

The rise of US intellectual capital: A trillion dollars of intangible investment annually

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*reflects solely my opinions and not those of the
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Creativity has accelerated

- Humans have always been creative
- But creativity was only a small proportion of investment and wealth
 - Until in the late 1970s, microprocessors gave a large boost to the profitability of innovation
 - Since then, creativity has become the central way to create wealth



Talk outline

- The acceleration of corporate research and development in the late 1970s
- Measuring the rise in investment in intangibles (new product creation)
- Some consequences of the rise in intellectual capital

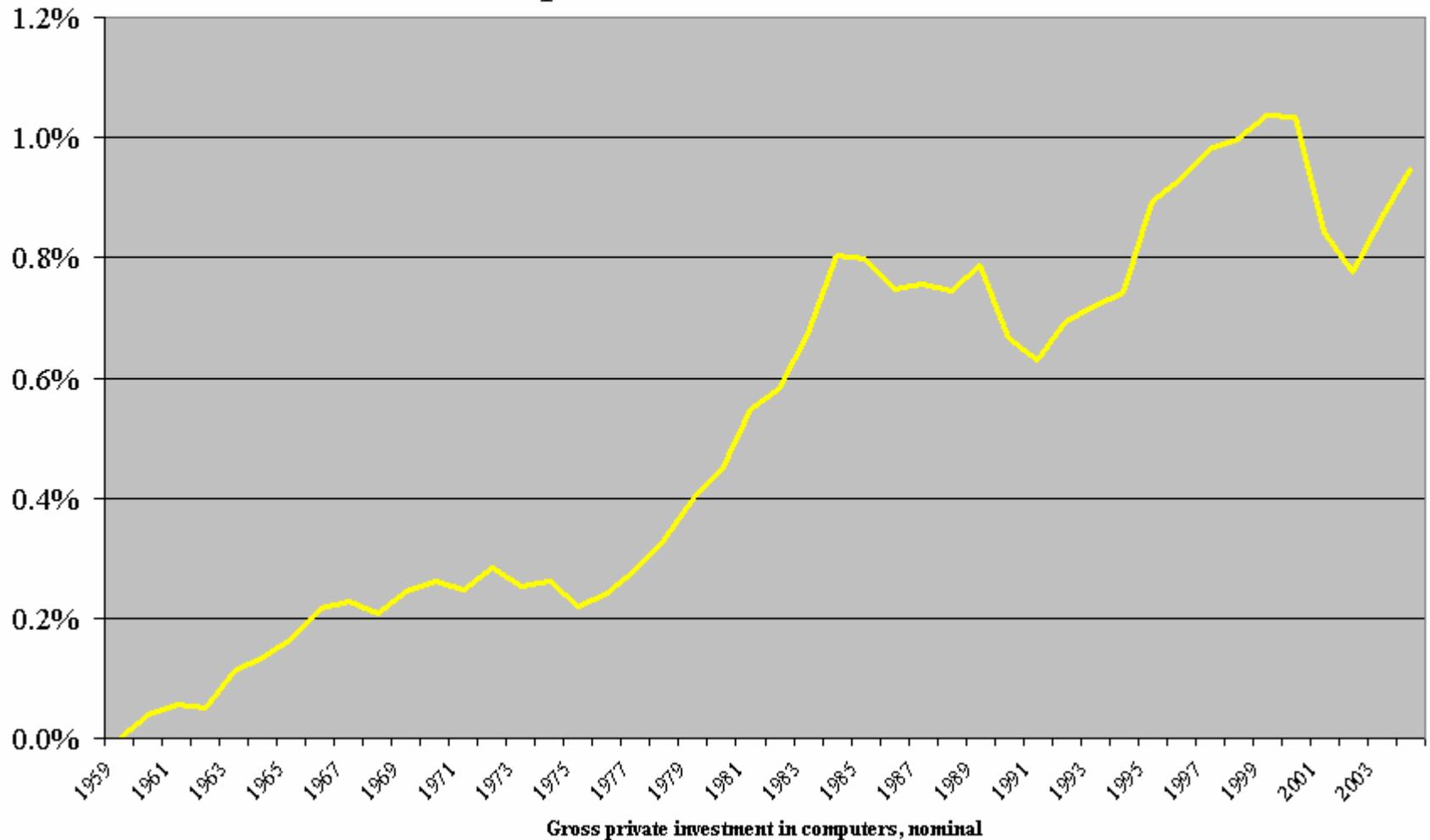


Computer expenditures broadened in the late 1970s

- As mainframes were supplemented by supercomputers, workstations, and PCs
- Information processing was automated and decentralized throughout the economy
- Barriers to entry broke down throughout the US economy
 - raising the return to new product development

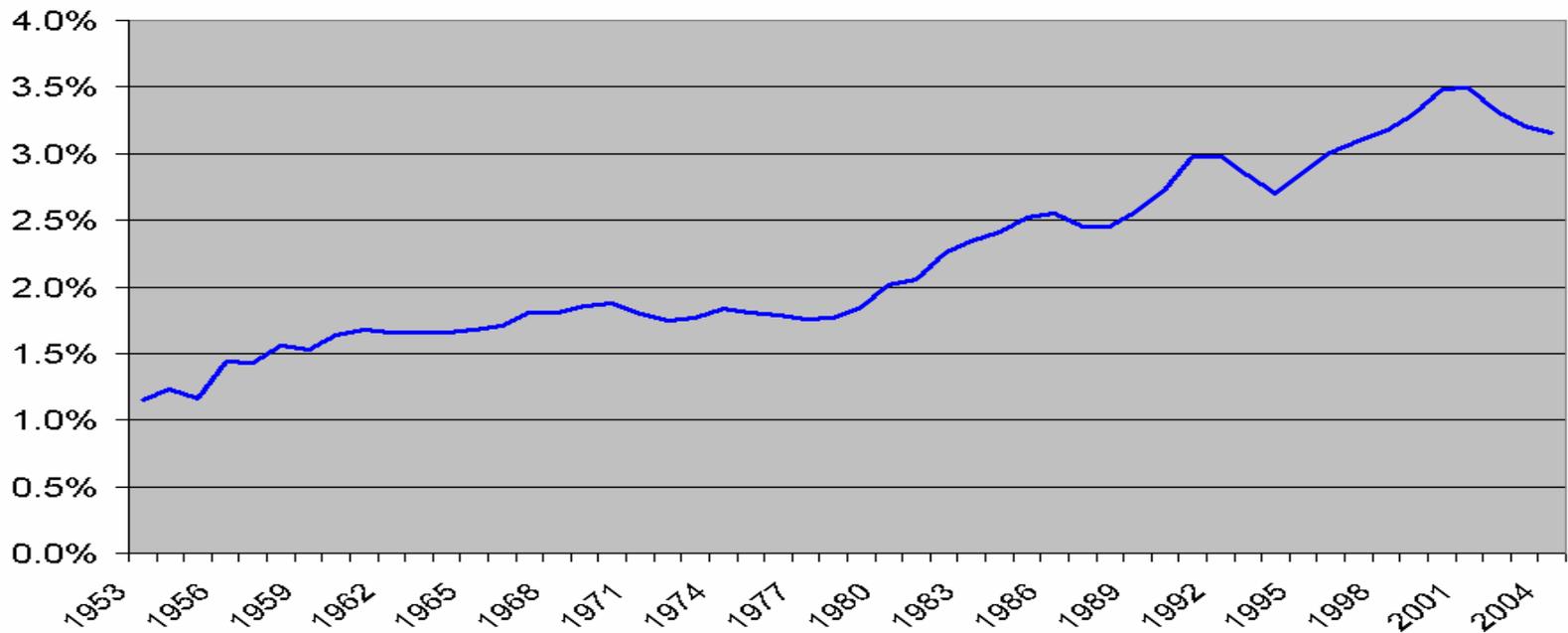


US investment in computers surged from 1977 to 1984 as percent of GDP



Since 1978, US nonfinancial corporations have doubled research and development spending

R&D Expenditures
as percent of Nonfinancial Corporate value added

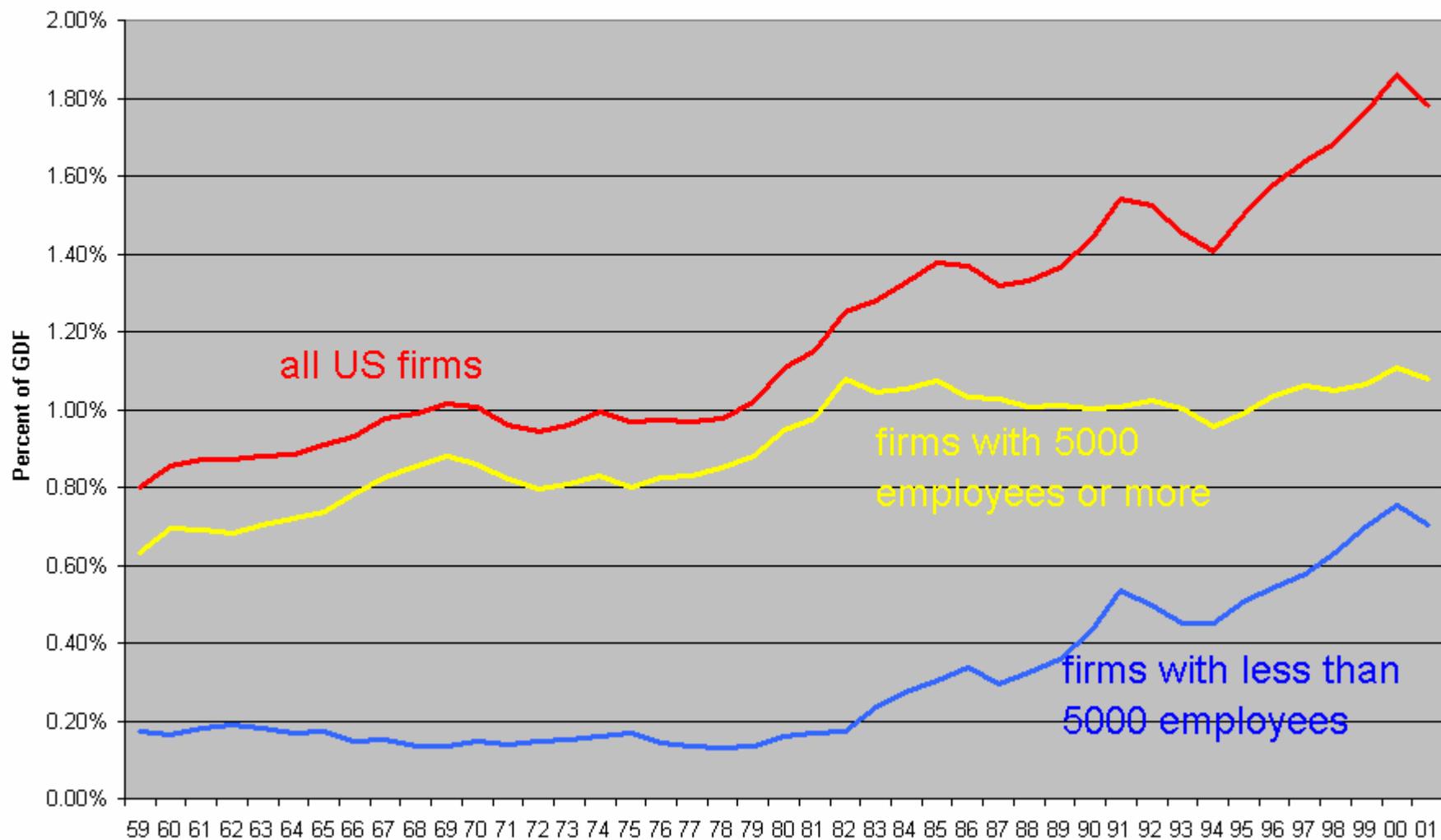


Before 1980, large corporations dominated US R&D

- Eighty percent of private R&D was performed by companies with more than 5000 employees
- Only large corporations could sell large quantities of products
- Since 1980, firms no longer need a large bureaucracy to sell to the world market
- And so small companies have accounted for almost all the growth in R&D



Most of the rise came because of new, small firms



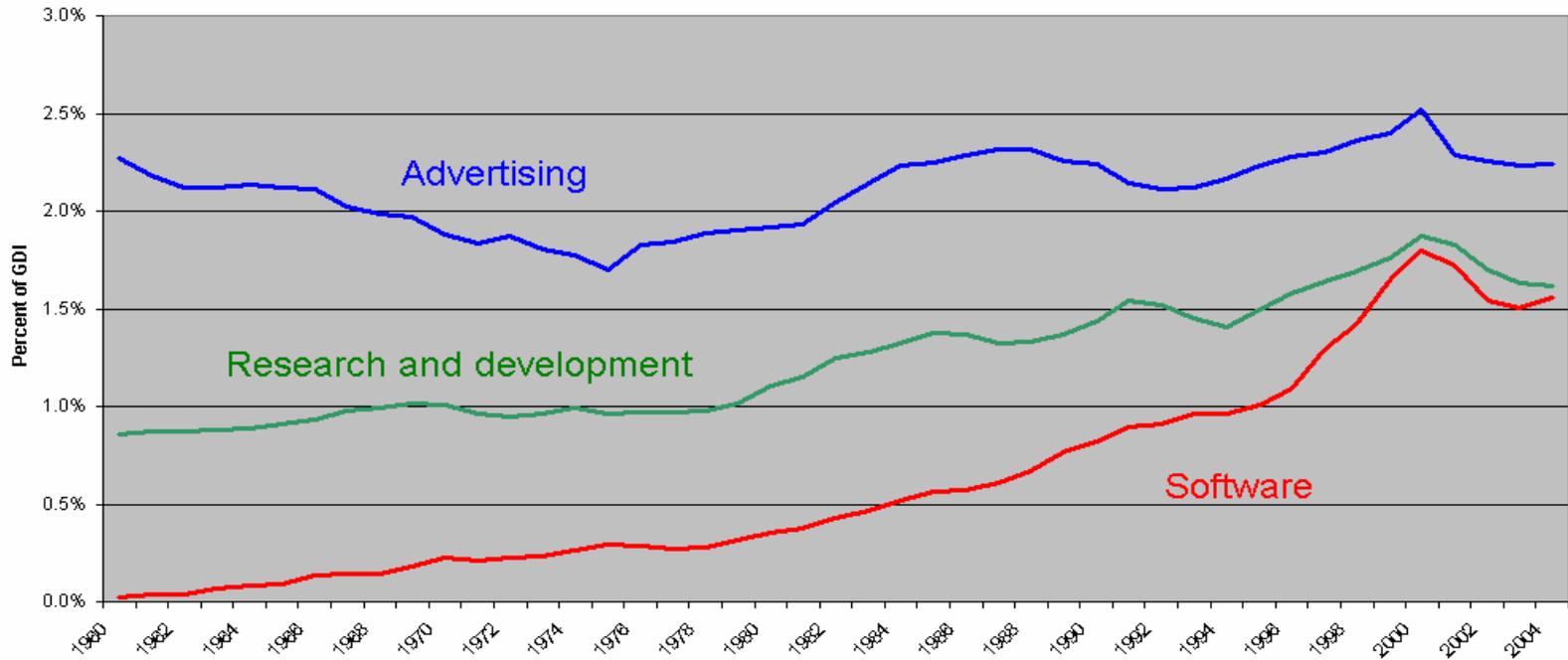
3 ways to measure intangibles

- Expenditures to create intangibles:
 - Research and development, software, intangibles
- Employment in creative occupations
 - Scientists, engineers, designers, writers
- Corporate margins
 - Intangibles give market power to products
 - Direct production costs shrink, but intangible investment expenses rise
- All suggest intangibles more than 7 % of GDP



Business intangible investments: R&D, Software, Advertising

Components of Intangible Investment

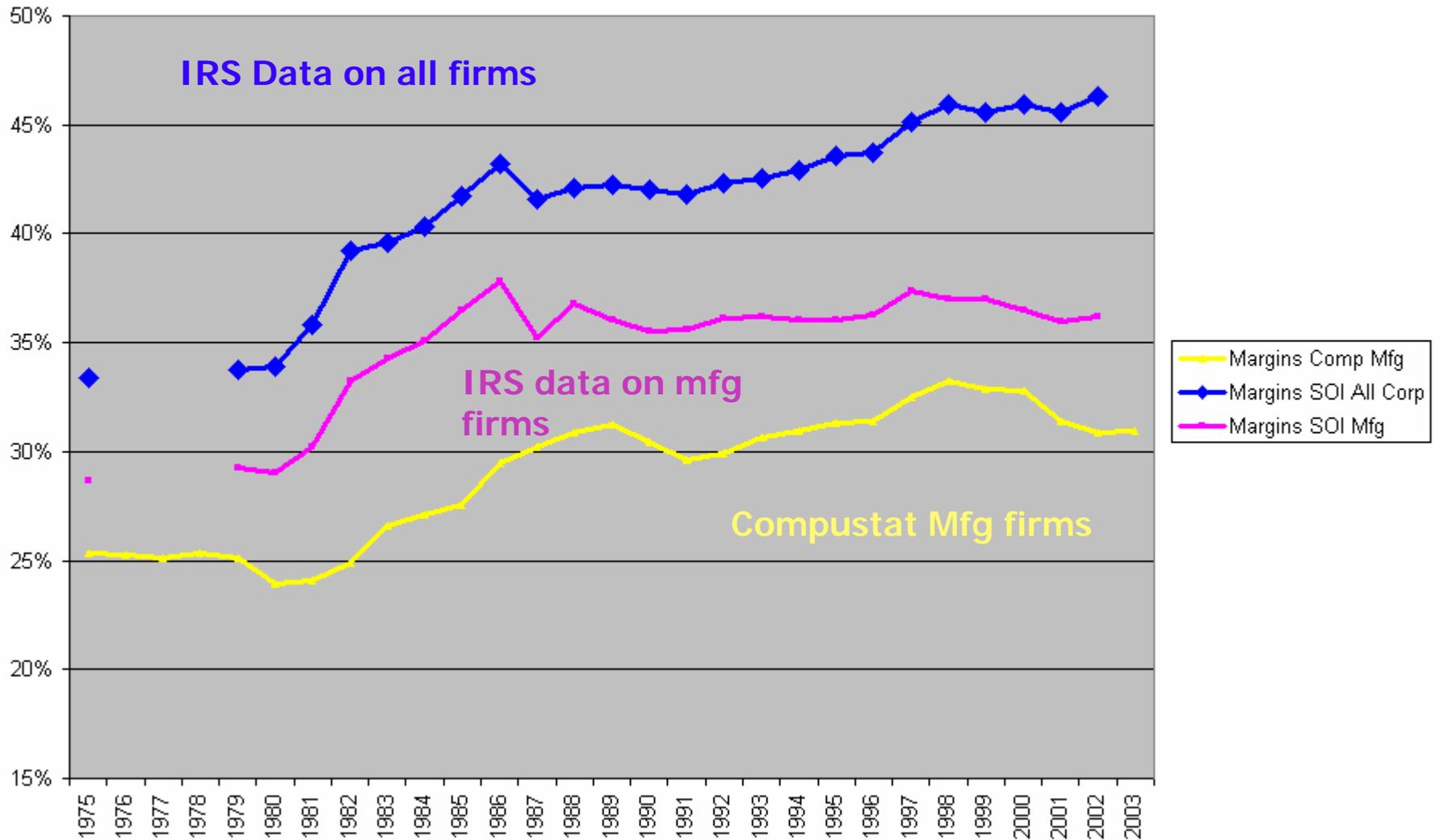


Ten percent of the payroll goes to six percent of workers who have creative occupations

US Occupational Data on Creative Workers		
	Percent of all:	
Occupational Groups	Wages	Workers
Computer and mathematical sciences	4.0 %	2.3%
Architecture and engineering	3.1 %	1.9%
Life, physical, and social sciences	1.3 %	0.9%
Arts, design, entertainment, sports, media	1.5 %	1.2%
All creative occupations	9.9 %	6.3 %



Margins rose since 1980 as intangible investment rose

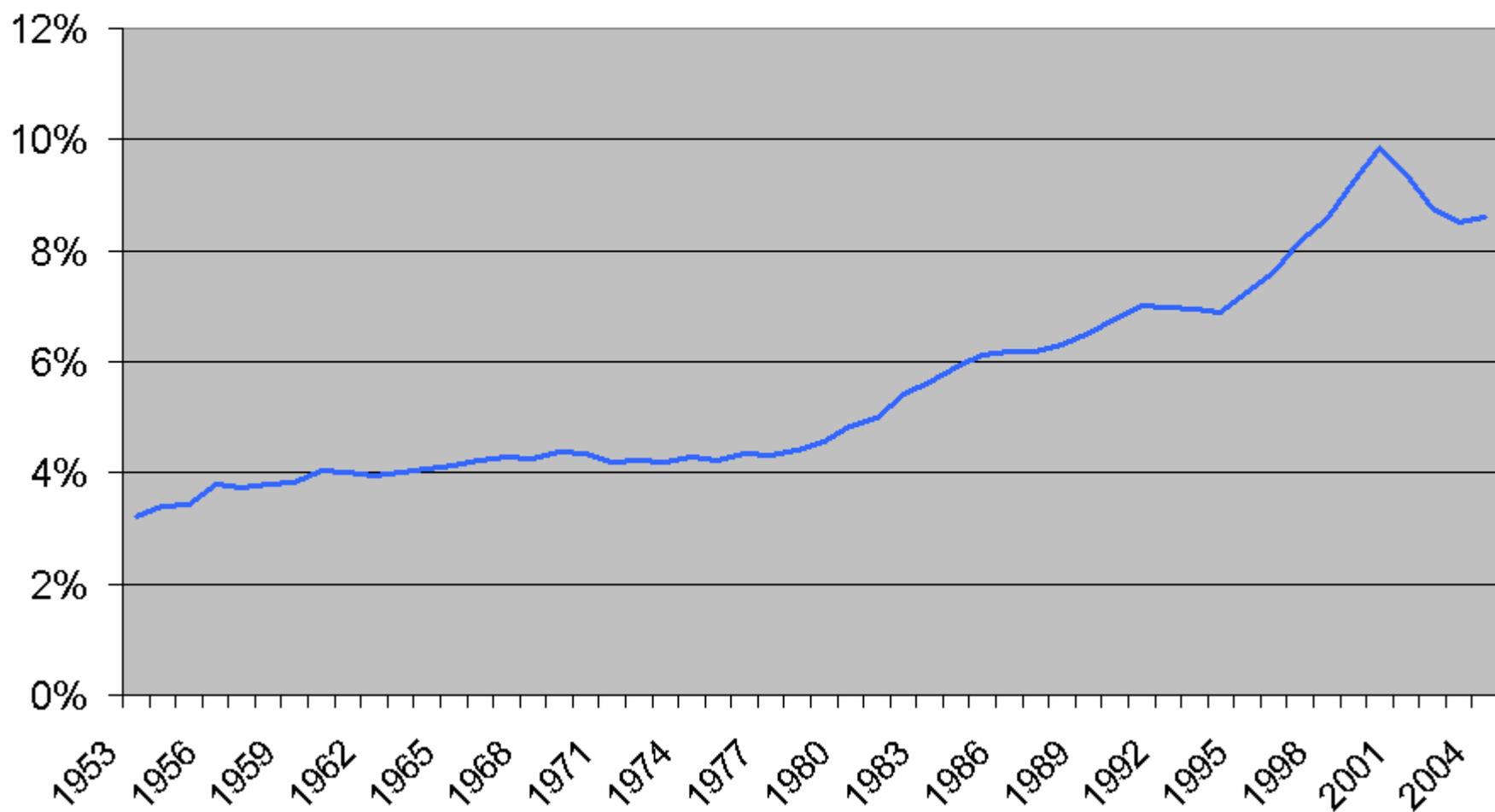


A crude estimate of intangibles

- Approximately \$1 trillion in intangible investment
- Of which more than 80 % is uncounted in GDP



Estimated Gross Investment in Intangibles As Proportion of GDP

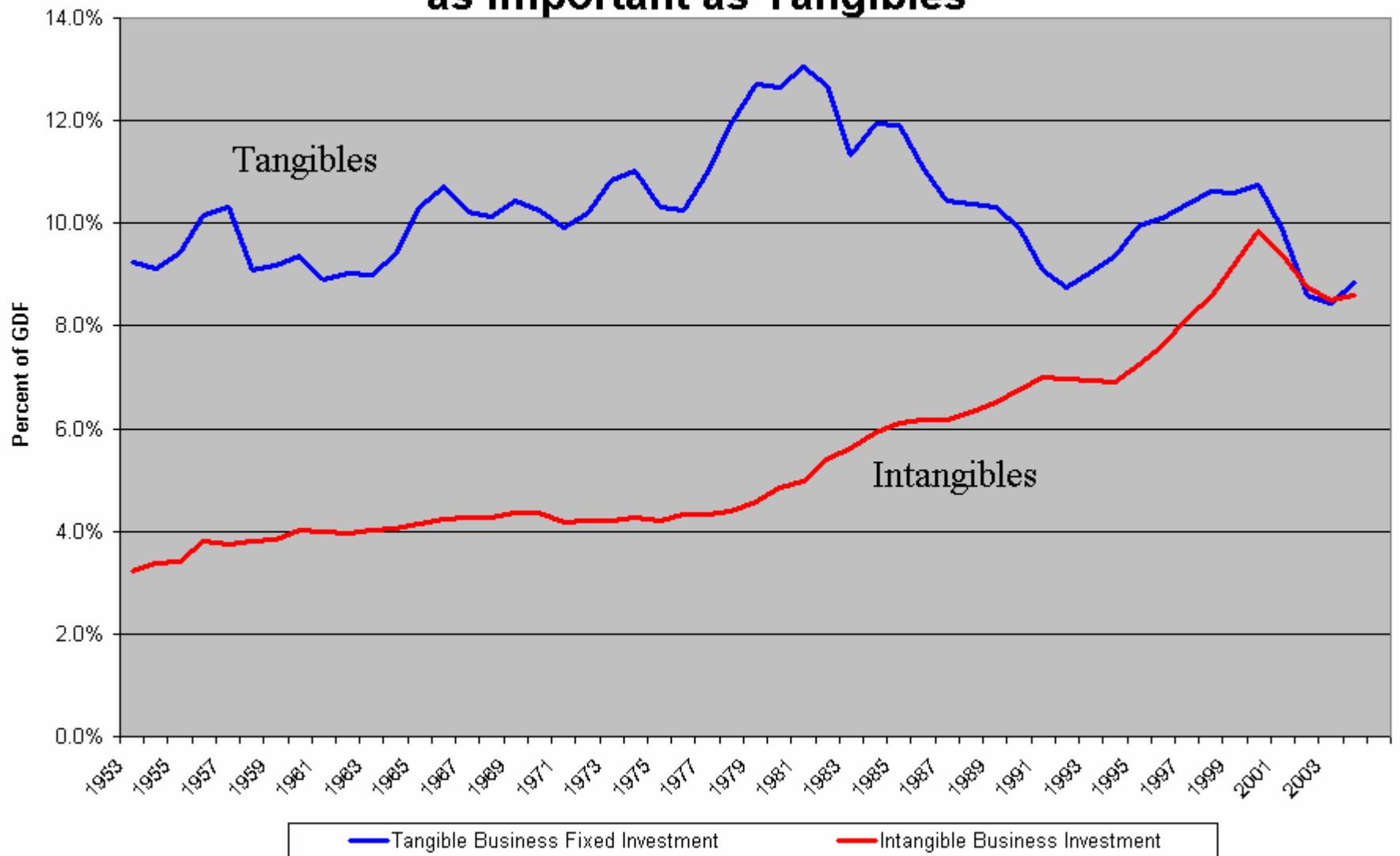


Nearly half of US business investment is now in intellectual rather than physical capital

- Business fixed investment, not including software, was 8.8 % of GDP in 2004
- Business investment in intangibles, including software, was 8.6 % of GDP in 2004



Investment: In the US, Intangibles are as Important as Tangibles

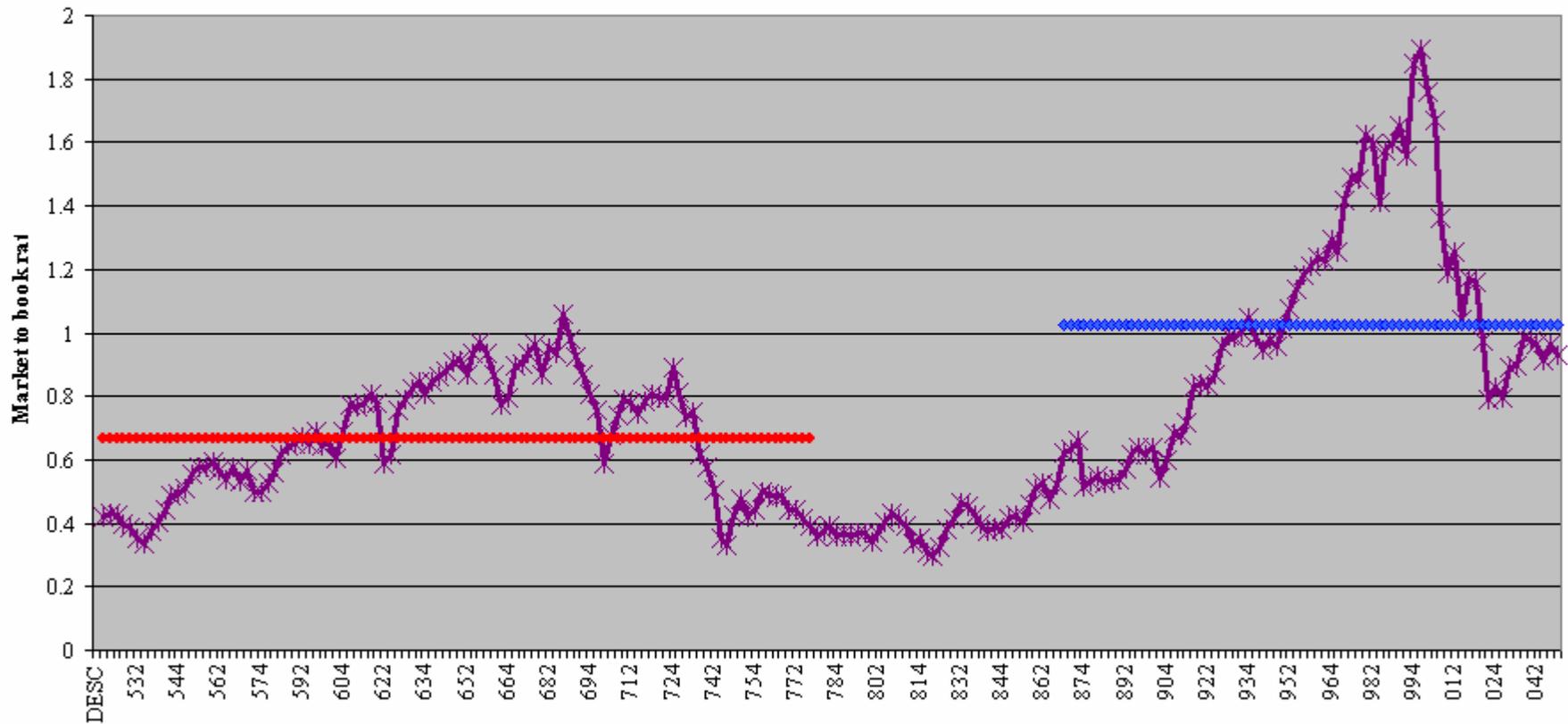


Consequences of the rise in creative destruction

- Greater stock market value
- \$1 Trillion intangible investment
= \$5 Trillion intellectual capital
- But: intangibles are *risky* assets
- More risk at individual corporations:
 - Stock prices more volatile
 - Used to need 20 stocks to diversify most risk
 - Now need 50 stocks to diversify



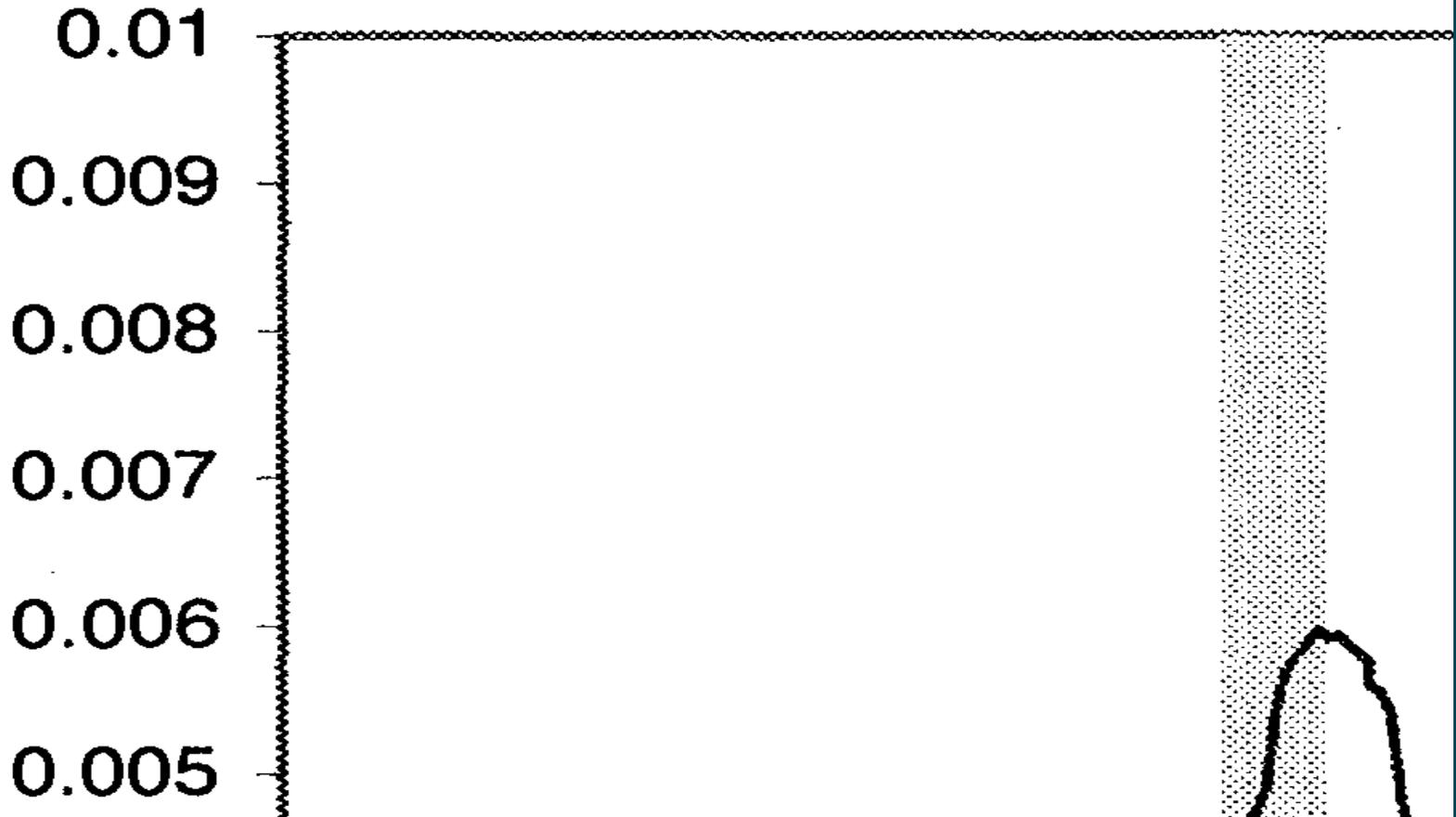
Relative to tangibles, stock market value is 50 % higher from 1986 to 2005Q1 compared to 1953 to 1977



Market value of equity, domestic corps., to book net worth (not including intangibles)

*— market/book
 -●- average,52-77
 -◆- average,87-05Q1

Since 1980, individual stock volatility
has risen sharply
as intangibles heightened risk



Risks to CEOs and localities have risen

- CEOs are twice as likely to be fired
- Outsiders are twice as likely to be chosen to run large corporations rather than being hired from within
- Some cities are superstars, others are flops
- Attracting and keeping highly educated workers in high-density centers is crucial for nations and cities



Risk and inequality is rising

- CEOs rising in value as well as riskiness?
- Corporations are forced to become more forward looking
- Decentralization with competition improves decisionmaking
 - Not just the private sector:
 - All sectors: public, private, and nonprofit can contribute to development of intellectual capital



Conclusion

- Creating intellectual capital is the main form of wealth creation today
- Countries, regions, and cities that foster creativity are likely to prosper
 - but creativity is risky
 - decentralization and competition are crucial

