

3

Economic and Social Impacts

Wirtschaftliche und
gesellschaftliche Auswirkungen

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Impacts of TC on Economy

- Output growth
- Scale and scope economies
- Productivity and efficiency
- Prices
- Variety, complexity, quality
- Division of labor

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Impacts of TC on Growth

- Direct: Output growth
(new products/services)
- Indirect:
 - Productivity growth
 - Price declines
 - Quality improvements
- Indirect:
 - Less *in* per *out* (resource sparing)
 - More *out* per *in* (yet more growth)

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Output

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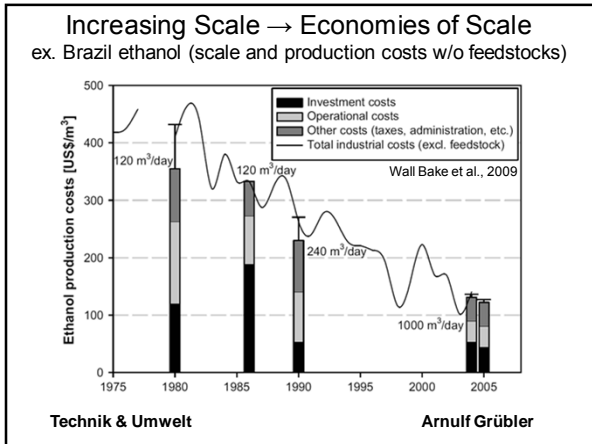
Growth of Mass Production/Consumption

	1950	2005	Factor increase
Objects in Use:			
Merchant ships (10 ⁶ dwt)	93	633	7
Motor vehicles (10 ⁶)	70	882	13
Telephones, fixed+mobile (10 ⁶)	70	3480	50
Radio sets (10 ⁶)	226	2505	11
TV sets (10 ⁶)	45	1988	44
Annual Production:			
New book titles (10 ⁶)	<200	~1000	>5
Raw steel (10 ⁶ t)	188	1147	6
Paper (10 ⁶ t)	50	364	7
Fertilizer (10 ⁶ t nutrient-equiv)	13	171	13
Activity per Year:			
International tourists (10 ⁶)	28	811	29
Air passengers (10 ⁶)	23	1970	86

Data sources: UN, World Bank, ITU, IISI

Scale

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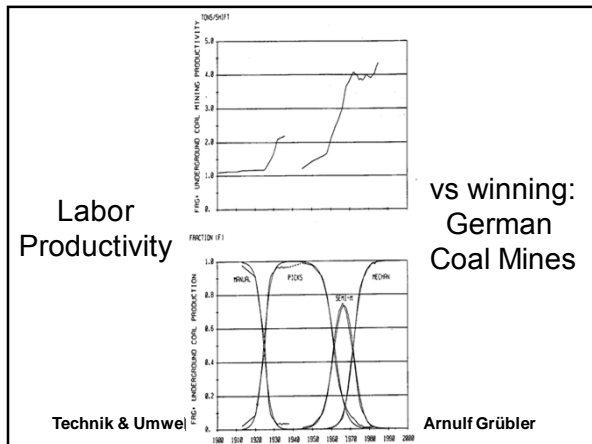
Productivity

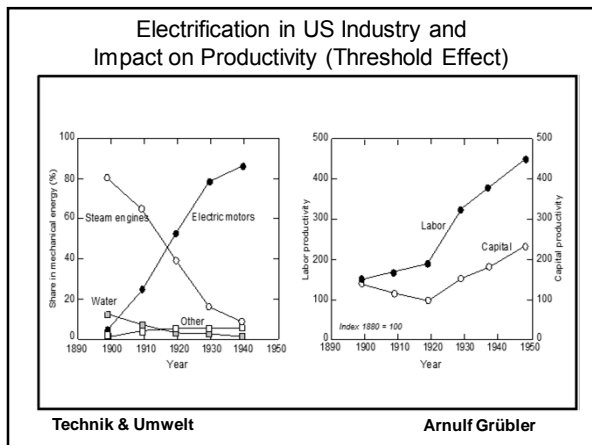
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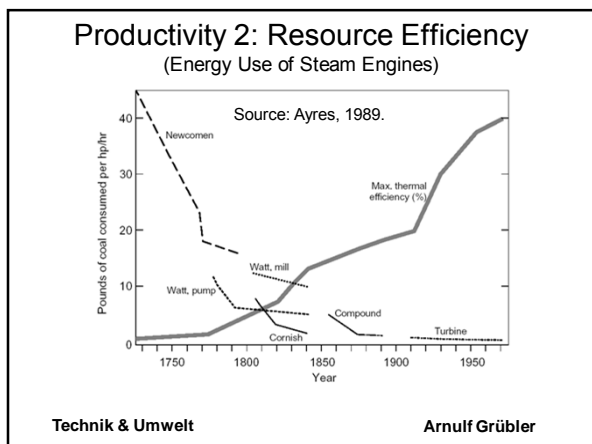
Examples of Productivity Growth

	Factor..	% / year
Costs of overseas telephone call (New York – London) 1925-1995	300..	8.5..
Output/hour per industry worker (UK) 1800-2000	200..	2.8..
Primary energy use per GDP (USA) 1800-2000	~7..	~1.0..

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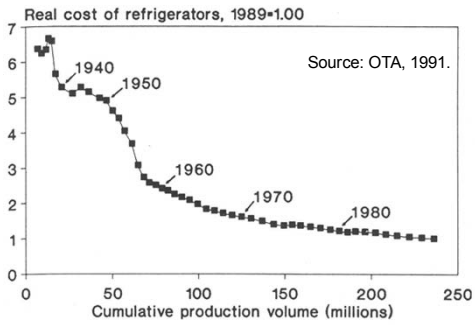


Costs and Prices

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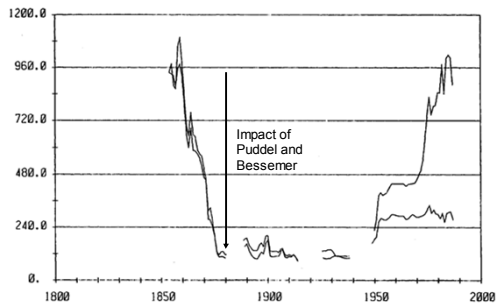
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Cost Declines in Refrigerator Costs in US



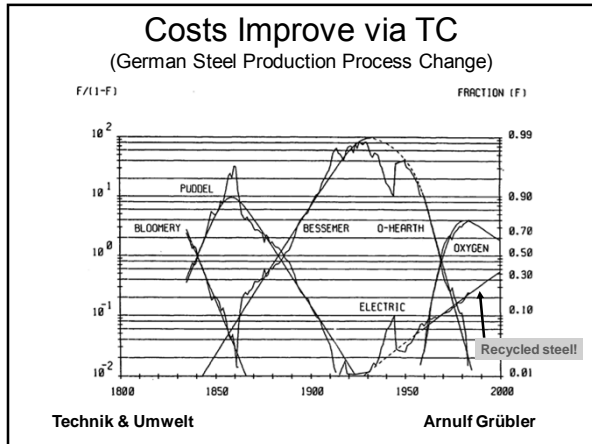
On example of cost declines + quality improvements (efficiency) see Bill Nordhaus example of Light Posted on the class server: nordhaus_lighting_1998.pdf

Germany – Steel Prices (Current and Constant Mark/Ton)



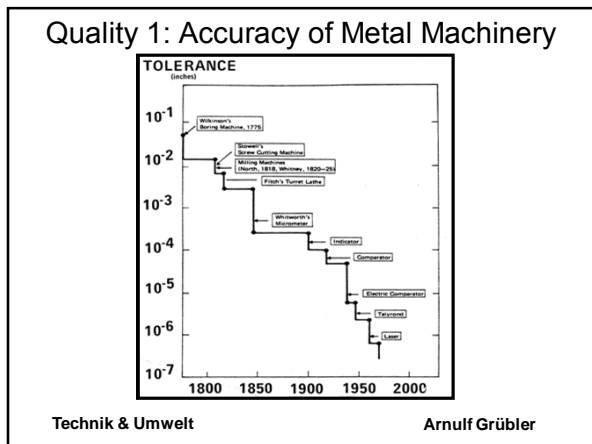
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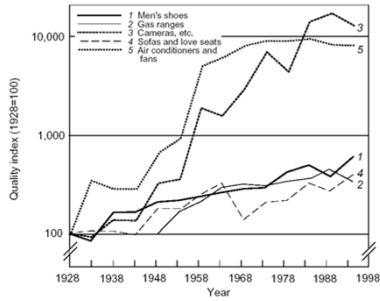


Quality:
Accuracy, Performance, Variety
(economies of scope)

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Quality 2: Consumer Products (Lower Price and Higher Quality = Consumer Surplus)



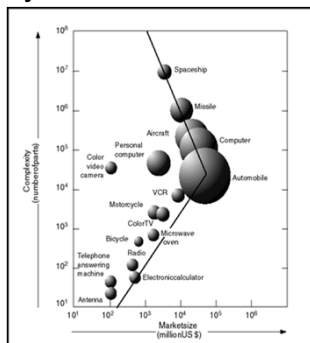
Source: Payson, 1994.

Complexity

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Complexity vs. Market Size of Products



Source: B. Ayres, 1988
based on
Nagayama and Funk, 1985.

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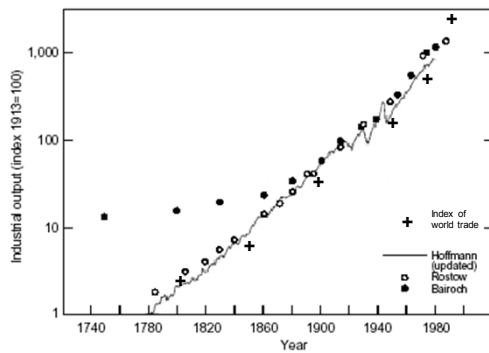
Division of Labor

- Functionally: Specialization:
Engineering; ecology; →
Industrial engineering; social ecology; →→
Industrial ecology
- Spatially: Interdependence
 - local and regional trade
 - international trade
 - globalization

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World – Growth in Industrial Output and Trade (1913=100)

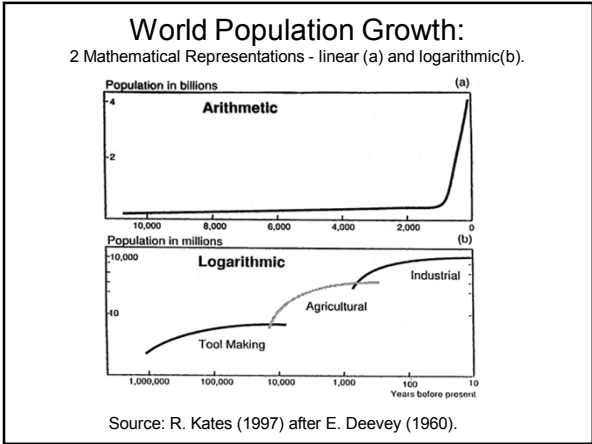


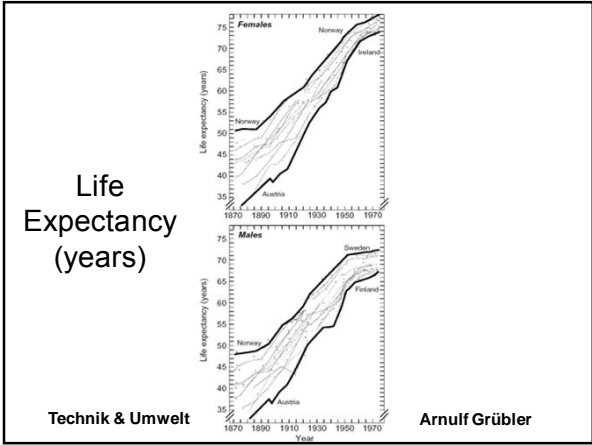
Impacts of TC on Society

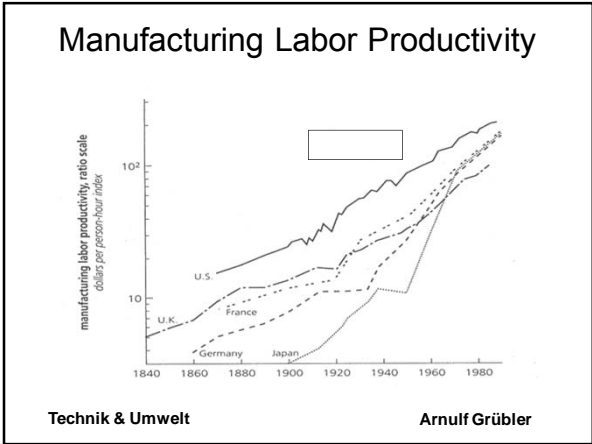
- Demographics
- Income
- Working time
- Structural changes:
 - Rural – urban
 - Primary – tertiary
 - Work - pleasure

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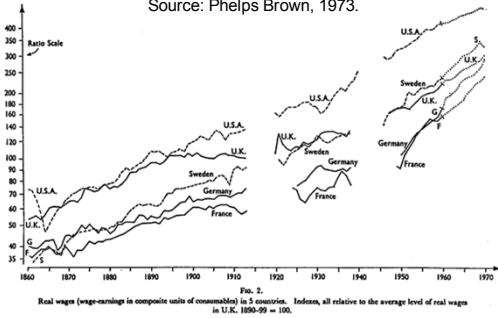






Growth in Real Wages

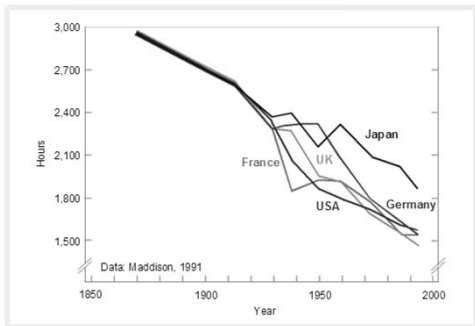
Source: Phelps Brown, 1973.



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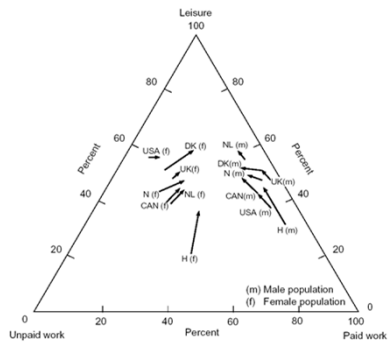
Reductions in Working Time (hours per year)



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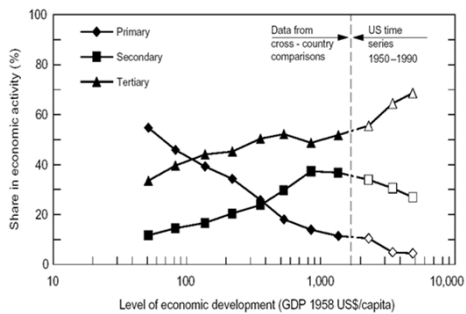
Changing Time Budgets (Gershuny, 1991).



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The Original Kuznets (1971, updated) Curve: Economic Structural Change



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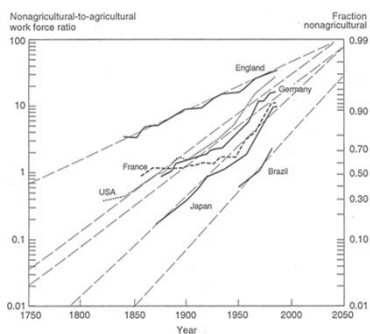
Kuznets Curves

- Originally: Income disparity as a function of income levels (GDP/capita): “Inverted U curve”.
- Industrial Ecology: Environmental Impacts (per unit output, etc..) vs. income levels.
- Evidence: OK for traditional pollutants; none for “modern” (affluence) pollutants like CO₂.
- Empirics: Beware of cross-sectional generalizations (always look at longitudinal trends as well).

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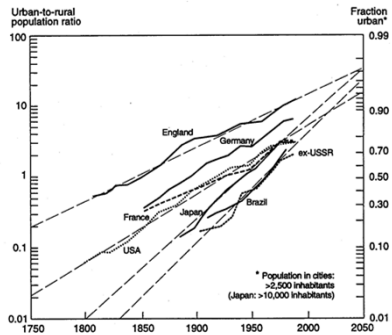
Spatial Relocation 1: Moving Away from Agriculture



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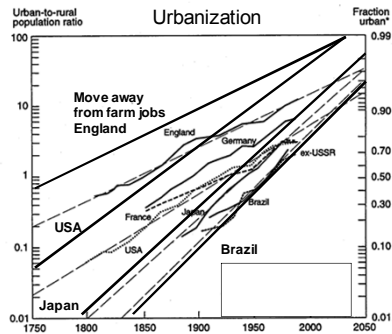
Spatial Relocation 2: Moving into Cities



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Drivers: What's the Chicken and What's the Egg?



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Summary Block 3

-- Economic Impacts = output and scale, productivity and efficiency, costs and prices, variety and complexity, division of labor, interdependence (clusters, network externalities)

-- Social impacts: = population, life expectancy, productivity (less work with higher pay), structural change: work - pleasure, primary - tertiary, rural - urban;
