

William Banner Laidlaw Scholarship Research Proposal

Provide a brief description of the project and explain why you are interested in your choice of project (maximum 250 words)

My project, "The Shifting Distribution of the Global Population in the Twenty-First Century: an Econometric Analysis of the Projected Fortunes of Nigeria and Japan, with Policy Recommendations for Sustainable Development" aims to analyse the causes of population increase and decline in Nigeria and Japan respectively, and suggest policy recommendations in response to both. It will hone in on the following core questions:

- RQ1: To what extent can population growth be harnessed to achieve sustainable economic development? An examination of Nigeria's prospects this century
- >RQ1a: Which factors are the most significant drivers for Nigeria's population growth?
- >RQ1b: What will be the effects of rapid population growth on the Nigerian economy?
- >RQ1c: What policy recommendations should be adopted in Nigeria to fulfil sustainable economic development objectives?

- RQ2: To what extent is rapid population decline a cause for concern? A time-series forecast of Japan's fate
- >RQ2a: What are the core causal factors for Japan's anticipated population decline?
- >RQ2b: What will be the effect of Japan's population decrease?
- >RQ2c: What policy recommendations should be adopted in Japan to fulfil sustainable economic development objectives?

My interest stems primarily from the academic value and the policy implications resulting from it. Conducting the research would also benefit my personal academic development as I hope to gain new quantitative skills such as developing my pre-existing R knowledge and conducting time-series and other econometric analysis. Demographic economics is closely intertwined with sustainability and development economics, areas I would like to pursue in my career.

Explain why you believe your research is important (maximum 200 words)

My research is important because population structural change will have impacts on everything in society. This incorporates, but is not limited to, the impacts on migration patterns, resource management, labour markets and public policy.

Migration can not be utilised to stop labour supply shortages in countries with labour supply shortages if the world's population on the whole is shrinking (although as this research will emphasise some countries such as Nigeria will face the opposite fate). Therefore governments will need to have

innovative policies to mitigate negative fiscal implications and resolve issues such as the 'pension time bomb'. Demographic transition will affect city-level governments who need to provide safe housing for all under the United Nations' eleventh Sustainable Development Goal (SDG) and maintain access to high quality education and healthcare for all.

Furthermore, the primacy of this research is elevated by the fact that the world is at an unprecedented stage in demographic transition. After many years of exponential population, as evident from the world population approximately quadrupling in the last century from 2 billion in 1927 to 8 billion anticipated by the end of this year, global population growth is modelled to stagnate before the end of this century.

What outputs and/or outcomes do you believe your research could produce (maximum 200 words) e.g. you may produce a report detailing your research outcomes but also think about how you could communicate your research outcomes to a wider audience

In the first summer, I intend to produce both a report and a research poster summarising my findings. I will apply my knowledge of computational methods in R, Excel and on the Gapminder tool to include graphic data visualisations in the poster.

I am very active in academic Twitter and am connected with many economists and doctorate students. Likewise I am prominent on LinkedIn. I will utilise these to my advantage to communicate my research outcomes to a wider audience and also expand my connections to open up opportunities for future research collaborations.

Furthermore I could reach a wider audience by creating a blog where I can discuss extracts of my research and develop them further in the future. I have also volunteered for an Economics Education charity called Bubble Bubble whose conferences have reached over 200 schools across the past year. As part of this, I have published an interview about my time in economic consulting and studying Economics as an undergraduate on YouTube; I would love to create a similar YouTube video summarising my research outcomes to a student or general public target audience. This is an increasingly popular medium of learning as information can be absorbed quickly.

What impact or benefit could your research results have beyond the immediate academic community? (maximum 200 words) (e.g. might a particular group or sector of society potentially benefit from your findings, and if so how?) Potential impact could be political, economic, social or environmental.

This project has the underlying goal of achieving material research impacts beyond the academic community. Since my proposal strives to find policy recommendations that should be adopted to fulfil sustainable economic development objectives in countries facing diametric population structure changes, it has the potential for profound political and social impact.

This can be through both instrumental impacts, affecting the adoption of government (both regional and national) policies and shaping legislation; and conceptual impacts which add to existing knowledge in the field of demographic economics and put ongoing discussions (such as the 'pensions time bomb' issue) into new perspective.

By analysing the effects on labour markets and explicating potential remedies, the report could also have significant economic impacts. This will be achieved through fiscal policy suggestions and employment strategies.

There will also be references to resource management and the policy options I propose there will have beneficial environmental impacts. My research will consider managing water stress, and how to ensure sustainable food supplies. It will also examine energy markets and take into account how the distribution of the population within each country and its composition by age will affect use of renewable energy (for instance, the locations of nuclear power plants).

Outline any potential interdisciplinary dimensions to your research project (maximum 200 words)

My project will extend across the social sciences. Whilst I identify it as principally belonging to Demographic Economics within the field of Development Economics, the policy implications I plan to include make it relevant to the study of Politics and Government. I am also exploring issues in sustainability and labour economics as part of the research project sub-questions.

Since I am using quantitative and computational methods for the econometric analysis, I also plan to enhance my data science skillset. Given the limited timeframe this will likely remain through the use of R but if time allows I will use software packages such as Halfviz which stems from the programming language C, or familiarise myself with Stata ahead of my second year Economic Data Analysis module. Meanwhile, I may conduct modelling using differential equations to assist in phases 1a) and 2a). Furthermore, I will be open to a pluralist, heterodox approach and consider systems thinking in my analysis where applicable.

Even if the project is interdisciplinary, the emphasis on sustainable economic development means it remains appropriate to work within the proposed Economics and Finance Department of the Durham University Business School (DUBS).

Outline any potential international dimensions to your research project (maximum 200 words)

This project focuses on the contrasting case studies of Nigeria and Japan, rendering it international from the onset. Furthermore, I anticipate that whilst the policy recommendations will originate from looking at the causal factors of Nigeria's rapid population growth and Japan's expected rapid population decline, the recommendations will be transferable to other countries experiencing the same transition. For

example, Tanzania's population will grow concurrently with Nigeria's; and countries currently in stages 4 and 5 of the Demographic Transition Model such as Spain and Italy will ultimately follow in Japan's footsteps. After I have finished my research I would willingly attend international academic conferences in the field, if given the opportunity.

My preferred Leadership-in-Action project is working with a social enterprise, NGO or charity. Whilst I do not yet know which organisation this will be, it may be based overseas or have international impacts. I would particularly like to work in the sectors of education, gender equality and LGBTQ+ rights. One charity that I hold close to my heart is Micro Rainbow, who provide safe housing and legal advice to LGBTQI+ migrants and refugees. Working with such an organisation would add an international dimension to my research and leadership projects.

Outline your research proposal

The research proposal should be no more than one 750 words* and should cover:

- *The research question*
- *The objectives of the research*
- *A summary of the project in simple terms which can be understood by a non-expert in the field*

The Shifting Distribution of the Global Population in the Twenty-First Century: an Econometric Analysis of the Projected Fortunes of Nigeria and Japan, with Policy Recommendations for Sustainable Development

Introduction:

The world is at an unprecedented stage in demographic transition. Global population growth is widely expected to stagnate by the end of the twenty-first century. Researchers at Washington University, for example, anticipate that the global population may peak at around 9.7 billion in 2064 before falling to 8.8 billion by the end of the century. [1] Many countries will face declining populations due to natural increase becoming negative as fertility rates fall below the magic 2.1. If these trends are replicated worldwide, then migration can not be used to plug the problems these cause. Population decreases can be both advantageous and disadvantageous. They may reduce pressure on resources but create new challenges, for instance in labour markets and caring for ageing populations. Hence it is helpful to plan policy recommendations to achieve sustainable development in the face of this. Japan is one such country widely expected to suffer population decline. Contrastingly, Nigeria is expected to experience rapid population growth resulting in it becoming the second most populous country after India by 2100 at current rates. It needs to develop policies that harness the demographic dividend whereby the working-age population is sizeable, in good health, with quality education and decent employment and a relatively low proportion of young dependents (with an emphasis on child quality not child quantity). [2]

Changing population distributions and structures have extensive effects. Ageing populations can have severe labour supply and fiscal implications. There is also the issue of sustainability regarding pensions as young workers are funding the currently retired; and healthcare implications which may be affected by future technological advancements. Internal and international migration also affect population size and composition. Urbanisation is both a cause and consequence of demographic transition.

My research project will address these questions specifically:

- RQ1: To what extent can population growth be harnessed to achieve sustainable economic development? An examination of Nigeria's prospects this century
- >RQ1a: Which factors are the most significant drivers for Nigeria's population growth?
- >RQ1b: What will be the effects of rapid population growth on the Nigerian economy?
- >RQ1c: What policy recommendations should be adopted in Nigeria to fulfil sustainable economic development objectives?

- RQ2: To what extent is rapid population decline a cause for concern? A time-series forecast of Japan's fate
- >RQ2a: What are the core causal factors for Japan's anticipated population decline?
- >RQ2b: What will be the effect of Japan's population decrease?
- >RQ2c: What policy recommendations should be adopted in Japan to fulfil sustainable economic development objectives?

Context:

Whilst there are related studies within the field of demographic economics, my research project will focus on Nigeria and Japan specifically in a way that has not been done before. I will synthesise existing research but I seek to generate innovative policy recommendations.

Datasets, Methodologies and Timeline:

I expect to spend one-and-a-half week on each of the following stages. I will build in two days of contingency period to each of the one-and-a-half-week periods.

Stage 1: Nigeria Case Study

- RQ1a - I will research all causes of the growth in Nigeria's population and use computational methods to conduct econometric and regression analysis to establish which factors are most significant.
- RQ1b - I will explore the consequences of population growth on Nigeria's economy.

Stage 2: Japan Case Study

- RQ2a - Like for Nigeria, I will collect data and utilise time-series analysis to forecast Japan's population trends and highlight the core causal factors.
- RQ2b - I will consider the economic effects of such population change.

Stage 3: Policy Recommendations

- RQ1c - I will identify which policy recommendations can be adopted to help Nigeria fulfil sustainable economic development objectives.
- RQ2c - I will do the same for Japan.

Stage 4: Final Report Write-Up and Poster

- Report of project findings - I hope to embed data visualisation charts using computational methods such as Excel, R or with the help of the Gapminder application.
- Poster - I think it would be valuable to draw attention to the most important policy recommendations and include key data visualisations.

Ethics:

I do not anticipate that an ethics review should be necessary for this project.

References

[1] Institute for Health Metrics and Evaluation (IHME), "World population likely to shrink after mid-century, forecasting major shifts in global population and economic power"

<https://www.healthdata.org/news-release/lancet-world-population-likely-shrink-after-mid-century-forecasting-major-shifts-global>

[2] Population Reference Bureau. (2013, May 20). *Harnessing the Demographic Dividend: A PRB ENGAGE Presentation* [Video]. YouTube. <https://www.youtube.com/watch?v=o-L3LrYJQi>