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From Malthus to Solow: How did the Malthusian economy really evolve?

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Abstract

This paper uses a variety of time-series methods and a new real wage series from [Clark, G., 2005. The condition of the working class in England, 1209 to 2004. Journal of Political Economy 113, 520 1307–1340.] to re-examine economic-demographic interactions in pre-industrial England. We confirm that there was a Malthusian economy in the sense that real wages were stationary until the end of the eighteenth century but we find that these was no positive check and that the preventive check broke down in the mid-seventeenth century so that Malthusian controls were absent from that point. There is no evidence of a positive feedback from increasing population size to technological progress as postulated by unified growth theory.

JEL classification: N13

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1. Introduction

The advent of unified growth theory has awakened renewed interest in the idea of a Malthusian economy. In the well-known paper of Galor and Weil (2000) there is a three-stage model in which the onset of modern economic growth is endogenous and is

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triggered by increases in the size of the population. The defining characteristic of a Malthusian phase in economic development is that there is no long-run trend growth in real wages. Improvements in productive potential are swallowed up by population growth. At the same time population growth is regulated by a preventive check on fertility and a positive check on mortality such that a homeostatic equilibrium is maintained.

The basic idea of the Malthusian model is captured in Figs. 1 and 2. In Fig. 1, the preventive check is reflected in the upward-sloping curve, which shows a positive relationship between the birth rate and the real wage, and the positive check is reflected in the downward-sloping curve which depicts a negative relationship between mortality and the real wage. At the intersection of these two curves fertility and mortality are equal, population growth is zero and wages are at the Malthusian equilibrium level. The population level that is compatible with this real wage is shown by the production function relationship in the lower panel, which embodies diminishing returns to labour. Fig. 2 displays a Malthusian model with "technological progress"[1] that increases the demand for labour over time such that a larger population can be sustained at a constant real wage. Here, equilibrium is at the real wage that implies an excess of fertility over mortality such that population growth is at the rate, r, which is compatible with constant real wages over time.

The pre-industrial English economy was one in which population grew over time as Fig. 3 shows. By 1800 population was 8.6 million compared with 2.8 million in 1541 (Wrigley and Schofield, 1981). Estimates of real wages were made many years ago by Phelps-Brown and Hopkins (1956) and a much-improved series has recently been published by Clark (2005): these are graphed in Fig. 4. Both series exhibit considerable volatility but do not appear to demonstrate trend growth over the period from the 13th to the 18th century. Fig. 5 confirms that, from the mid-16th century to the end of the 18th century, a tripling of the size of the population was absorbed without any deterioration in the real wage rate. Thus, to a first approximation this experience is similar to the Malthusian model of Fig. 2 rather than that of Fig. 1.

The Malthusian configuration of Fig. 2 is similar to the one envisaged by Galor and Weil (2000) as the first phase of their unified growth model. They also suppose that increases in population size promote faster technological progress and that eventually, as the Malthusian phase comes to an end, faster technological progress induces parents to invest in the education of their children. A virtuous circle ensues in which there is a positive feedback between technological progress and the accumulation of human capital in a post-Malthusian phase that culminates in the demographic transition to low fertility and high human capital and a modern growth regime.

The classic account of population growth in England before the industrial revolution is that of Wrigley and Schofield (1981). They painted a picture of a Malthusian model with weak homeostasis, i.e., with large shocks and a slow return to an equilibrium real wage which remained constant until 1800, in which population growth could be sustained at about 0.5% per year. They argued that there was clear evidence of the operation of a preventive check which dominated the system as a whole but that the positive check had disappeared by the 17th century.

[1] The literature has generally referred to the outward shift of the labour demand schedule as "technological progress" and we maintain that usage in this paper. Strictly speaking, the accumulation of other factors of production may also be partly responsible and estimates of the shift parameter should not be taken literally to measure TFP growth as in growth accounting.