AMERICAN UNIVERSITY
Department of Economics

Comprehensive Examination June 2009
Advanced Heterodox Theory

Directions: This examination has two sections, Micro and Macro. You must answer both sections; be sure to follow the directions in each section carefully (there is limited choice in both). Each section receives *equal* weight in the overall grading; therefore, you should plan to spend an *equal* amount of time (i.e., about 2 hours) on *each* section (micro and macro). Please make sure that all math is intuitively explained, all diagrams are clearly labeled, and all answers are responsive to the specific questions asked.

MICRO SECTION (2 hours total - 1 hour per question)

Directions: **Choose two (2)** of the following questions. Plan to spend about *1 hour on each one*.

1. The box below is often used to represent a one-shot Prisoners Dilemma game, assuming self-regarding preferences. Explain what this simple game shows about the likelihood of efficient markets.
    a. Still assuming a one-shot game, explain how to alter the game so as to incorporate (in two different examples). For each part i., and ii., explain how you came up with the new payoffs.
        i. Altruism.
        ii. A preference for fairness.
    b. Explain how the collective action problem illustrated by the game will change under the different assumptions about preferences.
    c. Discuss empirical evidence that supports one of the modeling choices in part a).

PLAYER 2

PLAYER 1	Cooperate	Defect
Cooperate	3,3	1,5
Defect	5,1	2,2

2. Efficient Equilibrium in Markets?

   a. Bowles argues that market equilibrium cannot be defined without specifying a bargaining process for arriving there. Explain. According to Bowles, what specific institutional form of bargaining is assumed by Walrasian economics?
   b. What are the limitations of such a mechanism for achieving an efficient equilibrium?
   c. What sorts of institutional arrangements might help markets achieve efficient equilibrium? Explain, give examples of how this works.

3. Bowles' contingent renewal model of firm behavior uses a Stackleberg equilibrium.

   a. Explain this equilibrium concept and why it is appropriate to use in this model of capital-labor relations.

   The equation below shows a worker's expected utility function:

   $V = \{[u(w,e) - iZ] / [i+t(e)]\} + Z$

   Where w = the wage set by the employer,
   e = effort per hour by the worker
   t = the probability of termination in the next period ($t = m(1-e)$), where m is the level of monitoring used by the firm.
   i = the worker's rate of time preference, and
   Z = the worker's fallback position, or what he/she would earn if terminated.

   b. Assume workers' utility functions were such as to define the following labor extraction function (Best Response Function): $(1-e) = \beta/w$ for $w \geq \underline{w}$, where $\underline{w}$ is the reservation wage. The reservation effort level associated with $\underline{w}$ is $\underline{e}$. Let $\underline{w} = 1.5$, $\beta = 1$. What is $\underline{e}$? Graph $e = e(w)$. Explain its shape.
   c. The firm has the production function $Q = Q(he)$, where h = hours hired, output is sold at p, and the firm maximizes profit. Use the firm's first order conditions to calculate w* and e*.
   d. How does this outcome differ from the outcome of wage determination in the simple neo-classical model? Why do employers not lower wages?
   e. Using the worker's BRF and also the FOCs from the full equation in from part b., outline two ways that worker ownership might change the outcome, linking these directly to variables in the BRF. Graph the new labor extraction functions.
   f. How might the initial dynamics (prior to E))change if the workers have a preference for fairness, as in Falk, Fehr and Zehnder?

4. Recall the Fishers, Eye and Jay, who jointly use an exhaustible resource.

   Their payoffs to fishing are:

   $Y_i = \alpha\,(1-e_j)\,e_i$, where y_i = amount of fish caught

   α= technology constant. Let α=1.

   e_j and e_i = respectively the amount time each spends fishing, fraction of 24 hour day.

   The fishers have utility functions: $u_i = y_i - e_i^{2.}$

   a. Let p = share of the population playing 6 hours (call that D), and (1-p)= share playing 4 hours (call that C). What is the equilibrium share of the population that plays D, p*?

   b. Is D an Evolutionarily Stable Strategy? Is C?

   c. Using the replicator equation $\Delta p = p' - p = \varpi p(1-p)\beta(b_x - b_y)$ explain what happens to p* over time.

   d. Now let the fishers have continuous choices of working time.

      i. Find the Nash equilibrium and
      ii. Show whether it is Pareto optimal? Stable?

   e. Drawing on Ostrom, discuss some empirical evidence on the prospects for having a stable high proportion of C's in the population, over time.

MACRO SECTION (2 hours total - 1 hour per question)

Directions: **Choose <u>two (2)</u>** of the following questions. Plan to spend about *1 hour on each one*.

1. Explain Eckhard Hein's argument about why the NAIRU may be endogenous in response to monetary policies that seek to stabilize inflation. In your answer, be sure to explain the model that Hein uses to make this argument (highlighting any key assumptions) and address the following specific points:
   a. Explain the difference between Hein's concepts of the GERE (goods market equilibrium rate of employment) and SIRE (stable inflation rate of employment)
      i. In what sense is the SIRE a NAIRU and how is it different from more conventional definitions of the NAIRU? Discuss briefly.
   b. Is the SIRE stable if the monetary authority (central bank) holds the interest rate constant in the "normal" and "puzzling" cases, respectively? Analyze and explain.
   c. How does monetary policy intervention (via adjustments in the interest rate) affect the

stability of the SIRE in each case, assuming that the mark-up is interest inelastic?

d. What happens if the monetary authority adjusts the interest rate in an effort to stabilize inflation, and the mark-up is interest-*elastic*?
e. Finally, discuss the policy implications of Hein's argument and evaluate to what degree you find his model convincing.

2. Suppose that the government subsidizes a country's R&D sector. Analyze the effects on long-run growth in each of the following models and scenarios (each is specified in its own notation):
   a. Aghion & Howitt's neo-Schumpeterian model with the innovation function, $\mu = \phi(n) = \lambda n^{\sigma}$ $(0 < \sigma < 1)$, where n is productivity-adjusted R&D expenditure; you may assume that the R&D subsidy increases the productivity of the research sector λ (which you may call "the productivity of innovation" for short).
   b. Setterfield & Cornwall's neo-Kaldorian model with the Verdoorn's Law equation, $q = r + \alpha y$, where q is the growth rate of labor productivity and y is the growth rate of output; you may assume that the R&D subsidy increases the shift factor α.
   c. Dutt's (2006) neo-Keynesian model with endogenous labor productivity growth at the rate a, with $\hat{a} = \phi(l - n)$, where l is the growth rate of labor demand, n is the growth rate of labor supply, and $\phi > 0$ is a speed of adjustment parameter; you may assume that the R&D subsidy gives a one-time positive shock to a.

   Your answers to this question should be ***mostly graphical and intuitive***, with reference *only* to *necessary* equations or math. Be sure to explain (in words) the *mechanism* that leads to the growth results in each model (if long-run growth increases, *why* does this happen? trace the chain of causality!), and compare and contrast the logic and implications of the three models.

3. First, consider a neo-Kaleckian specification of the aggregate demand side of the macro model. Let π be the profit share and the profit rate is $r = \pi u$, where the output-capital ratio, $u = Y/K$, is used as a proxy for the rate of capacity utilization. There is no foreign trade for simplicity. You may denote the budget deficit as $\gamma = (G - T)/K$, and the saving ($\sigma = S/K$) and investment ($g = I/K$) functions are:

$$\sigma = s_r r \qquad \text{and} \qquad g = g_0 + g_1 \pi + g_2 u$$

   where $g_0, g_1, g_2 > 0$, $0 < s_r < 1$, and there are no workers' savings ($s_w = 0$).
   a. Solve the aggregate demand side of the model for the goods market equilibrium condition, i.e., the short-run equilibrium level of u as a function of π. Be sure to find an *explicit, reduced-form solution* for u, determine the goods-market stability condition, and find the sign of the derivative $\partial u/\partial \pi$. Is this economy stagnationist or exhilarationist, or can it be either? Define your terms and discuss your result.

   Next, consider a "conflicting claims" model of inflation and distribution. The wage share is $\psi = 1 - \pi = wa/P$, where w is the nominal wage rate, $a = N/Y$ is the labor coefficient (labor hours per unit of output), and P is the price level (which equals value added, assuming no raw materials for simplicity). The wage and price reaction functions are

$$\hat{w} = \phi(\psi_w - \psi) + \lambda u \qquad \text{and} \qquad \hat{P} = \theta(\psi - \psi_f) \qquad (\phi, \theta, \lambda > 0),$$

   where ψ_w and ψ_f are the workers' and firms' targets for the wage share, respectively. Labor productivity grows at the rate $\varepsilon = \hat{X} - \hat{N} = -\hat{a} > 0$, which is assumed to be

exogenous.

b. Solve for the equilibrium wage share ψ as a function of capacity utilization u. Illustrate this solution on a diagram in $u \times \psi$ space. What is the slope of the distributive curve (DC, or $\hat{\psi} = 0$)? Interpret the meaning of whether DC slopes up or down.

c. Now combine the DC curve with an "IS" curve representing the solution from part a. on a single diagram in $u \times \psi$ space. Is the medium-run equilibrium necessarily stable, assuming that the goods market clears quickly and the price-distribution adjustments are slower? If not, on what does the stability of the medium-run equilibrium depend? Analyze graphically and explain intuitively.
    i. If an unstable case is possible, briefly explain the intuition for the instability.

d. For the *stable* case you found in part c. (and **ONLY** the stable case), analyze (*graphically*) and explain the short-run and medium-run effects of each of the following:
    i. A fiscal stimulus.
    ii. An increase in the productivity growth rate ε.
    iii. A rise in the bargaining power of labor, reflected in the workers' target wage share ψ_f.

e. What are the effects on inflation ($\hat{P}$) of each of the shocks in part d.? Analyze and explain. (You may use either graphs drawn in $\psi \times \hat{P}$ space or any convenient math, but be sure to supply the intuition).