Understanding South Korea and Japan's Spectacular Broadband Development: Strategic Liberalization of the Telecommunications Sectors

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Abstract

The ICT sectors of both South Korea and Japan developed rapidly, especially in developing high-speed, low priced broadband services. These networks can potentially provide both economies with new playgrounds for experimentation and innovation. Existing explanations of how these broadband networks and services were created tend to be confused and contradictory regarding 1) the roles played by the states, 2) the exact mechanisms of interaction between governments policies and programs, regulatory frameworks, and market dynamics, and 3) the politics driving each of the state-market interactions.

We find that differences in the institutional configurations of the two countries since the inception of their ICT sectors created a distinct set of political dynamics in each country. The initial telecom policy regimes of the two countries in their initial stages of liberalization were strikingly similar. However, the contrasting political dynamics drove Japan and Korea's policy regimes along different trajectories. Driven by politicized conflicts and a series of negotiated compromises between the former incumbent and lead bureaucracy, Japan's ICT sector underwent a *regime shift*, from which the market dynamics giving rise to broadband services developed. By contrast, Korea's *managed competition* policy regime, once established, was stable and hierarchical, with a strong lead bureaucracy managing the sector and former incumbent, without significant political battles. The market dynamics in Korea, from which its broadband services developed, occurred within its existing policy regime without a shift comparable to that in Japan. Differences in the politics, stemming from initial institutional configurations and subsequent political bargains at key junctures drove the two regimes along different trajectories.

Introduction

The rapid economic development of both Japan and South Korea (hereon, Korea) partly hinged on their success in developing lead sectors that became globally competitive. Light industries such as textiles were followed by heavy industries such as steel, autos, and then electronics and semiconductors. Much ink has been spilled in attempting to explain the two countries' rapid growth, especially regarding the governments' roles, their capacities, and their relationships to markets.[1] Our inquiry is aimed at understanding the two countries' rapid development of the latest lead sector – Information, Communications and Technology (ICT).

In fact, ICT has been recognized worldwide as not only a lead sector, but a broadly transformative sector capable of driving productivity, innovation, and growth in a wide range of industries.[2] While most advanced industrial countries have attempted to nurture their domestic ICT sectors, Japan and Korea are notable in their rapid and extensive deployment of broadband services. As we describe in the next section, neither country had broadband markets before 1999,[3] but by 2002, they were at the forefront of global price-performance and leaders in population penetration. Although the full potential contributions of broadband networks to the two countries' international competitiveness have yet to be discovered, few countries would regard their rapid broadband penetration with anything less than envy.

We find an analytical comparison between Japan and Korea's broadband development especially useful because they are often considered to have shared key patterns of state-market interaction in their overall economic growth, at least for a significant time period, and regardless

[1] For excellent overviews of the scholarship, see Noble (1989), Onis (1991), Wade (1992), and Woo-Cumings (1999).
[2] Cohen, et al. (2000).
[3] A variety of definitions for "broadband" exist, but we follow the OECD in refering to services that offer more than 256Kbps downstream access. We also exclude ISDN (Integrated Services Digital Network), an alternative, slower technology than DSL, despite requiring fiber optic cables to the home. See OECD (2002), p.6.

of the precise conception the analyst chooses to use.[4] Thus, in this paper we seek to understand and compare the exact manner in which the two governments interacted with their respective markets in the course of developing broadband networks and services, with special attention to the politics driving those interactions.

Korea and Japan's Rapid Development of Broadband

From the late 1990s, the ICT sectors of Korea and Japan developed rapidly, propelling them to the forefront of advanced industrial nations in terms of high-speed landline and wireless Internet connectivity. Since the market dynamics, policies, and politics behind the landline and wireless segments of the sector differ considerably, despite their increasing convergence, in this paper we limit our focus to the area with perhaps the most spectacular, if not sudden growth – broadband services.

As Martin Fransman points out, no existing measures of national performance in broadband are perfect. Of the most common measures, Korea far exceeds all other nations in terms of penetration, and Japan leads the world in terms of speed and price. [5]

Korea moved first, with the rapid growth of DSL (Digital Subscriber Line), a technology involving sending high frequency signals over existing copper telecommunications infrastructure. With consumers enjoying the cheapest prices in the world, Korea's broadband penetration became the highest worldwide by 2001, where it has remained through the date of this publication. Considering that there was no market for broadband before 1998, the fact that 70 out of 100 households sported broadband subscriptions by 2002 is nothing short of astonishing (See

[4] In addition to citations in footnote 1, see Cumings (1984). Conceptions include economic perspectives stressing export-led growth, import substitution with credible threats of removing protections, political economic conceptions of "developmental," "non-liberal," "coordinated market economies," "network states," et cetera.
[5] Fransman points to 1) availability, 2) penetration, 3) capacity/speed, 4) price, and he calls for the adoption of 5) quality of access, and 6) goodness of fit with the needs of users. (Fransman 2006: 7)

table 1, which shows penetration rate per 100 inhabitants, rather than households, due to data limitations).[6] In the one year between 1999 and 2001, the number of DSL subscriptions in Korea rose from 97 thousand to 2.7 million, and cable modem subscriptions increased from 17 thousand to 1.5 million.[7]

Table 1: Broadband Penetration Rate per 100 Inhabitants

	2000	2001	2002	2003	2004	6/2005
Korea	9.2	17.2	21.8	24.2	24.9	25.5
Japan	0.2	2.2	6.1	10.7	15	16.4
USA	2.3	4.5	6.9	9.7	13	14.5
OECD average	1.27	2.9	4.9	7.3	10.3	11.8

Source: OECD

Table 2: Broadband Subscriptions, Japan 1999-2005 (millions)

	1999	2000	2001	2002	2003	2004	2005
Total broadband	-	0.63	2.83	7.81	13.64	18.66	22.37
Cable Internet	0.15	0.63	1.3	1.95	2.48	2.87	3.23
DSL Lines	<.01	0.01	1.52	5.65	10.27	13.33	14.48
FTTH	-	-	0.07	0.42	1.45	2.43	4.64

Note: for FTTH, 2001-2003 indicate end of FY rather than calendar year
Sources: 1999-2003: OECD 2005, 2004-2005: MIC

Table 3: Broadband Subscriptions, Korea 1999-2005 (millions)

	1999	2000	2001	2002	2003	2004	2005
Total broadband	-	3.92	8.14	10.4	11.61	12.17	12.46
Cable Internet	0.17	1.56	2.94	3.55	3.94	4.24	4.15
DSL Lines	0.97	2.35	5.18	5.66	6.57	6.72	6.42
other	-	0.01	0.03	1.18	1.09	1.21	1.88

Note: number for 2004 is one month after end FY 2004, 2005 is end of FY 2005
Sources: 1999-2003: OECD 2005, 2004: MIC, 2005: NCA

Japan followed suit in the early 2000s. In 1999, when DSL was first introduced, Japan was one of the most expensive OECD counties for Internet access. However, penetration grew

[6] NCA (2004:15)
[7] OECD (2002b) p.13.

rapidly after 2000, with DSL subscriptions between the end of December 2000 and June 2001 increasing by over 4000 percent.[8] By 2002, Japan had the lowest prices for DSL in the world, as well as a market for FTTH (Fiber-to-the Home) services, high-speed fiber optic lines connected directly to households. FTTH services, offering transmission speeds of up to 100 Mbps (several times that of DSL) gave Japan the fastest household broadband networks worldwide.[9] By the end of 2005, over 44 percent of households had broadband access, and at the end of 2004, the ITU ranked Japan third in the number of total broadband subscribers.[10] Thus, by 2004, after a period of extremely rapid growth, Korea and Japan's broadband networks were at the forefront of broadband price-performance (see table 2).[11]

Table 4: Comparison of Prices per 100kbps, as of July 2003

Country	US$
Japan	0.09
Korea	0.25
Belgium	1.15
Hong Kong	1.27
Singapore	2.21
New Zealand	2.71
China	3.07
Canada	3.25
Netherlands	3.36
US	3.53
Germany	4.42

Source: MIC 2004

[8] OECD (2002b: 14)

[9] DSL services in Japan ranged from 1 to 8 mbps in 2001, though they increased to 50 by 2003. See IICP (2005) for details on transmission speed increases. The OECD figures on penetration per 100 inhabitants do not capture the rapid increases in speed, which are a critical characteristic differentiating the Japan from the US, with roughly similar penetration proportions.

[10] Ministry of Internal Affairs and Communications, Japan. Information and Communication Economy Office, Information and Communications Policy Bureau. *Main Data on Information and Communications in Japan.* <http://www.soumu.go.jp/joho_tsusin/eng/main_data.html> Accessed 6/2/2006

[11] In addition, by 2004, Japan and Korea had the cheapest cost for 100kbit/s as a percentage of monthly income. (ITU 2004: 25)

Governments, Markets, and Development in Korea and Japan – Expectations

Our interest in understanding how and why Korea and Japan's broadband networks developed so rapidly thrusts us into an ongoing theoretical debate regarding the role of governments and markets. Given that the rapid developments occurred after Korea's financial crisis and Japan's decade-long stagnation, how exactly did the governments and markets interact to produce these outcomes? How similar were Japan and Korea's roles of the governments and markets in their development of broadband? What were the politics driving each of the governments, and how do they compare to one another?

Theoretical debates over whether Japan and Korea's overall economic development were primarily due to market-led or state-led forces have been hashed out extensively. In applying these theoretical positions to broadband development, let it suffice to say that support can be found for both expectations – markets and technological developments affecting policy choices, as well as government actions shaping markets.[12] Our position is that both Japan and Korea's government were strategic in their liberalization of markets surrounding broadband.[13] By strategic, we mean that they had concrete goals in mind, and were capable of channeling policy and institutional change towards those goals. However, we are careful to recognize that the governments were far from omniscient nor monolithic; they were sometimes taken by surprise

[12] See Appendix for a more detailed treatment of the market-led and state-led expectations that grow out of these debates.

[13] The intellectual antecedents of our study are the following works of scholarship. Following Karl Polanyi, who recognized that markets must be created and sustained by continuous government intervention, we expect the government to play a strong role in shaping the actors and terms of competition (Polanyi 1944). Taking after Steven Vogel's analysis of liberalization in advanced industrial democracies, we also expect that liberalization, an increase in the level of competition, can be accomplished through both deregulation, a relaxing of rules, as well as re-regulation, a strengthening of rules (Vogel 1996). Influenced by Suzanne Berger, who pointed out that institutions can shape politics, and John Zysman, who argued that the strategies available to governments were influenced by the architecture of their financial systems, we expect the interaction of institutions and politics in the ICT sector to influence the strategies taken by governments. Berger (1972) esp 145-177, Zysman (1983).

by actual market developments, and political processes interacted with bureaucratic policymaking.

Existing analyses of the two countries' broadband development provide a confusing and contradictory picture, since they tend to contain the logic of either the market-led or government-led analysis, which essentially predict the opposite role of the state – withdrawing from markets, or actively intervening in them. Worse yet, some embed both within a single explanation.[14] Empirically, the market-led explanations tend to ignore bountiful examples of re-regulation, while state-led explanations tend to list government programs and outcomes with little regard for market dynamics. Both tend to downplay the political dynamics driving policies and regulatory regimes, an aspect we view as critical to understanding changes in policies, and the trajectories of such change. Therefore, neither can understand the precise nature of interaction between the governments and markets over time, nor can they accurately characterize the similarities and differences between Korea and Japan's broadband development.

In this paper, we closely examine the interaction between the governments and markets in the development of Korea and Japan's broadband services markets, focusing on the politics and institutional configurations that drive government policies and institutional change.

The Argument in Brief

We find that differences in the institutional configuration of the two countries since the inception of their ICT sectors created a distinct set of political dynamics in each country.[15] The initial telecom policy regimes – the set of institutions and policies that provide incentives and

[14] Tcha et al (2000), Lee (2002), Choudrie and Lee (2004), OECD (2000), are the most clear examples of this conflation. Fransman (2006), which appeared in print after we finished this manuscript, is perhaps the most even-handed account we have seen, splitting the credit between market and governmental factors. Chung (2006) in Fransman's volume, lists all possible contributory factors for Korea without a clear causal argument.
[15] In this paper we take a relatively narrow definition of institutions, referring to formal government organizations.

constraints for firms in determining their strategies – of the two countries in their initial stages of liberalization were strikingly similar, with a lead bureaucracy in each country closely micromanaging the telecom markets. However, the contrasting political dynamics drove Japan and Korea's policy regimes along different trajectories. Driven by politicized conflicts and a series of negotiated compromises between the former incumbent and lead bureaucracy, Japan's ICT sector underwent a "regime shift," from which the market dynamics giving rise to broadband services developed. By contrast, Korea's "managed competition" policy regime, once established, was stable and hierarchical, with a strong lead bureaucracy managing the sector and former incumbent, without significant political battles. The market dynamics in Korea, from which its broadband services developed, occurred within its existing policy regime without a shift comparable to that of Japan. Differences in the politics, stemming from initial institutional configurations and subsequent political bargains at key junctures drove the two regimes along different trajectories.

In both cases, however, we find that the market-led and state-led expectations are not entirely wrong, but are limited in their applicability to the entire sector. We argue that both governments engaged in deregulation as well as re-regulation *in particular segments* of the sector, in a *strategic attempt* to facilitate broadband networks. Japan did so in the context of a regime shift, while Korea did so within its existing policy regime.

Institutional Origins and Political Dynamics: Privatization and Liberalization

The telecom sectors of both Japan and Korea began under the auspices of direct government ownership and operation. The next step for both countries was to set up a monopoly

corporation as the state-owned carrier – NTT (Nippon Telegraph and Telephone) for Japan and KTA (Korea Telecommunication Authority) for Korea – a typical step for many industrialized countries other than the US.[16] Then, a combination of international, domestic, and technological developments sparked Japan and Korea's political process of privatizing their monopoly carriers and liberalizing the sector. International events included the privatization and breakup of AT&T in the US and the wave of liberalization and privatization across the world in the 1980s. Domestic developments included the completion of their respective national telephony infrastructures, and technological developments included value-added networks linking computers via telecom infrastructure.

The political dynamics of privatization and liberalization differed between the two countries. Japan's privatization of NTT, coinciding with liberalization measures, was a politically messy affair involving a reconfiguration of power between institutional actors. In contrast, Korea's privatization was a relatively smooth process, followed by a politically driven initiative to strengthen the lead bureaucracy. These differences were driven by the initial institutional configurations of the telecom sectors in the two countries, and the ensuing political dynamics that developed.

Japan: the Political Battle Creating MPT as a "Policy Bureaucracy"

In Japan, the political battle over privatizing NTT and beginning to liberalize the sector was complex and contentious, involving a dramatic power grab by the Ministry of Posts and Telecommunications (MPT).

[16] For most countries, the massive, coordinated infrastructure investment requirement made direct state ownership attractive, and the economies of scale in the business made a monopoly structure the logical choice.

In 1889, the Japanese government established the Ministry of Communications (MoC) as the owner and operator of Japan's telecommunications networks. Due to its involvement in propaganda during the war, the MoC was disbanded by the Allied Occupation government. In 1952, after political wrangling over the form it would take, the telecom functions of MoC were transferred to NTT, newly established as a public corporation. NTT then proceeded to become the dominant actor in telecom sector until the 1980s.[17] For example, though formally under the jurisdiction of MPT, NTT was able to essentially regulate itself for a number of reasons. First, MPT, which had been created from the Ministry of Postal Affairs, lacked expertise to effectively regulate NTT. Since NTT had been the prewar Ministry of Communications, MPT often lacked the staff with proper expertise in communications technology, leading to a situation in which NTT personnel sent to MPT were in charge of approving NTT's requests.[18] NTT also received budget allocations from the Diet, and MPT did not have the array of policy tools related to funding allocations enjoyed by the Ministry of Finance (MOF) or Ministry of International Trade and Industry (MITI). NTT also used its substantial R&D budget to keep a set of equipment suppliers, the "NTT family," including firms such as NEC, Fujitsu, and Oki, to supply equipment tailored to its specifications.[19]

The battle over NTT's privatization was fought among actors including the Second Administrative Reform Commission (Rincho), MPT, NTT, the Ministry of Finance, NTT "family" firms, retired NTT executives, NTT's union (Zendentsu), and several key LDP (Liberal Democratic Party) politicians. This battle was closely intertwined with a bureaucratic turf war between MITI and MPT over jurisdiction of the rapidly expanding telecom sector. This turf war

[17] For details on the early political and market dynamics of Japan's telecom sector, see Vogel (1996), esp. pp 137-145, Johnson (1989), Anchordoguy (2001), and Fransman (1995).
[18] Johnson (1989), p.190
[19] For details on the dynamics between NTT "family" firms and NTT, see Anchordoguy (2001), Fransman (1995).

involved many of the same political actors, with MPT leaning heavily on policy specialist politicians from the ruling LDP party (known as *zoku* politicians), with MITI attempting to bring the US into the policy debate on its side through American trade policy interests. Details of the battle have been documented elsewhere, but in short, the outcome was a dramatic gain in regulatory authority and policymaking power by MPT.[20]

MPT succeeded in rising from a "regulatory" bureaucracy with largely nominal power, to a full-fledged "policy" bureaucracy capable of MITI-style industrial policy. In a regulatory regime labeled by Vogel as "controlled competition," MPT compartmentalized the sector, orchestrated competitors, and used extensive licensing authority over matters such as pricing to micromanage competition.

Put simply, the outcomes of privatization and initial liberalization were somewhat of a reversal in MPT and NTT's power relations. NTT had escaped the fate of AT&T, which had been completely broken apart, but much of the regulatory oversight was transferred from the Diet to MPT. This outcome set up the political dynamics that drove Japan's telecom policymaking thereafter. MPT, as the lead bureaucracy, attempted to exert its will over NTT through different sets of policies, and unambiguously calling for a complete breakup of NTT when the issue arose in 1990, and again in 1996. NTT resisted, at times mustering political support within the LDP to compromise with MPT and soften its proposed measures.[21]

[20] For detailed accounts of the political battles, see Vogel (1994), Johnson (1989), Takano (1992), and for a longer overview, see Kushida (2005).
[21] For details on such policy battles, see Kawabata (2004), esp pp. 32-34.

Chart 1: The Evolution of Japan's Lead Bureaucracy and Incumbent

Prewar		Postwar - 1985		1985 - Present (2006)
Ministry of Communications (MOC)	→	NTT Public corp	→	NTT (NTT Holding Company after 1999)
Ministry of Postal Affairs	→	MPT (administrative bureaucracy)	→	MPT (policy bureaucracy)

Korea: Hierarchy and The Creation of a Strong Lead Bureaucracy

In Korea, the Ministry of Communications (MOC) was the bureaucracy that directly operated telecom services from 1948 until 1981. In 1981, as in Japan, telecom services were spun out into a state-owned monopoly carrier, KTA. However, unlike the case of Japan, KTA did not have the type of policymaking clout or supplier relations that NTT had enjoyed. MOC had real power and oversight over KTA, which facilitated a smooth privatization process.

The government decided to privatize KTA in July 1987 with little political resistence, and spent a decade slowly divesting itself from the company while it introduced competition into the sector. Along the way, key political actors supported increasing privatization and liberalization, including Presidents Roh Taewoo (1987-1993) and Kim Young-Sam (1993-1998), the Economic Planning Board (EPB), the Ministry of Finance and Economy (MoFE), and the industrial conglomerates, chaebol, made the process relatively free of conflict. The main political bargain during the privatization process was between the government and KTA's labor union, which agreed to the privatization on the condition that KTA would not be sold to chaebol or foreign interests, in order to assure stable employment.[22] In 1997, the government abolished the KT law that had governed KTA's activities, and they renamed it Korea Telecom (KT). By 2000, they had fully privatized the company.

[22] For each actor's preferences and strategies in privatizing KTA, see Bae and Chu (2003) and Sung et al. (2005).

Although the privatization process was relatively smooth, some conflict between bureaucracies did occur over the issue of liberalization, regarding how to introduce competition into the sector. Though not as extreme as the politicized turf war between Japan's MPT and MITI, there was some cleavage in the early 1980s between bureaucrats who preferred market-led liberalization and those who envisioned state leadership in high-tech industries. The cleavage developed into bureaucratic conflicts between the Ministry of Trade, Industry, and Energy (MoTIE), and Korea's MoC, with further policy coordination difficulties caused by software industrial policy being under the jurisdiction of the Ministry of Science and Technology (MST).[23]

In 1994, a politically driven focus on IT development by the Korean political leadership strengthened the lead bureaucracy for telecom policymaking.[24] In an administrative reform drive to coordinate high-tech policy, the Kim Young-Sam administration expanded the power, jurisdiction, and functions of MOC, creating the Ministry of Information and Communications (MIC). MIC was given sole responsibility for the IT sector, absorbing the industrial policy functions from MoTIE and MST. A series of politically driven policies – the "Framework Act on Informatization Promotion" in 1995, and an "Information Promotion Fund" in 1996 – strengthened MIC's legal and financial tools to guide IT policy. Another difference between Japan's MPT and Korea's MIC was that the Minister of MIC, appointed by the president, were always distinguished experts in IT, facilitating decisive policymaking and strengthening the legitimacy of MIC's policies. The contrast with Japan is clear, since the Ministers of Japan's

[23] For details, see Hong (1998).
[24] For details on the bureaucratic conflicts and establishment of MIC, see Hong (1998).

MPT tended to be politicians serving their rotation in Cabinet positions, with the real power often residing in the top bureaucrats.[25]

Thus, the initial institutional arrangements differed between the two countries, which shaped the actors responsible for driving political dynamics at key junctures. Despite these differences in the politics of telecom policymaking, however, the policy regimes that each country developed during the course of their liberalization converged to a remarkable degree.

Chart 2: The Evolution of Korea's Lead Bureaucracy and Incumbent

Ministry of Communications (MOC) (1948-1981)	→	MOC (1981 - 1994)	→	MIC (1994 - Present)
	→	KTA (1981 - 1997)	→	KT (1997 - Present)

The Regulatory Frameworks: "Managed Competition" Regimes

The regulatory regimes of Japan and Korea resembled each other quite closely in the first phases of liberalization. We conceptualize regulatory regimes as the policies, regulations, and institutions that shape the terms of market competition and private actors' incentives and constraints. Both had a strong lead bureaucracy that compartmentalized the sector, orchestrated new competitors, and micromanaged the terms of competition. In short, the regulatory regimes of both countries were geared towards "managing" competition.

[25] The first minister of MIC in 1994 was Mr. Sang-Hyon Kyong. He received a B.A. from Seoul National University, a B.S. from University of Rhode Island and a Ph.D. from Massachusetts Institute of Technology, all in engineering. Between 1965 and 1975, he was on the technical staff at Argonne National Laboratory, Bell Laboratories, and at Electronics and Telecommunications Research Institute (ETRI) of Korea. Before serving as the minister, he was a Vice President of Korea Telecom, the President of ETRI and National Computerization Agency (NCA), and vice minister of MOC .
The most recent minister was Mr. Dae-Je Chin who earned a B.A./ M.A. at Seoul National University, another M.A. at the University of Massachusetts, and a Ph. D at Stanford, all in electronic engineering. He began as an engineer at Hewlett- Packard 's lab and IBM's Watson Research Center. Prior to being named to head the Ministry, he served as the President and CEO of Samsung Electronics' Digital Media Network Business. In his long career at Samsung, he served in a series of increasingly important positions in several Samsung business units including: vice president of Memory Business; senior vice president of Semiconductor Business; executive vice president of System LSI Business; president & CTO of Corporate R&D Center; and president of Digital Media Network Business. In recognition of his many achievements in industry, he was named the Techno CEO of 2002 by the Ministry of Science & Technology. He has 6 overseas patents and 15 domestic patents.

In Japan, the Telecommunications Business Law governing the sector allowed MPT to divide carriers into three types based on whether they owned or leased infrastructure, and to exercise more control over carriers possessing infrastructure.[26] MPT also used administrative guidance to limit the scope of businesses to long distance, local, or international.[27] MPT exercised discretionary authority in allowing new competitors into the sector through a "Supply Demand Adjustment" clause in the Telecommunications Business Law. The clause enabled them to deny market entry to firms by citing excess supply or insufficient potential demand, without offering specific criteria. Interconnection rates charged to competitors for accessing NTT's infrastructure were arbitrated by MPT behind closed door negotiations in contentious annual negotiations between NTT and its competitors. MPT also managed prices set by carriers through its licensing authority, carefully weighing the expected effect of price change proposals by competitors and NTT on the competitive landscape before giving approval. Prices therefore came down gradually, and in lock-step, with competitors lowing their prices incrementally, followed closely by NTT.[28]

Korea's regulatory regime from the late 1980s was extremely similar. It also had a Telecommunications Business Law, and in 1990, the government compartmentalized the sector by dividing services into "facilities-bases" and "value-added" services, and creating a number of categories for service providers. [29] They also divided the sector along the lines of international,

[26] "Type I" carriers owned infrastructure and consisted of NTT and the NCCs. "Type II" carriers leased facilities from Type I carriers. "Special Type II" carriers could provide services across prefectures, while General Type II carriers limited their operations to local areas.
[27] Fuke (2000)
[28] For details, see Kushida (2005), (2006), Fuke (2000), Vogel (1996).
[29] The government re-categorized the service provides three times over the course of the 1990s. See Lee and Lie (2000) for details on how the categories for service providers shifted from "General," "Specific," and "Value-added" in 1990 to "Facility-based" and "Value-added, in 1994, and "Facility-based," "Special" and "Value-added" in 1997.

long-distance, and domestic, progressively licensing competitors in each sector over time.[30] Between 1990 and 1994, the government generally permitted only services that it had approved (a "positive listing" system), and in issuing new licenses, until 1997 it only accepted applications during a particular window of time allotted by the government (a "request for proposal" system).[31]

In sum, let us note that the liberalization processes of both countries entailed increasing the level of competition not simply by deregulation, but re-regulation – the creation of new rules and institutions. Both governments used their policy tools to actively manage the dynamics of market competition in their telecom sectors.

The Interaction Between Markets and Regulatory Regimes in Emerging Broadband Markets

So far, we have seen how the political dynamics of privatization between the two countries differed, though their regulatory regimes during the process of liberalization were quite similar. Here we closely examine the interactions between politics, regulatory regimes, and market dynamics during the advent of broadband markets. We examine Korea first, since it was first in developing broadband markets, and we find that broadband developed within its existing "managed competition" regulatory regime. We then examine the case of Japan, which reveals that in contrast to Korea, it underwent a "regime shift," and that broadband markets grew out of this process. We argue that differences in politics driving telecom policymaking are likely to be the root of the divergence in their regulatory regimes.

[30] In 1990, the government licensed DACOM (Datacommunications company of Korea) to International service, and in 1995 for long distance. In 1996, they licensed addition competition for international services, which Onsei took advantage of, doing likewise for long distance in 1997. In 1996, the government licensed a competitor to domestic telephony, Hanaro.
[31] For details, see Lee and Lie (2000).

Broadband in Korea: From the Managed Competition Regime

The Korean government did not orchestrate broadband deployment from a master blueprint to reshape its IT infrastructure. However, its policies strongly shaped the strategies taken by service providers and the service providers themselves. The "facilities-based" competition, in which different service providers competed with one another using separate sets of infrastructure, was the government's desire from the beginning.

In order to foster network infrastructure buildouts, MIC began using its newly acquired resources and policy tools. In 1995, it began the Korea Information Korea Information Infrastructure Initiative (KII; 1995-2005), which included in a variety of backbone building and R&D facilitation programs.[32] In order to directly foster facilities-based competition, MIC offered financial support, granting preferential tax treatment and directly underwrote loans to service providers building their networks.[33]

Broadband service began in Korea in 1998, when Thrunet introduced broadband services over its cable infrastructure. After the government announced that it would issue a license to one firm to lease out cable infrastructure, Thrunet was created in 1996 as a consortium of over one hundred companies, under the auspices of Dacom (Datacommmunications company of Korea), the long distance competitor to KT which had entered the market in 1995. The principal shareholder turned out to be state-owned energy company KEPCO (Korea Electric Power Company), and when Thrunet began its service, it used its own service and leased additional

[32] KII consisted of three parts: "KII-Government" built a nationwide backbone for broadband, "KII-Testbed" supported R&D to bring technologies to market, and "KII-Private" aimed to facilitate market competition in such a way that it would bring broadband networks to large buildings and households through private sector investment. See Lee and Chan-Olmsted (2004), pp. 658-659.

[33] Other financial support went to R&D, technology demonstration projects, pilot programs and community champions. For details, see Lee et al. (2004).

infrastructure from KEPCO. Incidentally, KEPCO had made a bold gamble to build its own fiber optic infrastructure without explicit government permission.[34] The broadband service became quite popular among the Korean public, impatient with the slow connection speed of dial-up services.

The entrance of a startup firm, Hanaro, into the broadband market is usually considered the beginning of Korea's broadband explosion. Hanaro was formed in 1997, after MIC's announcement in 1996 that it would license exactly one competitor into the local telephony market. Dacom, KEPCO, and chaebol such as Samsung, LG, and Daewoo were initial investors, and Shin Yun-Shik, former vice minister of MPT and top management of Dacom, was one of the initial leaders. In an attempt to create a relatively even playing field, MIC created a new set of regulations that prohibited KT from subsidizing its local service with profits derived from its long distance or international operations.[35]

Upon entering the local telephony services market, however, Hanaro quickly found that competing against KT was tantamount to taking on Goliath bare-handed. KT was able to offer high quality services for competitive prices, and the lack of number portability caused Hanaro to face network effects (consumers facing switching costs, keeping them in KT's service). Driven

[34] According to the following account by prominent government official, the story behind KEPCO's ownership of an extensive high-speed communications infrastructure serves as a check against the temptation to assign too much foresight and omnipotence to the Korean government in its creation of the market environment from which broadband developed. In around 1980, KEPCO installed fiber optic cables throughout its network, gambling that once it had the infrastructure, the government would have no choice but to allow KEPCO to use it more productively. This was interesting, given that KEPCO was fully government-owned and under the jurisdiction of the Ministry of Commerce and Industry (MCI). In the meantime, KT had its own incentive to create fiber optic networks, and the government supported their build-out, partly through financial incentives. A dispute ensued when both KEPCO and KT applied for a license to lease fiber to telecom carriers. From a capacity standpoint, according to the government official, KT's infrastructure was sufficient, and KEPCO's was redundant. However, both KT and KEPCO were fully government owned at the time, and although MOC was pitted against MCI, they could not engage in a public battle, since public disclosure would have revealed that MCI had allowed KEPCO to take matters into its own hands with taxpayers' money.

[35] Although the revenue often flows the opposite direction, with local service subsidizing long distance when incumbents face competition in long distance services, a former top government official asserts that the government wanted to ensure that flow of revenue within KT would be segmented in each market. Interview with former top MIC official (November 4, 2005).

to desperation, Hanaro noted that its customer surveys revealed that KT's data service subscribers (including Internet services based on dial-up and ISDN – Integrated Services Digital Network) lodged many complaints, mainly that access was slow and access fees were charged by the minute. DSL technology, which utilized existing copper infrastructure, delivered higher speed, and could be offered at flat rate fees, provided an opportunity Hanaro could not pass up.

The regulatory framework supported Hanaro's strategy to begin offering DSL, since Internet service provision was in a relatively unregulated segment of the market, requiring neither permission nor licensing.[36] Furthermore, in 1997 the government had switched from a "positive list" system, allowing only government-specified activities by service providers, to a "negative list" system, in which service providers could provide any service except government-prohibited ones.

Thus, in April 1999 Hanaro began offering broadband services utilizing both DSL and cable, using its own DSL network, and leasing cable capacity from a subsidiary of KEPCO (called Powercomm) and KT.[37] With its entry into broadband service, Hanaro sparked intense competition and created a price shock by providing the broadband service as a free addition to its basic telephone subscription which amounted to $40 with free installation. This price shock aided Hanaro in successfully gaining more than a million subscribers within 18 months of introducing its DSL service.

[36] It was classified as a value-added service, for Facilities-based Service Providers (FSPs).

[37] In cable service, the Korean government required structural separation of conduit and content, the two state-owned cable infrastructure owners of Powercomm and KT were not permitted to offer services, but instead leased capacity to programmers. Therefore, new entrants to the broadband market, such as Thrunet in 1998 and Hanaro in 1999, initially leased cable capacity to reach their earliest customers. This structural separation rules in cable were relaxed in 2000 when KT sold its cable infrastructure to cable service providers.

Hanaro's jaw-dropping DSL success profoundly influenced the strategy of KT, the dominant incumbent carrier.[38] Unlike NTT, KT had only begun investing in ISDN. It quickly scrapped plans for further investments in ISDN and put its weight behind DSL, since users clearly preferred its higher speed, flat-rate low subscription price, and always-on Internet access.[39] Fearing that it would be permanently left behind if it did not commence broadband service, KT started ADSL service in June 1999. Competition further heated up when other firms, including SK Telecom in 1999 and Onse Telecom in 2000, also entered the market.

Once it entered the market, however, KT's status as the incumbent with nationwide telephony infrastructure allowed it to quickly offer DSL service throughout the nation (Hanaro was limited in its geographic reach). KT's competitive pricing and rising demand for broadband enabled it to quickly catch up and surpass Hanaro's market share by June 2000, retaining a dominant market share since. Tables 4 and 5 shows its dramatic gain in market share – from 5 percent in 1999 to 44 percent in 2000. With DSL being in a relatively unregulated market segment, KT did not face policies designed to aid competitors at its expense. The smaller service providers never had a chance.

Table 5: Total Subscribers of Broadband Carriers

Year	1999	2000	2001
Thrunet	142,168	760,999	1,317,624
Hanaro	84,249	1,056,724	2,070,552
KT	12,903	1,730,977	3,874,442
Others	13,662	394,300	580,382
Total	252,982	3,943,000	7,843,000

Adapted from Lee (2003)

[38] We refer KTA as KT (Korea Telecom), because KTA was renamed as KT in December 2001.

[39] As a clear indication of consumer preference, in 1999, there were about 175 thousand ISDN subscribers, with 97 thousand DSL subscribers in Korea. However, in 2000, the number of ISDN subscribers had shrunk to 100 thousand, while DSL grew to over two million. (OECD 2005)

Table 6: Market Shares of Broadband Carriers (%)

	1999	2000	2001	2002	2003	2004
Thrunet	56	19	17	13	12	10
Hanaro	33	27	26	28	25	23
KT	5	44	49	47	50	55
Others	5	10	7	13	14	11

Source: Lee (2003) and MIC (2005)

Industrial Policy with a Twist

Notable about Korea's industrial policies towards broadband, within its strategic liberalization drive, is its attempt to not only enhance supply-side investment in networks, but to promote demand for their use as well. In its classical developmental strategy, Korea is usually considered to have been producer rather than consumer-oriented, channeling peoples' income into relatively centralized banking systems by keeping individual access to other avenues of investment such as securities or offshore markets relatively difficult, and then channeling those savings into strategic sectors. The KII strategies fall in the line of this classical industrial policy.

However, in promoting broadband and the Internet, the Korean government enacted a series of *demand magnification* programs. Several programs were designed to facilitate Internet education, computer use in schools, homes, to offer computer purchase assistance, and even to educate housewives, who tend to control household finances.[40] Perhaps the most clever demand magnification policy to was to deeply embed computer literacy in Korea's ultra-competitive

[40] Programs include the "Ten Million People Internet Education Project (2000-2002)" to provide Internet education to approximately a fourth of citizens and "One Million Housewife Digital Literacy Education Project." In terms of Internet access to schools, the government offered discounts for the provision of Internet access in primary and secondary schools under a special agreement with KT, leading to 100% penetration of schools with broadband by the end of 2000, though of course how it is used is another matter. (Choudrie and Lee (2004), p. 107.) In terms of PC diffusion promotion, from October 1999, the "PC for everyone" program aimed to provide PCs at low-prices, partly through a PC purchase installment saving system using the postal savings system. The Korean government also provided subsidies for purchase of PC by low-income citizens. In 2000, the government itself purchased 50,000 PCs as a four-year lease, providing it to low-income families with full support for broadband fee for five years. MIC (2001). With respect to housewives, government subsidies were granted to around 1,000 private training institutes over the nation for the purpose of education housewives, in order to create demand in households. MIC (2001).

university entrance exams, making a home PC a prerequisite for any serious education-minded parent, of which there is no shortage as evidenced by the extensive cram school industry. Broadband access became part of the package of computer literacy, driving sales for households with school-age children.[41] While the effectiveness of these programs and policies in promoting broadband cannot be determined decisively, it is noteworthy that the government adopted a range of demand magnification industrial policies in addition to the usual supply-side facilitation measures.

Re-Regulation: Managed Competition, Continued

If there was any doubt whether market developments in Korea's broadband services were an indication of government retreat, re-regulation by MIC in 2004 is strong evidence that the government sees its role primarily as facilitating competition, keeping the existing regulatory framework intact.

After the initial burst of growth, and after KT entered the broadband market, competing broadband providers began to run into financial difficulties. In 2002, Thrunet declared bankruptcy, and Hanaro found it increasingly difficult to sustain profitability.[42] Seeing this situation and deeming KT's dominance as a barrier to competition, in 2004 MIC stepped in to strengthen regulations in the broadband market. By shifting the categorization of broadband service providers from a less regulated segment ("value-added") to a more regulated segment

[41] Aizu (2002) provides a nice overview of how computer literacy as an investment in education plugged into the "education fever" caused by the rigorous entrance examination system. As the highly developed markets for cram schools indicates, family culture focusing on facilitating the success of children in school. Specifically, to go beyond Aizu's analysis, the computer literacy certification could be converted to additional points which counted towards university entrance exam scores.

[42] In early 2005, Hanaro absorbed Thrunet, but still had difficulty competing with KT, even contemplating receiving foreign funds to stay afloat (Fransman 2006:32)

("facility-based"), the government designated KT as the dominant service provider in broadband, making it subject to stricter regulations in terms of service and pricing.

Broadband in Japan: An Outgrowth of the Regime Shift

The Policy Drivers

In stark contrast to Korea's development of broadband, which occurred within the "managed competition" regulatory regime, Japan's broadband markets grew out of a transition in its regulatory regime away from "managed competition." The regime shift was driven by political dynamics in which MPT (reorganized in 1999 and renamed Ministry of Internal Affairs and Communications – MIC) continually battled NTT, and Japan's strengthened Cabinet Office entered telecom policymaking in a strategic push to develop IT. The shift entailed the government giving up many of the policy tools to manage competition, but adding new institutions and regulations in a transition from ex ante regulation through licenses and approval, towards an ex post mode of regulation relying on a dispute resolution commission and other institutions.

Japan's regulatory regime began a gradual transformation in the late 1990s.[43] In 1996, the battle between MPT and NTT over the divestiture of NTT – whether to break it up partially, completely, or not at all – ongoing since the early 1980s, was finally settled. Political compromises between a broad range of interested parties had been forged in 1983 and 1990, and resolved in 1996. To give a flavor of the complexity of negotiations in these political compromises, let it suffice to say that actors with often disagreeing interests included the MPT, NTT, the LDP, the Prime Minister (Hashimoto), the NTT labor union, the Social Democratic

[43] For gradual transformative institutional change and slow-moving causes and outcomes of change, see Streeck and Thelen (2006), Pierson (2003).

Party, the Fair Trade Commission, the Ministry of Finance, Keidanren, MITI, NTT's competitor carriers, and numerous policy research and deliberation councils.[44]

The outcome in 1996 was a surprise agreement between MPT and NTT, which allowed NTT to remain a single corporate entity united under a holding company. The tortured nature of this political compromise may be inferred by the fact that it required the lifting of the post-war ban on holding companies, one of the key tenets of the Allied Occupation in breaking up the prewar *zaibatsu*. Members of the Telecommunications Deliberation Council learned of this compromise in the newspapers after they thought they had secured an agreement to completely break up NTT.[45]

With the battle over NTT divestiture settled, MPT began to take measures to further liberalize the telecom market, through both deregulation and reregulation. In 1997, Japan signed the WTO Telecom Agreement, which removed many of the restrictions on inward FDI, especially regarding foreign ownership of infrastructure. [46] These new rules took effect in 1998, and in the same year MPT relaxed many of its licensing requirements.[47] MPT's deregulation measures were accomplished by altering the Telecommunications Business Law, a task made easier by broad political support in the form of the "Three Year Action Plan for Deregulation" spearheaded by the Cabinet Office in 1994.[48]

Interconnection to NTT's infrastructure, a necessity for most competitors, since NTT controlled the last-one-mile of infrastructure, had been a contentious political issue from the

[44] See Bolin (1997), Vogel (2000) for an excellent overviews.
[45] Interview, Toshihiko Hayashi, Professor at the University of the Air, former member of the Telecommunications Deliberation Council. (5/2001) Nakamura Ichiya, former MPT official, contends that the sudden compromise was the result of MPT shifting its focus from battling NTT to battling NHK, the national broadcaster under its jurisdiction. (5/2001)
[46] For details, see Kushida (2006)
[47] For Type I carriers, most price changes and market entry only required notification, whereas they had required approval prior to this. See Fuke (2000) for details.
[48] For details, see Suda (2005).

introduction of competition in 1985. MPT's basic stance was to force NTT to lower its interconnection rates, and the US periodically got involved in trade initiatives to pressure the Japanese government to force NTT to lower its interconnection rates. In 1998, MPT established clear rules for interconnection based on a specific formula.[49] In 2000, this formula was revised to further favor competitors.

Market Interactions in Early DSL Markets

The interaction between new market entrants attempting to offer DSL, several government actors, and a political drive to catch-up in IT not only to the West, but also to Korea, drove the next phase of the regime shift. In this phase, the liberalization was *strategic*, in that the government, while reacting to market developments, was clearly pushing for infrastructure and service development towards broadband diffusion.

In 1999, startup firm Tokyo Metallic, followed by others such as Fusion Communications, began offering DSL service. However, in order to do so, they required access to NTT's switching facilities to place their equipment within – a process known as collocation.[50] Unlike Korea's Hanaro, these startup firms did not own their infrastructure, since they had not entered local telephony markets. Unfortunately for these startup companies, the interconnection rules established in 1998 did not cover collocation, and were essentially operating in unregulated territory. Therefore, predictably, they were at the mercy of NTT, which delayed access and

[49] Kushida (2006), Fuke (2000) pp 43-45, Vogel (2000). The formula was know as LRIC (Long Run Incremental Cost), though the US immediately began arguing that Japan's LRIC calculations were flawed.
[50] DSL sends high frequency signals over conventional copper lines, requiring equipment on both the user's side (the box at home), and inside the carrier's facilities (NTT switching stations).

charged high fees. NTT was interested in continuing its per-minute charge-based ISDN service, and wanted to move directly into a proprietary fiber optic service.[51]

A series of government actions rapidly improved the competitive landscape for DSL providers. First, in July 2000, noting that Japan lagged behind many other industrialized nations, including Korea, in international IT statistics such as Internet penetration, usage, and broadband diffusion, the political leadership initiated a policy drive to catch-up in IT. The Cabinet Office, newly strengthened in its policymaking capacity, established an "IT Strategy Headquarters," within the Cabinet Office.[52] It produced the "*e-Japan* strategy," explicitly recognizing Japan's late start in IT, and stipulating a specific timeline to create a market environment providing low cost, fast Internet access.[53] Later that year, the Cabinet Office passed the "Basic IT Law," which allowed MIC (successor to MPT) a broad framework within which specifics could be determined via Ministerial Ordinances.[54]

Second, in October 2000 the FTC made a rare foray into telecom policymaking by issuing an unprecedented warning to NTT over its treatment of DSL providers, such as Tokyo Metallic and eAccess. At the same time, MIC revised several of its Ministerial Ordinances, forcing NTT to clarify the terms it offered collocation, and its methodology for calculating fees.

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[51] NTT had invested a total of approximately 9 billion dollars in its ISDN infrastructure (Cole 2006, citing Nezu 2002). Van der Staal, Grassmuck, and Hatta (1995) cite that in 1992, NTT invested 52 billion yen, and 30 billion yen in 1993 as it began to slow down its investments.

[52] See Pempel (2006) for details on how the Cabinet Office was strengthened, including increased personnel and expanded policymaking capabilities.

[53] See full text at the website of the IT Strategic Headquarters. Cabinet Office. *IT Strategic Headquarters.* [accessed 5/23/2006] <http://www.kantei.go.jp/foreign/policy/it/enkaku_e.html> Tilton (2004) argues that the *e-Japan* strategy conforms to the key characteristics of traditional "industrial policy" with a catch-up objective, explicit goal, and timeline to achieve specific outcomes.

[54] Ministerial Ordinances are legally binding, but can be decided by the ministry in charge working by iself, with no need to coordinate with other ministries, such as the Ministry of Justice to ensure coherence in Japan's civil law. In the government reorganization in 2000, MPT merged with the Ministry of Home Affairs and the Management and Coordination Agency and was given the unwieldy English title of "the Ministry of Public Management, Home Affairs, and Posts and Telecommunications" (MPHPT, Soumusho in Japanese). It made the sensible move to simplify its English name to the "Ministry of Internal Affairs and Communications (MIC) in 2004. In this paper, for simplicity, we refer to the successor of MPT as MIC.

It also forced NTT to lease out its unused fiber optic infrastructure (known as dark fiber) at low prices, as well as access to its local "last-mile" infrastructure (known as "unbundling the local loop").[55]

In 2001, MIC established a Dispute Resolution Commission (DRC), located within the ministry, but presented as an objective third party dispute mediator that revealed all its deliberations proceeding to the public – a shift from the negotiated settlements behind closed doors of the past. Among the early cases that the DRC dealt with were DSL providers complaining that NTT was slow to act on collocation, in which the DRC ruled against NTT.[56]

In 2003, MIC continued its deregulation by abolishing most of the classification, registration, and notification requirements for carriers, going so far as to remove the classification of carriers, and officially announcing that it did not limit the scope of carriers' activities.[57] MIC in essence announced that it would no longer compartmentalize the sector, and gave up many of its policy tools to manage competition.

Thus, by 2001, the competitive landscape facing Japanese DSL providers was considerably different from that in 1999, when the first firms began offering services. A whole set of regulations, backed by a political drive, seemed to back their business. Son Masayoshi, ethnically Korean and born in Japan, who founded Softbank in the 1980s, to become a star child of Japan's dot-com era in the late 1990s, took advantage of this new regulatory and market environment to its fullest extent.[58]

[55] See Kushida (2006), Fuke (2003)
[56] See website of the DRC at <http://www.soumu.go.jp/hunso/english/index.html> though summaries and minutes in Japanese.
[57] Fuke (2000)
[58] For details on Softbank's activities, see Vogel (2006) pp. 189-193. For a brief overview of Son Masayoshi, see Nathan (2004), esp. pp 99-119.

Softbank was an early investor in Yahoo!, and in September 2001, Softbank entered the DSL market through its subsidiary, Yahoo!BB. It created a price shock by setting its monthly subscription price at about half of the going market rate (2400 yen, approximately 22 dollars at 1 USD = 110 JPY), and engaged in an aggressive marketing campaign, including giving out $100 DSL modems for free at train stations. Softbank's price was the lowest in the world, forcing other DSL providers, including NTT regional companies, to lower their prices, and sparking a rapid increase in DSL adoption by Japanese.[59] Son then delivered a second price shock by bundling free IP telephony subscriptions with its DSL service, allowing Softbank subscribers to call each other without charge, setting flat rates for long distance calls to non-subscribers, and setting international calls at a fraction of the prevailing market rate.[60] Softbank was able to set this type of pricing because it leased dark fiber from NTT to create its own IP-switched backbone.

The sudden public interest in IP telephony was supported surprisingly quickly by MIC. Without political protest that one might have expected from NTT, which had the most to lose if its circuit-switched telephony infrastructure were bypassed completely, MIC assigned a dedicated array of numbers to IP telephones (a 050 prefix). It later went on to allow IP telephones to obtain telephone numbers within the existing numbering scheme if they met quality standards.[61]

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[59] MIC officials, among others, were taken by surprise at Son's aggressive pricing, and many voiced concern that Son was waging a dangerous price war, which would make the operation of infrastructure unprofitable to the point of threatening future investment into next generation networks. It is not clear that Son would have been allowed to wage this type of dramatic price war had the government retained its policy tools of "controlled competition."

[60] Flat-rate telephony was virtually unheard of in Japan at the time, since NTT's infrastructure dominated the last-one-mile, and its interconnection fee structure did not allow competitors utilize conventional telephone networks to offer flat-rate services. Son set IP telephony calls to the US at below cost prices, at 8 yen a minute (6-7 cents), compared to the 200-300 yen for 3 minutes charged by competitors.

[61] IP denwa demo bangou ga kawaranai riyuu: mittsu no kufuu de soumushou no jouken wo kuria. 2003. *Nikkei Communications* Nov 24: 66-68. Some MIC and former MPT officials have expressed the view that MIC was quick

Softbank's market strategy in DSL profoundly affected Japan's FTTH (Fiber-to-the-Home) service market. Encouraged by industrial policy measures by the government such as subsidies, and loans from the Development Bank of Japan, and with extensive investment by NTT, Japan had been developing fiber optic infrastructure since the early 1990s. Just as DSL markets were taking off, fiber had reached the last-one-mile of most urban areas in Japan. [62]

NTT had been planning to offer a proprietary service based on an alternative underlying technology than the Internet, expecting to combine video, telephony, and data in one line. They also expected to charge high fees for this service.[63] As Takanori Ida points out, the failure of Japan's government to completely break up NTT gave it the financial strength to engage in an extensive nation-wide FTTH buildout.[64] However, NTT was preempted by Usen (pronounced Yu-sen), a landline music broadcasting company that owned its own telephone pole and fiber infrastructure in urban areas. In March 2001, Usen began offering household FTTH services at the speed of close to 100 mbp/s (versus 2 to 15 or so for DSL) for approximately 6000 yen, only slightly more than double the price of Softbank's DSL.[65] Other competitors began to enter the FTTH market at a similar price range, dashing NTT's hopes of offering a much more expensive, proprietary service. FTTH providers also began offering IP telephony, contributing to a rapid rise in household IP telephony subscribers.[66] The advent of low-priced FTTH services is best

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to adopt IP telephony because it was still under the public radar, and that NTT was not in a position to launch a major public protest, since nobody foresaw the rapidity with which IP telephony spread.

[62] According to MIC document, by the end of 2001, FTTH networks covered 95% of metropolitan areas (MIC 2003).

[63] For details, see Kushida (2006)

[64] Ida points out that NTT DoCoMo financial success in the booming cellular markets provided NTT regional carriers, NTT East and NTT West with de fact subsidies (Ida 2006).

[65] For a wealth of information on details and the variety of FTTH networks to households, apartment buildings, and offices, see MIC (2005).

[66] Government numbers show two hundred thousand subscribers by mid-2004. This is not a large number, but given that a US investment bank estimated that 6 million users, or 12 percent of households used VoIP at the end of 2003, and that it is safe to assume that a large proportion of the 12 million DSL subscribers have DSL modems capable of IP telephony, the potential number of users is large. Moreover, *Nikkei Communications* estimates that by the end of 2003, over 3 million users out of 4 million plus users had IP-phone enabled DSL modems. "Setogiwa Ni Tatsu Ip Denwa Sougo Setsuzoku," *Nikkei Communications*, February 9 2004.

characterized as having its roots in NTT's traditional pattern of investment, coupled with industrial policy from the "controlled competition" regime of the late 1980s to 1990s, but whose market dynamics were strongly shaped by the DSL service market.[67]

Citing difficulties in competing in the telephony and broadband markets, NTT announced in early 2006 its intent to restructure itself under the existing holding company structure. Its attempt is to engage in reform without revising the NTT Law, which would clearly become a protracted political battle.

Conclusion

Understanding the Roles of the Politics, Governments, and Markets

Let us now sum up our findings, addressing our initial question of how exactly the governments, markets, and politics interacted in the two countries as their broadband markets developed rapidly. First, at a *market* level, we see that in both countries, new entrants offered broadband services, delivering a price shock to the Internet access market – especially Hanaro for Korea, and Softbank for Japan. The wild success of the newcomers forced the incumbents, KT and NTT, to realign their strategies towards deploying DSL. The specifics of the market dynamics were not micromanaged by either government. So far, we agree with market-led expectations.

Second, our close study of the *policies* shows that, in both countries, the governments' approach towards liberalization, an increase in the level of competition, was a conscious strategy of both deregulation, a relaxing of rules, as well as reregulation, a strengthening of rules. Here we disagree with simple market-led explanations of government-market interactions. Both countries set up "managed competition" regimes with similar policy tools to orchestrate

[67] See Kushida (2006) for an extended version of this argument.

competition into the sector, actively using those tools to incrementally increase and adjust levels of competition.

The Korean government, in allowing Hanaro to enter the local telephony market, did not "open" the market per se, but used the existing regulatory framework in introducing a competitor to KT. When they deemed the level of competition insufficient in the broadband market, they shifted the Internet service provider subsector into a more regulated compartment of the sector in order to exercise stronger authority over KT.

In Japan, the regime shift entailed a significant amount of deregulation as the government removed much of the policy framework of "managed competition." However, it also entailed significant reregulation, creating a new set of institutions such as the Dispute Resolution Commission to better engage in ex post regulation, and promulgating new policies to facilitate local loop unbundling and collocation. The government was also extremely quick to create regulations in support of services such as IP telephony which had the potential to significantly alter the terms of competition.[68]

Thus, we differ from the strongest of state-led expectations by being careful not to exaggerate the effect of state policies, but showing how they interacted with market developments, which were often startling to government officials in the speed with which they developed. However, the broad goals that each of the governments held – to facilitate the deployment and diffusion of high-speed Internet access – was firmly entrenched in their policy orientations, and both governments actively promoted broadband penetration as the market

[68] One might debate whether IP telephony can be considered a "disruptive technology" *a la* Christensen (2000). However, as Weber (2005) points out, Christensen's definition of disruptive technology is problematic because the capacity of incumbent businesses to adapt their business models to the new technology is the critical variable in determining whether a technology is disruptive or not. Therefore, if incumbents successfully adapt to the new technology, it is not a "disruptive technology." The definition lies in the business model rather than the technology.

developments unfolded. This leads us to conclude that both governments are best characterized as being engaged in *strategic liberalization*.

We also discovered a significant divergence in the two countries' regulatory regimes, a fact not obvious by reading existing single-country analyses of their respective ICT sectors or broadband development. While Korea used its existing policy framework to facilitate strategic liberalization, Japan underwent a regime shift that altered institutions and policy tools.

We found an explanation to this divergence in the politics driving each of the regulatory regimes. Beginning with different institutional configurations at the point of origin for the telecom sector, different political bargains at major junctures led to distinct sets of political dynamics, causing different outcomes in subsequent junctures. Korea's lead bureaucracy was able to establish a strong hierarchical relationship with the incumbent early on, assisted by a relatively weak incumbent, and later further strengthened by a politically driven focus on empowering the ministry. Japan's telecom politics involved a more complex struggle over power relations between the regulator and a more powerful incumbent, other government bureaucracies and actors, and a long chain of negotiated settlements.

As a building block for future scholarship, this comparative study also raises further questions. If we were to consider the telecom policies of Japan and Korea as comparatively "successful" in facilitating rapid development of the sector, what differentiates the ICT sector from other sectors whose policy and market outcomes cannot be considered as a success (such as macroeconomic policy in Japan)? To adequately address this question, we would need a sharper focus on differences in policy regimes, markets and politics, across sectors as well as policy

functions.[69] In other words, we would need to situate the sectors within the broader political economic context, and analyze the performance attributes required to facilitate the type of rapid broadband growth the two countries experienced. That being said, this study does point to factors such as the political impetus strengthening lead bureaucracies, and their intent to facilitate competition as a means rather than an end, the availability of technology favoring business models of new entrants, and an upsurge of entrepreneurs as the economies strove to adjust to new terms of international competition.[70]

Second, one might ask how the broadband services subsector fits within the broader context of the ICT sector as a whole. Again, this is material for further research. We might suggest that the policy tools across landline and wireless networks differ, and that differences in the strengths of market players (NTT "family" firms in Japan versus the chaebol in Korea) relatively to governmental actors may create a somewhat different set of political and market dynamics. Governments may have stronger policy tools on the one hand, but especially in the case of Korea, the chaebol would be much more powerful market players than KT. Deriving a fuller picture of the political dynamics in telecom policymaking for each country would require comparing our findings from this paper to those of the wireless subsector as well.

Implications: A New Playground for Experimentation

Let us conclude by noting that the development of high-speed network broadband environments in Japan and Korea has important implications for innovation and value-creation in the two countries, as well as international competition in ICT. The process of lead users putting

[69] Vogel and Zysman (2002) point out that different national governance structures are particularly suitable for not only particular sectors, but particular functions as well. Kitchelt (1991) notes the importance of taking this type of analysis to the sectoral level as well.

[70] For the change in terms of competition embedded in the digital production paradigm, and national asjustments, see various chapters in Zysman and Newman ed., (2006).

technologies to new uses was an essential component of the IT revolution which originated in the US.[71] The US, which was a playground for experimentation and innovation in the initial phase of the Internet revolution, has fallen behind many other countries in terms of network speed and penetration.[72] In the next round of competition, Japan and Korea's new high-speed, broadband environments promise to offer new "playgrounds" for experimentation and innovation.

[71] Cohen et al. (2000)
[72] Firms such as Microsoft, Cisco, Yahoo, Amazon, Google, and eBay faced the most advanced and sophisticated domestic market in terms of PC penetration, Internet usage, etc.

Appendix: Expectations for Market-led and State-led perspective of development applied to broadband.

First, in what we dub a *market-led* explanation, we would expect that some combination of new technology, new entrants, new corporate strategies, and the governments' retreat from market-distorting regulations produced a "market-friendly" environment from which broadband services developed rapidly. One might expect a spectrum of positions with respect to the actual relationship between governments and markets, even within the market-led perspective. At one end, one could follow the OECD in arguing that Korea successfully deregulated its telecom sector, and Japan created a better regulatory environment for market competition.[73] At the other extreme, one could invoke the arguments about globalization undermining government capacity to manage markets altogether – that factors such as increased trade, financial flows, and a dominance of neo-liberal ideology interconnected in new ways via information technology resulted in inevitable pressures on national modes of regulation, if not the conception the nation-state itself in a "flat" world. [74] One might envision how Korea's financial crisis and Japan's prolonged stagnation robbed them of rationale and legitimacy for continued intervention in various markets, or that the crisis and stagnation were the culminations of paralyzed states.[75] In this scenario, we would expect a new set of dynamic market forces as a result of the

[73] OECD 1999 (Korea), OECD 2000 (Japan).

[74] Friedman (2005) contends that the competitive landscape across the world has been "flattened," or set on an even playing ground. Other notable works include; Strange (1996) who argues that states have ceded much of their domain to non-state actors; Milner and Keohane (1996) bring into question whether Japanese and Korean-style government-led altering of comparative advantage (at least, in the short term) can persist in the face of capital mobility; Cerny (1995) argues that the states' ability to provide public goods, such as infrastructure, in addition to other factors including national identity, will be challenged, though he does mention in passing that policymakers will attempt to reinvent the state; Ohmae (1995) argues that the state is no longer the dominant actor nor business unit in the world; and Castells (1996) provides a vision of networks rather than states as the locus of dominant functions and processes.

[75]. For example, for Korea, Weiss (1998) argues that by the crisis, Korea had lost much of its state capacity, and Woo-Cumings (1999b) argues that the Korean developmental strategy led it to a bind in that it was wedded to large business, but politically paralyzed to enact bureaucrat-led reform. For example, for Japan, Katz (1998) argues that Japan's state, which had been development, became consumed by clientilistic interests over time, Castells (1998) argues that the very success of the Japanese developmental project led to forces thrusting it into crisis, and Van Wolfren (1990) finds no real center to the Japanese state.

governments' retreat from active attempts to manage their telecom sectors. It would be these new sets of market dynamics conducive to new entrants and price-based competition that yielded low service prices, which in turn drove rapid population penetration.[76]

Second, what we call a *government-led* expectation would lead us to expect that the Japanese and Korean governments intervened quite heavily in the telecom markets, strategically altering investment profiles to foster rapid broadband diffusion.[77] On the one hand, one could point to the nature of the telecom sector, which involves incumbent firms requiring strong regulation to foster competition, significant network investments in which private firms might be unwilling to invest, and existing institutions and histories of heavy government intervention and lead bureaucracies in charge of managing the sector. One might draw from broader scholarship contending that the salience of national governments persists in the face of globalization, technological shifts, and economic downturns -- perhaps even by acquiring new goals and tools along the way.[78]

[76] This logic tends to be more prominent in analyses of Korea. For example, see OECD (2000), Tcha, et al. (2000), Lee (2002), Choudrie and Lee (2004).
[77] This logic is found in several analyses of Korea's broadband development, including Fackler (2006), Frieden (2005), Lee and Olmsted (2004), Lee et al. (2003), Tcha et al (2000), Choudrie and Lee (2004) for Korea. For Japan's broadband development, Bleha (2005), and Tilton (2004) make strong arguments along this vein.
[78] Weiss (1998), Levy (2006)

Bibliography:

Aizu, Izumi. "A Comparative Study of Broadband in Asia: Deployment and Policy." 2002.

Amsden, Alice. *Asia's Next Giant: South Korea and Late Industrialization*. London: Oxford University Press, 1989.

Anchordoguy, Marie. "Nippon Telegraph and Telephone Company (NTT) and the Building of a Telecommunications Industry in Japan." *Business History Review*, no. 75, Autumn (2001): 507-41.

Bae, Yong-Su, and Sun-Mi Chu. "Minyounghua Jeongchaek-eu kyonglowa Whankyong: KT saryeyeonguwa ku hameu [The Paths and Environment of Privatization Policy - The Case Study of KT and its Implications]." *The Korean Association for Policy Analysis and Evaluation* 13, no. 2 (2003): 193-213.

Berger, Suzanne. *Peasants Against Politics*. Cambridge, MA: Harvard University Press, 1972.

Bleha, Thomas. "Down to the Wire." *Foreign Affairs* 84, no. 3 (2005): 111-24.

Bohlin, Erik. "Editorial: Restructuring Japan's telecommunications." *Telecommunications Policy* 21, no. 2 (1997): 79-84.

Castells, Manuel. *End of Millenium*. Malden, MA: Blackwell Publishers, 1998.

Choudrie, Jyoti, and Heejin Lee. "Broadband development in South Korea: institutional and cultural factors." *European Journal of Information Systems* 13 (2004): 103-14.

Christensen, Clayton. *The Innovator's Dilemma*: Harper Business, 2000.

Chung, Inho. "Broadband, the Information Society, and National Systems." In *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads*, edited by Martin Fransman, 87-108. Stanford, CA: Stanford University Press, 2006.

Cohen, Stephen, J. Bradford DeLong, John Zysman. *Tools for Thought: What is New and Important about the "E-conomy"*. Berkeley, CA: Berkeley Roundtable on the International Economy, University of California at Berkeley, 2000.

Cole, Robert. "Telecommunications Competition in World Markets: Understanding Japan's Decline." In *How Revolutionary was the Digital Revolution? National Responses, Market Transitions, and Global Technology in a Digital Era*, edited by John Zysman, and Abraham Newman. Stanford, CA: Stanford University Press, 2006.

Cumings, Bruce. "The Origins and Development of the Northeast Asian Political Economy: Industrial Sectors, Product Cycles, and Political Consequences." *International Organization* 38, no. 1 (1984): 1-40.

Fackler, Martin. "In Korea, Bureaucrats Lead the Technology Charge." *The New York Times*, March 16 2006.

Fransman, Martin. "Introduction." In *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads*, edited by Martin Fransman. Stanford, CA: Stanford University Press, 2006.

———. *Japan's Computer and Communications Industry: The Evolution of Industrial Giants and Global Competitiveness*. New York, NY: Oxford University Press, 1995.

Frieden, Rob. "Lessons from broadband development in Canada, Japan, Korea, and the United States." *Telecommunications Policy* (2005).

Frieman, Thomas L. *The World is Flat: A Brief History of the Twenty-First Century*. New York: Farrar, Straus and Girox, 2005.

Fuke, Hidenori. *Joho Tsushin Sangyo no Kozo to Kisei Kanwa: Nchibeiei Hikaku Kenkyuu. (Structural Change and Deregulation in the Telecommunications Industry)*. Tokyo: NTT Shuppan, 2000.

———. "The Spectacular Growth of DSL in Japan and its Implications." *Communications & Strategies*, no. 52 (2003): 175-91.

Hong, Sung Gul. "The Political Economy of the Korean Telecommunications Reform." *Telecommunications Policy* 22, no. 8 (1998): 697-711.

Ida, Takanori. "Broadband, the Information Society, and National Systems." In *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads*, edited by Martin Fransman, 65-86. Stanford, CA: Stanford University Press, 2006.

IICP, (Institute for Information and Communications Policy). *Henbou Suru Kontentsu Bijinesu [The Transforming Content Business]*. Tokyo: Toyo Keizai Shinpo Sha, 2005.

ITU. "Asia-Pacific Telecommunication Indicators 2004." International Telecommunications Union, 2004.

———. "Broadband Korea: Internet Case Study." 2003.

Johnson, Chalmers. *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975*. Stanford, CA: Stanford University Press, 1982.

———. "MITI, MPT, and the Telecom Wars: How Japan Makes Policy in High Technology." In *Politics and Productivity: How Japan's Developmental Strategy Works*, edited by Chalmers Johnson, Laura Tyson, John Zysman: Harper Business, 1989.

Katz, Richard. *Japan: The System that Soured: The Rise and Fall of the Japanese Economic Miracle*. New York, NY: ME Sharpe, 1998.

Kawabata, Eiji. "Dual Governance: The Contemporary Politics of Posts and Telecommunications in Japan." *Social Science Japan Journal* 7, no. 1 (2004): 21-39.

Kitschelt, Herbert. "Industrial Governance Structures, Innovation Strategies, and the Case of Japan: Sectoral or Cross-National Comparative Analysis?" *International Organization* Vol 45, no. 4 (1991): 453-93.

Kushida, Kenji. "Japan's Telecommunications Regime Shift: Understanding Japan's Potential Resurgence." In *How Revolutionary was the Digital Revolution? National Responses, Market Transitions, and Global Technology in the Digital Era*, edited by Abraham Newman, and John Zysman. Stanford, CA: Stanford University Press, 2006.

———. "The Politics of Restructuring NTT: Historically Rooted Trajectories from Actors, Institutions, and Interests." *Stanford Journal of East Asian Affairs* 5, no. 2 (2005): 29-36.

Lee, Choongok, and Sylvia M. Chan-Olmsted. "Competitive advantage of broadband Internet: a comparative study between South Korea and the United States." *Telecommunication Systems* 28 (2004): 649-77.

Lee, Heejin, Robert M. O'Keefe, and Kyounglim Yun. "The Growth of Broadband and Electronic Commerce in South Korea: Contributing Factors." Taylor & Francis, 2003.

Lee, Hong-Jae, Kwon Osang, Lee Seung-Hoon, Kwon Young-Joo, Chin Jaeyoung, Yoon Duyoung, Chae Hejinm, Lim Dongmin. "KISDI Issue Report: Tongshin Service Shijang Hyunghwanggua Jeonmang [The Current Telecommunication Market and Its Future Prospects]." Korea Information Society Development Institute, 2003.

Lee, Nae-Chan. "Broadband Internet Service: Korea's Experience." Korea Information Society Development Institute, 2002.

Lee, Nae-Chan, and Han-Young Lie. "Korea's Telecom Services Reform through Trade Negotiations." In *Trade in Services in the Asia-Pacific Region*, edited by Takatoshi Ito, and Anne O. Krueger. Chicago: The University of Chicago Press, 2003.

Levy, Jonah, ed. *The State After Statism: New State Activities in the Age of Liberalization.* Cambridge, MA: Harvard University Press, 2006.

MIC. "Hanguk-u Jeongbohua Jeonlyak –Jinan Yisipyeonyun Gan-U Jeongbotongshin Jeongchaek Kyongheomgua Seonggua- [The Informatization Strategy of Korea: The Implementation and Achievement of Its Policy goals for the Past Twenty Years]." Ministry of Information and Communication of South Korea, 2003.

———. "Heisei 16 nendo Denkitsushin jigyou bunya ni okeru kyousou joukyou no kyouka (an) [Evaluation of Competition in the ICT sector, FY2004]." Ministry of Internal Affairs and Communications, 2005.

———. "Kukmin-u Chengbu sanyon Jeongbo Tongshing Bunya Jeongchaek Seonggua [Evaluating IT policies and their Achievements during the Four Years of DJ Administration]." Ministry of Information and Communication of South Korea, 2002.

Milner, Helen, and Robert Keohane. "Internationalization and Domestic Politics: An Introduction." In *Internationalization and Domestic Politics*, edited by Helen Milner, and Robert Keohane. New York, NY: Cambridge University Press, 1996.

NCA. "Informatization White Paper 2004: Broadband IT Korea." National Computerization Agency, 2004.

Noble, Gregory. "The Japanese Industrial Policy Debate." In *Pacific Dynamics: The International Politics of Industrial Change*, edited by Stephan Haggard, and Chung-in Moon, 53-95. Boulder, CO: Westview Press, 1989.

OECD. "The Development of Broadband Access in OECD Countries." 1-63: Organisation for Economic Co-operation and Development, 2002.

———. "OECD Economic Surveys 1999-2000: Korea." 2000.

———. "OECD Economic Surveys: Japan." (2002).

———. "SourceOECD Telecommunications Database Vol 2005." 2005.

Ohmae, Kenichi. *The End of the Nation State: The Rise of Regional Economies*. New York, NY: The Free Press, 1995.

Onis, Ziya. "The Logic of the Developmental State." *Comparative Politics* 24, no. 1 (1991): 109-26.

Pempel, T.J. "A Decade of Political Torpor: When Political Logic Trumps Economic Rationality." In *Beyond Japan*, edited by Peter Katzenstein, and Takashi Shiraishi. Ithaca, NY: Cornell University Press, 2006.

Pierson, Paul. "Big, Slow-Moving, and Invisible." In *Comparative Historical Analysis in the Social Sciences*, edited by James Mahoney, and Dietrich Rueschemeyer. New York, NY: Cambridge University Press, 2003.

Polanyi, Karl. *Great Transformation: The Political and Economic Origins of Our Time*. Boston, MA: Beacon Press, 1944.

Song, We-Jin. "kukga yeongu gaebal saupui jeongchihak: CDMA gisul gaebal saupui sareibunseok [The Politics of National Research and Development Project: Case Analysis of CDMA Technology Development]." *Korean Review of Public Administration* 33, no. 1 (1999): 311-29.

Strange, Susan. *The Retreat of the State: The Diffusion of Power in the World Economy*. New York: Cambridge University Press, 1996.

Streeck, Wolfgang, and Kathleen Thelen. "Introduction: Institutional Change in Advanced Political Economies." In *Beyond Continuity*
Institutional Change in Advanced Political Economies, edited by Wolfgang Streeck, and Kathleen Thelen. New York, NY: Oxford University Press, 2003.

Suda, Yuko. "Japan's Telecommunications Policy: Issues in Regulatory Reform for Interconnection." *Asian Survey* 45, no. 2 (2005): 241-57.

Takano, Yoshiro. "Nippon Telegraph and Telephone Privatization Study: Experience of Japan and Lessons for Developing Countries." *World Bank Discussion Papers*, no. 179 (1992).

Tcha, Don-Wan, June S. Park, Suk-Gwon Chang, and Kwan Ho Song. "Korean telecommunication industry in transition." *Telecommunication Systems* 14, no. 1-4 (2000): 3-12.

Tilton, Mark. "Neoliberal Capitalism in the Information Age: Japan and the Politics of Telecommunications Reform." *Japan Policy Research Institute Working Paper No. 98* (2004).

van der Staal, Peter, Volker Grassmuck, and Keiko Hatta. "ISDN in Japan: Actors, status and expectations." *Telecommunications Policy* 19, no. 7 (1995): 531-44.

Van Wolfren, Karel. *The Enigma of Japanese Power*. New York, NY: Vintage Books, 1990.

Vogel, Steven, and John Zysman. "Technology." In *U.S.-Japan Relations in a Changing World*, edited by Steven K. Vogel. Washington DC: Brookings Institution Press, 2002.

Vogel, Steven K. "Creating Competition in Japan's Telecommunications Market." *Japan Information Access Project Working Paper* (2000).

———. *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries*. Ithaca, NY: Cornell University Press, 1996.

———. *Japan Remodeled: How Government and Industry are Reforming Japanese Capitalism*. Ithaca, NY: Cornell University Press, 2006.

Wade, Robert. "East Asia's Economic Success: Conflicting Perspectives, Partial Insights, Shaky Evidence." *World Politics* 44, no. 2 (1992): 270-320.

———. *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton, NJ: Princeton University Press, 1990.

Weber, Steve. "Christensen right and wrong." *QED*, no. 1 (2005).

Weiss, Linda. *The Myth of the Powerless State*. Ithaca, NY: Cornell University Press, 1998.

Woo-Cumings, Meredith. "Introduction: Chalmers Johnson and the Politics and Nationalism and Development." In *The Developmental State*, edited by Meredith Woo-Cumings. Ithaca, NY: Cornell University Press, 1999.

———. "The State, Democracy, and the Reform of the Corporate Sector in South Korea." In *The Politics of the Asian Economic Crisis*, edited by T.J. Pempel. Ithaca, NY: Cornell University Press, 1999.

Zysman, John. *Governments, Markets, and Growth: Financial Systems and the Politics of Inudstrial Change*. Ithaca, NY: Cornell University Press, 1983.

Zysman, John and Abraham Newman, ed. *How Revolutionary was the Digital Revolution? National Responses, Market Transitions, and Global Technology in a Digital Era*. Stanford, CA: Stanford University Press, 2006.