**Answers to practice problems ECON 655**

**Question 1**

The paper provides a case study of the impact of the Canada-U.S. border on regional trade pattern. The case of Canada-U.S. is particularly interesting because the two countries are so similar in terms of culture, language, and institutions. If, as will be seen to be the case, the border separating these two very similar countries exerts a decisive impact on continental trade patterns.

The methodology used in this paper derives from other studies that use gravity-type equations to examine the determinants of international trade patterns, including the impact of preferential trade blocs. Whereas the literature cited uses inter- national trade flows to estimate the impact of multinational trade blocs on trade patterns, this paper uses a combination of sub- national and international trade flows to estimate the impact of the multinational trade bloc on trade patterns.

What was McCallum’s empirical specification?

Where

**The main finding(s)**

Essentially his finding is that that the U.S.-Canadian border led to 1988 trade between Canadian provinces that is a factor 22 (2,200 percent) times trade between U.S. states and Canadian provinces, hence the puzzle

Whatever the reasons may be and whatever the future may hold, the fact that even the relatively innocuous Canada-U.S. border continues to have a decisive effect on continental trade patterns suggests that national borders in general continue to matter. That is the basic message of this paper.

In a result table and series of sensitivity analyses shows that national borders matter in the determinant of trade as oppose to what Kenichi Ohmae's statement that borders have "effectively disappeared”.

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**What are the major problems with McCallum’s study as identified by Anderson and van Wincoop?**

First, his estimate is based on a regression with omitted variables, the multilateral resistance terms. Hence their theory modifies McCallum's equation only by adding the multilateral resistance variables. Estimating McCallum's regression for 1993 data they find a ratio of 16.4, while their calculation based on asymptotically unbiased structural estimation and the computed general-equilibrium comparative statics of border removal implies a ratio of 10.7.

Second, the magnitude of both ratios largely reflects the small size of the Canadian economy. Thus, to fully understand the border effect one must conduct a general-equilibrium comparative statics exercise of removing the U.S.-Canada border barrier in order to determine the effect of the border on trade flows. McCallum's regression cannot validly be used to infer such border effects When they estimate McCallum's regression with U.S. data, they find that trade between states is only a factor 1.5 times trade between states and provinces. The intuition is simple in the context of the model. Even a moderate barrier between Canada and the rest of the world has a large effect on multilateral resistance of the provinces because Canada it is a small open economy that trades a lot with the rest of the world (particularly the United States). This significantly raises interprovincial trade, by a factor 6 based on their estimated model. In contrast, the multilateral resistance of U.S. states is much less affected by a border barrier since it does not affect the barrier between a state and the rest of the large U.S. economy. Therefore, trade between the states is not much increased by border barriers.

**Question 2**

What are the three methods considered by Feenstra?

Using published data on price indexes; using the computational method of Anderson and van Wincoop (2001); or using country fixed effects to measure the price indexes. The latter two methods were compared on a dataset dealing with trade between and within Canada and the United States. The fixed effects method produces consistent estimates of the average border effect across countries, and is simple to implement, so it might be considered to be the preferred empirical method.

**(A) Using published data on price indexes**

An objection to using published price indexes to measure pi and Pj is that these indexes may not accurately reflect the “true” border effects. That is, the myriad of costs (in money, time and currency risk) involved in making transactions across the border are probably not reflected in aggregate price indexes. So instead of using data to measure prices, we might want to model the c.i.f. prices pj as differing from the f.o.b. prices pi due to distance and other factors. Another problem with using published price indexes is that they are nearly always measured relative to an arbitrary base period. Thus, makes it sometimes to compare the levels of these prices when the base year for each price differs

(**B) using the computational method of Anderson and van Wincoop (2001)**

A drawback to the estimation strategy of Anderson and van Wincoop is that it requires custom programming to perform the constrained minimization (and obtain standard errors). The computational complexity of the Anderson and van Wincoop leads to loss of efficiency when compared to the fixed effect approach. This method gives consistent estimates of the average border effect

**(C) Using country fixed effects**

A third and final approach to estimating the gravity equation, while using ordinary least squares, is to use fixed effects to take account of the unobserved price indexes. Notice that the estimates from using fixed effect is nearly the same as the average border effect of 5.2 obtained by Anderson and van Wincoop (2001), who explicitly introduced the multilateral resistance term computed into the estimation. In contrast, the fixed effect approach estimates this terms as part of the regression without relying on formula, hence computationally simple. The approach gives consistent estimates of the average border effect. Since the fixed effects method produces consistent estimates of the average border effect across countries, and is easy to implement, so it might be considered to be the preferred empirical method.

**Question 3**

**Overview**: In their paper, they (i) develop a method that consistently and efficiently estimates a theoretical gravity equation, (ii) use the estimated general-equilibrium gravity model to conduct comparative statics exercises of the effect of trade barriers on trade flows, and (iii) apply the theoretical gravity model to resolve the "border puzzle”

Preferences ( the

Under the restriction that Πi = Pi what is the degree of homogeneity of nominal trade?

Homogeneous of degree 1. Since is homogeneous of degree -1 in . Given that makes nominal trade homogeneous of degree 1.

What is the problem with using this restriction in comparative static analysis?

The problem is that may not have the same directional changes, that is a change in a single component in P may not result in the same magnitude change in the component of Π

What is the problem with using this restriction in panel estimation?

In a panel data technique, this restriction will not yield good estimates (overstates the border effect) compared to a fixed effect approach. In a panel data, fixed effect is more compelling compared to using the symmetry condition. Leads to inefficient estimates as well

Question 4

What is the class of models considered in their paper?

The main features of the trade models analyzed in their paper include four primitive assumptions: (i) Dixit-Stiglitz preferences (ii) one factor of production (iii) linear cost functions and (iv) perfect or monopolistic competition as well as three macro-level restrictions, which trivially hold in a simple Armington model: (i) trade is balanced (ii) aggregate profits are a constant share of aggregate revenues and (iii) the import demand system is CES. In order to illustrate the logic of their results they highlight two simple examples that satisfy their primitive assumptions but may or may not satisfy their macro-level restrictions: **the Ricardian model and the Melitz (2003) model.**

We first demonstrate how, like in a simple Armington model, one can go from aggregate trade flows to welfare predictions under their three macro-level restrictions. They then discuss the exact role of our macro-level restrictions as well as the conditions under which they hold in each environment

**What are the limitations of their conclusions?**

What conclusions should one draw from their theoretical analysis? Two broad messages emerge from their results. The first message is a cautionary one. Although it may be tempting to think that new and richer quantitative trade models necessarily entail larger gains from trade, their analysis demonstrates that this is not the case. Within the class of trade models considered in this paper, the number of sources of gains from trade varies, but conditional on observed trade data, the total size of the gains from trade does not. Their equivalence results do not aim to suggest that micro-level data cannot be useful for thinking about the welfare implications of international trade. Rather, their point is that for micro-level data to affect estimates of the gains from trade, these data will have to be used in combination with trade models that fall outside the scope of the present paper, hence their “So far, not much” in the Introduction.

The second message is more positive. The flip side of their strong equivalence results is that within a particular but important class of trade models, there exist two sufficient statistics for welfare analysis: (i) the share of expenditure on domestic goods; and (ii) the trade elasticity. Although quantitative trade models are now able to explain a wider set of micro-level facts, they can still be used for counterfactual analysis using a very limited amount of macro data

**List specific generalizations that will lead to differences across structures.**

(A) R1 and R2 are trivially satisfied under perfect competition and do not play any active role in this environment. R3 is the crucial restriction which guarantees that, as in a simple Armington model:

1. changes in each component of the consumer price index can be inferred one-by-one from changes in relative imports
2. changes in relative imports can be aggregated into changes in the domestic share of expenditure
3. small changes in the share of domestic expenditures can be integrated into large ones (because the trade elasticity is constant across equilibria).

For instance, for condition (i) to hold, it must be the case that third-country changes have symmetric effects on country i and j.

Thus, R3 rules out, for example, a situation in which a decrease in bilateral trade costs between Costa Rica and the United States has a differential impact on Mexican and Canadian exports to the United States. In the Armington model, the previous conditions were a direct implication of strong restrictions on the demand-side, namely Dixit-Stiglitz preferences.

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3. linear cost functions and
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as well as three macro-level restrictions, which trivially hold in a simple Armington model:

1. trade is balanced
2. aggregate profits are a constant share of aggregate revenues and
3. the import demand system is CES

Violations of these will lead to differences across structures