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**THE CORN MODEL, GLUTS AND SURPLUS VALUE**

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## **The Corn Model, Gluts and Surplus Value**

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The controversy over Ricardo's corn model has focussed on the interpretation of his early writings. Here Ricardo's later use of a corn model example in his dispute with Malthus over gluts is discussed. Malthus's own extensive use of a corn model in attempting to justify his use of a labour commanded measure of value is analysed; it is shown that he calculates what Marx was to describe as surplus value from the physical productions of production and the real wage.

Key Words: Ricardo, Malthus, gluts, exploitation

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## Introduction

Sraffa's famous conjecture was that, before the *Essay on the Profits of Stock*, Ricardo had formulated a literal corn model, with corn comprising both inputs and outputs in the agricultural sector, implying the determination of the rate of profit as a ratio of corn quantities. This interpretation provoked a long controversy, reinvigorated by Peach (1993) and culminating in the exchange between Kurz and Mongiovi (2002) and Peach (2002). The focus in that debate, however, was on Ricardo's early writings. There is general acceptance that in the *Essay* of 1815 Ricardo used a "pseudo-corn model", that is heterogeneous capital was just *valued* in terms of the quantity of corn (rather than literally being corn). The weaknesses in this latter approach, pointed out by Malthus, led Ricardo to adopt "money of invariable value" to measure inputs and outputs in the *Principles*. Money prices were assumed to only reflect labour values, despite the fact that varying conditions of production across industries meant that no such perfect invariable measure of value was theoretically possible.

The purpose of this note is not to re-ignite the controversy on the early writings— to which the editors understandably called a halt. Rather I draw attention to Ricardo's 1820 *Notes on Malthus* where he uses an example which appears to be a literal corn model to rebut Malthus over the question of gluts. Then I reproduce Malthus' own very elaborate corn model table in the 1823 pamphlet on *The Measure of Value*. This is deployed to try and answer Ricardo's criticisms of the variability of his own measure of value – labour commanded – but with some surprising results.

## **Ricardo**

In the *Notes on Malthus* Ricardo writes:

““It would be of no sort of use” says Mr Malthus “to the farmer to go on cultivating his land with a view merely to give food and clothing to his labourers, if he neither consumed the surplus of what they produced himself, *nor could realise it in a shape that might be transmitted to his descendants*” [Ricardo’s emphasis]. What but a deficiency of population could prevent him from realising it in a shape that might be transmitted to his descendants? I am a farmer possessed of a thousand quarters of corn and my object is to accumulate a fortune for my family. With this corn I can employ a certain number of men on the land, which I rent, and after paying my rent the first year, realize 1300 qrs, or 300 qrs. profits. The next year, if there be plenty of labour in the market, I can employ more labour than before, and my 1300 will become 1700, and so from year to year I go on increasing the quantity till I have made it ten thousand quarters, and if labour be at the same price can command ten times the quantity of it that I could have when I commenced operations. Have I not accumulated a fortune for my family?” (Ricardo 1950-55 Vol II pp 318-320, footnote omitted)

Ricardo goes on to argue that if wages rose then accumulation would be slower. Although he did not explicitly calculate a corn rate of profit, he does appear to be doing so implicitly. For it is the application of the 30% first year profit rate (300qrs corn profit

divided by 1000qrs corn capital) to the 1300 of corn capital which brings the second year's production to 1700 <sup>2</sup>.

Could it be that this is really a “pseudo-corn model” where different inputs and outputs are all valued in terms of corn, as in the *Essay*, rather than literally being corn as in a true corn model. There is nothing in Ricardo's formulation that points towards this interpretation. Moreover the context argues against it, for Ricardo is suggesting that accumulation of an increasing stock of corn does represent an accumulation of wealth because it can be used directly to employ a growing workforce without having to be “realised”. If a broader bundle of wage goods were just being valued in terms of corn then the corn output would indeed have to be realised on the market in order to allow the purchase of the bundle. In such a broader case Malthus's point that there would have to be adequate demand for the (corn) output would have to be addressed rather than evaded.

The corn model is a most effective simplifying device for analysing changes on the supply side (either changes in wages due to labour shortage or most importantly for Ricardo falling productivity on marginal land). It is ironic, however, that the corn model calculation involving profitability reproduced above, is used by Ricardo in his debate with Malthus over general gluts<sup>3</sup>. If there is just one commodity then that commodity

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<sup>2</sup> The stock of corn would actually grow to 1690 assuming that the farmer can rent additional land of equal productiveness at the same corn rent (Ricardo assumes no “diminution in the productive powers of the land”).

<sup>3</sup> Elsewhere in the *Notes on Malthus*, Ricardo uses a slightly broader model to the same end, with “food and necessaries” rather than just corn as both input and output. “I may employ 20 workmen to furnish me food and necessaries for 25 and then these 25 to furnish me food and necessaries for 30 – these 30 again to provide for a greater number. Should I not get rich although I employed capital “merely for the sake of the demand occasioned by those who work for me”? (Vol II p 429).

constitutes wealth and there is no reason, as Ricardo points out, to hold back from increasing production whilst a surplus product is produced. Corn does not have to be sold to constitute wealth. But this argument cannot be carried over to the general case where the producer's output does not constitute wealth. Then it has to be sold on the market before the surplus is realised as profit and the automatic accumulation of the surplus, assumed by Ricardo, cannot be guaranteed. One-commodity models, without money, were bound to give Ricardo the result he wanted.

In the quotation considered above a physical profit rate can be inferred but is not calculated. Ricardo does explicitly calculate a physical profit in his penultimate letter to Malthus, though with more inputs and outputs than just corn:

“Suppose a farmer have a certain quantity of cattle and implements and a hundred quarters of wheat; that he expends this wheat in supporting a certain quantity of labour. And that the result is 110 qrs of wheat and an increase of  $1/10$  also in his cattle and his implements, would not his profits be 10 pct. whatever might be the price of labour the following year ? If the 110 qrs. could command no more labour than the 100qrs. could command before, he would, according to you, have made no profits; and you are right if we admit that yours is the correct measure of value – he would have a profit in kind but no profit in value. If wheat was the measure of value, he would have a profit in kind, and the same profit in value. If money was the correct measure of value, and he commenced

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with £100, he would have 10 pct. Profit if the value of his produce was £110. All these results leave the question of a measure of value undecided”(Vol IX p 249/250).

The discussion of alternative measures of profitability in this passage compares a physical calculation (with output representing an equi-proportionate expansion of heterogeneous inputs rather than simply corn), a “pseudo-corn” calculation, and a money profit rate based on money values which are supposed by Ricardo to reflect labour values.

### **Malthus**

Malthus seems an unlikely user of the corn model as it was he who pointed out to Ricardo in 1814 (Vol VI p 117) that inputs and outputs were never “of exactly the same nature”. However in his 1823 pamphlet on *The Measure of Value* we find the following table which Malthus claimed “will further illustrate the necessary constancy in the value of labour, and some of its most important results in a clearer manner and in shorter compass than if each case was taken separately” (Porta 1992 p 32).

*Table illustrating the invariable Value of Labour and its Results*

1. Quarters of Corn Produced by Ten Men, or varying Fertility of the Soil	2. Yearly Corn Wages to each Labourer, determined by the Demand and Supply	3. Advances in Corn Wages, or variable Produce command- ing the Labour of Ten Men	4. Rate of Profits under the foregoing Circum- stances	5. Quantity of Labour required to produce the Wages of Ten Men under the foregoing Circumstances	6. Quantity of Profits on the Advances of Labour.	7. Invariable Value of the Wages of a given Number of Men.	8. Value of 100 Quarters of Corn under the varying Circum- stances supposed.	9. Value of the Product of the Labour of Ten Men under the Circumstances supposed.
150 qrs.	12 qrs.	120 qrs.	25 pr. Ct.	8	2	10	8.33	12.5
150	13	130	15.38	8.66	1.34	10	7.7	11.53
150	10	100	50	6.6	3.4	10	10	15
140	12	120	16.66	8.6	1.4	10	7.14	11.6
140	11	110	27.2	7.85	2.15	10	9.09	12.7
130	12	120	8.3	9.23	0.77	10	8.33	10.8
130	10	100	30	7.7	2.3	10	10	13
120	11	110	9	9.17	0.83	10	9.09	10.9
120	10	100	20	8.33	1.67	10	10	12
110	10	100	10	9.09	.91	10	10	11
110	9	90	22.2	8.18	1.82	10	11.1	12.2
100	9	90	11.1	9	1	10	11.1	11.1
100	8	80	25	8	2	10	12.5	12.5
90	8	80	12.5	8.88	1.12	10	12.5	11.25

Source: reproduced in Porta (1992) p 38

The table is unambiguously a literal corn model with corn both the only input (wage goods) and output and with two sources of variation in the calculation, the yearly wage and the productivity of the soil. The first four columns are quite straightforward with the rate of profits calculated in percentage terms as the corn surplus (column 1 less column 3) divided by advances of corn wages (column 3). The fifth column is labelled “the Quantity of Labour required to produce the wages of 10 men” and is calculated as the proportion of wages in gross output of corn times the 10 men-(years) of labour expended. The sixth column is described in Malthus’s text as “the profits estimated in labour” which is a much clearer description than the column’s title of “Quantity of Profits on the



Advances of Labour” ”, for it represents the quantity of labour required to produce the surplus over and above wages. When these are added together Malthus arrives at a constant figure of 10 regardless of the variation of wages per year or of labour productivity. He is pleased to claim “the numbers in the seventh column, or the quantity of labour and profits united, cannot be constant, unless, as the quantity of labour required to produce the wages of 10 men increases, the quantity of profits estimated in labour diminishes exactly in the same degree. But this, from what has before been stated, must, under the circumstances supposed, be the case” (p 33).

Instead of describing column 7 as “the value of output” Malthus confusingly calls it the “invariable value of the wages” and proceeds in the last two columns to value 100 quarters of corn (column 8) or the total gross output (column 9) in terms of the labour they can command (ie dividing the relevant quantity of corn by the average corn wage from column 2).

Ricardo’s note on this part of the pamphlet points out (Porta 1992 p35) that the “great difference between Mr M’s system and mine” is that he (Ricardo) estimates the value of corn by comparing all the corn with the labour required to produce it , not just the corn the workers receive (which yields the labour commanded measure). Malthus concludes triumphantly that “the quantity of labour required to produce the wages of a given number of men, with the addition of the profits upon the advances estimated in labour, must always be the exactly the same as the quantity of labour which the wages will command” (p 33). In effect he has shown that if you add together the labour value of the

wage goods and the labour value of the surplus product you arrive at total labour value created, though Malthus describes the result rather as “the natural value of the corn wages of a given number of men” (p33)<sup>4</sup>. Ricardo objected to the circularity of Malthus’s argument in a series of letters (for example No 529, 542 Vol IX pp 297-300, 345-352). Bailey in his 1825 pamphlet on *The Nature, Measures and Causes of Value* is particularly scathing about this table calling it “certainly one of the most curious productions in the whole range of political economy” (1967 p 142).

Despite Malthus’ quite unconvincing exposition, it is remarkable, however, that the table actually calculates wages and profits in terms of the amount of labour required to produce what workers and capitalists receive (columns 5 and 6). This is exactly how Ricardo represents wages and profits in the *Principles* – “profits depend on the quantity of labour requisite to produce necessities for the labourers, on that land or with that capital which yields no rent” (Vol I p 126). . Moreover Malthus’s “labour-value” calculations are derived in the table from the physical conditions of production and the real wage, a step which neither Ricardo nor Marx explicitly carried out. The one-sector corn model permits this to be done without simultaneous calculations of labour values in several sectors, and Malthus works out the division of the product in labour value terms for a range of assumptions about wage and productivity levels. Thus we have in Malthus’s table explicit calculations of what Marx was later to describe as surplus value, measured

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<sup>4</sup> Malthus’s interpretation of column 6 as “quantity of profits on the advances of labour” actually depends on his assumption that all capital is the advance of necessities to the workers. If the farmer had also to advance seed corn, say in proportion to gross output, then the profit rate would represent the corn surplus on total capital advanced and the “quantity of profits on the advances of labour” would no longer be equal to the (labour) value of the whole surplus product. When added to the quantity of labour required to produce the wage goods the sum would not give Malthus his “invariable value of wages”.

in terms of labour time, and derived from the conditions of production and the real wage. Marx, whose opinion of Malthus was extremely low, did not notice any relation between Malthus' laborious calculations and his own approach, simply commending Bailey who "bitingly derides the insipid, impressive-sounding tables with which Malthus "illustrates" his measure of value." (Marx 1972 p 28)<sup>5</sup>.

## **Conclusions**

The object of this note is to take the discussion of corn models on from its earlier focus on whether Ricardo really did analyse the economy in terms of a corn model in 1814 and whether this preceded the use of a corn model by Torrens (de Vivo 1985). It seems that Ricardo did toy with a corn-model calculation several years later, though it was hardly appropriate for the debate with Malthus on general gluts. Malthus himself used a sophisticated elaboration of the corn model to justify, quite unconvincingly, taking labour commanded to be an appropriate invariable measure of value. In doing, so, however he laid out exactly how the division of labour value between workers and capitalists was determined by the physical conditions of production and the real wage.

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<sup>5</sup> My thanks to Tery Peach for this reference.

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