Marijn A. Bolhuis

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Education

2016-2021 PhD in Economics, University of Toronto (GPA 4.0/4.0)

PhD Dissertation: "Essays in Economic Growth"
Committee: Diego Restuccia, Xiaodong Zhu, Kevin Lim
Primary field: Macroeconomics
Secondary fields: International Economics, Machine Learning Forecasting
Passed comprehensive exams with Distinction in Macroeconomic Theory

2018 Recognised Research Student in Economics, University of Oxford

Supervisor: Douglas Gollin

2016 Visiting graduate student in Economics, University of Groningen (GPA 4.0/4.0)

2015 Visiting graduate student in Economics, University of Toronto (GPA 4.0/4.0)

2014-2016 Research MSc *with highest cum laude honors* in Economics, Utrecht University (GPA 4.0/4.0)

Graduated top of class
Thesis: "The Climatic Roots of Risk Preferences" (Grade 9.5/10)
Committee: Jan Luiten van Zanden, Erwin Bulte, Mark Sanders

2014 Visiting student in International Relations, University of Amsterdam (GPA 4.0/4.0)

2010-2014 BSc *with highest cum laude honors* in Liberal Arts & Sciences, Utrecht University (GPA 4.0/4.0)

Graduated in top 5% of cohort
Thesis: "The Sustainability of Dutch Natural Gas" (Grade 9/10)
Supervisors: Martin Junginger, Herman Hendriks
Double major: Economics; Energy Science
Minors: International Relations; Public Administration

Research and Teaching Interests

International Macroeconomics, International Trade, Economic Growth, Machine Learning and Macro-Forecasting

Job Market Paper

"Financial Linkages and the Global Business Cycle", with Marina M. Tavares (International Monetary Fund)

Business cycles tend to be highly correlated across countries, yet standard quantitative models explain only a fraction of this comovement. Motivated by the predictive power of changes in corporate funding costs for global GDP comovement, we examine the role of between-firm financial linkages in driving the global business cycle. We model multinational firms as buyers and suppliers of funding, and incorporate their cross-border linkages into a dynamic multicountry general equilibrium framework with production networks. We identify the structural parameter that governs international

transmission of financial shocks using quasi-experimental variation in financing conditions of US multinationals during the 2008-09 crisis. Our framework accounts completely for countries' production, investment, labor supply, trade and financial flows in terms of different sets of shocks. Applying the model to 25 countries during the 2005-2016 period, we estimate that financial linkages account for 1/3 of global GDP comovement, and for 2/3 of comovement with the US.

Working Papers

"Catch-Up Growth and Inter-Industry Productivity Spillovers in Open Economies"

Media Coverage: World Bank Blog

Countries tend to export more skill-intensive products as they become more productive. This paper proposes a tractable quantitative framework to examine the role of inter-industry productivity spillovers in this development process. I document that a country's comparative advantage tends to increase in industries that employ occupations that are used most intensively in current exports. The model rationalizes these findings by incorporating occupation-specific dynamic scale economies into a multi-sector gravity framework. I estimate the model using cross-sector heterogeneity in foreign demand shocks and find that scale economies are relatively large in high-skilled production. As a result, productivity spillovers tend to be larger in richer countries, and access to foreign markets allows developing countries to shift labor into sectors that contribute more to aggregate productivity growth. Counterfactual exercises suggest that spillovers play a quantitatively substantial role in accounting for slow cross-country convergence and increase the gains from trade, especially in economies with a comparative advantage in manufacturing.

"Deus ex Machina? A Framework for Macro Forecasting with Machine Learning", with Brett Rayner (International Monetary Fund). IMF Working Paper 20/45.

We develop a framework to nowcast (and forecast) economic variables with machine learning techniques. We explain how machine learning methods can address common shortcomings of traditional OLS-based models and use several machine learning models to predict real output growth with lower forecast errors than traditional models. By combining multiple machine learning models into ensembles, we lower forecast errors even further. We also identify measures of variable importance to help improve the transparency of machine learning-based forecasts. Applying the framework to Turkey reduces forecast errors by at least 30 percent relative to traditional models. The framework also better predicts economic volatility, suggesting that machine learning techniques could be an important part of the macro forecasting toolkit of many countries.

"The More the Merrier? A Machine Learning Algorithm for Optimal Pooling of Panel Data", with Brett Rayner (International Monetary Fund). IMF Working Paper 20/44.

We leverage insights from machine learning to optimize the tradeoff between bias and variance when estimating economic models using pooled datasets. Specifically, we develop a simple algorithm that estimates the similarity of economic structures across countries and selects the optimal pool of countries to maximize out-of-sample prediction accuracy of a model. We apply the new alogrithm by nowcasting output growth with a panel of 102 countries and are able to significantly improve forecast accuracy relative to alternative pools. The algortihm improves nowcast performance for advanced economies, as well as emerging market and developing economies, suggesting that machine learning techniques using pooled data could be an important macro tool for many countries.

"The Millennial Boom, the Baby Bust and the Housing Market", with Judd Cramer (Harvard University)

Media Coverage: VoxEU

As baby boomers have begun to downsize and retire, their preferences now overlap with millennial's predilection for urban amenities and smaller living spaces. This confluence in tastes between the two largest age segments of the U.S. population has meaningfully changed the evolution of home prices in the United States. Utilizing a Bartik shift-share instrument for demography-driven demand shocks, we show that from 2000 to 2018 (i) the price growth of four- and five-bedroom houses has lagged the prices of one- and two-bedroom homes, (ii) within local labor markets, the relative home prices in baby boomer-rich zip codes have declined compared with millennial-rich neighborhoods, and (iii) the zip codes with the largest relative share of smaller homes have grown fastest. These patterns have become more pronounced during the latest economic cycle. We show that the effects are concentrated in areas where housing supply is

most inelastic. If this pattern in the housing market persists or expands, the approximately $ 16.5 trillion in real estate wealth held by households headed by those aged 55 or older will be significantly affected. We find little evidence that these upcoming changes have been incorporated into current prices.

Work in Progress

"An Intangible Stagnation Trap: Evidence from Europe"

What is the role of weak demand in accounting for the sluggish recovery after the Global Financial Crisis? I combine European firm-level data with detailed export flows to examine how firms respond to external demand shocks during the GFC. Faced with lower demand, firms do not reduce their investment in tangible capital but invest significantly less in intangible capital. These effects are persistent: 8 years after the onset of the crisis, affected firms are significantly less productive and less intangible capital intensive. I rationalize these findings using a heterogeneous firm model in which intangibles reduce marginal costs but raise fixed costs. Firms' use of intangibles is therefore more sensitive to changes in the scale of production than tangible inputs. An aggregate demand shock can lead to a stagnation trap as lower investment depresses growth, which in turn depresses aggregate demand. The model can account for the post-crisis productivity slowdown in Europe and the lagged investment rate in Europe relative to the U.S., with considerable heterogeneity across countries.

"Misallocation in Indian Agriculture", with Swapnika Rachapalli (University of Toronto) and Diego Restuccia (University of Toronto and NBER)

We study frictions in land rental markets and their impact on agricultural productivity across states in India. We exploit large variation in land market institutions across states and detailed micro data. We find strong evidence that states with more rental market activity have less dispersion in marginal products of land across farmers and land is reallocated more efficiently over time. We find substantial differences across states in the extent of extensive and intensive level rental market distortions and these differences are systematically related to rental market activity across states. Rental market distortions have substantial negative effects on agricultural productivity. For instance, eliminating distortions increases agricultural productivity by 40% in some states relative to the most productive state, Punjab.

Non-Peer Reviewed Publications

2015	"Herstel van de Eurozone begint in Duitsland", de Volkskrant
2013	"Wie zwijgt, stemt toe...", Bureau de Helling

Honors, Scholarships and Awards

2020	Ontario Trillium Scholarship, University of Toronto (2016-2020)
.	Master of Financial Economics Award, University of Toronto
.	Department of Economics Travel Grant, University of Toronto
.	Program Level Fellowship, University of Toronto
2019	CEA Travel Grant (declined)
2018	WEHC Travel Grant
2017	SGS Conference Grant, University of Toronto

2016	Fulbright Scholarship (declined)
.	Doctoral Presidential Fellowship, Brown University (declined)
.	University of Toronto Fellowship (declined)
.	Prins Bernhard Cultuurfonds Scholarship (declined)
.	VSBFonds Scholarship (declined)
.	Dr. Hendrik Muller's Vaderlandsch Fonds Scholarship (declined)
.	Vreedefonds Scholarship (declined)
.	New School New York Provosts Scholarship (declined)
.	EHS Bursary, Economic History Society
.	U-Fonds Grant, Utrecht University
2015	K. F. Heinfonds Scholarship, K. F. Heinfonds
.	Young Innovators Summer School Grant, Utrecht University
2014	Nominee Egbert Tellegen Prize, Utrecht University
.	Honorable mention Oxford University Press Student Prize, University of Amsterdam
2013	Winner Taste of Strategy, Boston Consulting Group
2010	Exceptional Achievement in Chemistry, KNCV & VNCI
.	NLT Award, Landelijk Coördinatiepunt NLT

Research Visits

2019	International Monetary Fund
2018	University of Oxford

Research Experience

University of Toronto

2019-current	Research Assistant to Burhanetting Kuruscu
2017-current	Research Assistant to Diego Restuccia
2018	Research Assistant to Serdar Ozkan and Murat Celik
2018	Research Assistant to Margarida Duarte
2017-2019	Research Assistant to Marco Gonzalez-Navarro

Utrecht University

2015-2016	Research Assistant to Jan Luiten van Zanden
2014-2016	Research Assistant to Mark Sanders
2011-2012	Researcher, Morgen, Dutch National Student Association for Sustainability

Teaching and Advising Experience

2019-current	Freelance Thesis Supervisor, Utrecht University
2019-current	Teaching Assistant, University of Toronto

International Monetary Economics
International Economics after 1945
Competing Views in Macroeconomic Theory and Policy
Special Topics in Macroeconomics
International Trade Theory
Economic Growth
Principles of Microeconomics

Money, Banking and Financial Markets
Developmental Macroeconomics
Advanced Economic Theory - Macro
International Economic Institutions and Policy
Twentieth Century Economic History
Microeconomic Theory

2013-2016 Teaching Assistant, Utrecht University

Thermodynamics and Energy Conversions
Economics of Strategy and Organization

Energy and Environmental Economics

2012-2013 Teacher Undergraduate Exam Preparation, Capita Selecta

Mathematics

Microeconomics and Institutions

2010-2014 Teacher and Tutor, Lyceo/StudentsPlus

Physics
Chemistry
Economics

Mathematics
Business

Other Professional Experience

2019 PhD FIP Machine Learning Forecasting, International Monetary Fund

2014-2016 Student Representative, Education Board REBO Graduate School, Utrecht University

2013-2014 Treasurer, Morgen, Dutch National Student Association for Sustainability

Presentations at Conferences, Workshops and Seminars

2020 RCEA 8th Biennial Conference, Waterloo (postponed)
. University of Toronto

2019 Warwick Economics PhD Conference
. International Monetary Fund 3× (invited, February, August, October)
. North East Universities Development Consortium, Northwestern University
. University of Toronto

2018 University of Oxford
. World Economic History Conference, Cambridge, MA
. University of Toronto

2017 ASREC Conference, Boston

2016 REBO Research Day, Utrecht University;
. Workshop *Health and Welfare in the Long Run*, University of Groningen;
. Economic History Society Conference, Cambridge, UK

Skills

Additional Schooling

2015	Summer School *Financial Crises: A Brief History of Time*, University of Copenhagen
2014	Debt Sustainability Analysis, International Monetary Fund (EdX)
.	Winter School *Sustainable Economics and Management*, Witten/Heidecke University

Languages

Dutch: Native
English: Fluent
German: Intermediate
French: Intermediate
Spanish: Basic

Technical Skills

Python, R, MATLAB, ArcGIS, Stata, SPSS, LaTeX, EViews, SQL

References

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