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## **cross-country/time, diagram, 3<sup>rd</sup> variable, evaluative conclusion, LDC relevance**

### **INDUSTRIAL REVOLUTION**

#### **01. Agriculture**

- Yields doubled between 1700-1850. After mid-18thC all pop crisis because disease not famine.

##### **Supply of food and raw materials**

###### **AR mainly redistributed yield**

- Landlord Revolution [18thC] saw Parliamentary enclosures ‘privatise’ 30% of agr (most done by private sector before). Concentrate ownership (avg. N-Eng farm from 65 to 100 acres in 18thC).
- Agrarian Fundamentalists (e.g. Overton) say this unleashed ‘economies of scale’, incentivised land improvements (sold to those who could make best use of it) and property rights solved ‘tragedy of the commons’ [see Fig 01.01; fits North grand narrative].
- Overton claims yield increased 40% (1750-1800) but... assumes fixed consumption/capita. Jackson 10% estimate seems more likely.
- But... Allen says this created tenant system that benefited rentier landlords, diluting incentive to make capital improvements and labour more intensively. ToC already solved via rep (Ostrom).
- Hence... Clark says no difference between pre- and post-enclosure farms. Similar evidence from Japanese success with small farms. Humphries notes bad for women.

###### **AR was small responder not big initiator**

- Instead... Yeoman Revolution [17thC] introduced Norfolk Four Course, clay drainage systems, and selective breeding of animals (caused by BD and IR?). Broadberry +50% TFP; [see 07b]
- But... Small effect: Rising food prices show gains were outstripped by pop. growth until 1820 (end of IR) when GB escaped ‘Malthusian Trap’.
- AR merely trying to keep up. Stagnated during Napoleonic Wars (when it was most needed) so GB ‘survived’ via open-economy (80% of wheat imported), although limited by 19<sup>th</sup> C transport.

##### **Labour release**

###### **AR enabled GB to sustain a larger urban workforce, but only in the long run**

- Agr. labour productivity increased 54% during 1500-1750
- Classical econ’s say peasants were unproductive as family members were employed at a loss and farms produced for subsistence, as shown by Fig 01.02
- Agriculture’s share fell 74% to 45% (1500-1750) and Britain escaped ‘Malthusian Limit’ by 1850. Hence, relative ‘push’ from Agr. to Ind. But... more likely pull with 30% wage gap.
- Also no nominal decline. Labour prod. gains ( $Y/L$ ) due to more  $Y$  (arable land 2x in 18thC, reclaim +37%) not less  $L$ . Few displaced became unemployed (“thieving rather than weaving”).

###### **But... AR changed composition of workforce, boosting IR**

- Marxists say Commoners were ‘proletarianized’ into seasonal wage labourers. Also ratchet effect (wage uncertainty => kid labour to compensate). But... only affected ~15% of workforce.
- Feminists say decline in dairy farming (because of big farms) adversely affected female employment while tenant’s trouble to supervise boys reduced child labour (adult males share in Agr. rose from 39% to 67%). This ‘pushed’ families into factory jobs.

## Capital Creation and Demand-side

### AR did not produce useful savings

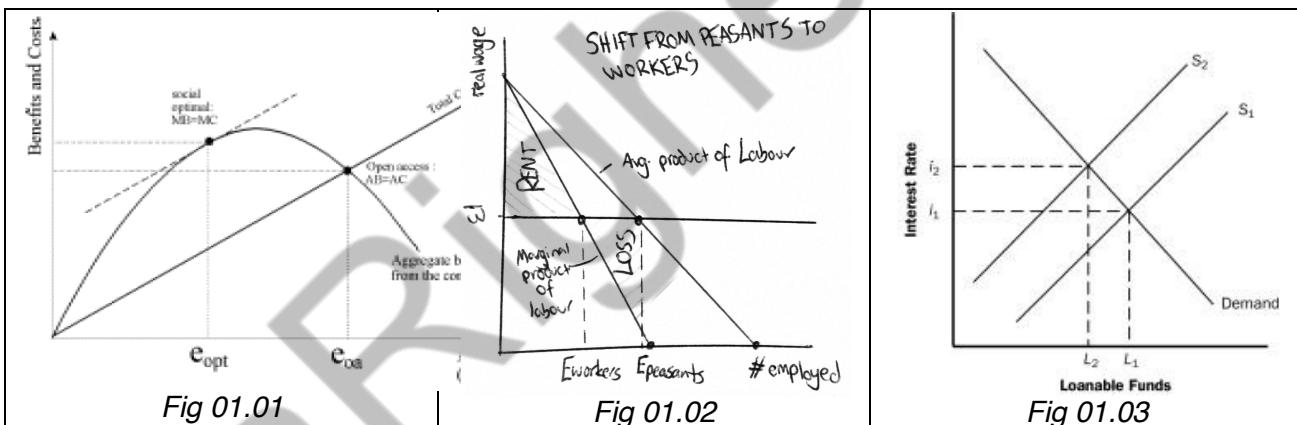
- AF say there would be ‘freeing’ of capital but... emergence of large farms increased K input by 93%, possibly crowding out industrialists
- AF say rural inequalities enabled rich to invest, as shown by *Fig 01.03* but... though rents doubled, rentiers mostly bought luxury goods, remaining net borrowers.

### AR destroyed potential customers

- Rural inequalities destroyed Commoner class as most people’s real wages fell. Engel’s Law states pop. would first cut back on non-essentials (i.e. IR goods)
- Indeed... industrial output increased 3x but rural consumption of it only increased 1/3. Also Say’s Law claim no help in long run.

## Evaluation: Insufficient

- Cross-Time: Yeoman Revolutions show most technological innovations were completed by 1700 and Shaw-Taylor & Wrigley do the same with structural shift.
- Cross-Country: Belgium had TFP growth ~1.9% since 1300 (GB had max of 1.7!). Germany managed 1871 IR without “Green Revolution”.
- Antithesis: Open Econ sees AR prod. hinder IR specialization, by drawing resources (Craft and Harley): Could have become the bread basket of Europe. Political Econ sees Corn law.
- 3<sup>rd</sup> Variable: of Enlightenment. Institutional changes (integrated middlemen, free-floating prices, specialisation, consumer-orientation) helped AR and IR [see 05. Technology, Mokyr]
- Reverse causality: IR caused 2<sup>nd</sup> AR (1800-50) via demand stimulus, infrastructure, and competitive pressures (had to pay workers more, hence had to use them more productively)



## 02. Population

- After C of stagnation, GB exceeded 5m ‘Malthusian limit’ 3x during IR. Despite of not because.

### Econ affecting Fertility

#### Higher wages increase BR

- ‘Long 18th Century’ (1690-1816) saw real wages grow 50%. Malthus says will lead to temporary surge in population (i.e. Labour Supply), as shown by *Fig 02.01*
- Bateman says especially in GB because nuclear household high ‘start-up cost’ creates strong correlation. EMP has much potential for rapid increase once people can “afford” to contravene...
- Mean female marriage age fell by 2.5 years, increasing marital fertility by 20%. 75% fertility change explained this. The share of illegitimate births tripled.
- IR specific factors: Ratchet effect (wage uncertainty => more kids to work), Proto-industry (didn’t need to own land to start family), women squeezed out of workforce (H&H: from 65% to 45%).
- Wrigley says fertility accounted for 64% of Britain’s rising intrinsic growth rate (IGR), which increased from -0.023%/pa to 1.62%/pa

## Econ affecting Mortality

### Econ development decreased DR

- Wrigley says better maternal nutrition increased the birthweight, lowering infant mortality by 10% and decreasing birth intervals by 2 months. But... Horrell says women's BMI fell.
- 'Super Adult Theory' says urbanisation helped people build up a better immune system (self-selection) which could be passed on to the next generation
- Aggregate gains: Life expectancy rose 16% 1760-1850, DR of 55-59 saw biggest decline, most substantial decline in maternal mortality until outbreak of WW2;
- But... vast disparity between urban and rural (1841  $e_0$  was 45y in Surrey but 25y in Manchester) [see 06. Living Standards, Geographical]

## Pop affecting Econ

### Many positive channels in theory but not much evidence

- Institutions: Adam Smith: specialisation/DoL. North: increased density => democracy => property rights (Coase). But... Bateman done by early 16<sup>th</sup> Century; tech more important.
- Boserup says increased density enables projects to become profitable; Kremer says tech discoveries and pop are correlated (young Einsteins); but... why not India or China?
- Lewis Dualistic Growth says Surplus Labour creates virtuous cycle [see 07. Proto-Industry] but... not much evidence and contra Allen Factor Prices
- Created demand but... Say's Law in LR and Mokyr est. <10% in SR (1800-50)
- Instead. Malthusian Theory seems to hold with growing pop ending in crisis [see Fig 02.02]. Craft & Harley imply requires AR, hurting IR. Bring in SoL [see 06. Living Standards]

## Antithesis: Bateman's EMP affecting Econ

### EMP limited pop growth

- British EMP came because nuclear start-up cost, no large dowry like India, and 1348 Black Death (linked with markets) bringing women into workforce. Reduced LR labour supply.
- Stopped pop. overwhelming econ (e.g. marriage age fell to 23y but still higher than most LEDCs; peak 1.75%pa; South Korea's pop grew 250% over 50y).

### This kept wages high, boosting IR

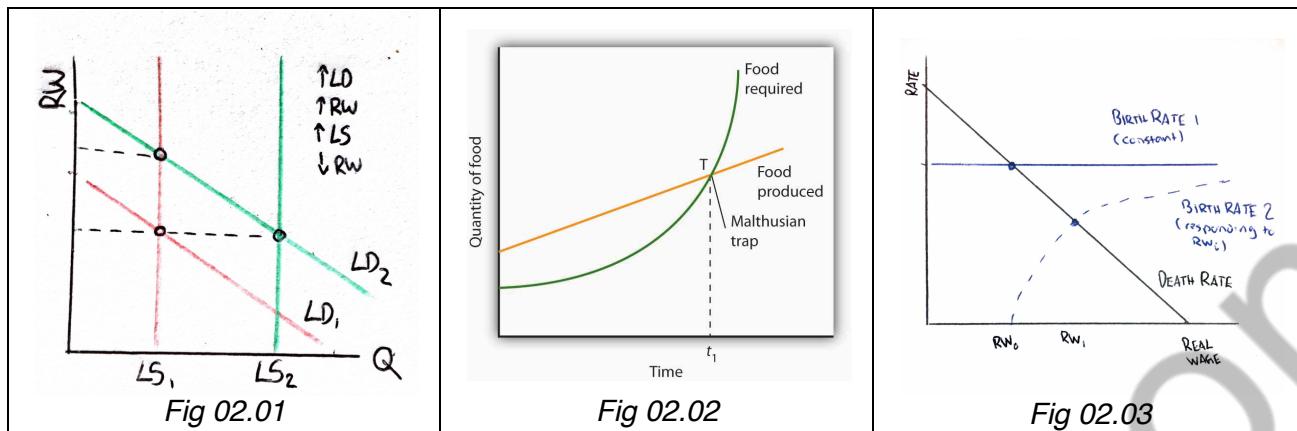
- Correlated BR to econ. allowing a high wage to be sustained (though still trap), as shown by Fig 02.03. Supported by Feinstein's finding that rw didn't grow much.
- Allen says high wages increased incentive to invest in labour saving technology, so this would help spark industrial revolution

### And had other positive effects as well

- HK: Less kids means parents can invest more in each; high rw gave greater incentive for skills.
- Institutions: sex motivated "capitalist spirit"; equality in family translated to democracy
- As children won't look after them in old age, parents need to save more, decreasing interest rate but... industrialists didn't need much external finance
- Young people's vacant period between leaving parent's home and setting up own increases both geographical and labour flexibility.

## Evaluation: IR despite of Pop.

- Reverse Causality & Antithesis: Restate how IR mainly shaped pop. positively and if anything population growth was bad for the economy.
- Cross-Country: High fertility resulted in Malthusian crisis in China from 1650-. Bateman uses modern data to show -1 birth/woman raises GDP growth 0.5%p.a. and lowers poverty 7%-points
- 3<sup>rd</sup> Variable: Both where shaped by institutions: IR by Mokyr Enlightenment, Smith markets, and North property rights; Population by EMP, which resulted from Black Death and good L market.



### 03. Trade

- Sum of exports+imports as % of GDP nearly doubled in 18thC and again in IR (40% by 1860)

#### Demand and Supply Resources of Industry

##### Trade was heavily integrated with IR

- Supply: Imports shifted Britain's from wool production to cotton processing (US, India). Food helped escape Malthusian (C&H: less AR needed). China didn't have access to New World.
- Demand: Processed Cotton became Britain's Ricardian comparative advantage (draw graph). Exports' share of GDP rose from 8% to 20% (1780-1860)

##### But... GB could have done without

- IR occurred during Napoleon's blockade, with exports to continent falling 25-50%. Evidently trade effect is somewhat limited. Exports' share of GDP didn't increase until last part of IR.
- Net effect contingent on trade-gains outweighing domestic-losses and counterfactual. If no trade, Britain could shift to other sector (e.g. enclosure, wool-to-cotton). Harley est. -6% GDP

#### Investment & Utilizing Idle Resources [Supply Side]

##### Trade absorbed surplus labour in theory but not in practice

- Lewis dualistic growth model: Trade increased labour demand without wages. Increases profits, and hence investment and labour demand in a virtuous cycle, as shown by *Fig 03.02*
- Little evidence of this in any LDC as fertility responds to economic conditions, especially EMP [see 02. Population, Batemans]. Hence expect this to be a temporary effect at most.

##### Trade raised funds

- Favourable colonial trade (e.g. Navigation Act) increased profits, hence investment, hence lowered interest rates which industrialists benefited from, as shown by *Fig 03.01*

##### But... not used in IR

- Unclear how much profits were increased. Export's rising share of GDP mostly due to higher volume at lower prices, could have offset each other.
- Trade impoverished sunset industries (e.g. timber and silk). Mercantilist policies and accompanying navy expenditure also lowered investment (e.g. Corn Laws)
- Funds that were created could have been consumed or invested in non-IR activities (e.g. canals). No concrete evidence.

#### High Wages

##### Trade could have encouraged investment in IR technologies

- Gunboat Diplomacy and forcing favourable trade terms (e.g. Opium Wars) boosted economy and hence wages (20% higher than Dutch).
- Allen says high factor prices encouraged investment in labour saving technologies. If technology is not "manna from heaven" but caused by more K-intensive techniques Britain's trajectory was more productive, as shown by *Fig 03.03* [see 05. Technology, Allen]

### But... weak reason why

- Before IR Spain, Portugal had similar Empires but had low wages and took much longer to industrialize than Britain. Couldn't have been 'sufficient' reason.
- Bateman's explanation of EMP is more feasible [see 02. Population, Bateman's...]

## Institutional Framework

### Trade embodied 'capitalist spirit'

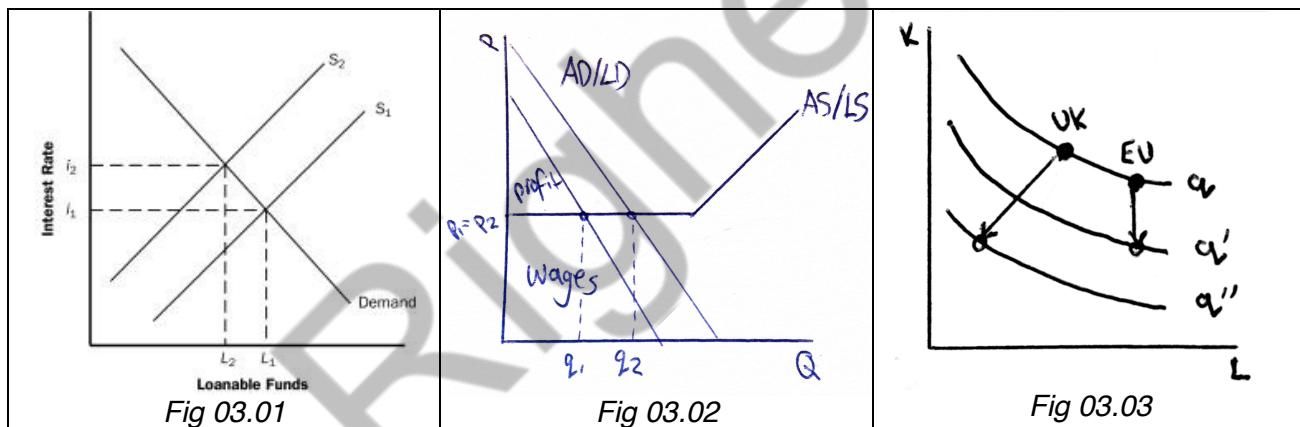
- Created/enhanced several commercial institutions. E.g. Inherent risk in shipping created Lloyd's of London, first modern business insurance market. This in turn allowed for more risk-taking
- Trade encouraged companies to have a business ethic and got Britain used to creative destruction (wool => cotton). Spain got dependent on Latin American Gold.

### But... not necessary, only accelerated

- Britain still fiercely resisted the consequences of creative-destruction (e.g. Corn Laws survived four hostile governments, harming IR).
- Many trade effects could have been achieved by domestic markets: intra-trade was big enough to encourage specialisation, capital demand etc. Bateman says same as early 16<sup>th</sup> Century.

## Evaluation

- Reverse Causality: Steam engine reduced transportation costs (North -60% freight rate), opened new markets (Gravity Model of Trade) and helped win 1841 Opium Wars (Nemesis)
- Cross-Country/Time: France's trade grew faster in 18thC, Netherlands in 17thC but neither had first IR. Switzerland had no colonies but #2. GB lost its American Colonies at beginning of IR.



## 04. Institutions [Extra]

### Taxation

#### Efficient taxation favouring IR

- Taxation's real share of GDP grew x5 between 1670-1810
- Mostly indirect excise taxes, with increases mainly targeting affluent spending. Hence penalised middle-class consumption in favour for upper-class investment (i.e. IR>SOI)
- Industry (new) and agriculture (powerful lobby) exempt from most tax hikes at the expense of proto-industry and sunset sectors. Boosted IR.
- Period coincided with British economic growth limiting negative effects unlike France. War was financed with as much debt/bonds as possible rather than taxation.

### War

#### "Britain tried to do two things at once"

- Military expenditure made up 30% of government spending in peace and 60% during war. Britain was at war for half of 1688-1815.

- Any increase in R&D didn't have an effect on macro-inventions important to industry e.g. steam, textiles, energy. If anything, IR helped fight war.
- No idle resources so military 'crowded out' private sector in capital markets [draw graph!], limited labour supply (10% of 1815 workforce) and raised agr. prices (Napoleon's blockade)
- Williamson shows Napoleonic Wars -1.5%pa GDP and -1.3% wages. Industry grew at half the rate it did afterwards. If anything, Britain's relative pacifism to Continent was a good thing.

## Transport [Public Good]

### Transport affects Econ

- Big markets enable specialization, economies of scale, and competition. Empower consumers (industrious revolution) and knowledge spillovers. Lower costs increase productivity.
- Canals vital for Birmingham (Grand Junction) and Manchester (Bridgewater), which don't have natural waterways. 1750-1830 expansion x3 km. Mainly privately funded
- Gov. created Turnpike Trusts, privately managed toll-roads. Solved 'free rider' and 'coordination' problem. By 1830 consisted of 50,000km (1/5+ of total). Long routes 33% quicker and +quality
- Canals 3x water density of France and more roads but... Netherlands and Belgium had more /km<sup>2</sup> without IR. Helped but wasn't critical.

### But... Econ affects transport, hence virtuous cycle

- North shows Freight rate decreased 60% between 1816-1865. Largely because of improvements in steam and iron before 1830 expansion.
- Railways required tech (steam power, telegraph), institutions (national LLC, biggest overhead cost since Pyramids) and standardization (gauges, time)

## Finance

### Gov. improved framework but... industrialists didn't benefit

- Payment: 1816 token coinage reduced fraud and BoE had control over M (QToM) but... limited use for industrialists (BoE had monopoly on banknotes with 6+ partners, only London until 1826)
- Borrow/Insurance: Most efficient private capital markets (idle savings => investments) in Eu after Glorious Revolution imported Dutch finance but... limited use for industrialists (usury laws and prohibition of joint-stock companies until 1825) and BoE not yet lender of last resort
- Private sector alternatives (e.g. banks, attorney brokerage, insider lending) let early industrialists reinvest profits rather than reserves but... established factories used little external finance
- Overall improvement, as shown by Fig 04.01, but not sig, for IR

## General

### British gov. had sufficient state capacity but limited responsibility

- Centralized: island geography created natural single state compared to fractured Germany and Italy (note, standardisation vs North German Customs Union and economies of scale)
- Little venality: Glorious Revolution created constitutional monarchy with relatively transparent Parliament (but... South Sea Bubble, Corn Laws). Enforced North property rights (FWT).
- Small bureaucracy: Didn't fight as many wars as continental countries, let private sector take on construction of roads and canals
- But... true since Glorious Revolution. IR 60 years later. Necessary but not sufficient.



## 05. Technology

- Craft 70-82% of IR growth because TFP. "measure of our ignorance". [see 07b]

**Mokyr's Enlightenment was necessary but not sufficient supply-side condition**

**Enlightenment explains Great Divergence [North]**

- 4 Channels: new agenda, new capabilities, selection, diffusion. Social attitudes moved away from 'fate, magic and the gods' and embraced 'entrepreneurial class'.
- North Market-friendly institutions: Statute of Monopolies (1624) created patent law (public good); English Bill of Rights (1689) enshrined civil liberties, protecting scientific debate.
- Contrast to China, where Qing dynasty's absolutism and refusal to embrace foreign technology can explain why an equally (if not better) resource endowed nation lost 'Great Divergence'.
- But... Bateman says merely recovered to early 16<sup>th</sup> Century levels

**British micro-inventions explain Little Divergence**

- France's Cartesian method helped advance abstract math/science but... Britain's Baconian method tinkered these to make them profitable. Increased TFP as shown by *Fig 05.01*
- Crafts shows it took many micro-inventions to make Steam Power cost-effective, having maximum economic impact a century after Watt's original patent.
- Britain's "republic of letters" was better due to the dominance of the Royal Society. Diffused ideas, lowered info cost, gave reputational incentive (not just \$, complementing patents)
- Hence Britain's Enlightenment unleashed growth but Italy's "Illuminismo" saw /capita output decline 0.12% p.a. 1760-1855. Germany (Kant and Hegel) didn't have IR until late 19thC.

**But... some faults and incomplete**

- Methodology*: Cultural phenomenon cannot be quantified and Britain's differences are intangible
- Evidence*: Sample shows only 1/2 inventors linked to Enlightenment and none in textiles. IR despite not because of institutions: Corn Laws took four gov. and 8y to repeal, outlasting IR; no state funding of primary education or sanitation; incompetent IP & railway regulation
- Theory*: Reverse causality: Economic growth can lead to a more scientific society, as a country can afford to invest more in academia and new exchanges.
- Unanswered Questions*: Why did this growth spurt continue into long-term; no explanation why it took over a century to spark IR; Why was Baconian British?

**Allen's Factor Prices were necessary but not sufficient demand-side condition**

**Factor Prices explain Little Divergence**

- Cheap coal (6x less than Dutch) and high real wages (20% higher than Dutch) encouraged entrepreneurs to invent labour-saving technologies that would be unprofitable everywhere else

- Assumes TFP was not “manna from heaven” but caused by more K-intensive techniques [i.e.  $A = f(K/L)$ ]. Hence Britain’s trajectory was more productive, as shown by Fig 05.02
- Baconian method endogenised. “Invented in Britain because it paid to invent it there”.
- Case Study of Spinning Jenny: Allen assumes needed 15% rate of return for investment: with 38% in Britain, 2.5% in France

### But... some faults and incomplete

- Methodology:* rate-of-return calculations are highly sensitive: If the Spinning Jenny were used just 50 more days a year it would have been profitable in France.
- Assumptions:* British wages lower than assumed as underpaid women and children not included. Horrell and Humphries: 1833 Factory commission saw child labour as obstacle to IR.
- Evidence:* In 1800, only 21% of inventions were labour-saving. Low-wage Scotland industrialised alongside England
- Unanswered Questions:* Why did IR took so long (Spinning Jenny profitable since 1650, coal cheaper in the 14thC)? Why did GB have these Factor Prices?

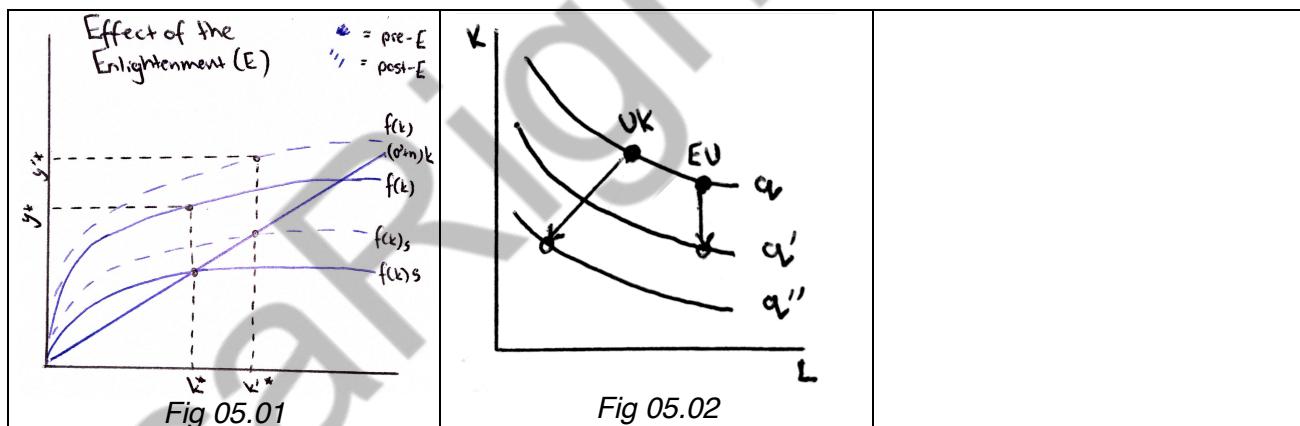
### Other

#### Wrigley's Coal endowment was necessary

- Coal allowed Britain to “break free from photosynthesis” as country could now use energy accumulated over a geological timespan. Land is a fixed resource and necessary for agr.
- Had Britain continued to rely on charcoal, the Industrial Revolution would have demanded woodlands larger than the isle itself. But... China also. Sustained LR growth

#### Bateman's EMP controlled population growth

- European Marriage Pattern (EMP), coupled with a more efficient agricultural sector, enabled Britain to avoid the worst effects of population growth
- Also boosted tech [see 02. Population]



## 06. Living Standards

- Composite measures show aggregate gains= Income (ve+) + Leisure (ve-) – Urban Dism (ve-)
- Anthropometrics shows inequality (not one working class) and pessimism: Health is net output!

### Composite Measures

#### Composite improvements mainly rely on real wage increases

- Crafts says HDI increased up to 50% between 1760-1850; Dasgupta-Weale indicator improved from 6.0 to 1.0 (best in Europe). Clearly some gains were made.
- Literacy rate only increased 13% between 1760-1850. Socio-Political Rights: Even after 1832 Reform Act only 1/7 of adult males could vote and virtually no women due to ‘property requirement’. New Poor Laws 1834 were more restrictive. Also weightings inherently imperfect.

### But... real wage is unreliable and unreflective of welfare

- Linder & Williamson: wages doubled as CoL -51%. But... Horrell and Humphries says they only focus on full-time working-age males and average doesn't reflect inequality. Hence...
- Feinstein: <30% as CoL -37% and stagnated during Engel's Pause. But... still no data on many staple foods (e.g. potatoes), doesn't reflect urban disamenities as its input not output of welfare.
- Still seems more likely as supported by Mokyr consumption approach and Craft & Harley output approach, neither of which suggests more than 0.5%pa wage growth

### Labour intensity increased but it is unclear how this affects LS

- Voth shows avg. working hours increased 2,500/year to over 3,000. Because fewer holidays (Saint Monday) not more h/day
- Either people worked more, earned more, spent more, and lived more (industrious revolution interpretation) or coerced into worse 'bundle', as shown by *Fig 06.01*. Later seems more likely as women and children often had no choice (and children really enjoy leisure).

## Anthropometric

### Geographical Inequality: Rural relatively better off

- 1815 avg. rural terminal-height was 0.75" more; 1841 e<sub>0</sub> 25y in Manchester but 45y in Surrey; infant mortality 11% increase 1810-50, primarily due to urbanisation
- Factory wages were 10-30% higher for similarly skilled jobs in countryside as they had to be compensated for urban disamenities. Feinstein says only 3-8% better accounting for this and highlights informational asymmetry means we can't use revealed preference analysis.

### Household Inequality: Deepening of patriarchal family

- Nicholas and Oxely: English female height fell to 60.75 between 1800-1815 while their Irish sisters grew to 61.50. Horrell says due to female's removal from salary-workforce. Less power at home and girls less valued by 'budget-maximising' parents. Married women BMI fell (not widows!)
- Explains why adolescent cohorts continued to 'shrink' even after the 1833 Factory Law restricted child labour and hence their calorie expenditure (became even less valued)

### Class Inequality: Rich got richer

- Avg. real wages grew 30% 1790-1850 but heights fell 1.3cm and life expectancy fell during last quarter century of IR (never exceeded the Elizabethan peak of 43y). How can this be?
- Gains concentrated in upper classes who spent an increasing share on luxury goods (food is income elastic) and only saw diminishing marginal returns from nutrition. Hence didn't grow much.
- Working class 'shrunk' as they worked intensely and in worse conditions (4,300 => 3,400 Kcal [hard labour needs 6,500]). Supported by Larson & Radini: like trees tooth enamel growth in layers

### Criticisms of Anthro. theory

- Food prices rose 66% more than textiles, so households may simply have substituted. Likewise substituted away from expensive proteins (i.e. meat) to carbohydrates. Both shown by *Fig 06.02*
- Indeed... while total expenditure rose 43% between 1790-1840, non-essential expenditure rose 137%, rising even during Engel's Pause.

### Weakness of Anthro. data

- Anthro. improvements are hard to isolate because of generational spillovers. Could be harmed by underfed parents during Napoleonic Wars, pregnant mother during 1812 crop failure, and/or unsanitary urban environment they grew up in.
- Worsened by fact great variance in heights throughout IR: 95% of Floud's observations lie within an 8cm interval despite only measuring a 2cm net change.

## Reverse Causality: Health and the Economy

### Econ affects Anthro.

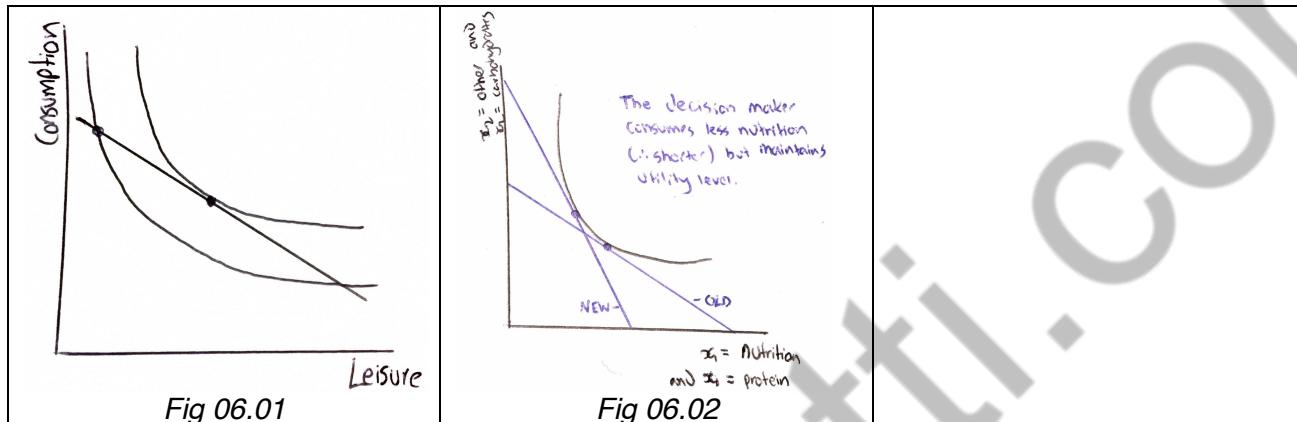
- Better econ allows more nutrition and medicine. Life expectancy rose 5 years 1760-1850. But... also affects work intensity. Child labour affected development of 1/3 of 10-14-year-olds.

### Anthro. affects Econ

- Better health allows more human K (work harder and better cognition) and lifetime working hours.
- Schulz found that in LEDCs a 1cm increase in height results in a 5-10% wage rise (a proxy for labour productivity); 13y increase in life expectancy raises GDP growth by 1.4% per annum.

### Why no Fogel's techno-physio evolution like in US reconstruction? (Anthro vs. Econ)

- Population grew: [see 02, *Population, Bateman*]
- Redistribution failure: as demonstrated by Anthro. above, political and social institutions did not serve the majority e.g. Corn Laws made food more expensive.



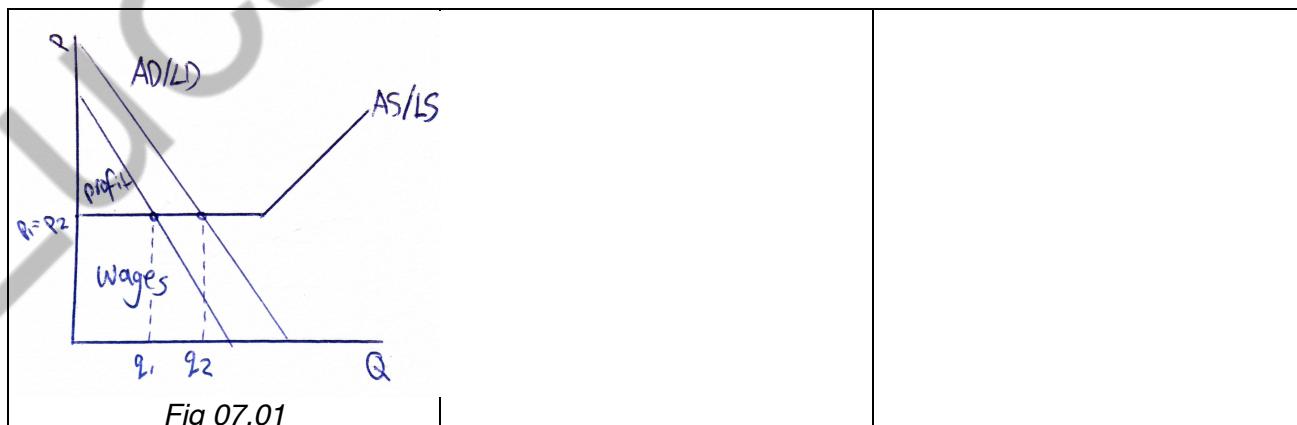
## 07a. Proto-Industry Theory

### Some theoretical benefits but contradictory evidence

- Labour Surplus: Infertile soil created proto-industry which induced a rise in marriage and hence pop. This in turn could expand Y without rw via virtuous cycle, as shown by *Fig 07.01*
- But... Marriage age fell uniformly across England. No 'population explosion' before IR [see 02. *Pop, Bateman*]; little evidence of Surplus L; low wages bad for IR [see 05. *Tech, Allen*]
- Transition to capitalism: Proto-industry created trained workforce (proletarianization), market-friendly institutions, and captured foreign markets
- But... Germany had similar context but no IR. 6/10 proto-industry regions deindustrialized during because they opposed IR's 'creative destruction'.

## 07b. Occupational Structure

- Shaw Taylor & Wrigley: Using marriage and birth certificate data to find Craft underestimated industrialization before IR took off: 1710 was 37% not 19%; 1817 was 42% not 25%
- Agriculture: Allen is correct in stating 'true' AR happened long before IR
- Tech: IR growth itself was much more driven by TFP rather than structural shift.



## LATE VICTORIAN DECLINE

### 08. Nature of Decline [Extra]

#### Kondratieff Cycle

##### Theory is shaky

- Theory of 50y long waves. Second wave (steel and rail) can explain GB's Mid Victorian boom (1845-73) followed by Long Depression (1873-96). Third wave ('new' industries) can explain subsequent recovery. Hence LVD was natural and temporary. [see Fig 08.01]
- Disagreement on cause: Some say driven by investment in K-goods, others by tech itself. Some say accumulation of other cycles...
- Trade; Kuznet (20y investment); Juglar cycle (9y staple industries' fixed investment); Jevon's sunspot theory (good harvest => more demand for GB X => overinvestment)

##### Evidence is very faulty

- Other than prices, most metrics don't support theory: Capital formation remained stable, unemployment didn't explode (~5% to ~7%), wages rose in LD and fell afterwards!
- MVB price rise (125 to 150) can be explained by monetarists: discovery of gold expanded  $M$  not  $Y$  (1853-55) and Franco Prussian War (1870-73) led to inflation. If anything, Landes says they were subdued by cost cutting innovations.
- GD price decline (150 to 75) largely caused by global events, especially the 1873 global financial crisis and absence of wars & gold. Doesn't explain why GB was overtaken

#### Climacteric

##### Case for nominal climacteric would be huge...

- Crafts says LVD is responsible for contemporary structural problems and 'productivity puzzle': poor management, lack of R&D, and failed education system. Also strong TUs.
- Feinstein: TFP 0% 1873-1913 when accounting for labour quality. Concentrated in two sectors (-0.3% mining and -1.2% construction) and in brief period (1899-1913). Also remember that growth accounting is very difficult and rests on many assumptions.

##### ... But is unconvincing

- After brief Edwardian downturn in business cycle, Feinstein metrics similar to MVB (1865 vs. 1913): industrial production 3.6% vs. 3.2%; GDP 2.0% vs. 2.1%
- Post War growth destroys any illusion of long-term setback, characterised by GDP 4-6%, 2% unemployment, and unheard of improvement in living standards

#### Relative Decline [IMPORTANT]

##### But GB's loss in relative standing is indisputable

- GB absolute level of GDP/capita was overtaken by US in 1880, by Sweden in 1910, and other European countries greatly narrowed their gap.
- Britain's manufacturing exports, despite seeing small nominal uptick, declined from having a 45% global share to 31% between 1885-1913. Makes sense as just 2% pop...
- Suggests, once IR spread, conditional convergence began and so largely natural. Shown in Fig 08.02. But how come US overtook it despite similar savings rate (14% vs. 10%)?

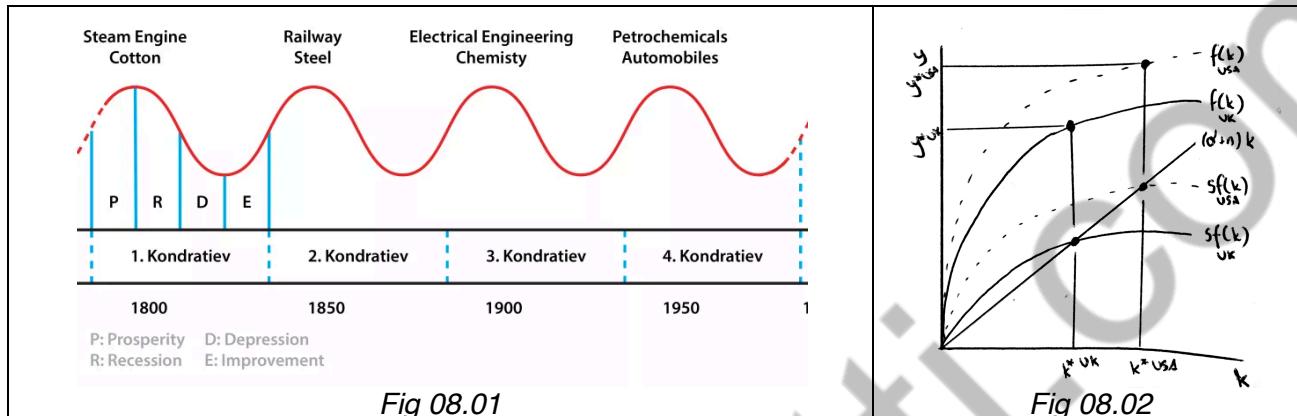
#### Why? Sectoral Shift [IMPORTANT]

##### British manufacturing had strength in number not in productivity

- Broadberry: Britain's manufacturing labour productivity ratio with key competitors stable throughout the past 120 years (2:1 with US and 1:1 with Germany)
- Even during IR British industry wasn't more productive than others. Success in shifting more labour out of agriculture (25% of 1871 workforce) than US or Germany (50%)

### Catch up growth was inevitable, hence not a failure

- Hence, after Civil War (1865) and German Unification (1871), Britain's advantage went. US's manufacturing workforce rose from 17% to 22% and Germany from 25% to 30%.
- Broadberry estimates that 88% of Germany's labour productivity 'catch up' is attributable to sectoral shifts. US able to make use of better  $k^*$  endowment
- Note that services did fail [see Fig. 09. Broadberry: Sectoral productivity issue]



## 09. Reasons for Decline

### McCloskey: No traditional failure (Manufacturing)

- Failure is GB not producing on PPF curve and not maximising profits subject to constraints. Will test output, foreign capital investments, and entrepreneurship for this.

#### Output

- Claim that if export growth sustained economy would have grown at 3.7%pa not 1.7%. But if so we would expect high U but limited (i.e. high-skilled TU) data indicates full Emp.
- Would have needed labour force to double or capital to grow at 6%pa to sustain 3.7% output growth, neither of which seems realistic

#### Foreign Capital

- Claims that, as GB had 1/3 of its wealth invested abroad, it would have done well increasing domestic investment (Solow A not "manna from heaven")
- But... eliminating capital market imperfections would have only raised the rate output growth from 2.4% to 2.6%. Edelstein: in fact risk adjusted  $r_d < r_f$  by 1.58%. Dimsdale: no crowding out as falling dependency ratio increased S [see Fig. 10.02]

#### Entrepreneurship

- Aldcroft: Entrepreneurs were lazy "clogs to clogs in three generations". But, excluding Edwardian period (1900-10), GB TFP was comparable to US 1-1.5%pa. Growth accounting v. diff!
- Anecdotal: for every black Brazilin needle there was a Boots. Industry wide failure seems unlikely because of perfect competition.

### Elbaum & Lazonick: Institution rigidities (Manufacturing)

#### Market Failure

- Schumpeter: "the role of the entrepreneur is not simply to maximise profits subject to constraints but to innovate constraints away". GB did not adopt "corporate capitalism".
- Firms were owner-proprietors and close family associates. Too small to hire specialised staff, create a hierarchical managerial bureaucracy and afford the mass investments.
- Fierce competition meant little profits to reinvest in R&D. Animosity also made firms reluctant to collaborate in research and coordination failure [see Fig 09.01]
- Also, after "long boom" Late Victorian capitalists gave too many concessions to TU, which were difficult to reverse once economy began to slow down.

- “Britain never made her markets subordinate to her firms”. Hence less competitive, especially in new industries, hence 2/3 of visible trade remained staple.
- Kennedy: If GB had same industrial structure as others with new industries and tech (US GM, Ger Bayer) GNP would have been 25-50% higher by 1913. Unleashed in post war.

### Government Failure

- “Public attempts at rationalisation left Britain industry with the worst aspects of both competitive and monopolistic worlds”.
- Quasi-cartelisation and tariff barriers, especially "imperial preference", protecting incumbents without cutting excess capacity. E.g. soda cartel didn't adopt Solvay process.
- Government-supported policy of high-interest rates, exacerbating companies' heavy debt burden during Edwardian downturn.
- Britain's educational system never focused on managerial and technical training. Distanced "aristocratic" students from business and applied science (still a problem today).
- But... above is theoretical and anecdotal, especially criticism of perfect comp. Monopoly creates DWL and United Alkaline failed whilst cotton succeeded!

### Broadberry: Sectoral productivity issue

#### US and German manufacturing were different not better

- Data shows no failure in industry [see 08. *Nature of Decline, Sectoral Shifts*]. US always had higher Y/L but did not overtake GB in terms of TFP!
- Instead US and GB operated on different points on isoquant curve in a respective industry (corporate vs. gentlemanly capitalism) based on their respective factor prices.
- US had higher resource endowment (electrification), enormous market (spread out the fixed costs of R&D), demand for standardized goods and less skilled L. Harley: “substitution for prerequisites”.
- Made sense that Britain focused on custom-quality over quantity as this was lowest isocost curve:
  - E.g. cotton industry: GB criticised for using older mule not newer ring spinning tech. But Sandbergh justifies via factor prices. Leunig finds same L-prod (!!). [see Fig 09.02; revise 01]
  - E.g. car industry: US focused on mass consumerism (Ford 1,700 cars with 300 men, GB 1:1) and the latter on specialisation (200 different makers by 1913, Royals Royce).
- Harley: GB had comparative advantage in staples because ‘first mover’, ‘learning by doing’, and agglomeration economies. Would start from same base as US/Ger for new.
  - GB was linchpin for global trade. [see Fig 09.03]. If GB adopted Ha-Joon/Infant-Industry approach, Ger/US and US would retaliate and there would be imperial scramble for primary

#### British services did fail...

- World moved “from the counting house to the modern office”, that is to (standardized, high volume, low margin) services. Horse&carts and railways require very different set ups.

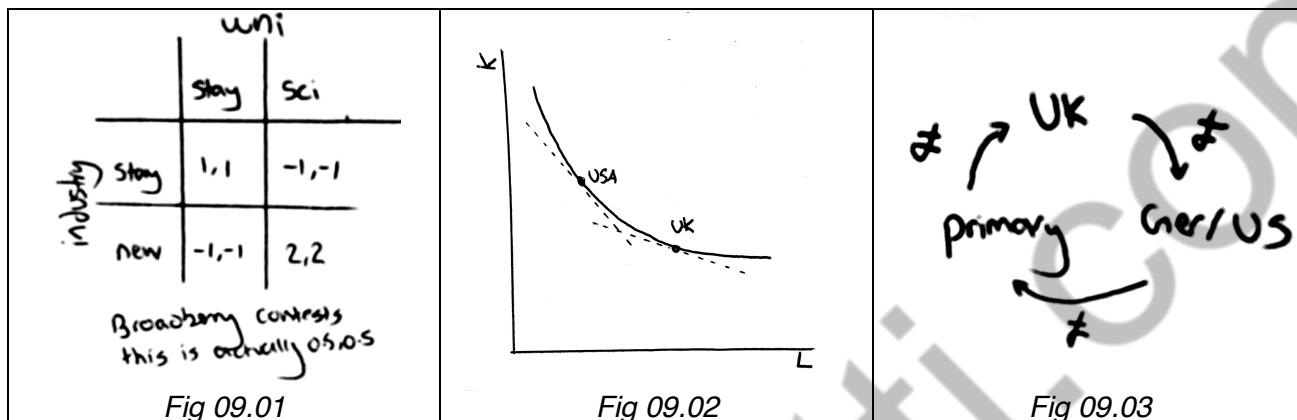
1870 -> 1910	US/UK	Ger/UK
Comm. & Trans	110 -> 217	74 -> 167
Distribution	67 -> 120	71 -> 53
Finance	64 -> 78	90 -> 76
Total	86 -> 107	63 -> 73

- UK manufacturing defence relies, firstly, on perfect competition, but services have natural monopolies (e.g. trains) and no foreign competition. Secondly relies on factor prices, but no difference between cost of phones and office centres in Western World.

#### ... because of big companies, TU, and education.

- Here previous criticism do apply: poor education system (vocational instead of general), strong TU resistance to intensification, and market concentration (Retail Price Maintenance fixed p)

- Finance is exception that proves the rule: didn't have unions and benefited from education, with Oxbridge "old boys club" creating networks of trust that helped overcome problem of asymmetric information and opportunism (Akerlof lemons). By 1914, GB held 44% of foreign investment in world and sterling anchored the Gold Standard.
- Gerschenkron: You can't just be successful by copying. Must follow unique path to development.



**Bateman Plan for Failure Q:** Intro [see 08. Relative Decline]; no industry failure [see 09. Broadberry #1]; structural shift [see 08. Structural Shift]; service failure [see 09. Broadberry #2]

## 10. Finance/Capital-Exports Recall $S - I = NX$ . Need to explain why $S > I$

### Traditional Criticism

#### Domestic: The City failed to facilitate "workshop of the world" transition to new industries

- Kennedy: Information asymmetry. Banking sector became monopolistic (local  $\rightarrow$  5 City Banks), losing knowledge and hindered long term loans. Lack of independent audits hurt stock market.
- GB firms had to rely on internal profits, networks and provincial stock exchanges. Contrast to Ger universal banks (specialised knowledge, sat on board, long-term view). No asymmetry!
- Hence GB had no funds to expand new industries or adapt corporate capitalism (high start-up costs). Overtaken in fixed capital/employee by US (1890) and Ger (1913). [see Solow Fig 10.01]
- But... Edwards & Ogilivie universal banks are a bad solution:
  - Germany may have relied on long term loans but US (also defined a success) did not. GB short term loans often rolled over on a routine basis so effective substitute.
  - All firms largely relied on internal finance. Universal banks never accounted  $\frac{1}{2}+$  of Ger credit market. Though it benefited new/heavy industry came at cost of old/staple.
  - Combining of clearing and merchant banks created financial instability. In 30s GB had no bank failures and US's Glass-Steagall Act made finance much more similar to GB.
- Instead... no industrial demand for City finance
  - Surveys show bankers rarely refused industry (personal/internal sources were sufficient). When banks did reject requests it was due to creditworthiness (e.g. Fred Hopper)
  - Industry only made up 8% of the stock exchange in 1913. Remember most firms were small (IPO was infeasible) and family owned (preferred to be in control).

#### International: Capital Exports took away precious funds

- Despite similar saving rates, Britain only invested 7% of GDP domestically vs. 12% in US and Ger. Less than 10% of net annual investments went to domestic capital markets. Rentier Econ.
- Kennedy: GB's GDP would have been 39% higher by 1914 had it invested at home. Dynamic comparative advantage, learning by doing, and Vernon's product life cycle.

- Note, 2 assumptions: banks failed and industry failed. McCloskey: There needs to be a reason why The City didn't exploit this supposedly profitable opportunity...

## Irrational Investors

### Case For

- Investors didn't profit maximize as they were 'blind' with money handled by large institutions that more interested in safe, standardized and large issues ( $r_d > r_f$ ).
- Investors overreacted to bubbles ( $r_d > r_f$ ). Only took shares with guaranteed returns in third railway boom (1857-1872); The City didn't finance electrification.

### Case Against

- Edelstein: Even accounting for risk, non-domestic returns were 1.58% higher. McCloskey: rich grow slower than poor, hence savings were 'pushed' out abroad (open classical model of trade)
- "By keeping savings at home, the British could have two Forth Bridges", not very productive. Also Modern Portfolio Theory: allowed investors to better diversify.

## Biased Capital Markets

### Unlikely that bias was a problem

- Investors profit maximized subject to bad constraints, hence didn't max income. The City unfairly favoured foreign investments and asymmetric information.
- But... If banks favoured foreign  $r_d > r_f$ , in fact see exact opposite! Gentlemanly capitalism helped avoid opportunism.
- Dimsdale shows no crowding out: any increase demand of loanable funds was matched by increase in supply (fall in dependency ratio). [see Fig 10.02]

## Negative Externalities

- Even if investors profit maximizing they don't achieve socially optimal outcome

### Empire is difficult to calculate

- British taxpayer absorbed the risk of investments in the Empire: When Indian bonds failed to pay out their coupon target, the gov. funded the difference. [see Fig 10.03]
- Davis & Huttenback: return on Empire assets would be 1-3%-points less if accounted for this hidden subsidy.
- But... Empire only accounts for 40-50% of total wealth invested abroad. Unclear how much was 'too much' and if offset by positive externalities e.g. globalization, trade terms

### Dutch disease is wrong

- Britain's high capital outflow inevitably led to an greater inflow of Interest Payments and Dividends (IPD), creating current account surplus ( $CA + KA = 0$ ).
- Increasing money supply increases prices under Gold Standard ( $MV = PY$ ), worsening trade balance ( $\epsilon = eP/P^*$ ) and hence GDP ( $Y = C + I + G + X - M$ )
- But... no correlation between Britain's trade balance and her real exchange rate.

### (Rowthorn & Solomou): Domestic absorption effect is less wrong

- If return on foreign investment is greater than domestic growth, then increase in C results in higher M and/or lower X. Worse visible trade balance sends wrong signal to industry.
- Some evidence for this. Between 1877-90 trade balance rose 2% whilst investment ratio fell 3.4% (i.e. C increased)
- But... no evidence 'signal' discouraged domestic production. If anything, expect increase in C increases Y via Keynesian multiplier.
- **KA replaced G that could have funded edu.** But... unlikely as gov. already subsidised Empire!
- **KA allowed staple industry to persist:** e.g. Indian railways built by British steel. But Harley says new industries would never be Britain's comparative advantage

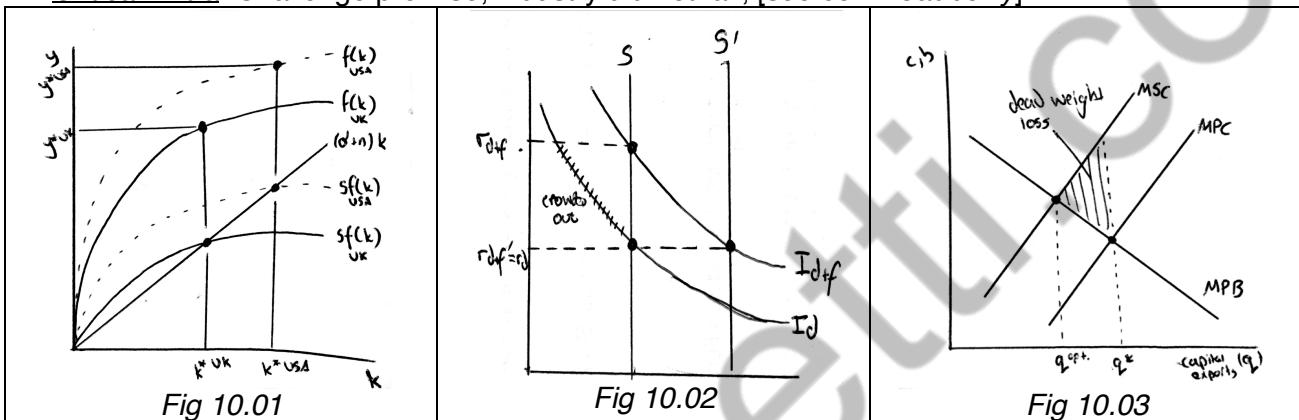
## Benefits of Capital Exports

### Raise global demand

- Only 4% of capital exports funded foreign industry but 2/5 of capital exports directly funded foreign transportation (and 2/5 indirectly), increasing demand for GB exports.
- Livingstone: "There are forty millions of people beyond the gateway to the Congo and the cotton spinners of Manchester are waiting to clothe them".

### Raise domestic income

- Not a zero-sum game: by increasing British income as a whole (accounting for 2.8% of GDP in 1873 then 9.2% in 1913) could indirectly increase domestic investment
- Cross Country: Germany and China have large KX . Both are seen as successful economies.
- Critical Extra: Challenge premise; industry did not fail; [see 09. Broadberry]



## 11. Other

### Trade

#### Patterns of Trade

- UK committed to free trade even as others use protectionism (e.g. US McKinley Tariff). Could argue that trade with countries increased because they developed, not free trade.
- 1846-73 value of exports grew 5%pa before stagnating ( $\uparrow$ volume,  $\downarrow$ price). 2/3 of visible exports remained staple goods.
- Visible/goods trade deficit more than doubled (-£60m to -£130m) but current account increased drastically (+£75m to +£200m) due to invisible/service trade and IPDs
- GB had deficit with other industrial nations but surpluses with primary producers (unusual). Did it rely on wrong products or effectively exploit its comparative advantage?

#### Impacts of Trade

- Thomas: Chamberlain's Fair Trade would have raised GNP by 1%. McCloskey: optimal tariff raised 4%, over 40y (not much)
- Hatton: Slowdown in world trade growth accounts for 50% decline in demand for exports and deteriorating competitiveness 30%
- Matthews et al: Half of the decline in TFP after 1873 attributed to fall in export growth as expectations depressed

### Education

#### British higher education caught up

- Wiener: GB public schools were aristocratic and didn't teach science and grammar only some. Cambridge NaSci only had 12 students in 1872, most who went onto medicine. Compared to modern German Realschule and 17,000 grads from technical unis in Ger 1910
- But... Pollard GB not spending much less than Ger by 1900: 0.051% vs. 0.065% of GNP. GB narrowed gap with industrial competitors

# 11. Other [AUGMENTED!]

## Education

**Traditional View:** Educational failure -> failure to adopt new tech -> relative decline

- HK is critical in endogenous growth models (e.g. Lipset Hypothesis)

### Tech within sectors

[Link 1 ~] **British higher education was behind but began to catch up**

- Wiener: GB public schools were aristocratic and didn't teach science and grammar only some. (Clogs to clogs in three generations). Contrast to modern German Realschule.
- Cambridge NaSci only had 12 students in 1872, most who went onto medicine. Germany had 17,000 technical uni grads in 1910, GB had 1,200
- Hence Elbaum and Lazonick 'institutional rigidities' criticism.
- But... Pollard GB spending caught up to Ger end of LV but still behind in absolute level

[Link 2 X] **No failure within industries**

- see Broadberry's Factor Price Defence

**Instead... British vocational education mattered and this was good**

- Flexible production technologies was the best strategy. Such tech is improved through tinkering (micro-inventions) that requires skilled labour not scientific R&D.
  - Robertson: R&D had little effect on the shipbuilding industry (comparative adv.)
  - If there was a shortage in supply of scientists we would expect high wages.
- Instead GB scientists were paid less than Germans
- Broadberry: UK industry apprenticeships were better than US

### Tech shifting between sectors

[Link 1 ~] **Britain did not adopt new industry tech**

- Newer industries (e.g. chemicals, electricity) were R&D intensive. Both because they were new and because inherently more science driven.
- GB's education failure meant they were stuck with staple industries instead of branching out (Overcommitment Thesis)
- Wrigley: Ger beat GB in the synthetic dye (despite Britain textile advantage) because it had more scientific resources.

[Link 2 X] **Nor should it have**

- See Harley first-mover's/comparative advantage

### Evaluation

- No industry failure: Broadberry identifies services as reason for relative decline. This didn't require science. Ahead of Ger and US in this and Finance old boys network.
- 3<sup>rd</sup> variable: If sci-edu. was then 1870s improvement should be correlated to rise in relative labour productivity. Instead opposite is true, suggesting other factors at play.
- Anti-thesis: R&D has second mover advantage

1910 Skills Index	USA/UK	Ger/UK
Industry	93	103
Services	102	101
Total	97	100

## Trade Unions

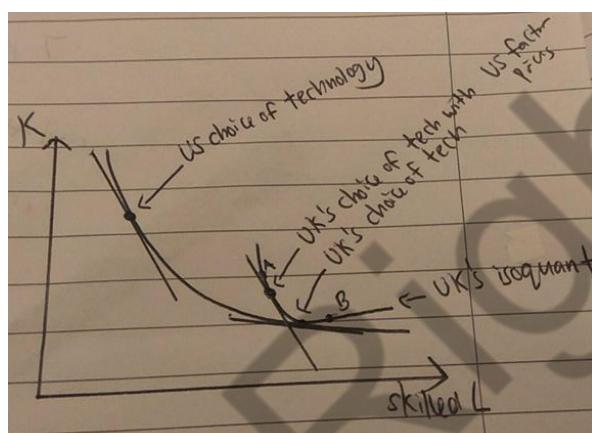
- Trade union influence rapidly expanded in LV: 0.75m 1885 to 4.0m 1914

### Rising wages did not happen

- $\uparrow TU \Rightarrow \uparrow rw \Rightarrow \uparrow Cost\ of\ Production \Rightarrow \downarrow Competitiveness \Rightarrow Industrial\ Decline$
- But... Industry-wide agreements were rare, instead local institutions. Hence the threat of the firm moving meant TU couldn't raise wages by much.
- And... High unionization and wage flexibility were often correlated (e.g. cotton). TU pressure was not feeding through effectively.

### Hindered the adoption of new tech

- TU non-cooperation can prevent management introducing k-intensive tech, which threatens making workers redundant (history of Luddites in IR)
- Lazonick: Hence Britain was stuck with the "antiquated method" of mule spinning rather than ring spinning like the US did. Also because unskilled L has less bargaining power.
- But... Broadberry's Factor Price Defence
- But... But... Lazonick says factor prices are also socially determined:
  - TU fear significant shift to k-intensive (become redundant) and l-intensive (becomes too tiring), limiting the choice to a small range.
  - Even if Britain had US factor prices, would have to stay. Hence Britain's choice of technology was a constrained decision.



- But... But... But... Empirical Evidence. Would expect GB to be quickly overtaken. Yet miniated lead in textiles and Leunig shows same L-prod. as US (!!?)

### Institutional constraint on the transition to corporate capitalism

- Elbaum and Lazonick argue that TU prevented ability to manage
  - Hierarchical managerial bureaucracy makes workers feel like cogs in a machine
  - Employers of large firms (monopsony) have more bargaining power
- But... small firms were appropriate for GB's skilled labor-intensive and flexible production methods. McCloskey's perfect competition argument.
- McCloskey's competitive stick – PC forcing firms to be efficient (only inefficiency in oligopoly)

### Evaluation

- Services: TU played role in the relative decline of services (Finance success b/c low TU). Toxic combination between imperfect competition AND TU that hurt productivity.
- Context: Classical micro theory fails in LVD. Militant TU in sunset industries did matter in Thatcher 80s.

### **British vocational education was good**

- Broadberry: German vocational training and UK apprenticeships were both better than US. German and US shipbuilders often trained in GB
- | 1910 Skills Index | USA/UK | Ger/UK |
|-------------------|--------|--------|
| Industry          | 93     | 103    |
| Services          | 102    | 101    |
| Total             | 97     | 100    |
- Note: Second mover advantage: R&D is expensive, better to copy (e.g. Ger and US cars)
  - Note: Only failure if more science would have helped. Wouldn't have helped industry, maybe services (e.g. typewriters)

## INTERWAR PERIOD

### **12. Unemployment/1920s-Depression**

- Unemployment increased from LVD 5-7% to IW 8-17%

#### **Supply: Wage Rigidity (Structural)**

##### **Case For**

- Labour gained much power via WWI as TU membership doubled. Made wages generally more sticky and "land fit for heroes" resulted in eight hour working day.
- Dowie: major supply shock as  $\bar{Y}$  falls in AD-AS model [see Fig 12.01] as there is now a downward pressure on output in both short (B) and long (C) run.
- Broadberry: Although avg. weekly hours reduced 13%, nominal wage weren't. Hence 13% increase in real wage price, which raised NRU by 2-8%-points. [see Fig 12.02]

##### **Case Against**

- Contra Broadberry, Solomou: When using more appropriate GDP deflator instead of RPI, any 'wage gap' is eliminated by 1922.
- Labour was weakened during interwar period: Unionisation fell from 45% to 26% between 1920-29 and 1926 Coal Strike was defeated.

#### **Supply: Benefits System (Frictional)**

##### **Case For**

- 1920 Unemployment Insurance Act increased eligibility rise to 11m and raised weekly benefits by ~40%. Benjamin and Kochin: 1920s avg. replacement rate ~50%...
- Decreased  $f$ , raising NRU by ~5-8%-points [ $U/L = s/(s + f)$ ]. So called "voluntary" unemployment, [see Fig 12.03] Not means tested, so esp. high for low-wage (rr=80-90%)

##### **Case Against**

- B&K based on just 20 observations. Many can't replicate findings: primary workers; 9/12 tested sectors; long-term U. Hatton's Curve: would expect vacancies to rise for all U [see Fig 12.04].
- Hatton and Bailey: rr is upwards biased because doesn't control for skills. Doing so eliminates significant findings.
- Lougani: can only explain 16% of interwar unemployment ignoring issue of reverse causality (weak labour demand lowers wages and hence raises replacement rate)
- Most unemployment was not voluntary as many lived in serious poverty as shown by Rowntree Foundation reports

#### **Demand: GS effect on Monetary Policy**

##### **1920s Recession**

- Announced GB would return to Gold Standard at \$4.86. Meant GB gave up monetary sovereignty due to "Impossible Trinity" as  $\Delta e = \Delta e$  [i.e. 0] +  $\pi^{UK} - \pi^{US} \dots$
- But after WWI Britain released pent-up C but US sterilised its gold influxes. Hence prices

diverged (Keynes est. by 10% by 1925). CB needed to correct for this...

- Announcement itself resulted in fall in  $\pi^e$  and thus withholding of C (inter temporal optimisation). Actual hike in discount rate (nominal 7%, real 20% 1920) further hurt I. Hence IS and LM shock!

### 1930s Recovery

- [see 14. Policy Recovery; Monetary Policy]

## Demand: GS effect on Trade

### Case For

- Recall  $\varepsilon = e^{\frac{P^{UK}}{P^*}}$ . Theoretically, MP  $\Delta e = \Delta P^{UK}$  so MP has no impact on  $\varepsilon$  (neutrality of money).
- But practically,  $\Delta e > \Delta P^{UK}$  due to sticky prices. Solomou and Vartis:  $\uparrow \varepsilon [10\%], \downarrow NX [30\%], \downarrow Y, \uparrow U$  [Okun's Law]. Moggridge: 0.75m jobs lost due to this in 1925. Hence even worse in 1920/1.
- GB very trade dependent and suffered much due to beachhead effect. Regression shows exports grew 78%-points less 1920-27 than expected based on wartime shortfall
- [If 30s see Policy Recovery; Exports]

### Case Against

- Okun's Law is a correlation, not a set causal link. Solomou has found no evidence of a clear relationship between  $e$  and  $Y$  in the short run.
- 30s protectionism and collapse in overseas investment means devalued currency only brings minor benefits. <1/10 all jobs created were linked to the export sector.

## Demand: Hysteresis/Path-Dependency

- Benjamin and Kochin: Peak because of demand, persistence because supply [see Fig 12.05/6]
- But... hysteresis can eliminate fixed LRAS. Now multiple LR equilibria and market doesn't guarantee we arrive at best one. "History matters"; Evolutionary Economics; QWERTY lock in
- Solomou: stationary tests show permanent output set back. [see Fig 12.07]

### Five Channels

- K scrapping: In downturn firms destroy facilities that cost much more to rebuild.
- Long-term U: Crafts: if U for <3 months 80% chance of finding job, if >12 months 20%. 20s saw long term unemployment of 5%, 30s of 25%
- Insider Outsider: If you represent less workers (i.e. higher unemployment) can target higher rw as you don't feel as much of the externality of a higher wage. [see Fig 12.08]
- Fisher Debt deflation: Decrease in P increases real debt burden, decreasing C/I. Especially due to WWI debt. Goldsmith: UK debt ratio rose from 1.3 (1913) to 2.8 (1929)
- Trade beachhead: If downward sloping AC curve (high fixed costs), a temporary expansion in foreign competitors leaves them in a better position. [see Fig 12.09]

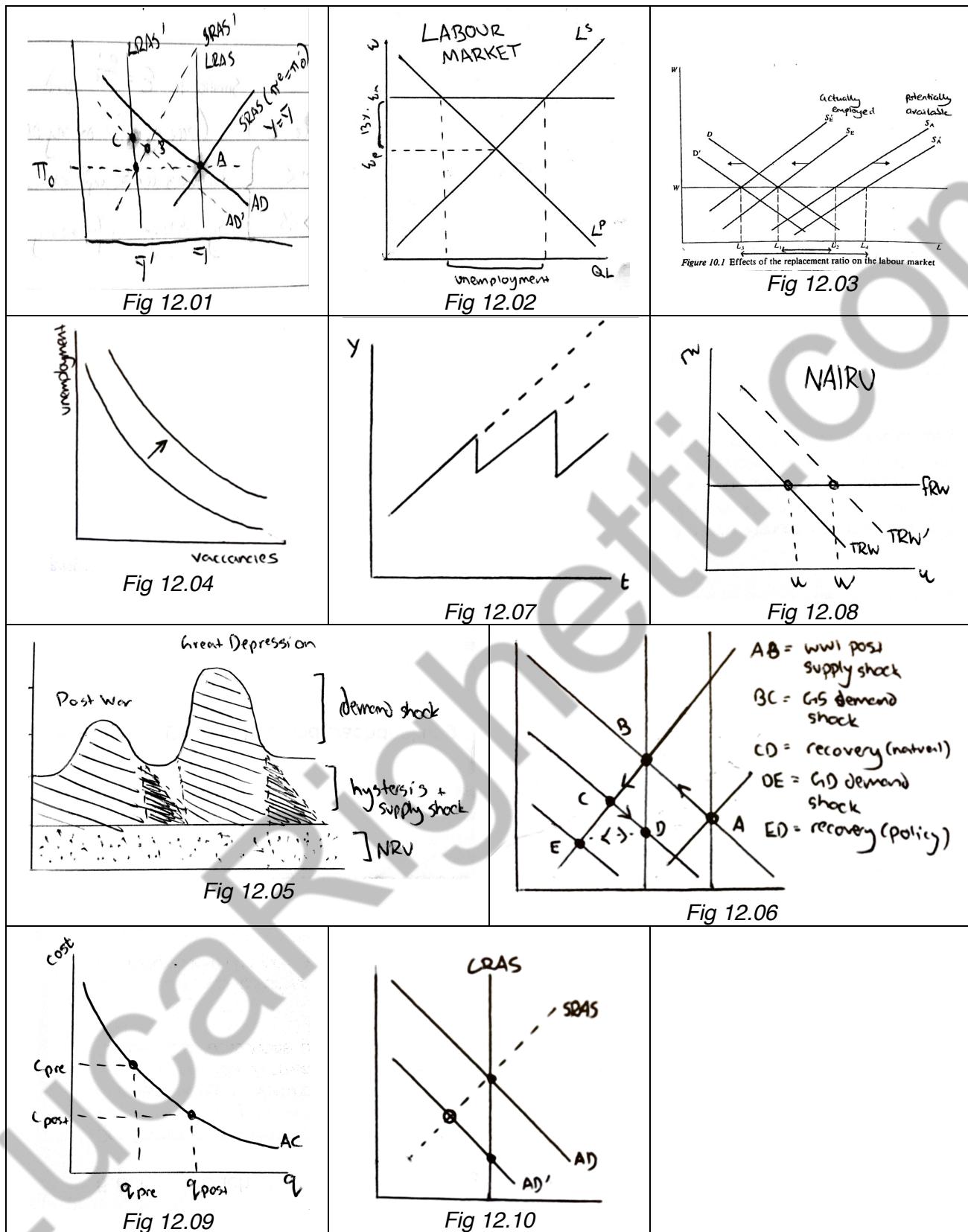
## Supply vs. Demand (possible bridge, possible conclusion)

- Supply-side factors imply stagflation but interwar characterised by demand-side Phillips Curve (-17% deflation and growing U). Backed by popularity of Keynesian Revolution.
- 20s GB unemployment underperformed relative to MEDCs, 30s overperformed. Post-WW2 supply conditions largely similar to post-WW1. Demand is what differed
- But... Note that AD shock on its own cannot change output but requires upwards sloping SRAS (vs. vertical LRAS), which is caused by sticky nominal wage. [see Fig 12.10]

**Note:** If Q on long-term unemployment, bring hysteresis paragraph forward and summarise two demand shock paragraphs. If Q on causes, summarise hysteresis to one or two sentences at the end.

**Extra GS:** Redmon estimates £ overvalued by up to 20% in 1925. Solomou and Vartis point out he ignores Germany and pre-1924 data. Actually just 10%. High  $\varepsilon$  just because of GS but also high rw.

**Extra U:** Also because US immigration harder; Pigou/Keynes/RER adjustment not strong; no fiscal



## 13. Natural Recovery

### General

- Great Depression lasted from Q3 1929 to Q3 1932 (real GDP down 5%). Recovery saw 4%pa growth, driven by C not NX. High cross-country and cross-time.
- Can we learn something from GB? Or was this SR boom at LR cost?
- Supply side improvements rely on demand side to realise potential

### Demand Side

**Automatic Improvements:** Built into downward sloping AD curve ( $\downarrow P, \uparrow Y$ ) [see Fig 13.01]

- GB large open economy, hence look at both open and closed case...
- Keynes Effect:  $\downarrow P, \uparrow \frac{M}{P}, \downarrow r, \uparrow I, \uparrow Y$ . But...  $\frac{M}{P} - r$  link broken via liquidity trap's "flight to safety" [see Fig 13.02] and  $r - I$  by animal spirits (why new factory during recession?)
- Pigou Effect:  $\downarrow P, \uparrow \frac{M=\text{wealth}}{P}, \uparrow C, \uparrow Y$ . But... Fisher says may instead be  $\uparrow \frac{\text{debt}}{P}$
- Real ER Effect:  $\downarrow P, \downarrow \epsilon, \uparrow NX, \uparrow Y$ . But...  $P^*$  also fell so no change. Feinstein shows recovery was not export driven at all (merely recovered 80% of pre-GD level).

### Exogenous Improvements

- US investment in Latin America created a surplus of primary products and hence a collapse in their price. This benefited GB:  $\uparrow \frac{P_x}{P_y}$  [Terms of Trade],  $\uparrow C, \uparrow Y$
- But... Reversed itself by 1932. UK sends 40% of exports to primary producers. Explains why GB suffered less and why consumption rose but not recovery itself
- 20s Building Society funds created 30s construction boom. Worswick says accounted for 17% of change in GDP and 20% increase in employment.
- But... Broadberry says  $\frac{1}{2}$  due to 'cheap money', a policy choice

### Supply Side

#### Technology

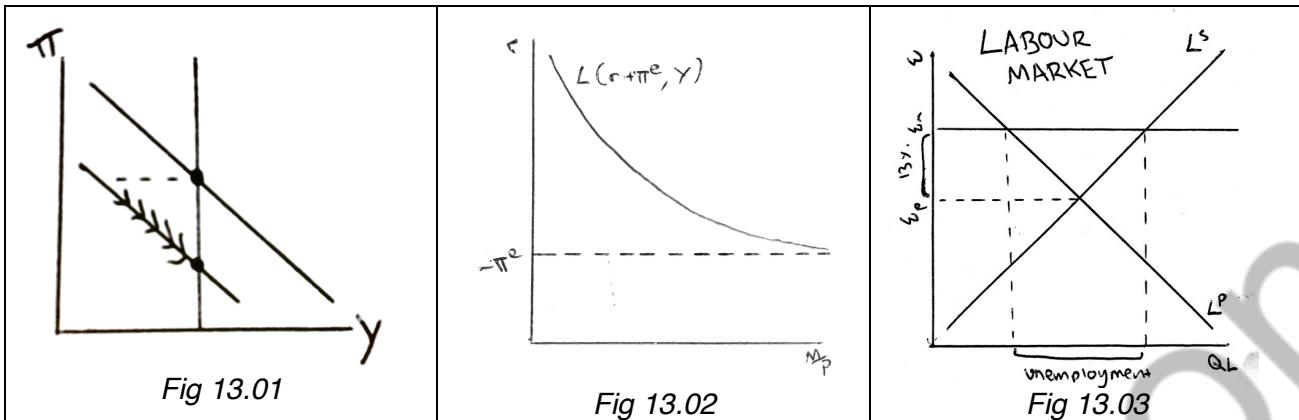
- GPTs are 'pervasive, improving, and innovation spawning'. Solomou and Ristuccia stress electrification: National Grid created 1926-33, increasing TFP.
- Theoretically allowed catch-up to US after LVD stagnation, but Gordon shows US improved as well so couldn't be unique.

#### New Industries

- Richardson: GB escaped from reliance on staple industries via new 'development block' (e.g. car-making in Oxford). As more k-intensive, this explains why U persisted.
- But... Von Tulzemann completely discredits via
  - 'Shift share' analysis ( $g_{prod}$  = within sectors + between sectors). Shows little between sectors as GB already mature and no difference within New vs. Old.
  - Input-output analysis. Shows development block was not separate.
  - K-intensity analysis. Shows New and Old use of labour was the same.
- Hatton: new industries don't contribute via NX (mostly import sub.) or I (7% of total)

#### Real Wage

- Beenstock et al. say high  $W/P$  caused GD and reduction (less TU, benefits, labour laws etc. AND/OR inflation) solved it [see Fig 13.03]
- Eichengreen & Sachs find negative relationship between rw and industrial production, as well as positive relationship between rw and ER
- But... Kitson & Solomou: should use GDP deflator not wholesale prices. Doing so, real wages continue to rise until 1936.



## 14. Policy Recovery

### [Specifics] Regime Change

#### Context

- Defined as a dramatic change that is clearly articulated and well understood. Boosts confidence via change in expectations, hence whole is more than sum of parts.
- Sargent: Rational expectations model: If people see government has credibly committed to stimulating the economy, econ will recover quicker.
- How? Keynes' Animal Spirits affect C and I; price expectations affect C and I via intertemporal optimization (if good becomes cheaper tomorrow, will wait)

#### Structure [Add from paragraphs below]

- Termin: unlike Germany (Hitler's "New Plan") and USA (1933 devaluation and New Deal):
  - Never changed balanced-budget fiscal policy
  - Leaving GS was undesired, hence population expected GB would return
  - Rational expectations says recovery should follow policy regime change immediately. Instead see one year lag between devaluation and recovery.
- Solomou disagrees
  - Rational expectations assumption is unrealistic. Instead, use adaptive learning, which justifies regime change [see Fig 14.01].
  - British looked strong on cross-country and cross-time comparison
  - [Non-S]: Balanced Budget was wise given low multiplier and worries of mismanagement

### [Specifics] Gold Standard

#### Context

- Exit from \$4.86 was forced by BoP crisis as BoE ran out of gold reserves and there was no political will to continue high interest rates, with Labour split over austerity.
- Madison: Gold Bloc grew 0.3%, devaluers 1.7%. Solomou regression (accounts for amplitude of depression) shows 3%-point gap.

#### Evaluation

- Eichengreen: GS caused GD via [i] deflationary bias as "surplus economies" did not play by the "rules of the game" and [ii] overheating US in late 20s raised interest rates [see Fig 14.02].
- Reinhart & Reinhart: Extending sample from 19 to 39 countries means GS is no longer significant. Hence devaluation is necessary but insufficient for recovery.

### [Specifics] General

#### Context

- Feinstein shows GD impact was a collapse in NX [external] but recovery was consumption driven [internal]. Need explanations that fits this pattern.

- Eichengreen and Sachs: leaving-GS had 4 channels: export, cheap money, Tobin's Q, rw. Also worth noting Fiscal Policy and tariffs.

#### Evaluation

- Broadberry & Crafts: Devaluation, cheap money, and tariffs may have helped in the short run but they subsidized inefficiencies in the long run (zombie firms)
- Contra US where “cost cutting innovation” was forced. Kleinknecht: 30s had highest number of important inventions.

## Exports

#### Case For

- £ falls 30% against \$ by Dec 1931. If Marshall-Lerner condition holds (i.e. volume effect > price effect) we expect NX to rise, boosting Y.
- Broadberry claims £80m improvement in NX, combined with Keynesian Multiplier, boosted GDP by 3%.

#### Case Against

- By 1937 competitiveness gain were eliminated by rising prices and other economies devaluating as well (but... Solomou's beach head effect, however this is unquantified).
- Feinstein shows exports merely recovered 80% of pre-GD level, hence can't explain recovery. Makes sense as trade was characterised by protectionism and trade blocs.
- 1/2 of GB exports went to countries that pegged their currency to sterling. Incorporating this, Britain's effective exchange rate only improved 4% between 1931-32.

## Monetary Policy

#### Theory

- On GS, BoE had to use MP to maintain \$4.86 peg in line with “Impossible Trinity”. In 1920 it was 7% (or 20% in real terms). After GS it could cut it to 2% (first time ever).
- IS-LM says will boost NX and I in theory but... Feinstein shows no NX recovery and Kitson & Solomou shows no extra loans to industry until 1935.
- Instead must have boosted C by disincentivising savings (intertemporal optimisation), making it cheaper to borrow, and wealth effect.

#### Housing

- House Building: Broadberry says cheap money accounts for 1/2 of rise in housing investment (an alternative asset) as building society rates fell from 6% to 3.5%.
- Worswick says construction boom accounted for 17% of change in GDP and 20% increase in employment. Also creates virtuous cycle with consumption.
- But... contested says mostly due to 20s building societies created funds in advance.

#### Other

- Tobin's Q: low r → rise in stock price → rise in Tobin's Q (stock market value / cost of building firm) → increased investment.
- Morys: prevented financial crash as bank's balance sheets saw fewer defaults, they had to pay less in deposits, and could rely on BoE being ‘lender of last resort’.

## Real Wage

- [see 13. Natural Recovery; Supply Side; Real Wage]

## Fiscal Policy

#### Case Against

- Reinhart & Reinhart: GB real government spending was small (only 18% higher at trough of GD vs 92% in US) and stable (s.d. of annual changes was 9% vs. US 34%)
- Middleton: We need to calculate Constant Employment Budget Balance ( $tY^* - G$  not  $tY - G$ ), [see Fig 14.03].

- Contractionary during GD (1931 budget increased surplus by 1.4%-points; surplus rose from 0.4% to 3.0% of GNP) until rearmament

#### Case For

- Broadberry agrees that fiscal policy was eventually expansionary but disagrees that it was contractionary during GD.
- Uses fiscal leverage measure (counterfactual GDP if no gov.) and “real” budget surplus measure (adjusts for price effect on interest payments).
  - Middleton counters that econometric evidence of multipliers is flimsy.

#### Case Irrelevant

- Crafts & Mills: low fiscal multiplier (0.5-0.8 vs. ~2) until 1935 due to  $\uparrow r$  (Loanable Funds);  $\uparrow \epsilon$  (Small open econ);  $\uparrow t^e$  (Ricardian Equivalence) and price flexibility (no SRAS)

## Tariffs

#### Case Against

- Textbook Theory: micro defence (Ricardo, generate DWL, inefficient reallocation) and macro apathy (IS-LM small open economy).
- Capie uses effective protection rate [ $output - input tariffs$ ] and finds no correlation, with steel and construction being key for recovery but not protected.
  - But... assumes input tariffs increase prices one-for-one
- Richardson uses import substitution rate  $\frac{\Delta Y - \Delta X}{\Delta M}$  and finds it was 50% higher for newly protected industries, suggesting tariffs were unimportant
  - But... assumes all industries had similar initial conditions in 1930.
- Broadberry and Crafts: LR decline due to reduced competition and SR insignificance using data 1924-48 but...
  - Problems with implementation of difference-in-difference model and misclassification of categories (merge 10% and <10%).
  - Lloyd & Solomou: Correcting for this they do find significant improvement of “additional tariff protection” at 5% level (using their own data set).

#### Case For

- Kitson and Solomou: Relax strong assumption of full-employment, CRS, and investment being independent of uncertainty. Doing so they find...
  - increased price competitiveness following tariff in both exports and imports
  - Newly protected sectors annual growth rate rose 3.9% (1930-5 vs. 1924-30)
- Lloyd & Solomou: Newly protected stagnated pre-GD (-2.7% growth gap) but then overtook (+1.5% gap). Positive effects of tariffs in short (1930-35) and medium run (1930-48)

