

Data Explained

Productivity differences within Northern Ireland

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The Business Data for Research (BDR) release will contain the Northern Ireland Annual Business Inquiry (NIABI 2014-2020), Broad Economy Sales and Exports Statistics (BESES 2014-2020), and the Business Register and Employment Survey (BRES 2014-2020). It will provide UK researchers with invaluable insights into the performance of Northern Ireland's (NI) economy.

We focus our attention on how the NIABI can contribute to our understanding of the NI productivity problem. NI's economy has consistently underperformed relative to the UK, with lower growth and little sign of convergence. This has been a persistent feature of the post-war period through to the present day, despite significant policy interventions. Low productivity has been identified as the central reason for this poor record of economic growth. Productivity in NI is almost 20% lower than the UK average, and it has the lowest productivity of any UK region. Increasing productivity has therefore been identified as key to raising wages and improving Northern Ireland's prosperity.

Initial research questions

In this project, we asked a simple question: how can we measure and understand business productivity in Northern Ireland?

The aim of this project was to understand NI's productivity drivers and examine how government policies can be designed to stimulate the country's gross value added. In the long run we hope that the continuation of this project can address long-standing problems around NI's productivity performance relative to other regions in the UK. Our specific research questions centred around understanding the productivity differences in NI across different economic sectors, local government districts, and super-output areas.

Dataset and variables used

In our [Data Insight publication](#), we primarily focused on the Northern Ireland Annual Business Inquiry (NIABI 2014-2020). The NIABI provides us with financial and employment information disaggregated to the enterprise level for the NI economy.

We focused on a sample of enterprises that are either registered as a company, limited liability partnership (LLP), joint venture, sole proprietor, (limited) partnership or public corporation. We subsequently excluded all enterprises that do not have any employees in NI. All variables used and defined were winsorized at a 1% level to avoid the influence of outliers. To answer our research questions, all variables, where applicable, were defined in terms of basic prices.

Our analysis was divided into two parts. First, a descriptive analysis pertaining to 2019, and second, a panel data analysis where we used the data from 2014 to 2019. We excluded 2020 to avoid any Covid-19 effects clouding the analysis.

We employed two measures of enterprise-level productivity. First, labour productivity was measured by gross value-added (at basic prices) divided by the total number of employees. Second, value added was measured as the logarithm of gross value-added (at basic prices). Other variables used included net capital expenditures (capital expenditures divided by the total number of employees) and subsidies per employee (total subsidies paid divided by the total number of subsidies per employee). Additionally, we used data on the industries in which enterprises operate. Our industry variable relied on the reporting unit section (rusection), allowing us to identify 17 distinct industries. These reporting unit sections broadly correspond to the two digit Standard Industry Classification (SIC). To understand regional variation, we used local governments districts (LGDs).

Data limitations encountered

Throughout the analysis of the data from the release, we encountered a number of data limitations.

First and foremost, the NIABI provides no information on enterprise-level capital holdings – only capital flows in the form of capital disposals and capital investments are provided. Contrary to the

data provided by the ONS for other regions in the UK, there is no information publicly available on the NI capital stock that can be used to back out enterprise-level capital holdings.

Secondly, it was unclear which enterprises actually generate their revenue in NI and which companies are mere holding companies or shell corporations. We resolved this issue by excluding all LLPs and public companies that fail to report a number of employees larger than zero.

The third limitation was the limited regional granularity with which the data was disclosed. Currently, only LGDs are made available to the researcher.

A fourth limitation was that some of the variables do not perfectly sum as indicated by the provided meta-data. In the case of taxes paid, this difference occurs for 32 percent of all observations. Unfortunately, we were unable to check all the variables in the NIABI for internal consistency due to the limited number of variables provided. We suggest researchers be cautious when using aggregates internal to the dataset.

The final limitation was that, at present, researchers cannot link the BESES, BRES and NIABI datasets.

Necessary modifications to initial research questions or research design

Due to these data limitations, we had to modify our initial research questions and research design in several ways. First, as data on the country's capital stock is unavailable, we were unable to estimate total factor productivity and production efficiency metrics. Instead, we calculated a standard measure of labour productivity and gross value added. Additionally, the limited granularity provided by the LGDs does not allow us to exploit and explore regional differences fully. While we demonstrate that there is significant variation across LGDs, policy recommendations made based on LGDs may not be applicable at higher resolution geographies.

Necessary modifications to the data

We suggest a number of modifications:

- Ensure internal consistency
- Provide clear meta data on questionnaire details, variable captured, units expressed (1000s of pounds or percentage), related question in the survey
- Identify companies that do not provide the total number of employees or have no employees to begin with
- Identify holding companies
- Identify revenue sources
- Include SOA and/or postcode information in the dataset. While disclosure risk is clear, the researcher and the disclosure team should be able to ensure that no disclosure occurs
- Allow the datasets EES, BESES, BRES and NIABI to be linked.

Recommendations to data owners

Provide researchers with NI capital stock estimates

Following the example of the Office for National Statistics (ONS), we suggest to the data owners that capital stock estimates are provided to researchers. This provision, provided a similar methodology is used, will make the NIABI infinitely more powerful in addressing different research questions pertaining to the NI economy. This will enable researchers to answer questions on productivity more holistically. [View the best practice example of public capital stock data and associated input and coding files.](#)

Allow linking of different datasets

The linking of the different datasets on either company, regional or industry level will exponentially enlarge the impact of the data release. Furthermore, it will open a multitude of research areas for productivity studies and other inquiries that can contribute to the NI government's [10X strategy](#).

Standardise and link with the ONS Annual Business Inquiry (ABI)

We recommend to the data owners that the NIABI (and possibly other surveys) is made consistent with the ONS ABI and eventually integrated into the ABI. This will then enable a true and integrated comparison across the different regions on a multitude of research questions across multiple dimensions.

Integrate a management survey

In 2022, David Jordan and John Turner launched a survey to gather data on management practices in Northern Ireland. Following the methodology from the ONS and Bloom and Van Reenen (2010), they examine the managerial skills gap that is suggested to be one of the largest contributors to Northern Ireland's productivity problems. In order to fully understand the region's productivity problem, collecting systematic data on management skills alongside business information is of paramount importance. As such, we recommend this management survey to be integrated into the NIABI.

Please include code files used in your analysis

Codes used in the [accompanying Data Insight](#) have been provided to Northern Ireland Statistics and Research Agency (NISRA) and are available upon request or through the ONS Secure Research Service.

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Administrative Data Research Northern Ireland (ADR NI) takes privacy protection very seriously. All information that directly identifies individuals will be removed from the datasets by trusted third parties, before researchers get to see it. All researchers are trained and accredited to use sensitive data safely and ethically, they will only access the data via a secure environment, and all of their findings will be vetted to ensure they adhere to the strictest confidentiality standards. The help provided by the staff of Administrative Data Research Centre Northern Ireland (ADRC NI) and the Northern Ireland Statistics and Research Agency (NISRA) Research Support Unit is acknowledged. ADR NI is funded by the Economic and Research Council (ESRC). The authors alone are responsible for the interpretation of the data and any views or opinions presented are solely those of the author and do not necessarily represent those of the ADR NI. NISRA's data has been supplied for the sole purpose of this project.

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