NBER Economics of Digitisation Tutorial Application

Contact Details

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Graduate Education

MSc in Economics for Development, Oxford University, 2014-15, Distinction & award for best thesis & 2nd best overall performance

PhD in Economics, Oxford University, 2016-pres.

Courses taken: Micro, Macro, Econometrics, Advanced Econometrics, International Trade, Economic History, Development Economics, Labour Economics

Areas of Research: Economics of Technology, International Trade, Labour Economics, Development Economics

Research papers in progress

1: "Artificial intelligence and service sector offshoring"

- Joint work with Layla O'Kane (Burning Glass Technologies)
- future Job Market Paper to be, hopefully (aiming to go on the market in 2020)

This paper explores how advances in machine learning (ML) and robotics process automation (RPA) affect service sector offshoring to low- and middle-income countries. I combine a dataset of online job adverts posted in the UK between 2012 and 2018 scraped by Burning Glass Technologies, a private labour market research firm, with UK administrative firm data on international trade in services transactions. I construct firm level measures of the intensity of use of ML and RPA using the skills and activities mentioned in the job adverts. I develop a heterogeneous firms model with production that incorporates both the decision to automate tasks using ML/RPA and the decision to offshore tasks, where both automation and offshoring involve a fixed cost but offer a potential marginal cost reduction. I then use a dataset that tracks task-based progress in ML to develop an instrument that reflects exogenous, supply side improvements in specific fields of ML. I also look at the impact of a change in the UK's R&D tax credit scheme, which reduced the cost of investing in software projects, on ML & RPA adoption in particular, and how this affected offshoring.

2: "The Brexit vote and labour markets: evidence from online job postings"

- joint work with Beata Javorcik and Ben Kett (Oxford)

This paper uses data on the quasi-universe of job adverts posted online in the UK to study the impact of the trade uncertainty caused by the Brexit referendum on labour demand between 2015 and September 2019. We develop measures of regional exposure to the threat of potential most-favoured-nation (MFN) tariffs if the UK were to leave the EU without a trade deal. We show that regions relatively more exposed to the tariff threat differentially reduced online hiring in the period after the referendum and this effect was distinct from the impact of the exchange rate depreciation and uncertainty surrounding future immigration policy and the financial services sector. Both skilled and unskilled job adverts were affected, although unskilled job adverts experienced a slightly greater relative decline. We develop two time-varying measures of Brexit-specific trade policy uncertainty, using newspaper coverage and Google searches for terms associated with Brexit and trade policy. Using these measures, we show that the relative decline in job adverts was concentrated in months with greater uncertainty about future trade arrangements with the EU. We conclude that uncertainty around trade policy, not only enacted policy, has real economic impacts.

3: "Automation, jobs and trade: evidence from Spanish manufacturing firms"

– joint work with Michael Webb (Stanford)

In this paper we shed new light on the firm-level consequences of automation. We take advantage of a unique dataset of Spanish manufacturing firms that provides rich information on firm technology use over the time period of 1990-2016. We begin by documenting the characteristics of firms that adopt three distinct automation technologies: robots, computer numerically controlled (CNC) machines and flexible manufacturing systems. Firms that automate using these technologies are on average larger, more productive, more internationally oriented, have a lower labour share and are more skill intensive. To evaluate the causal impact of automation on firm performance, we develop three different instrumental variables for the different types of automation. The first follows Webb (2019) in using the text from patent titles to identify robot-related patents that substitute for specific occupations. The second uses data on global sales of industrial robots from the International Federation of Robotics. The third uses the share of baseline employment of machine-tool operators, interacted with global imports of computer-numerically controlled (CNC) machines.

4: "The surprising persistence of the graduate wage premium in China"

In 1999 the Chinese government launched a program to rapidly expand university education, engineering one of the most rapid and large scale high-skilled labour supply shocks in history. Evidence on how this increase in the graduate labour supply affected the university wage premium is inconclusive. This paper exploits a unique feature of the Chinese university admissions system; admissions that are based entirely upon the

score of one standardised exam, with clear cut-off scores for university admission. This setup allows for the use of a Regression Discontinuity (RD) design to estimate the causal impact of university attendance on wages for students at the margin of being admitted to university. I estimate the university wage premium for students that started university before, during and after this key expansion period between 1990 and 2008. Despite the rapid increase in the number of students attending university, there has been a substantial return to obtaining a university degree for academically marginal students throughout this period. The results suggest that the students admitted to university as part of the initial expansion program had much to gain from this educational reform.

Other projects in the making

5. Using LinkedIn profiles to study the impact of automation on the business process outsourcing sector in India – joint work with Gaurav Nayyar (World Bank)

We are planning a project using LinkedIn profiles to study the changing skills and occupational composition of the business process outsourcing (BPO) sector in India. Much of the work on automation to date has focused on rich countries. One would expect that there would be less to gain from automation in a country with abundant low-skilled labour, such as India, yet there is evidence that the Indian BPO sector has been automating at a rapid rate and decreasing its labour share. We want to study the strategic interaction between automation in advanced and developed countries and how automation in developing countries affects low-skilled workers.

6. Studying the impact of software, ICT & data science on global value chains in Denmark

– joint work with Friedrich Bergmann (Copenhagen Business School)

In this project we have access to Danish matched worker-firm and transactional trade data and want to study how technology adoption affects firm sourcing, global supply chains and the international structure of the firm.

Attending the NBER Economics of Digitisation Tutorial

I would like to attend the NBER Economics of Digitisation Tutorial in order to learn more about the frontier research on digitisation and interact with other researchers and students working in this area. I have funding from my scholarship at Oxford that could cover my flights if accepted.