The home-market effect and bilateral trade patterns: A reexamination of the evidence

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A B S T R A C T

This paper finds that the evidence for the home market effect (HME) found by Hanson and Xiang (AER, 2004) is sensitive to the way the dependent and the independent variables are constructed. Second, we also find that the HME evidence goes away when we estimate their difference-in-difference gravity model on a truncated sample of positive trade flows. With Eaton–Tamura–Tobit, Heckman, and Helpman–Melitz–Rubinstein estimation of the gravity equation using Hanson and Xiang’s data, we are unable to find any evidence for the HME. Finally, the HME evidence is also absent for a sample of Canadian provinces’ exports to U.S. states. All of our results, taken together, do not reject the existence of the HME in general but rather suggest that the HME results found by Hanson and Xiang may not be robust.

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1. Introduction

Hanson and Xiang (2004) develop a multi-sector, monopolistic competition model and use it to reveal a systematic relationship between the strength of the home-market effect and industry characteristics.1,2 The multisectoral nature of their model, by suggesting “treatment” and “control” sectors, allows them to devise a difference-in-difference gravity approach to empirically test the home-market effect. The home-market prediction is that industries with high transport costs and low substitution elasticities (more highly differentiated products) will tend to be more concentrated in large countries than industries with low transport costs and high substitution elasticities. Hanson and Xiang treat the former industries as “treatment” industries and the latter as “control” industries. Using this innovative approach, they are able to address major econometric concerns about earlier tests of the home-market effect, including possible correlation between industry demand and supply shocks and a failure to control for “remoteness” of exporting and importing countries, both of which can lead to biased coefficient estimates. Because Hanson and Xiang’s approach provides a novel and potentially quite useful methodological breakthrough, we examine the robustness of their findings to changes in data handling, changes in sample, and changes in estimation procedure. Overall, the
weight of evidence from reasonable amendments to the Hanson–Xiang methodology and from a large number of robustness
check runs against the presence of a significant home-market effect in trade flows.

Our observation is that in a difference-in-difference gravity specification in which there is a constant and/or a squared term for
the independent variable of interest and both the dependent and independent variables are in ratios (differences in log values) for
exporting country pairs, the method used to eliminate redundant observations affects both the sign and magnitude of the
coefficient estimated for the independent variable of interest. Since each exporting country pair should only enter the sample
once for a given destination country (and for a given treatment and control pair), some method for choosing one out of the two
permutations associated with each pair of exporting countries must be used. Unfortunately, there exists no theoretical guidance
about what the configuration of exporter pairs in the dependent variable or/and the independent variable must be. Our empirical
analysis confirms that the configuration of exporter pairs powerfully affects the HME regression results. Specifically, when we
apply Hanson and Xiang’s difference-in-difference gravity specification using different configurations of exporter pairs we obtain
completely conflicting results about the HME. In most specifications there is no evidence of the HME. When the HME is found in a
few specifications it is reduced by more than 50%.

Second and importantly, we find that the data used by Hanson and Xiang are characterized by the pervasive presence of zero
trade flows and that the strategy Hanson and Xiang use to incorporate information on zero trade flows into their analysis
influences their empirical findings. Specifically, when the dependent variable is in double ratios (ratio of ratios), its value is
powerfully affected by the value imputed to zero trade flows (even if the value to which each zero is set is small). Unfortunately,
there is neither theoretical nor empirical justification for choosing a particular value to impute to zero trade flows, even though
Hanson and Xiang follow many researchers in setting these values to unity. As expected, the influence of these imputed values on
the inferences one may draw from estimation rises as the number of zero values in the trade data rises.

When we drop observations that contain zero trade values from the Hanson and Xiang sample we find no evidence of a
home-market effect in the difference-in-difference gravity regression. Truncated OLS, Tobit-Style, Heckman and Helpman–
Melitz–Rubinstein estimators of the gravity equation, which are methods better suited to samples with many zero values and are
applied with intercept, without intercept and with intercept that varies depending on the way the explanatory variable of interest
is configured, also do not yield support for the home-market effect.

We also look for the evidence of the HME using a sample of Canadian provinces’ exports to U.S. states. This exercise is
motivated by the fact that there exists established evidence of clustering of economic activity in Canadian largest provinces. Yet
we also don’t find any evidence of the HME under different econometric specifications.

Looking at different theoretical models that generate the HME hypothesis, we also provide some explanations for the absence
of the HME. We show that in Hanson and Xiang’s model the HME is determined not only by factors such as trade costs and the
elasticity of substitution between varieties but also factors such as the tastes of exporting countries and the intensity of scale
economies of industries. Failing to take into account those factors may explain why we have found no evidence of the HME or
even the evidence of a reversed HME.

Finally, it is important to point out that, taken together, our results suggest that the HME evidence found by Hanson and Xiang
may not be robust. However, our results must not be taken as evidence rejecting the HME hypothesis of the new trade theory or
new economic geography models in general. Rather, the results of the econometric exercises in this paper must be seen as
contributing to the discussion about the applicability of suitable econometric methods in future empirical studies of the HME
effect.

2. Sensitivity of the difference-in-difference gravity specification to configuration of country pairs

The econometric specification Hanson and Xiang rely on to test the home-market effect is the following cross-section,

\[
V_{jhk} = \ln \left( \frac{S_{mkj}/S_{mjk}}{S_{njk}/S_{nkj}} \right) = \alpha + \beta f(Gdp_{j}/Gdp_{h}) + \varphi (X_{j} - X_{h}) + \theta \ln (d_{jk}/d_{hk}) + \epsilon_{majhk} 
\]

where \(Gdp_{l} (l = j, h)\) is exporter \(l\)’s market size (as measured by its gross domestic product) and \(d_{lk} (l = j, h)\) is the distance
between the exporting country \(l\) and the destination country \(k\). \((X_{l} - X_{h})\) is a vector of control variables that determine relative
production costs for industries \(m\), high-transport-cost and low-substitution elasticity industries, and industries \(o\), low-
transport-cost and high-substitution-elasticity industries, in exporter \(j\) relative to that in exporter \(h\). This vector also includes
level differences in standard gravity dummy variables such as common border and common language. The dependent variable \(V\)
is composed of four export values with \(S_{dik} (d = m, o \text{ and } i = j, h)\) denoting exports of country \(i\) to destination country \(k\) in
industry \(d\).

The function \(f(Gdp_{j}/Gdp_{h})\) captures the relative number of product varieties in the exporting country pair. Hanson and Xiang
show that this ratio of product varieties can be approximated by a linear function of polynomials of two alternative relative
market size measures: \(\ln(Gdp_{j}/Gdp_{h})\) or \((Gdp_{j}/Gdp_{h}) - 1\). As Hanson and Xiang show theoretically, an estimated coefficient for \(\beta\)
that is positive and statistically significant is evidence of HME, or whether larger countries export more of high transport cost, low
substitution elasticity goods.
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