

THE INFORMATIONAL STRUCTURE OF MARKETS,
TRANSACTIONS COSTS AND THE INTERNET, AND THE
CHANGING STRUCTURE OF THE GLOBAL ECONOMY

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ISEO

The Study of the Informational Structure of Markets

- Began about 30 years ago with study of asymmetric information
- Adverse selection and moral hazard
- The effects are surprisingly destructive of markets and market performance

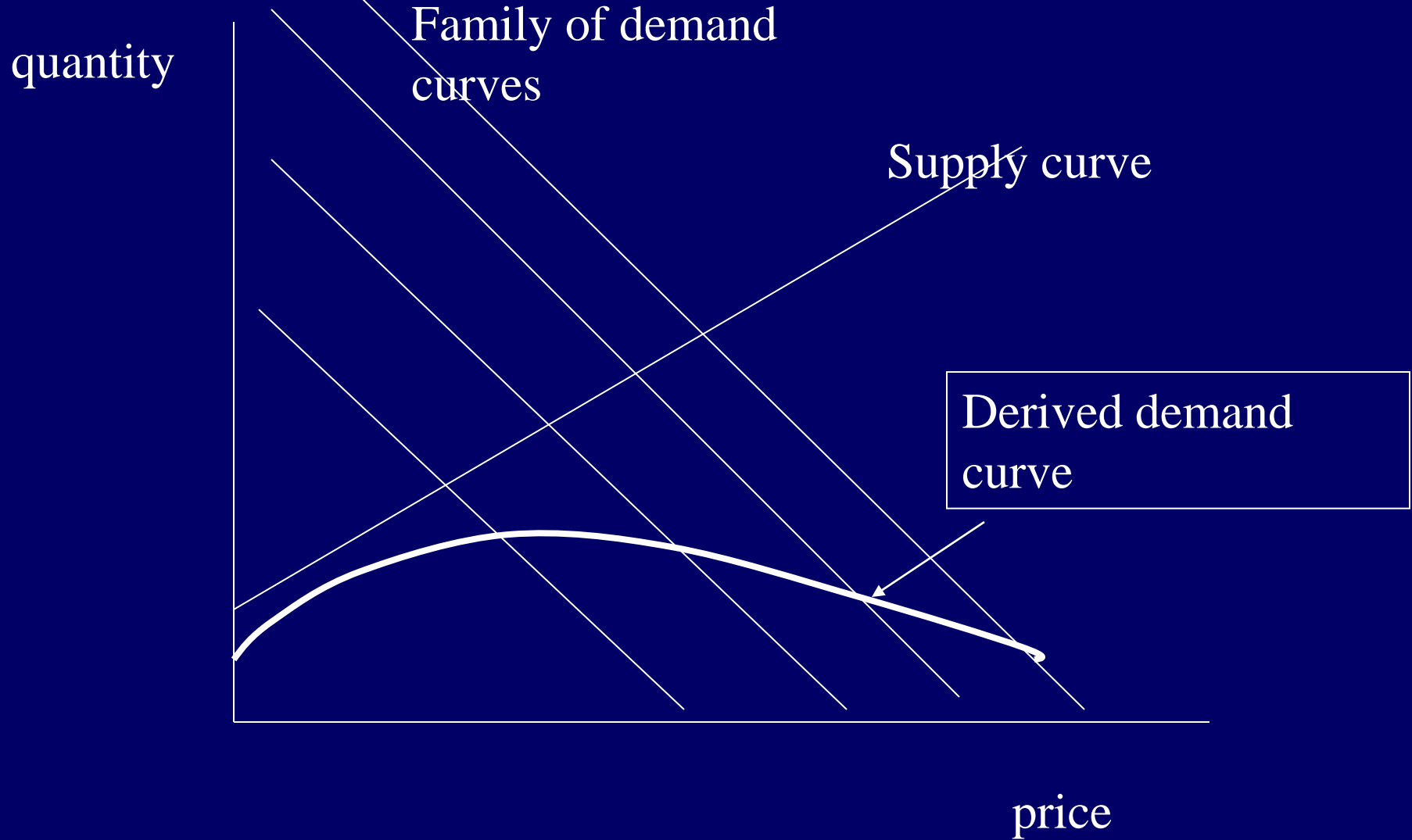
How Markets Respond

- Performance - unraveling from the top down
 - An unobservable quality variable on the demand side of the market
- Signaling
- Informational Intermediaries
- Relationships and trust
- Regulation and Disclosure

The Akerlof Adverse Selection Model

- Used cars as an example
- Buyers cannot see an important product attribute that varies across sellers - call it quality or durability
- Product differentiation is lost ex ante
- Buyers are buying a lottery
- Price reflects the average quality
- Sellers at the top end of the quality spectrum sequentially withdraw from the market

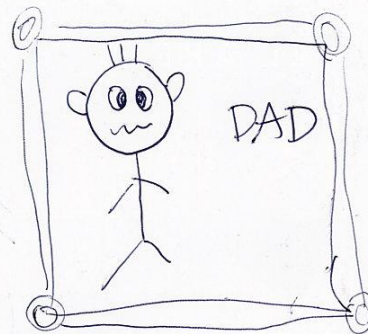
Markets with Adverse Selection



Signaling

- One of the processes by which markets try to solve the informational asymmetry problem
- High quality sellers try to signal the quality and low quality sellers imitate the signaling activity if they can - thus relieving the signal of informational content
- Signals that survive in equilibrium with informational content are visible actions that are not rationally imitated by low quality sellers - I.e.the signal is too expensive for low quality sellers
- Warranties in the car example
- Education in the job market
- Dividend increases in the financial markets

My Daughter's notes and the hundredth anniversary

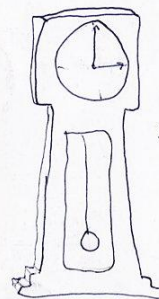


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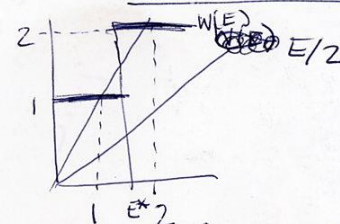
Stay Awake



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Dad's Theory



- benefit in signaling must be confirmed by experience
- multiple equilibria
- to achieve efficiency and separating, set tax rate of t on the signal, and distribute income from the tax equally to all
- fish in the marketplace! (1)
- time is a ubiquitous signal and screening device in economy and society

The Informational Underpinnings of a Market

- The informational underpinnings of a market
 - Buyers and sellers can find each other
 - Marketplaces
 - Knowledge of prices
 - Knowledge of product characteristics
 - The matching problem
 - Monitoring and control
 - Coordination in the Supply and Demand Chains

Markets and Informational Structure

- The Akerlof example - where does the knowledge of the quality variation come from?
- Each markets have an information network that surrounds them
- The internet operates on markets and their performance by affecting the nature of these information networks
 - Lowers the cost at the margin of acquiring more information
 - Increasing the density of the network
 - Increases communication among buyers
 - New car market as an example

Transactions Costs

- Economists refer to all those costs that are associated with creating or altering the informational underpinnings of markets and business processes, as TRANSACTION COSTS
- They are costs associated with information:
 - Processing, storing, moving it around to where it is needed, monitoring and control functions, searching and finding markets, product information, prices etc
- Some transactions costs that are internal to organizations and some are associated with the functioning of markets.

Transaction Costs and the Internet

- Network based ICT basically connects electronic databases to each other and to those who want access to them
 - Instantaneous
 - Independent of geography
 - Negligible marginal cost
- This has the effect of dramatically lowering transaction costs
- It is the driving force behind the large productivity gains we are starting to see and the rapid evolution of the global economy
- We have only begun to see the effects of this in the advanced and developing economies

Economics and Physics

- Friction and Newtonian Mechanics
- The economic analog of no friction is costless perfect information
 - A world in which most transaction costs are zero or negligible

ICT's and Transaction Costs in Organizations

- The rapid reduction of transaction costs began in the 1980's
- Associated with ERP systems
- Globally and in China, the penetration of ERP systems is low
- It is the basic building block

ICT's Markets and Supply Chains

- The impact of ICT's on transaction costs in markets and supply chains began in the mid 90's
- Dependent on the existence and accessibility of a reliable high speed network - the internet
- This is the part that over several decades has the potential to increase the degree of integration of the global economy

The productivity puzzle with respect to ICT

- Summary of the postwar data
- Coordinating Economic Activity
- The importance of the network
 - Labor saving and time saving
- The wedge between growth in *GDP* and growth in employment

Productivity and Related Data -China and International

Population, Internet Users and Internet Penetration in China, 2000-2005 (in millions)

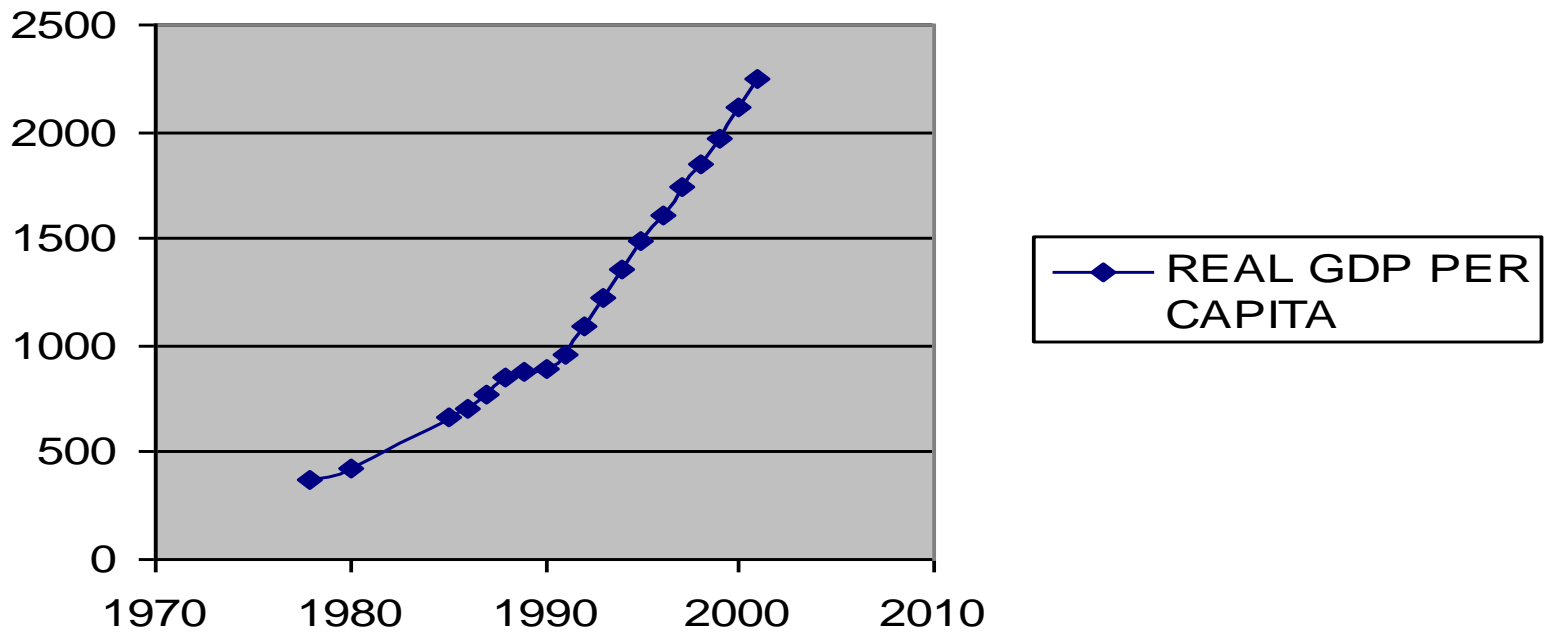
	Population	Internet users	Internet penetration
2000	1,262.5	22.5	1.8%
2001	1,271.1	33.7	2.7%
2002	1,279.2	59.1	4.6%
2003	1,287.0	114.5	8.9%
2004	1,294.6	176.0	13.6%
2005	1,302.2	250.0	19.2%

Note: population figures are US Census Bureau; Internet user figures are ITU through 2002 and eMarketer projections for 2003-2006; Internet penetration figures are eMarketer projections based on the previous data
Source: US Census Bureau, International Telecommunication Union (ITU), eMarketer, November 2003

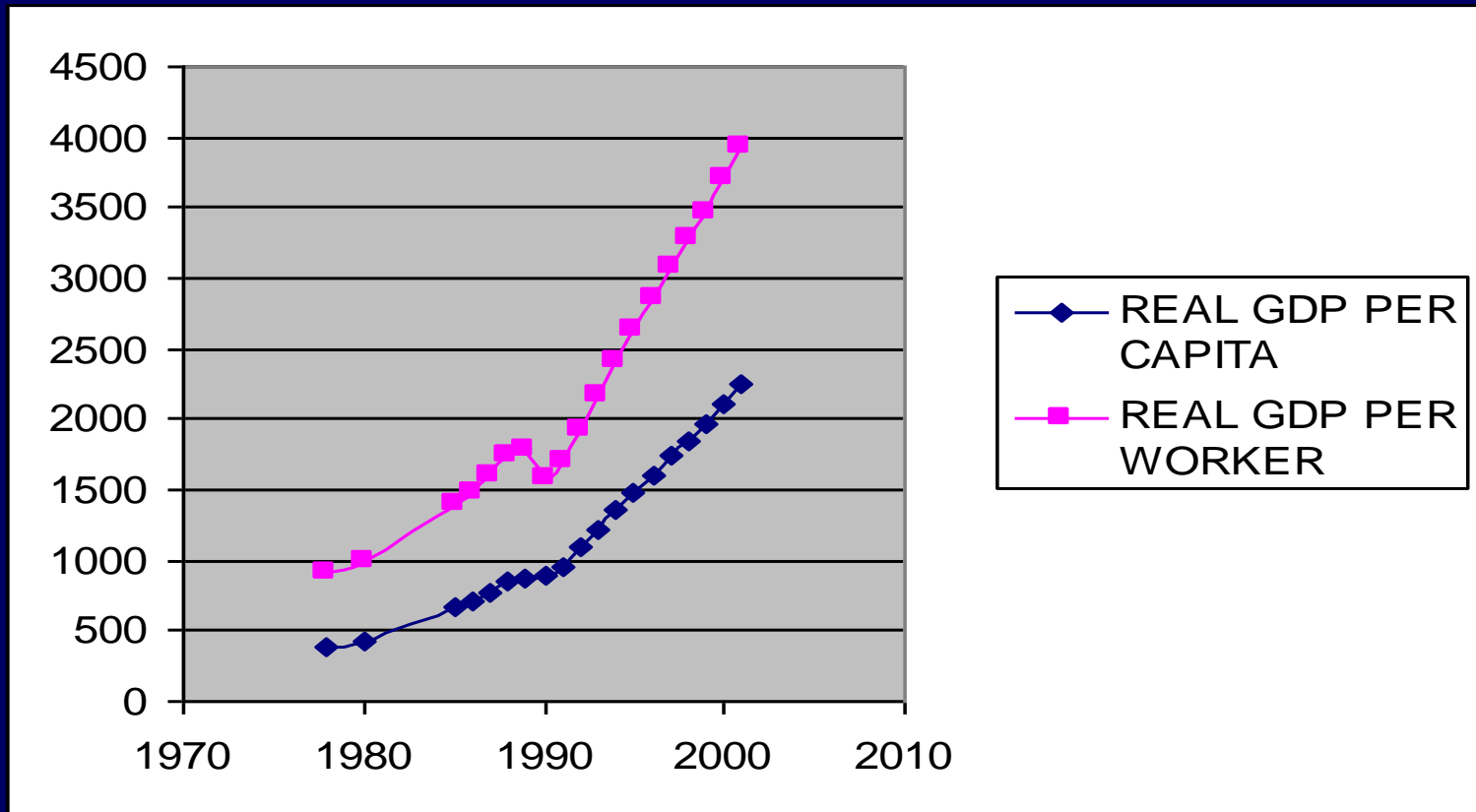
CHINA	REAL GDP PER CAPITA	REAL GDP PER WORK,ER		
1978	376.5	902.6		
1980	425.9	992.4	6.4	4.9
1985	660.4	1401.7	9.2	7.2
1986	707.9	1484.1	7.2	5.9
1987	776.9	1608.7	9.7	8.4
1988	851	1738.9	9.5	8.1
1989	872.4	1777	2.5	2.2
1990	892.9	1576.7	2.3	-11.3
1991	962.5	1702.2	7.8	8.0
1992	1086.9	1925.1	12.9	13.1
1993	1219.5	2163.4	12.2	12.4
1994	1358.6	2413.4	11.4	11.6
1995	1485.6	2643.6	9.3	9.5
1996	1611.2	2859.9	8.5	8.2
1997	1736	3073.9	7.7	7.5
1998	1854	3275.9	6.8	6.6
1999	1969.1	3472.6	6.2	6.0
2000	2114.3	3712.8	7.4	6.9
2001	2250.1	3932.5	6.4	5.9
AVERAGE GROWTH RATES	8.1	6.6		

China

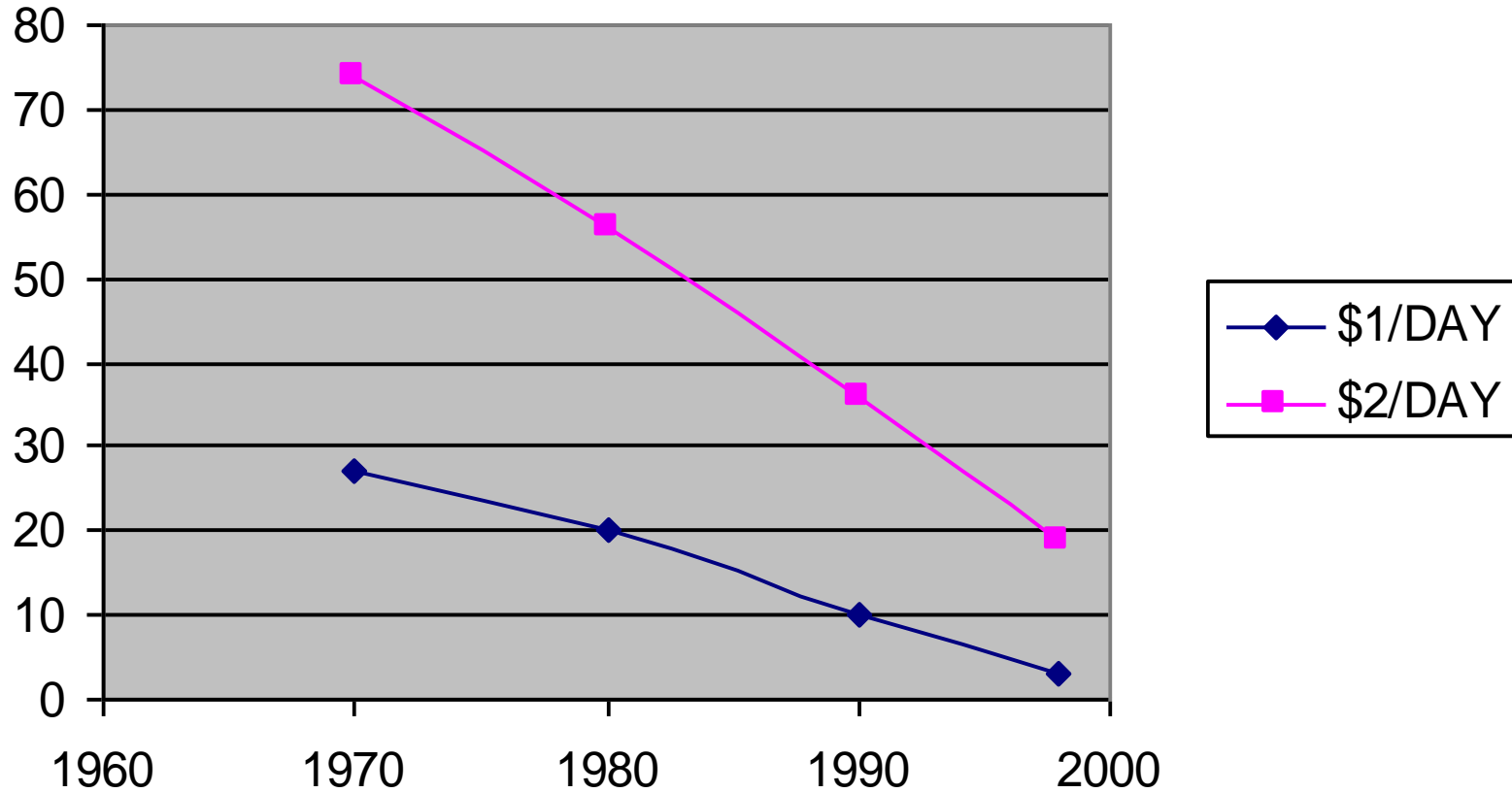
REAL GDP PER CAPITA



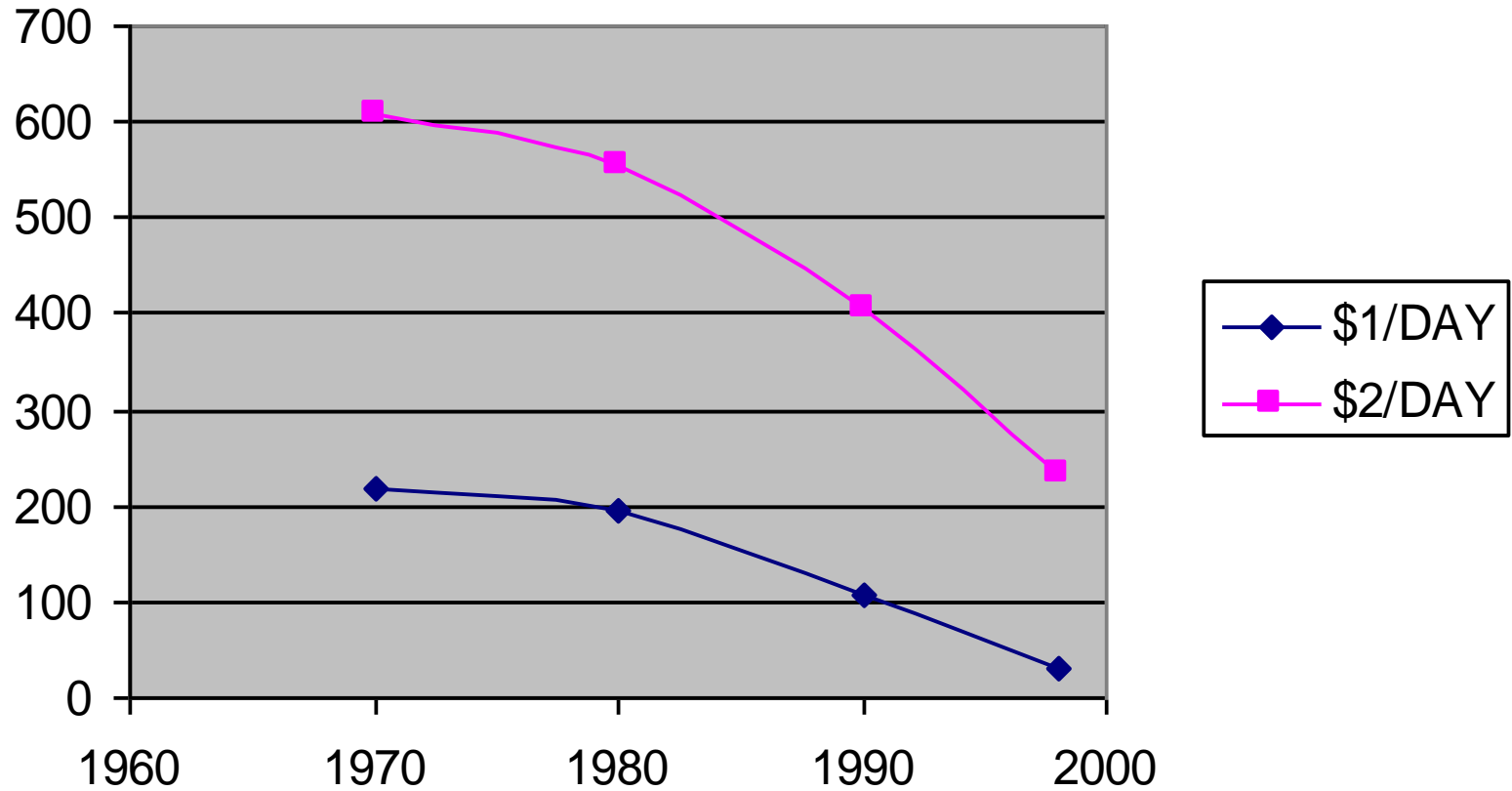
China



POVERTY IN PERCENTAGES



POVERTY NUMBERS OF PEOPLE

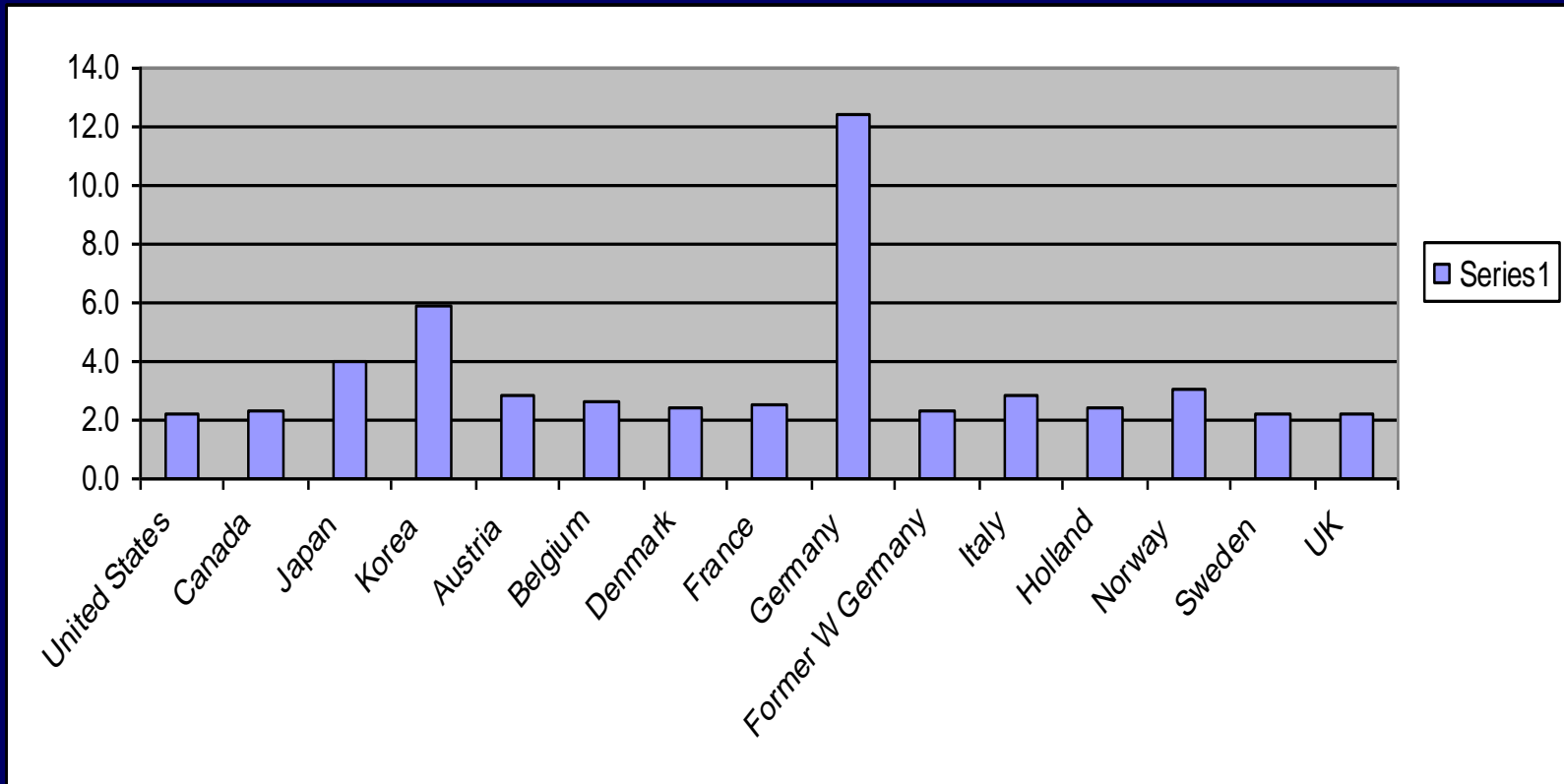


Additional Facts

- Rural populations went from 82% in 1978 to 62% in 2001
- Urban incomes were 3.5 times rural in 1978, fell to 1.5 times in 1986, then hovered there and are now back up to 2.0 times rural incomes on a per capita basis
- Growth rates have been high in all regions ranging between 7.3% in the northwest to 9.6% in the central and southeast - the national average being 8.9 from 1978 to 2001
- But the starting points were different so the end points have larger differences in absolute terms

INTERNATIONAL AVERAGE GROWTH RATES		PER CAPITA GDP												
	United States	Canada	Japan	Korea	Austria	Belgium	Denmark	France	Germany	Former W Germany	Italy	Holland	Norway	Sweden
	2.2	2.3	4.0	5.9	2.8	2.6	2.4	2.6	12.5	2.3	2.8	2.4	-12.7	2.2

International GDP per capita Growth: 1960-2002



USA OUTPUT PER HOUR INDEX					AVERAGE GROWTH RATE
2001	1	116.9			4.7
	2	117.7	2.8		
	3	118.2	1.7		
	4	120.4	7.7		
2002	1	122.8	8.2		
	2	123.3	1.6		
	3	124.7	4.6		
	4	125.4	2.3		
2003	1	126.4	3.2		
	2	128.6	7.1		
	3	131.3	8.7		
	4	132	2.1		

Growth Rates in Economic Development: Various Industrial Revolutions - Paul Romer

- England 1% 69
- Continental Europe and the USA 2% 35
- Japan 7-8% 10
- South Korea 10+% 6.6
- It is accelerating probably because of
 - Developed economy demand
 - Technology transfer
 - Efficiency of integration of global markets

Areas of Impact

- The effects are pervasive, large, and not short-run
- New markets are created
- Geographic boundaries of markets are pushed out
 - Because time and distance are collapsed in the information layer
- Hence liquidity or density increases
- Buyer knowledge improves
- Supply chains respond to shocks differently

Areas of Impact (continued)

- Removing time, cost and manual effort from business processes
 - In economic terms, there is a reduction in the labor intensity of business information, accounting, monitoring and control processes
- Lowering cost of acquiring product information
- Expanding the Scope for Outsourcing
- Changing the informational parameters around market models

eBay

- History
- Lowered the cost of buyers and sellers finding each other in market for collectibles and used goods from prohibitive to close to zero
- Several million new markets/auctions per day

IT in India

- Software development and service centers
- Integrated into process on internet
- Labor immobility
- Untrapping intangible assets like human capital
- Labor in one country or region is directly and input to service delivered in another country
 - Historical antecedents - call centers

Nike in Asia and Supply Chains in Global Business/Economy

- South Korea and Taiwan 35 years ago
- Vietnam and China now
- What is the same
 - Valuable human resources at low cost
- What is different
 - Integration into the global supply chain much more complete and efficient

Outsourcing and The Supply-Demand Chain

- Well known subject in economics
 - Ronald Coase
- Much discussed subject now in business and int'l trade
- The outsourcer gets to focus on what it is good at
- The outsourcee adds value by contributing expertise, economies of scale and scope, best practice
- The countervailing force is transaction costs
 - All those costs of communicating, coordinating and aligning incentives among multiple organizations

Google and Search Engines

- Accessible databases growing exponentially
- The importance of search engine and related intelligent agent technology
- The Google IPO

Google: The collapse of inconvenience

What's wrong with that?

As more and more public and quasi-public information goes online, your past is largely transparent to anyone with a computer. “Perhaps you once went on a rant at a selectmen’s meeting, or signed a petition without stopping to read it. Or maybe you endured a bitter divorce,” says Neil Swidy in *The Boston Globe*. “You may think those chapters are closed. Google begs to differ.” Theoretically, court and other legal records, police arrests, obscure newspaper articles, and other such documents have always been publicly available. But an enormous amount of time, effort, and expertise was needed to dig them up. Now, with a couple of keystrokes, a lifetime’s worth of records can unfold on someone’s computer screen in 0.2 seconds. “It’s the collapse of inconvenience,” says professor Siva Vaidhyanathan of New York University. “It turns out inconvenience was a really important part of our lives, and we didn’t realize it.”

THE WEEK September 19, 2003

The Downside

- The "collapse of inconvenience" is the analog of the reduction of transactions costs in the economic sphere
- Loss of "down time"
- Privacy
 - On Google if you type in a phone number you get a name and address
- Speed of movement of economic activity
- Generally the removal of "frictions" that slowed things down and hence made transitions less frightening

The Longer Run and The Global Economy

- Network based information technology infrastructure will get built out globally making the idea of the global economy real
- This is efficient outsourcing on a very large scale
- The growth potential is staggering if your time horizon is 20 to 30 years
 - In the infrastructure
 - And in the outsourcing
- It will probably occur over several decades at an accelerating pace

The Economic Development Process and Globalization

- 20th Century experience - no known substitute for market system for efficient allocation of resources to highest and best use
- But the market system is being oversold
- It is a necessary but not sufficient condition for economic development and growth
- To assess this claim, we need a plausible simple model of economic growth and development

Growth, Productivity and Assets

- Per capita GDP grows with Productivity Increases
- Productivity is function of a vector of assets that are accumulated over time
 - Functioning and efficient markets
 - Human capital
 - Infrastructure (ICT's roads railways, airports, ports, public sector investment)
 - Legal and regulatory structure
 - Technology and know how
 - Tangible Private Capital
 - Political Stability and Peace
 - Labor Mobility
- These assets are accumulated over decades
- And when done properly in a balanced way - they are in economic terms, complementary inputs

Rapid Economic Growth

- Growth in the aggregate numbers is not the only outcome
- Relative prices change and incomes rise
- As prices change, the mix of industries changes
 - To a first approximation away from labor intensive sectors and activities
- The portfolio of economic activity shifts
- People have to change jobs and industries
- Very high premium on education and human capital
- Also safety nets, and institutions that provide training and transitions to new work are of great value
- Protectionist forces emerge more or less in direct proportion to the speed of the transitions

Technological Progress and Growth

- Growth theory - Robert Solow
 - Important innovation
 - Developed with advanced countries in mind
 - Many of the variables in the vector of assets were assumed and suppressed to focus on capital and labor and technological progress
- Technological progress in growth models operates on the production function
- BUT some of the large effects of ICT's are on transactions costs in markets

The Effects of ICT Driven Technological Progress in the Global Economy

- Trade increases
- Global markets more integrated
- Intangible assets for accessible and hence more valuable
- Prices of inputs (labor) and outputs (goods and services) change
- Economic activity shifts to developing countries at the margin
- Incomes and labor prices eventually bid up promoting economic development

Anti-globalization Forces

- If the potential benefits are large, why is there so much opposition?

The short and the long run

- In the long run probably everyone wins - though no one knows the time horizons
- In the short run there are winners and losers
- In the developed economies the winners are consumers and the losers are those whose jobs are exported
- Politics is "local" and protectionism is a permanent feature of the landscape
- The challenge is to keep it under control by responding to the concerns as they arise

Governance in the Global Economy

- Global Markets are informationally immature relative to domestic markets
- In the financial markets, this results in more volatility
- In domestic markets, when market forces cause damage to individuals the government intervenes to slow the process down
- In the global economy, thus far, there is not comparable entity with the authority, legitimacy and capacity to intervene as governments and central banks do.

The Fascinating Case of Europe

- The Euro Area
- Fiscal policies and rules
- Labor mobility
- The new entrants
 - Recalling the reunification of Germany
- Creating an economically unified entity is going to take a century

Antiglobalization

- Complex coalition
- Environmental issues
- The wage issue
- Volatility and negative experiences
- Immaturity of regulation
- Governance in the global economy

Unhelpful Over-simplifications

- "All you need is a market system.."
- "Everyone benefits.."
 - And over what time horizon

ICT's Have a Critical Role to Play

- It is a key component of the infrastructure investment
- Link to global economy
- Directly influences the value of country's intangible assets like human capital
- ICT'S are infrastructure and an enabling asset in
 - The private sector - efficiency
 - Government
 - Education
 - Health care delivery and much more

There are potentially large positive externalities associated with these investments

Obstacles

- State owned or recently privatized telecom monopoly
- Misguided telecom regulation
- Cellular and wireless
- Efficient use of capital - multi-user models
 - Cell phones and internet cafes
- High fixed low variable cost
- Externalities and the need for public sector investment

Creating Versus Capturing Value

- It is easy to see the potential social value creation
- The issue is whether suppliers capture enough of the value to justify the investment
 - Capturing value
 - The revenue model
- Closely related question
 - What is the right mix of public and private sector investment

LAYERS OF ICT ACTIVITY

MILLIONS OF ECONOMIC AND SOCIAL
EXPERIMENTS

ACCESS TO INFORMATION RESOURCES AND
EDUCATION

COMMUNITIES AND SOCIAL NETWORKS

SUPPLY CHAINS AND MARKET MAKING

BUSINESS PROCESS AUTOMATION

APPLICATIONS

PROTOCOLS AND CONNECTIVITY

HARDWARE AND NETWORKS

Education in the Developing World

- The production function
 - Teachers
 - A facility
 - Health
 - Enough wealth that not needed at home to work
 - Stability at home and in environment
 - INFORMATION RESOURCES

THANK YOU
THE END