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Price Theory -- A Stylized History

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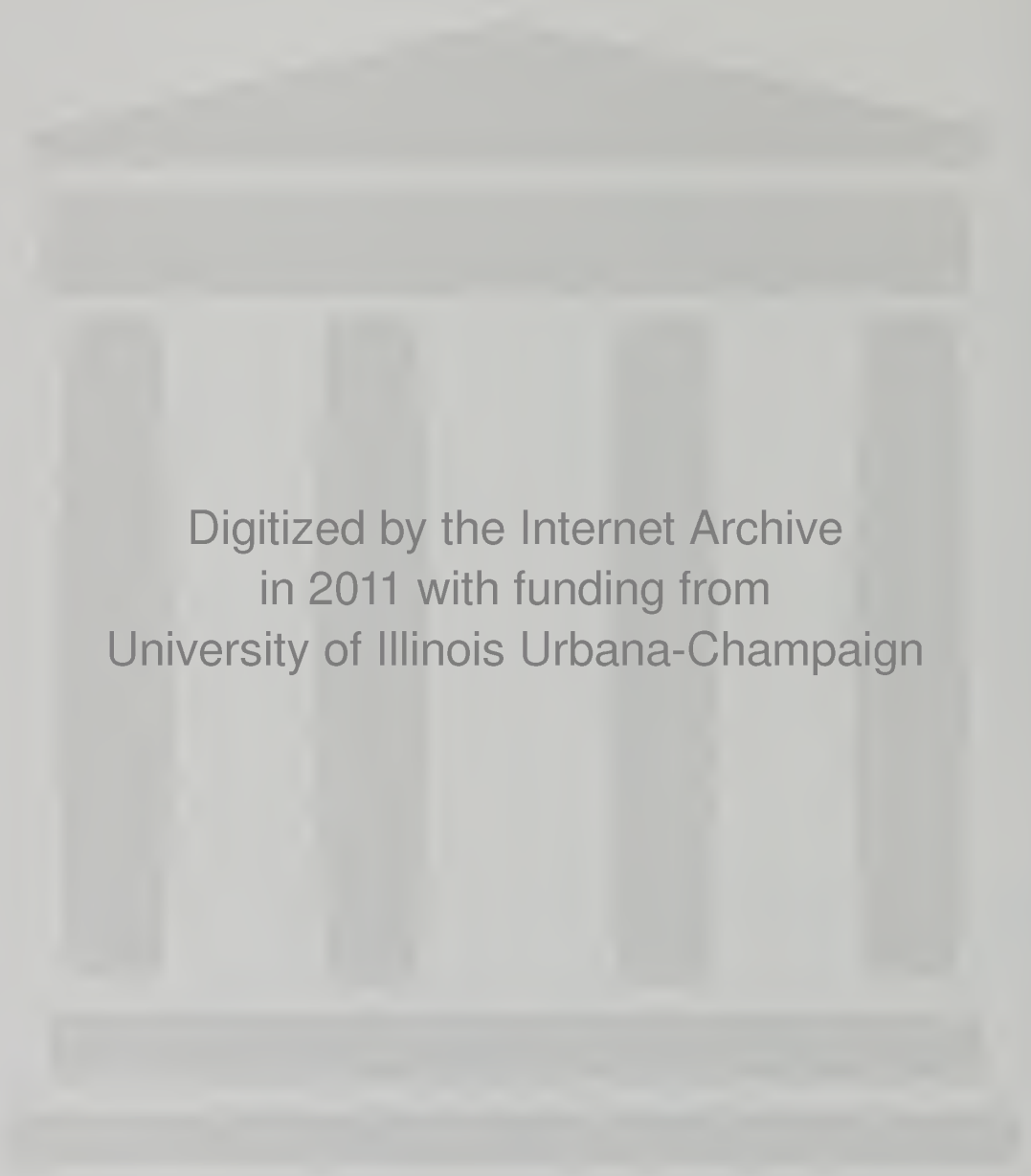

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PRICE THEORY--A STYLIZED HISTORY

By Hans Brems

Abstract

The purpose of the paper is to restate rigorously four models of relative price.

Cantillon tried to build a land theory of value by reducing labor to indirect land: ultimately labor was produced from necessities. Marx tried to build a labor theory of value by reducing machines to indirect labor: ultimately machines were produced from labor and machines.

Smith and neoclassicals used the full trinity of capital, labor, and land and made no attempt to reduce it to any single input. Inputs were additive only via their prices, hence all input prices would be present in the price solution.

PRICE THEORY--A STYLIZED HISTORY

By Hans Brems

The purpose of the paper is to restate and solve four familiar models of relative price. We shall use the following notation:

Variables

$L \equiv$ available labor force

$L_i \equiv$ labor absorbed in ith industry

$N_i \equiv$ land used in ith industry

$n \equiv$ money rent rate

$P_i \equiv$ price of ith good

$r \equiv$ rate of interest

$S_i \equiv$ capital stock used in ith industry

$w \equiv$ money wage rate

Parameters

$a_i \equiv$ labor coefficient of ith industry

$\alpha_i \equiv$ labor elasticity of output in ith industry

$b_i \equiv$ land coefficient of ith industry

$\beta_i \equiv$ capital elasticity of output of ith industry

$c_i \equiv$ capital coefficient of ith industry

$j_i \equiv$ joint factor productivity of ith industry

$m \equiv$ labor's manner of living

I. CANTILLON

1. Production Technology

Cantillon certainly knew no diminishing returns--indeed nobody knew them before Turgot [1767 (1844: 418-433), (1977: 109-122)].

Did Cantillon know that production takes time? In other parts of his work he was well aware of it, but in the passages [1755 (1931: 41)] developing his famous "Par between Land and Labour" he ignored capital. Let us restate his par mathematically.

Let a Cantillon economy be producing two consumers' goods, i.e., a necessity consumed only by labor and luxury consumed only by landlords. Both are produced solely from labor and land in processes having fixed input-output coefficients:

$$L_i = a_i X_i \tag{1}$$

$$N_i = b_i X_i \tag{2}$$

where subscripts i = 1, 2 refer to the necessity and the luxury, respectively.

There is a third process, a labor-producing one. Like Malthus and von Neumann, Cantillon saw labor as reproducible--produced from necessities in a process having a fixed input-output coefficient m_1:

$$X_1 = m_1 L \tag{3}$$

To Cantillon the coefficient m_1 was labor's "manner of living," not a biological minimum but a social minimum varying among regions: it was higher in Northern France than in Southern France--as Cantillon [1755 (1931: 71)] described it in such specific detail. However high it was, we treat it as a parameter.

2. Processes Break Even

Now in long-run equilibrium let all processes break even. The two goods-producing processes will break even after freedom of entry and

exit has done its work and washed away all profits over and above labor cost at the standard money wage rate w and land cost at the standard money rent rate n. As a result, in each industry revenue equals cost:

$$P_i X_i = L_i w + N_i n$$

Divide by output X_i, use (1) and (2), and write a Cantillon price equation:

$$P_i = a_i w + b_i n \qquad (4)$$

or, in Cantillon's own words [1755 (1931: 41)]: "... the intrinsic value of any thing may be measured by the quantity of Land used in its production and the quantity of Labour which enters into it, ..."

The labor-producing process will break even, because [1755 (1931: 83)] "Men multiply like Mice in a barn if they have unlimited Means of Subsistence." Here, too, revenue equals cost or, in more familiar terms, the wage bill equals the value of labor's consumption:

$$Lw = P_1 X_1$$

3. Solution for Relative Price

Insert (3), divide L away, and write a Cantillon wage equation:

$$w = m_1 P_1 \tag{5}$$

Insert (5) into (4) and write the Cantillon price equation:

$$P_i = a_i m_1 P_1 + b_i n$$

which is a system of two equations in two unknowns P_1 and P_2. Write it out for i = 1, 2, rearrange, and find Cantillon's relative price

$$\frac{P_1}{P_2} = \frac{b_1}{b_2[1 + (a_2/b_2 - a_1/b_1)b_1 m_1]} \tag{6}$$

4. A Land Theory of Value

Via labor's manner of living m_1 Cantillon [1755 (1931: 41)] reduced labor to "the quantity of Land of which the produce is allotted to those who have worked upon it." Did he?

Dimensionally (6) is indeed a land theory of value. According to (1) and (2) the dimension of labor intensity a_i/b_i is man-hours per acre. According to (2) the dimension of the land coefficient b_1 is acres per physical unit of first good. According to (3) the dimension of the manner of living m_1 is physical units of first good per man-hour. After cancellation, then, the dimension of the second term of the bracket of (6) will be a pure number. Consequently (6) simply expresses relative price in terms of relative acres used. But (6) has more than the direct land coefficients b_1 and b_2 in it.

Indirect land was important to Cantillon. Indirect land was needed to produce labor in accordance with the input-output coefficient m_1. Such labor, in turn, was needed in accordance with the labor coefficients a_1 and a_2. As a result a_1, a_2, and m_1 should--and do--appear in (6) and affect relative price P_1/P_2. How?

If we think, as we normally do, of necessities (food) as less labor-intensive than luxuries (services), i.e., $a_1/b_1 < a_2/b_2$, then the second term of the bracket of (6) will be positive. In that case a higher manner of living m_1 would affect necessities less than luxuries hence lower relative price (6).

Only in the special and unlikely case of labor intensities being the same in both goods, i.e., $a_1/b_1 = a_2/b_2$, will the second term of the bracket vanish and leave us with a pure land theory of value $P_1/P_2 = b_1/b_2$.

II. SMITH

1. Production Technology

Did Smith assume fixed input-output coefficients, or did he know diminishing returns? Eltis (1984: 107) finds no trace of diminishing returns in Smith. Hollander (1980) finds them only on the basis of a very selective choice of quotes. Samuelson (1977), (1978), on the other hand, assumed Smith to share diminishing returns with Ricardo, Malthus, and Mill. Certainly Smith's "natural price" was phrased generally enough, or vaguely enough, to permit both interpretations. For the moment, as in Cantillon, let us assume both consumers' goods to be produced in processes having fixed input-output coefficients.

Smith may or may not have known diminishing returns, but he definitely knew that production takes time. Let it take one year, i.e., let there be a one-year gap between inputs and outputs:

$$L_i(t) = a_i X_i(t + 1) \tag{7}$$

$$N_i(t) = b_i X_i(t + 1) \tag{8}$$

where subscripts i = 1, 2 refer to the necessity and the luxury, respectively. Labor is absorbed and land is used in both goods: $a_i > 0$ and $b_i > 0$.

2. The "Natural Price"

Smith's goods-producing processes will break even after freedom of entry and exit has washed away all profits over and above capital cost at the standard rate of interest r, labor cost at the standard money wage w, and land cost at the standard money rent rate n. As a result in each industry revenue equals cost:

$$P_i X_i(t + 1) = (1 + r)[L_i(t)w + N_i(t)n]$$

Divided by output $X_i(t + 1)$, insert (7) and (8), and find a Smithian price equation:

$$P_i = (1 + r)(a_i w + b_i n) \qquad (9)$$

Here is Smith's [1776 (1805: book I, chapter 7)] "natural price," i.e., a price "neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the

stock employed in raising, preparing, and bringing it to market, according to their natural rates."

3. Was Labor Reproducible?

Did Smith, like Cantillon, have a third process producing labor from necessities at a fixed input-output coefficient equalling labor's subsistence real wage? To be sure, Smith [1776 (1805: book I, chapter 8)] did observe that "every species of animals naturally multiplies in proportion to the means of their subsistence..." And, for humans, Smith did describe such subsistence not as a biological minimum but as a social minimum varying among nations. Indeed it was higher in North America than in England.

Yet, if ever tempted to build such a labor-producing process into his price theory, Smith withstood the temptation. Nothing like Cantillon's par between land and labor occurred to Smith. Nowhere did he reduce labor to land.

We, too, shall withstand the temptation, leave Smith's "natural price" the way he left it, and solve it for relative price.

4. Solution for Relative Price

The "natural price" (9) is a system of two equations in two unknowns P_1 and P_2. Write it out for i = 1, 2, rearrange and find Smith's relative price

$$\frac{P_1}{P_2} = \frac{a_1 w + b_1 n}{a_2 w + b_2 n} \tag{10}$$

The annual wage-and-rent bill is earning interest at the same rate in the two industries, so r disappeared from (10). But the money wage rate w and the money rent rate n are still with us in (10), whose sensitivities to them are

$$\frac{\partial(P_1/P_2)}{\partial w} = \frac{(a_1/b_1 - a_2/b_2)b_1 b_2 n}{(a_2 w + b_2 n)^2} \tag{11}$$

$$\frac{\partial(P_1/P_2)}{\partial n} = \frac{(a_2/b_2 - a_1/b_1)b_1 b_2 n}{(a_2 w + b_2 n)^2} \tag{12}$$

If we think, as we normally do, of necessities (food) as less labor-intensive than luxuries (services), i.e., $a_1/b_1 < a_2/b_2$, then (11) is negative and (12) positive: a higher money wage rate w will lower but a higher money rent rate n will raise relative price (10).

Only in the special and unlikely case of labor intensities being the same in both goods, i.e., $a_1/b_1 = a_2/b_2$, will (11) and (12) be zero, and relative price be insensitive to factor prices.

III. MARX

1. Fixed Capital

Ricardo had seen that relative price would equal relative man-hours absorbed if all capital was a wage fund, i.e., if all capital was circulating capital. But Ricardo had felt compelled to add his chapter on "machinery" to his third edition. Here he [1821 (1951: 32)] had seen that if fixed capital or its durability varied among industries, relative price would no longer equal relative man-hours. Marx, too, paid much attention to machinery. So--unlike Samuelson (1957: 884) and (1971: 413n)--let us assume Marxian capital to be

fixed constituting a third good in our model, "machines," so our $i = 1, 2, 3$.

2. Present Net Worth

Fixed capital requires dynamic planning. Let a firm in the ith industry consider acquiring the new physical capital stock S_i. Define the future cash flow of revenue minus wage bill of such a capital stock as

$$H_i \equiv P_i X_i - wL_i \tag{13}$$

Let the rate of interest used to discount such future cash flows be r. Then at time zero the present worth of a future instantaneous rate of cash flow located at time t is $e^{-rt}H_i dt$, and the present net worth J_i of the new physical capital stock S_i is the present worth of all future cash flows over its useful life u minus its cost of acquisition:

$$J_i \equiv \int_0^u e^{-rt}H_i dt - P_3 S_i \tag{14}$$

In a stationary economy the cash flow H_i is not a function of time hence may be moved outside the integral sign. Move it, carry out the integration (14), insert (13), and find present net worth

$$J_i = \frac{1 - e^{-ru}}{r} (P_i X_i - wL_i) - P_3 S_i \qquad (15)$$

3. Production Technology

Ricardo had known diminishing returns but may not have realized that they would make his labor and capital coefficients vary with his margins of cultivation. Marx ignored land and with it diminishing returns. We welcome such simplification allowing us to treat labor and capital coefficients as technological parameters:

$$L_i = a_i X_i \qquad (16)$$

$$S_i = c_i X_i \qquad (17)$$

Ricardo's durable producers' goods had been made from labor alone. To his credit, to Marx it also took producers' goods to produce producers' goods: $a_i > 0$ and $c_i > 0$ for $i = 1, 2, 3$.

4. Equalization of Rates of Profit

Any student of Marx must choose between the "values" of volume I [1867 (1908)], resulting from equalization of rates of surplus value among industries, and the "prices" of volume III [1894 (1909: 181, 212)], resulting from equalization of rates of profit. We choose volume III and let equalized rates of profit equal the rate of interest common to all borrowers, then present net worth (15) will be zero. Set (15) equal to zero, divide by physical output X_i, use (16) and (17), rearrange, and find a Marxian price equation:

$$P_i = a_i w + c_i P_3 \frac{r}{1 - e^{-ru}} \qquad (18)$$

which is a system of three equations in the three unknowns P_1, P_2, and P_3.

5. Was Labor Reproducible?

Did Marx, like Cantillon, have a third process producing labor from necessities at a fixed input-output coefficient equaling labor's

subsistence real wage? To be sure, in his volume I Marx [1867 (1908: 190)] did apply his labor theory of value to labor itself: labor's value in exchange did equal "the value of the means of subsistence necessary for the maintenance of the labourer."

Yet, if ever tempted to build such a labor-producing process into his price theory, Marx withstood the temptation. He despised Malthus, and we agree with Samuelson (1971: 406) that if Marx did have a minimum subsistence wage "it is not well determined by efficacious linkages."

We, too, shall withstand the temptation, leave Marx's price equation (18) the way he left it, and solve it for relative price.

6. Solution for Relative Price

Write (18) for i = 3 and solve for P_3:

$$P_3 = \frac{a_3 w}{1 - c_3 r/(1 - e^{-ru})} \tag{19}$$

Then insert (19) into (18) written for i = 1, 2, rearrange, and find Marx's relative price

$$\frac{P_1}{P_2} = \frac{a_1[1 + (c_1/a_1 - c_3/a_3)a_3 r/(1 - e^{-ru})]}{a_2[1 + (c_2/a_2 - c_3/a_3)a_3 r/(1 - e^{-ru})]} \qquad (20)$$

7. A Labor Theory of Value

Dimensionally (20) is indeed a labor theory of value. According to (16) and (17) the dimension of capital intensity c_i/a_i is machines per man-hour. According to (16) the dimension of the labor coefficient a_3 is man-hours per machine. After cancellation, then, the dimension of the second terms of the brackets of (20) will be pure numbers. Consequently (20) simply expresses relative price in terms of relative man-hours absorbed. But (20) has more than the direct labor coefficients a_1 and a_2 in it.

Indirect labor was important to Marx. Indirect labor was needed to produce machines in accordance with the input-output coefficient a_3. Such machines, in turn, were needed for u years at the rate of interest r in accordance with the capital coefficients c_1, c_2, and c_3. Consequently a_3, c_1, c_2, c_3, r, and u should--and do--appear in (20) and affect relative price P_1/P_2. How?

If like Gordon (1961) we think of necessities as more capital-intensive than luxuries and of luxuries as more capital-intensive than

machinery, i.e., $c_1/a_1 > c_2/a_2 > c_3/a_3$, then the second terms of the brackets of the numerator and the denominator of (20) will both be positive but the former larger than the latter. In that case a higher rate of interest r or a shorter useful life u would affect necessities more than luxuries hence raise relative price (20).

Only in the special and unlikely case of capital intensities being the same in all three goods, i.e., $c_1/a_1 = c_2/a_2 = c_3/a_3$, will the second terms of the brackets of numerator and denominator vanish and leave us with a pure labor theory of value $P_1/P_2 = a_1/a_2$.

IV. NEOCLASSICAL RELATIVE PRICE

1. The Smithian Trinity Once Again

Cantillon ignored capital and Marx land. Let us restore the full Smithian trinity of capital, labor, and land. First, extend our present net worth to include the rent bill. Define the future cash flow of revenue minus the wage and rent bills of a contemplated new physical capital stock S_i as

$$H_i \equiv P_i X_i - wL_i - nN_i \tag{23}$$

Then define present net worth J_i of the new physical capital stock S_i as the present worth of all future cash flows over its useful life u minus its cost of acquisition:

$$J_i \equiv \int_0^u e^{-rt} H_i dt - P_3 S_i \tag{24}$$

In a stationary economy the cash flow H_i is not a function of time hence may be moved outside the integral sign. Move it, carry out the integration (24), insert (23), and find present net worth

$$J_i = \frac{1 - e^{-ru}}{r} (P_i X_i - wL_i - nN_i) - P_3 S_i \tag{25}$$

2. Production Technology

Let us finally come to grips with diminishing returns to the full trinity of capital, labor, and land. Wicksell [1893: V, 121-127 (1954)] and Wicksteed [1894 (1932: 33)] were the first to do so and

to show that it doesn't matter who hires whom. With diminishing returns thus generalized we can no longer use input coefficients as technological parameters. But we can use input elasticities as such. Like Wicksell [1901 (1934: 128)] let us do that and choose a Cobb-Douglas form

$$X_i = j_i L_i^{\alpha_i} N_i^{\beta_i} S_i^{\gamma_i} \tag{26}$$

where j_i is joint factor productivity, α_i, β_i, and γ_i are the labor, land, and capital elasticities of output, and where $\alpha_i + \beta_i + \gamma_i = 1$.

3. Optimization

A firm will hire another man, rent another acre, or install another machine until such hiring, renting, or installation will add nothing to its present net worth J_i:

$$\frac{\partial J_i}{\partial L_i} = \frac{1 - e^{-ru}}{r} \left(P_i \frac{\partial X_i}{\partial L_i} - w\right) = 0$$

$$\frac{\partial J_i}{\partial N_i} = \frac{1 - e^{-ru}}{r} \left(P_i \frac{\partial X_i}{\partial N_i} - n\right) = 0$$

$$\frac{\partial J_i}{\partial S_i} = \frac{1 - e^{-ru}}{r} P_i \frac{\partial X_i}{\partial S_i} - P_3 = 0$$

Carry out the partial differentiations of (26), rearrange, and find factor demand to be in inverse proportion to factor price:

$$L_i = \frac{\alpha_i P_i X_i}{w} \tag{27}$$

$$N_i = \frac{\beta_i P_i X_i}{n} \tag{28}$$

$$S_i = \frac{\gamma_i P_i X_i}{P_3 r/(1 - e^{-ru})} \tag{29}$$

Multiply across, add (27), (28), and (29), and notice in passing Wicksteed's [1894 (1932: 37)] product-exhaustion theorem $wL_i + nN_i + P_3 S_i r/(1 - e^{-ru}) = P_i X_i$.

4. Solution for Relative Price

Raise (27) to the power α_i, (28) to the power β_i, and (29) to the power γ_i. Multiply the three equations. Use (26) and find an X_i on both the left-hand and the right-hand side of their product. Divide it away, rearrange the rest, and find the neoclassical price equation

$$P_i = \frac{1}{j_i}\left(\frac{w}{\alpha_i}\right)^{\alpha_i}\left(\frac{n}{\beta_i}\right)^{\beta_i}\left(\frac{1}{\gamma_i}\right)^{\gamma_i}\left(\frac{P_3 r}{1 - e^{-ru}}\right)^{\gamma_i} \qquad (30)$$

which is a system of three equations in the three unknowns P_1, P_2, and P_3. First write it for i = 3, solving for P_3:

$$P_3 = \left[\frac{1}{j_3}\left(\frac{w}{\alpha_3}\right)^{\alpha_3}\left(\frac{n}{\beta_3}\right)^{\beta_3}\left(\frac{1}{\gamma_3}\right)^{\gamma_3}\left(\frac{r}{1 - e^{-ru}}\right)^{\gamma_3}\right]^{1/(\alpha_3 + \beta_3)} \qquad (31)$$

then for i = 1, 2, solving for relative price:

$$\frac{P_1}{P_2} = \frac{j_2}{j_1} \frac{(w/\alpha_1)^{\alpha_1}}{(w/\alpha_2)^{\alpha_2}} \frac{(n/\beta_1)^{\beta_1}}{(N/\beta_2)^{\beta_2}} \frac{(1/\gamma_1)^{\gamma_1}}{(1/\gamma_2)^{\gamma_2}} \left(\frac{P_3 r}{1 - e^{-ru}}\right)^{\gamma_1 - \gamma_2} \tag{32}$$

where P_3 stands for (31).

5. Factor Prices

All factor prices, i.e., the money wage rate w, the money rent rate n, and the rate of interest $r/(1 - e^{-ru})$, appear in (32), and we are not surprised. The essence of neoclassical thought is that factors are substitutes and that factor demand depends on factor price--indeed in our (27), (28), (29) was always in inverse proportion to factor price!

In (32) the money wage rate w occurs in the power

$$\alpha_1 - \alpha_2 + \alpha_3 \frac{\gamma_1 - \gamma_2}{\alpha_3 + \beta_3} = \frac{(\alpha_1 - \alpha_2)\beta_3 - \alpha_3(\beta_1 - \beta_2)}{\alpha_3 + \beta_3} \tag{33}$$

If we think of necessities as more land-intensive (food) and more capital-intensive (housing), hence less labor-intensive, than luxuries

(services), then $\alpha_1 < \alpha_2$ and $\beta_1 > \beta_2$. As a result both terms of the numerator of (33) are negative, and a higher money wage rate w will unequivocally lower the relative price of necessities (32).

V. SUMMARY AND CONCLUSION

1. Summary

We have restated and solved Cantillonian, Smithian, Marxian, and neoclassical models of price.

Cantillon ignored capital and offered a land theory of value: ultimately labor was produced from necessities. To reduce his labor to indirect land he needed all his labor coefficients as well as labor's "manner of living." All of this would appear in his price solution in addition to his direct land coefficients.

Marx ignored land and offered a labor theory of value: ultimately machines were produced from labor and machines. To reduce his machines to indirect labor he needed all his capital coefficients as well as a rate of interest and a useful life of machines. All of this would appear in his price solution in addition to his direct labor coefficients.

Smith and neoclassicals used the full trinity of capital, labor, and land and made no attempt to reduce it to any single input. Inputs were additive only *via* their prices, hence all input prices would appear in the price solution.

Each model was true under its own assumptions. Fixed input-output coefficients, reproducible labor, circulating capital, or even absence of capital were restrictive assumptions--but perhaps acceptable as first approximations at a preindustrial stage.

Smith's assumptions were the least restrictive because they were the least explicit. His own wording was general enough, or vague enough, to allow capital to be fixed, to allow for diminishing returns to capital, labor, and land, indeed to allow his "natural price" to cover our neoclassical case.

2. Preferences?

Since 1870 we have known that preferences matter, yet our only relationships referred to until now have been input-output relationships. How are preferences sending their signals?

Our Marxian, Smithian, or neoclassical solutions were not self-contained: they had factor prices in them, and such factor prices are determined beyond the ith industry, i.e., in economy-wide factor

markets. Out there the factor demands (27), (28), and (29) of the ith industry are added to the factor demands of other industries. Such aggregate factor demand will reflect preferences: aggregate demand for capital will be high, hence the rate of interest high, if consumers prefer capital-intensive goods, say housing. In the economy-wide factor markets aggregate demand meets aggregate supply. Aggregate supply also reflects preferences, e.g., work-leisure preferences or present goods-future goods preferences. In short, preferences are sending their signals into the ith-industry market *via* the factor prices. A general-equilibrium model is the only full explanation of relative price.

REFERENCES

R. Cantillon, Essai sur la nature du commerce en général, written around 1730, published 1755 referring to a fictitious publisher: "A Londres, Chez F. Gyles, dans Holborn"; reprinted, Boston, 1892; edited and translated into English by Henry Higgs, C.B., London, 1931; translated into German with an introduction by F. A. Hayek, Jena, 1931; republished in French, Paris, 1952.

W. Eltis, The Classical Theory of Economic Growth, London, 1984.

R. A. Gordon, "Differential Changes in the Prices of Consumers' and Capital Goods," Amer. Econ. Rev., Dec. 1961, 51, 937-957.

S. Hollander, "On Professor Samuelson's Canonical Classical Model of Political Economy," J. Econ. Lit., June 1980, 18, 559-574.

K. Marx, Das Kapital: Kritik der politischen Oekonomie, vol. I, Der Produktionsprocess des Kapitals, Hamburg, 1867; translated as Capital: A Critique of Political Economy, vol. I, The Process of Capitalist Production by Samuel Moore and Edward Aveling, edited by Friedrich Engels, revised and amplified according to the fourth German edition by Ernest Untermann, Chicago, 1908.

_____, Das Kapital: Kritik der politischen Oekonomie, vol. III, Der Gesamtprocess der kapitalistischen Produktion, Hamburg, 1894; translated as Capital: A Critique of Political Economy, vol. III, The Process of Capitalist Production as a Whole by Ernest Untermann, edited by Friedrich Engels, Chicago, 1909.

D. Ricardo, The Principles of Political Economy and Taxation, third edition, London, 1821, reprinted in The Works and Correspondence of David Ricardo, P. Sraffa and M. H. Dobb (eds.), vol. I, New York, 1951.

P. A. Samuelson, "Wages and Interest: A Modern Dissection of Marxian Economic Models," Amer. Econ. Rev., Dec. 1957, 47, 884-912.

_____, "Understanding the Marxian Notion of Exploitation: A Summary of the So-Called Transformation Problem Between Marxian Values and Competitive Prices," J. Econ. Lit., June 1971, 9, 399-431.

_____, "Insight and Detour in the Theory of Exploitation: A Reply to Baumol," J. Econ. Lit., Mar. 1974, 12, 62-70.

_____, "A Modern Theorist's Vindication of Adam Smith," Amer. Econ. Rev., Feb. 1977, 67, 42-49.

_____, "The Canonical Classical Model of Political Economy," J. Econ. Lit., Dec. 1978, 16, 1415-1434.

A. Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, London, 1776, new edition, Glasgow, 1805.

A. R. J. Turgot, "Observations sur le Mémoire de M. de Saint-Péravy," Limoges, 1767, in E. Daire (ed.), Oeuvres de Turgot, Paris, 1844, and translated as "Observations on a Paper by Saint-Péravy on the Subject of Indirect Taxation," in P. D. Groenewegen, The Economics of A. R. J. Turgot, The Hague, 1977.

K. Wicksell, Ueber Wert, Kapital und Rente, Jena, 1893, translated as Value, Capital and Rent by S. H. Frohwein, London, 1954.

_____, Föreläsningar i nationalekonomi, I, Lund, 1901, translated as Lectures on Political Economy, I by E. Classen and edited by Lionel Robbins, London, 1934.

P. H. Wicksteed, The Co-ordination of the Laws of Distribution, London, 1894, reprinted by the London School of Economics in 1932 with 14 misprints corrected but not the dP/dC on mid-page 32, which should have been dP/dL.

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