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2008 (Oral) International Trade, Development

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Dissertation Title:

Essays in Trade and Learning

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Expected Completion Date: May 2012

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Ph.D., Economics, Yale University (expected May 2012)

M.Phil., Economics, Yale University, 2009

M.A., Economics, Yale University, 2008

M.A., Economics, The University of Western Ontario, 2006

B.A., Economics (with distinction) The University of Western Ontario, 2005

Fellowships, Honors and Awards:

Teaching Fellowship, Yale University, 2012
University Dissertation Fellowship, Yale University, 2011
University Fellowship, Yale University, 2006-2009, 2010-2011
Economic Growth Center Prize, Yale University, 2006-2010
Doctoral Fellowship, Social Sciences and Humanities Research Council of Canada, 2006-2010
Canada Graduate Scholarship in the Master's Program, Social Sciences and Humanities Research Council of Canada, 2005-2006
The Chancellor's Prize in Social Sciences, The University of Western Ontario, 2005
The S.F. Glass Gold Medal, The University of Western Ontario, 2005
Mark K. Inman Senior Essay Prize, The University of Western Ontario, 2005
Benjamin Higgins' Prize in Development Economics, The University of Western Ontario, 2004
Dr. Mark K. Inman Scholarship in Economics, The University of Western Ontario, 2003, 2004
Barry Connell Steers Scholarship, The University of Western Ontario, 2004
The Walter J. Koenig Scholarship, The University of Western Ontario, 2003
Dean's Honor List, The University of Western Ontario, 2002-2005
University of Western Ontario In-Course Scholarship (awarded twice), 2002-2004

Teaching Experience:

Teaching Fellow, Yale University
 Undergraduate International Economics, Spring 2012
 Undergraduate Intermediate Microeconomics, Spring 2009
 Undergraduate International Trade, Fall 2008

Teaching Assistant, The University of Western Ontario
 Economics Drop-in center, Spring 2006
 Undergraduate Intermediate Econometrics, Fall 2005

Research Experience:

Research Assistant, Costas Arkolakis, Yale University, 2008-2011

Conference and Seminar Presentations:

International Trade Workshop, Yale University, Fall 2011
Graduate Summer Workshop, Yale University, Summer 2011
Midwest International Trade Meeting, University of Wisconsin-Madison, Fall 2010
The 4th Annual Carroll Round, Georgetown University, April 2005 (presenter and discussant)

Academic Service:

Committee on academic policy, member, The University of Western Ontario, 2004-2005

Working Papers:

"Product Switching in a Model of Learning" [Job Market Paper]

"State Dependence in Export Market Participation: Does Exporting Age Matter?"

Book Chapters:

"Market Penetration Costs and International Trade" (with Costas Arkolakis), in Guido Porto and Bernard M. Hoekman eds., *Trade Adjustment Costs in Developing Countries: Impacts, Determinants and Policy Responses*, The World Bank and CEPR, 2010

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Dissertation Abstract

Contrary to the prevailing view that improvements in productivity drive firms' survival and growth in a market, recent empirical studies find no evidence of a significant productivity advantage of old firms over young firms. Rather, it is growth in broadly defined demand side fundamentals that enables firms to survive and expand in any particular market. In light of these findings it has been hypothesized that firms face fundamental uncertainty with regards to demand conditions in their targeted destination. As firms begin to supply that market, they discover new information concerning the appeal of their products, establish a customer base, and consequently grow. This process is the essence of the demand learning hypothesis. Despite its empirical relevance, the theoretical trade literature has paid little attention to the implications of this hypothesis for the study of the dynamics of firms' exporting behavior.

In my dissertation, I apply the notion of demand learning to analyze two aspects of exporters' behavior: product switching (the adding and dropping of products by individual firms) and export participation. In the first chapter of my dissertation, I begin by demonstrating that product switching behavior is age dependent: conditional on export sales, less experienced exporters are more eager to engage in product adding and dropping than more experienced ones. I then argue that this pattern can be explained by a model of demand learning, as opposed to a model of stochastic productivity evolution. In the second chapter, I argue that a model that incorporates demand learning, as opposed to sunk costs, can account for a substantial portion of the persistence observed in export participation.

Chapter I: Product Switching in a Model of Learning (Job Market Paper)

Recent studies that analyze detailed firm micro-level data find that product switching is an important channel of microeconomic and macroeconomic adjustments in the economy. Firms adjust to changes in competition, regulations, trade costs, and exchange rates by adding and dropping products. Such changes have been shown to translate into substantial productivity adjustments at the firm as well as the aggregate level (for example, Goldberg, Khandelwal, Pavcnik, and Topalova, 2010, Bernard, Redding, and Schott, 2010). While product switching behavior is widespread and economically important, relatively little is known about the basic process by which firms make product switching decisions or how these decisions are affected by the firms' experience.

In this paper, I apply the notion of demand learning to study the decisions of firms to begin exporting new or discontinue exporting existing product lines. In analyzing product switching decisions of exporters I contribute to the trade literature in three ways. First, I use Brazilian destination-product-firm level export data for the period 1990-2001 to document a novel pattern in product switching behavior: conditional on export sales, younger exporters are more eager to engage in product adding and dropping compared to exporters with more experience. Second, I argue that the age dependence of product switching behavior naturally arises from a model of demand learning. Third, I demonstrate that the learning model predicts the data quantitatively.

Demand learning is not the only way to explain product switching behavior of exporters or of firms in general. Such behavior can be generated by a model that assumes random productivity and demand shocks. Product specific demand shocks will generate individual product adding and dropping, while productivity specific shocks will generate expansion or contraction in the range of products produced by a firm. Such a model with random productivity evolution, however, cannot generate the *age dependence* of firm behavior *conditional on size*. As argued in a number of studies, some notion of demand learning is essential to explain the growth and expansion of firms through their lifecycle (for example, Foster, Haltiwanger, and Syverson, 2010, Arkolakis and Papageorgiou, 2010). That notion is the focus of this study.

The key component of the model is the characterization of the learning process in firms. Products of firms are characterized by their appeal index, which is not known to the firms, and is subject to inter-temporal preference shocks. The combination of the appeal index and inter-temporal shocks comprise per-period demand shocks, which are only observed by firms after production decisions are made. Through observing an accrual of shocks and updating the subsequent mean of the observed demand shocks, firms learn about the true appeal index for their products. Variations in the inter-temporal preference shocks translate into product adding and dropping. The process of learning the true appeal index elucidates the age dependence of product switching behavior conditional on sales, which is one of the key contributions of the paper.

Another important contribution of this paper lays in demonstrating that the model of demand learning explains patterns in the data quantitatively. Previous literature has focused on testing the qualitative implications of the learning mechanism using a reduced form empirical approach. Contrariwise, I incorporate an endogenous demand learning mechanism into a general

equilibrium setup, and perform a quantitative evaluation of the learning model. Calibrated to match cross-sectional statistics on the export sales and export scope distributions of Brazilian exporters, the model predicts that exporter turnover and product switching are equally important in explaining aggregate exports, a prediction that is borne out by the data. Furthermore, the calibrated model predicts that in response to bilateral trade liberalization, the product switching margin contributes three times more to the growth in export sales compared to the exporter turnover margin. The large role of the product switching margin in aggregate economic adjustments to trade reforms has been documented in a number of empirical studies. A model of demand learning provides not only solid rationalization for product switching behavior, but also a quantitatively appealing framework for policy analysis.

Chapter II: State Dependence in Export Market Participation: Does Exporting Age Matter?

The recent literature emphasizes the importance of in-the-market learning as a determinant of firm growth and survival in a market. However, the potential role of learning in accounting for export hysteresis has received less attention. Considerable research has been devoted to the sunk costs explanation of export patterns. Much of the empirical evidence for sunk costs originates from studies showing that exporting in the current period is predicted by exporting in the previous period (for example, Roberts and Tybout, 1997). In this paper I argue that continuous export history beyond a one-period lag has important predictive power in explaining current export choice. I further argue that the widely found statistical dependence of exporting today on exporting yesterday results from two mechanisms: sunk costs and in-the-market experience. The aforementioned statistical dependence, then, cannot be unambiguously interpreted as evidence in favor of sunk costs.

I thus derive a stylized export participation equation from a model of monopolistic competition. In that model I formulate in-the-market learning mechanism in the form of the hypothesis of age dependent sales. The dependence of export choice on one-year lagged exporting can arise from sunk costs, from in-the-market learning, or from both, whereas longer export history matters only if in-the-market learning exists. I use the latter prediction from the model to test for the presence of in-the-market learning mechanisms. I estimate a dynamic random effect probit model of export participation which includes a longer export history. I use Heckman's (1981) techniques to properly identify the coefficients of the lag of the dependent variable. I then use the logarithmic parameterization of the age effect to decompose the effect of one-year lagged exporting into the sunk costs and age components. The empirical model is estimated using Colombian plant-level data for the period between 1979 and 1989. I find that each consecutive year of exporting increases the probability that a firm will export in the future. This finding provides strong support for the importance of the in-the-market learning mechanism. While I cannot reject the sunk costs hypothesis, I find that the effect of sunk costs declines by one half in the presence of the learning mechanism.