VICTORIAN BRITAIN DID FAIL

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contents should be considered preliminary.

In a recent, extremely influential article McCloskey challenged
central tenets of the conventional wisdom concerning the British economy
of the late nineteenth century. He argued that significantly higher
income growth could not be obtained via a higher domestic investment rate[1]
and that growth was constrained by inelasticities on the supply side.[2]
Instead of seeing the period as one of entrepreneurial failure he painted
"a picture of an economy not stagnating but growing as rapidly as permitted
by the growth of its resources and the effective exploitation of the
available technology".[3]

These views were later criticised by Kennedy who concluded "not
that British resources were incapable of sustaining more rapid growth, but
rather that resources were not deployed to exploit opportunities which did
exist".[4] Kennedy reached his conclusion by maintaining that McCloskey's
one sector neoclassical growth model was too aggregative and that this
misspecification had led to a comparison of the actual historical record
with an inappropriate counterfactual situation.

This short article maintains that McCloskey's re-interpretation
of the late nineteenth century should be rejected even on the basis of
McCloskey's own model. Using this model it is shown in section I that the
economy was growing at less than the steady state rate of growth.   If
the economy had been on the steady state path and maintained also the modest
rate of productivity growth achieved between 1830 and 1860 until World War I,
then output per head in 1911 would have been 24 per cent higher.   In
section II it is shown that a higher domestic investment rate, entailing a
higher capital to labour ratio, would have permitted a large increase in
consumption per head.   An investment rate similar to that of Germany would
have given a 26 per cent increase in consumption per head in 1911.   Maintain-
ing productivity growth and investing at the German rate would have permitted
a 37 per cent rise in consumption per head in 1911.

I

The basic data necessary to an appraisal of McCloskey's arguments is set out in Table 1. The figures there are based on Feinstein whose work was not available when McCloskey wrote his original article but has subsequently been accepted by him as authoritative. [5/] Perhaps the main difference to be noted is that growth of net domestic output for 1872 to 1911 is put at only 1.73 per cent per year as opposed to McCloskey's estimate of 2.40 per cent (for 1872 to 1907). [6/]

TABLE 1   Output, Capital and Growth, 1872-1911[a]

	K[b]	Y[c]	μ[d]	μ'[e]	$\Delta K/K$	$\Delta L/L$[f]	$\Delta Y/Y$
1872	3227	1013	3.19	3.02			
1882	3684	1206	3.05	2.90	1.34	0.75	1.77
1892	3969	1387	2.86	2.71	0.76	1.03	1.41
1902	4901	1781	2.75	2.62	2.13	1.12	2.53
1911	5565	1973	2.82	2.67	1.28	0.90	1.03
1872-1911					1.41	0.95	1.73

a.   The first four columns are all five year averages centred on the year specified. The last three columns, rows 2-5 represent average annual growth rates for the previous decade derived from the five year averages. All data are derived from C.H.Feinstein, National Income, Expenditure and Output of the United Kingdom, 1855-1965 (Cambridge, 1972).

b.   Net Capital Stock at Constant Replacement Cost plus stocks and work in progress. Feinstein, Table 43 and by the formula in Table 49.

c.   Net Domestic Product at 1900 factor cost, Feinstein Table 5, col.12-col.14.

d.   Net Capital to Net Output Ratio, K/Y.

e.   Net Capital to Gross Output Ratio, K/Gross Domestic Product; Gross Domestic Product from Feinstein, Table 5, col.12.

f.   Derived from Feinstein, Table 57 col.3; $\Delta L/L$ is the rate of growth of the labour force.

McCloskey used a neoclassical one sector growth model in which the production function was Cobb-Douglas.

$$Y = Ae^{rt} K^{\alpha} L^{\beta} \qquad (1)$$

The sources of economic growth could be decomposed thus:

$$\Delta Y/Y = \alpha.\Delta K/K + \beta.\Delta L/L + r \qquad (2)$$

where α is the share of profits in national income, β is the share of labour and r (the residual) is the rate of growth of output per unit of total input. Given the information in Table 1 and the (constant) values of α and β, values for r can be obtained by substitution into eqn.(2). The results are shown in Table 2 for $\alpha = 0.4$ and $\beta = 0.6$; these values are those used by Matthews[7] and recently approved by McCloskey,[8] although not those used in his 1970 article.[9]

TABLE 2   Values of the Residual (per cent per year)

1872-1882	:	0.8	1902-1911	:	0.0
1892-1992	:	0.5	1872-1911	:	0.6

Source: See text

To establish his argument that the economy was growing as fast as it could McCloskey relied first of all on the property of the neoclassical model that the rate of growth is in the steady state independent of the investment rate, since changes in the capital to output ratio offset changes in the investment rate. Kennedy suggested much faster growth was possible by rejecting this aspect of the model and by adopting a very high value of the residual of 1.2 per cent.[10/]

However, McCloskey's conclusions can be criticised without resort to such tactics. The first point to note is that in the steady state the neoclassical model has capital and output growing at the same rate. Late nineteenth century Britain had capital growing more slowly than output; rather than being in the steady state, Britain would be more accurately described as in a transition between steady states. The 1870's and 1880's saw a lower investment rate than earlier or later in the century.[11/] The transition process of adjustment would be expected to show slower growth and a declining capital to output ratio; this is indeed what happened. At the same time apparently exactly the reverse was happening in the United States.[12/]

It is straightforward to calculate the neoclassical steady state rate of growth based on the average growth rates of inputs and the residual for 1872-1911. Using the condition that capital and output would be growing at the same rate, substitution in eqn.(2) gives:

$$\Delta Y/Y(ss) = \alpha . \Delta Y/Y(ss) + \beta . \Delta L/L + r \qquad (3)$$

which can be rearranged as:

$$\Delta Y/Y(ss) = \frac{\beta . \Delta L/L + r}{1-\alpha} \qquad (4)$$

For 1872-1911 the steady state rate of growth works out at 1.95 per cent per year, as opposed to the 1.73 per cent actually achieved. If the original net capital to output ratio of 3.19 had been maintained a domestic net investment rate of 6.22 per cent would have been required[13] - not large, but much bigger than was achieved in the 1870's and 1880's.[14] Had the economy achieved the steady state rate of growth by 1911 domestic output would have been about 9 per cent higher than it was. This avoidable loss could be compared with Hawke's calculation that the non-existence of the railway could have reduced national income by about 10 per cent in 1865.[15]

The second point of note is that in the years immediately before 1914 the rate of productivity growth fell markedly below what the economy had achieved regularly before and what competitor economies achieved. In arguing that the economy was doing as well as it could this feature was glossed over by McCloskey, although there is no reason to suppose that it was inevitable.

It is easy to show that the decline in productivity growth had important consequences. Suppose the economy had maintained a productivity growth rate of 0.8 per cent per year from 1872-1911, well below American or German rates,[16] about equal to the rate achieved between 1830 and

1860$\overline{\underline{}}^{17/}$ and only a small increase over the average calculated as achieved for 1872 to 1911 of 0.6 per cent. Then using eqn.(4) the steady state rate of growth turns out to be 2.28 per cent. Had this been achieved, by 1911 output would have been 24 per cent higher. A domestic net investment rate of 7.27 per cent would have been required.

The argument of this section has been that, contrary to McCloskey's interpretation, the neoclassical model can be used to argue that to an important extent the late Victorian economy did fail. The failure to match the investment rate and productivity growth rate of the earlier Victorians, or of competitor economies, had by World War 1 seriously adverse consequences on the level of domestic output.

II

The second part of McCloskey's argument that raising the home investment rate was not a way to significantly improve the performance of the late Victorian economy was to argue that gains from reallocating capital from abroad to home could not have raised output much. This view was challenged, albeit rather inconclusively, by Kennedy who pointed out its sensitivity to certain crucial and, perhaps unlikely, assumptions.$\overline{}^{18/}$

A different approach is adopted here, although without stepping outside the confines of the neoclassical single sector growth model. In this model whilst the steady state rate of growth is invariant with respect to the investment rate the capital intensity of activity is not. This last is in turn vital to the possible level of consumption per head. An

important question is therefore 'By undertaking lower domestic investment rates than other economies did Britain suffer reduced consumption levels?'

The basic point is easy to grasp. In the neoclassical model output per head is an increasing function of capital per head but on the other hand maintaining higher capital per head requires a higher savings rate. The problem is to choose that capital to labour ratio which can be sustained and which maximises consumption per head, or, as the economic growth literature puts it, to find the Golden Rule. This problem was, of course, solved by Phelps. For the type of model with which we are concerned the Golden Rule can be stated as requiring the net marginal product of capital to be equal to the natural rate of growth, which is the steady state rate of growth.[19] If the net marginal product of capital exceeds the natural rate of growth, the presumption is that a higher investment rate and a resultant higher capital to labour ratio will raise consumption per head in the long run.

If we grant McCloskey's assumptions of a competitive economy with a Cobb-Douglas production function it is easy to investigate whether the Golden Rule was met. The natural rate of growth can be thought of as 2.28 per cent, the value obtained at the end of section 1. The gross marginal product of capital for the Cobb-Douglas case is $\alpha Y/K$ (where Y is gross output) or, using the notation of Table 1, is α/μ'. From Table 1 for the 1870's this turns out to be $0.4/3.02 = 13.2$ per cent. Net marginal product of capital is simply gross marginal product minus the rate of depreciation of the capital stock. From Feinstein's figures this could not have been more than 2 per cent.[20] So net marginal product of capital was over 11 per cent and hence vastly exceeded the natural rate of growth.

There was therefore apparently plenty of scope for late nineteenth century Britain to raise consumption per head by investing more at home. Of course, virtually no economy ever approaches the Golden Rule because there is a time preference for consumption. However, to illustrate the scope for the British Economy to raise its consumption standards, (even without attaining the Golden Rule), according to McCloskey's neoclassical model, it is easy to give a small example.

Suppose Britain had done no foreign investment but had instead achieved the following annual growth rates of domestic capital; 1872-1882 : 3.75 per cent; 1882-1892 : 3.40 per cent; 1892-1902 : 3.12 per cent; 1902-1911 : 3.07 per cent. This would have been possible given the initial capital to output ratio by domestic net investment rates of between 12 and 14 per cent, similar to those achieved by Germany and the United States.[21/] These rates can then be used in conjunction with eqn.(2) and the data of Table 1 to find consumption in 1911. It turns out that with no net property income from abroad and with government spending at the actual 1911 rate, this would have permitted consumption expenditure of £2157m. (1900 factor cost) compared with £1716m. actual, a rise of 26 per cent. Had the economy also maintained its productivity growth rate at 0.8 per cent throughout, then the hypothetical consumption figure becomes £2356m., a rise of 37 per cent.[22/]

These figures are only illustrative. They do not, of course, represent a maximum figure for 1911 for two reasons. Firstly, the investment rate is not sufficient to meet the Golden Rule. Secondly, in the example the economy was arbitrarily denied any foreign investment.

III

     Used in this way the message of the neoclassical model seems clear. For whatever reason, the British economy of the late nineteenth century missed opportunities to raise its consumption per head. The conclusion is similar to Kennedy's but comes straight from McCloskey's own model : Victorian Britain did fail!

Footnotes

1/   D.N.McCloskey, 'Did Victorian Britain Fail?', Economic History Review, 2nd ser. XXIII (1970), 451.

2/   Ibid. p. 451.

3/   Ibid. p. 459.

4/   W.P.Kennedy, 'Foreign Investment, Trade and Growth in the United Kingdom, 1870-1913', Explorations in Economic History, XI. (1973-4), 440.

5/   D.N.McCloskey, 'Victorian Growth : A Rejoinder', Economic History Review, 2nd ser. XXVII (1974), 275.

6/   D.N.McCloskey, 'Victorian Britain', p.448.

7/   R.C.O.Matthews, 'Some Aspects of Post-War Growth in the British Economy in Relation to Historical Experience, Transactions of the Manchester Statistical Society, (1964), p.12.

8/   D.N.McCloskey, 'Rejoinder', p.275.

9/   The differences are trivial, however.

10/   Kennedy, op.cit. pp.418-419.

11/   For example, the gross domestic investment rate in five year averages was for 1872 8.2%, for 1882 8.4% and for 1892 8.0%; see Feinstein op.cit. Table 5 for 1830-60 the comparable figure was 11.3% according to Feinstein's paper 'Capital Accumulation and Economic Growth in Great Britain, 1760-1860', (mimeo, Cambridge 1976) Table 25.   For 1902 the figure was 10.9%.

12/   See J.G.Williamson, 'Late Nineteenth-Century American Retardation : A Neoclassical Analysis', Journal of Economic History, XXXII (1973), 581-590.

13/   Since the rate of growth of the capital stock is the net investment rate divided by the net capital to output ratio.

14/   The net investment rate in five year averages for 1872 was 3.2%, for 1882 3.8% and for 1892 3.4%; see Feinstein op.cit. Table 5.

15/   G.R.Hawke, Railways and Economic Growth in England and Wales, 1840-1870 (Oxford, 1970), p.410.

16/   McCloskey himself cites a productivity growth rate of 1.3 per cent per year for the United States between 1889 and 1909, "Victorian Britain", p.458, and 1.13 per cent per year for Germany between 1880 and 1910, 'Rejoinder', p.277.

17/   Feinstein, 'Capital Accumulation', Table 22 finds total factor
       productivity growing at 0.8 per cent per year.

18/   McCloskey, 'Victorian Britain', p.455, Kennedy, op.cit. pp.422-
       424.

19/   E.S.Phelps, Golden Rules of Economic Growth (New York, 1966) p.10.

20/   Feinstein, 'National Income' Table 5.

21/   Kuznets's data suggest that for Germany, the net investment rate for
       1881-1913 averaged 13.6 per cent and for the United States for
       1889-1908 13.4 per cent.   S.Kuznets, 'Long Term Trends in Capital
       Formation Proportions', Economic Development and Cultural Change,
       IX, part III (1961), p.64, 92.

22/   This would have been easily enough to avoid the overtaking of Britain
       by the United States in terms of real income per head; Maddison's
       figures suggest that in 1913 the United States enjoyed an 11 per
       cent advantage; A.Maddison, 'Comparative Productivity Levels in the
       Developed Countries', Banca Nazionale del Lavoro Quarterly Review,
       XX, 308.