Discussion of Ian Morris,
"Prosperity in the Very Long Run"

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Vulgar Malthusian View Meets Romer (1990)

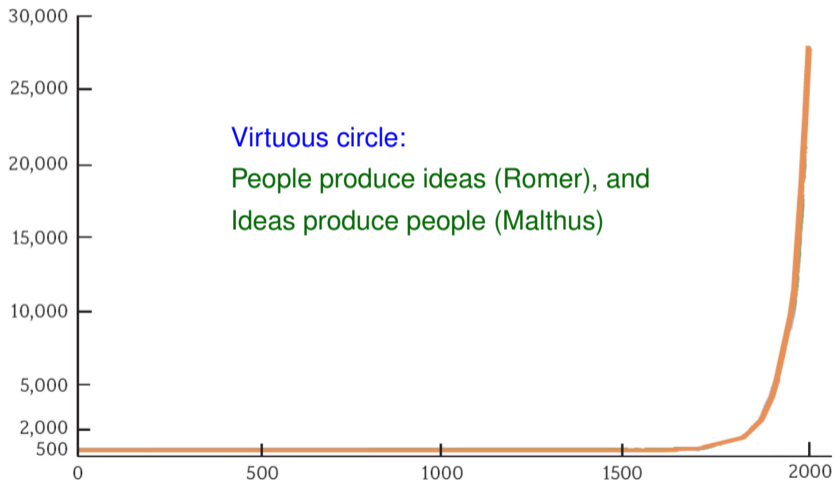- GDP is produced with Ideas (A), People (L), and fixed Land (T)

$$Y_t = A_t^\sigma L_t^\alpha T^{1-\alpha}, \quad T = 1$$

- Then GDP per person (y) is

$$y_t = \frac{A_t^\sigma}{L_t^{1-\alpha}}$$

- Remarks
  - New ideas $\uparrow A_t \Rightarrow \uparrow y_t$
  - But Malthusian population increases drive incomes back down: $\uparrow L_t \Rightarrow \downarrow y_t$

Explaining the "hockey stick" chart of very long run progress

Virtuous circle:
People produce ideas (Romer), and
Ideas produce people (Malthus)

Prediction of Malthus-Romer Model

- Growth rates themselves rise exponentially (e.g. Kremer 1993, Jones 2001)

    - So income per person and population rise as a double exponential = hockey stick

- Same story works with semi-endogenous growth (inside baseball!)

- Is land really fixed?

    - No! In fact, perfectly elastic land seems like the history of the world

    - Conjecture: I think the model would work even with $\alpha = 1$ (so elastic land)

    - But that would need to be checked; depends on overall degree of IRS (next slide)

    - So maybe we do not need the Vulgar Malthusian channel after all!

Population Data

Year	Population (millions)	Average Annual Growth Rate
-25000	3.34	...
-10000	4	0.000012
-5000	5	0.000045
-1000	50	0.000616
0	170	0.000626
1000	265	0.000931
1500	425	0.001942
1800	900	0.003889
1900	1625	0.005909
2000	5333	0.011884

Pop levels and growth rates rose 100x between -10,000 and 1500

$$100^{1/3} \approx 4.5 \quad 1000^{1/3} = 10$$

Is the energy measure more like Υ or y? Aggregate vs per capita?

- While population levels rose by 100x, per capita GDP rose by at most 3-4x

- The energy measures (ergs/second/gram) in the paper strike me as aggregates(?)

  - Large growth in aggregates is not evidence that per capita living standards increased.

  - Did energy use per capita rise?

  - May be true, but it would be helpful for the paper to be very clear about this distinction.

Population and Welfare (Klenow, Jones, Bils, and Ahdami 2022)

- Even just adding more people to the world is socially valuable!

  ○ Prosperity before 1500 was mostly adding people, not income per person

  ○ But how valuable, quantitatively?

- Suppose N_t people each have consumption c_t. Flow of aggregate welfare is
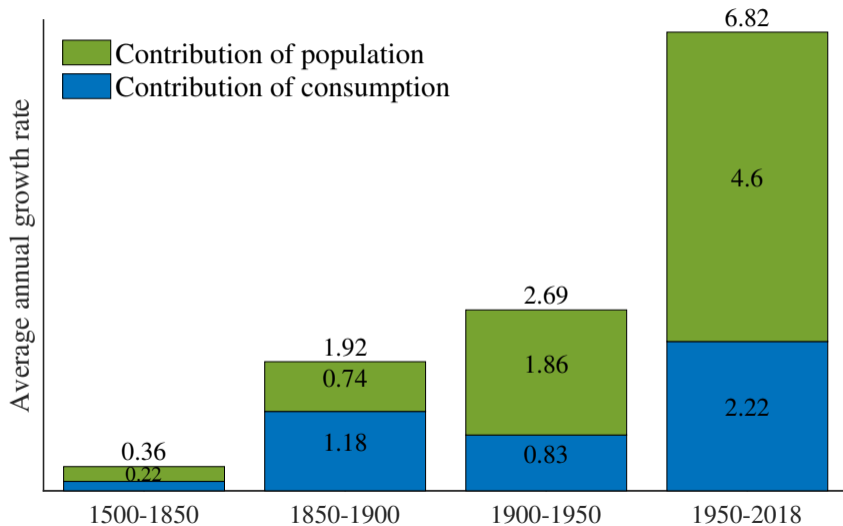
$$W_t = N_t u(c_t)$$

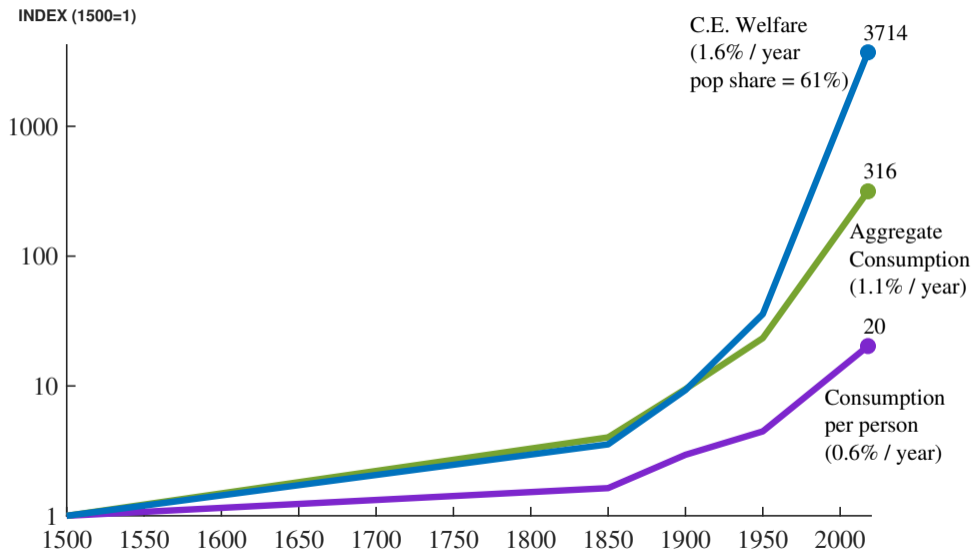- KJBA show that the growth rate of Consumption-Equivalent Welfare is

$$g_\lambda = v(c)n + g_c$$

where $v(c_t) \approx [2, 5]$ today = value of a year of life measured in years of c

World CE growth over the long run, 1500-2018

World cumulative growth, 1500-2018

INDEX (1500=1)

C.E. Welfare
(1.6% / year
pop share = 61%)

3714

316

Aggregate
Consumption
(1.1% / year)

20

Consumption
per person
(0.6% / year)

Fascinating paper on a great topic!