Problem Set 3: Due Sunday, September 20

For this problem set, please e-mail Problem 1 and Problem 2 as separate documents.

Problem 1

Write a referee report about one of the following two papers.

- Ngai, Rachel, and Barbara Petrongolo. 2015. "Gender Gaps and the Rise of the Service Economy" Use the version, here:

  http://personal.lse.ac.uk/petrongo/Ngai-Petrongolo2015.pdf.

- Barany, Zsofia and Christian Siegel. 2015. "Job Polarization and Structural Change." Use the version, here:

  http://people.exeter.ac.uk/cs441/researchpapers/polarization_structural_change.pdf

Elisabeth Sadoulet and Alain de Janvry have posted a useful set of guidelines on how to write a referee report, here at http://are.berkeley.edu/courses/ARE251/2004/assignments/RRGuidelines.pdf . In addition to these guidelines, keep in mind the following three points:

- First, try to relate the paper you are reviewing to the papers that we have discussed so far in class. Spend at least a couple paragraphs on this.

- Second, when writing a referee report, it's relatively easy to point out the deficiencies' in the paper's motivation, assumptions, empirical strategy, etc... . While somewhat more challenging, what is substantially more helpful is to also suggest strategies through which these shortcomings can be overcome or circumvented. Try to push yourself to write constructive comments.

- Finally, the *Guidelines* mention that a referee report should "recommend to an editor whether a paper is suitable for publication or not." You don't need to provide an explicit recommendation for this assignment.

Problem 2

On Wednesday, we'll discuss Oberfield and Raval. The subsequent questions consider the draft of the paper given at

http://economics.mit.edu/files/9861 .

1. What is the contribution of this paper? What gap in the literature does this paper fill?

2. In this part of the question, we will derive Equation (8) of the paper. Recall the set-up. Industries (n) which are composed of plants (i). There is a representative consumer who has nested CES preferences, who is trying to maximize:

$$Y = \sum_n D_n^{\frac{1}{\eta}} Y_n^{\frac{\eta-1}{\eta}} \text{ where } Y_n = \left[\sum_{i \in I_n} D_{ni}^{\frac{1}{\varepsilon_n}} Y_{ni}^{\frac{\varepsilon_n - 1}{\varepsilon_n}}\right]^{\frac{\varepsilon_n}{\varepsilon_n - 1}},$$

where ε_n is the elasticity of substitution across varieties within and industry and η is the elasticity of substitution across products produced by in different industries. Each plant has the following production function

$$Y_{ni} = \left[(A_{ni}K_{ni})^{\frac{\sigma_n - 1}{\sigma_n}} + (B_{ni}L_{ni})^{\frac{\sigma_n - 1}{\sigma_n}}\right]^{\frac{\sigma_n}{\sigma_n - 1}}$$

The D's are preference weights.

   (a) Given the preferences of the representative consumer, and using $P_n = \left[\sum D_{ni} P_{ni}^{1-\varepsilon_n}\right]^{\frac{1}{1-\varepsilon_n}}$ to refer to the ideal price index industry n's output, write out the demand curve faced by plant i.

   (b) Using your answer from part (a), write out the profit maximization problem of plant i, who takes P_n as given.

   (c) Let K_n and L_n refer to the amount of capital and labor employed by industry n and r and w to refer to the factor prices. We are interested in writing out an expression for $\sigma_n^{\text{industry}} \equiv 1 + \frac{\partial \log(K_n r / L_n w)}{\partial \log(w/r)}$ in terms of the plant level production elasticity, σ_n, the plant demand elasticity ε_n and dispersion in plants' capital shares. Define $\alpha_{ni} = \frac{rK_{ni}}{rK_{ni} + wL_{ni}}$ as the capital share of plant i, and θ_{ni} as the $\frac{rK_{ni} + wL_{ni}}{rK_n + wL_n}$ as the expenditure share of plant i, within industry n. Then $\alpha_n = \sum_i \alpha_{ni}\theta_{ni}$ is the capital share of industry n. Note that $\frac{\partial \log(K_n r / L_n w)}{\partial \log(w/r)} = \frac{1}{K_n r / L_n w} \frac{\partial \log(K_n r / L_n w)}{\partial \log(w/r)}$. Use this fact and the relationship $K_n r / \left(L_n w + K_n r\right) = \alpha_n = \sum_i \alpha_{ni}\theta_{ni}$ to re-write σ^{industry}. You should now have a term $\frac{\partial\left(\sum_i \alpha_{ni}\theta_{ni}\right)}{\partial \log(w/r)}$

(d) Use plant i's cost-minimization conditions to explain why $\frac{\partial \alpha_{ni}}{\partial \log(w/r)} = \alpha_{ni}\left(1-\alpha_{ni}\right)\left(1-\sigma_n\right)$.

(e) Explain why $\frac{\partial \log \theta_{ni}}{\partial \log(w/r)} = \left(\varepsilon_n - 1\right) \cdot \left(\alpha_{ni} - \alpha_n\right)$. Hint: Write $\frac{\partial \log \theta_{ni}}{\partial \log(w/r)} = \frac{\partial \log \theta_{ni}}{\partial \log\left(\frac{p_{ni}}{p_n}\right)} \times \frac{\partial \log\left(\frac{p_{ni}}{p_n}\right)}{\partial \log(w/r)}$. What do each of the two terms represent?

(f) Plug the relationships from parts (d) and (e) into your expression of $\frac{\partial\left(\sum_i \alpha_{ni}\theta_{ni}\right)}{\partial \log(w/r)}$ from part (c). Re-arrange until you get the desired result.