UNIVERSITY OF CALIFORNIA AT BERKELEY

Department of Economics

International Economics Field Exam 2024

GENERAL INSTRUCTIONS:

This is a 2-hour (120 min) field exam. There are 3 questions in total. You need to answer any 2 of the 3 questions. Question 1 corresponds to course 280A, Question 2 corresponds to course 280B and Question 3 corresponds to course 280D. Each question is worth 30 points for a total of 60 points.

Question 1 for 280A (Faber and Rodriguez-Clare)

Part 1 (Rodriguez-Clare) (15 points)

This question is about the Melitz model. Consider some country (call it Home) for which we normalize the wage at 1. As in the lecture notes, let σ denote the elasticity of substitution between varieties, let φ denote productivity, let $G(\varphi)$ be the CDF of productivity, let L be total labor endowment, let f_e and f be the entry and overhead cost in units of labor. Under autarky, the equilibrium entails some combination of $\bar{\pi}$ and φ^*, where $\bar{\pi}$ denotes average profits (net of operating fixed costs) of surviving firms and φ^* denotes the cutoff productivity.

(1) How would you compute the measure of surviving firms, M?

(2) Now imagine that Home firms can also export to other markets, with iceberg trade costs that are common across firms (as in Melitz) but with no fixed exporting costs (in contrast to Melitz). (i) Show that in this case $\bar{\pi}$, φ^*, and M do not change as we go from autarky to trade. (ii) Letting λ denote the domestic trade share of Home, what are the gains from trade and how do they compare to those in the Krugman model? [Hint: use the fact that preferences are CES, which gives you a formula for λ that you can manipulate to get the real wage.] (iii) How would you describe the trade flows occuring in this model, and how do these implied trade flows compare to what we know about firm-level trade data?

Part 2 (Faber) (15 points)

Answer the following three questions in reference to Atkin, Faber and Gonzalez-Navarro (2018) "Retail Globalization and Household Welfare":

(i) Describe the welfare measure and its components that the paper uses to quantify the household gains from foreign supermarket entry.

(ii) How do they estimate the "Direct Price Index Effect" of foreign retail entry?

(iii) Discuss two different theoretical channels that could give rise to what the authors refer to as the "pro-competitive price index effect".

Question 2 for 280C (Simonovska) (30 points)

1 International Risk Sharing

This question is based on the paper by Heathcote and Perri (2013).

Assume that the economy consists of three types of agents: households, intermediate-good producing firms and final-good producing firms in two countries, denoted by home and foreign (* represents foreign variable).

In each period t, the economy experiences one event $s_t \in S$. Let $s^t = (s_0, s_1, ..., s_t) \in S^t$ denote the history of events from date 0 to date t. The probability at date 0 of any particular history s^t is $\pi(s^t)$.

Firms in the home (foreign) country produce intermediate good a (b). Intermediate goods are traded across borders at no additional cost. The production function for intermediate goods in each country is given by:

$$F(z(s^t), k(s^{t-1}), n(s^t)) = exp(z(s^t))k(s^{t-1})^{\theta} n(s^t)^{1-\theta}$$

These firms invest in capital, $k(s^t)$, which depreciates at rate δ between periods, and hire labor $n(s^t)$, which is supplied by the household. Capital and labor are not traded across borders.

Final good producers at home combine intermediate goods a and b into a final non-tradable consumption good according to the following rule:

$$G(a(s^t), b(s^t)) = a(s^t)^{\omega} b(s^t)^{1-\omega}, \omega > 1/2$$

(i) What should the aggregator look like in the foreign country if there is bias toward local goods–i.e. home bias?

Let $P_c(s^t)$ ($P_{c^*}(s^t)$) be the price of consumption in home (foreign). Let $q_a(s^t)$ ($q_a^*(s^t)$) denote the price of good a in terms of the home (foreign) consumption good. Define the real exchange rate (RER) as

$$e(s^t) = \frac{P_{c^*}(s^t)}{P_c(s^t)}$$

(ii) Assuming that the law of one price holds for intermediate goods, derive the RER in terms of intermediate-good prices, and define the terms of trade (TOT) for the home country. What does this model predict about the relationship between RER and TOT?

Households in each country buy and sell shares of home and foreign intermediate-good producing firms' equity. Let $\lambda_H(s^t)$ ($\lambda_F(s^t)$) denote the number of home–i.e. firm a–(foreign–i.e. firm b–) equity shares held by home agents. Similarly, let $\lambda_H^*(s^t)$ ($\lambda_F^*(s^t)$) denote the fraction of home–i.e. firm a–(foreign–i.e. firm b–) equity held by foreign agents. Assume that

shares held by the two types of agents add up to unity for each asset. Let $P(s^t)$ ($P^*(s^t)$) denote the pre-dividend price of a share of equity issued by the home (foreign) intermediate-good producing firm, expressed in home (foreign) consumption units. Agents receive dividends $d(s^t)$ ($d^*(s^t)$) per share of home (foreign) equity expressed in home (foreign) consumption units.

(iii) Derive the market clearing condition for the two types of equities.

(iv) Derive the per-period budget constraint for the home household.

Assume that the household utility function is given by:

$$U(c(s^t), n(s^t)) = \log c(s^t) - v(n(s^t)),$$

where v is positive, increasing and convex.

(v) Given initial conditions $\lambda_H(s^{-1}) = 1, \lambda_F(s^{-1}) = 0$, characterize the solution to the home consumer's problem and derive the Euler equation for the equities.

(vi) Re-write the Euler equation in the familiar asset pricing format,

$$E_t[M_{t+1}R_{t+1}] = 1 \tag{1}$$

where M_{t+1} denotes household's stochastic discount factor and R_{t+1} denotes the gross rate of return on the asset.

(vii) Discuss the components of returns to equity, including the role of exchange rate risk.

Let $Q(s^t)$ denote the price the intermediate-good producing firm uses to value dividends at s^t relative to consumption at date 0. Assume that the firm issues equity and maximizes its present value (of the dividend) with zero agency frictions. Assume that domestic firms use the discount factor of the representative domestic household to price the marginal cost of foregoing current dividends in favor of extra investment:

$$Q(s^t) = \frac{\pi(s^t)\beta^t U_c(s^t)}{U_c(s^0)},$$

where $U_c(s^t)$ is the marginal utility of consumption.

(viii) State and characterize the intermediate-good producing firm problem. Derive the Euler equation for capital and express it using the notation in (1). How does the return to capital relate to the return to equity?

(ix) Define a competitive equilibrium in this economy.

(x) Evaluate the following statement: In this economy, stock prices are given by $P(s^t) = k(s^t), P^*(s^t) = k^*(s^t)\ \forall t, s^t$.

(xi) Discuss the role of the RER in this model in the context of risk sharing.

References

Heathcote, J. and F. Perri (2013): "The international diversification puzzle is not as bad as you think," *Journal of Political Economy*, 121, 1108–1159.

Question 3 for 280 D (Gaubert and Tsivanidis) (30 points)

Part 1 (Gaubert) (15 points)

A researcher wants to study changes in migration patterns between cities in the U.S. over time. She wants to use a quantitative spatial model to drive her analysis of the data. She is contemplating several options. For all of them, she is set on the labor demand side of the model: workers produce and consume a differentiated traded good, which is modeled following the Armington assumption. However, she is considering these different options for the spatial labor supply side:

- (a) The utility of a worker ω living in i at time t is $u_i^t(\omega) = \frac{A_i^t w_i^t}{P_i^t}\varepsilon_i^t(\omega)$, where $\varepsilon_i^t(\omega)$ is iid across workers and locations and is distributed Frechet with shape parameter κ. *(Like in class, A_i^t is the level of amenities and P_i^t is the price index of city i in year t.)*
- (b) The utility of a worker ω living in j at time t but who was living in i in the previous period is $u_{ij}^t(\omega) = \frac{A_j^t w_j^t}{P_j^t \mu_{ij}}\varepsilon_{ij}^t(\omega)$, where $\varepsilon_{ij}^t(\omega)$ is iid across workers, time and location pairs and is distributed Frechet with shape parameter κ.
- (c) The lifetime utility of a worker ω living in j at time t is $\log V_j^t(\omega) = \log A_j^t + \log w_j^t - \log P_j^t + \beta \mathbb{E}\left[\max_k \log V_k^{t+1} - \log \mu_{jk} + \varepsilon_{jk}^t(\omega)\right]$, where β is the discount factor and $\varepsilon_{jk}^t(\omega)$ is iid across workers, time and location pairs and is distributed Logit with shape parameter κ.
- (d) The lifetime utility of a worker ω living in j at time t is $\log V_j^t(\omega) = \log A_j^t + \log w_j^t - \log P_j^t + \beta \mathbb{E}\left[\max_k \log V_k^{t+1} - \log \mu_{jk} + \varepsilon_{jk}^t(\omega)\right]$, where $\varepsilon_{jk}^t(\omega)$ follows a normal distribution, with an arbitrary correlation structure across time and location pairs.

1. What does $\{\mu_{ij}\}_{ij}$ capture in these models?
2. For each of these options, can you cite papers that use this spatial labor supply side (or are isomorphic to it)? Bonus points will be given for papers not studied in class.
3. For each option, does the model deliver a closed form expression for the migration flows I_{ij}^t ? If so, write down these flows (it is OK if they are a function of other endogenous variables of the model).
4. Please explain to the researcher the pros and cons of each option. She is in particular curious about:
    - the realism of model predictions for migrations - how restrictive is this model of migration flows?
    - can one derive an estimating equation for the migration elasticity that can be estimated using a simple regression analysis?
    - the ease with which the model can be used for counterfactual analysis

Part 2 (Tsivanidis) (15 points)

This question develops a spatial model of worker sorting and housing regulatory reform. There are $i \in \{1, \ldots, N\}$ locations, with $\omega \in [0, \bar{L}]$ indexing individual workers with total population $\bar{L}$. Workers have the following Cobb-Douglas preferences $U_i = u_i w_i r_i^{\beta-1}$ where u_i are the amenities in i, w_i are wages, r_i are house prices, and $\beta \in (0, 1)$.

1. Suppose worker ω has an idiosyncratic preference $\epsilon_i(\omega)$ for living in location i so that $U_i(\omega) = u_i w_i r_i^{\beta-1} \epsilon_i(\omega)$. Assume that ϵ_i is drawn iid from a T1EV distribution with scale parameter θ. What is the number of workers of each type living in each location? What is average utility of workers in location i?
2. Now suppose developers supply housing floorspace with a Cobb-Douglas technology $H_i = \bar{a}_i r_i^{\eta}$. What does η capture? Give examples.
3. Suggest a potential (persuasive!) approach to estimate η
4. Suppose amenities and wages are exogenous. What are the exogenous and endogenous equations of the model? Write down the equations that characterize them.
5. The government now introduces a set of policies aimed to shift out housing supply in certain neighborhoods, which you interpret as $\{d \ln \bar{a}_i\}$ (where $d \ln \bar{a}_i < 0$ in neighborhoods "treated" by the policy and $d \ln \bar{a}_i = 1$ otherwise). Can you differentiate the equilibrium equations of the model to generate predictions for the impacts of the policy on residential populations and house prices? In particular, discuss which you locations you think will experience impacts from the policy.