

What Is Behind The Surge in Korean Patenting?

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Recent Surge in Korean Patenting

*** Korean patents in the US**

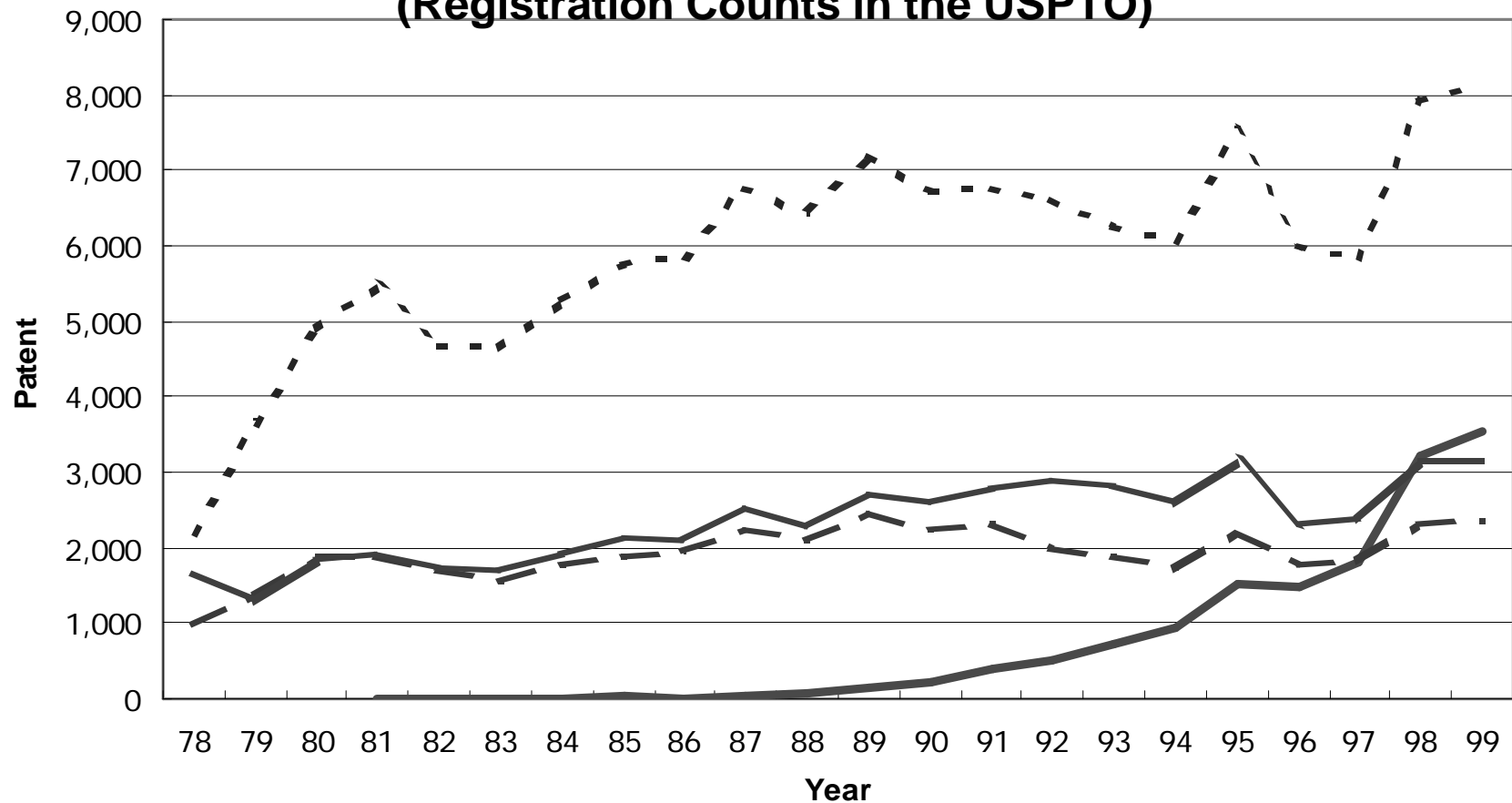
- only 2 in 1980 → 3529 in 1999 in terms of registered patents
- ranked as # 21 in 1995 → ranked as # 6 in 1999
- annual growth rate: 36% Vs. 5.8% for OECD countries
- Samsung Electronics jumped as top 5 from top 100 in 1991

*** Domestic patents**

- # 2 in terms of the share of IP applications by local residents per population
- # 1 in terms of the ratio of domestic patent applications to R&D expenditures

Korea Vs. Advanced European Countries

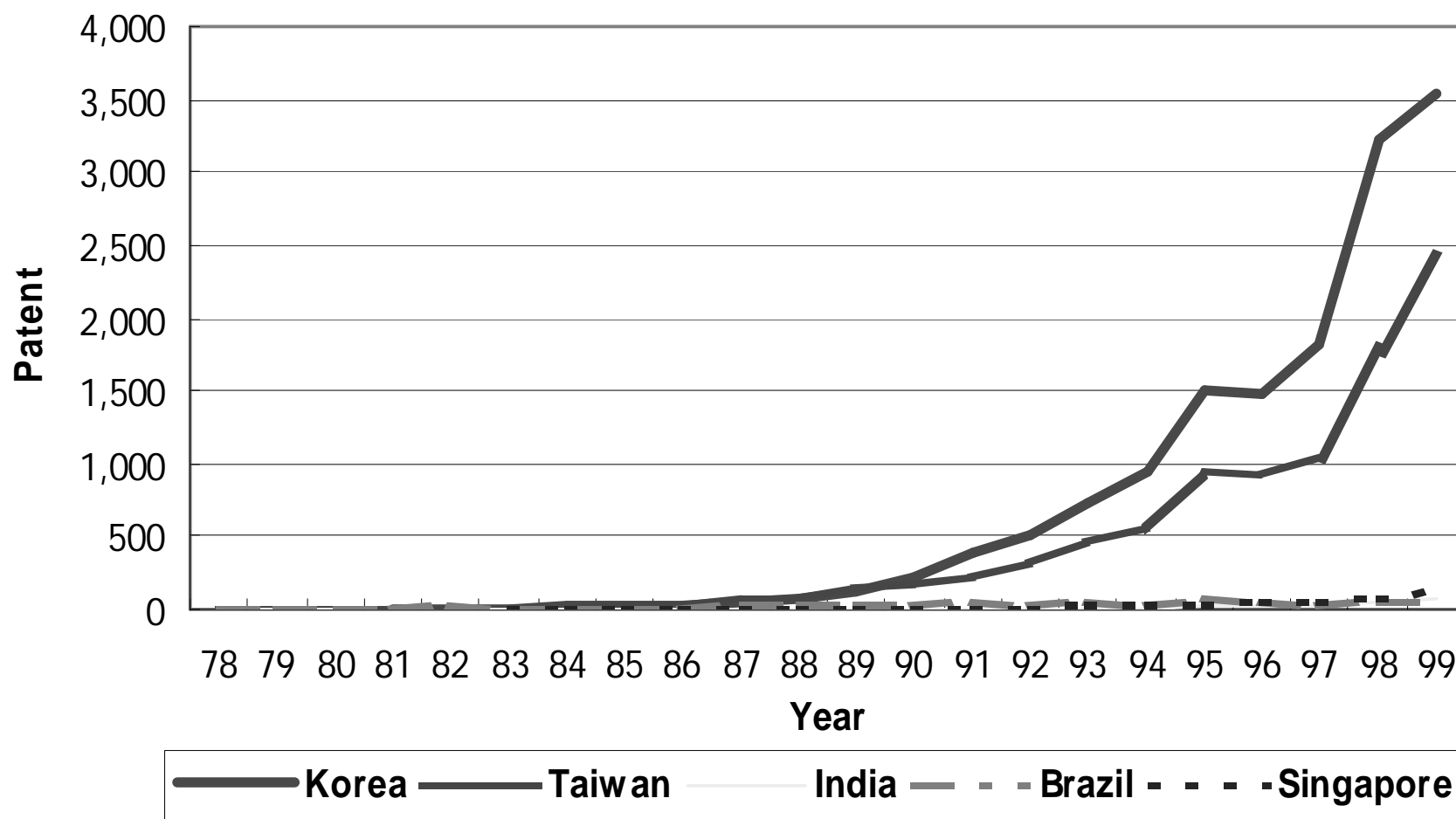
**Comparison of Patenting Trends of Korea with Those of
Germany, France, and U.K.
(Registration Counts in the USPTO)**



— Korea — - - United Kingdom — — France - - - - Germany

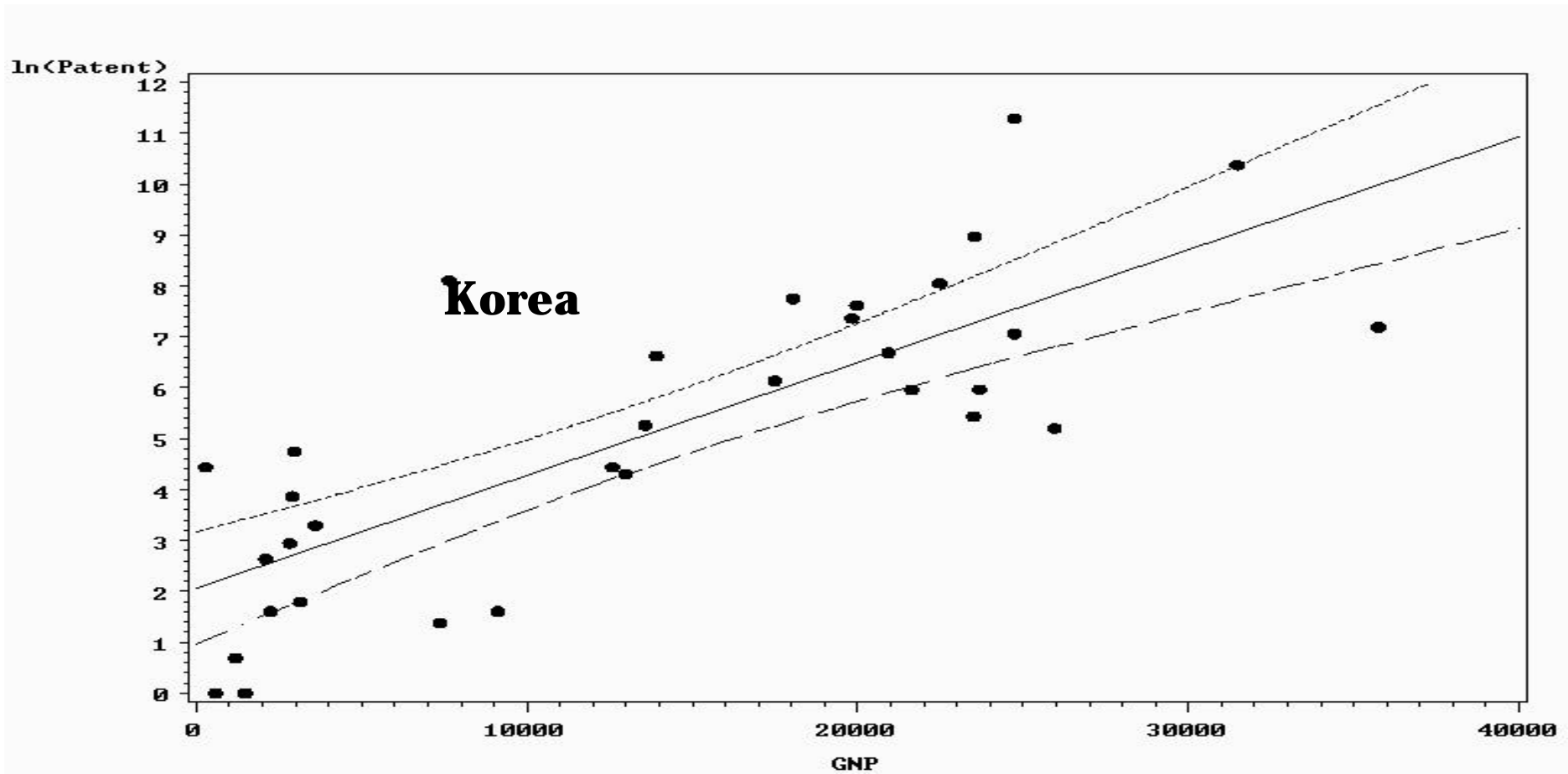
Korea Vs. Major Developing Countries

**Comparison of Patenting Trends of Korea
Vs. Major Developing Countries
(Registration Counts in the USPTO)**



Korean Patenting Relative to GNP

Simple Regression of U.S. patent counts on GNP



Framework of the World Bank Project

- **Research Q: What's behind the surge of Korean patenting, esp. in the US?**
- **Empirical examination four arguments**
 - **Demand-pull view: better technological opportunities i.e., semiconductor, biotech**
 - **IPR-push view: stronger IPR protection in Korea**
 - **Supply-push view: Industrial upgrading of Korea to more patent-intensive, high-tech sectors**
 - **Corporate strategy view: Pivotal role of Korean chaebols and their growing emphasis on innovative capabilities and the better R&D management**

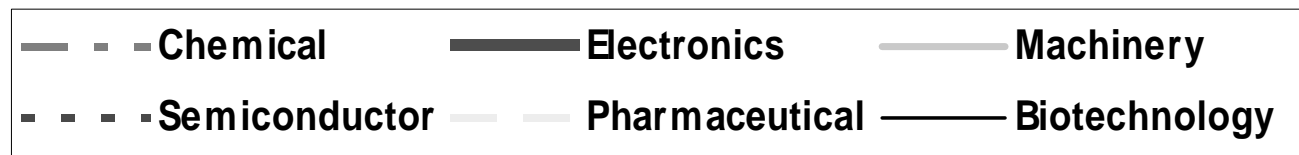
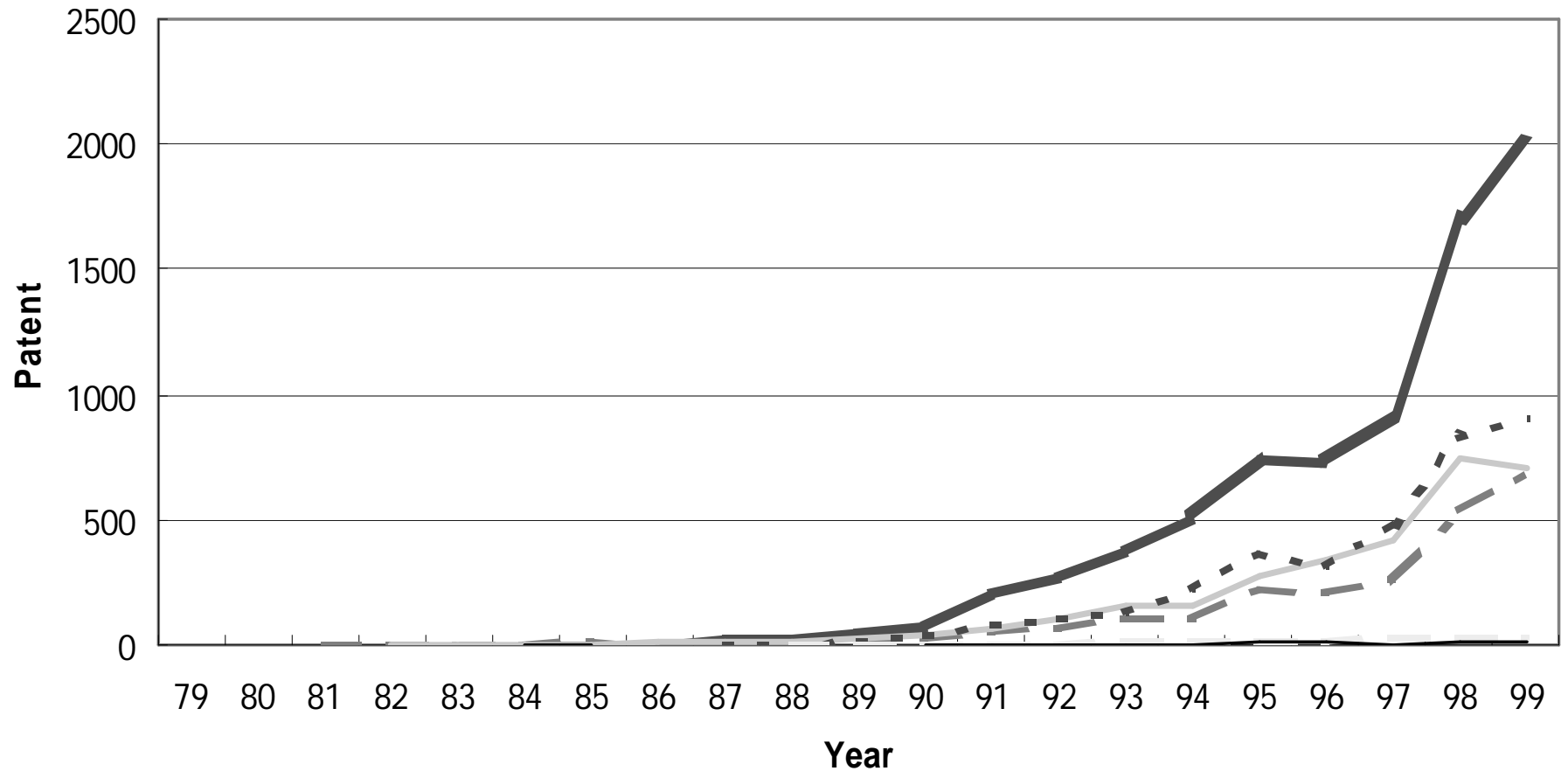
Demand –Pull View

- **Empirical findings: Partial support**
 - **much steeper growth of Korean patents in semiconductor than the global average**
 - **few Korean patents in biotechnology**

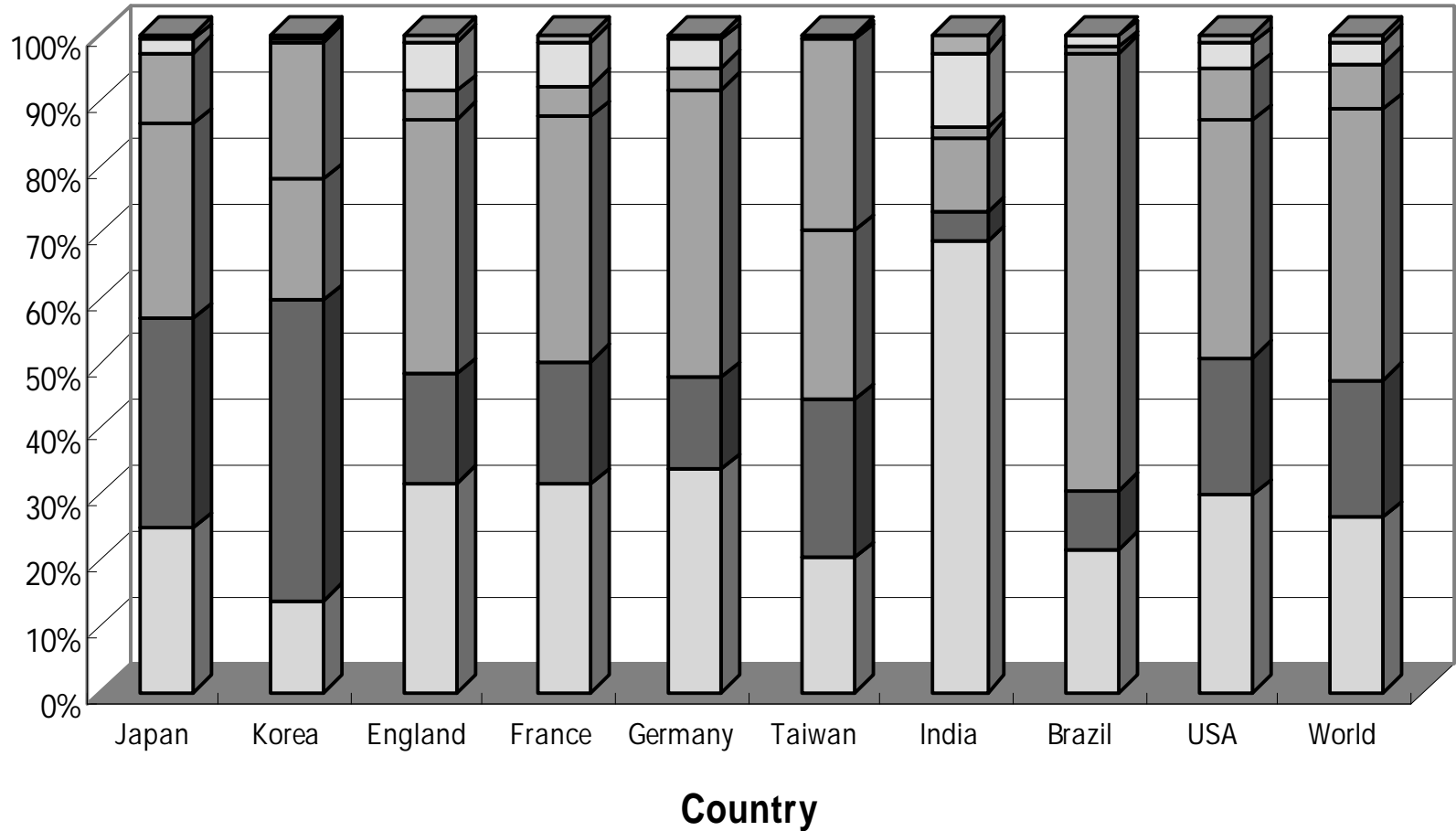
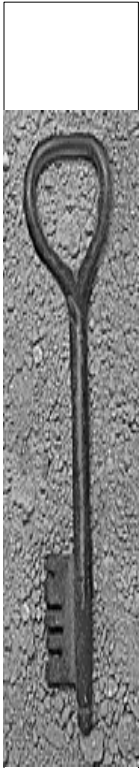
Supply-Push (Industrial Upgrading) View

- **Empirical Findings: Partial Support**
 - (+) Useful for the explanation about the upsurge in Korean patenting in electronics and semiconductor**
 - (-) Difficulty in explaining poor patenting performance in chemical and automobile as top industries in Korea chosen and nurtured in the process of industrial upgrading**

Korean Patents by Industry

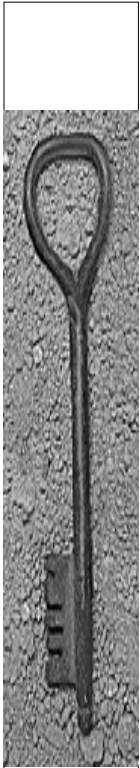


Cross-Country Comparison of Patent Shares by Selected Industries

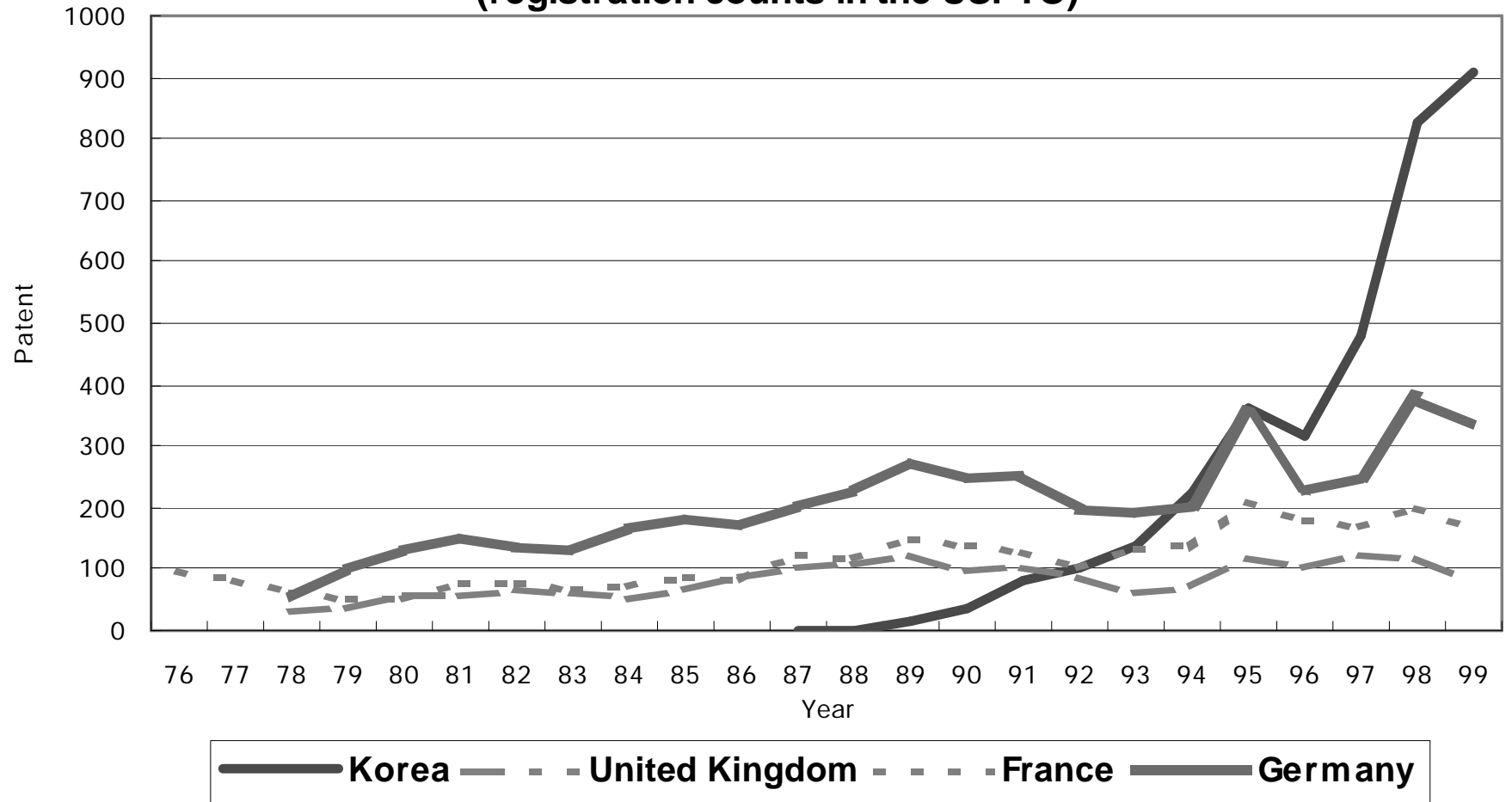


Chemical
 Electronics
 Machinery
 Semiconductor
 Pharmaceutical
 Biotechnology

Upsurge in Korean Patenting in Semiconductor



**Comparison of Korean Semiconductor Patents
with Those of Major Advanced Countries
(registration counts in the USPTO)**



IPR-Push View

- **Empirical Findings: Partial support**

(+) big jump in substance patent applications in Korea (initially, by foreigners and then gradually by local residents) after the introduction of substance patents in 1986

(-) big jump in Korean patenting in the 1990s w/o major changes in IPR until late 1990s

Major IPR Changes in Korea

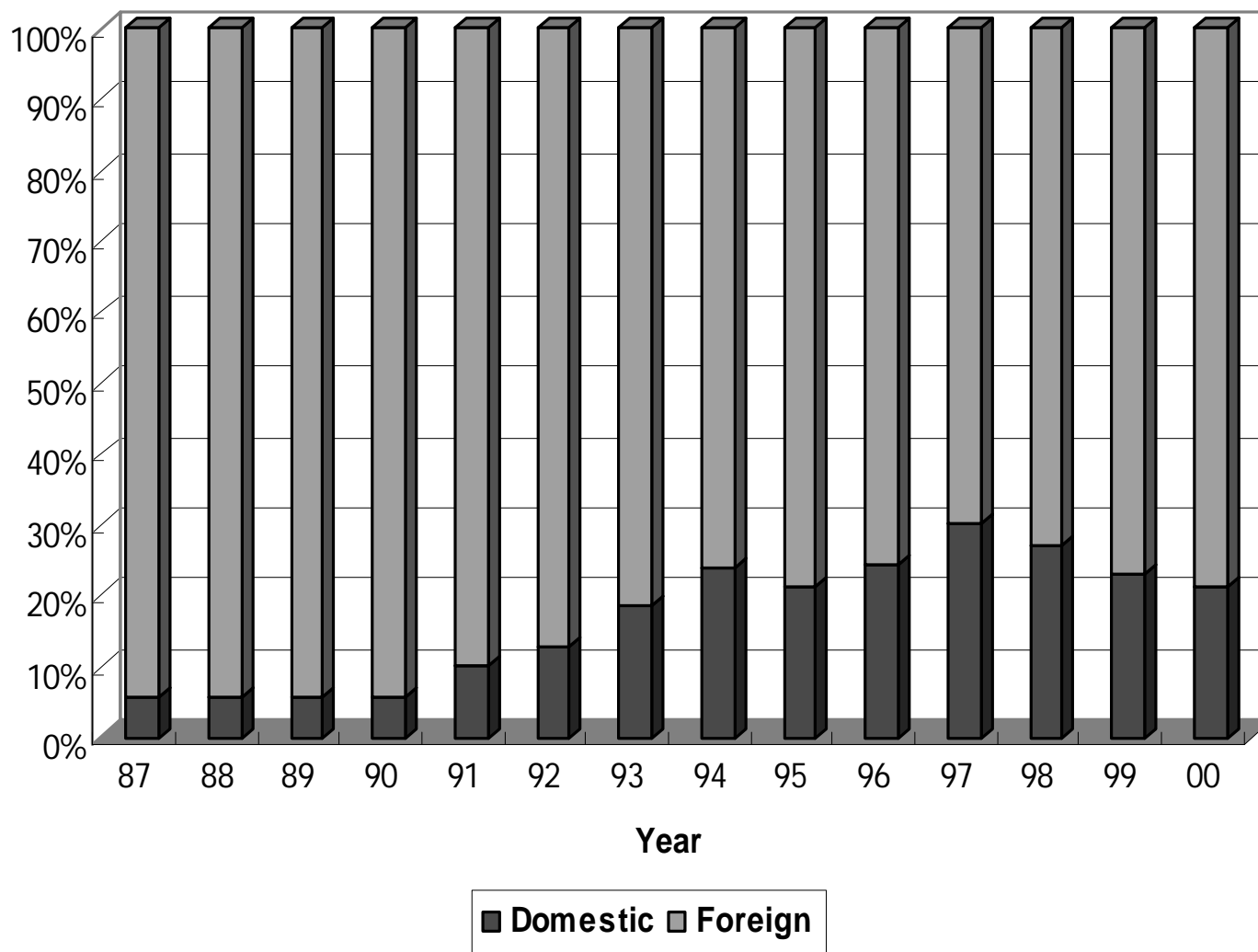
- **1980-1982 in compliance with the Paris Convention and PCT**
- **1986 to introduce substance patents**
- **1995-1997 in compliance with UR/TRIPs**

Strong IPR Protection in Korea

Country	1980	1985	1990
Brazil	1.85	1.85	1.85
India	1.62	1.62	1.48
Japan	3.94	3.94	3.94
Korea	3.28	3.61	3.94
Singapore	2.57	2.57	2.57
U.S.A.	4.19	4.52	4.52
Average	2.40	2.44	2.46
Maximum	4.24	4.52	4.52

Source: Ginarte and Park, 1997: 285- 286.

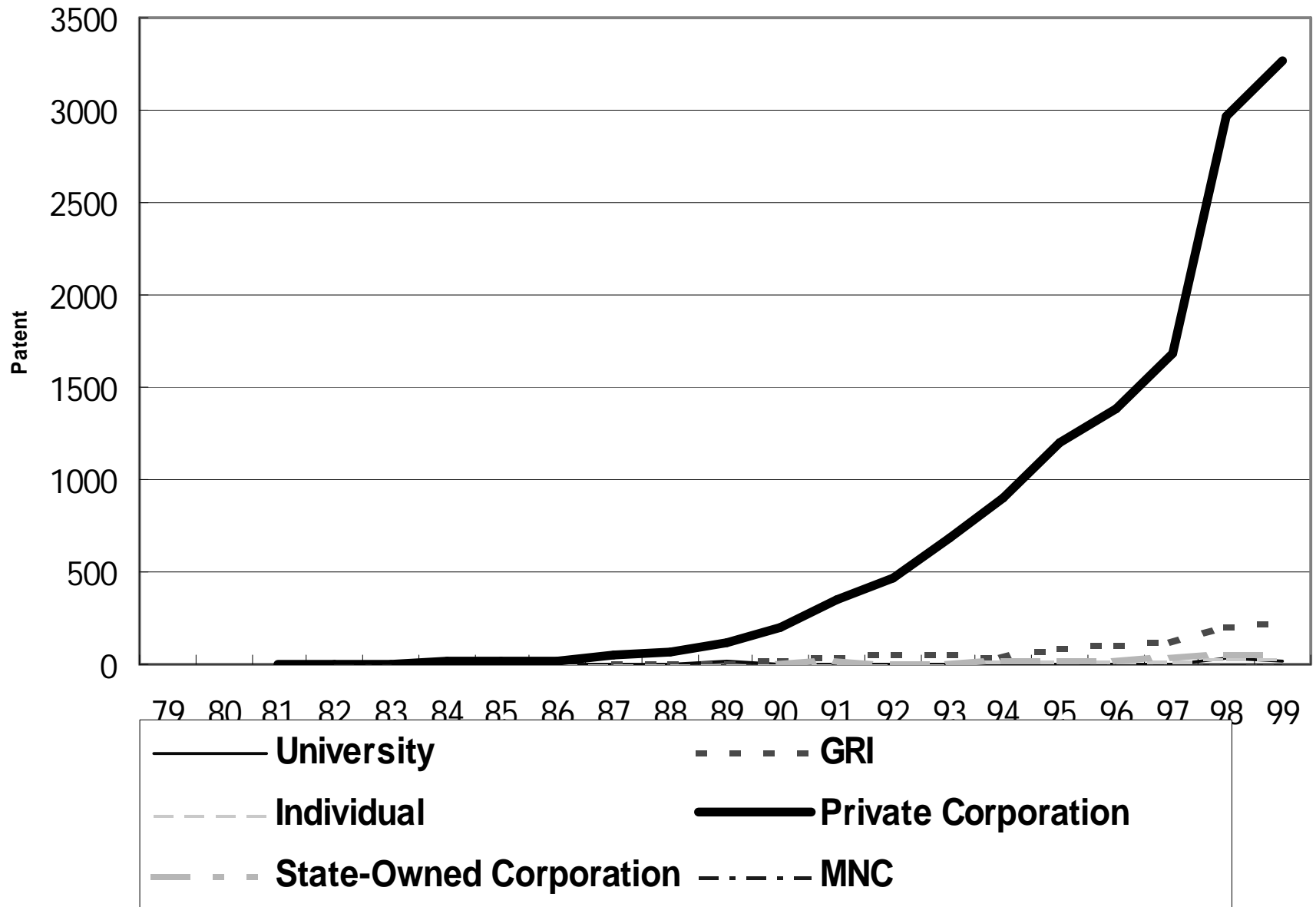
Share of Substance Patent Applications by Local Residents



Corporate Strategy View

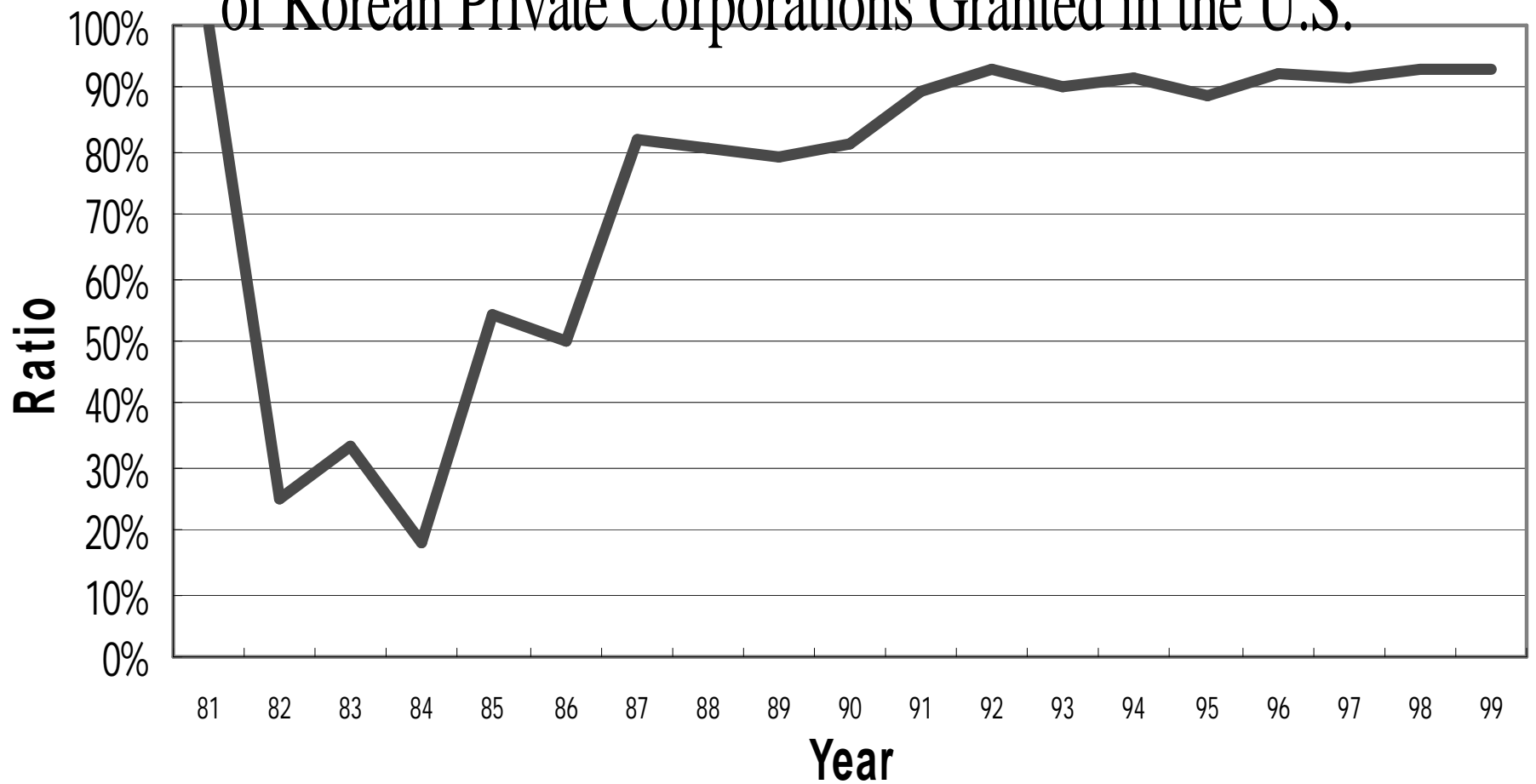
- **Empirical findings: Offers the best explanation for the upsurge in Korean patenting**
 - **Pivotal roles of five largest chaebols, esp. Samsung (Electronics): shift of focus towards more high-tech industries and innovation-driven strategies**
 - **Excellent R&D productivity in conjunction with relentless investments in R&D**

Korean Patents by Organizational Types



Dominant Role of Chaebols in Korean Patenting

Patent Share of Five Largest Chaebols to Total Patents
of Korean Private Corporations Granted in the U.S.



Research Productivity of Selected Countries

	U.S. patent counts in 1999	R&D expenditures (billion U.S. \$; 1994)	U.S. patent count /R&D expenditures
Korea	3529	12.8	275.7
U.S.	75014	169.3	443.1
Japan	32666	75.1	435.0
Germany	8121	37.3	217.7
France	3150	26.5	118.9
U.K.	2351	21.7	108.3

Source: patent counts from our U.S. patent database; R&D expenditures from OECD's Main Science & Technology Indicators, 1999.

Policy Implications from the World Bank Project

- **Positive, yet limited role of major IPR changes and industrial upgrading policy in encouraging domestic firms to become more innovative**
 - **Strong IPR induces tech transfer from MNCs**
- **Importance of nurturing entrepreneurial corporations and offering good incentives and infrastructure for their transition towards more R&D-driven and innovative strategies (transition from imitators to innovators)**
 - **Pivotal role of innovative large corporations in Korea**
 - **Vs. Poor research productivity of GRI and universities**

Challenges for the Future

- **Improve the quality of patents by aiming at path-breaking new technologies and basic technologies, esp. in emerging technologies**
 - **Only 7.2% of patents generate net profits (Vs. 30% for Japan)**
 - **Only 22% pf patents are utilized for commercial purposes**
 - **Royalty income: 200 m US \$ Vs. royalty payments: 3 b US \$ in 2000**
- **Need for the transformation from early imitators or smart modifiers to innovators; from technological catching-up to technological leadership**
 - **Need to secure *de facto* technology standards**

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