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Discussion

Trade wedges, inventories, and international business cycles

Samuel Kortum

Department of Economics, Yale University, USA

Residuals of the import demand equation, the so-called "trade wedges", are disturbingly large and persistent. This fact suggests substantial room for improvement in the standard formulation of import demand, particularly when applied to high-frequency changes over time. Alessandria, Kaboski, and Midrigan hypothesize that the real problem is failing to distinguish between the volume of imports and consumption of imported goods, the difference being the change in inventories of imported goods. In this view, the standard import demand equation applies to consumption of imports. It needs to be augmented with a model of inventory management to explain the volume of imports. Using a clever and tractable formalization, the paper integrates inventories neatly into a standard open-economy macro model, showing that it improves the standard model's predictions along several dimensions. It generates large fluctuations in trade volumes (due to the dynamics of inventories rather than trade wedges), countercyclical real net exports, and less correlation in consumption across countries.

I want to make two points in this discussion. First, I show that trade wedges, if viewed from the perspective of bilateral trade flows, are also disturbing. Thus, I concur with the authors' motivation: it is a first-order problem to address. Second, I call attention to the neat model of inventories employed in this paper. I predict that this model will have many applications and extensions in future work. While I am not convinced that inventories are the main source of our problems in explaining import behavior over time, this paper certainly takes a step in the right direction.

1. Bilateral trade wedges

Start with Eq. (2) in the paper, which is a basic model of import demand. In spending terms ($X_t = P_t C_t$), the fraction spent on imports depends on the relative price of imports P_t^m/P_t, with the trade wedge τ_t picking up any discrepancy

$$\frac{X_t^m}{X_t} = \tau_t \left(\frac{P_t^m}{P_t}\right)^{1-\gamma}. \tag{1}$$

The problem, as illustrated nicely in the paper, is that most of the action is in τ_t. Its reminiscent of the dominant role of the Solow residual in growth accounting.

With data on bilateral trade, we can dig deeper and replace total spending on imports X_t^m with bilateral spending by each destination-country n on goods from each source-country i, which we denote by $X_{ni,t}$. By analogy to (1), denoting the price of n's imports from i by $P_{ni,t}$, and normalizing by purchases of domestic goods

$$\frac{X_{ni,t}}{X_{nnt}} = \frac{\tau_{ni,t}}{\tau_{nn,t}} \left(\frac{P_{ni,t}}{P_{nn,t}}\right)^{1-\gamma}. \tag{2}$$

It would be difficult to measure all the prices on the right side of this equation, but fortunately we can learn something without them.

All the fundamental factors related to time variation in the cost of production in the exporting country i, such as wages and productivity there, should be captured by a time-varying source-country effect $S_{i,t}$ (which enters with an opposite sign when i is the importing country). We can examine the explanatory power of these fundamental

E-mail addresses: kortum@uchicago.edu, samuel.kortum@yale.edu

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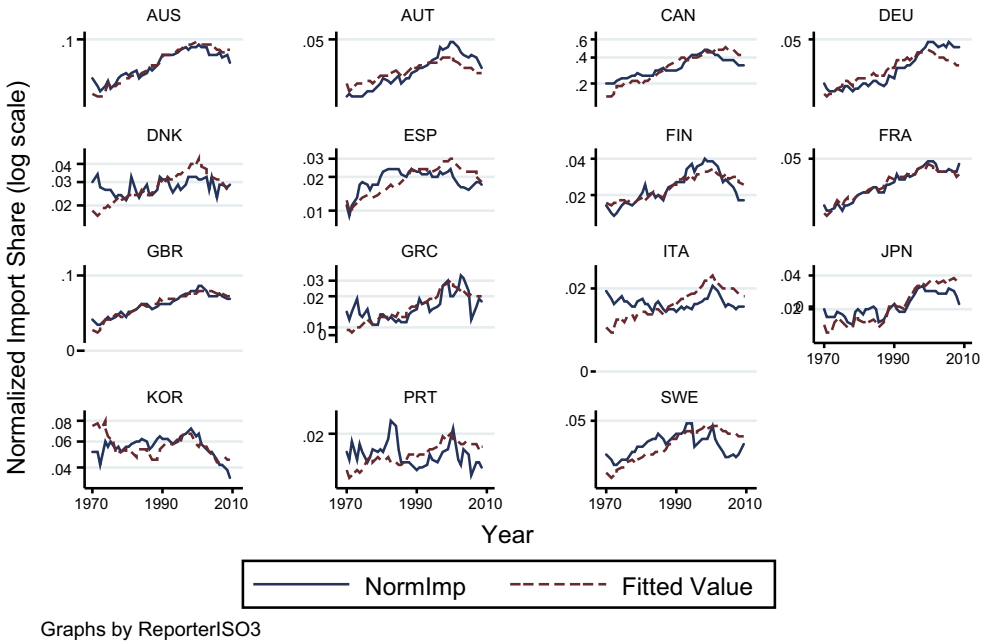

Fig. 1. Normalized Import Share (Exporter USA).

factors by running the regression

$$\ln\frac{X_{ni,t}}{X_{nnt}} = S_{i,t} - S_{n,t} + d_{ni} + d_t + \varepsilon_{ni,t} \tag{3}$$

for all foreign country pairs $n \neq i$. A change in the source effect for country i should show up as a proportional change in how much it exports to each destination n (and proportional decline in how much it imports from each). Here d_{ni} captures any time-invariant factors making n an attractive export destination for i and d_t captures globalization, as trade flows between country pairs tend to rise over time relative to domestic flows. In this specification, $\varepsilon_{ni,t}$ is the trade wedge. Note that this regression has nothing to say about trade elasticities, thus has the advantage of being robust to any particular value of γ.[1]

I estimate (3) using data on bilateral trade and production in manufactures from 1970 to 2009 for 16 countries (see the figures for the 3-letter country codes).[2] The R^2 is 0.953. I plot the data and fitted values (actually $X_{ni,t}/X_{nn,t}$ on a logarithmic scale) for the observations in which the United States is the exporter (Fig. 1) or the importer (Fig. 2). A casual impression is that we do well in accounting for these bilateral trade flows, but that impression is somewhat misleading. If we drop all the terms $S_{i,t} - S_{n,t}$ from the regression, the R^2 falls only slightly to 0.939. Thus the incremental R^2 is $0.23 = (0.953 - 0.939)/(1 - 0.939)$ for these terms, which subsume all the effects of relative production costs on trade. The bilateral trade wedges account for nearly four times as much of the variation in these normalized import shares.

The bottom line is that Alessandria, Kaboski, and Midrigan are right to point to the shortcomings of typical import demand equations applied in a dynamic setting. Their inventory explanation is plausible. A good test is whether such an explanation also makes inroads into the substantial bilateral trade wedges that I have highlighted here.[3]

2. A tractable model of inventories

The model of inventories employed in this paper has a lot of potential for use in open economy macroeconomics. Yet it almost gets lost among all the other things going on in this paper. I want to give it a little individual attention.

[1] This regression equation is also consistent with the Ricardian formulation of bilateral trade flows in Eaton and Kortum (2002). In that case the source effect is

$$S_{i,t} = T_{i,t}(c_{i,t})^{-\theta},$$

where $c_{i,t}$ is the cost of a bundle of inputs in i (depending on the quality-adjusted wage and price of intermediates), $T_{i,t}$ is productive knowledge in country i, and θ is the parameter of the distribution of efficiency, capturing (inversely) the strength of comparative advantage.

[2] The data were constructed in Arkolakis et al. (2012).

[3] Eaton et al. (2011) incorporate these bilateral wedges in accounting for the decline in trade during the recent recession. While the wedges are substantial, their overall contribution to that decline appears to be quite small for most countries.