

Elite Decision-making: A Study On
China's Semiconductor Policy Process
精英决策：中国半导体产业政策过程研究

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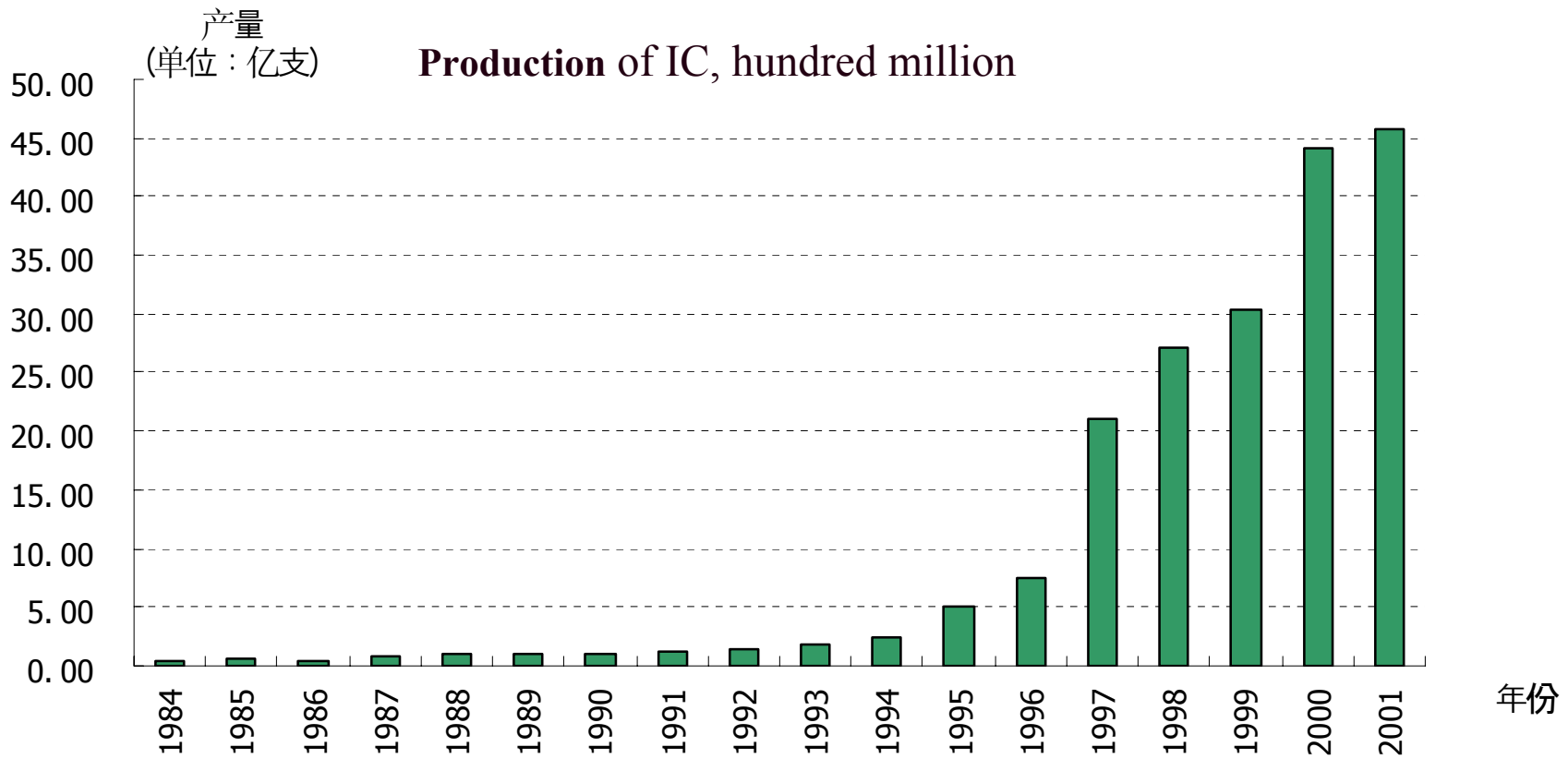
Puzzle 问题

- Why China's semiconductor industry stagnated in 80's and 90's?八九十年代的半导体产业发展为何滞后?
 - Policy Analysis: What is a “good” policy for China's semiconductor industry? 怎样是好的政策?
 - Policy Process: Who made the decision? And how?谁在决策? 如何决策?
- Is public policy a consensus? 公共政策是共识吗?

Semiconductor Industry in history

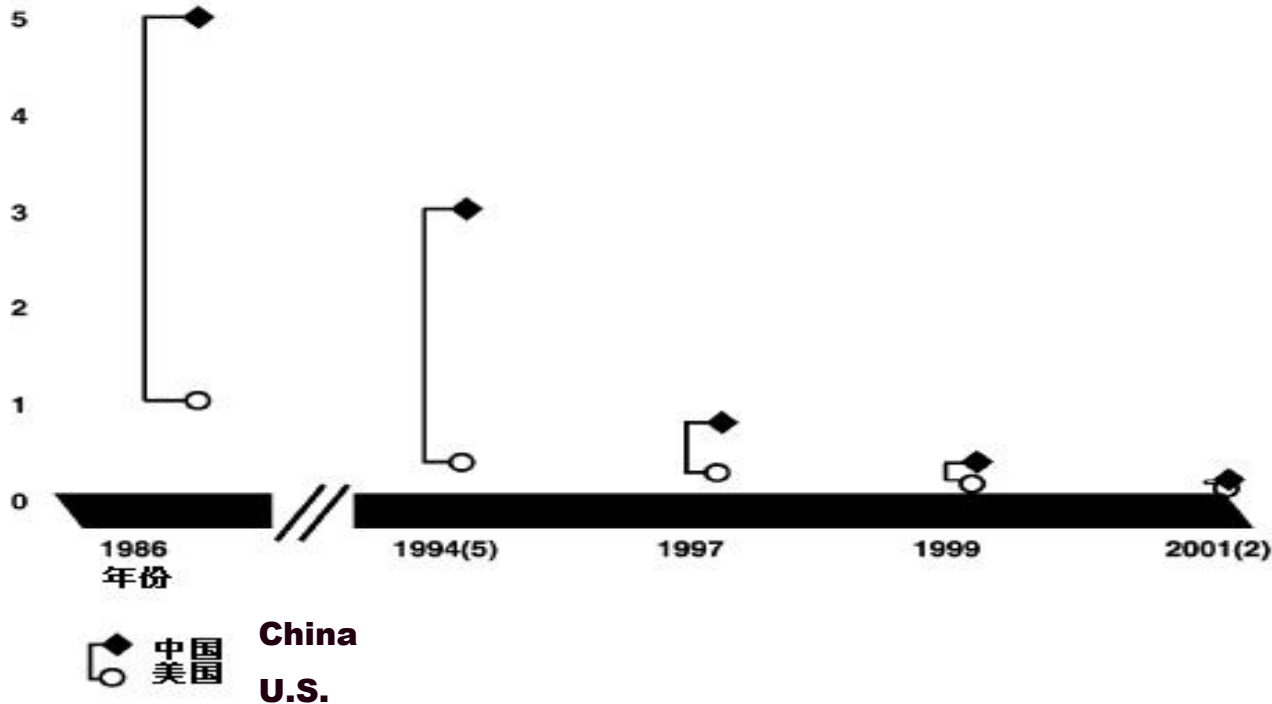
- 50-60's: China had a good performance in semiconductor technology research 中国半导体产业起步较早，表现不俗
 - As one of the “four urgent technologies” in *1956-1968 S&T Planning* 在首部科技规划中被列为“四项紧急措施”之一
 - First Flat Silicon IC in 1965 (US in 1967?) 研制出首枚平面硅集成电路
- 1966-1976: Semiconductor research system was destroyed in the Culture Revolution 文革中研究队伍和设施受到严重破坏
- 1978-present: Under the Reform and Opening Policy, China's semiconductor research and industry development was recovering. 改革开放后逐步恢复半导体研究和产业发展

China's Semiconductor Industry Performance in 80-90's (1) 中国半导体产业绩效-产量



China's Semiconductor Industry Performance in 80-90's (2) 中国半导体产业绩效-技术

6 特征尺寸(微米) Feature Size, Micron



注：由于1986-2002年的整套数据不能完全获得，图中对时间刻度进行了调整，只描绘能获得数据的年份，2002年的数据是估计值。选取各年份数据点的具体数值如下：中国-5.00，3.00，0.80，0.35和0.18微米；美国-1.00，0.35，0.25，0.18和0.13微米。

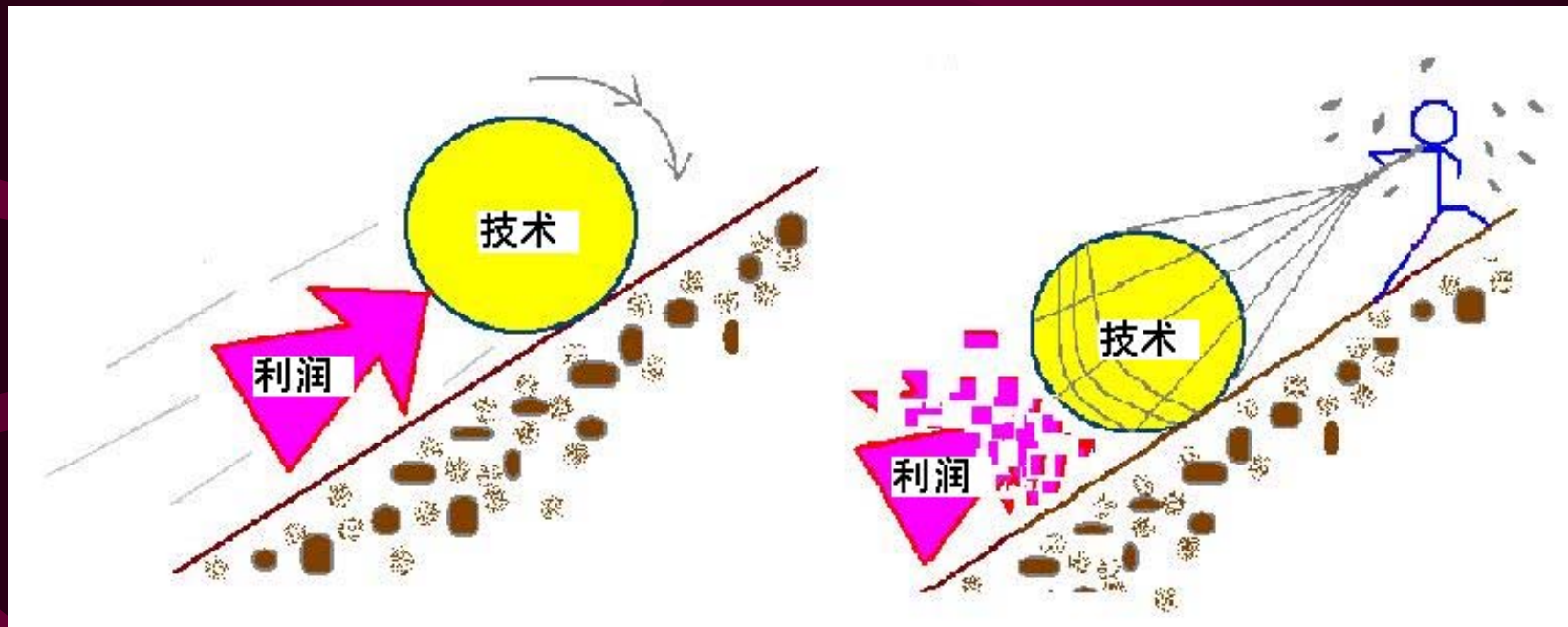
数据来源：GAO对中国半导体制造厂、马里兰大学计算机辅助生命周期工程电子产品和系统研究中心主任、英特尔公司及半导体国际技术发展蓝图提供的数据进行分析得出。

Dilemmas: What happened in China's Semiconductor industry in 80-90's ?

八九十年代的半导体产业困境

- Dilemma(1): Domestic R&D or import technology 自主研发与引进技术的两难境地
 - Domestic research and development: own the patents and creative sources of sustainable development; but uncertainty in research and difficulty in industrialization. 自主研发：拥有自主专利和创新能力，但研究可能失败且成果难以产业化。
 - Import technology from advantaged countries: direct outputs in market; but high costs and risks to lock-in. 引进技术：立竿见影的市场效果，但成本高昂且受制于人。
- Difficult to choose

Semiconductor Industry Driven by Huge Profits from Successful Market.

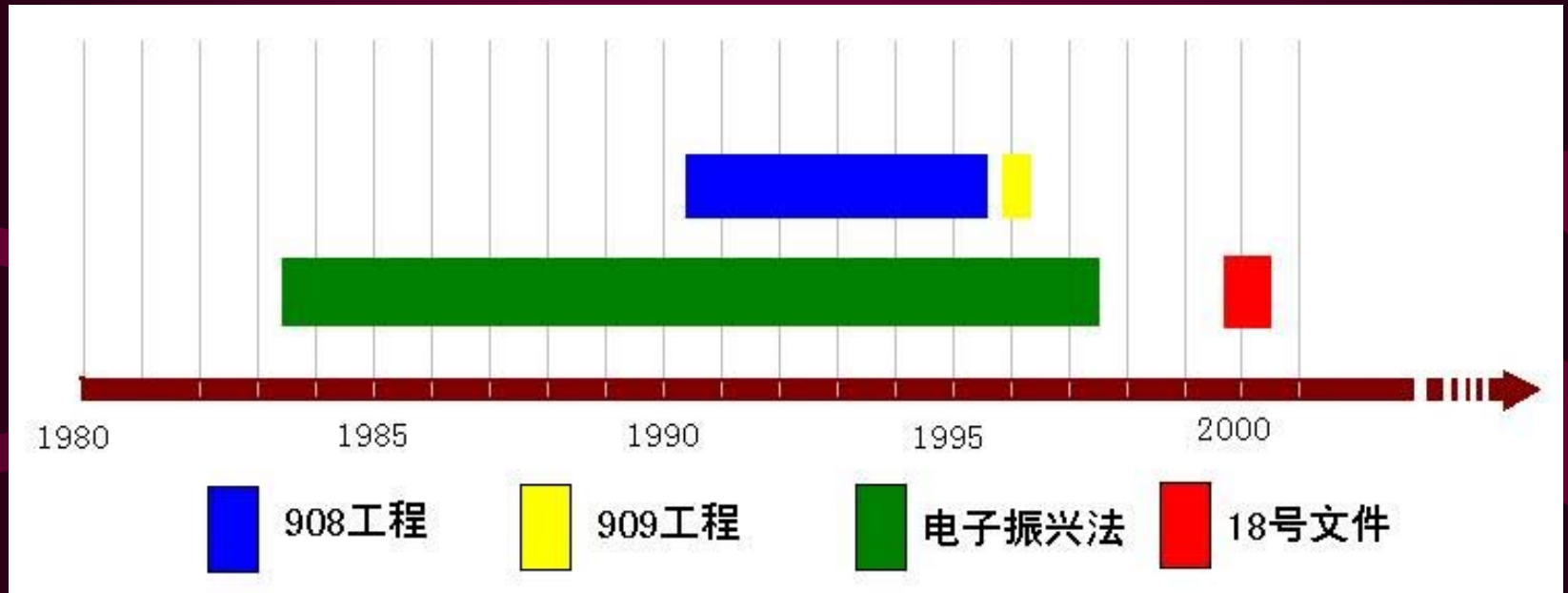


Dilemmas: What happened in China's Semiconductor industry in 80-90's ?

八九十年代的半导体产业困境

- Dilemma(2): Money or Rules 直接投资还是制定规则？
 - Give money to promote the research programs, as well as to build factories: pick winners 政府直接投资于研发和生产项目，谁是被选中的幸运儿？
 - Cases: 908 engineering and 909 engineering 908工程和909工程
 - Set rules to stimulate and regulate the industry development: who cares? 制定促进投资和竞争的市场规则，但谁会来做这吃力不讨好的事情呢？
 - Cases: Act of Promoting Electronic Industry and Document 18th(2000) 电子振兴法和18号文件

What kind of policy was preferred?

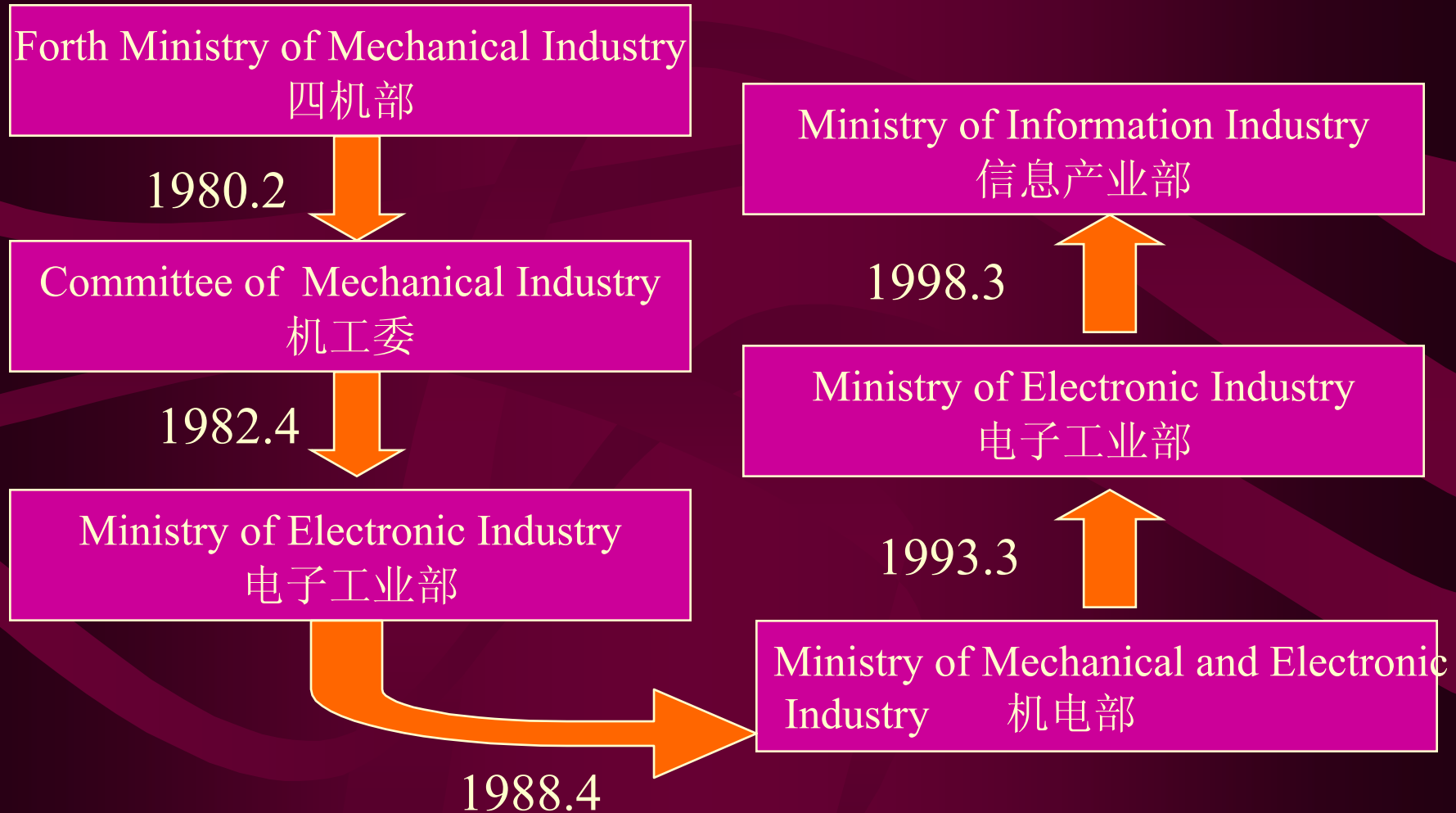


Dilemmas: What happened in China's Semiconductor industry in 80-90's ?

八九十年代的半导体产业困境

- Dilemma(3): Who was in charge of China's semiconductor industry? 谁对半导体工业的发展负责?

Who was in charge of it?



Actors in semiconductor policy process

- Technical Officials 技术官僚
 - Elite Transform in government in 80's: Lots of officials who made great success in the liberation and revolution retired; Professional Younger officials with technical or management background enrolled. 80年代政府精英转型：一批老前辈、老革命退休，年轻化、专业化的年轻干部加入政府。
 - Being selected by CCP, those technical officials lacked social supports. 干部由党组织提拔，缺乏足够的社会支持。
 - Technical officials had **bi-criteria**: political loyalty and professional capability. 技术官僚的双重行为准则：“靠得住，有能力”
- Political Authority 政治权威
 - High level leaders with great political power.
- Intellect Elite 知识精英
 - Outstanding scientists in the semiconductor and relevant fields.

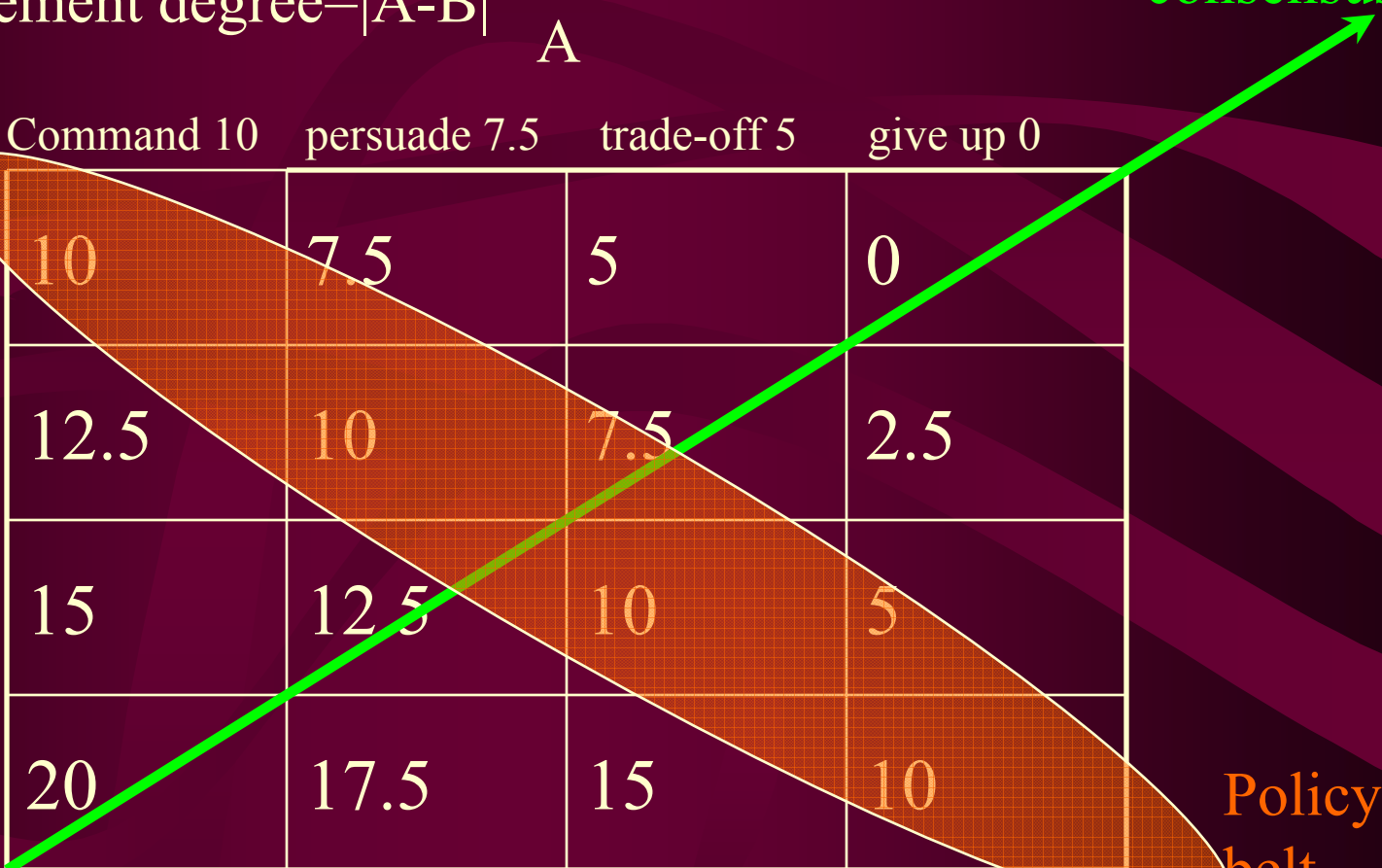
Model: How technical officials made decision?

- Policy opinion: A & B 假设有A、B两种政策意见
- Four attitudes to promote policy A: command(10), persuade(7.5), trade-off(5), give up(0). 主张A的技术官僚采取四种方式推广政策：命令（10分），说服（7.5分），折衷（5分），放弃（0分）。
- B's four attitudes to reject policy A: veto(-10), trade-off(-5), delay(-2.5), give up(0)。主张B的技术官僚采取四种方式来拒绝政策A：否决（负10分），折衷（负5分），拖延（-2.5分），放弃（0分）。

Model: How technical officials made decision?

Set: disagreement degree= $|A-B|$

Increasing consensus



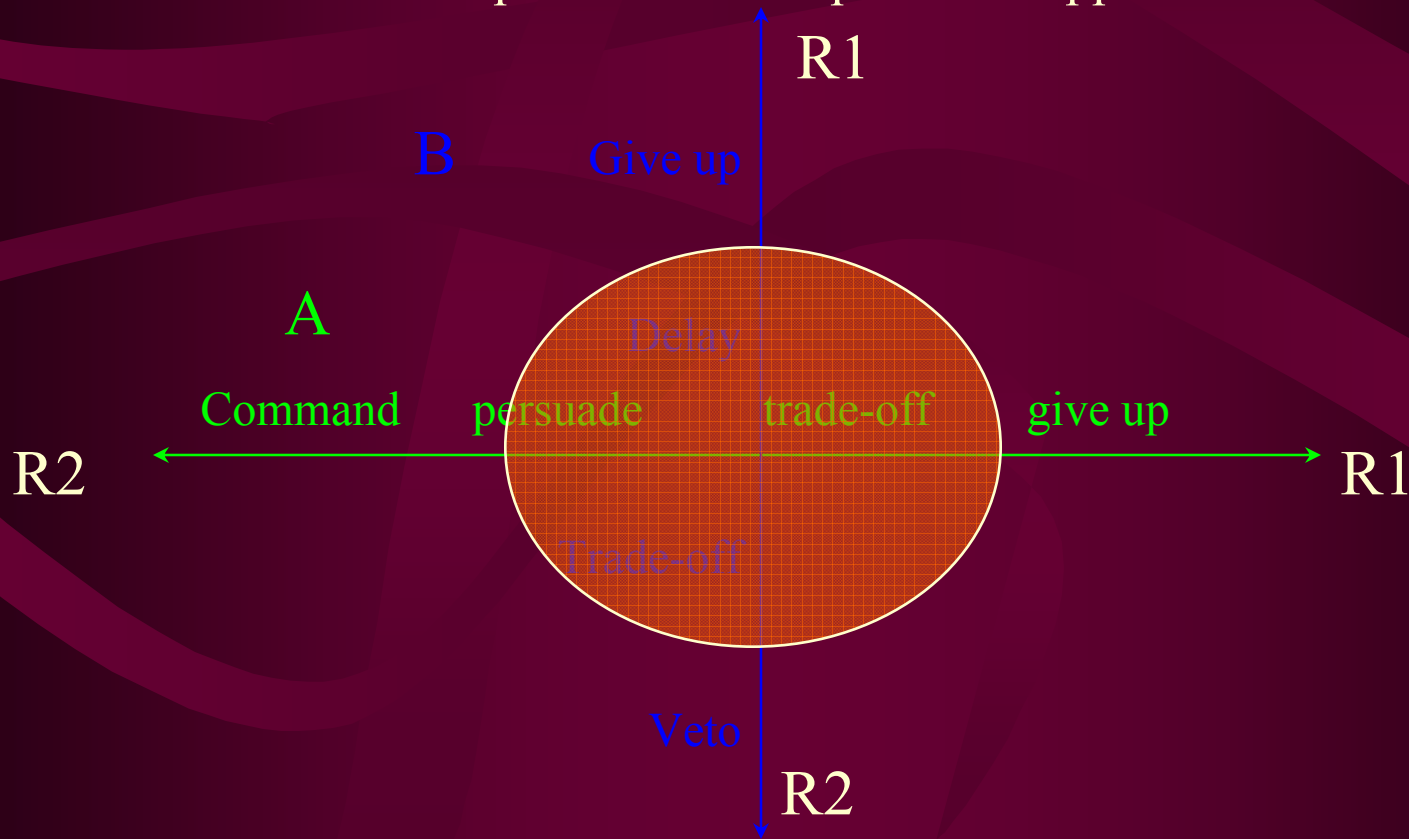
B

	Command 10	persuade 7.5	trade-off 5	give up 0
Give up 0	10	7.5	5	0
Delay -2.5	12.5	10	7.5	2.5
Trade-off -5	15	12.5	10	5
Veto -10	20	17.5	15	10

Policy belt

Model: How technical officials made decision?

- Bi-criteria:
 - R1: Risk on bad performance in professional capability
 - R2: Risk on bad performance in political support.



Conclusions

- Since high risks in political support and professional capability, Technical officials tended to **trade-off and delay**. 由于来自双重标准的考验，技术官僚倾向于妥协和拖延。
 - 80's: The consensus on no-action 80年代达成“不作为的共识”。
 - Long policy process on Act of promoting Electronic Industry and 908 Engineering 漫长的908工程和夭折的《电子振兴法案》。
- Political Authorities tend to **command** since they own great power. 政治权威倾向于用命令方式来影响政策过程。
 - Top level leaders push the 909 Engineering and Document 18th (2000) 909工程和18号文件由于高层介入而极为迅速。
- Intellect Elites tend to **veto** since the risk of lacking political support is lower. 知识精英倾向于否决性的批判