Institution: Bournemouth University

Unit of Assessment: UoA 17

Title of case study: Using economic modelling to inform UK airport expansion

Period when the underpinning research was undertaken: 2008 - 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Adam Blake	Professor of Economics and Econometrics	31/12/2007 - current
Dr Neelu Seetaram	Principal Academic	01/12/2010 - 31/01/2018

Period when the claimed impact occurred:

August 2013 – December 2020

Is this case study continued from a case study submitted in 2014? Y/N

No

1. Summary of the impact (indicative maximum 100 words)

Bournemouth University (BU) researchers have developed improvements to economic modelling techniques that more precisely model the economic consequences of infrastructure development policies. This type of modelling allows governments to more accurately assess the economic impacts of large-scale investment projects. The technique was influential in the 2016 decision by the Airports Commission to recommend the construction of a third runway at Heathrow ahead of other UK airport expansion options at Gatwick, and of the final decision by the UK Government in June 2018 to back Heathrow expansion. The economic modelling techniques used to inform the Heathrow decision will also be fundamental in future appraisal of large-scale transport investment.

2. Underpinning research (indicative maximum 500 words)

The underpinning research undertaken by Blake (BU 2008 to present) and Seetaram (BU 2010-2018) is represented by a number of publications and research awards. These have pioneered the application of new approaches for estimating the economic impacts of tourism activities.

Economic impact research has evolved since the 1970s with the use of input-output models. These typically estimated static economic impacts are limited in their applicability. Building on these earlier models, Blake was one of the first to introduce computable general equilibrium models to tourism economics (from 2001-8 at a different HEI). More recent research conducted at BU, in which Blake has been instrumental, has extended and enhanced economic impact modelling in the following ways:

- The inclusion of forward-looking dynamics in economic impact modelling of tourism, which takes techniques for applied dynamic economic models used in other contexts and adapts them for tourism impact modelling. The dynamic nature of these models allows the estimation of the economic impact that tourism has over time, while the forward-looking nature of them allows for the estimation of investment and other effects that will come about because of future demand [R5]. These forward-looking dynamics had previously been developed research for the UK Government [G7], building an

appreciation of the robust nature of this technique in the Government's interpretation of results.

- The inclusion of uncertainty [R2] and stochastic random effects [R1] in dynamic economic models of tourism allows the impacts of investment to be assessed based on uncertain anticipation about future tourism demand by allowing different growth paths to be modelled, giving the ability to estimate the effects of this uncertainty as well as of changes in the potential future growth paths.

- Demonstrating the importance of segmentation in econometric modelling of tourism demand, both in terms of tourists' purpose of visit and country of origin and showing that models that do not include these effects are systematically biased [R3; R4].

These developments provide much more rigorous modelling methodologies to examine the impact of airport expansion. The incorporation of forward-looking dynamics and segmented tourism demand modelling were both explicitly included in the model used in the Airports Commission report [E1].

3. References to the research (indicative maximum of six references)

The below are published in peer reviewed journals:

[R1] Liu, A., H. Song and A. Blake (2018). Modelling Productivity Shocks and Economic Growth Using the Bayesian Dynamic Stochastic General Equilibrium Approach. *International Journal of Contemporary Hospitality Management.* DOI: 10.1108/IJCHM-10-2017-0686

[R2] Pratt, S., A. Blake and P. Swann (2013). 'Dynamic General Equilibrium Model with Uncertainty: uncertainty regarding the future path of the economy', *Economic Modelling* 32: 429-439. DOI: 10.1016/j.econmod.2013.02.034

[R3] Cortés-Jiménez, I. and A, Blake (2011). 'Tourism Demand Modelling by Purpose of Visit and Nationality', *Journal of Travel Research*, 50(4):421-442. DOI: 10.1177/0047287510363615

[R4] Pratt, S., S. McCabe, I. Cortés-Jiménez and A. Blake (2011). 'Measuring the Effectiveness of Destination Marketing Campaigns: comparative analysis of conversion studies', *Journal of Travel Research* 49(2):179-190. DOI: 10.1177/0047287509336471

[R5] Blake, A. (2009). 'The Dynamics of Tourism's Economic Impact', Tourism Economics, 15(3):615-628. DOI.org/10.5367/000000009789036576

Grants:

[G6] Airports Commission, 2014, Airport Expansion Options: Wider economy impacts [GBP 60,000] (Blake and Seetaram).

[G7] HM Revenue and Customs, 2012-13, The HMRC Regional CGE Model. [GBP52,500] (Blake).

4. Details of the impact (indicative maximum 750 words)

Heathrow expansion is a major infrastructure project that will have enormous benefits to the United Kingdom for decades to come, providing more flights, more jobs and greater economic growth. Bournemouth University research was instrumental in the Government's 2018 decision to progress with building a third runway at Heathrow.

In 2014, Blake and Seetaram received funding from the Airports Commission, via consultancy firm Price Waterhouse Cooper (PwC), to investigate the economic effects of various forms of future airport expansion in the UK [G6]. Building on Blake's previous use of economic modelling by purpose of visit and nationality [R3], Blake and Seetaram constructed and used an econometric model of tourism demand into and out of the UK, with different estimations of elasticities based on mode of transport and destination (for UK outbound) or origin (for UK inbound). These estimates were then used to construct and test a spatial dynamic computable general equilibrium of the UK economy. The spatial element contained different regions of the UK, with the South East and the local areas around both Heathrow and Gatwick airports included as separate regions. The dynamic element followed the model methodology developed by Blake [R5].

The model was used by external consultants PwC to provide estimates of the wider economic impact of airport expansion options, with the results presented in Chapter 7 of the Airports Commission report [E1]. Figure 7.1 [E1 p137] of that report gives a schematic overview of the model, with the 'wider economy and productivity' section being the model constructed by Blake and Seetaram. Figures 7.2 (p141) to 7.4 (p145) and Table 7.1 (p147) present the main results from this economic model. Based on the modelling, the report concluded that:

"Overall, Heathrow Airport Northwest Runway scheme performs most strongly in respect of its economic benefits. There are greater direct benefits for passengers and its wider economic impacts, such as on trade and agglomeration, are stronger. The Northwest Runway scheme would also deliver more local employment, providing a large number of jobs in an area of comparatively high unemployment and a city experiencing rapid population growth" [E1 p150].

The results from Blake and Seetaram's modelling formed part of the evidence base that led to the Airport Commission deciding to support a new runway at Heathrow instead of expansion of Gatwick or extension of the current Heathrow Northern runway [E1]. In June 2018, based on this recommendation, the government formally approved plans for the new runway at Heathrow. In the final announcement of this approval, the Secretary of State for Transport gave the wider economic benefits as one of the key benefits of the Heathrow expansion:

"Expansion at Heathrow will bring real benefits across the country, including a boost of up to GBP74,000,000,000 to passengers and the wider economy, providing better connections to growing world markets, and increasing flights to more long-haul destinations" [E2].

This followed a statement in 2016 in which the Under-Secretary for Transport announced that the Government accepted the findings of the Airports Commission report, using the wider economic impact of expansion as a key reason to expand Heathrow:

"If we do nothing, the cost to our nation will be significant, amounting to more than GBP20,000,000,000 over 60 years through delays, fewer flights and passengers having to fly from airports elsewhere. In addition, the wider impacts on our economy will be in the region of GBP30,000,000,000 to GBP45,000,000,000. That is why the decision we have reached today is so important to the future of our country—not just to tackle the immediate shortage of airport capacity but to set our country on a course to even greater prosperity for future generations" [E3].

Overall Blake and Seetaram's research, through the development of a novel and robust economic modelling technique, provided the Airports Commission and the UK Government with a more accurate and detailed analysis of the airport expansion options than could otherwise have been obtained. This led to a much greater evidence base for the decision over airport expansion, and to more confidence within government about the option to be chosen. The modelling approach that was developed has expanded the capability of economic impact modelling to analyse the impact of proposed major investment projects in the future.

A Director at PwC has stated that "Professor Blake and Dr. Seetaram's expertise was instrumental in being able to present empirically and theoretically rigorous evidence to the Airports Commission" [E4] and that "PwC could not have conducted this analysis without them, and this research could not have been conducted by any other research group in the UK, and only by a few leading researchers in this field world-wide" [E4]. He goes on to say that the project "has provided an exemplar of assessment of airport expansion, and in the assessment of other major infrastructure projects, that will be used in future research by policy makers around the world" [E4].

5. Sources to corroborate the impact (indicative maximum of 10 references)

[E1] Airport's Commission (2015) *The Airports Commission's final report* pp135 – 151. Full report available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440316/airports-commission-final-report.pdf

[E2] Grayling, C. (5 June 2018) Airports National Policy Statement House of Commons. Hansard: https://hansard.parliament.uk/Commons/2018-06-05/debates/ED5F2A14-318D-4A18-8414-E472C9608DD2/AirportsNationalPolicyStatement

[E3] Ahmed, N., Airports Capacity (25 October 2016) House of Lords. Hansard: https://hansard.parliament.uk/Lords/2016-10-25/debates/0C2F6520-DB51-4A08-AF0D-1BFCA98E2C81/AirportCapacity

[E4] Price Waterhouse Cooper (January 2021) *Letter of support from a Director*