HISTORY OF ECONOMIC THOUGHT
(ECON 406)
Spring 2010

Problem Set A

Surplus Models Prior to 1800

1. What is the long-period method of economic analysis? What are the conditions required for the economy to be in a long period position? What is the relationship of short period positions to long period conditions?

2. Compare and contrast Petty's "Political Price", Quesnay's "Fundamental Price" and Smith's "Natural Price".

3. Why did Petty need a theory of value?

4. What role do social classes play in the surplus models of Petty, Quesnay and Smith?

5. Trace out the emergence of profit and rate of profit in the works of Petty, Quesnay and Smith.

6. Given the following data show how Quesnay's *Tableau Economique* delineated the economic interdependency of the economic classes:

	Productive Class	Proprietors Class	Sterile Class
Initial	$300*rm* $300*fs*	$300*fs*	$300*fs*
Position	$200*m* $600	$300*m*	$300*fs*
Production	$900*fs*	$600	$600*m*
	$600*rm*		

where *rm* is raw materials, *fs* is foodstuffs and *m* is manufactured goods.

7. Quesnay's *Tableau Economique*:

	Productive Class	Proprietors Class	Sterile Class
Initial	$200*rm* $200*fs*	$200*fs*	$200*fs*
Position	$200*m* $600	$300*m*	$200*fs*
Production	$600*fs*	$400	$400*m*
	$400*rm*		

where *rm* is raw materials, *fs* is foodstuffs and *m* is manufactured goods.

Questions:

a). Using the above data, show the exchanges that must take place in order for the initial positions to be recreated.

b). Discuss the following statement: although both the productive class and the sterile class produce a physical surplus, only the productive class produces a value surplus and that only because Quesnay assumed it did.

c). What monetary form did the surplus assume in the *Tableau*?

d). For what political purpose did Quesnay develop the *Tableau*?

8. How does Adam Smith deal with the problem of coordinating conflicting individual actions?

9. Describe Adam Smith's theory of prices for a primitive society.

10. Describe Smith's theory of prices for a capitalist society. Why does Smith believe that the labor theory of value (prices) cease to hold in a capitalist economy?

11. What does it mean when we say that Smith had a labor commanded theory of value?

12. What are the properties of Smith's long period prices? What does it mean when we say that Smith's theory of prices was an adding-up-theory of prices? What determined the wage rate and the rate of profit in Smith's theory of prices?

13. Describe Smith's "theory" of accumulation and growth. What roles do the wage fund and productive versus unproductive labor play in this theory?

14. What is the difference between a productive workers and an unproductive worker?

15. Consider the following classical production model in which labor is the only input:

$15w = 25p_1$
$30w = 70p_2$

a. assume w = \$2.00, determine p_1 and p_2.
b. determine the consumption of good 1 per worker, and the consumption of good 2 per worker. If the number of workers increase to 75, how much of good 1 and good 2 will be produced.

Problem Set B

Full flowering of the Classical Surplus Models, 1800 - 1870

David Ricardo and the Corn Model

1. a. Given the following Ricardian corn model:

$(5_c p_c + 5_l w)(1 + r) = 20_c p_c$

solve for the rate of profit when $w = 1_c p_c$.

b. now assume that the wage rate is increased to $w = 2_c p_c$, what direction will the rate of profit move and why?

c. now let us assume that the production of corn has expanded so that a lower quality of land is taken into cultivation; thus production on this land can be delineated as followed:

$(7_c p_c + 5_l w)(1 + r) = 20_c p_c$

(i) solve for the new rate of profit.

(ii) how much rent does the landlord of the most fertile land get?

(iii) if a tax is placed on wages, what happens to the rate of profit and rent?

(iv) if a tax is placed on rent, what happens to the rate of profit?

d. what is the movement of the rate of profit and rent as less and less fertile land is brought into cultivation.

2. Assuming $w = 2_c p_c$, solve for the rate of profit and derive the wage-profit line:

$(5_c p_c + 3_l w)(1 + r) = 15_c p_c$

3. Ricardo's corn model:

$(6_c p_c + 4_l w)(1 + r) = 18_c p_c$

a. solve for r when $w = 1_c p_c$.

b. derive the wage-profit line.

c. show that w and r are inversely related.

4. Consider the following Ricardian corn model:

$(6_c p_c + 4_l w)(1 + r) = 30_c p_c$

a. solve for the rate of profit when the real wage is one unit of corn.

b. assume that the real wage is increased to three units of corn, what is the new rate of profit? What direction has the rate of profit moved and why?

c. now let us assume that the production of corn has expanded so that a lower quality of land is taken into cultivation; thus production on this land can be delineated as follows:

$(9_c p_c + 6_l w)(1 + r) = 30_c p_c$

(i) solve for the rate of profit when the real wage rate is one unit of corn.

(ii) how much rent in terms of corn does the landlord of the most fertile land get.

5. Consider the following corn economy:

$(5_c p_c + 7_l w)(1 + r) = 30_c p_c$

a. if $w = 2_c p_c$, determine the quantity of profits and the rate of profit.

b. assume that the capitalists reinvest all their profits, how much corn will be produced at the next harvest? Discuss the relationship between the reinvestment of profits and the growth of output of corn.

c. assume that the real wage has increased to three units of corn, what is the new rate of profit? What direction has the rate of profit moved and why?

d. what is the maximum real wage rate?

e. derive the wage-profit line.

f. now let us assume that the production of corn has expanded so that a lower quality of land is taken into cultivation; thus production on this land can be delineated as follows:

$(8_c p_c + 7_l w)(1 + r) = 30_c p_c$

(i) solve for the new rate of profit when the real wage is two units of corn.

(ii) how much rent does the landlord of the most fertile land get?

(iii) if the real wage increases, what happens to rent and why?

(iv) if production expands and more and more less fertile land is brought into cultivation what happens to rents and the rate of profit and why?

6. Given the following Ricardian corn model:

$(10p_c + 8w)(1 + r) = 40p_c$

a. solve for r when the real wage is 2 units of corn.

b. if all profits are reinvested, what will be the new level of output and what will be the growth rate?

c. derive the wage-profit line.

d. now let us assume that the production of corn has expanded so that a lower quality of land is taken into cultivation; the production on this land can be delineated as follows:

$(15p_c + 10w)(1 + r) = 40p_c$

(1) assuming that the real wage is 2 units of corn, how much rent in terms of corn does the landlord of the most fertile land get.

(2) assume a tax of 10% is placed on wages, what happens to the rate of profit and rent?

7. Given the following 2-sector corn model:

$(15p_c + 20w)(1 + r) = 60p_c$

$(5p_c + 5w)(1 + r) = 10p_b$

a. what is the physical surplus of the economy.

b. if $p_c = 1$ and the $w = 1p_c$, determine r and p_b.

c. if the amount of corn used in the production of good b is increased to 20,

(1) how much of good b will be produced?

(2) what is the physical surplus of the economy?

(3) what will be the growth rate of the economy?

(4) what is the maximum number of unproductive workers for each productive worker employed?

8. Given the following Ricardian corn model:

$(12p_c + 10w)(1 + r) = 60p_c$

a. solve for r when the real wage is 3 units of corn.

b. if all profits are reinvested, what will be the new level of output and what will be the growth rate?

c. derive the wage-profit line.

d. now let us assume that the production of corn has expanded so that a lower quality of land is taken into cultivation; the production on this land can be delineated as follows:

$(20p_c + 10w)(1 + r) = 60p_c$

(1) assuming that the real wage is 3 units of corn, how much rent in terms of corn does the landlord of the most fertile land get.

(2) assume a tax of 10% is placed on wages, what happens to the rate of profit and rent?

9. Given the following 2-sector corn model:

$(20p_c + 15w)(1 + r) = 60p_c$

$(5p_c + 5p_b + 5w)(1 + r) = 15p_b$

a. what is the physical surplus of the economy.

b. if $p_c = 1$ and the $w = 1p_c$, determine r and p_b.

c. if the amount of corn used in the production of good b is increased to 20,

(1) how much of good b will be produced?

(2) what is the physical surplus of the economy?

(3) what will be the growth rate of the economy?

10. What was Ricardo's purpose in writing his "Essay on the Influence of a Low Price of Corn on the Profits of Stock"?

11. Using a model of you own construction, describe Ricardo's "pure" corn model and show that the rate of profit can be determined independent of prices and that the rate of profit increases with a fall in the wage rate.

12. According to Ricardo, why must the rate of profit determined in the corn sector rule in the entire economy?

13. Why does David Ricardo make the following statement:

> "If the interests of the landlords be of sufficient consequence, to determine us not to avail ourselves of all the benefits which would follow from importing corn at a cheap price, they should also influence us in rejecting all improvements in agriculture, and in the implements of husbandry." [Ricardo, "An Essay on the Influence of a Low Price of Corn on the profit of Stocks," Sraffa edition, p. 41]

14. "It follows then, that the interest of the landlord is always opposed to the interest of every other class in the community. His situation is never so prosperous, as when food is scarce and dear: whereas, all other persons are greatly benefited by procuring food cheap." [Ricardo, "An Essay on the Influence of a Low Price of Corn on the profit of Stocks," Sraffa edition, p. 21] Explain.

15. "Profits then depend on the price, or rather on the value of food. Every thing which gives facility to the production of food, however scare, or however abundant commodities may become, will raise the rate of profits, whilst on the contrary, every thing which shall augment the cost of production without augmenting the quantity of food, will, under every circumstance, lower the general rate of profit." [Ricardo, "An Essay on the Influence of a Low Price of Corn on the profit of Stocks," Sraffa edition, p. 26] Explain.

16. What is a real wage? If the real wage is given why is it possible to obtain a physical rate of profit?

David Ricardo and Linear Production

1. What is the long period method of analysis in Classical political economy?

2. What role does the theory of value play in Classical political economy?

3. Let us now consider a one-stage classical production model with two goods:

$$l_m w(1 + r) = p_m$$
$$l_c w(1 + r) = p_c$$

a. Assume $l_m = .4$, $l_c = .3$, $w = \$2.00$, and $p_c = 1$; determine r and p_m.

b. Assume $l_m = .4$, $l_c = .3$, $w = \$2.00$, and $r = 20\%$; determine p_c, p_m, and p_m/p_c.

c. Assume that both l_m and l_c declined by 10%; would p_m/p_c change?

d. Assume that l_m declined by 10% and l_c declined by 5%; would p_m/p_c change?

4. According to Ricardo, what was the principle problem in Political Economy?

5. Describe Ricardo's labor theory of value in *On the Principles of Political Economy and Taxation*.

6. What is the implication of Ricardo's theory of value for his view on the relationship between the wage rate and rate of profits? What does this imply about the determination of the rate of profit?

7. What were Ricardo's criticisms of Smith's adding-up-theory of prices of Smith's labor commanded theory of value?

8. Discuss the following statement:

> One of the most significant results of Ricardo's work on prices is that he not only carried out the analysis without reference to supply and demand, but also showed that an explanation of prices can be carried out without recourse to those concepts.

9. Explain why Ricardo was so interested in finding an invariable standard of value and why he concluded that in an economic system which used capital in production such a standard of value could not be found.

10. Using the following model

$$10Lw(1 + r) = 10_m p_m$$
$$(10_m p_m + 15Lw)(1 + r) = 60_c p_c$$

Prove the following claims:

a). p_m/p_c cannot be determined independently of r.

b). If $w = p_c$, then r can be solved for independent of prices.

c). w and r are inversely related.

d). The origin of profits, hence r, is found in the productive sector, especially in terms of the necessary consumption basket.

11. Consider the following two-stage classical production model:

$$L_m w(1 + r) = Mp_m$$

$$(Mp_m + L_c w)(1 + r) = Cp_c$$

a. Show that p_c can be reduced to quantities of direct and indirect labor multiplied by the rate of profit and the wage rate.

b. Assume $L_m = 20$, $M = 25$, $L_c = 10$, and $C = 70$:

(1) assume that $w = 1p_c$, determine r, p_m, and p_c.

(2) determine the wage rate-rate of profit relationship, the maximum rate of profit, and the maximum wage rate.

(3) determine the total amount of capital in the model.

12. Consider the following two-stage classical production model:

$$L_m w = Mp_m$$

$$(Mp_m)(1 + r) + L_c w = Cp_c$$

a. Show that p_c can be reduced to quantities of direct and indirect labor multiplied by the rate of profit and the wage rate.

b. Assume $L_m = 15$, $M = 30$, $L_c = 20$, and $C = 90$:

(1) assume that w = \$2.50, determine r, p_m, and p_c.

(2) determine the wage rate-rate of profit relationship, the maximum rate of profit, and the maximum wage rate.

(3) determine the total amount of capital in the model.

13. Describe the one-way production schema. How are capital goods placed in the schema?

14. What did Ricardo mean by the value of labour?

15. For Ricardo what is wealth? Also what is, for Ricardo, value? Finally, for Ricardo, what is the source of value? What is the measure of value? and What is the creator of wealth?

16. What did Ricardo mean by the rise and fall in the value of labour?

17. "The proportions in which capital that is to support labour, and the capital that is invested in tools, machinery and buildings, may be variously combined. This difference in the degree of durability of fixed capital, and this variety in the proportions in which the two sort of capital may be combined, introduce another cause, besides the greater or less quantity of labour necessary to produce commodities, for the variations in their relative value--this cause is the rise or fall in the value of labour." [Ricardo, *On the Principles of Political Economy and Taxation*, Sraffa edition, p. 30] What is Ricardo talking about?

18. "If men employed no machinery in production but labour only, and were all the same length of time before they brought their commodities to market, the exchangeable value of their goods would be precisely in proportion to the quantity of labour employed." [Ricardo, *On the Principles of Political Economy and Taxation*, Sraffa edition, p. 32] Develop a production-price model to illustrate Ricardo's statement.

19. "There can be no rise in the value of labour without a fall of profits. If the corn is to be divided between the farmer and the labour, the larger the proportion that is given to the latter, the less will remain for the former." [Ricardo, *On the Principles of Political Economy and Taxation*, Sraffa edition, p. 35] Construct a model to demonstrate this statement.

Karl Marx and Circular Production

1. Define constant capital, variable capital and surplus value.

2. What was Marx's explanation for the origin of profits? What role does his labor theory of value play in this explanation?

3. What determines the rate of profit for Marx? Why was Marx interested in the tendency for the rate of profit to fall? What was his explanation for the rate of profit to fall?

4. Using a model of your own construction, describe Marx's models of simple reproduction and expanded reproduction. Be sure to describe the assumptions of each model and the essential relationships inherent in each model.

5. "The death knell of capitalist private property sounds. The expropriators are expropriated." Describe the set of arguments developed by Marx to reach this conclusion.

6. What is the machine question?

7. What is the relationship between Socialism and Marxism/radical economics?

8. Marxist say that the source of value is labor, that the origin of profits is in the exploitation of labor, and that the relative prices of two goods are determined by the relative quantities of labor embodied in their production. Write an essay defending these propositions as being theoretically sound.

9. What makes Marx's economic theory so radical relative to the Classical Political Economy theory upon which he based his theory?

10. Why is Marx's explanation for the origin of profits so radical?

11. Why is economics conceived in terms of social relationships as opposed to commodities such a radical notion?

12. What did Marx mean by mode of production? Is this really a radical idea?

13. Capitalism is a historically-based mode of production. Why is this a radical idea?

14. Why is the statement "workers are free to be wage slaves" not incoherent?

15. What is meant by socially necessary labor time?

16. Why is labor-power not the same thing as labor?

17. What is the rate of surplus value suppose to measure?

18. What is the organic composition of capital? What special role does it play in the labor theory of value and the falling rate of profit?

19. "Capitalism is a historically contingent social system of production". What does this statement mean and what implications flow from it?

20. The exchange of commodities in capitalism is the process through which exploitative social relationships are reproduced. Discuss.

Problem Set C

The Underground Years

1. What are the differences between the Classical explanation of prices and profits and the neoclassical/supply and demand explanations?

2. What is the difference between equilibrium and long period positions?

3. Neoclassical economics represents a new basis for explaining prices. What was the old basis? What is different about the new basis?

4. In a linear view of the production process, intermediate products move steadily towards their final goal, consumption, down a strictly one-way path. What does this mean? Discuss.

5. What is the transformation problem and was Marx really concerned about it?

6. What was Bortkiewicz argument that Marx's method of transforming values into prices was incorrect?

7. Using models of your own choice, verify the following conclusions made by Bortkiewicz:

   a). Profits in each sector do not equal the surplus value in the each sector (although total profits equal total surplus value).

   b). "total prices" does not equal total value.

   c). The rate of profit does not equal the rate of surplus value.

   d). Variations in the organic composition of capital in the "basic" sectors affect r while variations in the organic composition of capital in the luxury goods sector does not affect r.

8. Let us now consider a two-stage classical production model:

$$L_m w(1 + r) = Mp_m$$
$$(Mp_m + L_c w)(1 + r) = Cp_c$$

   a. Show that p_c can be reduced to quantities of direct and indirect labor multiplied by the rate of profit and the wage rate.

   b. Assume $L_m = 10$, $M = 15$, $L_c = 8$, and $C = 40$; also assume that $w = 1p_c$. Determine r, p_m, p_c, and p_m/p_c. Can prices be determined independent of the rate of profit?

c. Assume $L_m = 10$, $M = 15$, $L_c = 8$, and $C = 40$; determine the wage rate-rate of profit relationship and graph it. What is the maximum rate of profit; what is the maximum wage rate. As the rate of profit varies, what happens to p_m/p_c?

d. What is the unit of integrated capacity for good c? What is the rate of growth of the model? Is there any limit to the rate of growth? Why or why not?

e. What is the total amount of capital in the model.

f. What happens to the rate of profit and the growth rate of the model if L_m fell to 7 due to technological change (and nothing else changed)?

9. Consider the following two-stage classical production model:

$$L_m w(1 + r) = Mp_m$$

$$(Mp_m + L_c w)(1 + r) = Cp_c$$

a. Show that p_c can be reduced to quantities of direct and indirect labor multiplied by the rate of profit and the wage rate.

b. Assume $L_m = 15$, $M = 30$, $L_c = 20$, and $C = 90$:

(1) assume that w = \$2.50, determine r, p_m, and p_c.

(2) determine the wage rate-rate of profit relationship, the maximum rate of profit, and the maximum wage rate.

(3) determine the total amount of capital in the model.

(4) what happens to the rate of profit if L_m decreased to 10 due to technical change (and nothing else changed)?

Problem Set D

The Re-emergence of the Surplus Models, 1930 – 1960

Wassily Leontief and Input-Output Analysis

1. Consider the following price model:

   $.3p_1 + .5p_2 + w_1 + r_1 = p_1$

   $.2p_1 + .1p_2 + w_2 + r_2 = p_2$

   a. if $w_1 = w_2 = \$1.00$ and $r_1 = r_2 = \$1.00$, then determine p_1 and p_2.

   b. if $w_1 = \$1.00$ and $w_2 = \$2.00$ and $r_1 = r_2 = \$1.00$, then determine p_1 and p_2.

   c. if $w_1 = w_2 = \$1.00$ and $r_1 = \$1.00$ and $r_2 = \$2.00$, then determine p_1 and p_2.

   d. what are the theoretical implications of these results?

2. Consider the following quantity model:

   $.3Q_1 + .2Q_2 + Q_{s1} = Q_1$

   $.5Q_1 + .1Q_2 + Q_{s2} = Q_2$

   a. what do Q_{s1} and Q_{s2} represent.

   b. if $Q_{s1} = Q_{s2} = 10$ determine Q_1 and Q_2.

   c. if $Q_{s1} = 10$ and $Q_{s2} = 20$ determine Q_1 and Q_2.

   d. describe the Keynesian multiplier in terms of the quantity model.

3. Describe the relationship between the quantity model and the price model with respect to the level of employment and national income.

4. Consider the following economy:

   $.25Q_1 + .25Q_2 + Q_{s1} = Q_1$

   $.3Q_1 + .2Q_2 + Q_{s2} = Q_2$

   a. determine Q_1 and Q_2 if $Q_{s1} = 10$ and $Q_{s2} = 20$.

b. prove that Q_1 and Q_2 must be positive.

c. determine the change in output if Q_{s1} is increased by 10%. Why does Q_2 increase, even though Q_{s2} was not increased at all?

5. Consider the following economy:

$.5Q_2 + Q_{s1} = Q_1$ $\quad$ $.3p_2 + w_1 + r_1 = p_1$

$.3Q_1 + Q_{s2} = Q_2$ $\quad$ $.5p_1 + w_2 + r_2 = p_2$

a. assume $Q_{s1} = 5$ and $Q_{s2} = 10$, solve for Q_1 and Q_2

b. assume $w_1 = w_2 = \$1.00$ and $r_1 = r_2 = \$3.00$, solve for p_1 and p_2

6. Consider the following economy:

Price Model	Quantity Model
$.3p_2 + 1w_1 + pm_1 = p_1$	$.4Q_2 + Q_{s1} = Q_1$
$.4p_1 + 1w_2 + pm_2 = p_2$	$.3Q_1 + Q_{s2} = Q_2$

Questions:

a. assume that $w_1 = w_2 = \$1.00$ and $pm_1 = pm_2 = \$2.00$, determine p_1 and p_2.

b. assume that $Q_{s1} = 10$ and $Q_{s2} = 15$ where Q_{s1} and Q_{s2} represent final demand or the surplus, determine Q_1 and Q_2.

c. using the answers in (a) and (b) determine gross national product, net national income, and the wage share of net national income.

d. assuming that Q_{s1} is increase by one unit, with wage rates and profit margins remaining the same, determine the new net national income and the new wage share of net national income. Provide an economic explanation for these results.

e. assuming that pm_1 and pm_2 are increased to \$3.00, with wage rates remaining the same and $Q_{s1} = 10$ and $Q_{s2} = 15$, determine the new net national income and the new wage share of net national income. Provide an economic explanation for these results.

f. describe the Keynesian multiplier in terms of the quantity model.

7. Consider the following economy:

$.4Q_1 + .3Q_2 + Q_{s1} = Q_1$

$.6Q_1 + .1Q_2 + Q_{s2} = Q_2$

a. determine Q_1 and Q_2 when $Q_{s1} = 10$ and $Q_{s2} = 20$.

b. if Q_{s1} increases while Q_{s2} remains constant, why does Q_2 increase?

8. Consider the following economy:

Price Model	Quantity Model
$.6p_2 + 1w_1 + pm_1 = p_1$	$.3Q_2 + Q_{s1} = Q_1$
$.3p_1 + 1w_2 + pm_2 = p_2$	$.6Q_1 + Q_{s2} = Q_2$

Questions:

a. assume that $w_1 = w_2 = \$3.00$ and $pm_1 = pm_2 = \$2.00$, determine p_1 and p_2.

b. assume that $Q_{s1} = 20$ and $Q_{s2} = 15$, determine Q_1 and Q_2.

c. using the answers in (a) and (b) determine gross national product, net national income, and the wage share of net national income.

d. describe the multiplier in terms of the quantity model.

e. assuming that Q_{s2} is increase by five units, with wage rates and profit margins remaining the same, determine the new net national income and the new wage share of net national income. Provide an economic explanation for these results.

f. assuming that w_1 and w_2 are increased to \$4.00, with wage rates remaining the same and $Q_{s1} = 20$ and $Q_{s2} = 15$, determine the new net national income and the new wage share of net national income. Provide an economic explanation for these results.

9. A town has three main industries: a coal-mining operation, an electric power generating plant, and a local railroad. To mine \$1.00 of coal, the mining operation must purchase \$0.25 of electricity to run its equipment and \$0.25 of transportation for its shipping needs. To produce \$1.00 of electricity, the generating plant requires \$0.65 of coal for fuel, \$0.05 of its own electricity to run auxiliary equipment, and \$0.05 of transportation. To provide \$1.00 of

transportation, the railroad requires $0.55 of coal for fuel, and $0.10 of electricity for its auxiliary equipment. In a certain week, the coal-mining operation receives orders for $50,000 of coal from outside the town, and the generating plant receives orders for $25,000 of electricity from outside. There is no outside demand for the local railroad. How much must each of the three industries produce in that week to exactly satisfy their own demand and the outside demand?

11. Construct your own transaction table and identify the value added and the household industry. How did Leontief alter the transaction table in order to analysis economic events over time?

12. Describe a closed input-output model. What are the differences between a closed and a open input-output model.

13. Describe the relationship between the quantity model and the price model with respect to the level of employment and net national income.

14. Compare Leontief's input-output model with Marx's reproduction models, and with Quesnay's *Tableau Economique*.

18. How does Leontief transform the transaction table into an economic model?

Transformation Problem Re-visited

1. What were Winternitz's and Seton's contributions to the transformation problem?

Kiel Group and the Capital Controversy of the 1930s

1. Answer the following questions.

    a. What are the differences between a one-stage and a two-stage classical production model?

    b. What are the differences between a classical production model and a Burchardt production model?

2. Describe the interdependencies of the 2-sector Burchardt model.

3. "…the Self-reproduction of capital is an elementary 'technological' fact of capitalistic production." [Nurske, "The Schematic Representation of the Structure of Production," p. 238] Explain.

4. What is Marx's contribution to the Burchardt model?

Two Sector Models of Production, Prices, Profits, and Accumulation

1. Workers spend what they get and capitalists get what they spend. What did Kalecki mean by this?

2. Why does a higher profit mark up (or degree of monopoly) produce a lower degree of capacity utilization (or output) and a higher profit share in national income?

3. What determines profits and savings in the Burchardt models?

4. What determines the distribution of income between wages and profits in the Burchardt models?

5. Why in the Burchardt models does wages and profits constitute all of the net national income and gross national income, so that net national income equals gross national income?

6. What drives output and the expansion of output in the Burchardt models?

7. Is it possible to derive a wage-profit line in a two-sector Burchardt model? Why or why not?

8. What is the relationship between the wage rate and rate of profit or profit mark up in a one-sector and two-sector Burchardt model?

9. Let us consider the following model of the economy:

   (a) $Q_m(rm_m p_{rm} + l_m w_m)(1 + r_m) = Q_m p_m$

   (b) $Q_c(rm_c p_{rc} + l_c w_c)(1 + r_c) = Q_c p_c$

   (c) $(1/q_{cm})M_c = Q_m$

   (d) $q_c M_c = Q_c$

   (e) $Q_m(rm_m p_{rm} + l_m w_m)r_m = (Q_m - M_c)p_m = M_m p_m$

   (f) $Q_c(rm_c p_{rc} + l_c w_c)r_c = M_c p_m$.

   Let us also assume that $rm_m = 1$, $l_m = 1$, $rm_c = 2$, $l_c = 2$, $q_m = 2.5$, $q_c = 3$, $q_{cm} = .6$, $p_{rm} = \$1.00$, $p_{rc} = \$2.00$, $w_m = \$1.00$, $w_c = \$1.00$, and $M_c = 10$.

   a. Determine Q_c, Q_m, r_m, r_c, p_m, and p_c.

   b. Determine i_s.

c. Assume that M_c is increased to 15 (nothing else has changed); determine the new values for Q_c, Q_m, r_m, r_c, p_m, p_c, and i_s. Compare your answers with those determined in (a) and (b) above and explain any differences.

d. Now assume that both wage rates have increase to $2.00 (nothing else has changed) and repeat the exercise in (c) above.

e. Now assume that $q_c = 4$ (nothing else has changed) and repeat the exercise in (c) above.

f. Now assume that $q_{cm} = .7$ (nothing else has changed) and repeat the exercise in (c) above.

Problem Set E

The Re-establishment of the Surplus Theoretic Framework, 1960 – 1990

Sraffian Production-Price Models

1. Compare and contrast the classical production-price model, the two-sector Burchardt production-price model, and the Sraffian production-price model with regard to the nature of production, the origin of profits, and the relationship between wages and profits.

2. Compare and contrast the nature of interdependency in the two-sector Burchardt model and the Sraffian model.

3. Why does production as a circular process (flow) mean that the maximum rate of profit is finite?

4. Why does production as a circular process (flow) mean that prices cannot be resolved completely into direct and indirect multiplied by wage rates and rate of profit? What does this mean for the labour theory of value?

5. What is the commodity residual? What does it represent? What are its implications for the determination of prices?

6. Why is Sraffa's analysis of prices, wage rates, and rate of profit not predicated on constant returns to scale?

7. Why does the production of a surplus necessitates the introduction of distributional variables? What does this imply about the origins of profits?

8. Utilizing 'mathematical' and literary discourse, critically compare the Ricardian one-good economy with the Sraffian multi-good economy in the following areas:

   origin of profits
   origin of value
   the notion of the surplus
   determination of prices
   the role of prices
   distribution of wages and profits
   the quantity of capital
   relationship between the K/L ratio and the rate of profit.

9. Consider the following economy:

   $.6p_1 + .4p_2 = p_1$

$.5p_1 + .5p_2 = p_2$

a. solve for p_1 and p_2

b. prove that p_1 and p_2 must be positive.

10. Consider the following economy:

$(6p_i)(1 + r) + 15Lw = 15p_c$

$(3p_c)(1 + r) + 12Lw = 12p_i$

$(3p_c + 2p_i)(1 + r) + 6Lw = 6p_s$

a. define the concepts of basic and non-basic goods and identify which category corn, iron, and steel fall into.

b. determine p_c, p_i, and p_s, assuming r = 10% and w = $1.00.

c. do non-basic goods have an impact on the prices of basic goods? Why or why not?

d. contrast and compare the classical concepts of necessaries and luxuries with basic and non-basic goods.

e. Compare and contrast Sraffa's notion of the surplus with the notion of the surplus found in the works of the Classical economists.

11. Consider the following economy:

$(3p_i)(1 + r) + 10Lw = 10p_c$

$(2p_c)(1 + r) + 6Lw = 6p_i$

a. determine prices when r = 0 and w = $1.00.

b. determine the maximum rate of profit.

c. determine prices if r = R and w = 0.

12. Consider the following economy:

$[6p_i][1 + r] + 12Lw = 12p_c$

$[9p_c][1 + r] + 15Lw = 15p_i$

Answer the following questions:

a. determine p_i and w when r = 0 and $p_c = 1$.

b. determine the maximum rate of profit and the prices, p_c and p_i, associated with it.

c. derive the wage-profit line with p_c taken as the <u>numeraire</u>.

13. Why does Sraffa say that the adding-up of component theories of prices is wrong?

14. The theory of value plays an integral role in Classical models. Discuss its role in the models of Ricardo, Marx, and Sraffa. The following points need to be considered:

a. the conceptualization of the homogeneous labor used in production;

b. the origin of profits and the determination of the rate of profit;

c. the role of prices and the rate of profit in the capitalist system;

d. comparison of Ricardo's labor theory of value with the Sraffian theory of value;

e. comparison of Marx's labor theory of value with the Sraffian theory of value; and

f. whether value needs to be a part of a theory of prices.

After Sraffa

1. Let us consider the following one-stage Burchardt production model:

(1) $L = L_d + L_o$ (4) $pQ_i = s_pP$

(2) $Q = L_d/l$ (5) $P = [lw + l_o^*][1 + r]$

(3) $Qp = P + L_dw + L_ow = P + w(lQ + L_o)$

Let us also assume that $L_o = 20$, $l = .3$, w = \$1.00, $s_p = .5$, $Q_i = 10$, $Q^* = 100$, and r = 20%.

a. Determine, p, Q, L_d, L, and P.

b. Determine the share of profits in output.

c. Assume that s_p has increased to 1 (nothing else has changed); determine the new values for p, Q, L_d, L, P, and the share of profits in output. Why are the new values different from the ones in (a) and (b) above.

d. Now assume that r = 10% (nothing else has changed) and repeat the exercise in (c) above.

e. Now assume that Q* = 200 (nothing else has changed) and repeat the exercise in (c) above.

f. Now assume that $Q_i = 5$ (nothing else has changed) and repeat the exercise in (c) above.

2. Let us consider the following one-stage Burchardt production model with the mark up determined by investment needs:

(1) $L = L_d + L_o$ (4) $pQ_i = s_pP$

(2) $Q = L_d/l$ (5) $p = [lw + l_o*w][1 + r]$

(3) $Qp = P + L_dw + L_ow = P + w(lQ + L_o)$

Let us also assume that $L_o = 20$, $l = .3$, $w = \$1.00$, $s_p = .5$, $Q_i = 10$, $Q^* = 100$, and $q = .4$.

a. Determine, p, Q, L_d, L, P, and r.

b. Determine the share of profits in output.

c. Assume that s_p has increased to 1 (nothing else has changed); determine the new values for p, Q, L_d, L, P, and the share of profits in output. Why are the new values different from the ones in (a) and (b) above.

d. Now assume that $Q_i = 5$ (nothing else has changed) and repeat the exercise in (c) above.

e. Now assume that q = .3 (nothing else has changed) and repeat the exercise in (c) above.

f. Now assume that $Q_i = 5$ and q = .3 (nothing else has changed) and repeat the exercise in (c) above.

3. Consider the following one-stage Burchardt production model:

(1) $L = L_d + L_o$ (4) $pQ_i = s_pP$

(2) $Q = L_d/l$ (5) $p = lw(1 + r)$

(3) $Qp = P + L_dw + L_ow = P + w(lQ + L_o)$

Let us also assume that $L_o = 40$, $l = .5$, $w = \$4.00$, $s_p = .5$, and $Q_i = 40$.

a. Assume r = 25%, determine, p, Q, L_d, L, and P.

b. Assume that s_p has increased to 1 (nothing else has changed); determine the new values for p, Q, L_d, L, and P. Why are the new values different from the ones in (a).

c. Assume that the mark up is determined by investment needs: $r = q/(1 - q)$ where $q = (Q_i/Q)$ the investment-output ratio.

(1) Assume q = .5, determine, p, Q, L_d, L, and P.
(2) If the investment-output ratio increases what happens to the real wage and why?

4. Consider the following two-sector Burchardt model of the economy:

(a) $Q_m(rm_mp_{rm} + l_mw_m)(1 + r_m) = Q_mp_m$

(b) $Q_c(rm_cp_{rc} + l_cw_c)(1 + r_c) = Q_cp_c$

(c) $[q_m/(q_m - 1)][M_c + M^*_m + M^*_c] = Q_m$

(d) $q_cM_c = Q_c$

(e) $Q_m(rm_mp_{rm} + l_mw_m)r_m = (Q_m - M_c - M^*_c)p_m$

(f) $Q_c(rm_cp_{rc} + l_cw_c)r_c = (M_c + M^*_c)p_m$

where rm_m is the raw material production coefficient for the machine industry;

l_m is the labour production coefficient for the machine industry;

rm_c is the raw material production coefficient for the consumption good industry;

l_c is the labour production coefficient for the consumption good industry;

p_{rm} is the price of the raw material input in the machine industry;

p_{rc} is the price of the raw material input in the consumption good industry;

w_m is the wage rate in the machine industry;

w_c is the wage rate in the consumption good industry;

r_m is the profit mark up in the machine industry;

r_c is the profit mark up in the consumption good industry;

p_m is the price of machines;

p_c is the price of the consumption good;

Q_m is the output of machines;

Q_c is the output of the consumption good;

q_m is the output-machine ratio for the machine industry;

q_c is the output-machine ratio for the consumption goods industry;

M_c is the number of machines currently used in the consumption goods industry;

M^*_m is the number of extra machines to be produced for the machine industry; and

M^*_c is the number of extra machines to be produced for the consumption goods industry.

Assume the following values:

$rm_m = 2$, $l_m = 1$, $rm_c = 3$, $l_c = 2$, $p_{rm} = \$2.00$, $p_{rc} = \$3.00$, $w_m = \$2.00$, and $w_c = \$1.00$.

Answer the following questions

a. Assume $q_m = 3$, $q_c = 4$, $M_c = 15$, $M^*_m = 0$, and $M^*_c = 0$, determine Q_c, Q_m, r_m, r_c, p_m, and p_c.

b. Assume that M^*_c and M^*_m are increased from zero to 10 (nothing else has changed); determine the new values for Q_c, Q_m, r_m, r_c, p_m, and p_c.

c. Compare your answers with those determined in (a) and (b) above and explain the differences.

d. If q_m and q_c both increase to what happens to the profit mark ups. Why?

e. M^*_c and M^*_m represent machines produced but not put to use. If they were put to use in their respective industries, what would be the results?

5. Consider the following economy:

$[.3p_2][1 + r_1] + 1w_1 = p_1$ $\qquad$ $.4Q_2 + Q_{s1} = Q_1$

$[.4p_1][1 + r_2] + 1w_2 = p_2$ $\qquad$ $.3Q_1 + Q_{s2} = Q_2$

Questions:

a. assume that $w_1 = w_2 = \$1.00$ and $r_1 = r_2 = 10\%$, determine p_1 and p_2.

b. assume that $Q_{s1} = 10$ and $Q_{s2} = 15$, determine Q_1 and Q_2.

c. using the answers in (a) and (b) and assuming that the capitalist propensity to consumer out of profits is zero, determine national income, net national income, nominal investment, the wage share, and the Kaleckian multiplier.

d. assuming that Q_{s1} is increased by one unit, with wage rates and profit mark ups remaining the same, determine the new net national income, the new level of nominal investment, and the new wage share. Provide an economic explanation for these results.

e. assuming that r_1 and r_2 are increased to 15%, with wage rates remaining the same and $Q_{s1} = 10$ and $Q_{s2} = 15$, determine the new net national income, nominal investment, and wage share. Provide an economic explanation for these results.

f. repeat (e) except that wage rates are increased to \$2.00 while the mark ups for profit remain at 10% and determine the wage share. Compare this result with that in (e) and comment.