Institution: Durham University		
Unit of Assessment: UoA 17 Business and Management Studies		
Title of case study: Modelling the impact of future trade agreements on the United Kingdom's Economy		
Period when the underpinning research was undertaken: Between 2015 and 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Dr Anamaria Nicolae Dr Michael Nower	**Role(s) (e.g. job title):** Associate Professor in Economics Lecturer in Economics (formerly PDRA and PhD student)	**Period(s) employed by submitting HEI:** September 2004 - present July 2020 - present (PhD: October 2015 - June 2019, PDRA: April - December 2019)
Period when the claimed impact occurred: Between 2017 and 2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact

Research from Durham University Business School has had significant impact on Bank of England analysis and parliamentary scrutiny of Government activity and policy, as well as having impacted on the business community, regarding the implications of various Brexit related trade scenarios for the United Kingdom's economy. Specifically, the research has: (1) provided a bespoke macroeconomic model that was used in the Bank of England's *'EU withdrawal scenarios and monetary and financial stability: A response to the House of Commons Treasury Committee'* report, November 2018, offering unique insights into the effects of various No-Deal/no-transition scenarios on the short-run dynamic pattern of GDP, which informed and influenced monetary policy making; (2) impacted the voting decisions of MPs in their votes on the *"indicative vote on No Deal"* and *"Benn Bill"* in the House of Commons, as well as influencing the work of the International Trade Select Committee and other parliamentary bodies on a number of Brexit and trade-related publications; (3) informed local MEP and business organisations on possible trade agreements.

2. Underpinning research

Dr Nicolae has a long-standing collaboration with Professor Stephen Millard, Senior Economist in the Structural Economics Division at the Bank of England. While on research leave at the Bank of England in 2012, Nicolae worked with Millard on a research project contributing to understanding the United Kingdom's Productivity Puzzle (the unprecedented lack of recovery in productivity following its decline during the financial crisis of 2008). Various explanations for this puzzle have been put forward in the literature; however, none of them is able to solve it entirely. Given that understanding what drives productivity remains important, the Bank made *'What determines the supply potential of the economy*?' one of its key research questions within the broader area of *'Central bank response to fundamental technological, institutional, societal and environmental change'* as part of its One Bank Research Agenda.

This joint work resulted in the Bank of England Working Paper *The effect of the financial crisis on TFP growth* **R1,** exploring a possible explanation for this behaviour of the United Kingdom's productivity (where TFP is *Total Factor Productivity,* a measure of economic efficiency). A significant research gap was identified: although the link between international trade and productivity is well established in the literature, international trade has not been examined as one of the potential explanations for the United Kingdom's Productivity Puzzle, especially the significant changes in international trade during and following the Financial Crisis of 2008. In this context, a successful ESRC NEDTC Collaborative Studentship was obtained in 2015, with the research project: *Explaining the UK Productivity Puzzle via International Trade*, to which the Bank actively contributed with Millard as co-supervisor for Michael Nower.

Combining Nicolae and Nower's expertise in cutting-edge macroeconomic models of international trade and calibration techniques, and Millard's expertise in conducting policy-oriented research, a three-country dynamic, stochastic, general equilibrium macroeconomic model of international trade with monopolistic competition, heterogeneous firms and endogenous productivity has been developed **R2**. While this model allows the quantification of the dynamic effects of various changes in tariff and non-tariff barriers to trade on labour productivity and other macroeconomic variables, it also has a number of novel characteristics: it allows for trade between more than two countries simultaneously and has the ability to analyse the short-term dynamic behaviour of the main economic variables. These characteristics mean that the model in **R2**, designed to analyse the cause of the stagnation in productivity, is not only well-suited to study the role of international trade in explaining the Productivity Puzzle, but also to study the dynamic effect of the potential changes in tariff and non-tariff barriers to trade - *corresponding to various trade agreements* - associated with the United Kingdom's exit from the EU - on the United Kingdom's economy.

The model in **R2** was further extended in **R3** by relaxing the restrictive assumption of full employment, allowing for labour market frictions in the model. Relaxing the assumption substantially improves the model's ability to quantitatively evaluate the effect of the changes in tariff and non-tariff barriers on macroeconomic variables, given that the movement of labour into and out of unemployment is a key driver of the response of productivity and other macroeconomic variables to shocks such as changes in barriers to trade, making the model even better suited to study the dynamic effect of Brexit. While other studies have analysed the long-run impact of the United Kingdom's exit from the EU, our models are the only ones able to provide insights into the short-run path of the United Kingdom economy after withdrawal, a feature which was especially important for the Bank of England.

The theoretical models in both **R2** and **R3** were calibrated to three countries, corresponding to the United Kingdom, the EU and the Rest of the World (all countries which are not in the EU). This meant that they could then be applied to quantify and examine the effects of possible future trade scenarios associated with the United Kingdom's exit from the EU on the United Kingdom's economy and offer policy advice on Brexit.

3. References to the research

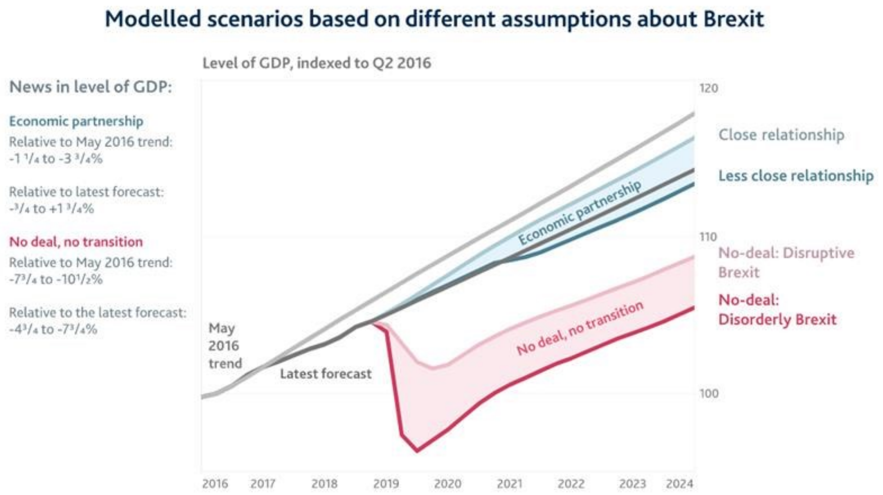
R1 Millard S. and A. Nicolae, *The Effect of the Financial Crisis on TFP Growth: A General Equilibrium Approach* (2014), Bank of England Working Paper No. 502.
R2 Millard S., A. Nicolae and M. Nower, *International Trade, Non-Trading Firms and their Impact on Labour Productivity* (2019), Bank of England Working Paper No. 787; first circulated September 2018.
R3 Nicolae A. and M. Nower, *International Trade and the Interaction of Labour Market Frictions and Endogenous Firms Exit: An Examination of Labour Productivity and Trade Dynamics* (2020); first circulated November 2017.

R1 and R2 are high level papers used as a basis for forming monetary policy at the Bank of England; additionally, they have been internally peer reviewed as being above the 2* benchmark.

4. Details of the impact

Influence on the Bank of England's Monetary Policy
Given that the long-run stagnation in the United Kingdom's productivity is of key concern to monetary policymakers, in September 2018, **R2** was presented to members of the Bank's Monetary Policy Committee (MPC) at a *One Bank Research Awayday*. Considering the model's ability to analyse the impact of changes in barriers to trade on productivity and the wider economy, it was identified at the Bank as clearly suited for an analysis of the impact of the United Kingdom's withdrawal from the EU. The theoretical model in **R3** has also been calibrated and applied to examine the effects of changes in tariff and non-tariff barriers to trade associated to the United Kingdom's withdrawal from the EU across a range of possible post-Brexit trade scenarios of interest to the Bank or the purpose of understanding monetary policy. Chris Young, the Head of the Structural Economics Division at the Bank of England said*: "the results of this work were presented to the Monetary Policy Committee directly, providing them with helpful guidance in understanding the consequences of the United Kingdom's withdrawal from the European Union*." [E1]

On 27 June 2018, the House of Commons Treasury Committee requested that the Bank of England publish their analysis of how leaving the EU would affect its ability to deliver its objectives for monetary and financial stability *"in good time before Parliament comes to make its key decisions"* [E2]. In response to this request, on 28 November 2018, the Bank published their analysis of the EU withdrawal scenarios and monetary and financial stability [E3].



The Bank's analysis report drew heavily on the model in **R3**, as one of a suite of macroeconomic models used to analyse and inform the Bank on the effects of various No-Deal scenarios on the United Kingdom's GDP, in their modelling of EU withdrawal scenarios. Up to this point, internal models and other non-Bank research were only able to offer a view on the long-run impact of various scenarios for the United Kingdom's withdrawal from the EU on the United Kingdom's economy, but not on the short-run. Because Nicolae and Nower's model could analyse the short-run effects, it gave policymakers a better view as to the likely path of the economy in the months following Brexit, specifically predicting the potential for decrease of 7.75% in GDP in the event of a Disorderly exit, seen in **Chart A: GDP in EU withdrawal scenarios** on page 7 of the Bank's report (Chart A was also included in the Bank's two-page report summary, under the heading 'Modelled scenarios based on different assumptions about Brexit', reproduced above) [E3].

Young, said: **R3** *"[...] suggested the key insight that withdrawing from the European Union with no deal would result in an immediate, sharp drop in GDP relative to its previous trend. Further, their research suggested that the initial sizable fall in the level of GDP would be larger than the long-run fall, such that GDP would remain below its new equilibrium for several years. Both these predictions were incorporated into the Bank's analysis"* [E1]. **Chart A** was subsequently reproduced widely in the national (and international) press. The publication of the Bank's analysis and especially that part based on the underpinning research in **R3** changed the tone of the debate in Britain.

The Bank's report received a substantial amount of public and media interest at the time, with coverage including the BBC, ITV, The Guardian, Sky News and The Telegraph [E4]. Many media organisations made particular reference to the potential short-run impact of the worst case, No-Deal Brexit. Sky News wrote on 28 November: "*The Bank of England says that a disorderly Brexit could push the UK towards the biggest slump in modern memory. It says that a disorderly Brexit, involving no new trade deals, severe disruption at borders and uncertain economic conditions, could lead to the British economy shrinking by nearly 8% - more than the effect of the financial crisis.*" [E4] As Young *said*: "*the research undertaken at Durham has allowed us to gain new insights into the impact of changes in international trade on productivity, especially in relation to the dynamics, and has benefitted monetary policymakers by offering a view as to the likely path of the UK economy in the months following EU withdrawal".* [E1]

The ongoing collaboration of Nicolae and Nower with Millard at the Bank of England on evaluating the effects of various possible trade scenarios/agreements following the United Kingdom's exit from the EU on key areas of the United Kingdom's economy (such as labour productivity and GDP) based on **R3,** led to work which contributed to the '*Trade and Productivity*' internal Bank project, as it "*provides unique insights into the dynamic short-run path of the UK economy after withdrawal", "the results of which were presented to the Monetary Policy Committee",* and which, as Dr Longoni who led the project stated: "*has benefitted monetary* *policymakers by offering a view as to the likely path of the UK economy in the months following Brexit."* [E1]

Influence on the House of Commons of the United Kingdom

In addition to its impact on monetary policymaking, the Bank's report, and its unique insight into the short run behaviour of GDP, was also used by MPs as part of their deliberations over the United Kingdom's leaving the EU with No Deal, which they subsequently voted against when voting in the House of Commons. The House of Commons Hansard shows that of the 24 MPs who made direct reference to the Bank's analysis in their speeches during various parliamentary debates taking place between the date of the publication of the Bank's report (28 November 2018) and the 27 March 2019 indicative vote on No Deal, 20 of them (83.3%) voted against No Deal, 2 voted for, and 2 abstained [E9(a)]. Furthermore, of the 29 MPs who made reference to the Bank's analysis between its publication and the *"Benn Bill"* vote on 4 September 2019, 25 of them (86.2%) voted against a No Deal exit. Additionally, all 13 MPs who made direct reference to the dramatic short-run drop in GDP following a No-Deal Brexit then went on to vote against a No-Deal Brexit, in favour of the *"Benn Bill"*. Among them, John McDonnell, Shadow Chancellor of the Exchequer, said in his speech: *"The Bank of England said that it [No-Deal Brexit] could cause more economic damage than the financial crisis of 10 years ago [...]",* while Mr Philip Hammond, former Chancellor of the Exchequer, stated, referring to the analysis of the short-term GDP, that No-Deal Brexit *"could cause a recession, with GDP reduced by up to 7.75% and unemployment rising to 7.5%."* [E9(b)]

In addition to this, in response to the 2017 International Trade Select Committee inquiry into *UK Trade options post 2019,* the model developed in **R2** was calibrated with the three countries in the model being the United Kingdom, the EU and the Rest of the World and applied to study various trade scenarios. The results presented by the Durham team in a written evidence submission [E5(a)] showed that the decision as to which future trade scenario is preferred for the United Kingdom would depend on the relative weightings of the Government's priorities: higher prioritisation of increasing employment would make trading under WTO rules preferable, while greater priority for increasing productivity would make EEA membership preferable. This advice was picked up directly within the committee's final report to government, which stated: "*Dr Anamaria Nicolae and Michael Nower, of Durham University, noted that the value of the unilateral free trade model depended on what one valued in the economy: [I]t would be desirable for the UK to adopt a unilateral free-trade, low tariff or uniform-tariff approach if […] [the Government] are prioritizing maximising UK productivity growth, consumption, or wages, and minimising UK price growth. However, if the UK government is prioritizing maximizing the number of firms (and hence employment), then adopting such an approach would not be desirable.'* [E6, pg.45]. Subsequently, the same advice was incorporated verbatim by the Scottish Parliament Information Centre (SPICe) in its *'UK trade policy and Brexit'* briefing (March 2018) [E7, pg.44].

Nicolae and Nower submitted further evidence to the 2018 International Trade Committee's inquiry into <u>*Continuing application of EU trade agreements after Brexit*</u> [E5(b)]. While almost all contributions to this inquiry suggested that the Government's policy objective should be that of seeking continuity on EU's FTAs and any of the other trade related treaties to which the EU is a party, Nicolae and Nower's submission was *the only one* able to quantify the short and long term effect on GDP from not grandfathering any of the EU's FTAs and any of the other trade related treaties to which the EU is a party. Applying the model from **R3**, they calculated and showed how much grandfathering would contribute to minimizing reduction in the United Kingdom's GDP post Brexit. Again, the advice was incorporated into the committee's final report to government. "*Dr Anamaria Nicolae and Michael Nower, of Durham University Business School, calculated that "[n]ot grandfathering any of the EU's FTAs and any of the other trade related treaties to which the EU is a party, will reduce GDP long term by 1.1% and short term by 2.7%".* [E6, pg.89]

Following written evidence submitted to the International Trade Select Committee *Trade and the Commonwealth: Australia and New Zealand* inquiry [E5(c)], Nicolae and Nower were invited to give oral evidence, presented by Nower on 9 January 2019. Drawing on calculations based on the model in **R3**, Nower advised the committee about the potential impact of future free trade agreements between the United Kingdom and Australia and New Zealand on the United

Kingdom's economy, as well as the impact of future trade arrangements between the United Kingdom and EU on the ability of the United Kingdom to strike free trade agreements with non-EU countries, and the desirability of the United Kingdom seeking membership of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership. [E8]

Informing local MEP and business organisations on possible trade agreements
Through ongoing engagement with former local MEP Jude Kirton-Darling, Durham's research further contributed to the debate on the consequences of No-Deal on the economy and to informing the general public. Following a meeting with Kirton-Darling on 14 June 2019, in which a study based on **R3,** on the consequences of No-Deal Brexit, was presented, the online publication *northeastlabour.eu* wrote: "The outcome of the study has prompted North East Labour MEP Jude Kirton-Darling to warn Conservative Party leadership contenders against the damage a No-Deal Brexit can cause: "*This is further proof that a no-deal Brexit should not be on the negotiating table as an option, or anywhere near it. With damning evidence against it piling on, I find it shocking that no-deal is still featuring so prominently in the Brexit discourse*." [E10(a)]

In July 2017, Nicolae began discussions with regional strategic bodies and business groups, to support them in their campaigns with local businesses, to both inform, and ensure necessary changes needed are made in preparation for Brexit. A Policy Note [E10(b)] written by applying **R3** to five possible post-Brexit trade scenarios, brought awareness on the effects of possible future trade scenarios on key macroeconomics variables to North East business, as it was circulated to the North East England Chamber of Commerce (NEECC) International Trade Committee. The Policy Note is also hosted on the NEECC online '*Brexit Knowledge Hub*' in '*Preparing for Brexit'*, with accompanying Potential Brexit Impact on the UK Economy: FAQs answered by the Durham team, offering regional business accessible information regarding the implications of different trade scenarios to help them prepare for Brexit [E10(c)]. Nicolae and Nower also took part in NEECC's *'Preparing for Brexit'* series of events for regional stakeholders, covering the economic implications of No-Deal Brexit [E10(d)]. Jack Simpson, Policy Adviser at NEECC said: *"These activities, while providing us with a better understanding of the effect of Brexit on the economy, have been useful in informing our members and make them aware of the business implications of various Brexit scenarios, No-Deal especially, in order to encourage them to carry out the necessary planning and preparation to place their businesses in the best position to succeed after UK's exit from the EU."* [E10(e)]

5. Sources to corroborate the impact

E1 Set of Bank of England Testimonials: (a) Chris Young, Head of the Structural Economics Division at the Bank of England, (b) Dr Enrico Longoni, Senior Economist in the Structural Economics Division at the Bank of England
E2 Letter from Chair of Treasury Committee to Governor of the Bank of England, 27 June 2018
E3 Bank of England, EU withdrawal scenarios and monetary and financial stability, A response to the House of Commons Treasury Committee, November 2018 (summary and report)
E4 Media Coverage: ITV, Telegraph, Guardian, BBC, Sky News, Reuters
E5 Set of Written Evidence to Parliamentary Inquiries: (a) *UK Trade options post 2019*, (b) *Continuing application of EU trade agreements after Brexit;* (c) *Trade and the Commonwealth: Australia and New Zealand*.
E6 House of Commons International Trade Committee Reports: (a) *UK Trade options beyond 2019, First Report of Session 2016–17*, (b) *Continuing application of EU trade agreements after Brexit, First Report of Session 2017–19*
E7 UK trade policy and Brexit, *The Scottish Parliament*, SPICe Briefing, 7 March 2018.
E8 Oral Evidence: *Trade and the Commonwealth: Australia and New Zealand*, International Trade Committee
E9 Hansard Reference to Bank of England No-Deal Analysis: (a) indicative vote, (b) *"Benn Bill"*
E10 North East England Engagement: (a) MEP engagement (northeastlabour.eu, Facebook page, Twitter feeds); (b) Policy Note; (c) NEECC - Potential Brexit Impact on the UK Economy: FAQs; (d) NEECC Twitter feeds; (e) North East England Chamber of Commerce Testimonial.