

1. (15%) Consider a market economy with a relatively strong preference for current consumption compared to its trading partners, along with good growth opportunities. The country produces two goods, manufacturing (M) and agriculture (A), with a comparative advantage in A and free trade in goods.
 - a. Using a two-period model of intertemporal trade, with current consumption on the horizontal axis, show the amount of savings and investment if the country has open capital markets and free international trade in savings. Using the equations $Y = C+I+NX$, and $NX+S_f = 0$, explain how the flow of savings affects investment, domestic savings, and growth in the present. How does it affect the trade balance (i.e., net exports) in both the present and the future?
 - b. Using a PPF with A on the horizontal axis, show the country's present free trade equilibrium, both with and without the flow of savings in (a). Explain why the change in the optimal consumption (or domestic spending) point is consistent with your explanation above for how the trade balance is affected in the present.
 - c. Using a diagram for the Foreign Exchange market, explain how the flow of savings in (a) would affect the foreign exchange rate. Is this consistent with your explanation above for how the trade balance is affected in the present?

2. (10%) Consider the above economy with a comparative advantage in A.
 - a. Using a PPF with A on the horizontal axis, but assuming balanced trade, show how an import tariff would affect exports and imports if the country was too small to affect the terms of trade. Why is the consumption possibility frontier (i.e., the trade isovalue line) not tangent to either the PPF nor the indifference curve? How does the tariff affect welfare?
 - b. If the above tariff has a large effect on the terms of trade, could it be welfare-improving for this country? Show this. How would it affect world welfare?
 - c. Using a diagram for the Foreign Exchange market, explain how the tariff would affect the foreign exchange rate and, in turn, exports.

3. (10%) Suppose that two similarly-sized countries are engaged in free trade, where Home imports cars from Foreign, and exports food to them. Their governments are each independently considering whether or not to impose tariffs on their imports. If neither imposes a tariff, Home receives \$100 billion in gains from trade and Foreign receives \$200 billion. If Home imposes a tariff but Foreign does not, Home gains \$150 billion and Foreign only gains \$100 billion. If Foreign imposes a tariff but Home does not, Home gains only \$25 billion and Foreign gains \$225 billion. If both imposes tariffs, Home gains only \$50 billion and Foreign gains \$150 billion. Show how this problem leads to a Prisoner's Dilemma if both countries try to maximize their own welfare, taking the actions of the other country as independent or given. What is each country's dominant strategy? What is the Nash equilibrium? What is the social optimum, and what strategies could help countries reach it?

4. (10%) What is the World Trade Organization? How does it work, how did it evolve, and what are its key principles and major rules? Relative to its predecessor, what improvements has it made in the world trading regime? What are the key issues which led to the failure of the Doha Round?

5. (25%) The U.S. automobile industry produces approximately 14 million vehicles per year at an average price of \$30,000 each, and U.S. consumers purchase 20 million vehicles. Assume the roughly one million employees of the U.S. automobile industry are concerned about their jobs, and ask their congressional representatives to impose a tariff on each imported automobile.

- a. Assuming the U.S. is a small economy, show the effects of a \$1000 specific tariff. If an increase in the world price of vehicles to \$31,000 would increase domestic production by 1 million vehicles, and reduce domestic consumption by 1 million vehicles, what is the change to consumer surplus, producer surplus, the government budget, and net domestic welfare? Assuming the price increase would save 100,000 jobs, how much would consumers be paying per job saved, per year?
- b. Assume instead that the U.S. is a large country, and the tariff is \$1500, which reduces the world price by \$500 per vehicle. What is the change in net domestic welfare?
- c. Go back to the small country case. Instead of a tariff, suppose the government gave domestic automobile producers a subsidy of \$1000 per vehicle produced. What is the change to consumer surplus, producer surplus, the government budget, and net domestic welfare? How much would taxpayers be paying per job saved, per year?
- d. Suppose that the government considered a quota on imports instead. In the small country case, how might this be similar to the tariff? In what ways would it be different? Assuming the domestic automobile industry is an oligopoly with some monopoly power, how would this affect the effects of a quota versus a tariff?
- e. "This tariff would be a good thing," your friend argues, "because it would make cars more expensive, and people would buy fewer cars and pollute less." Is he right, wrong, or what? Under what conditions could the tariff improve efficiency, and what would be the optimal policy?

6. (15%) The United States is a major exporter of agricultural products such as cotton, and has a significant effect on the world price. The U.S. government provides a significant production subsidy to U.S. farmers, often equal to as much as two-thirds of the costs of production. The market is very competitive, the overall market exhibits the standard upward sloping marginal cost (supply) curve.

- a. Show a graph for the U.S. cotton market, for both market equilibria (with and without the government subsidy). What happens to the market price of cotton, domestic production of cotton, and the domestic consumption of cotton?
- b. Using your graph, explain the distributional effects of the subsidy on domestic producer surplus, domestic consumer surplus, and the government budget. Assuming there are no externalities from cotton production, what happens to overall welfare in the United States?
- c. How would the cotton subsidy affect welfare in other countries with a potential comparative advantage in it? What about in those with a comparative disadvantage?

7. (15%) Under what conditions would subsidies be economically justified? Carefully explain: (a) the infant industry argument, (b) the externality argument, and (c) the Brander-Spencer strategic trade model. In each case, explain the conditions under which a government subsidy would be optimal.

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