



The Public Defense  
of the Doctoral Thesis in Economics

by

Călin-Vlad Demian

on

Essays on International Trade and Heterogeneity

will be held on

Wednesday, Oct 5, 2016 at 2:00 pm

in

Monument Building, Senate Room

Central European University

Nádor Street 9, Budapest

**Thesis Committee:**

Laszlo Matyas (Chair)

Alessandro De Chiara (Internal member)

Sergey Lychagin (Internal member)

David L. DeRemer (External member)

Peter Elek (External member)

**Supervisor:**

Miklós Koren

**Examiners:**

Alejandro Cuñat, Professor of Economics at the University of Vienna

(External Examiner)

Sergey Lychagin, Assistant Professor at the Central European University, Research Fellow  
of the Applied Microeconomics Industrial Organization Economics of Education

(Internal Examiner)

The doctoral thesis is available for inspection  
at the CEU Economics Department

## **Abstract**

This thesis consists of three chapters: two single authored and one co-authored; each chapter investigates a different way in which varying forms of heterogeneity impact the effects of trade.

Chapter 1 presents a computable general equilibrium model that investigates the role trade liberalization has on skilled and unskilled wages. The model allows for endogenous skill formation as workers choose to become skilled or remain unskilled in response to new market conditions. I find that there is a substantial difference in how the skill premium changes depending on which sector is liberalized and on initial country conditions.

Chapter 2 also builds a computable general equilibrium model, investigating the welfare impact of EU institutions through free trade. I find that cross-sector input-output linkages play an important role in quantifying the gains from trade, which are orders of magnitude larger than what traditional models predict.

Chapter 3 is a joint work with Antoine Berthou and Emmanuel Dhyne, looking at the role firm heterogeneity has in estimating the elasticity of trade. The paper contains a theoretical model delivering sharp predictions which are then tested empirically against a novel dataset. We find that there is a substantial difference in elasticity between high and low productivity firms, as well as between sectors.

I provide more details on the contributions of the three chapters of the thesis below.

## **Chapter 1: Trade, the Skill Premium and Global Inequality**

Chapter 1 investigates the role trade liberalization has on shaping both between and within country inequality. I build a Ricardian model in the spirit of Eaton and Kortum that features an arbitrary number of countries, capital-skill complementarity and four sectors each taking care of a different part of the production process. Within each country there are skilled and unskilled workers and whether a worker acquires education is determined endogenously given market prices and wages.

I calibrate the model to the year 2005 for a wide range of countries, both developing and developed and simulate a 10% symmetric drop in trade costs. I find there is a rich set of ways in which trade affects inequality.

I identify two opposing effects through which changes in trade costs influence inequality. First, as inputs become cheaper because of lower trade costs, firms will increase the demand for skilled workers due to capital-skill complementarity; however, as the consumption bundle is cheaper and acquiring education less costly, more workers may choose to become skilled increasing the supply. These two effects offset each other and which one dominates depends on country specific factors and which sector is liberalized.

Liberalizing capital goods increases inequality in developed countries and lowers it in poorer ones. Conversely, liberalizing foodstuff will increase inequality in developing countries the most.

Overall, my model does a good job replicating empirical patterns for several waves of trade liberalization. If workers can respond to the new economic conditions and the shares of skilled and unskilled labor can adjust, inequality may increase or decrease. However, the supply of labor must be free to adjust so trade liberalization should go hand in hand with encouraging school enrolment and other forms of training.

## **Chapter 2: The European Union and the Gains from Trade**

In Chapter 2, I investigate the effect the EU had in increasing countries welfare through cheaper trade. I build a similar model to the one in Chapter 1 that I calibrate to the countries of the European Union. I examine the welfare gains by looking at two distinct facets of membership: joining the EU and using the Euro.

For the first scenario, I look at the 2004 enlargement wave. I estimate the changes in trade costs between 2003 and 2006 for trade between new and old members and then compute the changes in welfare, assuming that this had been the only shift in policy. I find that while gains are positive for all countries, new entrants gained significantly more than old members from enlargement, up to 5.5%. I break down total gains by transmission mechanism and find that allowing for interconnectedness across sectors significantly amplifies the changes in welfare.

In my second counterfactual, I ask what would have happened had Greece abandoned the Euro at the onset of its sovereign debt crisis in 2009. The losses due to higher trade costs would be around 2% of GDP. Greece being forced to have balanced trade would incur

another 1.5% in losses. Currency devaluation, while boosting external competitiveness, would further decrease welfare. Coupling depreciation with running a trade surplus would not incur considerable extra losses over the balanced budget scenario. However, these losses are measured in the best of possible worlds, abstracting from additional costs of default, public sector payment issues, social unrest, inflation or unemployment.

### **Chapter 3: Exchange rate movements, firm-level exports and heterogeneity**

joint with Antoine Berthou and Emmanuel Dhyne

Chapter 3 looks at the role productivity heterogeneity has in firms' exchange rate elasticity. We build a heterogeneous firms model where firms choose to export and set their price both domestically and abroad in terms of the exchange rate and the number of competing firms. In addition, firms source some of their inputs from abroad. The model delivers sharp predictions regarding the differences in elasticities between firms of varying productivities, between productive and unproductive sectors, between diverse and uniform sectors and between sectors that are reliant on intermediates from abroad and those that are not.

We test the model's predictions using a novel dataset of highly disaggregated firm-based data for a panel of 11 European economies over 8 years. We find substantial variability in the exchange rate: more productive and more diverse sectors exhibit lower elasticities and the least productive firms are 3 times more sensitive to exchange rate movement than the most productive ones. We also find that the use of imported inputs explains a large part of exchange rate heterogeneity: sector with a large share of importing firms exhibit lower elasticity. We believe that the discrepancy between the responses of small and large firms provides some new light on the "International Elasticity Puzzle".

# Călin-Vlad Demian

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## WORK EXPERIENCE

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2015 Jan – present	<b>Information Analyst</b> University College London
2014 Jan – 2015 Jan	<b>Research Assistant</b> Research Department, European Central Bank
2013 Sept – 2013 Dec	<b>Visiting Researcher at the Centre for Economic Performance</b> London School of Economics, London, UK
2012 Aug – 2014 Apr	<b>Research Assistant to Miklos Koren</b> Central European University, Budapest, Hungary
2012 Oct – 2013 Apr	<b>Research Assistant to Adam Szeidl</b> Central European University, Budapest, Hungary
2011 Sept – 2013 Apr	<b>Teaching Assistant, Graduate Level Macroeconomics</b> Central European University, Budapest, Hungary

## EDUCATION

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2010 – 2016	<b>PhD in Economics</b> Supervisor: Miklos Koren Central European University, Budapest, Hungary
2015 Dec	<b>Advanced R programming</b> Royal Statistical Society, London, UK
2015 Apr	<b>Day course in Data Visualisation</b> Farr Institute, London, UK
2014 Aug	<b>Summer school in Multi-level Modelling</b> Vienna Joint Institute, Vienna, Austria
2011 Aug	<b>Summer school in Solving DSGE models with heterogeneous agents and bounded rationality</b> London School of Economics, London, UK
2008 – 2010	<b>Master degree in Corporate Finance and Insurance</b> Babes-Bolyai University, Cluj-Napoca, Romania
2005 – 2008	<b>Bachelor Degree in Commerce, Tourism and Services</b> Babes-Bolyai University, Cluj-Napoca, Romania

## DISTINCTIONS AND AWARDS

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2013	Winner of the Olga Radzyner Award for the paper <a href="#">The European Union and the Gains from Trade</a> , conferred by the Austrian Central Bank
2010 Sept– 2013 Aug	CEU Full Doctoral Scholarship Central European University, Budapest, Hungary
2009	Winner Of Grand Prize At National Romanian research competition in Economics "Olimpiada Studenteasca"

2008 Sept – Romanian National Scholarship  
2010 June Babes-Bolyai University, Cluj-Napoca, Romania

#### TOOLS AND SOFTWARE APPLICATIONS

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Proficient R (including graphics frameworks such as ggplot and Shiny), MATLAB, STATA, Microsoft Office Suite  
Experienced Python, SQL, STAN, Eviews, L<sup>A</sup>T<sub>E</sub>X  
Working knowledge Spark, VBA, SPSS

#### SELECTED CONFERENCE PRESENTATIONS

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2015 March CompNet Workshop, Madrid, Spain  
2014 Sep CompNet Workshop, Lisbon, Portugal  
2014 Jun CompNet Workshop, Frankfurt, Germany  
2014 Feb 7<sup>th</sup> RGS Doctoral Conference in Economics, Dortmund, Germany  
2013 Sept 13<sup>th</sup> European Trade Study Group, Birmingham, United Kingdom  
2013 May Spring Meeting of Young Economists, Aarhus, Denmark  
2012 Sept 12<sup>th</sup> European Trade Study Group, Leuven, Belgium  
2012 June 4<sup>th</sup> Economic Challenges in Enlarged Europe, Tallinn, Estonia

#### WORKING PAPERS AND WORK IN PROGRESS

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Trade, the Skill Premium and Global Inequality

The European Union and the Gains from Trade

Exchange rate movements, firm-level exports and heterogeneity

Asymmetric Distributions and Asymmetric Shocks

[Assessing European firms exports and productivity distributions: the CompNet trade module](#), ECB Working papers 1788

[Assessing European competitiveness: the new CompNet microbased database](#), ECB Working papers 1764

#### PUBLISHED PAPERS

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[Cointegration in Central and East European markets in light of EU accession](#), Journal of International Financial Markets, Institutions & Money 21 (2011)

#### LANGUAGES

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**Romanian** Native proficiency  
**English** Full working proficiency

#### PERSONAL INTERESTS

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Chess, jogging, hiking, science-fiction literature, history, cooking