that few broke away to compete head-on with the foreign firm. This began to change after the 1987 reform.

¹⁵ La Croix, Sumner J. and Kamaura, Akihiko (1996). "Product Patent Reform and Its Impact on Korea's Pharmaceutical Industry." *International Economic Journal* 10 (1).

¹⁶ La Croix, Sumner J. (1995). "The Rise of Global Intellectual Property Rights and Their Impact on Asia." *AsiaPacific Issues* 23.

twelfth the size of Yuhan, the largest national drug firm.¹⁷ Today, of the five largest national drug firms, only Dong-A, the maker of Bacchus-F, has an active R&D program aimed at creating new drug compounds. Of the other four firms, Yuhan and Hanmi concentrate on producing generic medicines, and Choongwae and Dae-woong, on licensing agreements with MNCs.

IPR reform if anything has made national firms more practical and less inclined to take risks with their overall business strategy. Rather than pour money into large R&D programs in order to move toward state-of-the-art drug creation, national firms are following one of three strategies to retain or grow their market share: produce traditional medicines (health tonics), produce or distribute branded drugs by partnering with MNCs, or produce generics or APIs (Active Pharmaceutical Ingredients, which are essentially bulk drugs) for export. Of the latter, several Korean firms voluntarily have instituted Good Manufacturing Practices (GMPs) for API production that exceed Korean governmental guidelines put forth in 1990 and instead meet the tougher GMP standards in the US and Europe. This permits them access to the largest API markets in the world. By the mid-to-late 1990s, Korean drug firms LG Bio Sciences, Chong Kun Dan (CKD), and Yuhan all had received USFDA approval for API production, and with it, the ability to export to American drug manufacturers. One motivation for the “quality in production” approach of Korean companies was the entry of Chinese and Indian API firms who were able to undercut Korean prices in selling to developing countries. Establishing a toehold in the US and European markets for future exploitation was a second motivation.

It is likely that in the next few years Korean drug firms will gravitate toward one of two business strategies: servicing primarily the domestic market, or competing internationally on quality and price. We see evidence of the second strategy already, not only with APIs but also with final products. Within three years of Biogen’s DNA recombinant hepatitis B vaccine coming off patent, LG Chem was selling a recombinant hepatitis B vaccine at 50-80% of the

¹⁷ Firm size based on market capitalization in 2003. Samsung Pharmaceutical was worth US\$22 million, and Yuhan, US\$278 million, as of February 2003.

current international price.¹⁸ There is little indication that Korean drug firms stand posed to introduce original, innovative products, either in the traditional tonic market or in conventional pharmaceuticals.

While it is too early to tell whether Korea will gain a notable share of the global drug market, it is likely that national firms will continue to lose a significant portion of the domestic market. The government separated the prescribing and dispensing of drugs in 2000, and as a result, foreign branded drugs are now prescribed and bought more frequently than locally produced generics.¹⁹ This explains the reversal in the top selling drugs in Korea mentioned earlier. Support for IPR among Korean firms continues to be weak since innovation and new drug creation is not a central business strategy of local firms.

MICROELECTRONICS

The government began promoting the development of the electronics industry in 1969 with great success. National firms started manufacturing simple consumer electronics such as portable radios for the domestic market, and later, manufactured TVs, microwave ovens, and VCRs almost exclusively for export. Production in the sector rose from US\$56M in 1968 to US\$7,300M in 1985, and US\$33,000M in 1991 (Sridharan 1996). During the 1970s and 80s, three-quarters of the sector's output was destined for overseas markets (Bloom 1992). As was the case in state targeted industries, chaebols controlled local production. In the electronics sector, the four largest chaebols were LG, Samsung, Daewoo, and Hyundai.

¹⁸ Milstien, J., and Candries, B. (2002). *Economics of vaccine development and implementation: changes over the past 20 years*, World Health Organization. Obtainable at http://www.who.int/vaccines-access/supply/economics_vaccineproduction.pdf.

¹⁹ Under the old system, physicians profited when they prescribed and sold lower-priced domestic drugs to patients because these were often discounted by the manufacturer below the government's reimbursement price. Absent a profit motive, inappropriate prescription decreased and doctors began prescribing branded drugs because they were seen as more effective than domestic generics. Another result of separating prescribing from dispensing was that retail pharmacies, who claimed just 31% of drug sales in 1999, accounted for 66% two years later.

TABLE 5.3: EVOLUTION OF THE ELECTRONICS INDUSTRY IN KOREA

	1960s	1970s	1980s	1990s
FINAL PRODUCT	radios, B&W TVs	color TVs	microwave ovens, VCRs, audio products, semiconductors	semiconductors, computers and peripherals
DESTINATION	domestic market	export under OEM	export under own name	export under own name
PRODUCTION	assemble imported parts & components	assemble imported parts & components	assemble local and imported parts	assemble local and imported parts
OBTAINING KNOW-HOW	MNCs in Korea	joint ventures with MNCs	reverse engineering, R&D in US, Europe	imitation, some technology generation

Several problems plagued the chaebols as new entrants to the global electronics market. Besides their technological dependence, the Korean firms had no name recognition, little access to world distribution channels, and nearly nonexistent marketing capabilities (Bloom 1992). Manufacturing under OEM agreements with American and Japanese firms solved, at least temporarily, all of these problems and helped the Korean firms surmount their inexperience. The arrangement also benefited the foreign partner as it allowed US and Japanese firms to circumvent currency issues (a high dollar and yen) that made it difficult to export from their home countries.

In the early 1980s, the government's focus turned to the semiconductor memory sector, and then, in October 1986, it announced the development of 4MB Dynamic Random Access Memory (DRAM) – cutting edge technology at the time – as a national project. Korea entered the sector at a propitious time. A trade dispute between the US and Japan had created a worldwide shortage of memory chips and opened the door to new suppliers. When three chaebols – Samsung, LG, and Hyundai – decided to expand into semiconductors, all faced the obvious problem of obtaining the manufacturing know-how necessary to meet current global standards in memory chips. In an attempt to attain this knowledge first-hand, a government research institute, the Electronics and Telecommunications Research Institute (ETRI), coordinated and oversaw a research consortium of private firms and public universities on DRAM manufacturing with some

success (Pecht et al. 1997).²⁰ Other firms decided to pursue OEM arrangements to gain manufacturing know-how. Most of the 256k DRAMS manufactured by Hyundai in 1988 were sold to Texas Instruments under an OEM, for example (Bloom 1992).

Clearly, though, the quickest way to acquire know-how was through the appropriation of foreign technology, and Korean firms sought it out aggressively. To illustrate, Samsung broke into the chip market in 1982 by creating a Semiconductor R&D Laboratory whose primary purpose was reverse-engineering the metal oxide semiconductors (MOS) developed abroad. A year later, when major US and Japanese chip producers refused to license their technology to Korean firms, Samsung systematically bought up small, distressed American firms to acquire proprietary chip designs. Samsung set up a provisional R&D site in Silicon Valley to pass on locally obtained chip know-how back to the head R&D office in Seoul. Finally, the chaebol hired the same Japanese firm that had built the Sharp semiconductor plant in Japan to build its production facility “virtually copy[ing] Sharp’s system to expedite its process development.”²¹ These open, bold tactics enabled Samsung to sell copies of US chips within three years of their introduction, and within 18 months of Japanese versions.²² In 1984, Samsung became the first non-American and non-Japanese firm to sell DRAM chips on the international market. By 1992, Samsung became the world’s largest DRAM supplier, with LG close behind (Sridharan 1996).

Despite Korea’s rapid success in semiconductors, capital investment in the sector was low when compared with Japan. In the three years between 1987 and 1989, Koreans invested US\$3 billion in chip fabricators while the Japanese invested US\$4.5 billion in 1988 alone (Bloom

²⁰ The consortium spent US\$110M in R&D between 1986 and 1989, 57% of which was government money. It later disbanded due to competitive tensions between the chaebols. Interestingly, ETRI was the first Korean entity to receive an international (US) process patent in semiconductor manufacturing. The year was 1987. Samsung was second in 1989.

²¹ Kim, Linsu (1997a). "The Dynamics of Samsung's Technological Learning in Semiconductors." *California Management Review* 39 (3): 86-100.

²² While this may have been a typical way to gain entry into a new industry, Samsung’s tactics within the context of the period were perceived by its foreign competitors as highly underhanded. These and similar tactics by other Korean firms served to strain Korean-US relations, and Korean-Japanese relations as well. In fact, many joint-ventures between Japan and Korea collapsed during this time due to Korea’s methods of obtaining foreign technology. See Kong, T. Y. (2000). *The Politics of Economic Reform in South Korea: A Fragile Miracle*. London, Routledge.

1992). This was early indication that Korean firms would continue to concentrate on memory production instead of switching to microprocessors and logic chips, both more capital intensive endeavors. DRAMs require less design input, and thus, less research and development. DRAM production is, in effect, commodity production. To be competitive, firms must excel in high-volume output, which the chaebols had demonstrated skill (their export performance in consumer electronics is one example). Korean firms went after this commodity market, and essentially ignored the higher value-added and more R&D-intensive chips. Even as late as 1995, 91% of the semiconductors Korea produced were memory chips.

Unlike pharmaceuticals, IPR plays at best a minor role in stimulating innovation in the sector. Several empirical studies have shown that the semiconductor sector is “one of the industries least reliant on patents to appropriate returns” on innovation. In fact, market lead-times and learning curve advantages have proven to be more effective means of appropriating profits than IPR.²³ This is especially true in memory where process innovations, not product innovations, are what give a manufacturer market advantage. Patents are used less to protect a firm’s commercialization and licensing earnings (the traditional use of patents) and more to force competitors to negotiate favorable technology rights, crucial in a sector where advances in technology are, in Cohen’s words, “a cumulative process.” One exception is the chip layout design or mask work. Here, recent empirical work has established that firms rely on patents primarily to protect proprietary rights. In fact, Ziedonis (2000) found that firms were more likely to protect mask work innovations via patents than copyrights (*sui generis* protection) and much more likely to bring legal action against infringers. Drawing on this distinction between the two types of process patents – manufacturing and mask works – we look at the patenting practices of Korean chip producers.

²³ See Cohen, Wesley M.; Nelson, R. R., et al. 2000. "Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)." NBER, 7552. And also, Hall, Bronwyn H. and Ziedonis, Rosemarie H. (2001). "The Determinants of Patenting in the U. S. Semiconductor Industry, 1980-1994." *Rand Journal of Economics* 32: 101-28.

TABLE 5.4: INTERNATIONAL (US) PATENTING IN SEMICONDUCTORS, 1980 TO 2004

	Patents for manufacturing process	Patents for chip design or mask works ²⁴
1980s		
ALL COUNTRIES	5,929 (100%)	232 (100%)
JAPAN	1,395 (24%)	79 (34%)
TAIWAN	6 (0%)	0 (0%)
KOREA	4 (0%)	0 (0%)
1990s		
ALL COUNTRIES	19,074 (100%)	1,653 (100%)
JAPAN	5,740 (30%)	477 (29%)
TAIWAN	1,819 (10%)	5 (0%)
KOREA	1,278 (7%)	4 (0%)
2000 TO 4/2004		
ALL COUNTRIES	28,085 (100%)	2,693 (100%)
JAPAN	6,677 (24%)	636 (24%)
TAIWAN	4,036 (14%)	50 (2%)
KOREA	2,182 (8%)	20 (1%)

Korean firms began to take out international patents for the chip manufacturing process soon after the 1987 reform, but the first patent dealing with the etching of chip designs or mask works was not obtained until 1998. Using US patent data, we compare the number of semiconductor patents granted to Japan, Taiwan, and Korea for the manufacturing process and the design process. (We add Taiwan for purely comparative purposes.) During the 1980s, patents granted for semiconductor processes totaled 5,929 and for the mask work 232, with Japan garnering 24% and 34% respectively. Korea obtained 6 of 5,929 manufacturing patents. (See table 6.4 above.) Throughout the 1990s, Korea picked up 7% of all chip manufacturing patents

²⁴ Patents for the mask work have to do with the *process* of etching the design on the wafer. The layout design itself is protected by a special type (*sui generis*) of copyright. Mask work patents must meet one of the following USPTO descriptors:

- (a) Processes or apparatus for sketching, designing, and analyzing circuit components;
- (b) Processes or apparatus for planning, designing, analyzing, and devising a template used for etching circuit pattern on semiconductor wafers.

Manufacturing process patents are listed under PTO classification 438, and mask work process patents under classification 716. Several classifications may be listed for each patent. To prevent double counting, patents which listed both 438 and 716 were grouped by the primary classification. Although semiconductor patents may also report other classifications, 438 and 716 are the main classes for manufacturing chips. This table is meant to reflect the patenting behavior of several countries over time, and not as an exhaustive summary of granted patents in the field of integrated circuits.

even though the chaebols were ranking first or second as global suppliers of memory. The picture did not change much beginning in 2000. From that year through April 2004, Korean firms were granted 8% of all semiconductor manufacturing patents, about half the number awarded to Taiwanese firms. In mask works, Korea had obtained 24 patents since 1990, and Taiwan 55. While the percentage of manufacturing and mask work patents taken out by Japanese firms was balanced (between 24% and 30% of the total), Korean firms acquired few patents in chip layouts (less than 1% of the total). The emphasis on manufacturing patents indicated that Korean firms were relying on patents for the reasons Cohen et al. suggested: “largely to deter threats of litigation and to improve their bargaining positions in negotiations with external patent owners.”²⁵

The chaebols have been less aggressive in moving into more innovative intensive areas (the production of microprocessors, for example), preferring instead to concentrate on maintaining their global market share in memory chips.²⁶ Since IPR in the semiconductor sector has a peculiar utility, it is a poor *direct* measure of innovative capacity. It can, however, proxy the degree to which a country has reached world technology standards. Semiconductor firms acquire large portfolios of patents to use as bargaining tools to gain rights to a competitor’s patent portfolio. This ability to bargain for cross-licensing rights is crucial in an industry thick with proprietary rights, where fabrication plants cost upwards of US\$1B and are obsolete within 5 years, and where infringement litigation can force companies to suspend production for 2 or 3 years often precipitating bankruptcy. Korean firms did not begin to amass such defensive portfolios until the 1990s, more than four years after IPR reform.

SOFTWARE

²⁵ Cohen, Wesley M. and Merrill, Stephen A., Eds. (2003). *Patents in the Knowledge-Based Economy*. Washington DC, National Academies Press.

²⁶ Korea continues to hold the largest share of the global DRAMs market (40%), but controls only 1.5% of the market for non-memory semiconductors. Memory chips represent less than a third of the global semiconductor market.

The Korean software industry began developing in the early 1980s and grew rapidly. The annual growth rate for software sales averaged 57% between 1985 and 1991, compared with the world average of 16% over the same time period (see table 6.5 below). The number of domestic software firms more than doubled to 702 from 305. Unlike the microelectronics sector, low entry barriers permitted new firms continually to enter the domestic market and the industry was dominated by small firms, many with fewer than 100 employees.

TABLE 5.5: SOFTWARE INDUSTRY IN KOREA, 1985 TO 1991

	1985	1986	1987	1988	1989	1990	1991	AAGR
NUMBER OF FIRMS	305	352	392	463	615	654	702	14.9%
SALES IN BILLION WON	50.8	100.9	133.6	216.6	339.9	580.7	758.0	56.9%

Source: Jungwon Lee and Jinjoo Lee (1994).

These growth figures notwithstanding, the country's capacity for technological innovation in software was weak. Korea relied heavily on imports particularly in those areas, such as system software, where the domestic skill set was at its most basic level. Foreign-made software accounted for 45% of sales in 1986, and had remained nearly constant, at 43%, four years later.²⁷ The skill level in application software was more advanced. Local firms possessed a slight advantage in application software due to their ability to translate office software into the local language. They also had detailed knowledge of the numerous documents needed to conduct business in the country, and this could be incorporated into word processing and other types of software. This local advantage was never sufficiently leveraged, however. Even though the sector was internally oriented (exports accounted for just 2% of all sales in 1990), and customized software accounted for 70% of the market, there remained a lack of specialist software firms. The country's shortage of proficient programmers was no doubt a contributing factor. And the cost of creating new system software in-house was a heavy a burden for many small firms.

²⁷ Lee, Jungwon and Lee, Jinjoo (1994). "Competitive Structure and Strategic Types in the Korean Software Industry." *Technovation* 14 (5): 295-309.

Though Korea's dependence on advanced industrialized countries for vital software concerned the government, industrial policy targeting the software sector was late in coming. In 1989, only 4.2% of the monies the government earmarked for information technology projects were pegged for software development. Lee and Lee (1994) claimed the government's "hardware oriented policy put the Korean software industry far behind that of other developing countries such as Taiwan and Singapore." One comprehensive policy, the "Basic Plan for Software Development," was put forth by the Ministry of Science and Technology (MOST) in 1990. The policy had as its primary objective entering the top five software development countries, but set specific sub-goals that were considerably less lofty (e.g., developing technological know-how, boosting domestic demand for software, and training new programmers). The government's pledge to develop the software sector lacked the vigor of its pledge to microelectronics. Software is less standardized than hardware. Policy concerning the latter need only set a narrow industrial goal (e.g., produce 4M DRAMs), achievable through imitation and mass production with ample support from the government. Development of the software sector is not so straightforward. Product differentiation, particularly in system software, requires a high level of innovative capability (and R&D) which was hampered by the domestic industrial structure.

Software has traditionally been protected by copyright. The first law dealing with the protection of software in Korea—the Computer Program Protection Act of 1987 (CPPA)—was a form of copyright protection and was enacted at the same time as patent reform. There was little initial interest in extending patent protection to software in the late 1980s. Even a prominent patent attorney was dubious about the utility of patents for computer programs, writing that "patent protection for computer software will probably be unnecessary or inappropriate in most cases."²⁸ Following Japan's lead, the Korean Intellectual Property Office set out patent

²⁸ Lee, Tan Hee (1986). "Legal Protection for Computer Software: Korea's Careful Progress toward International Standards." *Law/Technology* 19 (1): 27-50. It is useful to keep in mind that the United States did not begin permitting software patents until 1981. The deciding case was *Diamond v. Diehr* in which the US Supreme Court upheld the patentability of a process for curing and molding synthetic rubber that

examination standards for “computer-related inventions” in January 1985, but for software to be patent eligible it had to be “part of a patentable apparatus or system.” The pendulum started moving toward patentability in 1993 when the contents of computer databases were afforded copyright protection. Gradually the idea of software patents began to take hold. Applications for patent protection of electronic commerce began to be filed in the mid to late 1990s, and any remaining ambiguity over the patentability of software *per se* was swept away with the 2001 measure allowing business method patents. Though the software industry did not push for IPR reform in 1987, business method patents were most likely a response to local demand. Today, the IPR regime in Korea is more protective than is the European regime, given that the EU as of April 2004 has continued to refuse to extend patent protection to computer software programs.²⁹

Of the three industries discussed here, domestic microelectronics firms have benefited the most from stronger IPRs; for the pharmaceutical and software industries, the advantages of reform are less clear.³⁰ In microelectronics, the major change in intellectual property law concerned the mask work itself; discrete chip elements (i.e., diodes, capacitors) and the chip manufacturing process had been protectable under the old regime. But conferring protection on

relied on a computer program to open a mold or press at a designated time. The Court ruled that a process controlled in part by computer software was not automatically rendered ineligible for patent protection. See Merges, Robert Patrick (1992). *Patent Law and Policy: Cases and Materials*. Charlottesville, Virginia, The Miche Company.

²⁹ Though the European Patent Convention does not extend patent eligibility to computer programs, in truth, many firms are exploiting the ambiguous working in the EPC to file for and receive software patents. Article 52(2) of the EPC prohibits the patenting of, among other things:

- a. discoveries, scientific theories and mathematical methods;
- b. aesthetic creations;
- c. schemes, rules and methods for performing mental acts, playing games or doing business, and *programs for computers* (italics added);
- d. presentations of information.

As of April 2004, some members of the European Union have considered revising the law to explicitly include software and database patents. (Other members vehemently oppose a change.) The legal situation in Europe is complicated since two separate entities oversee patent issues. One is the 15-member EU; the other is the 19-member European Patent Office (EPO) established by the EPC. The EPO has been granting software patents by claiming software *with a technical character* can be patented though the law itself appears to proscribe such patents.

³⁰ As a side note, enforcement of software IPRs has been patchy in Korea and continues to be a source of tension between the US and Korea. IPR in microelectronics and pharmaceuticals is regularly enforced. This seems to mirror the country’s uneven support of the software industry in general.

the mask work, which began with the US and spread to Japan and Korea, precipitated a sea change in the industry, supplanting the “gentleman’s agreement” between firms to freely share technology, with a highly litigious environment requiring firms to acquire extensive IP portfolios in self defense. When Korea reformed in 1987 and joined the ranks of the US and Japan as regards intellectual property laws, Korean firms were compelled to use IP in the same tactical way. IPR reform played a reciprocal function (vis-à-vis the US, Europe, and Japan) and permitted Korean firms to join the club of a dozen or so global chip makers where patents were the mandatory dues.³¹

SCIENCE AND TECHNOLOGY

A persistent problem stemming from the state-led industrialization model Korea followed, and raised in the preceding discussion, was the country’s dependence on foreign technology. The strides the country made in industrialization and in export competition did little to lessen the problem. A 1996 OECD report measured Korea’s technological dependence as the expenditure ratio of technology imports to domestic R&D. From 1977 to 1981, that ratio was 21%; from 1982 to 1986, it was 20%; and from 1987 to 1993, 18%. (In 1975, Japan’s technology imports to R&D was just 5%.) This led the OECD authors to conclude that in order for Korea to stay globally competitive it had to “raise the value-added and technological intensity of what it produce[d].”³² In 1984, the Ministry of Science and Technology (MOST) commissioned a study which evaluated the country’s technology use compared with advanced industrialized countries. The US was assigned a score of 100, Germany followed with 55, Japan was given 50, and Korea

³¹ One legal scholar summarized the function of IP in the chip industry: “Due to the large size of the patent portfolios of large semiconductor companies, it becomes prohibitively expensive to investigate adequately all claims of infringement by competitors and litigate against the alleged infringers. Therefore, most semiconductor manufacturing companies enter into broad cross-licensing agreements with their competitors. These agreements allow unrestricted use of their technology in return for similar rights and/or cash from their competitors.” See Radomsky, Leon (2000). “16 Years after the Passage of the US Semiconductor Chip Protection Act: Is International Protection Working?” *Berkeley Technology Law Review* 15 (1049).

³² Cited in Kong, Tat Yan (2000). *The Politics of Economic Reform in South Korea: A Fragile Miracle*. London, Routledge.

trailed at 3.³³ A 1986 internal report by the Bank of Korea determined that Korean firms spent more on entertainment (i.e., lobbying) than they spent on research.³⁴ General Motors' budget for R&D was US\$4.7B in 1990, more than the whole of Korean industry (US\$4.4B).³⁵ The development of national technological capacity rested on indigenous R&D efforts, the purchase of mature technology from abroad, and last, undertaking reverse engineering of foreign products. We have discussed the second and third of these factors already; we turn now to the first.

Korea's effort at generating its own technology is most notable in the rise in R&D outlays between 1980 and 1994. Money directed toward research (public and private) during this time increased 28 fold; for industry alone, it increased by a factor of 65. Not surprisingly, the top five chaebols accounted for nearly a third of private spending on R&D in 1993. By the late 1990s, Korea spent as much on R&D as a percentage of GNP as did the United States and Japan.

TABLE 5.6: R&D EXPENDITURES IN KOREA, IN BILLION WON

	1975	1980	1985	1990	1994
PUBLIC	28.5 (67%)	180.0 (64%)	306.8 (25%)	651.0 (19%)	1257.1 (15.9%)
PRIVATE	14.2 (33%)	102.5 (36%)	930.3 (75%)	2698.9 (81%)	6634.5 (84%)
TOTAL	42.7	282.5	1237.1	3349.9	7894.7
% OF GNP	0.42%	0.77%	1.58%	1.95%	2.61%

Sources: *Korea Industrial Technology Association, as cited in Lim (1998, p93); Kim (1997, p55), and UNESCO, various years.*

In the private realm, Korean firms began to establish corporate research and development centers in significant numbers during the second half of the 1980s (see Table 5.7). These firms also built R&D facilities overseas. In the US, for example, Korean enterprises had set up a dozen R&D centers by 1992; six years later, the number had reached 32. (This was still far behind

³³ Charters, Ann. (1984). "New Law Will Ease the Transfer of Know-How." *Financial Times*. July 12. IV Technology, 8.

³⁴ Kong, Tat Yan (2000). *The Politics of Economic Reform in South Korea: A Fragile Miracle*. London, Routledge.

³⁵ Ibid.

Japan's 251 and Germany's 107, however.)³⁶ Between 1993 and 1996, Korean investment in R&D in the US grew from US\$55M to US\$351M.

TABLE 5.7: CORPORATE R&D CENTERS IN KOREA

	1980	1985	1990	1994
NUMBER OF R&D CENTERS	54	183	966	1,980

Source: Kong (2000, p 170).

The push by industry to boost R&D activity did little to change an ingrained ethos at the conglomerates of relying on external sources for technology. Even as late as the 1990s, in the midst of the government's program to intensify indigenous innovative capacity, chaebols entered into partnerships with foreign firms chiefly to obtain technology.³⁷ Two-thirds of Korea's royalty payments went to overseas companies.³⁸ And though Korea had dominated large portions of the global DRAM market by 1989, in 1995 they still depended on the US and Japan for 84% of the machinery needed to manufacture chips. This dependence is evidenced by the country's constant trade deficit with Japan in critical components and equipment. While chaebols clung to strategic technical alliances, their very success at emulation made foreign "market leaders wary of technology transfer to Korea" (Kong 200, p169).

³⁶ Dalton, Donald H. 1999. "Globalizing Industrial Research and Development." Congressional Informational Service, As of 1998, there were 715 foreign owned R&D centers in the US; Japan and Germany accounted for half of them. Of R&D expenditures spent in the US by foreign firms, Switzerland and Germany ranked first (US\$3.3B), Japan third (US\$3.2B), and the UK fourth (US\$3.1B). Total foreign R&D expenditures were US\$19.7B.

³⁷ In a book highly favorable to industry, the authors noted that in joint ventures "chaebols generally bring cash, production processing experience, and access to new markets with them to the negotiating table; foreign firms generally bring the necessary technology (p10)." See Pecht, Michael; Bernstein, J.B., et al. (1997). *The Korean Electronics Industry*. Boca Raton, CRC Press.

³⁸ Ibid. The high cost of technology was a constant concern of the chaebols. In a cost-cutting measure, Samsung and Goldstar reached an agreement in June 1992 to cross-license their patent holdings, even in highly competitive areas such as liquid crystal display technology. This enabled Samsung to cut royalty payments from 12.2% of sales in 1989 to 6.7% of sales in 1991. See Paisley, E. (1992). "South Korea: Trade and Investment - Time for a New Start." *Far Eastern Economic Review*, August 13. See also Lee, footnote 24.

In the public realm, the state transferred basic research from universities to influential Government Research Institutes or GRIs. University research was deemed underdeveloped, inadequate, or ineffectual depending on the critic. In the late 1980s, GRIs became the “backbone of advanced R&D in Korea” and received 90% of the government’s research grants.³⁹ Their role in the country’s industrial growth and expansion cannot be overstated. It was the GRIs who spearheaded the development of new technologies, not the private sector and not the university, as is the case in the US and Britain. Of the top 30 Korean entities holding international patents through 1999, 7 were GRIs and the remaining 23 subsidiaries of major chaebols. The government’s direct role in creating new technologies meant that science and technology policy generally had a greater impact on industry than similar policies did elsewhere. However, the effectiveness of the GRIs in stimulating technology generation in the private sector was dubious. Korean industry’s strengths lied in its ability to commercialize, not invent, new products.

We draw several conclusions from this section’s discussion of high-tech industry, science and technology. In Korea, the prevalence of chaebols has tended to slow the transition from acquiring to creating technological knowledge. These large enterprises were uninterested in IPR reform in 1987; neither did they champion reform after the fact. Samsung, the largest chaebol and “the South Korean economic miracle’s showcase high-tech progeny,” as Charles Lee wrote in 1997, “is belied by its dependence on foreign technology.”⁴⁰ Lee concluded that Korea’s technology deficiencies *even at end of the 1990s* were the country’s Achilles’ heel “requiring drastic surgery”. And while the chaebols have grasped the strategic importance of IPR –

³⁹ Kim, Linsu (1997b). *Imitation to Innovation: The Dynamics of Korea's Technological Learning*. Boston, Harvard Business School Press. See also Schoening, N.; Souder, Wm., et al. (1998). "The Influence of Government Science and Technology Policies on New Product Development in the USA, Uk, South Korea, and Taiwan." *International Journal of Technology Management* 15 (8): 821-835.

⁴⁰ Charles S. Lee. *Far Eastern Economic Review*. July 24, 1997. Lee cited the conglomerate’s high royalty payments to overseas companies which dampened Samsung’s profits.

approximately 90% of all US patents awarded to Koreans go to the 5 largest chaebols⁴¹ – it is more likely that new, small, entrepreneurial firms ultimately will drive technological innovation in the country. Many of these newer companies are spending more than 20% of their revenues on R&D and are seeking to create global market niches.⁴² It is clear that obtaining technology the old way is proving futile “because of...increasingly uninterested foreign partners.”⁴³ Ironically, the main obstacles to stimulating local innovation are directly attributable to state policy. We have elaborated on three of these obstacles: a monopolistic and noncontestable industrial structure (except for software), an export-orientation model with heavy focus on scale, and severely restricted FDI that resulted in low levels of foreign investment (only 7% that of Brazil’s in the 1980s).

The evidence we will present in Chapter 6 confirms that Korea captured benefits from IPR reform. But we make the point here that there is little support for the view that the surge in patenting by Korean firms both at home and abroad was due to a comparable surge in innovation.

⁴¹ Luthria, Manjula and Maskus, Keith (2003). Protecting Industrial Inventions, Authors' Rights, and Traditional Knowledge: Relevance, Lessons, and Unresolved Issues. *East Asia Integrates: A Trade Policy Agenda for Shared Growth*. K. Krumm, and Kharas, Homi. Washington DC, IBRD, World Bank.

⁴² Noland, Marcus (2002). *Economic Reform in Korea: An Unfinished Legacy*. Korea as a 21st Century Power, University of Cambridge. 3-6 April, 2002, Luthria, Manjula and Maskus, Keith (2003). Protecting Industrial Inventions, Authors' Rights, and Traditional Knowledge: Relevance, Lessons, and Unresolved Issues. *East Asia Integrates: A Trade Policy Agenda for Shared Growth*. K. Krumm, and Kharas, Homi. Washington DC, IBRD, World Bank.

⁴³ See Paisley, E. (1992). "South Korea: Trade and Investment - Time for a New Start." *Far Eastern Economic Review*, August 13. He cites the collaboration between IBM, Toshiba, and Siemens to develop a new generation of DRAM chips, and the noticeable shutting out of Korean firms. Others have documented Japan's unwillingness to transfer technology to Korea for fear of losing market share. Two well-known examples involve microwave ovens and the color TV picture tube (Kong 2000, p103). One scholar wrote that Korean firms in the mid-1990s “cited technology as the most critical barrier to their export competitiveness.” Diamond, Larry and Kim, Byung-Kook, Eds. (2000). *Consolidating Democracy in South Korea*. London, Lynne Rienner.

Bilateral Bargaining and IPR Reform

We know that direct pressure from the United States, including the threat of punitive trade action, prompted the Korean government to reform its IPR regime in 1986. In the previous chapter, we stated that the US position on tighter IP protection worldwide solidified during the 1980s. Korea played directly into American concerns at the time. The overarching issues included the US trade deficit which rose to unprecedented levels beginning in 1983, and the precipitous decline of microelectronics and other high-tech exports. The US share of the global high-tech market fell from 34% to 29% between 1986 and 1990. An economic recession hit in 1988. And in 1989, the percentage of US patents awarded to non-residents hit an historic high of

TABLE 5.8: TRADE DATA FOR THE UNITED STATES, 1983 TO 1989

US\$ B	1983	1984	1985	1986	1987	1988	1989
EXPORTS	201.7	218.7	212.6	226.4	253.9	323.3	362.9
IMPORTS	261.7	330.5	336.4	365.7	406.3	441.9	473.4
SURPLUS (DEFICIT)	(60.0)	(111.8)	(123.8)	(139.3)	(152.4)	(118.6)	(110.5)

Source: Bureau of Economic Analysis, US Dept of Commerce, various years.

48%; nearly half of all US patents granted that year went to foreign inventors. At the same time, several developing countries began to show impressive growth, spurred surprisingly by their exportation of high-tech products.⁴⁴ By the mid 1980s, imports from Korea, Taiwan, and Japan accounted for nearly half of the US trade deficit. Between 1981 and 1985, Korean exports to the US doubled.

Korea's standing as a member of the world economy was soaring by the mid 1980s. The country's current account showed rising surpluses for three years in a row beginning in 1986 indicating that, at least on some level, the promotion of the heavy and chemical industries during

⁴⁴ For example, US global market share was more than one-third from 1980 to 1987, dropping to an average 30% between 1988 and 1995, a decline of 9%. At the same time, Korea's high-tech global market share rose from 1.1% in 1980 to 4.1% in 1995, an increase of 273%. NSF (2002). *Science and Engineering Indicators, Chapter 6*. Washington DC, National Science Foundation. One example often mentioned was the US share of the global market in DRAM chips. It had dropped to 17% in 1986 from 75% in 1980.

the 1970s and the high-tech industries in the 1980s had paid off. The high import barriers that Korea had maintained, and continued to maintain well into the 1990s, also contributed to the country's trade surpluses.

TABLE 5.9: TRADE DATA FOR KOREA, 1985 TO 1990

IN US\$B	1983	1984	1985	1986	1987	1988	1989
EXPORTS	24.4	29.2	30.3	34.7	47.2	60.6	62.4
IMPORTS	26.2	30.6	31.1	31.6	40.0	51.8	61.5
SURPLUS (DEFICIT)	(1.8)	(1.4)	(0.8)	3.1	6.2	8.8	0.9
EXPORTS TO US	8.3	10.5	10.8	13.9	18.4	21.5	20.7
% TO US	34%	36%	36%	40%	39%	35%	33%

Source: *International Trade Statistics, United Nations Statistic Division, various years.*

For US politicians, it was not the dismal trade figures alone that were alarming, but the trade deficit combined with the apparent ebb of American industrial superiority. The latter was attributed largely to the misappropriation of American technology. US policymakers were lured by the prospect that if they could control the global diffusion of American technology, they could halt American industrial decline.⁴⁵ Prominent economists and politicians began advocating for a strategic approach to managing the nation's trade relations. David Teece, an expert in innovation practices, wrote in 1987 that "the notion that the US can adopt a designer role in international commerce while letting independent firms in other countries such as Japan, Korea, Taiwan, or Mexico to do the manufacturing is unlikely to be viable as a long-run strategy because profits will accrue primarily to the low-cost manufacturers..."⁴⁶ Policymakers heeded Teece's forewarning.

⁴⁵ A common, cogent argument for controlling the unauthorized use of technology would point to the fate of the US electronics sector and compare it with the steel and auto sectors. The latter two enjoyed some measure of protection from foreign competition via trade barriers like voluntary restraint agreements. The electronics sector was not afforded any legal protections, and so, it was argued, was hit twice – once through the government's resistance to impose VERs, and then by the government's failure to protect the industry's main source of competitiveness: intellectual property. See Ryan, Michael P. (1995). "Ustr's Implementation of 301 Policy in the Pacific." *International Studies Quarterly* 39: 333-350.

⁴⁶ Teece, David J. (1987). *Capturing Value from Technological Innovation: Integration, Strategic Partnering, and Licensing Decisions.* Technology and Global Industry. B. Guile, and Brooks, Harvey. Washington DC, National Academy Press.

Brazil's weak IPR regime was deemed unfair since it permitted Brazilian manufacturers to freely appropriate US technology; but Korea's weak regime was regarded as a direct threat to American competitiveness.

Korea became a primary target of US action, then, for a number of related reasons. First, many political and industry leaders saw a correlation between Korea's ascendancy in high-technology sectors and America's waning supremacy in those same sectors. US firms' dwindling world market share was believed due to deliberate price undercutting by Korean firms and other foreign competitors. Korea's method of acquiring foreign technology also fueled tensions between the two countries (as well as between Korea and Japan).⁴⁷ Additionally, US politicians were becoming convinced that Korea had outgrown the need for special treatment since, by the 1980s, the growth of the Korean economy was outpacing economic growth in the US.⁴⁸ The confluence of these grievances, combined with a mounting trade deficit with Korea, led US policymakers to act. The measures the government took to protect the US semiconductor sector illustrates well how the linkages between the perceived loss of US technological leadership, Korea's penchant for reproducing foreign technology, and concerns about balance of payments and overall American competitiveness influenced the substance and thrust of US policy. It also foreshadowed the general policy towards IP that followed.

Foreign competitors in Japan, and much later in Korea and Taiwan, began copying and selling US and European-designed semiconductors in the mid 1970s.⁴⁹ In bypassing the costly development stage of chip design simply by replicating existing designs, competitor firms could

⁴⁷ A number of articles began appearing in the press in the early 1980s detailing the rising tensions between Korea and Japan over technology transfer. A 1983 article in *Business Week* cited the "prickly Korean-Japanese relationship" due to the reluctance of Japanese businessmen to help Korea become an advanced industrial power. Koreans, in turn, complain about Japanese firms sharing "only medium-level technology". One Japanese official insisted that "Japanese firms learned from the US and became competitors of the US. They aren't going to let Korea do the same thing to them." Helm, Leslie (1983). "Japan Grudgingly Lends Korea a Helping Hand." *Business Week*, October 3.

⁴⁸ By special treatment we refer to the unilateral support the US provided to Korea after the Korean War, including open access to the American market for Korean products and significant transfers of American technology and technical expertise to Korea.

⁴⁹ For background, see Stern, Scott; Porter, Michael E., et al. 1999. "The Determinants of National Innovative Capacity." Harvard Business School Working Paper, 00-034.

undercut the original American manufacturers' price. These chips, essentially copies of American and European circuit designs, inundated the world market. In 1984, the US Congress, responding to the semiconductor industry's appeals for help, passed the Semiconductor Chip Protection Act which extended sui generis protection to the layout design or mask work.^{50,51} The Act permitted the US government to apply the new law to *foreign-produced* semiconductors sold in the US. The goal was to eliminate at least one large outlet for forged chips – the American market, and to force other countries to enact similar legislation.⁵² Towards the same goal, the International Trade Commission (ITC), on behalf of US chip manufacturer Texas Instruments (TI), brought action against nine foreign chip manufacturers for unfair trading practices. In its ruling, the ITC ordered seven foreign companies to pay US\$204M to TI; the remaining two settled for undisclosed amounts. It was the first time US trade law had been used to defend intellectual property. From this point forward, US policymakers were steadfast in their goal to coerce foreign governments to pass and enforce stronger patent laws.

OPPOSITION TO REFORM IN KOREA

Obviously, had the Korean government wanted to legislate tighter patent policy it would have done so without prodding from the US government. One scholar noted that “strong opposition of the Korean government as well as virtually all Korean chemical and pharmaceutical firms to product patents signaled a probable loss of wealth under the new patent regime” (La

⁵⁰ Often called the “sixth pillar of US IPR policy”, the Semiconductor Chip Protection Act of 1984 (SCPA) extended sui generis copyright protection to the mask work or chip topology. The law granted 10 year exclusive rights to “the predetermined, three-dimensional pattern of metallic, insulating, or semiconductor material present or removed from the layers of a semiconductor chip product; and...the relation of the images to one another in that each image has the pattern of the surface of one form of the semiconductor chip product” [directly quoting from the law]. “Sixth pillar” reference from Besen, Stanley M. and Raskind, Leo J. (1991). “An Introduction to the Law and Economics of Intellectual Property.” *Journal of Economic Perspectives* 5 (1): 3-27.

⁵¹ The SCPC was made obsolete by TRIPS which directly addresses the protection of mask works in Section 6, Articles 35-38. The Washington Treaty, an international effort aimed at harmonizing IP laws dealing with semiconductors, was also replaced by the more stringent standards outlined in the TRIPS Accord.

⁵² In 1985, Japan passed legislation permitting intellectual rights protection for semiconductor layout designs. Europe enacted similar legislation in 1987.

Croix and Kamaura 1996). Sensing growing pressure from abroad for domestic reform, Korean industry began actively lobbying their government to forestall changes to Korean IP law. The government did not permit chemical or pharmaceutical product patents, and domestic firms wanted the eligibility restrictions sustained. Even before the US ITC brought suit against the nine foreign chip makers in 1985, the Korean chemical and pharmaceutical industries had organized the “Council of Chemical Product Patents” which, contrary to what the name might denote, opposed granting property rights to chemical substances.

The chemical sector’s stance on IPR was predictable, as was the resistance to patent reform from all of industry generally. The government’s economic development platform since the late 1970s hinged on head-to-head competition with world market leaders in high-technology. The expertise of Korean manufacturers was nowhere near the frontier of technology, so as we have seen, they played their strongest card, competing on price rather than product innovation or differentiation. Under pressure to meet export quotas, Korean manufacturers reproduced in mass products invented elsewhere. Sung-Hee Jwa summarized these state-induced constraints on domestic firms and asserted that “persistent government intervention destroyed private sector incentives for creative economic ventures” (2001). As in Brazil, structural obstacles to private innovation gave rise to an industrial base bitterly opposed to amending or expanding intellectual property rights.

There was an underlying political dimension to Korea’s opposition to reform as well. By the 1980s, Korea was no longer competitive in many labor-intensive industries such as textiles and simple consumer electronics. Accordingly, the National Assembly resisted moves to hasten the opening of the domestic market. This protectionist bent exacerbated tensions between Korea and its trading partners, particularly the US. In 1981, the Korea-US Economic Consultation Trade Subgroup was formed to address trade issues that arose between the two countries. This institutional approach to defusing trade disputes, however, did little to dispel or conceal an internal debate in Korea over the nature of its relationship with the US. On the one hand, Korea

needed to preserve its special connection with the US in order to maintain access to the American market. On the other hand, Korean politicians wanted autonomy, the right to legislate domestic policy as they wished. This latter point went deeper than simple self-rule. Korea used IPR to convey and pursue national strategies; for example, preservation of the national market and ethnic closure.⁵³ Up until 1974, Korea singled out Japanese inventors and prohibited them from applying for or obtaining Korean patents even if they resided in the country.⁵⁴ Discriminatory treatment towards Japanese chemical and pharmaceutical patents persisted over the next decade leading to a collapse in bilateral talks between the two patent offices from 1986 until 1993 when the issue was resolved. South and North Korean patents were null and void in the other country until a 1992 agreement on North-South exchange explicitly addressed reciprocal protection.⁵⁵ And Korea refused to grant copyright protection to non-Korean authors, even those residing inside the country. Reform, in short, meant relinquishing what had become an active foreign policy tool. When the US insisted that the country reform its IPR regime, it “provoke[d] an outburst of anti-American protest”.⁵⁶ In late 1985, in response to increasing pressure from the US for patent reform, Korean students poured gasoline on the office of the American Chamber of

⁵³ Song, Sang-Hyun and Kim, Seong-Ki (1994). "The Impact of Multilateral Trade Negotiations on Intellectual Property Laws in Korea." *UCLA Pacific Basin Law Journal* 13.

⁵⁴ Up until 1981, Korean patent law barred foreigners without a Korean address or place of business from applying for patents. This changed when Korea joined the Paris Convention and acceded to its international priority rule. Foreigners were allowed to apply for patents but were required to use a Korean sponsor. Most of the discriminatory treatment towards Japanese businesses stemmed from intense competitiveness between the two countries. Scholars have noted other discriminatory measures Korea applied to Japan. “Korea used a form of VER to ban imports of automobiles and electronics from Japan, its most serious competitor. This agreement (to which Japan was not even a consenting party) began to function in the 1980s and remained in effect until 1999, long enough to allow these industries to build up their knowledge-based assets.” See Amsden, Alice and Hikino, Takashi (2000). "The Bark Is Worse Than the Bite: New WTO Law and Late Industrialization." *Annals of the American Academy of Political and Social Science* 570 (104). At the same time, though, Korea entered into bilateral agreements with the Netherlands, Norway, France, and Italy for mutual recognition of patents, designs, and/or trademarks. See West, James M. (1983). "Evolving Industrial Property Law and Transfer of Technology in the Republic of Korea." *Texas International Law Journal* 18 (1): 127-149. This uneven treatment toward foreign business suggests that Korea’s foreign economic policy was more complex than simple market closure.

⁵⁵ *The Korea Times*, February 23, 1999. Because North-South talks stalled in the late 1990s, the IPR issue was never adequately resolved. Thus, a South Korean firm can register a domestic competitor’s trademark in North Korea, but legal action cannot be brought against the imposter firm in either the North or South.

⁵⁶ Butler, Steven B. 1986. "US and S Korea Resolve Trade Disputes." *New York Times*. July 22, 1986. World Trade News, 7.

Commerce in Seoul and threatened to set it afire in protest over US “economic subjugation” of Korea.⁵⁷ The issue of IPR came to symbolize the very worst of “US hegemony” and so garnered wide-ranging and cohesive resistance, much more so than in Brazil where groups opposing reform often opposed each other as well.

Finally, opposition to IPR was deeply embedded in Korea’s national culture. Artistic and intellectual works were viewed as public goods in Korea, not as private property.⁵⁸ Na Ri Lee has attributed this belief to the country’s Confucian political philosophy, where “...a knowledgeable person is esteemed and *the producers of knowledge...honoured by the social respect, not by the pecuniary or by the institutional reward*”.⁵⁹ This notion of IP as a public good lingers today. No local group lobbied for legal rights over an idea or invention. Historically, IPR policy had been imposed on the country twice: by Japan in 1908, and by the United States in 1946. Modern patent law in Korea, wrote Lee, “was not the consequence of legal evolution from domestic need” but instead forced on the country by an outside power (Lee 2000). The lack of participation in international IP conventions that was noted in Chapter 3, in fact, mirrored domestic sentiment. Korea eventually joined global patent and copyright treaties in the 1980s and 1990s, but in joining Korea trailed many developing countries by decades.

THE REFORM PROCESS

Korea was the first country formally investigated by the United States Trade Representative for inadequate protection of US intellectual property. The complaint was self-initiated by the USTR on November 4, 1985.⁶⁰ Talks between the two countries commenced

⁵⁷ Armstrong, Larry (1985). "A Rebellious Seoul Rebuffs US Trade Attacks." *Business Week*, November 18, 1985. The American Chamber of Commerce may have singled out because it had been actively appealing to the Korean government to reform IPR.

⁵⁸ Song, Sang-Hyun and Kim, Seong-Ki (1994). "The Impact of Multilateral Trade Negotiations on Intellectual Property Laws in Korea." *UCLA Pacific Basin Law Journal* 13.

⁵⁹ Lee, Na Ri (2000). "Technological Change and Regulatory Heterogeneity." *Vaasan Yliopiston Julkaisuja* 233 (8). Emphasis in original.

⁶⁰ *50 Federal Registry* 45883. See Chapter 5 for a discussion on the evolution of US trade law. It is important to note that the US had been pressuring the Korean government to raise IPR standards at least

immediately and continued through July 1986. On July 21, Korea consented to tighten and extend the exclusive rights protection conferred on intellectual property. An agreement between the two countries was signed on August 28, 1986 and the USTR formally terminated its investigation (50 FR 29445). The Korean National Assembly under administrative guidance passed the new Patent Act on December 31, 1986. The law became effective on July 1, 1987.

There has been much speculation on why direct pressure from the United States was successful in compelling Korea so quickly to reform, when the same pressure was unsuccessful in Brazil, Argentina, and India. Korea agreed to overhaul its IPR regime nine months after the USTR opened its case, yet Brazil resisted US pressure for a decade, as did Argentina and India. One line of thinking contends that a country's level of trade dependency determines its pliability.⁶¹ Countries more dependent on access to the American market acquiesce more readily to US demands. During the first six months of 1986 – the months preceding the USTR action against Korea – Korea's trade surplus with the US doubled to US\$3.26 billion. The US was absorbing 40% of Korea's exports compared to 26% of Brazil's exports during 1986.^{62,63} A significant share of Brazilian exports, nonetheless, were bound for the American market.

Even if the trade dependency theory does account for Korea's pliability and Brazil's imperviousness, it cannot explain the rapidity with which the Korean government amended its policy. The autocratic nature of the Korean government is the most plausible explanation. IPR reform was ratified just months before the beginning of democratization. There was no public debate over governmental policies before June 1987. It took "large-scale street protests [which]

since 1980. The USTR investigation was the first formal complaint filed and carried the possibility of trade sanctions.

⁶¹ For an example of this view, see Noland, Marcus (1997). "Chasing Phantoms: The Political Economy of USTR." *International Organization* 51 (3): 365-387.

⁶² Of course, Korea was also dependent on the US for military support. But at the time, it was uncertain whether the military security the US provided would continue. Both the Nixon and Carter administrations had considered a complete withdrawal of US troops from the Korean Peninsula.

⁶³ Brazil exports totaled US\$22.4B in 1986; and US\$26.2B, US\$33.8B, US\$34.4B, and US\$31.4B in 1987, 1988, 1989, and 1990. The percentage of Brazilian exports headed to the US was 26%, 27%, 25%, 23%, and 25% respectively. Both countries ran large trade surpluses with the US in 1986; but Korea's surplus, at US\$7.4B, was 3x the size of Brazil's (US\$2.4B). Trade statistics obtained from the United Nations Statistics Division, various years.

left the military regime of Chun Doo-Hwan no alternative but to implement constitutional reforms, including guarantees of a freer press” before policies were contested publicly (West 1997). (The new constitution was adopted the following year, in 1988.) The government, or more specifically here, the executive, exercised strong top-down control enabling the enactment of radical patent reform that was vastly unpopular. The legislature did not resist. Recall that the Brazilian Congress twice refused to pass IPR reform, delaying its ratification almost a decade.⁶⁴ Had patent reform come to a vote in the National Assembly on the last day of 1988 instead of 1986, it is unlikely it would have passed. A window of opportunity, then, appeared briefly in 1986 permitting the effortless switch in policy. (For reform opponents, of course, the timing was unfortunate). The US ignored IPR throughout the 1960s and 70s, but made the issue a mainstay of American trade policy by 1984.⁶⁵ This was precisely the time that the trade deficit with Korea caught the attention of US policymakers. As it turned out, the US pressed Korea to reform during the country’s final months of autocratic rule.⁶⁶

Passage of reform was a watershed in Korean intellectual property rights. The new law extended patent eligibility to chemical and pharmaceutical processes *and* products for the first time in the country’s history.⁶⁷ Patent life was increased to 18 years. The discretionary power of the Korean patent office (KIPO) to issue compulsory licenses was circumscribed. Copyright

⁶⁴ See Chapter 4. The Brazilian patent law eventually passed via leadership agreements among the major parties, circumventing a roll-call vote in both houses and silencing vociferous objections from a number of Chamber and Senate members.

⁶⁵ This is not an overstatement. Beginning with the case against Korea in late 1985 and counting through August 9, 2002, the USTR initiated a total of 70 Section 301 investigations. Sixteen of these investigations, or 23%, involved IPR. Between 1985 and 2002, nearly a quarter of all complaints brought against countries trading with the US dealt with lax protection of intellectual property. Between 1985 and 1998, an additional twenty-four Section 301 cases were filed and then withdrawn; of these, 6 or 25%, concerned intellectual property rights.

⁶⁶ New policy could be passed and implemented rapidly in the years before democratization since the Korean president had “ultimate” governing powers. See Choe, Amy (1999). "Korea's Road toward Respecting Intellectual Property Rights." *Rutgers Computer and Technology Law Journal* 25 (2): 341-374.

⁶⁷ Prior to reform, chemical processes were patentable but not chemical products. Neither pharmaceutical products nor processes were patentable before reform.

protection was conferred on works initially published outside of Korea and copyright terms extended to life plus 50 years. (See Table 5.10 for a summary of the new law.)

These were enormous changes in IPR policy, particularly when one considers that between 1961 and 1986 the government *shrank* rather than *expanded* the range of products or processes eligible for patent protection. The country's modern patent law dated to 1961. The 1961 law (No. 950) proscribed food and chemical product patents. In 1973, the government barred material from nuclear conversion from being patentable as well as the use of chemical compounds (Law No. 2505).

TABLE 5.10: IPR IN KOREA BEFORE AND AFTER THE 1987 REFORM

		PRE-1987 REFORM	POST-1987 REFORM
PATENTS	chemical substance patents	denied	allowed
	pharmaceutical product patents	denied	allowed
	agrochemical product patents	denied	allowed
	microorganism product patents	denied	allowed
	biological product patents	denied	allowed
	"local working" requirement	use/manufacture	sell/lease
scope of "compulsory licensing"	considerable	limited	
patent duration	12 yrs from grant	18 yrs from application	
COPYRIGHT	protection for foreigners' work	denied	allowed
	protection for all UCC works*	denied or restricted	allowed
	neighboring rights**	denied or restricted	allowed
	protection for derivative works	denied	allowed
	protection for compilations	denied	allowed
copyright duration	20 years	50 years	
SOFTWARE	protection for computer programs	denied	allowed

*refers to those works specified in the Universal Copyright Convention (UCC) including 1) linguistic and artistic works, 2) musical works, 3) theatrical works, 4) architectural works, 5) photographic works, 6) visual works, and 7) maps and other diagrammatic works.

**neighboring rights are technological adaptations of copyrighted works such as sound recordings and broadcasts. These were granted 20-year term protections.

Korea made other concessions to the US, namely, pipeline protection and the conversion of process patents to product patents. Pipeline protection is retroactive protection for products that were not patent eligible under Korea's old IPR regime, and not yet marketed in Korea, but under patent in the US. Korea agreed to give 10-year terms of protection for pipeline patents, and 5-year terms for the legal protection of software. Additionally, patent holders were given the

right to expand process patents to incorporate the product invention itself. Patented manufacturing processes could now include, for instance, the actual chemical compound produced. Obviously, only pharmaceuticals and chemicals met the requirements for retroactive protection. More than half of the 900 pipeline applications, or 515, were approved. Of these, 489 were pharmaceutical and 26, agrochemical products. All were inventions that had been patented in the US between 1980 and June 10, 1987. That is to say, only products *patented in the US by US nationals* were eligible for pipeline protection in Korea.

This gave US firms advantage over other foreign firms doing business in Korea. It also, quite bluntly, flew in the face of the most favored nation (MFN) precept, the very backbone of GATT. The “US only” pipeline terms negotiated between the Americans and the Koreans quickly led to a heated dispute with the European Community (EC), and prompted the UK to try to obtain a similar bilateral agreement with Korea. After nearly six years of negotiation, in November 1993, Korea agreed to extend pipeline protection to an additional 221 pharmaceutical and chemical products under patent in the EC. Protection was retroactive to July 1987. A year later, the pipeline provision was granted to Japanese inventions.

Extending pipeline to European nations and then to Japan was a bitter pill to swallow, causing, as *The Korean Times* opined, “an embarrassment for the Korean government.” Korea, an opponent of the TRIPS Accord in general, tried without success to block inclusion of the MFN clause in the agreement. With IPR reform, Korea was forced to abandon both a principal tactic to attain global competitiveness and a foreign economic policy tool to curb foreign access to the domestic market. One scholar wrote, “the reform of patent laws...has been difficult as the most-favored nation treatment of pipeline protection was a difficult concession for Korea” (Song 1994). Ultimately, for Korea, IPR reform was “a necessary evil to induce foreign investment or ease a political tension” (Lee 2000). But how stable was IPR reform in those first few years?

Stability of Reform

We are interested in discovering how Korea reacted to reform after the changes in IP law were enacted. We know that industry achieved a level of international competitiveness (in established technologies) on par with many advanced industrialized countries largely through the appropriation of foreign technology. The government's science and technology policy was being refocused toward technology generation, but technology creation still lagged behind other OECD countries. We know that the rapidity with which reform was adopted was due to propitious political timing and that the domestic political landscape had since changed. But, as one scholar noted, disparities "between economic policies and cultural attitudes in South Korea and the United States...complicated, and are likely to continue to complicate, the implementation and effect of [IPR reform]"(Park 1987). Nothing in 1987 indicated that Korea would commit itself to the new IP regime; but as we know the country did remain committed to reform.

Our objective in this section is to provide evidence of Korea's commitment. A working definition of policy commitment and policy backtracking was laid out in Chapter 3 and utilized in the Brazilian case study. We apply the same three criteria here.

1. MEASURES TAKEN TO STRENGTHEN REFORM

Perhaps the most important of our measures for determining state commitment or backtracking is the direction of subsequent IP legislation post-reform. State lawmaking in the years following coerced reform can reveal the extent to which the state has taken up or accepted the new direction in domestic policy. (As was made clear in Chapter 3, though, a state may come to accept the reform but for reasons quite different than those put forth by the hegemon or whoever compelled the state to alter its national policy in the first place.) The measures Korea took to strengthen and extend IPR provide the strongest evidence of its commitment to tighter IP protection.

Four years after reform, Korea began passing additional regulations aimed at strengthening and expanding the legal protections conferred on ideas and inventions. (See table 6.11 for a concise list.) Many of these supplemental laws were notable departures from the government's earlier positions and were remarkable as much for their number as for their signaling of what had become acceptable (and unacceptable) local business practice. Semiconductor chip mask works were afforded sui generis protection in 1992, and a year later, computer databases redefined as literary works and thus eligible for copyright protection. This was three years ahead of the EU directive on protection of databases.⁶⁸ Another example was the

TABLE 5.11: SUPPLEMENTAL IPR LEGISLATION POST-1987 REFORM

patents	1988	Reverts "Burden of Proof" in patent litigation to challenger instead of patent holder
	1996	Patent duration extended to 20 yrs from application (TRIPS compliance) Allows patents for nuclear substances
	1997	Replaces pre-grant with post-grant opposition system Fines for infringement increased to 50M won from 20M won.
	1998	Allows patents for animal inventions
	1998	Allows 5 year extension on pharmaceutical or agricultural patents to compensate for time spent obtaining regulatory approval
copyrights	2001	Allows public universities to obtain patents
	1993	Allows protection for computerized databases
	1999 2000	Extends protection to electronically transmitted copyrighted material Prohibits circumventing protective devices meant to prevent illegal reproduction of computer programs
trademarks	1996	Allows protection for trademarks in color (previously, only B&W marks)
	1997	Extends protection for 3-dimensional marks
	1998	Prohibits counterfeiters from registering well-known international marks
trade secrets	1991	Allows protection for trade secrets
	1999	Raises trade secret violation to tort
designs	1998	Allows protection of designs in textiles
semiconductors	1992	Allows protection of semiconductor layout designs (mask works)
plant varieties	1995	Allows protection for new plant varieties (asexual reproduction)
business methods	2001	Allows protection for business methods

new trademark law. Before 1998, Korean firms could register well-known international trademarks before these marks had been exploited locally. Foreign firms were then blocked from using their own brand name in Korea. In a well-known case, Kyung Won Enterprises (KWE), a

⁶⁸ Directive 96/9/EC of the European Parliament and of the Council on the legal protection of databases, March 11, 1996. *Official Journal L 077, 27/03/1996 P. 0020 – 0028.*

local retail discounter, registered the trademark *Wal-Mart*.⁶⁹ When Wal-Mart Stores, Inc. entered the Korean market, the company discovered it was unable to use its own trade name. The trademark law allows foreign companies to stop unauthorized registrations by local firms. It also removes components of Korean law prejudicial toward foreigners.

It was mentioned previously but is worth repeating here that with the enactment of these additional laws, the IPR regime in Korea mirrored that in the United States and Japan and surpassed many of the protections afforded in Europe. Business method patents, which are granted in the US, Japan, and now Korea, are contentiously debated in the EU; no consensus has emerged on whether business methods or computer programs qualify as legal property. This put Korea at the forefront of IPR; the country had one of the most protective IPR regimes in the world.

There is little evidence that the supplemental laws Korea adopted post-reform were the result of domestic interest group pressure. (One possible exception is the extension of patent eligibility to business methods, which appeared to be pushed by the software and e-commerce sectors.) Some of the new laws were passed in order to comply with the TRIPS agreement; for example, increasing the duration of patents to 20 years, extending eligibility to nuclear substances and plant varieties, and recognizing trade secrets. But most of the additional laws were the result of state initiative; these included patents for animal inventions, an expansion of qualifying trademarks, permitting public university researchers to own patents, and the more-than-doubling of infringement fines. There are other examples of the state extending IPR absent industry demand. In 1999, the government attempted to provide an exclusive property right (i.e., patent) for computer databases to supplement the misappropriation protection it granted under the

⁶⁹ *The Korea Times*, June 18, 1999. Wal-Mart Stores, Inc. won its case against KWE.

copyright law. Interestingly, property protection for computer databases was opposed by the Korean database industry.⁷⁰

2. DOMESTIC INSTITUTIONS

The second criterion indicating a state's commitment to reform is the level of support the government provides to domestic institutions necessary for implementation of the new law. Two Korean institutions, the country's patent office and the federal patent court established to hear cases involving intellectual property disputes, merit our attention. We mention briefly a third institution – "Special Enforcement Periods" – launched to impose compliance with the new copyright law.

Korean Intellectual Property Office (KIPO)

Since patents, copyrights, and trademarks are tradable property, the state is obliged to maintain a system that verifies owners and tracks property transfers. The Korean Intellectual Property Office (KIPO) serves this function for Korea. Established as an independent agency in 1977, the government has funded this institution amply allowing it to keep up with the flood of patent applications that were filed post-reform. (Korea now ranks third in the world, after Japan and the US, in the number of applications it receives annually.) At present the ratio of applications to examiners is approximately 220, which is similar to the number of applicants Japanese examiners review (see discussion in Chapter 4). A revision to the patent law which took effect in 2001 has reduced the wait for examination to 10 months (the world average is 24 to 30 months). KIPO staffing has increased nearly 7-fold since the early 1980s, and personnel

⁷⁰ Jong, Sang-Jo and Park, Junu (2002). "Property Vs Misappropriation: Legal Protection for Databases in Korea." *Washington University Journal of Law and Policy* 8 (75). The authors write "[d]ue to the weak financial standing of firms that specialized in database production, as well as the shortage of source information in Korea, it is unduly burdensome for firms to invest in both the production of source code and the organization of that code into a database format." The government introduced the bill "to provide more incentives to the database industry" but failed, according to the authors, to "fully consider its negative effects upon free access to information." (The database industry often repackaged information compiled overseas.) The 1999 legislative session expired before the bill was voted on.

increases of 10-15% are planned through 2005. Examiners undergo extensive training in order to stay current in technology and IPR practices. In 1999, Korea became the first country in the world to allow electronic filing of applications, which today represent 93% of all patent applications. (The US patent office instituted electronic filing a year later, at the end of 2000.) By all relevant accounts, the KIPO has achieved world-class standards in a relatively short period of time.

Patent court

The government established a specialized federal court, the Korean Patent Court, on March 1, 1998, effectively overhauling the country's intellectual property trial structure that had been in place since 1946. The Korean Patent Court (KPC) was modeled after the US Federal Appellate Court created in 1982 to hear disputes involving intellectual property. Considering that Korea's IPR regime did not resemble a modern system until after 1987, the establishment of the KPC eleven years later was a progressive move on the part of government.

Appeals of IP rulings dealing with the validity and scope of claim(s) are now sent directly to the federal Patent Court, ultimately removing the executive (i.e., KIPO) from arbitrating patent rights, and instead placing the responsibility with the judiciary. Technical examiners work alongside KPC judges and fully participate in the court's hearings and deliberations. This institutional change has served to further legitimize (and strengthen) the exclusive right bestowed on IP by the government; it is a significant change when one considers that overall Korea's "property rights system has operated under the discretion of administrative rather than transparent legal rule" (Jwa 2001). One concrete example of the strengthening of IP rights is the court's allowance of "non-literal" infringement claims.⁷¹

⁷¹ Lee, Na Ri (2000). "Technological Change and Regulatory Heterogeneity." *Vaasan Yliopiston Julkaisuja* 233 (8). Non-literal infringement is also known as The Doctrine of Equivalents, meaning that a court will permit a charge of infringement if the defendant's device or method is "sufficiently similar" to the patented device or method but not exactly like it. The Korean Court has not yet accepted an Equivalent Doctrine along the lines of the US or Japanese courts, but it is moving in that direction.

Korea's patent court was established before a similar court had been set up in Japan. It is one of the few national courts in the world created specifically to rule on IP matters.

“Special Enforcement Periods”

Special Enforcement Periods deal primarily with the enforcement of copyright laws. Twice a month, police and prosecutors routinely make unannounced raids on businesses suspected of illegally circumventing copyright laws. The government has earmarked significant funds and personnel to catching and adjudicating domestic infringers. To this author's knowledge, there is no other country that has similarly systematized or institutionalized local compliance with national IP laws.

3. PUBLIC ACTIONS SUPPORTING IPR

The last criterion we look at is the state's public posture vis-à-vis IPR reform. With the Brazilian case study, we considered Brazil's position on IPR at two separate international conferences: a meeting of the United Nations Commission on Human Rights and the WTO's Ministerial conference in Doha. Here, we consider the public roles Korea voluntarily assumed under the PCT system and at WIPO.

PCT Searching Authority

The Patent Cooperation Treaty (PCT) permits inventors to apply for patent protection in other member countries simultaneously by substantially reducing the transaction costs involved in multiple filings. In most cases, inventors file an international application with their national patent office; this application is then routed through a PCT International Searching Authority (ISA) or an International Preliminary Examining Authority (IPEA). Only national patent offices which have met benchmarks put forth by the PCT have been designated an International Searching Authority.

Korea became a member of the Patent Cooperation Treaty in 1984. In 1999, the KIPO became the 8th national patent office designated as an International Searching Authority. Korea joined the US, Japan, and seven other patent offices chosen to undertake prior art searches for international patents.⁷² In January 2004, KIPO began offering electronic filing of PCT applications, one of three patent offices worldwide with this capability.⁷³

WIPO Leadership Role

Korea became a member the World Intellectual Property Organization in 1979, acceded to the Paris Convention for the Protection of Industrial Property in 1980, and joined the Berne Convention for the Protection of Literary and Artistic Works in 1996.⁷⁴ Considering the country's level of industrial development and its linkage to the world economy, Korea's accession to these principal IP treaties was overdue. The delay reflected the country's general antagonism toward global IPR agreements which Korea saw as too restrictive; the government even went as far as opposing the Most Favored Nation (MFN) requirement which was the cornerstone of the Paris Convention. In a real sense, Korea's foot dragging was misplaced. As a specialized agency of the United Nations, WIPO was often responsive to developing countries' appeals for better access to technology from the industrialized world. For example, Mexico, Korea, Indonesia and Brazil demanded and received liberal compulsory licensing rights for foreign technology under the 1981 Nairobi Agreement.⁷⁵ Yet, Korea resisted joining any international IP conventions until well after many least-developed countries had become members.

⁷² The other International Searching Authorities are Australia, Sweden, Austria, Spain, Russia, China, and the European Patent Office.

⁷³ The other two are the European Patent Office (EPO) and Finland.

⁷⁴ WIPO administers 23 treaties covering all aspects of intellectual property.

⁷⁵ *The Japan Economic Journal*, November 3, 1981. The agreement aimed to revise the Paris Convention and permit an "exclusive patent license right" for developing nations. This allowed governments to retract patents from foreign firms if the invention was not locally worked and turn the confiscated patent over to a domestic firm for exploitation. Agreements like the Nairobi Agreement were what ultimately drove the advanced industrialized countries to pursue a different venue (e.g. GATT/WTO) in order to tighten global IPR laws.

Korea's relationship with WIPO changed radically in the mid to late-1990s. The country began to champion stronger protections for intellectual property and to take leadership positions in the organization, for example, chairing the Budget Committee and acting as coordinator of the 29-country Asia Group. Additionally, Korea has been an active participant in APEC's (Asian-Pacific Economic Cooperation) Intellectual Property Rights Experts Group.

We employ a synoptical approach, as we did with the Brazil case, to assess the stability of IPR policy in Korea. Accordingly, the three criteria used to assess a country's commitment post-reform – supplemental laws, support of domestic institutions, the public role taken by the state internationally – should be considered as a whole rather than separately. The expansion of legal protection into areas not covered by TRIPS, and thus not mandated by international treaty, indicate a state acting voluntarily to strengthen its national IPR regime. Korea's support for domestic institutions and its public role in specialized international institutions post-reform are best viewed in juxtaposition with the country's opposition to IPR up until the late 1980s.

States commit to imposed reform when they are able to internalize reform benefits. We present evidence of Korea capturing and creating benefits from IPR reform in the next chapter. In this chapter's final section, we consider why Korea was quickly able to turn reform to its national advantage.

Conclusion

Firms patent to prevent competitors from imitating their new inventions. Firms also patent for strategic reasons: to safeguard against litigation, to use as bargaining chips in cross-licensing deals, and to prevent competitors' patenting of related devices or methods. Strategic patenting has increased considerably since the 1980s, and is evident in many countries with modern patent regimes. The impressive boost in global patenting that began fifteen years ago is still scrutinized by scholars; the basis for the increase is not fully understood, though some patent-law critics credit overt maneuvering by firms to rope off large segments of the market for themselves. (The patenting of gene sequences that have no known utility stands as a prime example.) In their seminal paper on the precipitous rise in IPR activity in the US in the late 1980s and 1990s, Kortum and Lerner (1997) attribute the increase to "changes in the management of innovation, involving a shift to more applied activities [by firms]." But they also concede that "compared to earlier periods...patentees are more aggressively exploiting the patent system" and that "the intensity of research effort has not risen at the same time that patenting has surged" (p33).⁷⁶ Most scholars agree that the sudden increase in patenting activity around the world is not attributable to an increase in research effort nor is it the result of an inexplicable rise in innovativeness – not even in the US. We adopt a similar line of thinking to explain what happened in Korea during the 1990s.

The surge in IP activity by Korean firms both at home and abroad (as we describe in detail in the next chapter) suggests strategic, not innovation-based, patenting. Though R&D expenditures did rise from 0.7% of GDP in 1986 to 2.5% in 1995, there is little corroborating evidence that Korea experienced a jump in innovative activity between 1988 and 1998 that would

⁷⁶ This holds true for non-American firms too. One scholar noted that "a few well-publicized [patent infringement] victories by US firms [against their Japanese rivals] prompted Japanese firms to begin 'ramping up' their patent portfolios." See Sakakibara, Mariko and Branstetter, Lee. 1999. "Do Stronger Patents Induce More Innovation? Evidence from the 1988 Japanese Patent Law Reforms." The Anderson School at UCLA., No. 99-2.

correspond to the 62-fold increase in domestic patenting.⁷⁷ As we have argued throughout this case study, Korean firms are users, not producers, of technology. US patents granted to Koreans are highly correlated with Korean exports to the US – more than half are in the field of electronics.⁷⁸ This highly concentrated patenting pattern suggests firms are using IPR to protect existing market share rather than appropriate returns from R&D. Only a minor portion of patented technologies and utility designs are commercialized in Korea (31% and 18%), while in Japan 60% of both are commercialized.⁷⁹ Nearly a third of patents in Japan generate profits, while 7% of Korean patents do.⁸⁰ A look at the origins of key components for a range of high-technology goods manufactured in Korea reveals a serious gap between local technological know-how and international standards. Ninety percent of the chips used in computers made in Korea are imported, as are 80% of the parts for industrial robots and for gas turbines for generators. Korea buys abroad 70% of the components for DVD players, and 55% of the parts for mobile telephones and digital cameras. Nearly all of these products belong to the electronics sector, where Koreans have taken out the majority of patents. Only two Korean patents have been accepted by the International Standards Organization or the International Evaluation Center as an international standard – and both patents deal with the Korean alphabet.⁸¹ Of the ISO's and IEC's 941 technology commissions, Korea heads only one compared with Germany's 169, the UK's 140, India with 10, and China with 6.

Korea was able to garner benefits from IPR reform because it exploited strategic patenting. Two factors help explain why this was possible. Firstly, Korean firms had proven adept and nimble in responding to changes in governmental policy. Chaebols operated within a

⁷⁷ The rate of patenting in the US by Koreans increased 26 fold over the same time period. Koreans were granted 575 Korean patents and 131 US patents in 1988, and 35,900 Korean patents and 3429 US patents in 1998. Data from KIPO and the USPTO.

⁷⁸ One out of two domestic patents was in the electronics field; the world average was one in five. Chemical patents in Korea accounted for one in ten patents, worldwide they represented 22-23% of the total.

⁷⁹ *The Korean Times*, May 17, 2000.

⁸⁰ Song, Jaeyong (2002). "What Is Behind the Surge in Korean Patenting?" Yonsei University, Korea.

⁸¹ *The Korean Times*, May 17, 2000.

perverted incentive structure where business decisions were based less on commercial realities and more as a response to government action. Korean firms had shown a keen ability to profit whenever state policy shifted. By having to meet state-mandated export targets, the chaebols had been exposed to cutthroat competition from foreign companies and had learned to copy and hone the business strategies adopted by their foreign competitors. In this case, it meant accumulating extensive patent collections the same as their overseas rivals. Secondly, Korean firms were not required to undergo a fundamental change in their commercial operations in order to benefit from IPR reform. Most firms continued to try to obtain foreign technology rather than create new technologies. In short, there was little to be lost and much to be gained in strategic patenting. Korean firms resisted IPR reform, but quickly learned to profit from it.

The assumption of an economy linked to the global market is central to our explanation of how Korea was able to capture and create benefits from IPR reform. The monopolistic nature of high-tech industry in Korea made it improbable that local firms would gain much domestically, but profiting abroad was likely. Briefly, the government was compelled to adopt a highly protective IPR regime. Innovation-based patenting required huge investments of time and effort, with a significant lag between research and payoff. Local firms opposed the new patent policy, but learned to adapt and profit from reform via strategic patenting. The rate of domestic and international patenting by Korean firms rose dramatically as a result, and Korea's current account was positively impacted. As benefits accrued to the state as a whole, the government continued to expand and strengthen domestic IP laws. This cycle was a perversion of the traditional intent of induced innovation that underpinned intellectual property protection laws, but it nonetheless explains why Korea committed itself to domestic policy it had so strongly opposed.

Chapter 6: Conclusion

Capturing Benefits: Evidence from the Case Studies

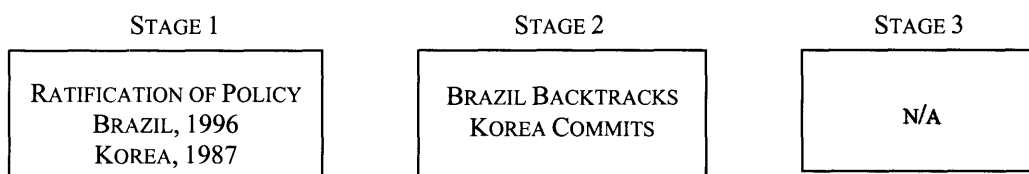
Of the two countries studied in depth in this thesis, at the time each passed new patent laws, Brazil appeared more likely to stay pledged to IPR reform. For nearly two centuries, Brazil had conferred legal protections on inventions and expressions of ideas, and had permitted non-citizens to obtain patents, copyrights, and trademarks through its provision of national treatment in 1873 – this was several years before the United States did the same. Moreover, Brazil was particularly well positioned to benefit from a strengthened IPR regime. There was a rich scientific tradition in the country, a number of world-class research universities, and a sizable pool of highly educated scientists and engineers. There was a long history of technology-intensive foreign firms setting up local operations in the country. And there was a large domestic market, more than 3.5 times the size of Korea's in fact. Brazil's pharmaceutical market, to give an example, was ranked 8th largest worldwide, and the Brazilian microelectronics market was first in the developing world. Altogether these would seem to foretell a country ready and able to take advantage of higher standards of protection.

Korea, by comparison, had a short history of protecting IP. The country's first law dated only to 1946, and the first formal patent system to 1961.^{1,2} The country signed the Paris Convention in 1980, years after Algeria (1966), Jordan (1972), Niger (1964), and the Philippines (1966). Korea had a strong cultural antipathy towards IPR that was rooted in Confucian philosophy. Song and Kim (1994), explaining this attitude, wrote that "copying a book written by others was not an offense [in Korea], but instead a recommended activity, reflecting a passion for learning...such a negative attitude toward IPR [was] prevalent and affect[ed] the majority of Korean society..." Most significantly, the country's economic development plan rested on the

¹ The Modern Korean Patent Act, T'ukhopop Law No. 91, was enacted in 1946 by the US military administration. The first formal patent system was put in place in 1961. Song, Sang-Hyun and Kim, Seong-Ki (1994). "The Impact of Multilateral Trade Negotiations on Intellectual Property Laws in Korea." *UCLA Pacific Basin Law Journal* 13.

² Korea's Copyright Act was enacted in 1957, and up until the 1987 reform, only works first published in Korea were eligible for protection.

notion of using and building on the technology of other countries. The economic plan could be summed up in three words: growth through imitation. Yet, it was Korea that remained committed to IPR reform and Brazil that backtracked.



Korea passed a series of IP laws after the reform was approved by the National Assembly on December 31, 1986. These included protection for software, semiconductor lay-out designs, computer databases, plants, and business methods. The most recent IP law – extending ownership rights to business methods – meant that Korea had joined the ranks of the United States and Japan as the only three countries to grants patents for new ways of doing business. Korea generously funded the national patent office to keep up with the added volume of applications, and established a national patent court in 1996 along the lines of the Federal Appellate Court for Patents in the US. At the international level, Korea became a Searching Authority under the Patent Cooperation Treaty, one of eight national patent offices so designated.

Table 6.1 displays both the core protections included in the initial reform (denoted by the shaded area) and the supplemental measures the Brazilian and Korean government took after

TABLE 6.1: EVOLUTION OF IPR REFORM IN BRAZIL AND KOREA

	BRAZIL	KOREA
PHARMACEUTICAL PRODUCTS	Yes (1996)	Yes (1987)
PHARMACEUTICAL PROCESSES	Yes (1996)	Yes (1987)
SOFTWARE	Yes (1996)	Yes (1987)
BIOTECHNOLOGY	Yes (1996)	Yes (1987)
*PIPELINE PROTECTION	Yes (1996)	Yes (1987)
MICROORGANISMS	Yes (1996)	Yes (1987)
TRADE SECRETS	No	Yes (1991)
SEMICONDUCTORS	No	Yes (1992)
DATABASES	No	Yes (1993)
PLANT VARIETIES	No	Yes (1995)
*ANIMALS	No	Yes (1998)
*BUSINESS METHODS	No	Yes (2000)
*NATIONAL PATENT COURT	No	Yes (1996)
*PCT SEARCHING AUTHORITY	No	Yes (1999)

*not required by TRIPS. Shaded area indicates scope of initial reform.

reform. As described in Chapter 4, within eighteen months of enacting IPR reform, Brazil issued a number of decrees aimed at mitigating the new policy; among these were a generic drug law and new health regulations that delayed the issuance of drug patents. The country's patent office continued to be under-funded and under-staffed. And in 2001, four years post-reform, Brazil took an international stance against IPR reform at the UNCHR and at the WTO's Fourth Ministerial Conference in Doha, with the aim of having many of the central tenets of the TRIPS Accord rescinded at the next trade round.

Korea captured reform benefits subsequent to enacting a new IPR policy and, due to this, fully committed to reform in spite of its initial opposition. Importantly, these reform benefits were not the promised consequences advanced by reform advocates, but were instead gains many expected to accrue outside the country.³ Brazil, unable to capture reform benefits, backtracked.

We now look at the consequences of IPR reform in Brazil and Korea in three broad areas: control of technology, balance of payments, and domestic market share indicators. We have argued that these areas reflect the benefits associated with IPR reform in open economies.

At the country level, control of technology refers to who owns the patented technology: the state issuing the patent or a foreign state. We measure control of technology by the percentage of patents granted to residents versus non-residents. Both the overall rate of patenting and the percentage of resident patenting are benefits that reforming states can capture. At the international level, patents taken out by the reforming state in other countries are an unpredicted consequence of reform that denotes benefits of reform *created* by the reforming state. We measure international patenting using US patent data.

The impact of IPR reform on a country's current account can be either positive or negative. Given that TRIPS has an importation rule for the local working requirement in national

³ The benefits being promoted were increases in inward FDI, in technology transfer, and in national income. See discussion in Chapter 2.

patent laws, trade in IP-intensive sectors may very well be affected. (The importation rule necessitates that we include import and export effects.) The proportion of exports based on high technology, and the ratio of high-tech imports to all imports, provides part of the balance of payments effects of reform. The remainder consists of the purchase and sale of technology; that is, the net contribution of royalty payments to the reforming state's current account.

Concentration of industry due to monopoly rights is a necessary trade-off of IPR and is fully recognized by economists (Viscusi 2000). A shift in market share towards patent holders is expected. Of interest here is whether domestic or foreign firms have an increased presence in the local high-tech, or IP intensive, sectors of the reforming state. Data on the percentage of local and foreign firms servicing the domestic pharmaceutical market in Brazil are used. The local pharmaceutical market serves as a proxy for sectors that are heavily reliant on patent protection.

Last, monopolistic pricing and the cost of administering a new patent system are costs associated with IPR reform that are always absorbed by the reforming state. As these costs are unavoidable by any state with a patent system, they are not addressed here.

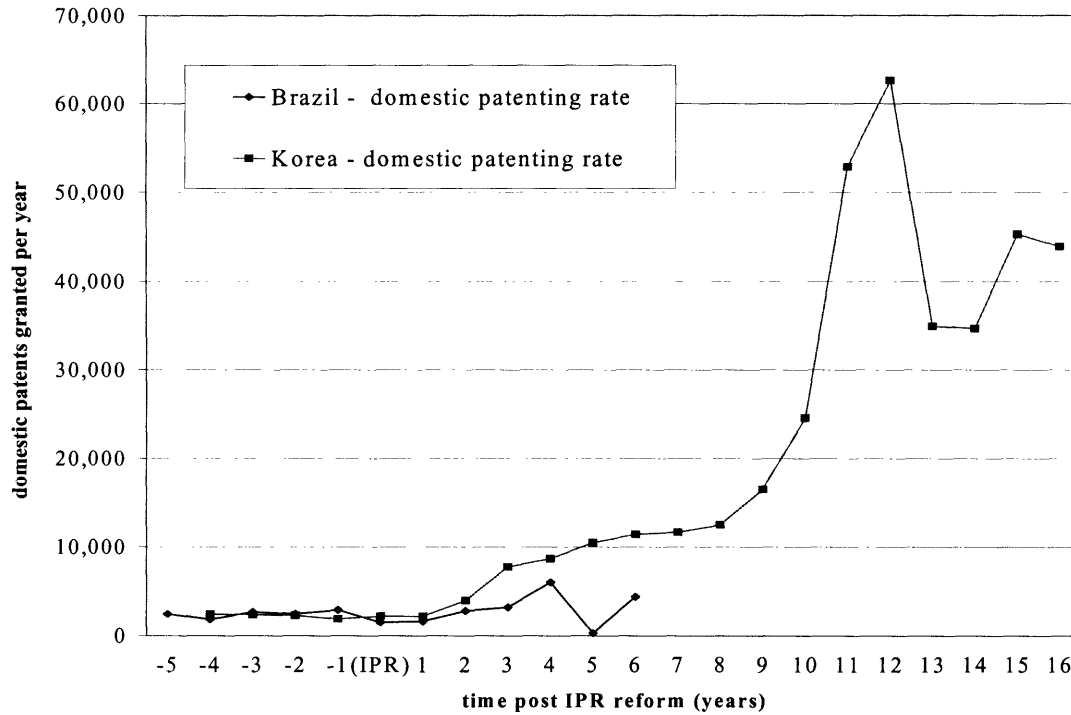
We should point out that, in most cases, data are given for the year that IPR reform was enacted and at some point post-reform (i.e., post-enactment), usually five years. Because patent data are best understood in terms of their overall trend, we have provided data for the pre-reform, as well as the post-reform, period.

CONTROL OF TECHNOLOGY

The rate of domestic patenting in Brazil and Korea was nearly identical at the time each reformed IPR. Five years post-reform, the Korean patent office was issuing 4.5 times more patents, and the Brazilian patent office, 2.9 times (Figure 6.1). The positive trend continued in Korea. Ten years post-reform, 10 times the number of patents were granted, and that number more than doubled the

next year.⁴ By 1996, less than 10 years post-reform, Korea ranked 3rd in world in total number of registrations (290k), behind Japan (640k) and US (450k).

FIGURE 6.1: DOMESTIC PATENTING: RAW NUMBERS



Patent data presented in terms of total number of patents granted per million population per year is shown in Figure 6.2. As in Figure 6.1, “(IPR)” on the *x*-axis refers to 1987 for the Korean data and 1996 for the Brazilian data.

The same per capita representation for a twenty year span, from 1983 to 2002, without reference to the number of years plus- or minus-reform, is presented in Figure 6.3. We have included US data to allow for comparisons. In the years leading up to reform, Korea had a slightly higher rate of patenting per million population than Brazil did. After Korea reformed in 1987, the country’s patenting rate per mm capita increased dramatically, and by 1992, had exceeded the US rate of patenting.

⁴ The Korean Intellectual Property Office (KIPO) granted 24,579 patents in 1997 and 52,900 in 1998, peaking at 62,635 in 1999, and dropping off substantially in 2000 and 2001 (34,894 and 34,663) due to the 1997-8 financial crisis. It takes approximately two years for a patent application to proceed through the examination process to issuance.

FIGURE 6.2: DOMESTIC PATENTING PER CAPITA

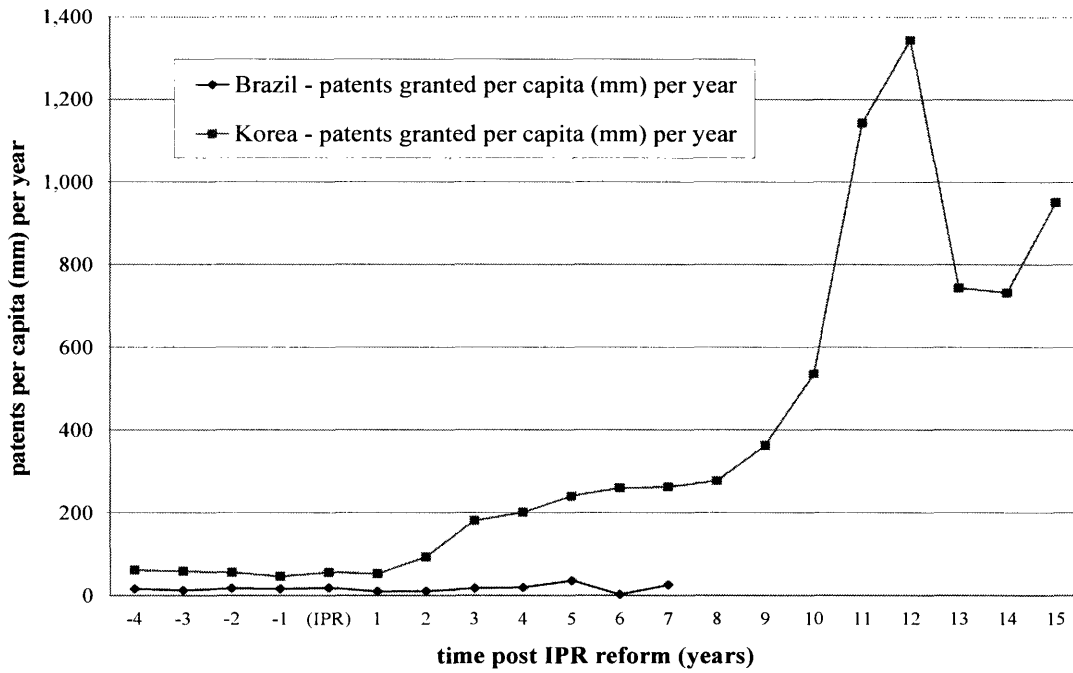
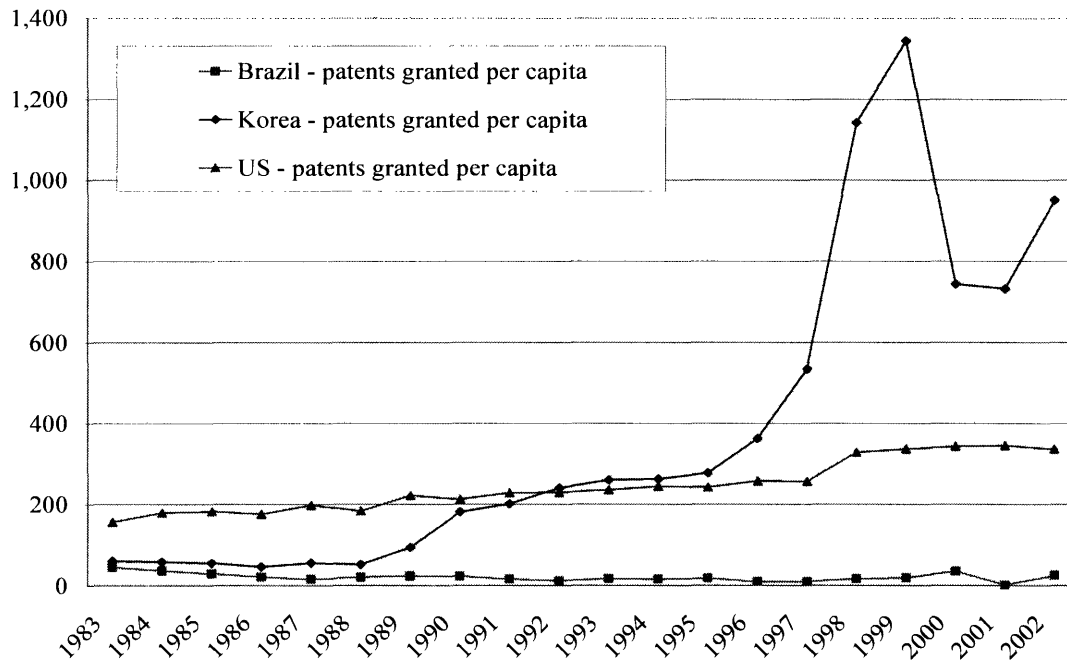


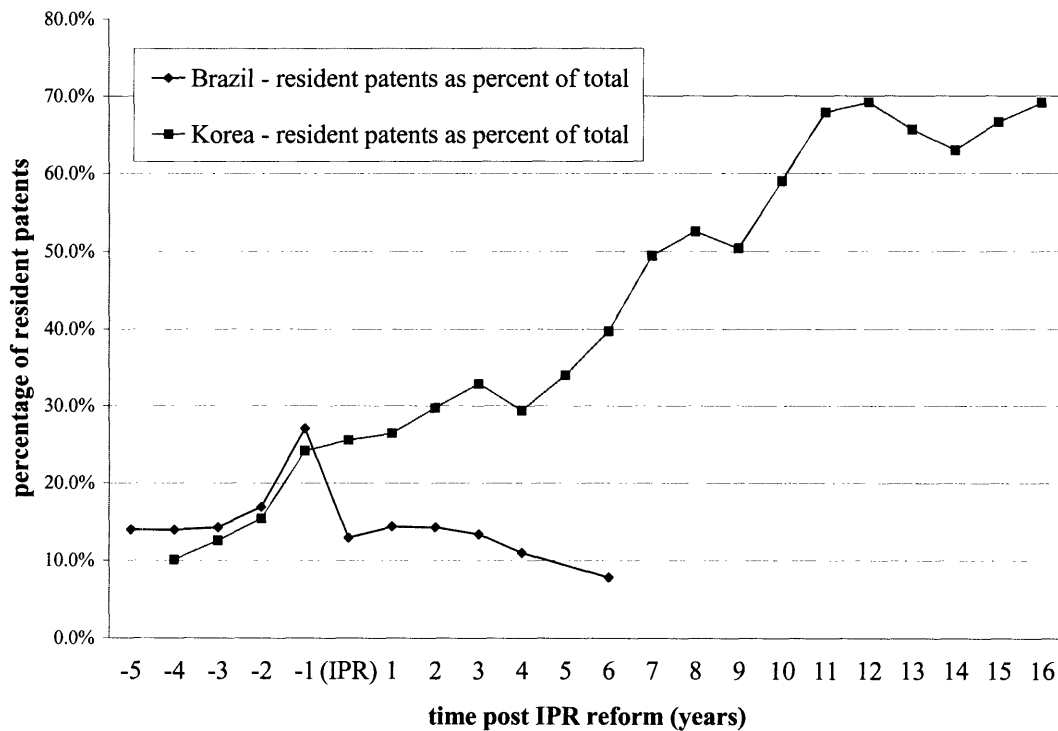
FIGURE 6.3: DOMESTIC PATENTING PER CAPITA, 1983 TO 2002, WITH US REFERENCE



Figures 6.1, 6.2, and 6.3 show a higher proclivity for patenting in Korea post reform, but patenting by whom? Are Korean firms and individuals patenting in greater numbers in Korea, or

is the increase due to the patenting activity of multinational firms? Figure 6.4 breaks out the national origin of the owner of technology. In Korea, there is a noticeable rise in the percentage of national firms obtaining patents. Six years post-reform, nearly 40% of Korean patents were issued to nationals. Ten years post-reform, the percentage had risen to 59% and reached nearly 70% twelve years after reform. In Brazil, six years post-reform, residents received just 7.8% of Brazilian patents and the trend appears to be continuing downward. The peak in resident patenting that occurred the year before the new law was passed was most likely due to a slow-down in patent filings by foreign firms in anticipation of more favorable exclusionary rights after reform.

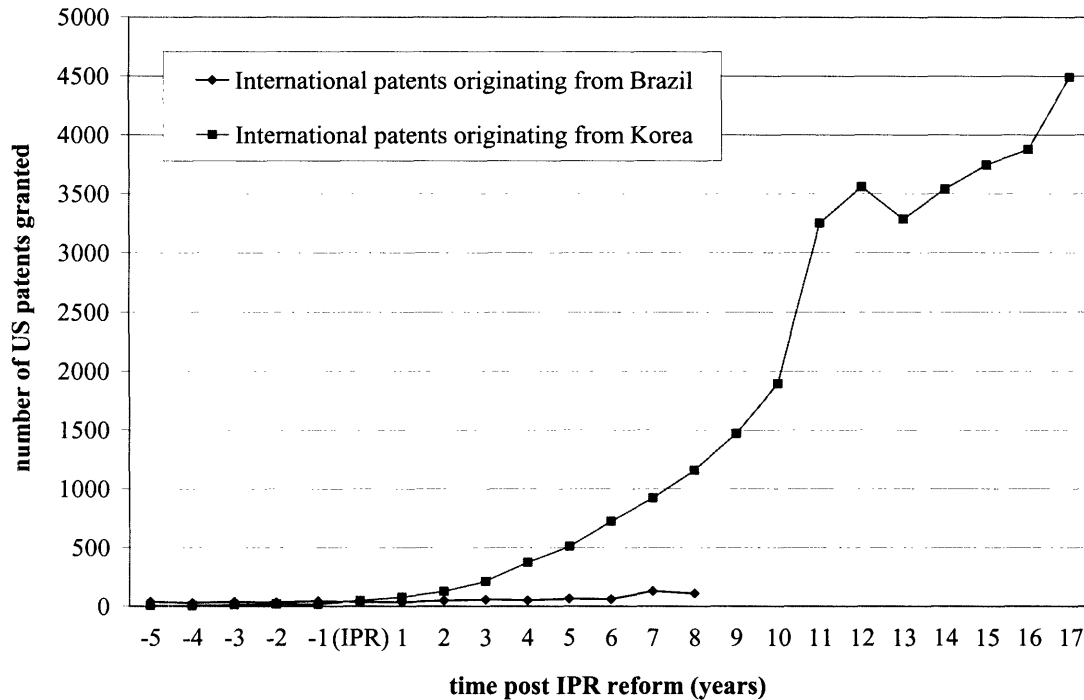
FIGURE 6.4: DOMESTIC PATENTING: RESIDENT VS. NON-RESIDENT



The positive trend of domestic patenting post reform is an expected outcome of reform. What about the rate of global patenting by residents of the reforming state? A surge in international patenting by the reforming state is not predicted by the theory, and can be viewed as created or unintentional benefits of reform. Figure 6.5 shows similar propensities for foreign patenting in

Korea and Brazil prior to and up to reform. Post-reform, Korea's level of international patenting rose 8 fold after six years. Ten years post-reform, the country was obtaining international patents at nearly 19 times the initial rate, and after fifteen years, at over 38 times the initial rate. Brazil, on the other hand, received just 1.7 times the number of foreign patents six years post-reform.⁵

FIGURE 6.5: INTERNATIONAL PATENTING: BRAZIL AND KOREA



Though it is true that Korea could have applied for foreign patents without first having reformed domestic law, it is unlikely for two reasons. First, reform precipitated the establishment of a large cadre of IPR experts and bureaucrats: patent attorneys and patent examiners, for example. The new policy also served to build local firm competency in filing, defending, and managing patents and patent portfolios. This experience was transferable to dealings with other IP regimes, and facilitated the process of applying for foreign patents. Second, a large number of Korea's international patents were in the field of microelectronics, particularly semiconductor technology.

⁵ The rise in global patenting that occurred in the late 1990s makes the difference between Korea and Brazil even more striking. IPR reform and the subsequent increase in international patenting by Korea happened at least 10 years *before* the global surge in cross-border patenting, while Brazil reformed at the time international patenting activity was exploding.

It would be difficult to fathom US semiconductor firms in the early 1980s not objecting to Korean firms obtaining US patents if there was no reciprocity for American chip manufacturers in Korea.⁶

It is important to note that an increase in the rate of patenting, whether domestic or international, does not translate necessarily to increases in national innovativeness or competitiveness. In other words, the data presented above may or may not indicate a legitimate rise in local rates of innovation and technological prowess. To make the point, IP activity in Korea is being driven by patent applications in semiconductor technology at a rate that is more than double the world (and US) average.⁷ But relatively few patents are issued in the areas of chemicals and automobiles even though these sectors, along with semiconductors, have been selected by the government as growth industries in the country's development plan. Instead of demonstrating increases in national innovation, setting aside for a moment the ambiguity of the term, the sectoral makeup of Korean patents is more indicative of the deliberate or strategic use of IPR for national advantage.

BALANCE OF PAYMENTS

An increase in the rate of patenting is anticipated post-reform. The effect of reform on bilateral trade, though, is ambiguous. Maskus (2000) summarized the uncertain impact of stronger IPR on the reforming state's current account.

The basic tradeoff when countries adopt stronger patents is between greater market power for rights-owning firms, permitting higher profits on lower trade volumes, and greater market demand for those firms as local imitators are made less competitive, inducing higher trade flows. Thus, no certain prediction may be made about the impacts of variable patent rights on trade volumes [p2231].

Maskus and other scholars writing on IPR and trade focus on whether foreign firms are more or less eager to export to a state post-reform. Smith (2001), for example, notes the market

⁶ We refer here to the industrial and strategic trade policies adopted by the US administration in the late 1980s in an attempt to assist the American semiconductor sector.

⁷ In 1999, Korean firms were granted over 900 US patents in the field of semiconductors; the next largest foreign recipient was Germany with less than 350 patents.

expansionary effects of IPR reform both in terms of the technology owner's willingness to transfer production outside the source country *and* outside the firm itself.⁸ One problem with much of the current research, including that of Smith's and Maskus', is that aggregate trade data is used. Once high technology trade is pulled out of all non-fuel trade, the results invert. Fink and Primo Braga (1999) confirmed a positive relationship between IPR reform and overall trade, but stronger patent protection was "not found to be significant for high technology trade flows" (p10).

Presumably, a reforming state's exporting capacity would also be affected by reform if stronger IPR stimulates national firms to innovate and those same firms then export their IP-intensive goods. Thus, when national patent policy is altered, the consequences for the reforming state may be seen both in the volume of trade and in the composition of exports and imports. We take several different looks at the impact of reform on balance of payments, segregating first IP-intensive trade from all trade. Twelve classes of goods using SITC Rev.2 were identified as the products or processes most affected by IPR reform; that is, items in these classes became eligible for patent protection after reform. Briefly, these consist of nine classes of chemicals and related products including pharmaceuticals, and three classes of electronic apparatus including microelectronic circuitry.⁹ Figures 6.6 and 6.7 compare the total volume of trade in Brazil and Korea to trade in IP-intensive sectors in the years preceding up to and following reform.

⁸ Smith argues that firms can expand foreign markets three ways: through exports, through affiliate sales, and through licensing agreements. She claims that IPR reform has increasingly positive effects on each of these. The location advantage is boosted which results in increases in affiliate sales and licensing relative to exports. And the internalization effect increases licensing relative to affiliate sales and exports. See pages 433-4.

⁹ SITC Rev.2 class 5xxx Chemicals and Related Products (with 9 subclasses), 75xx Office Machines and Automatic Data Processing Equipment, 76xx Telecommunications and Sound Recording Apparatus, and 77xx Electrical Machinery, Apparatus and Appliances.

FIGURE 6.6: BRAZIL - HIGH-TECHNOLOGY EXPORTS AND IMPORTS, PRE AND POST REFORM

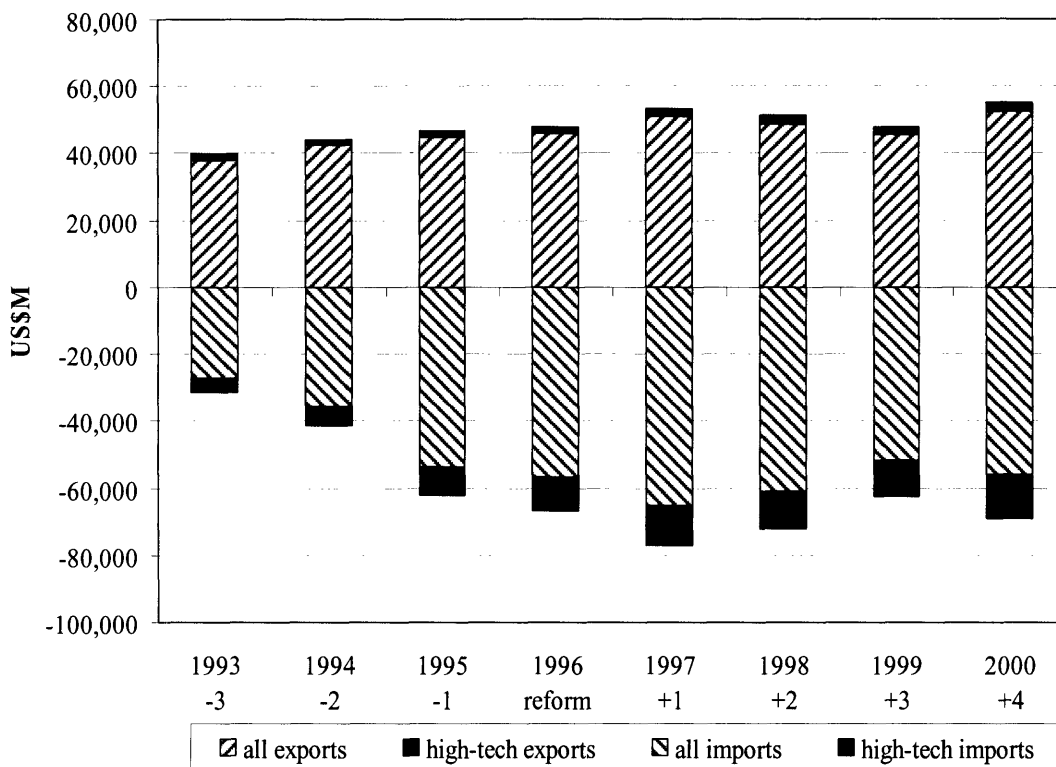
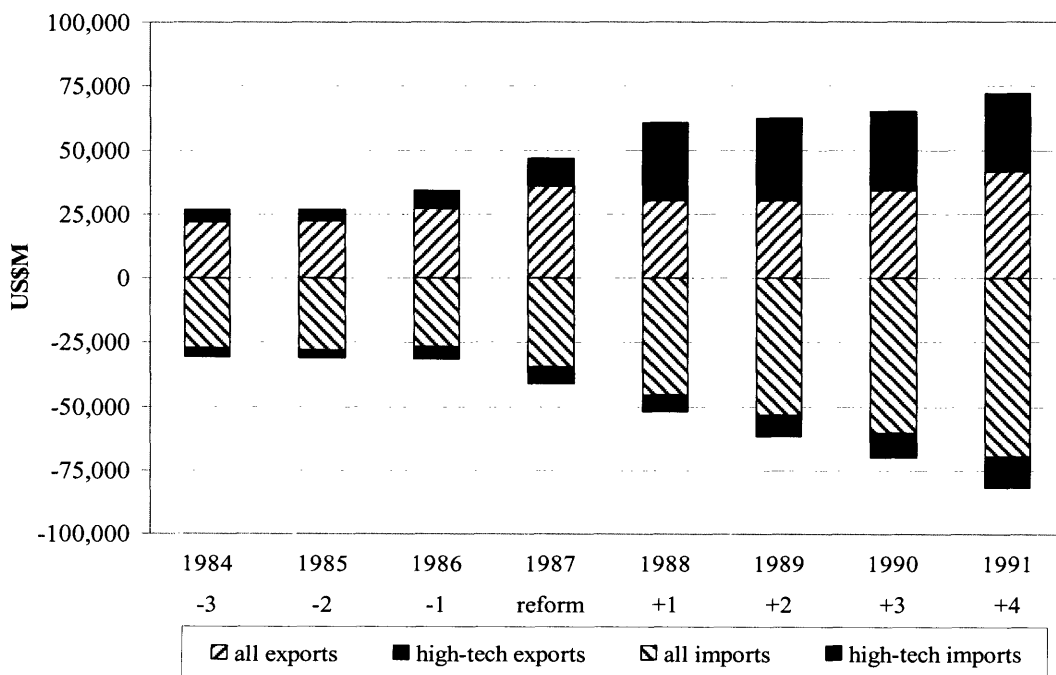


FIGURE 6.7: KOREA - HIGH-TECHNOLOGY EXPORTS AND IMPORTS, PRE AND POST REFORM



Source for Figures 6.6 and 6.7: International Monetary Fund, Balance of Payments Statistical Yearbook, various years.

In Brazil, in the four years following reform, overall exports rose 15%, IP-intensive exports increased 20% and pharmaceutical exports, 8%.¹⁰ Total imports on the other hand remained constant over the same period, but IP-intensive imports climbed 24% and pharmaceutical imports 38.8%. Thus, in the post-reform period, IP-intensive imports outpaced exports in Brazil even though overall exports grew at a faster rate than imports. The volume of all imports remained unchanged while the volume of IP-intensive imports swelled.

In Korea, total exports grew 54% after reform whereas IP-intensive exports rose 169% and pharmaceutical exports increased nearly 6 fold (477%). Overall imports doubled over the same period, but IP-intensive imports rose 135% and pharmaceuticals 269%. The composition of trade in Korea post-reform was the converse of Brazil; IP-intensive exports grew substantially faster than all exports and far exceeded the volume of IP-intensive imports coming into the country.

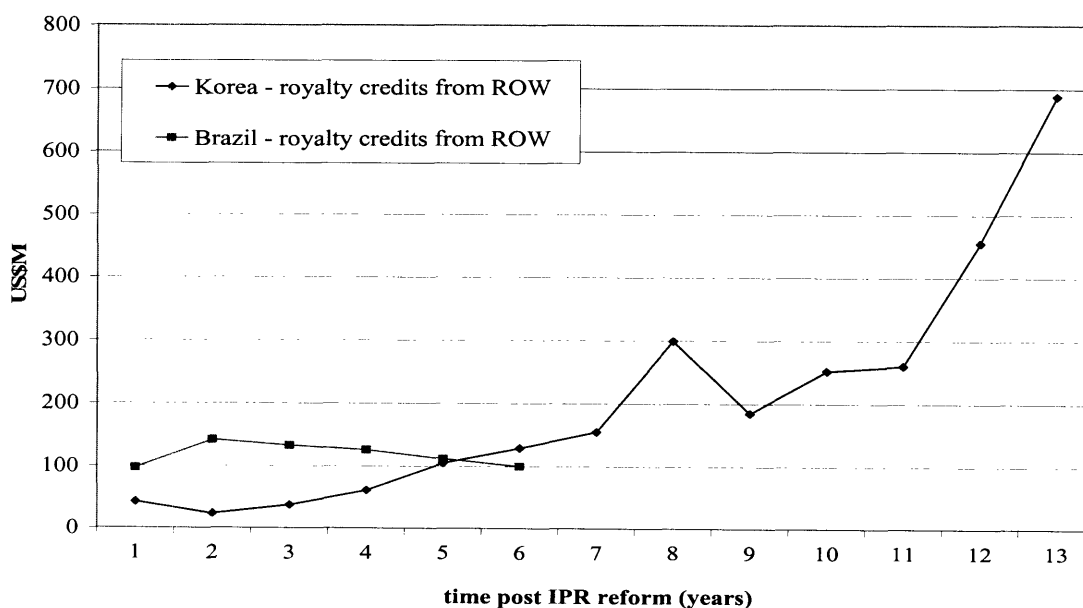
The actual composition of exports and imports at the time of reform and post-reform provides a slightly different cut at the terms of trade of both countries. In Brazil, IP-intensive exports represented just 8.1% of exports at the time the country adopted new patent legislation; four years later, IP-intensive goods accounted for 10% of all exports, a meager two percentage point increase. The composition of Brazil's imports was clearly altered. While IP-intensive goods represented a third of all imports at the time of reform (33.4%), they accounted for 40.8% of imports four years later. We see the exact opposite outcome in Korea. The share of IP-intensive goods was 40.8% of all exports at the time of reform, and 47.1% four years later. IP-intensive imports as a percentage of all imports rose to 30% from 27.4%. Unlike Brazil, Korea exported more high technology goods than the country imported, and this trend intensified after IPR reform.

¹⁰ Brazil ran a large trade surplus in the first few years of the 1990s (in 1993, it totaled US\$13.3 billion). By mid-decade, however, an overvalued exchange rate caused import prices to plummet and the surplus eroded rapidly. By 1995, imports to Brazil exceeded exports by US\$1.2 billion.

The purchase and sale of technology is the second aspect of the balance of payments effects. We refer here to the royalty payments countries pay one another for the use of technology and other patented and copyrighted goods. Only a few of the most advanced industrialized countries run a surplus in royalties; most industrialized and all of the developing countries run a deficit, including of course Brazil and Korea. To assess the impact of reform on intellectual property transactions in both countries, we summed the royalty credits for the first two years post-reform and compared this to the credits for years five and six post-reform. (Two-year averaging was used to circumvent steep variation anomalies in the data.)

Brazil collected US\$239M in royalty payments from the rest of the world (ROW) in years one and two post-reform, and US\$212M in years five and six, a decrease of 11%. Korea was paid US\$65M in the first two years after reform, and US\$234M in years five and six, an increase of 260%. This is visually displayed in Figure 6.8 below and includes Korean data thirteen years post-reform. Tables 6.2 and 6.3 contain annual credit and debit amounts for 6 years post-reform.

FIGURE 6.8: ROYALTY CREDITS, BRAZIL AND KOREA POST REFORM



Source: *Annual Report of the Brazilian Central Bank, various years; Annual Report of The Bank of Korea, various years; IMF Balance of Payments Statistical Yearbook, various years.*

It is noteworthy that, between the years of 1988 and 1997, payments to Korea for use of Korean patents and copyrights grew 500% while Korean payments to the ROW for the use of their technology rose 194%. The difference is still more pronounced from 1988 to 2000, 13 years post-reform: payments to Korea jumped more than 16-fold (1,538%) while payments to the ROW increased 293%. If this trend continues, and there is little reason to doubt that it will, Korea will run a surplus in this component of the service account by 2009, making the country one of the very few net sellers of technology to the ROW.

TABLE 6.2: BRAZIL - ROYALTIES AND LICENSING FEES, POST-REFORM

US\$M	1997 (REFORM +1)	1998 (REFORM +2)	1999 (REFORM +3)	2000 (REFORM +4)	2001 (REFORM +5)	2002 (REFORM +6)
CREDIT	97	142	133	126	112	100
DEBIT	887	1075	1283	1415	1244	1229
NET	-790	-933	-1150	-1289	-1132	-1129

Source: *Annual Report of the Brazilian Central Bank, various years; IMF Balance of Payments Statistical Yearbook, various years.*

TABLE 6.3: KOREA - ROYALTIES AND LICENSING FEES, POST-REFORM

US\$M	1988 REFORM +1	1989 REFORM +2	1990 REFORM +3	1991 REFORM +4	1992 REFORM +5	1993 REFORM +6
CREDIT	42	23	37	61	105	129
DEBIT	820	1120	1364	1581	1629	1414
NET	-778	-1097	-1327	-1520	-1524	-1285

Source: *Annual Report of The Bank of Korea, various years; IMF Balance of Payments Statistical Yearbook, various years. Note: debits for 1988-89 are rounded to the nearest 10.*

Recapping, Korea's balance of payments was positively affected by reform both in terms of high-technology trade and in terms of royalty and licensing fees. Brazil, on the other hand, did not parlay strengthened patent protection into tangible national advantage. While IP-intensive exports continued to comprise a greater share of all Korean exports—reaching nearly half of the value of all exports four years after reform, the percentage of high-technology exports to total exports increased only slightly, to 10%, in Brazil. Whereas royalty payments to Korea jumped 3½ fold in the six years following reform, payments to Brazil from the ROW declined 11%. Data

on the impact of IPR reform on bilateral trade in the two countries studied in depth confer little empirical support to the broad predictions of the literature touched on at the beginning of this section.

MARKET STRUCTURE

Finally, we examine whether the local market share held by domestic pharmaceutical firms increased or decreased post-reform. Admittedly, this is a crude measure of the effects of reform since many factors influence shifts in market share, for instance, changes in state policy mandating local content or the rise in joint ventures between local and foreign firms. The currency crises that plagued both countries during the late 1990s also complicate the interpretation of market data. All the same, we are interested in overall trends here: are local firms gaining or losing domestic market share in the high-technology sector in the years following reform? Table 6.4 provides a snapshot of the structure of the pharmaceutical markets in Brazil and Korea post-reform. We use the local pharmaceutical sector as a proxy for industries directly impacted by IPR reform. The time covered is a six-year period, from 1997 to 2003. Market share statistics were not available for Korea until 1997, 10 years after passage of the initial reform.

The figures for Korea show that domestic drug firms lost market share to foreign firms between 1997 and 2003. Korean firms' share of local sales declined 16% – from 82% to 66% – even though the composition of manufacturers remained the same. There are approximately 300 pharmaceutical manufacturers in Korea; 47 or 15% are multinational firms.

TABLE 6.4.: NATIONAL MARKET SHARE IN HIGH-TECH SECTORS, POST-REFORM

	BRAZIL		KOREA	
	1997*	2003	1997	2003
domestic firms	15-25%	30%	82%	65.6%
multinational firms	75-85%	70%	18%	34.4%

Source: *Business Monitor International and IMS Health*; *1997 estimates by IMS Health.

In Brazil, foreign drug firms dominate the local market. Their share of local drug sales was somewhere between 75% and 85% in 1997, and 70% in 2003. Does this mean domestic pharmaceutical firms are slowly gaining market share post-reform? Before drawing that conclusion, we need to consider the national currency issues that beset Brazil at the time. In early 1999, the *real* was devalued from dollar parity to just below two *reals* to one dollar, causing a precipitous rise in the price of imports. (Drug imports account for 25% of domestic sales in Brazil.) As a result, overall drug sales declined 26%, from US\$10.3B in 1998 to US\$7.6B in 1999. And in 2001, the *real* depreciated 30%, again affecting the price of imported drugs. Sales of locally produced generics rose dramatically in response – from US\$31.6M in 2000 to US\$366M 2002 – but still represented a fraction of total sales (5%). Though MNCs were hit hard by the country's currency problems, they still managed to hold onto the lion's share of the local drug market. Of the top ten drug manufacturers in Brazil, nine are MNCs.

We considered the consequences of IPR reform in three broad areas: control of technology, balance of payments effects, and national market share indicators. This compilation reflects the commonly used measures employed by economists and others working in the field of intellectual property rights to assess the domestic impact of tighter patent protection. Neither Korean nor Brazilian firms gained market share in the local drug sector post-reform. But using measures of technology ownership and current account effects, Korea captured and created benefits from reform. Hence, the country committed itself to IPR reform even though the government was initially opposed, vehemently, to amending national patent policy. Brazil was unable to internalize reform benefits; these benefits were absorbed instead by other countries. When the adverse effects of reform became apparent three years after ratification, Brazil backtracked.

In the next section, we take a deeper look at the institutional factors that may have helped Korea glean benefits from reform.

Explaining commitment: factors within the state

In Chapter 3, we stated that states will commit to reform after they begin deriving economic benefits from the new policy. To be clear, *these benefits are different from those envisioned by policy advocates*. It is obvious that governments will implement only those reforms they perceive to be in their interest. The expectation of obtaining economic benefits is what motivates voluntary reforms, such as large-scale reductions in tariffs. In this and other market liberalization reforms, national interests and the interests of other states conveniently coincide. This reinforcing feature of voluntary reforms is absent with imposed reforms. Here, national and foreign interests often collide, as the tightening of IP protection clearly illustrates. As a result, a set of benefits expressly for the reforming state are promoted and given as justification for changing domestic policy. Recall that for IPR reform these included increases in foreign direct investment, technology transfer, and overall economic growth. Brazil and Korea questioned, or rejected outright, the likelihood of obtaining these projected benefits; instead, Korea reaped a different set of advantages post-reform. To repeat, states commit to involuntary reform only after they are able to secure reform benefits, *benefits different from those promoted by reform advocates*. Korea, post-reform, cultivated its global control of technology, improved its balance of payments in high-technology trade, and held its share of ownership in domestic high-technology sectors—benefits nothing like the ones promoted by policy advocates. No amount of coaxing, punishing, or sophisticated monitoring will bring about wholesale implementation of reform. The reforming state has to reap benefits first and foremost.

Several factors *within the state* increase that country's odds of profiting from reform. Among the most crucial are: previous extensive exposure to the international market, demonstrated deftness in commercial ventures, highly adaptive or agile national firms, and a willingness to reap reform benefits whenever and wherever possible.

Exposure to the competitive realities of the global market prepares a country to handle shifting rules of the marketplace. Notably, the reform policies states are coerced into enacting

(the rules of globalization) in most cases have been implemented already by the large, advanced-industrialized trading states; hence, the business strategies of firms operating under these specific market reforms can be observed and imitated by succeeding states that reform. Exposure to global trade puts a newly reforming state in a good position to learn how other countries use the rules of globalization to their competitive advantage. In the mid-1980s, the US extended property rights to semiconductor topologies and pushed other chip producer countries to do the same. Japan resisted initially, but then followed suit. Japanese firms quickly adopted the strategy of US-chipmaker Texas Instruments and amassed huge revenue-generating intellectual property holdings. American and European apparel firms, reacting to stricter labor codes in their countries, are beginning to build global market share by promoting a social values agenda (i.e., goods made by high-wage earning workers) instead of attempting to compete on price. These tactics or similar ones likely will be used by firms in other countries if Western labor standards are imposed on them. Firms enmeshed in the international market learn to adapt to and profit from market reforms. Firms shielded by their governments from the harsh realities of global competition will find it difficult to bend with, and benefit from, new market rules.

States that demonstrate commercial deftness understand how the rules of globalization directly impact commercial operations. They take advantage of obligatory policy changes without altering their core industrial strategy. Korea, for example, excelled at exploiting R&D for commercial purposes. In Brazil, by contrast, R&D was pursued mainly for its value to scientific knowledge; little attention was given to its profit-making potential. Korean firms were skilled at absorbing and adopting foreign technology for mass producing consumer goods. Though foreign firms held majority IP rights in cutting edge technologies, Korea performed extremely well on the manufacturing side, or in what Teece calls a “complementary asset” (1986). The state was able to expand its global market share in the very sectors it held few if any intellectual property rights. IPR reform in Korea did little to alter the country’s core industrial strategy of growing its global market share in high-technology industries, and using technology

developed elsewhere to achieve this end. As illustrated in the previous section, Korea began taking out international patents at an astonishing rate. By the late 1990s, it became the third largest register of IP property (after the US and Japan), even though the country continued to be a *user* not a *producer* of new technology. The main thrust of the country's economic strategy – compete in the high-technology sectors using foreign technology – remained the same.¹¹

Highly adaptive or agile national firms enhance a country's ability to capture reform benefits. By agile we mean firms that can switch business tactics quickly and adroitly in response to external stimuli without disruptions to output or turnover. With respect to IPR reform, we refer to firms that are able to swap their "pirate and sell" approach with a "patent and sell" approach without losing noticeable market share. Korean firms, after years of responding and adapting to major shifts in the government's industrial policy, were experienced in rapidly shifting course to take advantage of abrupt changes in policy.

Last, and most important, states willing to reap policy benefits whenever and wherever possible are likely to succeed in turning reform to their advantage. This includes an ability to question, reject, and look beyond the benefits being promoted to other possible advantages not articulated by reform advocates. Korea was less interested in boosting IFDI (in fact, government restrictions on direct investment remained in force for years after IPR reform), and more on improving its balance of trade. To achieve the latter and better the country's position vis-à-vis other states, Korea began its drive to control new technology both at home and abroad by engaging in strategic patenting. Though the government publicly subscribed to the traditional argument for tightening IPRs – recall that state monies earmarked for R&D rose post-reform in a bid to improve national innovative output, Korea clearly aimed to capture short-term benefits from reform. *Ownership of intellectual property took precedent over fostering innovativeness*

¹¹ Clearly, using technology produced elsewhere is not a new strategy. In fact, Mansfield found that in the US "60% of patented innovations were imitated legally within four years of their introduction" (Griliches, et al. 1984). What is new about the Korean case is that the country pursued ownership of technology at the same time it continued to use foreign technology for its own commercial goals.

and the generation of new technology. And the state strengthened its link to the global market by pursuing foreign patents as aggressively as domestic patents.¹² One area where Korea lost ground was the domestic drug sector. Imports of foreign branded drugs now penetrate the local market and have driven out national generic producers and herbal tonic makers; for reasons unknown, local drug firms have been disinclined to using patents to hold onto market share. Overall though, Korea demonstrated keenness at preserving its international market position post-reform, even if this meant yielding to foreign imports in some domestic industries.

Brazil's response to IPR reform was entirely different. The government was unwilling to renounce favored sectors (e.g., pharmaceuticals) and would not give ground on particular domestic goals (e.g., universal health care). Hilker (2004) has called this *policy incoherence* which "occurs when a government/institution consciously accepts that the objectives of a particular policy cannot be achieved due to conflicting interests or priority accorded to another policy." Additionally, Brazilian firms appeared incapable of – or unable to recognize the value in – strategic patenting for competitive advantage. Brazil held a rather inflexible definition of national pride that served to stifle thinking in the government and in industry on how to glean benefits from IPR reform. Patenting by resident inventors remained essentially flat in the years following reform, the rate of foreign patenting by nationals unchanged, public support of R&D continued to be weak, and R&D efforts largely unconnected from any commercial application.

What else besides state capacity might influence commitment? Drawing on contemporary work on treaty making and compliance in general, we contemplate how different approaches to rule-making might facilitate state commitment and ward off backtracking. To grossly simplify the literature, two scholarly camps have emerged within the last eight years, each advocating a different approach to achieving commitment to and full implementation of

¹² The strategic nature of Korea's foreign IPR holdings is evidenced by the highly concentrated patenting pattern. We refer the reader to Chapter 5.

international directives. One group promotes the use of *legalization* or binding rules (or hard law) in international agreements. The other advances *soft law* or non-binding rules to accomplish (ultimately) deep and lasting changes in domestic policy. We side with proponents of soft law.

Aiding commitment through nonbinding rules

Scholars studying international agreements tend to see full implementation of treaty obligations as a two-step process: ratification of the treaty (or formal compliance) and enforcement. In most cases formal compliance – bringing domestic laws into conformity with international rules – is readily achievable. The international community uses a number of methods to affect the enactment of new domestic laws (e.g., arm-twisting, incentives, sanctions, compensation, issue-linkage, public shaming, etc.). Attention has swung now toward the problem of enforcement.

Relatively little is known about the extent of *actual* local enforcement of mandated rules; this is especially true for an assortment of issues ranging from IPR reform, environmental conservation, restrictions on weapons procurement, curbs on corruption, and protection of human rights. Information is available for only a small fraction of multilateral agreements, and even in these cases, details are often fragmentary or anecdotal, and rarely come from disinterested sources. With the exception of the pillar agreements that comprise the WTO, treaties seldom include explicit instructions on how to achieve across-the-board enforcement of rules; countries are told to develop their own strategies for implementation.¹³ Questions persist on what constitutes satisfactory enforcement and how outside entities are to monitor and assess on-the-ground compliance. Signatories (and observers) may disagree over whether a participant-state is

¹³ A good example is the 1992 UN Conference on Environment and Development, which made little mention of enforcement of rules. The action plan of the Rio Declaration, called Agenda 21, did address enforcement, but left the matter up to individual states with only vague instructions on how to proceed. Chapter 8, Section (e) 8.21 asserts: “Each country should develop integrated strategies to maximize compliance with its laws and regulations relating to sustainable development, with assistance from international organizations and other countries as appropriate.” The full text of Agenda 21 is available at <http://habitat.igc.org/agenda21>.

locally enforcing the spirit of the treaty as well as its specifics. In some cases, states are held to an uncommonly high standard of enforcement. Israel's inclusion on the US 301 Special Watch List, for instance, stemmed in part from American concerns over whether *future* criminal prosecution of Internet copyright infringers would actually take place – a level of IPR enforcement that went well beyond the conditions set forth in the TRIPS agreement.¹⁴ Though Korea's IP laws are among the most protective in the world and the country established one of the few national courts worldwide to hear IPR-related cases, Korea landed on the 301 Priority Watch List in January 2004 for not pursuing copyright infringers on university campuses aggressively enough and for not extending police authority to the federal group investigating software piracy. Both Israel and Korea are TRIPS compliant; but both failed to satisfy the US criterion of adequate enforcement of IPR.

Global rules are easy to sidestep. And the problems associated with monitoring local enforcement are well understood. National sovereignty (and firm confidentiality) must be respected and maneuvered around. Mutual trust must develop between the monitoring entity and the reforming state, or confidence maintained in sources providing information on enforcement. And a decision made on who bears the costs of monitoring. Even with these known problems, the conventional thinking on how best to achieve local enforcement of imposed reforms is through the use of binding rules – an approach that necessitates extensive and ongoing monitoring. In an editorial in the *Washington Post*, USTR Robert Zoellick promoted the use of binding rules with penalties for non-enforcement, not only in multilateral venues but in bilateral situations as well.

“...partners in [US] free-trade agreements must commit to effectively enforce their labor and environmental laws. [We will] impose fines on countries that fail to abide by their obligations.”¹⁵

¹⁴ The decision to add Israel on the Watch List stemmed in part from this assertion: “...[though] Israel recently joined the U.S. and ten other countries in the largest single law enforcement action ever undertaken against Internet piracy...it remains to be seen whether Israeli prosecutions will result from this action.” See United States Trade Representative's 2004 Special 301 Report, page 26.

¹⁵ Zoellick, Robert B. 2004. "Helping Labor through Trade." *The Washington Post*. Editorial, A19.

The World Trade Organization's Dispute Settlement Procedure (DSP) is perhaps the best known institutional vehicle for compelling states to enforce internationally mandated rules. Using binding rules to achieve enforcement goals often requires linking environmental, labor, and similar type reforms to trade or to financial aid. Linking the rules of globalization to trade has not been accomplished yet – with the notable exceptions of IPR (at the WTO) and a handful of regional and bilateral agreements – but there is considerable interest in repeating the TRIPS success in other issue-areas.¹⁶

In the last several years, political scientists have begun providing theoretical justification for moving toward more binding rules in multilateral agreements and have promoted the tactic as a sensible way to achieve higher levels of enforcement. These scholars use the term *legalization*, and sometimes *hard law*, to denote a greater reliance on the rule of law as opposed to, say, a gentlemen's agreement or a promise by the state to reform. Legalization is essentially defined by three characteristics: heightened obligation on the part of the state, greater precision in the wording of rules, and delegation of rule interpretation and enforcement to third parties (Abbott et al. 2000). The underlying assumption is that the universal problem of collective action (at the international level) results in perfunctory tolerance of state non-enforcement. "Legalization contains an implicit promise," Kahler claims, "...[that] greater cooperative gains will be reaped by resolving collective action problems more efficiently" (2000). Abbott and Snidal contend that state commitment is more credible with hard law, even though "hard law restricts actors' behavior and even their sovereignty" (2000, p422). And with what seems counterintuitive in light of our earlier discussion, and offered without empirical support, is the assertion that "higher

¹⁶ The GATT ruling on the Tuna-Dolphin case is attributed with opening the "trade and environment" door. In this case, the dispute settlement panel ruled against the US and for Mexico finding that American domestic law designed to protect the inadvertent capture of dolphins in tuna nets was discriminatory. The ruling stunned environmental groups and had the effect of spurring their effort to get environmental issues included in future trade talks. Labor rights activists however have not been as successful getting the ILO Conventions accepted by the trade organization as of this writing (2004).

levels of obligation and more precise rules reduce the costs of monitoring and lower the bar for enforcement actions” (Kahler 2000, p664).

Not all political scientists agree with the conclusions drawn by legalists. Scholars working in a variety of fields have questioned the wisdom of pursuing binding laws and mandatory sanctions if the long-term goal is changing state behavior and state norms. Moreover, there is concern that tying environment, labor, competition policy, human rights, corruption and other issues to trade will unduly strain and weaken the multilateral trading system, and ultimately undercut its effectiveness in prying open markets.¹⁷ Simmons and de Jonge Oudraat (2001, p5) allege that “iconoclastic NGOs that inserted labor and human rights issues and environmental concerns into the equation of global commerce have undone the older consensus [on economic reform]”.

Proponents of nonbinding law argue that taking a different approach in international agreements would enhance the prospect of changing state behavior, and with it, securing state commitment to reform. Less encroaching on state autonomy than obligatory or binding rules, soft law may preclude a state backlash provoked primarily by sovereignty claims. Nonbinding rules in international agreements permit states some wiggle room or discretion in the scope and pace of domestic reform. One consequence of hard law is the disjoint that results between local political and legal practice and what is mandated by international law; this is avoided when nonbinding rules are used. Several scholars have noted that though soft policies have lower rates of compliance, they appear to have the greater influence on state behavior (and thus are more effective) in the long term (Raustiala and Victor 1998).

Moreover, soft law enables states to aim for more ambitious goals. Raustiala and Victor claim the reason that most countries comply with most international rules most of the time is

¹⁷ There are exceptions to this view however. Some claim that the inclusion of issues such as labor rights will reinforce the legitimacy of the trading regime. See Hansson, Göte (1983). *Social Clauses and International Trade: An Economic Analysis of Labour Standards in Trade Policy*. London, St. Martin's Press.

because of the relatively easy objectives set forth in hard law; "...countries negotiate and join agreements with which they know they can comply... proposed [targets] that could lead to noncompliance do not earn the consent of most governments" (1998, p662). What is the purpose, then, of introducing bolder targets in a nonbinding instrument if states are not obliged to abide by them? The bolder targets laid down in soft law can advance a particular end goal by raising international public awareness and promoting a certain vision of how the world ought to be and what states ought to do. Nonbinding rules raise the bar and keep the pressure on, so to speak. Not so with hard law. Hathaway (2002) contends that the actual signing of a human rights treaty may reduce international pressure on a state to reform.

Soft law, then, is a serviceable way to change established norms, both international and domestic. For example, Richardson writes that "[m]any societies once regarded corruption as inevitable and, although wrong, not particularly harmful...Consensus now exists that corrupt behavior reduces economic growth, invariably benefits the few at the expense of the many, is especially injurious to the poor, and can destabilize governments" (2001, p75). This reversal in thinking is largely attributable to several nonbinding instruments introduced in the 1990s that raised awareness of the problem of corruption and persuaded several countries to finally crack down on it. The UN General Assembly in 1996 issued the Declaration Against Corruption and Bribery in International Commercial Transactions, a soft policy approach that urged states to adopt a code of conduct for public officials and to criminalize bribery and other types of corruption. The same year, the World Bank and the IMF issued a Declaration on Partnerships for Sustainable Growth, recognizing corruption as an obstacle to economic growth and prosperity and urging states to do something about it (Richardson 2001).

Externally imposed hard law – like the TRIPS Accord – *in and of itself* will not change public opinion nor will it persuade states to freely alter how they deal with domestic problems. Nonbinding rules, though not always successful in producing a radical (and swift) change in the public's perception of what is possible, give us reason to be optimistic nonetheless. We are

beginning to see examples of the fruitfulness of this approach to rule-making, as our anticorruption example illustrates. The ubiquitous belief that corruption is intractable and unsolvable has now given way to a different point of view: that the problem can and should be dealt with proactively by the state.

Soft law can serve as a stop-gap to more legalistic tools as well, allowing time for widespread consensus on policy reform to emerge and take hold. Historically, early steps toward establishing a new global norm have been taken slowly and cautiously. The global trading regime provides an excellent example. The GATT entered into force in 1948 with its members consenting to just 122 mutual tariff reductions. The second round achieved 5,000 reductions. Signatories agreed to 8,700 tariff cuts in the third round; and in 1962, the fifth round, another 4,400. Finally, in 1967, the sixth GATT round (the Kennedy Round), achieved across-the-board tariff reductions of 35-50% – nineteen years after the original trade agreement was negotiated. Some sort of “evolutionary dynamic” is at work in successful international agreements; these ambitious treaties build up slowly and take root over a period of years or decades. This gives states the breathing space they need to adjust, adapt, and accept international rules no matter what their domestic political and economic situation. Soft law provides states this needed leeway.

To recap, we considered several state features which appear to enhance the odds of capturing benefits from externally imposed reform: prior, extensive linkage to the global market; commercial deftness; highly agile national firms; and a readiness to reap benefits wherever possible. Capturing reform benefits is the key to policy commitment and long-term policy stability. In addition, the particular approach taken in international agreements can facilitate (or delay) the stability of imposed domestic policy. We have reasoned that nonbinding rules or soft law would be the better approach if the ultimate goal is achieving a long-term commitment to the rules of globalization.

The practical importance of stable policy

What is the practical importance of studying state commitment to economic reform? Why not focus on enforcement of reform policy? For reform advocates, the end goal is full-scale enforcement, after all. We take the position that determining state commitment to reform is a good predictor of genuine policy implementation and longevity, regardless of whether (inadvertent) enforcement has begun and a number of the reform's objectives have been achieved.

Observers of policymaking assume that states will remain pledged to the reforms they *voluntarily* enact. In Chapter 3, we spatially represented the global economic policy agenda, and the evolution of policy proposal to state acceptance, to illustrate that elected reforms have the benefit of ideological buy-in (or at least acquiescence) from the state, whether or not domestic support is present or nascent. States consider self selected reforms to be reasonable, justifiable, and legitimate. But the stability of *externally imposed* reforms is dubious since states regard coerced reforms as unwarranted, objectionable, and, often, unfair. These reforms are pushed onto states at an early period in the agenda setting process, and lack the theoretical and empirical grounding of voluntary reforms. We see evidence of the widely recognized risk of state backtracking whenever outsiders are called to closely monitor state enforcement of new policy. On-the-ground implementation of imposed reforms, policies we called the rules of globalization, will be resisted, countered, and delayed. In short, *long-term policy stability and full implementation are not possible until the state has committed itself to the reform*. Therefore, one of our main objectives has been to understand when, how, and why mandated but objectionable reforms, those prone to state backtracking, take root domestically and become part of the state's policy arsenal.

Oddly, policy enforcement – whether strict, halfhearted, or nonexistent – tells us little about state commitment or backtracking. The carrying out of mandated rules does not mean a state is committed to the reform. (We stick with our framework, which splits apart formal compliance or enactment of new policy, commitment, and enforcement.) States may make an

intentional decision to enforce the reform, or implementation may be accidental or inadvertent. The former indicates commitment, the latter does not. Importantly, the presence or absence of intent is often determined in hindsight. By the late 1980s, the Soviet Union had achieved a 30 percent reduction in sulfur dioxide emissions as mandated by the 1979 Convention on Long-Range Transboundary Air Pollution, not because of strict enforcement it was later determined, but because of a national industrial downturn (Mitchell 1998). Halfhearted or no enforcement might be due to insufficient technical, administrative, or financial resources or other domestic failings, or the result of imprecise language in the treaty or directive. Enforcement may falter simply because the reform tries national norms. "One wonders why piracy persists in Russia and China," one scholar writes, "if their intellectual property laws conform to international standards of protection. ...Enforcement of these laws...is weak because judges, attorneys, police, and the people at large are ill informed about the meaning of ownership of property" (Tiefenbrun 1998). It may take time, in other words, for perceptions to change and for enforcement of reform to take hold. The president of Tanzania, William Mkapa, signed an anti-corruption pledge in good faith in 1995, yet the country's near bottom ranking on Transparency International's Corruption Perceptions Index (CPI) barely budged for several years, finally jumping to 76th out of 90 in 2000 (Richardson 2001).¹⁸ The point is before any decision is made on what recourse is needed to bring about full implementation of new domestic policy – be it financial or technical support, education, prodding, or punishment, state commitment or backtracking must be determined first. In the Tanzanian case, sanctions would not have hastened the reform process.

We have made a distinction between involuntary and discretionary reforms, and claimed that the former are particularly susceptible to state backtracking. State disinterest, lingering questions over policy effects, and jurisdictional overreach all characterize involuntary reform, making these policies particularly vulnerable to state backtracking.

¹⁸ On the CPI 2003 list, the country ranked 92nd out of 130 countries.

LACK OF CONCERN

Coerced states reject the view that the problem the reform deals with is grave or pressing. Compared with other issues it faces, states have modest interest in what imposed reforms aim to solve – be it unstable intellectual property rights, environmental externalities, labor rights, or corruption. No state will deem economic reform vital to its national welfare if the country must be strong-armed by outsiders to adopt it. Elected reforms target policy areas perceived to be of prime importance to economic growth and the national interest; moreover, the efficacy of voluntary reforms is backed by accepted economic theory and mounting empirical evidence. As we noted in Chapter 3, imposed reforms tend to draw on non-economic rationales, such as fairness or protection, and are vulnerable to confutation. What is more, involuntary reforms may entail wealth transfers from poorer to richer states at least in the short term, or have other asymmetric effects that are contingent on the country's current level of economic development. States forced to reform are unswayed by the arguments advanced for policy change and see little connection between the imposed reform and their national interest.

UNCERTAIN REFORM EFFECTS

Unlike discretionary reforms in which a consensus has formed on the correctness of one policy course, imposed reforms confront issues beset by uncertainty – over the nature or severity of the problem at hand and also over the intended (plus the unavoidable and unintended) effects of a policy response. For example, Martin and Maskus (1999) note that states receive contradictory advice on instituting stricter labor standards, and Langille (2001) admits that “whether more respect for labor rights is good or bad is contested, both normatively and empirically (470).” Though disagreements over policy can and do erupt in traditional macroeconomic issue-areas, such as the debate over floating or fixed exchange rates, the uncertain scientific, economic, or social effects inherent in the rules of globalization impedes policy consensus, often rendering arguments for reform suspect. This erodes the ability of policy

advocates to convincingly prophesize advantages for the reforming state, the expectation of which might sustain these countries through a difficult period of adjustment (for example, a decline in competitiveness in their labor intensive sectors due to the adoption of higher labor standards).

JURISDICTIONAL OVERREACH

The perceived jurisdictional overreach of advocates for reform is a factor that plays against the new policy's long-term stability. Jurisdictional overreach refers to the expanding role of institutions, international private interests, and other non-state actors in global rule-making and agenda setting, and the intrusion of external actors in purely domestic policy decisions. A good example of jurisdictional overreach can be seen in environmental policymaking. The World Conservation Union (IUNC) has played a prominent role in the negotiation and implementation of several global environmental treaties, such as the CITES.¹⁹ Both state and non-state actors – 82 nations, 79 international NGOs, and over 700 national NGOs – comprise the IUNC; and nations and NGOs are given equal voice in its proceedings. In monitoring treaty compliance, NGOs through the IUNC wield considerable influence over the national legislation of member countries. Pressure from non-state actors in fact was responsible for raising formal compliance with CITES (via enactment of satisfactory domestic legislation) from 28% in the late 1990s to 52% in 2004. (The clout of this NGO continues to grow; in 1999, the IUNC became one of 17 non-state observers to the UN General Assembly.)²⁰ Non-state actors are gaining influence in

¹⁹ CITES, or the Convention on International Trade in Endangered Species of Wild Fauna and Flora, an international treaty signed in 1973, regulates or restricts trade in 34,000 different species. Other treaties that the IUCN has either negotiated or helped implement are the Convention on Wetlands of International Importance (e.g. Ramsar Convention on waterfowl habitat), the World Heritage Convention (WHC), the Convention on Migratory Species (CMS), and the Convention on Biological Diversity (CBD).

²⁰ There are many examples of the expanding role of non-state actors in global policymaking. For example, 1,500 NGOs have been granted top tier status and unprecedented access at the UN's Economic and Social Council (ECOSOC). At the 1992 Rio de Janeiro Earth Summit, 1,500 NGOs participated alongside 172 nation-states. Human rights groups, like Amnesty International, bring roughly three-quarters of all human rights violation cases to the UN Working Group on Arbitrary Detentions. For details, see Shelton, Dinah (2001). Human Rights. in *Managing Global Issues: Lessons Learned*, edited by P. J. Simmons and C. de Jonge Oudraat. Washington DC, Carnegie Endowment for International Peace. For general information on

other issue-areas once seen as the purview of nation-states. The Fair Labor Association of the US and the Ethical Trading Initiative, its European complement, have compelled multilateral corporations with operations in developing countries to adhere to the core labor standards set out by the International Labor Organization (ILO). Though it is true that the FLA and the ETI have changed corporate not state policy, these NGOs nevertheless have achieved a measure of labor reform in poorer countries where the ILO has not. And in IPR we have documented how non-state actors – here, multilateral drug companies – were successful in getting the TRIPS agreement adopted at the conclusion of the Uruguay Round, effectively overhauling domestic IP policy around the world. Jurisdictional overreach means that external actors, weighing in with their own set of costs and benefits quite apart from the economic, social, or judicial milieu of targeted countries, can compel these countries to enact unpopular domestic policies.

States' lack of interest in pursuing reform, uncertainty over the effects of the imposed reform, and unease over the reach of international actors into global rulemaking all increase the risk of state backtracking. The conventional wisdom on commitment contends that once states are convinced of the projected benefits of reform, the policy will stabilize. Or that the desire to cooperate, which may set in after sustained global engagement, will reduce the risk of renegeing. Another view claims that domestic interest groups, newly profiting from the reform, will emerge to lobby for the continuation, and expansion, of the policy. The evidence presented in this thesis, though, challenges the conventional wisdom.

Directions for future research

The indicators we used to establish state commitment or backtracking were unduly crude, allowing us to determine the presence or absence of commitment but neither the magnitude of commitment nor its trend. There are a number of questions we may want answered, but the present framework provides us little if any help. One scholar admitted that “theoretical

the growing influence of NGOs in global rulemaking, see Simmons, P.J. (1998b). "Globalization at Work: Learning to Live with NGOs." *Foreign Policy*.

frameworks distort by two means, either by marginalizing a set of interesting problems or by making it impossible to raise certain questions at all” (Kratochwil 1993). Our framework is unsatisfactory for the second reason. What does it mean, for example, if a state suddenly reverses itself after passing supplementary laws and pouring state money into supporting domestic institutions? Has the state begun to backtrack or is there another explanation? What if international pressure to reform tapers off or ceases altogether; will the state revert to its former policies? That is to say, if reform becomes totally voluntary, does it make sense to continue to talk about state commitment? What if, after capturing reform benefits, the state openly backs reform but refuses to enact auxiliary laws or support the requisite domestic institutional changes for reform? Do we consider the state committed to reform or not? The Brazilian and Korean case studies presented unambiguous results with starkly different outcomes, but such clean outcomes are the exception rather than the rule.

One way to address these problems is to develop more sophisticated markers for state commitment. For instance, we did not attempt to describe the relevance nor rank the importance of different supplementary laws passed post-reform. Additional legal measures may be essential for deepening or expanding the reform, or they may be trivial. Establishing a national patent court is a monumental judiciary change that extends domestic IPR reform, while increasing the budget of the patent office by five percent is comparatively trivial. A state forced to change its labor policy demonstrates its commitment to labor reform in general by extending to all state workers the right to organize. But a stronger indicator of commitment might entail a substantial increase in the minimum wage, establishing a 40-hour work week, mandating overtime pay, and proscribing the employment of children under the age of 13. It follows that any future study employing the framework presented here should differentiate and rank the indicators of state commitment so that *the level of commitment as well as its trend can be learned*. Likewise, adding additional indicators, such as whether a coerced state pressures others to reform, would heighten our understanding of state commitment.

Another potential avenue of research would explore why certain countries fail (and even refuse) to turn imposed reform to their advantage. We speculated that certain state features, such as a set outward orientation, make it more probable that the state will attempt to reap reform benefits. What is needed is a thorough and systematic exploration of the scope of conditions under which states are more likely to seek and obtain national advantage after adopting highly objectionable but mandated reforms. By *conditions* we mean both extant state capacity and the external conditions that influence state behavior. An example of the latter is the extent to which neighboring countries have enacted obligatory reforms and whether or not free riding on others' reform is possible. To illustrate this point, say the five largest Latin American countries have adopted tighter IPR regimes and have begun paying royalties to the US for its technology. Assume also that they have negotiated aggregate payments in which each country's share is less than each would pay on its own. Other regional countries refuse to tighten IPR to avoid the concomitant welfare losses, but persist in appropriating foreign technology. US firms, now receiving annual royalty payments from several LA countries, have an incentive to produce technology particularly valuable to the region – perhaps a new drug to combat tropical diseases. The free-riding countries, unwilling to undertake IPR reform, enjoy the benefits of foreign innovation all the same even though the development of the new drug is due to tighter IP protection in neighboring countries.²¹ Does the number of reforming states in the immediate region increase or decrease the odds that other countries will commit to reform? For questions of state capacity, the varieties of capitalism literature could provide a practical starting point for investigating a range of hypotheses to explain why some countries respond nimbly and cunningly to pending welfare losses (effectively averting a net loss), while other countries' sole response is to resist reform.

²¹ This is a liberal take on the dual free rider problems (of North-South and South-South) noted by Yang. He argues that the joint effort of regional countries in the South can circumvent the second free rider problem. See Yang, Yong (1998). "Why Do Southern Countries Have Little Incentive to Protect Northern Intellectual Property Rights?" *Canadian Journal of Economics* 31 (4): 800-816.

Our aim has been to understand why imposed domestic economic reform stabilizes in some states but not in others. We are concerned with a narrow set of policies, often referred to as second phase economic reforms or the rules of globalization. These reforms, which demand unpopular changes in national law, increasingly will be grafted onto trade treaties or made a condition of international aid. The intended goal is to speed the harmonization of domestic market rules; an objective almost entirely pressed by NGOs from the advanced industrialized countries. Our case evidence suggests that there are significant limits to the capability of international institutions or hegemonies to compel state action on domestic reform. In a formal sense, institutional or hegemonic pressure is effective at inducing policy change; when leaned on, governments will enact reform. But in a functional sense – that is, whether or not the new policy is fully implemented on-the-ground – coaxing, upbraiding, and threats from outside actors are neither effective nor prudent.

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Treaties

- International Union for the Protection of New Varieties of Plants (UPOV), Geneva
International Convention for the Protection of New Varieties of Plants, 2 December 1961, last amended on 19 March 1991.
- United Nations Educational, Scientific, and Cultural Organization (UNESCO), Geneva
Universal Copyright Convention (copyrights), 16 September 1955, last amended 24 July 1971.
- United Nations World Intellectual Property Organization (WIPO), Geneva
Berne Convention for the Protection of Literary and Artistic Works (copyrights), 9 September 1886, last amended on 28 September 1979.
Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure, 28 April 28 1977, last amended on 26 September 1980.
Convention for the Protection of Producers of Phonograms Against Unauthorized Duplication of Their Phonograms, 29 October 1971.
Hague Agreement Concerning the International Deposit of Industrial Designs, 6 November 1925, last amended on 28 September 1979.
International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (Rome Convention), 26 October 1961.
Locarno Agreement Establishing an International Classification for Industrial Designs, 8 October 1968, last amended on 28 September 1979.
Madrid Agreement Concerning the International Registration of Marks (trademarks), 14 April 1891, last amended on 28 September 1979.
Madrid Agreement for the Repression of False or Deceptive Indications of Source on Goods (geographical indicators), 14 April 14 1891, last amended on 31 October 1958.
Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks,
Paris Convention for the Protection of Industrial Property (patents), 20 March 1883, last amended on 28 September 1979.
Patent Cooperation Treaty (PCT), 19 June, 1970, last amended on 3 October 2001.
Strasbourg Agreement Concerning the International Patent Classification, 24 March 1971, last amended on 28 September 1979.
Trademark Law Treaty, 27 October 1994.
Treaty on Intellectual Property in Respect of Integrated Circuits (Washington Treaty), 26 May 1989.
- World Trade Organization, Geneva
Agreement Establishing the World Trade Organization (Final Act embodying the results of the Uruguay Round of Multilateral Trade Negotiations), January 1, 1995.
Annex 1A Multilateral Agreements on Trade in Goods, January 1, 1995.
Annex 1B General Agreement on Trade in Services (GATS), January 1, 1995.
Annex 1C Trade-Related Aspects of Intellectual Property Rights (TRIPS), January 1, 1995.

National Intellectual or Industrial Property Offices

Brazil, Instituto Nacional da Propriedade Industrial (INPI), www.inpi.gov.br.

Korea, Korean Intellectual Property Office (KIPO), www.kipo.go.kr.

United States, United States Patent and Trademark Office, www.uspto.gov.

Japan, Japanese Patent Office, www.jpo.go.jp.

European Union, European Patent Office, www.european-patent-office.org.

Taiwan, Taiwan Intellectual Property Office, <http://www.tipo.gov.tw>.

Industry Associations

Asociación Brasileira de las Industrias de Química Fina (ABIFINA)

Associação Brasileira da Indústria Farmacêutica (ABIFARMA)

Associação Brasileira da Indústria Química (ABIQUIM)

Associação da Indústria Farmacêutica de Pesquisa (Interfarma)

Associação dos Laboratórios Farmacêuticos Nacionais (ALANAC)

Brazilian Society for the Development of Science (SBPC)

Business Software Alliance (BSA)

European Union of Industrial and Employers' Confederation (UNICE)

International Council of Chemical Associations

International Federation of Pharmaceutical Manufacturers and Associations (IFPMA)

Japan Federation of Economic Organizations (Keidanren)

Korea Specialty Chemical Industry Association (KSCIA)

Korean Pharmaceutical Manufacturers Association (KPMA)

Motion Picture Association (MPA)

Pharmaceutical Research and Manufacturers of America (PhRMA)

Semiconductor Industry Association (SIA)