

## Is Anywhere Stuck in a Malthusian Trap?

Charles Kenny<sup>1</sup>

### INTRODUCTION

It is often suggested that the industrialized world's escape from Malthusian stagnation to modern economic growth over the last 250 years contains important lessons for the developing world of today (Galor and Weil, 1999, Lucas, 1998). This is based on the belief that large parts of the developing world, and in particular the countries of Africa, are still caught in Malthusian stagnation. For example, Clark (2007) suggests that the region has declined over the last two centuries under Malthusian influences and as a result material living standards in the region "are likely the lowest ever experienced by any people in world history." Again, Conley et al. (2007) argue that, for Africa, "the continent's countries remain mired in a Malthusian crisis ..."

In this paper I would like to suggest that (almost) nowhere in the World today looks at all 'Malthusian.' Indeed, (almost) the whole World –including most if not all of Africa – shares features of Malthus' vision for escaping the trap he outlined. As a result, 'lessons' from the history of Nineteenth Century Europe may be of little bearing to modern developing countries, and talk of a Malthusian crisis needs tempering.

The key features of the Malthusian model are that (i) **income determines population growth, with rising wages increasing survival rates** and (ii) **there is a vital factor of production (land) which is fixed, implying decreased returns to scale for all other factors**. The equilibrium state in such a model is a population living on subsistence incomes. In such a world, any shock to populations (such as war or plague) may have a short-term impact by raising incomes, but this feeds through into population growth, returning long run income and population levels to their equilibrium. Technological improvements that increase the carrying capacity of land will allow more output, but there is a limit to such improvements, and population increase in response to expanded output per capita will rapidly return incomes to subsistence levels.

1. Senior Economist, the World Bank. The views expressed are those of the author and do not necessarily reflect those of the World Bank, its Executive Directors, or the countries that they represent.

The country-level analysis in this paper suggests that (i) the link between income and population growth is (almost) everywhere broken and (ii) there is little evidence of declining returns to scale because of constraints imposed by land carrying capacity anywhere. Population dynamics are being driven by non-income factors in a manner that is reducing population growth rates everywhere. At the same time, output is increasing everywhere, in a manner inconsistent with significantly declining returns to scale based on land being a vital factor of production.

## THE MALTHUSIAN MODEL

Malthus was concerned with “the constant tendency in all animated life to increase beyond the nourishment prepared for it ... The race of plants and the race of animals shrink under this great restrictive law,” he argued, “and the race of man cannot by any efforts of reason escape from it.” (1803, p. 14). Populations, he suggested, naturally expanded until such time that the finite resources available to that population dictated a mortality rate high enough to stop growth. That checks to population were primarily linked to resource limitations could be seen whenever there is a ‘sudden enlargement in the means of subsistence’ –in other words, where resource constraints were relaxed. In the Eighteenth Century New World, for example, Malthus noted that populations had doubled in 25 years thanks to abundant and underutilized land.

The simplest version of the Malthusian model suggests that the birth rate is set by customs regulating fertility, the death rate by income, and income by the size of the population. Because of a fixed factor of production (land), any rise in population reduces incomes, raising the death rate and so returning the population to an equilibrium level.<sup>2</sup> Any rise in incomes connected to technological advance which allows for greater production on the same land will lower the death rate, leading to population growth which will return incomes to their equilibrium ‘subsistence’ level.

This ‘subsistence’ level does not necessarily imply income adequate only to provide the biological necessary minimum of calories –both changes in the mortality-income relationship and differences in customs regulating fertility could create markedly different subsistence incomes, thought Malthus. If a technological change allowed better mortality outcomes at a given income, for

2. Malthus wrote that “The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction; and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague, advance in terrific array, and sweep off their thousands and tens of thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear, and with one mighty blow levels the population with the food of the world.”

example, the 'subsistence income' of affected societies might fall as sustainable populations at a given level of output increased (Clark, 2007).

Given that, Malthus' only hope for raising general standards of living was to change fertility behavior. A reduction in fertility would raise the income level at which death rates equaled birth rates (lower birth rates would reduce the population level, this would increase income and so the age of death). Improved health outcomes by themselves would have little or even a negative impact on the quality of life of the mass of people, he felt. Malthus wrote at the time that Jenner invented the smallpox inoculation –but he argued against the hope that such innovations would make too much difference: “as the actual progress of population is, with very few exceptions, determined by the relative difficulty of procuring the means of subsistence, and not by the relative natural powers of increase, it is found by experience that, except in extreme cases, the actual progress of population is little affected by unhealthiness or healthiness.”

He was not, as a result, against inoculation, as he explained in the 1806 appendix to his *Essay* –he hoped that the reduced mortality which resulted might encourage poor people to have fewer children. “In making every exertion which I think likely to be effectual, to increase the comforts and diminish mortality among the poor, I act in the most exact conformity to my principles,” he protested. But this was a hope rather than a certainty –because the birth rate would have to fall alongside mortality if any improvement to the quality of life was to be sustained: “in every point of view, a decrease in mortality at all ages is what we ought to aim at ... if, at the same time, we can impress ... children with the idea that, to possess the same advantages as their parents, they must defer marriage ... if we cannot do this all our former efforts will be thrown away.”

Malthus saw education (which promotes “industry, morality and good conduct”) as a potential tool to reduce birth rates. But overall, he argued that personal morality, rather than institutional change, was the secret to progress: “the truth is that though human institutions appear to be the obvious and obtrusive causes of much mischief to mankind, they are, in reality, light and superficial in comparison with those deeper-seated causes of evil which result from the laws of nature” (1803, p. 339). Indeed, “the principle and most permanent cause of poverty has little or no relation to forms of government, or the unequal division of property” –it was the breeding habits of the poor.

## HISTORICAL EVIDENCE FOR MALTHUSIAN TRAPS IN THE UK

Empirical support for the Malthusian model is considerable in the historical record. There is strong evidence of a close relationship in the UK between the size of the population and the level of wages (and the marginal product of

## A nonsense statement, if you understand modes of production.

IS ANYWHERE STUCK IN A MALTHUSIAN TRAP?

labor) until around the 1800s. Wages in the UK and across Western Europe rose dramatically after the Black Death before declining as populations recovered. Indeed, from 1200 to 1650 there was seemingly complete stagnation of the production technology of the British economy –GDP changed hardly at all, and any rise in population was offset by a proportionate decline in income per capita. This was related to a very strong correlation between output per capita and land per capita (Clark, 2007). From 1650 to the Nineteenth Century, technology change in the UK did allow for a slow expansion in output, but it was not at a fast enough rate to outpace population growth, so that GDP per capita remained comparatively stagnant (Pereira, 2006).

### THE BREAKDOWN OF THE MALTHUSIAN MODEL IN THE UK

Even before Malthus had finished his jeremiad, however, the UK began behaving in a distinctly un-Malthusian manner. The exact nature of the relationship between rising incomes, declining fertility and improved health in the Nineteenth Century in the UK is debated. Pereira (2006) notes that there are strong correlations between literacy, GDP per capita growth rates, death and birth rates. Because of these close correlations it is hard to robustly unpack the causal mechanisms at work. But some things are abundantly clear –rising incomes and improved child health during the course of the Nineteenth Century certainly did not raise population growth rates as Malthus feared.

Bar and Leukhina (2006) suggest that changes in total factor productivity during the Industrial Revolution, while dominant in explaining GDP per capita growth, were not significantly linked to observed patterns in fertility behavior. This would not surprise Malthus. But that 60 percent of the fall in the crude birth rate can be accounted for by the decline in young-age mortality would have surprised him.<sup>3</sup> Families started having fewer babies as more of their children survived childhood. A mechanism Malthus was considerably skeptical about turned out to be a dominant factor in change.

By 1851, the breakdown in Malthusianism in Western Europe was apparent enough to be commented on at some length by John Stewart Mill:

Subsistence and employment in England have never increased more rapidly than in the last thirty years, but every census since 1821 showed a smaller proportional increase of population than that of the period preceding; and the produce of French agriculture and industry is increasing at a progressive ratio, while the population exhibits in every quinquennial census, a small proportion of births to the population.” (quoted in Hollander, 1984).

3. Pereira (2006) finds that literacy and time are significantly related to declining birth rates whilst wages and death rates are not using data for Britain 1760–1900. Conversely, low death rates are associated with higher wages and time, but not literacy.

## THE GLOBAL ESCAPE

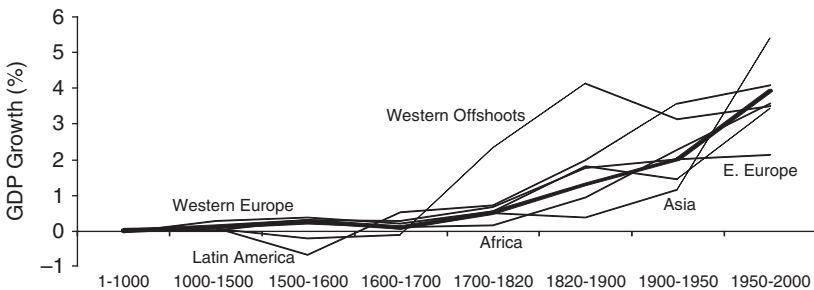
The global picture regarding Malthus' 'limits to production' also suggests a breakdown in the Malthusian model that was underway even as the Reverend was writing his text. The picture over the last two millennia of comparative economic stagnation followed by expansion as technological change took hold is available from data collected by Angus Maddison. Figure One presents data on long term trends in GDP growth at the regional level over a 2,000 year period. The figure shows global average GDP growth (the thick black line) as well as growth data for the six regions of Western Europe, the 'Western Offshoots' (North America and Australasia), Eastern Europe and the former Soviet Union, Latin America, Africa and Asia.

For every region prior to 1700, GDP growth remained well below one percent. Western Europe was the 'star performer' in the Sixteenth Century, managing annual GDP growth averaging 0.4 percent. At the other end of the scale, Latin America saw its economy halve in size over the century as the guns and (more importantly) germs of the old world destroyed civilizations and peoples. The region rebounded in the next century, posting a historically unprecedented growth rate of 0.52 percent over the period 1600–1700. The Western offshoots followed a similar pattern a century later. Two hundred years of decline brought on by disease and conquest reversed as economies and immigrant populations expanded to take advantage of the 'sudden increase in the means of subsistence,' as Malthus put it. This led, again, to a growth rate of historically incredible speed: 2.4 percent per annum from 1700 to 1820. But the broad global story prior to 1820 was of very slow GDP growth and (so) the type of stagnant economies that fit a Malthusian pattern.

What is interesting from a Malthusian perspective is the truly global impact of the Industrial Revolution. It was only with the Nineteenth Century, as new technologies of production were introduced, that we see regional growth above

Figure One

Historical Average GDP Growth Rates by Region (Source: Maddison, 2001)



one percent absent prior collapse. But these technologies apparently spread –fairly fast– worldwide, so that *every* region began to see rapid growth.

Slowest-growing Asia's performance between 1820 and 1950 was an annualized growth rate of 0.68 percent. This was still nearly seven times the global average annual growth rate in the 1,819 years prior to 1820. And after 1950 Asia reversed its position to record the most rapid GDP growth of any region. In 1800, Malthus suggested that "From the accounts we have in China and Japan, it may be fairly doubted whether the best-directed efforts of human industry could double the produce of these countries even once in any number of years." In 1820, the GDP of the two countries combined was \$249 billion. It did take until 1952 for that combined GDP to double, but by 2003, Japan and China's combined economies were 36 times as large as they were in 1820 (data from Maddison 2001).

That there has been an 'Asian miracle' in the second half of the Twentieth Century will come as little surprise, but again it is worth noting that everywhere is seeing ever-more rapid economic expansion, and this 'global miracle' started in the early Nineteenth Century. Regional GDP growth rates varied between an average of 0.07 and 0.19 percent per year 1AD to 1820AD. They varied between an average of 1.94 and 3.69 percent per year in the 180 years after 1820. The slowest regional growth rate since the Napoleonic Wars was more than ten times greater than the fastest regional growth rate in the eighteen centuries before that. And the rate of economic expansion has only increased in more recent times. In the period since the Second World War, the *slowest* growing region –Eastern Europe and the Soviet Union– still grew faster than the *average* rate of global growth 1900-1950. And the average rate of global growth in the post-war period was faster than the growth achieved by any region in the fifty years prior.

## RECENT GLOBAL EVIDENCE AND THE MALTHUSIAN TRAP

Table One provides more detailed evidence regarding performance on GDP growth over the period 1960–2000, using World Bank data. Only the DR

*Table One*  
GDP Growth Rates Since 1960

|                                 | 1960s | 1970s | 1980s | 1990s | 1960–2000 |
|---------------------------------|-------|-------|-------|-------|-----------|
| Average                         | 5.40  | 4.57  | 2.85  | 2.71  | 4.00      |
| Standard Deviation              | 3.15  | 2.80  | 2.74  | 3.34  | 1.77      |
| Negative Growth (# countries)   | 0     | 4     | 13    | 26    | 1         |
| Below 0.5% Growth (# countries) | 1     | 4     | 17    | 27    | 1         |
| Below 2% Growth (# countries)   | 9     | 23    | 51    | 59    | 11        |
| Number of Countries in Sample   | 107   | 126   | 147   | 177   | 102       |

Notes: Source World Bank (2007)

Congo amongst the 102 countries for which we have data saw negative GDP growth rates –indeed it was the only country to manage GDP growth of below 0.5 percent, which we have seen was an exceptionally high rate of growth prior to 1820. Only eleven countries saw GDP growth of below 2 percent 1960–2000 –the global *average* growth rate for the period 1900–1950. As this data suggests, countries rich and poor alike are seeing GDP growth. Indeed, poorer countries are, if anything, expanding a little faster –there is no evidence of a binding constraint on output in low income countries.<sup>4</sup>

Behind this rapidly growing global output is unprecedented growth in agricultural production topped with even more rapid growth in other sectors. Globally in the second half of the Twentieth Century, agricultural output approximately tripled and population only a little more than doubled (Ruttan, 2002). Global cropland per capita has approximately halved since the 1950s, while daily food supplies per capita have increased by around a quarter (Goklany, 2002, Goklany, 2009). One billion people remain poorly nourished worldwide today, but this is a problem of management and distribution, not an inability to produce far more than enough nutrition for the global population.<sup>5</sup> Indeed, 1.6 billion people worldwide are overweight, suggesting they might see potential benefits to less food consumption (Wik et al., 2008).

At the same time, the growth in industrial and services output has played a central role in reducing absolute poverty and pulling poor people out of a subsistence economy (Hasan and Quibria, 2004). While agricultural output tripled since 1950, global GDP as a whole went up seven-fold. People can't eat call center telephones or factory components, of course, but with the money made producing or using them, they have the resources to tap into a growing global trade in agricultural goods. The value of global agricultural trade since the 1960s has increased tenfold, to approximately \$600 billion. This trade included net agricultural inflows into least developed countries of about \$7 billion in 2004 (Wik et al. 2008).

The relaxation of a 'binding land constraint' is made clear by how much more has been produced in the same geographic space over time. The whole World's economic output in 1820 was somewhat smaller than South Korea's output in 2003. And 25 percent of the World's current GDP is produced in an area the size of Cameroon, which accounts for 0.3 percent of the World's populated land mass (World Bank, 2008).

4. A regression with average annual GDP growth 1960–2000 as the dependent variable and GDP per capita in 1960 as the independent variable produces the following result (probabilities from t-stats in parenthesis):  $\text{GDP Growth} = 4.76 (0.00) - 0.11 * \text{GDPpc1960} (0.40)$   $R = 0.01$ .
5. If we used agricultural residues and food waste to fatten animals, we could preserve enough cereals to feed 3 billion people, for example (Nellemann, 2009). We could add in savings of 90 million tonnes of maize from abandoning inefficient US ethanol production.

Because of the ubiquitous global increase in GDP growth rates, sustained per capita income increases have not required a decline in population as proposed by Malthus. Maddison (2001) provides population data 1950–2000 for 228 countries and economies. Of these only Montserrat and St Kitts and Nevis have seen a population decline over that period. Meanwhile, GDP per capita has grown in 123 of the 140 countries and economies for which Maddison has data for 1950 and 2000.

And this growing global population is becoming more healthy. Global average life expectancy has increased from 51 to 69 years 1950–1999, while the standard deviation in life expectancy has fallen from 13 to 7 years. Global infant survival has increased from 924 to 978 per thousand live births over the past 40 years, while the standard deviation halved. Indeed, health is dramatically improving at the same level of income, especially amongst the poorest, without the subsequent decline in per capita incomes that Malthus feared would result. Predicted life expectancy at an income of \$300 per year was 33 years in 1950, it was 46 years in 1999.<sup>6</sup>

Fertility has also fallen worldwide, despite Malthus' skepticism regarding the 'static custom' of fertility decisions. We have data on fertility from the World Bank for 187 countries in 1960 and 2000. Over that period, fertility rose in four countries (Timor-Leste, DR Congo, Equatorial Guinea and Chad) and fell in 183 countries.<sup>7</sup> The average decline was 42 percent and the standard deviation was 20 percent. Again, despite Malthus' pessimism, improved global health has been a major factor behind this decline in fertility rates worldwide (Conley et al., 2007, Angeles, 2010).

Of course, Malthus' preferred tool for altering fertility customs has also spread. Over the period 1950–99, global literacy levels expanded from 52 percent to 81 percent of the world's population (Kenny, 2005). Malthus' contention that education might encourage lower fertility is supported by a strong correlation between women's education in particular and lower birth rates. But the correlation is probably not about 'proper behavior' (the detumescent effect of reading Milton), as he proposed. Instead, it is likely due to the fact that a stronger decision-making role for women in the household is linked to higher girls schooling, improved child health and lower fertility

6. Furthermore, the relationship from improved health to more rapid income growth appears far more robust than either of the alternatives suggested by Malthus (income leading to better health or better health leading to lower income) (Kenny, 2009, Bloom et al. 2004).
7. It is worth noting that one of the few cases where fertility rose over those forty years was in the country with the very lowest GDP growth rate worldwide –DR Congo. Despite negative income growth, the country did see child mortality fall from 276 to 202 per thousand live births between 1960 and 2000 –but compared to global and regional averages, this was comparatively slow progress from a comparatively high starting point. Chad was also a slow grower. A GDP growth rate of 1.8 percent per year 1960–2000 placed it in ninth to last place out of 102 countries. (We do not have data for Timor-Leste or Equatorial Guinea).



altogether. In particular, women, who bear the brunt of the risks and costs of having children, tend to want fewer babies than do men. In a manner that would disappoint Malthus, the spread of contraceptives –when accompanied by women’s decision-making over their use– has considerably simplified women’s fertility decision-making (Singh, 1994, Altman, 1999).

Across most of the globe, then, it appears that Malthus’ concern over static custom does not match evidence of rapid and ubiquitous fertility decline in countries driven by equally rapid and ubiquitous improvements in child health and women’s decision-making power. In defense of Reverend Malthus, however, it does appear he was correct to suggest there was no necessary link between changes in *income* and changes in fertility (Angeles, 2010) –fertility rates have been dropping at all income levels.<sup>8</sup>

## AFRICA AND THE MALTHUSIAN TRAP

Because Africa is the most frequent subject of concern regarding Malthusian pressures, it is worth taking a closer look at evidence regarding the region in particular. We know that the continent’s economy is growing rapidly –its GDP was almost six times as large in 2000 as it was in 1950. In addition, while African agriculture has not performed as well as in other regions more able to embrace the technologies of the green revolution, it has still seen progress. Over a forty year period where agricultural labor in the region has been expanding about twice as fast as agricultural land, output per worker still climbed twenty percent –helped by the rapid spread of fertilizers and other technologies. Fertilizer use per hectare has approximately quadrupled since 1961 (Nin-Pratt and Yu, 2009). Food consumption also rose by about 100 calories per capita 1970 to 2000 (Wik et al., 2008).

Nonetheless, and in particular South of the Sahara, it might be that a strong relationship between growth in populations and growth in incomes remains.

A Malthusian would expect a strong positive correlation between GDP per capita growth in the first period and population growth in the lagged period (because rising incomes lead to longer lifespans). They would expect a negative correlation between contemporaneous population growth and GDP per capita growth (because rising numbers share the same output). Using data from the World Bank (2007), we can examine the links between population growth and GDP per capita change for a sample of 46 Sub-Saharan African countries over the period 1960 to 2005, using annual and five-year (quinquennial) data periods.

8. There are 109 countries for which the World Bank has income and fertility data in 1980 and 2000. Running a regression of fertility as the dependent variable against natural log GDP per capita as the independent variable, in 1980 the equation is fertility =  $16 - 1.4 \ln \text{GDPpc}$  ( $R=0.52$ ). In 2000 the equation is fertility =  $14 - 1.2 \ln \text{GDPpc}$  ( $R=0.72$ ).

## IS ANYWHERE STUCK IN A MALTHUSIAN TRAP?

*Table Two*

Correlation Coefficients Between Population and Income Growth 1960–2005,  
Sub Saharan Africa Sample

| Correlation Calculated at Country Level  | Average Correlation Coefficient Across the<br>Country Sample |
|--|--|
| GDP per Capita Growth Year One and Population<br>Growth Year Two                 | – 0.06   |
| GDP per Capita Growth Quinquennium One and<br>Population Growth Quinquennium Two | 0.01   |
| Population Growth and GDP per Capita Growth<br>Same Year                         | – 0.09   |
| Population Growth and GDP per Capita Growth<br>Same Quinquennium                 | – 0.14   |

Notes: Source: World Bank (2007), up to eight (quinquennium) or 44 (annual) datapoints for each country.

Table Two looks at the average values across countries in the region for within-country correlations between population and GDP per capita growth using the expected relations and our one and five year periods. The first line reports the correlation between year one GDP per capita growth and year two population growth over 45 years averaged across 46 countries. The second line looks at the same average correlation but using five year periods rather than annual data. The third and fourth lines look at average contemporaneous correlations between population growth and income growth using one year and five-year periods. In no case is the average correlation coefficient across the 46 countries of the sample greater than 0.14 (suggesting none of the relationships are strong) and, in the case of annual GDP per capita growth to population growth, the coefficient carries the reverse of the expected sign.

How many out of each of the individual 46 African countries displayed both tested Malthusian relationships –in that they had contemporary population growth negatively correlated with income growth as well as income growth positively associated with subsequent population growth over this 45 year period? Thirteen countries –or 28 percent of the sample– do display the correct correlations in each case, but only in four cases are the correlations even marginally strong in both directions (greater than 0.3) suggesting that the relationship might be somewhat significant in determining overall economic outcomes. These four countries are Tanzania, Togo, Mauritius and Angola.<sup>9</sup>

9. Using a different technique and data from Maddison (2001) for an African sample suggests that there is no significant link between contemporaneous population and income growth over decades and no significant positive link from GDP per capita growth in decade one to population growth in decade two using a pooled sample. Results available from author on request.

Table Three

Fertility Change in a Sub-Saharan Africa Sample

|           | How many countries<br>See an Increase in Fertility? | Average Fertility<br>Change (%) | Count |
|-----------|---|---------------------------------|-------|
| 1963–67   | 23  | 0.95                            | 45    |
| 1968–72   | 24  | 0.74                            | 45    |
| 1973–77   | 11  | – 0.61                          | 45    |
| 1978–82   | 5   | – 2.31                          | 47    |
| 1982–87   | 2   | – 4.25                          | 47    |
| 1988–92   | 1   | – 5.56                          | 47    |
| 1993–97   | 1   | – 6.63                          | 47    |
| 1998–2002 | 1   | – 5.89                          | 46    |

Table Three looks at fertility growth in the sample of Sub-Saharan African countries. The number of countries in the region seeing increasing fertility is rapidly declining over time (from 23 countries in the 1963–7 period to one in the 1998–2002 period), and the average fertility change has been increasingly strongly negative since 1973. ‘Static custom’ regarding fertility has been rapid to change in Africa as much as elsewhere.

Of course, Malthus suggested a number of other causes were more likely to be behind changes in population than alterations in fertility, amongst them variation in “sickly seasons, epidemics, pestilence, and plague ... [and] gigantic inevitable famine [which] stalks in the rear.” But as we have seen, there is little evidence of a relationship through such causes between income and population growth in the data. Furthermore, we have direct evidence that health has improved in the continent. Under-five mortality in the region dropped from an average of 262 per 1,000 live births to 147 over the period 1960–2005, and life expectancy has climbed by about ten years. Again, this improvement in health is consistently linked to lower fertility and *declining* population growth in Africa and around the World.

In sum, it appears that the birth rate is declining rapidly under the influence of improved child health and the greater empowerment of women. Furthermore, the death rate is impacted more by technology change than income, and because land appears not to be a binding constraint to output, population growth no longer determines changes in income. All of these statements appear to be as true about Africa as elsewhere in the World. Perhaps four countries in Africa show some evidence of not immediately contradicting a Malthusian interpretation of economic and population change, elsewhere in the region and the World the evidence is strongly and increasingly against such a model.

## CONCLUSION

Many parts of the world are employing farming practices that threaten declining land yields in the near to medium term. And there are a range of resources beyond

land that we are using at levels that threaten environmental damage from the local to the global –along with wrenching social and economic harm. ‘Neo-Malthusian’ concerns regarding sustainability are both valid and pressing. But these were not the worries that beset Reverend Malthus. To that extent, his was a simpler world –if only because it was stuck, so he thought, in a miserable equilibrium.

Malthus, in his *Political Economy*, argued that the best –only– way to improve the quality of life was to decrease birth rates. And the best way to do that was through “civil and political liberty, and education” which would encourage poor people to seek the “means of being respectable, virtuous and happy” through smaller families. In this regard, he may have been partially right for the wrong reasons. It appears that civil and political liberty combined with education may play a role in reducing child mortality and (so) birth rates –even if in some cases declining birth rates are achieved through the morally suspect (to Malthus) use of contraceptives.

In turn, lower birth rates and longer lives lie behind the demographic transition as an important (if temporary) boost to per capita incomes as working-age populations increase as a proportion of the whole (Ahituv, 2001, Bloom et al. 2001, Barro, 1998). This suggests that demographics can be important to economic outcomes, again if in a way very different from that predicted by Reverend Malthus.

We have also seen that Malthus argued that the secret to progress was prudence in personal affairs rather than institutional change, but while prudence in personal affairs may be part of the story (through the demographic dividend), this very prudence appears to have its roots in the spread of education and health technologies that have required significant institutional change. Indeed, it is implausible to argue that institutions play no role in determining outcomes in Africa today –that, whatever institutional improvements occur, the region is condemned to poverty by the laws of nature (Easterly and Levine, 1997).

These cases of only incomplete inaccuracy aside, from the time of writing onwards Malthus’ *Essay on the Principle of Population* was almost completely wrong about the future course of human history not just in England or Europe, but worldwide. The greatest reason that Malthus was wrong about the course of global history was that he underestimated the power of technological change to increase output and improve health. This change had already begun altering the British economy as he wrote. And at an incredibly rapid pace, technological advance freed economies on every continent from a pressing barrier to growth of finite land for agriculture. This in particular is why growth theories based on the dystopian visions of a priggish Nineteenth Century English cleric have little bearing on debates and approaches regarding the future of development anywhere in the world today.<sup>10</sup>

10. Conversely, as Morris and Adelman (1988) and Taylor (1996) note, influences on growth posited by modern theories have very little explanatory power in explaining 19<sup>th</sup> Century growth.

BIBLIOGRAPHY

- Ahituv, A. (2001). Be Fruitful or Multiply: On the Interplay Between Fertility and Economic Development, *Journal of Population Economics* 14, 1.
- Altman, M. (1999). A Theory of Population Growth When Women Really Count, *Kyklos* 52, 1.
- Angeles, L. (2010). Demographic transitions: analyzing the effects of mortality on fertility, *Journal of Population Economics*, 23, 1.
- Bar, M. and O. Leukhina (2006). Demographic Transition and Industrial Revolution: A Coincidence? Mimeo, Department of Economics, San Francisco State University.
- Barro, R. (1998). Human Capital and Growth in Cross-Country Regressions, mimeo, Harvard University.
- Bloom, D., D. Canning and J. Sevilla (2001). Economic Growth and the Demographic Transition, NBER Working Paper 8685.
- Bloom, D., D. Canning and J. Sevilla (2004). The Effect of Health on Economic Growth: A Production Function Approach, *World Development*, 32, 1.
- Clark, G. (2007). *A Farewell to Alms: A Brief Economic History of the World*. Princeton University Press.
- Conley, D., G. McCord and J. Sachs (2007). Africa's Lagging Demographic Transition: Evidence from Exogenous Impacts of Malaria Ecology and Agricultural Technology, NBER Working Paper 12892.
- Easterly, W. and R. Levine (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions, *Quarterly Journal of Economics*. 112 (November): 1203–50.
- Galer, O. and D. Weil (1999). From Malthusian Stagnation to Modern Growth, *American Economic Review* 89, 2.
- Goklany, I. (2002) The Globalization of Human Wellbeing, *Cato Policy Analysis* No. 447.
- Goklany, I. (2009). Have Increases in Population, Affluence and Technology Worsened Human and Environmental Wellbeing? *The Electronic Journal of Sustainable Development* 1, 3.
- Hasan, R. and M. Quibria (2004). Industry Matters for Poverty: A Critique of Agricultural Fundamentalism, *Kyklos* 57, 2.
- Hollander, S. (1984). 'Dynamic Equilibrium' with Constant Wages: J.S. Mill's Malthusian Analysis of the Secular Wage Path, *Kyklos*, 37, 2.
- Kenny, C. (2005). Why Are We Worried About Income? Nearly Everything that Matters is Converging, *World Development* 33, 1.
- Kenny, C. (2009). There's More to Life than Money: Exploring the Levels/Growth Paradox in Income and Health, *Journal of International Development*, 21, 1.
- Lucas, R. (1998). On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, 3–42.
- Maddison, A. (2001). *The World Economy: A Millennial Perspective*. Paris: OECD.
- Malthus, T. (1803). *An Essay on the Principle of Population* (ed. D. Winch, 1992), Cambridge: Cambridge University Press.
- Morris, C. and I. Adelman (1988). *Comparative Patterns of Economic Development: 1850–1914*. Baltimore, MD: Johns Hopkins University Press.
- Nellemann, C. (2009). *The Environmental Food Crisis*. Nairobi: UN Environment Program.
- Nin-Pratt, A. and B. Yu (2009). An Updated Look at the Recovery of Agricultural Productivity in Sub-Saharan Africa. Paper Presented at the International Association of Agricultural Economists Conference, Beijing, China, August 16–22.
- Pereira, A. (2006). When Did Modern Economic Growth Really Start? The Empirics of Malthus to Solow, mimeo, University of British Columbia.
- Ruttan, V. (2002). Productivity Growth in World Agriculture: Sources and Constraints, *Journal of Economic Perspectives* 16, 4.

## IS ANYWHERE STUCK IN A MALTHUSIAN TRAP?

- Singh, R. (1994). Fertility-Mortality Variations Across LDCs: Women's Education, Labor Force Participation, and Contraceptive Use, *Kyklos*, 47, 2.
- Taylor, A. (1996). Sources of Convergence in the Late Nineteenth Century, NBER Working Paper, No. 5806.
- Wik, M., P. Pingali and S. Broca (2008). Global Agricultural Performance: Past Trends and Future Prospects, 2008 World Development Report Background Paper, World Bank.
- World Bank (2008). *World Development Report: Reshaping Economic Geography*. Oxford: New York.
- World Bank (2007). *World Development Indicators*. Washington, DC: World Bank.

### SUMMARY

The key features of the Malthusian model are that (i) income determines population growth, with rising wages increasing survival rates and (ii) there is a vital factor of production (land) which is fixed, implying decreased returns to scale for all other factors. The equilibrium state in such a model is a population living on subsistence incomes. The country-level analysis in this paper suggests that (i) the link between income and population growth is (almost) everywhere broken and (ii) there is little evidence of declining returns to scale because of constraints imposed by land carrying capacity anywhere. Population dynamics are being driven by non-income factors in a manner that is reducing population growth rates everywhere. At the same time, output is increasing everywhere, in a manner inconsistent with significantly declining returns to scale based on land being a vital factor of production.

Copyright of *Kyklos* is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.