Ilya Manuylov

Website

Contact Information

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Research Interests

Industrial organization and trade, innovation, technology upgrading

Education

Aarhus University, School of Business and Social Sciences, Denmark
Research Centre for Firms and INdustry Dynamics (FIND)
Ph.D. Candidate, Economics and Business Economics,
September 2018 — June 2022 (expected)

- Dissertation Topic: "Essays on R&D, firm productivity and technological change"
- Supervisors: Frédèric Warzynski, Michael Koch

Higher School of Economics, Moscow, Russia

M.Sc., Economics, 2018
B.Sc., Economics, 2016

Norwegian School of Economics, Bergen, Norway

Master's exchange program, Spring 2017

Job Market Paper

The Role of 'Research' and 'Development' in Technology Upgrading of a Firm
Link

In this paper I use longitudinal data from the Spanish innovation panel (PITEC) to uncover separate effects of 'Research' and 'Development' on productivity growth at a firm level. I also report expected dynamic gains as well as fixed costs associated with both types of R&D activities. By bringing together the ideas from the structural productivity estimation literature and the search theory principles, I develop a model of innovation and productivity dynamics that accounts for intrinsic differences between 'Research' and 'Development' (unlike previous models considering R&D as a uniform activity). In the model, firms invest in 'Development' to search for higher productivity levels on intervals of the technology distribution, while investments in 'Research' expand frontiers of firm-specific search intervals. Given the observable entry into 'Research' and 'Development', the model is used to identify individual fixed costs associated with those activities. The findings show that 'Research' is a primary contributor to the productivity growth, when both direct and indirect effects are taken into account. 'Research' significantly improves success rates of 'Development' in the long run. At the same time, it turns out that fixed costs of R&D have been largely underestimated in the previous literature, where 'Research' and 'Development' expenses are not differentiated. For instance, I find 'Research' to be almost ten times more expensive than 'Development' when it comes to fixed costs. It implies that only a relatively small subsample of firms can afford to invest in 'Research'. Hence, policies aimed at boosting productivity growth by means of subsidizing R&D have to consider structural differences between 'Research' and 'Development'.

Publication

Robots and Firms (with Michael Koch and Marcel Smolka)
published in *The Economic Journal*, Volume 131, Issue 638, August 2021, Pages 2553–2584
https://doi.org/10.1093/ej/ueab009

We study the microeconomic implications of robot adoption using a rich panel data-set of Spanish manufacturing firms over a 27-year period (1990-2016). We provide causal evidence on two central

questions: (1) Which firm characteristics prompt firms to adopt robots? (2) What is the impact of robots on adopting firms relative to non-adopting firms? To address these questions, we look at our data through the lens of recent attempts in the literature to formalize the implications of robot technology. As for the first question, we establish robust evidence for positive selection, i.e., ex-ante better performing firms (measured through output and labour productivity) are more likely to adopt robots. On the other hand, conditional on size, ex-ante more skill-intensive firms are less likely to do so. As for the second question, we find that robot adoption generates substantial output gains in the vicinity of 20-25% within four years, reduces the labour cost share by 5-7%-points, and leads to net job creation at a rate of 10%. These results are robust to controlling for non-random selection into robot adoption through a difference-in-differences approach combined with a propensity score reweighting estimator. To further validate these results, we also offer structural estimates of total factor productivity (TFP) where robot technology enters the (endogenous) productivity process of firms. The results demonstrate a positive causal effect of robots on productivity, as well as a complementarity between robots and exporting in boosting productivity.

Work In Progress

Automation and Biases of Technological Change (with Michael Koch)

We develop a structural framework of productivity dynamics with robots in order to evaluate the role of automation in Hicks-neutral and labor-augmenting technological change. We use a rich panel data-set of Spanish manufacturing firms over a 27-year period (1990-2016) that allows us to assess the bias of technological change at the level of the individual firm. Observing dynamic choices of robot adoption in the production process, we are able to separate automation-specific effects on the firm's multidimensional productivity from other factors associated with technological change within firms. By revealing the bias of robots and other types of technological change, quantifying their contribution to output growth and separating it into both its labor-augmenting and its factor-neutral components, the study provides an important contribution to the literature evaluating the impact of robot adoption.

How Effective are R&D Tax Credits?

In this paper I use firm-level data on R&D tax benefits from Spain over a 16-year period (2001-2016) to evaluate the efficiency of existing R&D tax credit schemes in promoting long-term productivity growth in manufacturing. I apply a structural model of productivity dynamics with R&D and study the effects of different policies on the decision to invest in R&D, fixed costs associated with those activities and long-term dynamic profit gains. The model utilizes the distinction between investments in pure research projects and investments in technological implementation of new prototypes in order to show how different policies affect the composition of R&D expenditures at a firm level and whether current policies lead to the most efficient allocation of resources across R&D types.

Teaching

Aarhus University, School of Business and Social Sciences, Denmark

ECON Data and Software Lab. Undergraduate.	Spring 2019, 2020
Macroeconomics. Undergraduate.	Fall 2019, 2021
Supervision of Bachelor's Projects and Master's Theses.	Spring 2019-2021

Higher School of Economics, Moscow, Russia

International Economics. Undergraduate.	Fall 2015-2017

Seminars & Conferences

2021: AEA Annual Meeting (Online), XXXV Jornadas de Economia Industrial (Online PhD meeting), FIND Research Centre Workshop (Aarhus BSS)
2020: Scandinavian PhD Seminar (Online), FIND Research Centre Workshop (Aarhus BSS), Danish Graduate Programme in Economics Workshop, Aarhus-Kiel Workshop
2019: Tuborg Research Centre Seminar (Aarhus BSS), XVth Danish International Economics Work-

shop (Aarhus BSS), RIEF Network (Aix-Marseille School of Economics), DEGIT XXIV (University of Southern Denmark), EARIE (Universitat Pompeu Fabra), FIND Research Centre Workshop (Aarhus BSS), Danish Graduate Programme in Economics Workshop, Aarhus-Kiel Workshop
2018: Danish Graduate Programme in Economics Workshop, Aarhus-Kiel Workshop

LANGUAGES — Russian, English, Danish

SKILLS — R, Stata, SAS, SPSS, MATLAB, Python, Gephi, Pajek, Cytoscape

CERTIFICATES — Statistician with R (Datacamp, ca. 56 hours)
Topics: data management, inference, probability, experiments, classical statistics, Bayesian analysis.

English – IELTS Academic (Advanced, C1)
Danish – Prøve i Dansk 3 (Karaktergennemsnit: 11,0)