

UC Berkeley, Department of Economics

International Economics Field Exam January 2019

GENERAL INSTRUCTIONS: This is a 3 hour exam. There are 3 questions in total and you need to answer all questions. Question 1 corresponds to 280A, question 2 corresponds to course 280B, and question 3 corresponds to course 280D.

Question 1

Consider a standard gravity model of international trade with one factor of production, labor, and two sectors: manufacturing and services. There is perfect labor mobility across sectors and no mobility across countries. In the real world, there is trade in services, but this sector is much less tradable than manufacturing, so here to simplify we will simply assume that manufacturing are tradable and services are non-tradable. The trade elasticity in the two sectors is θ_k with $k = M, S$. Assume that upper-tier preferences between services and manufacturing are CES with elasticity of substitution ρ .

1. Let's focus on some economy that we will call Home, assume that there is current-account balance, and imagine there is a foreign shock that reduces Home's domestic trade share in manufacturing (λ_{HH}). (1a) Assume that $\rho = 1$ (Cobb-Douglas case). What is the effect of the foreign shock on manufacturing employment? (1b) Under what conditions on ρ will the shock lead to a decline in manufacturing employment in Home? Proceed with as much formalism as you can.
2. Assume again that $\rho = 1$, and that there is cross-country ownership of resources, so that an exogenous share π_{ij} of the earnings in country i is transferred to country j . This implies that income in country j is $\sum_i \pi_{ij} w_i L_i$. Assume further that that there is current-account balance, so that expenditure is equal to income in each country, $E_j = \sum_i \pi_{ij} w_i L_i$ for all j . Imagine that there is an increase in productivity in the rest of the world so that the wage of Home falls with respect to the wages of all other countries. (2a) What happens to manufacturing employment? Proceed with as much formalism as you can. (2b) Could one use this to explain the decline in manufacturing employment in the US in response to the China Shock? A qualitative answer here is fine.

Question 2

This question explores the welfare implications of collateral externalities that have been studied in the macro-finance literature. Consider a model with three periods, $t = 0, 1, 2$ and two countries, Home and Foreign. Each country is

populated by a unit mass of individuals. The two countries trade frictionlessly with each other. Every period, Home (Foreign) produces a constant number of Y (Y^*) units of the Home (Foreign) good. Producer markets are perfectly competitive and prices are fully flexible.

Home agents are risk averse and maximize

$$\max E_0 \sum_{t=0}^2 \beta^t \log C_t$$

where C_t is a bundle of Home and Foreign goods:

$$C_t = \zeta C_{ht}^\alpha C_{ft}^{1-\alpha}$$

where ζ is some unimportant constant and $0 < \alpha < 1$.

Foreign agents are risk-neutral and maximize:

$$\max E_0 \sum_{t=0}^2 \beta^t C_t^*$$

where the foreign consumption bundle is quasi-linear in the Foreign good:

$$C_t^* = \xi \log C_{ht}^* + C_{ft}^*$$

Market clearing requires:

$$Y = C_{ht} + C_{ht}^* \quad ; \quad Y^* = C_{ft} + C_{ft}^*$$

We normalize the price of the foreign good (in foreign currency): $p_{ft}^* \equiv 1$. The price of the foreign good in domestic currency is then $p_{ft} = \varepsilon_t$, the nominal exchange rate defined as the Home price of the Foreign currency, and Home's terms of trade are $p_{ht}/p_{ft} = p_{ht}/\varepsilon_t = p_{ht}^*$. We denote p_t the consumption price index of Home (in the domestic currency). Under our assumption on preferences, one can show that it satisfies $p_t = \varepsilon_t p_{ht}^{\alpha}$.

There exists a single asset, a one-period nominal bond in zero net supply paying in units of foreign currency with a nominal interest rate $1 + i_{t+1}^*$. Home enters in period 0 with an exogenous debt level $D_0 > 0$, maturing at period 0.

Home and Foreign budget constraints are:

$$\begin{aligned} \frac{p_t}{\varepsilon_t} C_t &= p_{ht}^* Y - TB_t \\ p_{ht}^* C_{ht}^* + C_{ft}^* &= Y^* + TB_t \end{aligned}$$

where $TB_t = D_t - D_{t+1}/(1 + i_{t+1}^*)$ is Home's trade balance. Given the finite horizon, Home and Foreign are also subject to the terminal condition $D_3 = 0$. We only consider interior equilibria where consumption of both goods in both countries are strictly positive in all periods.

- Express C_{ht}^* as a function of p_{ht}^* and express C_{ht} , C_{ft} as functions of p_{ht}^* and C_t . Define the real exchange rate $q_t = \frac{\varepsilon_t p_{ft}^*}{p_t}$. Express the real exchange rate in terms of p_{ht}^* .

In period 0, Home must choose the level of debt D_1 , to be repaid in period 1. Assume that a sudden stop occurs in period 1 with some probability $0 < \pi \leq 1$. When a sudden stop occurs, foreign investors will refuse (for exogenous reasons) to finance debt in excess of \bar{D} . That is, $D_2 \leq \bar{D}$. Assume that this borrowing constraint binds when the sudden stop occurs. It follows that Home trade balance in period 1 in the event of a sudden stop is $D_1 - \bar{D}/(1 + i_2^*)$. Foreign investors do not face any borrowing constraint.

- Show that $1 + i_{t+1}^* = \beta^{-1}$ for $t = 1, 2$.
- Assume now that $\pi = 1$ so that a sudden stop is certain to occur at $t = 1$. Explain how a fall in the relative price of Home goods affects Home's period-1 consumption, C_1 , all else equal. Calculate the equilibrium terms of trade at date 1, p_{h1}^* as a function of D_1 and the parameters of the model. Show that:

$$\frac{dp_{h1}^*}{dD_1} = -\frac{\alpha}{(1-\alpha)Y} < 0$$

Explain why the relative price of the Home good is decreasing with D_1 . [Hint: the assumption that Home's financing constraint is binding in period 1 implies that its Euler equation between periods 1 and 2 does not hold.]

- Assume now that the debt limit depends on the terms of trade in period 1: $\bar{D} = \kappa p_{h1}^* Y$. Discuss whether the competitive equilibrium is constrained Pareto efficient. That is, discuss whether a social planner, who is constrained in the same way as the private agents (i.e. unable to circumvent the financial friction in period 1) but can coordinate a change in D_1 along with a compensating transfer between Home and Foreign in period 0 will be able to increase the welfare of Home agents.
- Discuss whether this is a good model to capture the interactions between financial frictions, international capital flows and sudden stops?

Question 3

You want to estimate firm-level productivity using a dataset that has 10 years of firm-level data, with information on total sales, labor employed and capital stock.

- Making the assumption that the firm's production function is Cobb-Douglas, write down your estimating equation

2. List the source of potential biases in estimation.
3. List the estimation techniques you could use given the data at hand.
4. What estimation technique would you choose? Explain why this is your preferred choice, and detail the caveat(s) of the approach.
5. The statistical agency offers to collect one more piece of data for all firm-years. Which one would you ask for? Explain why.