



Understanding Productivity in Northern Ireland

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1. Abstract

- 1.1. Productivity is a key driver of economic growth and improved standards of living. As such, it features prominently in Economic Strategies and development plans for national and regional economies.
- 1.2. Productivity levels in Northern Ireland have lagged the UK average for several decades along with employment rates, resulting in lower income levels and standards of living. The UK also lags key competitor nations. Despite being the focus of economic strategies and an improvement in the rate of growth since 2014, productivity levels in NI are still more than 15 percent below the UK average.
- 1.3. This paper outlines the overall impact of lower productivity on income levels, and why productivity is lower (structure of employment and sectoral productivity – what we do and how we do it). It then illustrates a range of scenarios in terms of what the impact of higher levels of productivity could mean for the NI economy and what might be required to close the productivity gap.
- 1.4. Productivity is acknowledged as a challenging concept for many to understand. However, from a public policy perspective, it is important that it remains close to the top of the economic policy agenda and that strategic plans cascade effectively into operational plans in order for the NI economy to reach its potential.

2. Introduction

- 2.1. The Ulster University Economic Policy Centre (UUEPC) published the original "Understanding Productivity in NI" paper during 2016¹. This paper updates that research with the latest literature and data including the new Balanced GVA measure published by the ONS in order to provide a comprehensive understanding of NI's productivity position.
- 2.2. Productivity is a topic that generates a significant amount of interest and debate in both the academic and policymaking fields as it is a key driver of increased living standards over time. Andy Haldane points out in his Bank of England speech that **"Since 1850 UK living standards... have risen roughly 20-fold... if productivity had flat-lined over the period, UK living standards would only have only doubled."**² This statement underscores how important productivity growth has been for improving living standards in the past. It will continue to be an important driver of living standard for the future.
- 2.3. The slowdown of productivity growth is a global phenomenon that began in the 1970's rather than being a specific and recent issue for either the UK or NI. Global productivity growth slowed from 1.9% annual average growth (1950-70) to 0.3% from 1980³. Research carried out by the Bank of England⁴ suggests that there are a range of contributory factors. These include;
- Mismeasurement (failing to include elements of the emerging digital economy, for example)
 - Crisis related scarring from the recession (credit availability, reduced asset prices and reduced labour churn)
 - Forbearance and monetary policy (resulting in a reduction in "creative destruction")
 - Slowing innovation (whether the fourth industrial revolution has the same impact as previous revolutions and the challenge for mankind in terms of generating new ideas)
 - Diffusion dynamics (slower transfer of ideas and practices from country and enterprise leaders to laggards)
- 2.4. Whilst productivity has slowed at international level, the UK has also lost some ground relative to competitor nations such as France and Germany. The gap between NI and the UK average has been persistent and generally widening⁵ for many years despite being the focus of a number of economic strategies. Several authors, including Birnie⁶ & ⁷, MacFlynn⁸ and Shapira, Doyle, Ward & Kuah⁹ have noted concerns about declining relative productivity in NI and the importance of growth, which will improve standards of living in the medium to longer term.

¹ https://www.ulster.ac.uk/_data/assets/pdf_file/0008/118385/Understanding_productivity_in_Northern_Ireland_27_September_2016.pdf

² <https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/productivity-puzzles.pdf?la=en&hash=708C7CFD5E8417000655BA4AA0E0E873D98A18DE>

³ Bank of England

⁴ <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q201.pdf>

⁵ GVA per hour worked and GVA per productive job

⁶ <http://pwc.blogs.com/northern-ireland/2016/02/northern-ireland-productivity-amongst-lowest-in-the-developed-world.html>

⁷ <http://pwc.blogs.com/northern-ireland/2015/08/productivity-single-biggest-challenge-to-northern-irelands-recovery.html>

⁸ <http://www.agendani.com/addressing-northern-irelands-productivity-puzzle/>

⁹ [https://www.research.manchester.ac.uk/portal/en/publications/competitiveness-and-innovation-profiles-of-three-small-open-economies-new-zealand-singapore-and-republic-of-ireland\(a59ca58f-5ccc-40ce-a7c8-3e7636e080cd\).html](https://www.research.manchester.ac.uk/portal/en/publications/competitiveness-and-innovation-profiles-of-three-small-open-economies-new-zealand-singapore-and-republic-of-ireland(a59ca58f-5ccc-40ce-a7c8-3e7636e080cd).html)

3. Measuring income, per capita income and productivity

3.1. It is helpful to illustrate the statistical concepts that are employed within this paper in advance of discussing the analysis and results.

3.2. Total income (GVA)

3.2.1. Gross Value Added (GVA) is the total value of income generated by the economy. In 2017 GVA in Northern Ireland was £39.6bn¹⁰ or 2.2% of the UK total. GVA is measured in three ways; the income method (wages plus profits), production method (value of output of goods and services minus input costs) or final balanced method (combining the income and production methods).

$$\text{Gross Value Added} = \text{Wages} + \text{Profits}$$

3.3. GVA per capita (per head income)

3.3.1. GVA per capita measures income (GVA) per person in an economy and is a commonly used method of comparing the standard of living across different economies. However, it is widely recognised that this indicator is limited in that it does not include a range of qualitative factors, such as air quality or levels of stress that impact upon the overall wellbeing of citizens. Measuring wellbeing or happiness has, in recent years, become more important as Economists such as Joseph Stiglitz and Thomas Picketty and many Governments look beyond GDP to measure and explain progress and prosperity, rather than focussing on factors that influence wealth and general wellbeing rather than just income. The per person measure in this metric takes account of the whole of the population, i.e. those below 16, above 65 and also those of working age who are not employed, who can be thought of as the future potential and past productive capacity of the labour force. NI's GVA per capita was £21,200 in 2017, which was higher than two other UK regions – Wales (£19,900) and the North East (£20,100) of England.

$$\text{Gross Value Added Per Capita} = \text{GVA} / \text{Population}$$

3.4. Productivity

3.4.1. Productivity is the ability to produce outputs (such as goods or services) taking into consideration the amount of inputs (such as raw materials, capital and labour) used to produce them. The measure used for much of the paper is;

$$\text{Productivity} = \text{Gross Value Added} / \text{employment}$$

3.5. The measures of productivity used later in this paper are GVA per person employed and GVA per hour worked. The latter is regarded as a more meaningful measure of productivity, as it cannot be skewed by part time working, overtime or reductions in the working week.

$$\text{Productivity} = \text{Gross Value Added} / \text{total number of hours worked}$$

¹⁰ <http://www.ons.gov.uk/economy/grossvalueaddedgva/bulletins/regionalgrossvalueaddedincomeapproach/december2015>

4. NI's relative economic performance

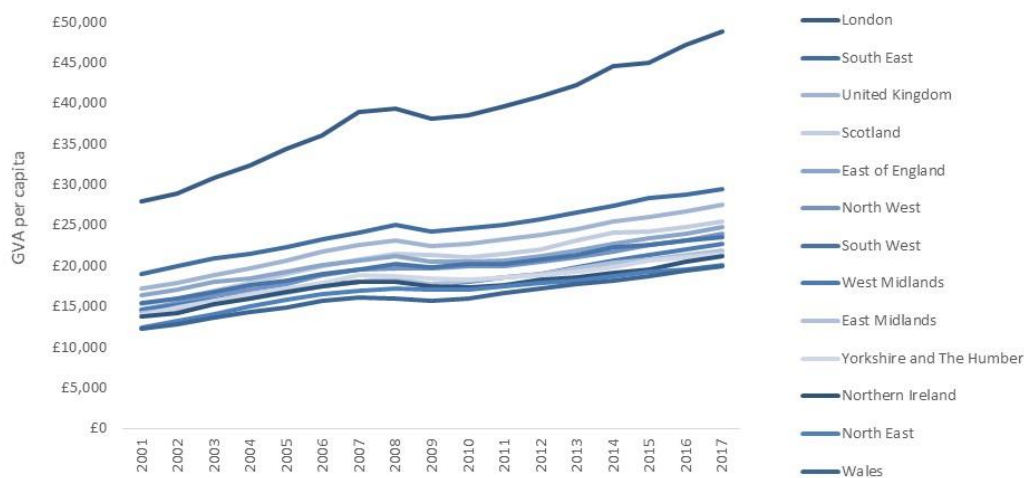
4.1. Income

4.1.1. GVA in NI was £39.6bn in 2017. The population of NI accounts for 2.8% of the UK total, whereas GVA makes up 2.2% of the UK total. This demonstrates that wages and profits are relatively lower in NI than GB. If NI generated 2.8% of the UK's GVA – equal to its population share – it would produce £51.6bn, £11.9bn more than it currently does.

4.2. Relative income levels

4.2.1. GVA per capita is £21,172¹¹ in NI, 23% below the UK average (ranked 10th of the 12 UK regions). Figure 1 illustrates that there has been limited convergence between the UK regions and that the "London effect" skews the UK average. It is important to note that GVA is measured on a workplace basis and therefore commuters from the East and South East of England contribute to London's GVA but not to its population, inflating the figure as a result. Inter-regional commuting is less common outside the south-eastern corner of England and as a result the impact on regional GVA data is more modest.

Figure 1 - GVA per capita, nominal terms, UK regions, 2001-17

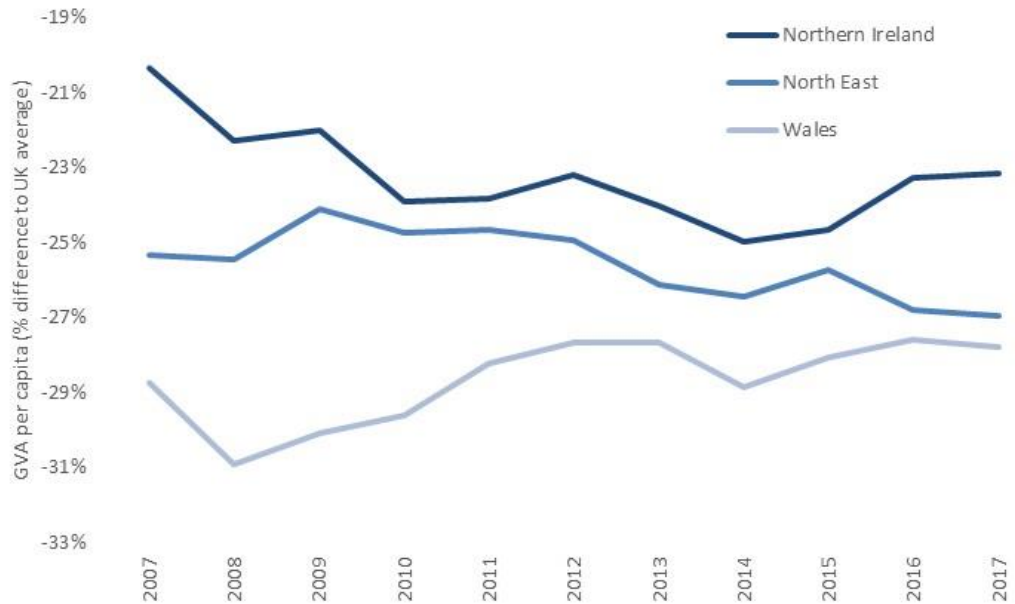


Source: ONS Regional Accounts

4.2.2. Over the last decade, NI's GVA per capita grew by 1.6% per annum on average, which was the second slowest of the UK regions ahead of Yorkshire & the Humber. The result is that NI's relative income now lags further behind the UK average. The gap was at its widest in 2014 (25%), however since 2014, there is some positive news in that NI's rate of growth picked up to 3.5% per annum (vs 2.6% in the UK) and the gap has closed marginally to 23% in 2017. Initial investigations suggest that this is due to relative more rapid employment rate and productivity growth over the past four years.

¹¹ 2014 is the latest year for which there are available data

Figure 2 - GVA per capita differential to UK average, 2007 - 17, selected regions



Sources: ONS Regional Accounts & UUEPC analysis

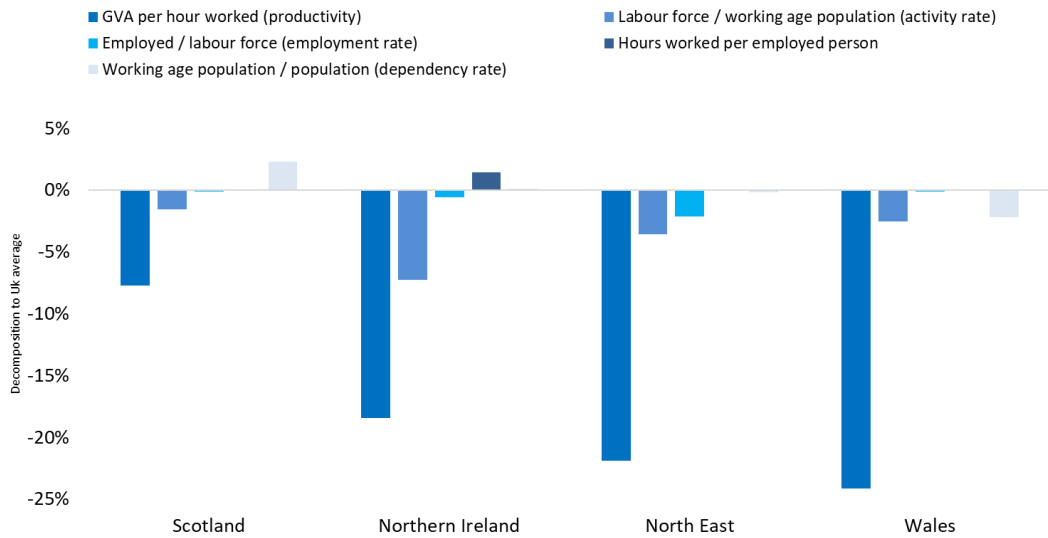
- 4.2.3. This evidence demonstrates that there is a persistent and, until 2014, widening income gap between the NI economy and UK average at a macroeconomic level. Wales has managed some convergence while the North East has declined in relative terms.
- 4.2.4. It is essential to understand the individual factors that contribute to relatively lower levels of income in NI and the drivers of recent improvements in productivity and the employment rate in NI in order to inform appropriate policy responses.

5. Decomposing the income gap

- 5.1. A research monograph published by ERINI¹² in 2006 calculated the relative contribution of five contributory factors to the regional GVA gap with the UK average. The five constituent elements were:
- Productivity (how much wages and profits are produced per hour worked);
 - Employment rate (proportion of the labour force who are employed);
 - Activity rate (Proportion of the working age population who are employed or unemployed – i.e. in work or actively seeking work);
 - Hours worked; and the
 - Dependency ratio (working age population as a proportion of the total population).
- 5.2. Following this methodology and using the same data sources, it is possible to calculate the relative contribution of these factors to the current regional GVA gap. It should be noted at this point that there are four potential sources of employment data for NI that could be used in this calculation. They are;
- Workforce Jobs;
 - Productive Jobs;
 - Labour Force Survey; and
 - Labour Force Survey reconciled to workforce jobs.
- 5.3. The Labour Force Survey is the recommended source for total employment data and also for calculating the employment and activity rates. For sectoral analysis, NISRA have recommended that productivity jobs data for NI are used in the calculations. Further explanation of each of the sources and their uses is included in Annex A.
- 5.4. Figure 3 demonstrates that lower productivity is the most significant explanatory factor of lower incomes in all four of the regions included in the analysis, suggesting that this should be the main economic policy focus to grow the economy in the medium to longer term.

¹² <http://eservices.afbini.gov.uk/erini/pdf/EriniMon7.pdf>

Figure 3 - Decomposition of regional GVA per head gap for selected UK regions, 2012-17 average



Sources: Regional Accounts (GVA), Labour Force Survey (labour force & total employment), Annual Survey of Hours and Earnings (hours worked), Nomis (mid-year population and working age population estimates), UUEPC analysis

- 5.5. In NI, the main driver of the income gap is lower productivity (measured as output per hour worked, at 18.5 pp's of the 23.0% differential). The next most significant driver is lower economic activity rates, at 7.2 pp. Northern Ireland's 16+ employment rate, the dependency ratio and hours worked are broadly in line with the UK average.
- 5.6. The patterns are similar in the North East and Wales, although lower productivity is a more significant issue there than in NI.

6. Productivity

6.1. The evidence in section 5 demonstrates that relatively lower productivity in an NI context is the most significant contributory factor to the income gap. Boosting productivity could make a significant difference to income levels and standards of living in NI.

6.2. Paul Krugman made a statement more than two decades ago about the importance of productivity, which is as relevant now as it was then. He said:

Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.

Paul Krugman, The Age of Diminishing Expectations (1994)

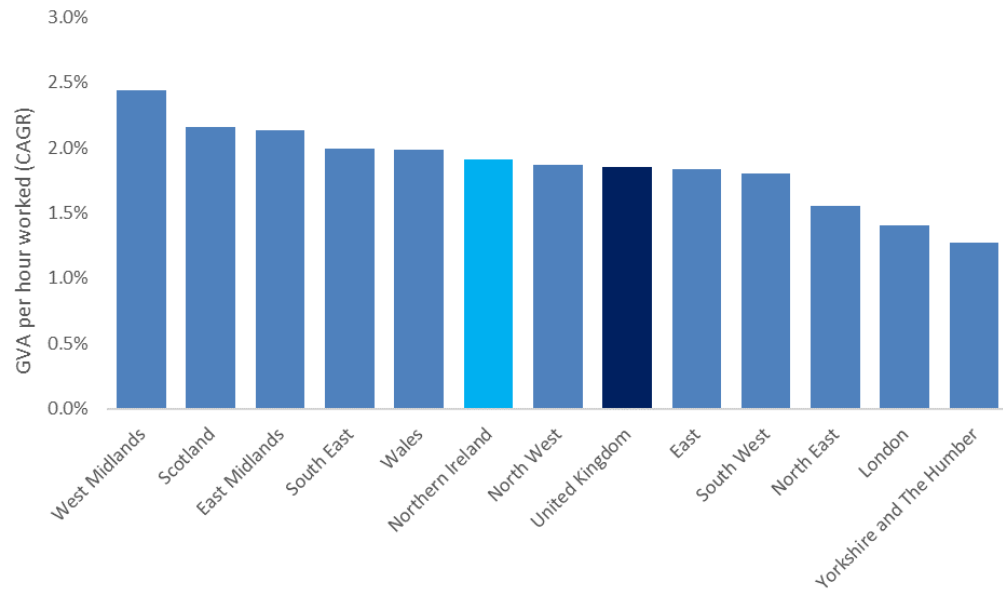
6.3. Productivity will matter a great deal over the next decade if the UK is to maintain or boost its relative standard of living in an international context. In the current climate of BREXIT driven uncertainty, lower levels of competitiveness and productivity are likely to move further up the policy agenda at both national and regional levels.

6.4. Declining relative productivity

6.4.1. NI productivity (GVA per hour worked) grew at 1.9% per annum in nominal terms over the last decade, the sixth fastest rate of the UK regions, which is encouraging for Northern Ireland. However, despite these mid-table rates of growth and some catch up in recent years, it was from a low base and GVA per hour worked in NI now ranks 8th of the twelve UK regions, 17% below the UK average. Alongside an improving employment rate, the relatively more rapid growth in productivity has contributed to faster GVA per capita growth and some convergence with the UK since 2014.

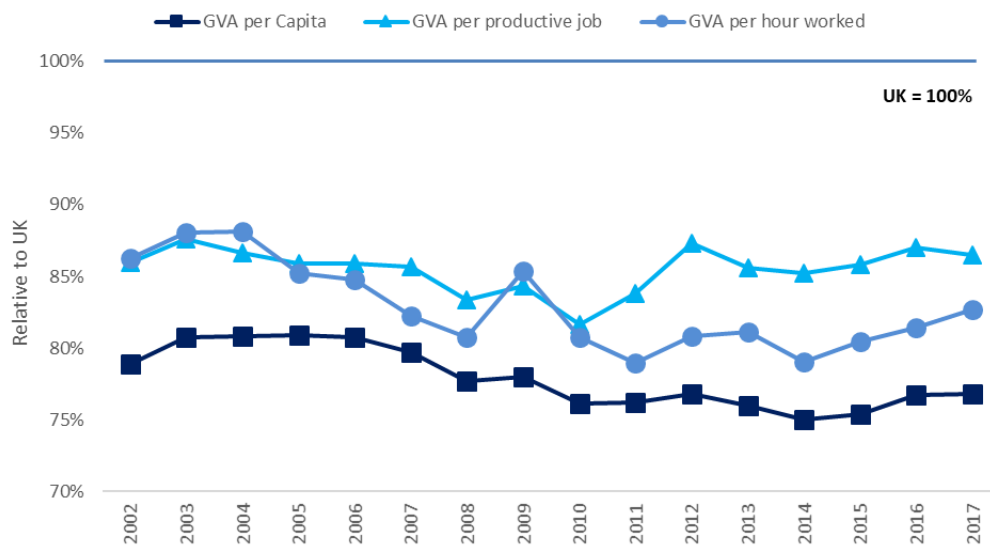
6.4.2. Figures 4 and 5 show that persistently lower levels of income & productivity represent key economic policy challenges for NI. Some encouragement can be taken from the fact that GVA per hour worked (in nominal terms) has improved relative to the UK over the last four years as NI's rate of growth averaged 2.5%, while the UK averaged 2.0%.

Figure 4 – Compound annual growth rate of GVA per hour worked, 2007 - 17



Sources: ONS Regional Accounts, ONS Productive Jobs (Hours worked), UUEPC analysis

Figure 5 - NI GVA per capita, GVA per hour worked and GVA per worker relative to the UK average, 2002 – 2017



Sources: ONS Regional Accounts, Productivity jobs, productivity hours worked (unsmoothed series) & Annual Population Survey

Notes: UK includes extra region (mainly offshore energy)

- 6.4.3. In trying to understand the most effective way for policy to address the apparent gap, it is important to understand whether it is;
- **What the region does (its sectoral mix); or**
 - **How it does it (its productivity within sectors); or**
 - **Both**

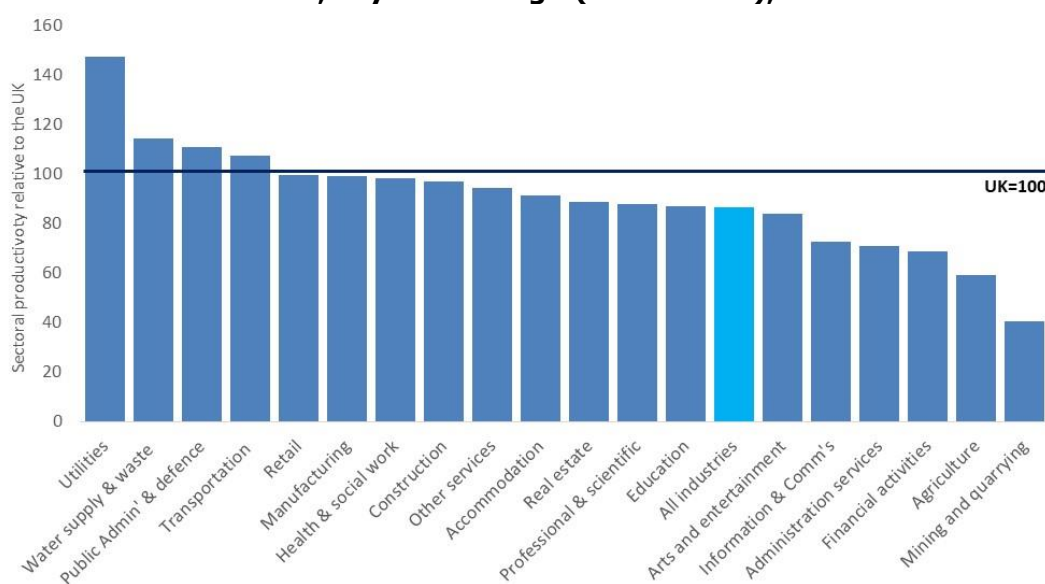
The potential policy response will differ depending on the cause(s). The questions revolve around;

- How much resource should be directed towards direct employment support (short term interventions) and productivity (which is employment support for the long-term)
- Whether the region needs to grow the sectors that are relatively more productive (suggesting policies that try to alter the sectoral structure within NI – investment policy, sectoral targeting, public expenditure policy); or
- does it need its enterprises to perform better (suggesting policies that improve enterprise behaviour, perhaps leadership or training programmes, benchmarking of business practices and technology use), or does it need to focus on both elements; or
- Both employment and productivity support, focussing on both structure and performance?

6.5. Sectoral productivity

6.5.1. Sectoral productivity in NI lags the UK average in 16 out of 20 sectors as illustrated in Figure 6. A similar pattern is found in the manufacturing subsectors, in which 13 of 21 subsectors are below the UK average.

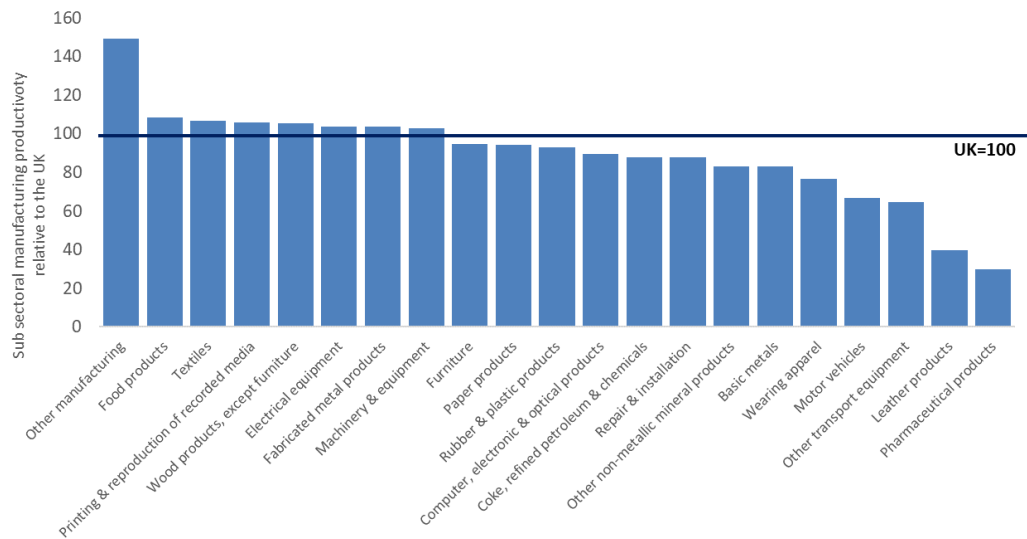
Figure 6 - NI sectoral productivity relative to the UK average in nominal terms, 3-year average (2015-2017), UK = 100



Sources: ONS regional accounts, ONS productive jobs, workforce jobs, & UUEPC analysis

Note: Workforce jobs sectoral composition applied to productive jobs totals as per ONS consultation and guidance

Figure 7 - NI sub sectoral manufacturing productivity relative to the UK average in nominal terms, 3-year average (2015-2017), UK =100



Sources: ONS Regional Accounts, Workforce Jobs, BRES & UUEPC analysis

- 6.5.2. An examination of the sectoral data suggests that further exploration of the data may be required to fully understand the potential reasons for some of the differentials. Several the most striking issues are;
- 6.5.3. **Utilities and Water supply & waste:** This may be a feature of relatively lower levels of competition in the NI market allowing higher levels of profitability. Further research will be required to identify sector specific issues as how the sector might deal with diseconomies of scale due to NI's relatively smaller size will be of interest.
- 6.5.4. **Public administration:** The position of this sector as one of NI's relatively productive sectors and 11 percentage points above the UK average is, prima facie, surprising given that it is a non-profit making sector. Compensation of Employees (wages) accounts for 64% of GVA in the sector, with the remainder (36%) generated by Non-Market Capital Consumption (NMCC). Analysis carried out by Department of Finance Statisticians reveals that NMCC as a proportion of GVA in the public sector is higher in NI than any other UK country (and has been from the start of the data series in 1997). Therefore, higher relative productivity is likely to be driven by a large extent by NMCC. This issue merits further consideration as it would appear that productivity, excluding NMCC may represent a more meaningful comparison in economic development terms.
- 6.5.5. **ICT:** The -27-percentage point differential appears surprising at first glance, given the type of activity undertaken and wages paid within the sector. Whilst further research would be required to understand the detail and reasons more fully, firms that are headquartered outside the UK operate a transfer price agreement for the purposes of calculating Corporation Tax payments (cost plus x% as the profits are part of a global group structure). It may be that wages are reasonably high in an NI context, but profits are relatively lower due to transfer pricing arrangements.
- 6.5.6. **Agriculture:** The sector data warrants further investigation in order to understand productivity more fully. It is likely that the relatively small size of NI farms contributes in a significant way to this differential. The measurement of workers is also very difficult in the farming sector and as a result, allocation

issues and therefore accuracy may be more challenging than in other sectors. Furthermore, agriculture in NI receives a substantial proportion of its income from subsidies. High level of subsidies will reduce the actual GVA figure and as such will be supporting jobs in NI, ultimately helping to reduce productivity. Nevertheless, a further investigation of the specific data within the agricultural sector would be helpful to understand the impact of subsidies in the sector and any potential impacts that may arise as a result of potential policy changes following Brexit.

6.5.7. **Finance & insurance and Mining:** the differential in these sectors is likely to be explained by the types of enterprises that are in NI and other regions of the UK. In the case of finance and insurance, these enterprises tend to be headquartered in London. In Mining, Scotland and the North Sea Oil shelf are where the most profitable enterprises operate. The enterprises that operate in NI are focussed on generally lower value-added office activities in the case of finance and the mining and crushing of stone and mineral products, explaining the significant differential

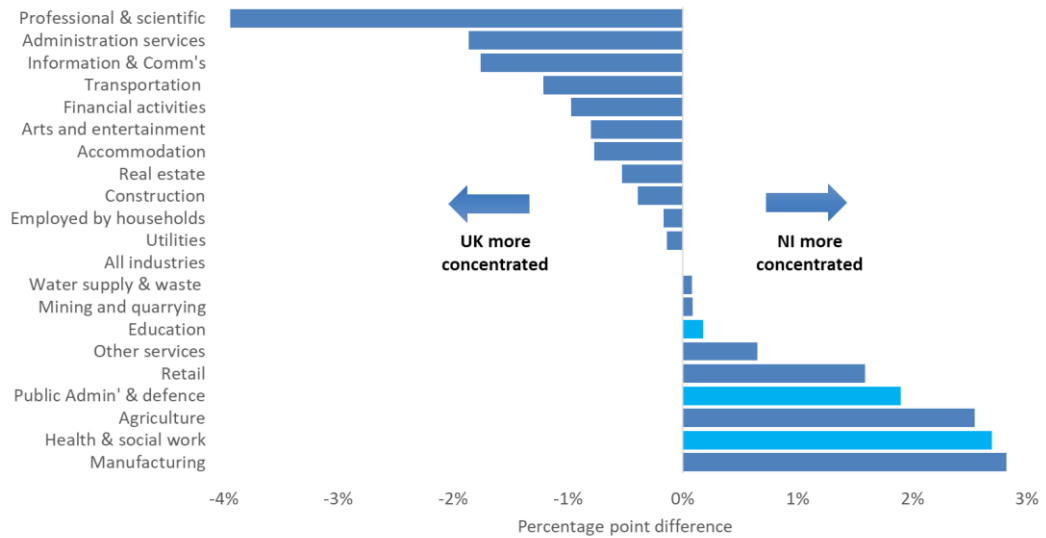
6.5.8. **Manufacturing:** as an externally focussed sector, it is unsurprising that manufacturing productivity is close to the UK average. Figure 7 illustrates NI's relative productivity within the manufacturing sub-sectors. Other manufacturing, food products and textiles are more productive than the UK average and may be explained by the location of some medical devices companies in the case of other manufacturing and the retention of the higher value-added design and management function in the case of textiles. Pharmaceuticals and transport equipment are surprisingly low productivity, but like IT, this may be a feature of foreign ownership and transfer pricing arrangements.

6.6. Sectoral employment composition

6.6.1. This section analyses "what NI does" by examining the current sectoral mix in NI relative to the UK average, using workforce jobs sectional composition. This is important, as illustrated earlier in the paper, matching the sectoral employment rate and productivity performance will not close NI's income gap with the UK average fully.

6.6.2. NI has a much larger concentration of employment in lower value adding sectors such as Agriculture, Retail & Health and Social work than the UK average. In contrast, employment in the UK is relatively more concentrated in higher value adding sectors such as professional services, ICT & financial services.

Figure 8 - Sectoral employment concentrations, NI vs. UK, 2017



Sources: ONS Regional Accounts, ONS workforce jobs & UUEPC analysis
Note: Based on sectoral employment share of Workforce jobs data in 2017. i.e. NI agriculture share of total employment = 3.7% whilst UK=1.2% and hence a 2.5 percentage point difference. Light blue shading denotes predominately public sector industries.

6.7. Higher productivity and the link to better wages

- 6.7.1. Productivity can be a challenging concept to articulate in lay-persons terms. In short, higher productivity activities allows enterprises to make more in profit and employees to take home higher wages. As a policy lever, productivity can be considered as focusing on higher wage jobs for the longer term.
- 6.7.2. There is a positive relationship between productivity and wages, as illustrated in figure 9 by the dotted blue line. In general, high productivity sectors employ a greater proportion of individuals with high qualifications, invest in technology and capital and are more externally focussed than average. Generally, enterprises benefit from higher profits and employees receive higher wages.

Coloured Quadrants

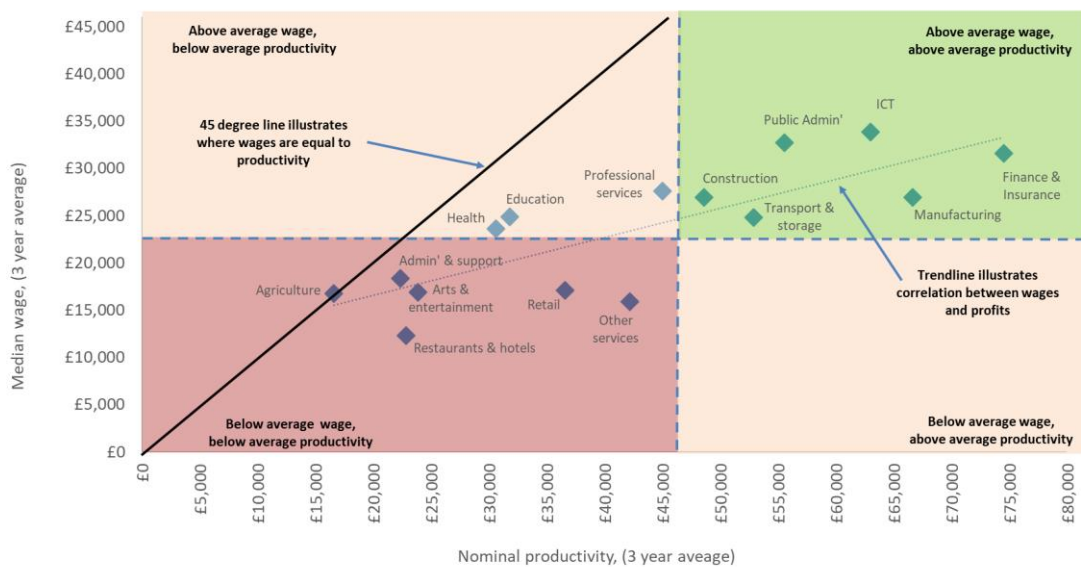
- 6.7.3. The quadrants serve to illustrate which sectors are above or below average wages or productivity.
- The top right (green) quadrant is above average productivity and above average wage. As these sectors are above average in both productivity and wages, growth in these sectors will be very beneficial to the NI economy if they expand relatively. This quadrant accounts for 262,000 workers, 31.4% of the stock of total workers.
 - The bottom right (amber) quadrant is below average wage and above average productivity and may reflect sectors in which more significant capital investments are required, such as manufacturing.
 - The top left (amber) quadrant is above average wage, but below average productivity. This quadrant accounts for 237,000 workers, 28.4% of the stock of total workers.
 - The bottom left (red) quadrant is below average wage and average productivity. Additional growth in these sectors will reduce the NI average wage and productivity and as a result will widen the income

gap. This quadrant accounts for 316,000 workers, 37.8% of the stock of total workers.

45-degree line

6.7.4. The solid black 45-degree line shows the point at which wages are equal to productivity (or there are no profits) which would be normal for pure public sector activities. Agriculture is the closest sector to this line and may be due to wages making up a large proportion of GVA. Public Administration is an outlier although this is in large part due to NMMC, as discussed earlier in the paper. A useful exercise would be to remove NMMC from public sector data for both NI and the UK in order to better assess core productivity.

Figure 9 - Comparison of sectoral productivity and wages, NI, 3-year average (2015-2017)



Sources: Annual Survey of Hours and Earnings, Regional Accounts, ONS Productive jobs & UUEPC analysis

Note: Some sectors are excluded for a range of reasons. Mining and those Employed by Households are excluded as they are small sector and therefore mean wage data is not published. Utilities, Water Supply & Waste are not included as they are highly capital-intensive sectors focused on infrastructure. Real estate is excluded as data is driven to a large extent by imputed rents in addition to wages and profits.

6.7.5. This analysis demonstrates that NI's productivity has persistently lagged the UK average for over almost two decades, that employment is more highly concentrated in lower productivity sectors and sub-sectors in NI than the UK average and that within sectors, productivity is generally lower.

6.7.6. Over the past four years, NI's productivity has grown more rapidly than the UK. Unfortunately, as NI started from a lower base, a sustained period of rapid productivity growth would be required to close the gap with the UK. A useful mathematical exercise is to change the sectoral productivity & employment composition to illustrate the sheer scale of change that is required within the NI economy in order to close the productivity gap.

7. Closing the productivity gap

- 7.1. These scenarios illustrate the magnitude of change that would be required for NI to narrow the productivity gap with the UK from a starting point of 13%.

Scenario 1: NI matches UK's sectoral productivity = 5% productivity gap

- 7.2. If NI's sectoral productivity (GVA per productive job) matched the UK and the employment rate was held constant, the productivity gap would reduce from 13% to 5% (£3.7bn of additional GVA). This calculation illustrates the significance of lower productivity within sectors in NI compared with the UK.

Scenario 2: Removing lower value adding jobs to match UK average productivity

- 7.3. In this scenario, the productivity gap is closed completely by removing low value-added employment from the NI economy. Just less than 180,000 low productivity jobs¹³ would need to be removed from the NI economy to raise NI average productivity to the UK level. This would reduce GVA by almost 9% to £36Bn and total employment by 21.2% to just under 660,000.

- 7.4. This scenario illustrates the scale of change required if NI were to match UK average productivity levels. Whilst it is both implausible and unwise to consider this as a scenario that is in any way realistic, it helps to illustrate the scale of change that would be required to close the gap completely.

Scenario 3: Adding higher value adding jobs to match UK average productivity

- 7.5. In this scenario, the productivity gap is closed completely by adding higher value adding jobs to the NI economy. Just over 110,000 high productivity jobs (at £100,000) would need to be added to the NI economy to close the gap with the UK. This would increase GVA by almost one third to almost £52bn and increase total employment by more than 13% to almost 950,000 (pushing the employment rate¹⁴ up to 64% of the 16+ population which would be much higher than the current UK average of 60%). Again, this scenario illustrates the scale of change required without adding any additional population in the form of highly skilled economic migrants.

- 7.6. Each of these scenarios illustrates how stark the changes might be if NI aims to match UK levels of productivity. To pursue either of the extremes illustrated within the preceding text as a policy direction in NI would be both unachievable and likely to have other significant negative consequences.

Scenario 4: NI = 90% of UK productivity levels

- 7.7. The various illustrative scenarios highlight the complexity and the nuances of boosting relative productivity. By way of example, an aspirational target of reaching 90% of the UK average level of productivity could be a more reasonable, but still, a very stretching policy ambition. An illustration might be to create 70,000 jobs at £72,000 productivity to get to 90% of the UK average. This is just an illustration of the impact of a potentially stretching productivity target.

¹³ Productivity is assumed to be £25,000

¹⁴ Regarding productive jobs

8. Closing the income gap

- 8.1. This paper has demonstrated the impact that a range of factors can have on relative income per capita in NI. This leads to the question of “What is required to close the income gap?”
- 8.2. There are a number of mathematical scenarios in which NI could close the income gap with the UK average. Like the productivity scenarios, these demonstrate the scale of change and the complex nature of the productivity issue and that each scenario would require a very different policy response.

Scenario 1: NI matches UK sectoral productivity¹⁵

- 8.3. If NI’s productivity within each sector matched the UK (holding current employment rate constant), the GVA per head gap would reduce from 23.2% to 16.0% (+£3.7bn of additional GVA).

Scenario 2: NI matches UK employment rate

- 8.4. If NI’s 16+ employment rate increased to UK levels, by adding 82,000 jobs and sectoral productivity remained constant, the GVA per head gap would reduce from 23.2% to 15.6% (+£3.9bn of additional GVA).

Scenario 3: NI matches UK sectoral productivity and employment rate

- 8.5. If NI’s sectoral productivity and employment rate matched the UK (keeping the sectoral mix the same), the GVA per head gap would reduce from 23.2% to 7.7% (+£8.0bn of additional GVA). The remainder of the gap could be closed by matching NI’s sectoral employment structure to that of the UK.
- 8.6. These scenarios serve to illustrate the scale of the change required in order to achieve convergence with the UK average. Scenario 3 is the most ambitious, in which NI improves both its employment rate and sectoral productivity to match the UK averages. Even in this scenario, NI would still lag the UK average level of income per capita by 7.7%.

¹⁵ It should be noted that GVA per employee is used in this calculation as hours worked are not available at sectoral level.

9. Key findings

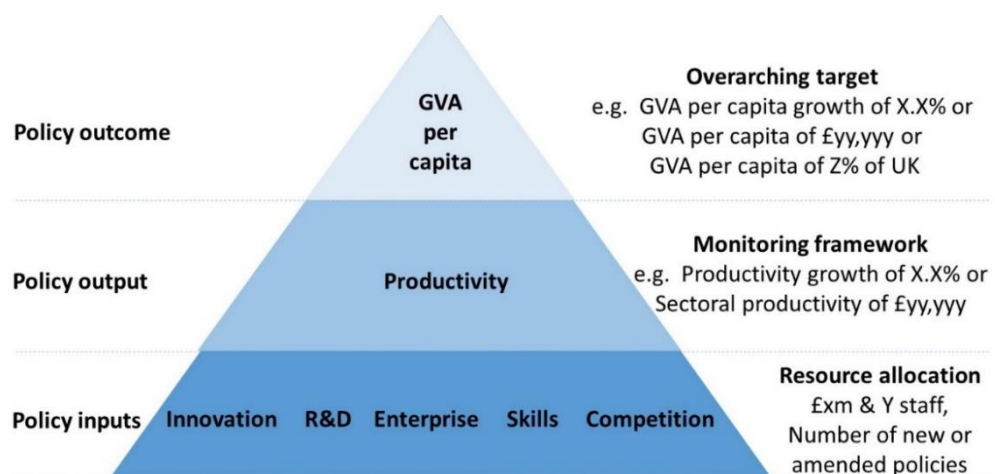
- 9.1. This paper has demonstrated that the relative income gap between NI and the UK has been persistent and widening for most of the last decade. Since 2014 however, productivity growth and employment rates have improved in NI and these factors have led to a slight narrowing of the gap between NI and the UK.
- 9.2. The decomposition of the income gap demonstrates that relatively lower productivity is the main contributory factor. NI's productivity is 13% below the UK average¹⁶, making it an important economic development issue as it is an essential condition to improving incomes and standards of living in NI.
- 9.3. **What NI does**, is generally lower value-added activity and this explains a large proportion of the productivity gap. The paper demonstrates that a very significant change in NI's sectoral composition would be required to close the gap to any extent and would also have significant implications for wider society in terms of skills that would be in high demand, skills that would no longer be required and also in terms of migration and population change.
- 9.4. Sectoral productivity is also lower, on average. Sectors that trade internationally, such as manufacturing are close to the UK average, but many others are well below the UK average. Boosting sectoral productivity through investment, greater use of technology or more efficient processes would have a large impact on the overall level of productivity and as a result, income and standards of living in NI.
- 9.5. The analysis has also revealed that some elements of the **data** are worthy of further investigation to aid understanding of the data and potential implications for policy. Two sectors of note are Public Admin & Defence and Agriculture, with the former exhibiting higher productivity than may be expected and the latter the opposite. Policy makers in NI must ensure that the data employed to underpin policy decisions are as robust as possible. However, measurement risks can be somewhat mitigated by focussing targets on the numbers of jobs created and the wages associated with those jobs, as high productivity jobs are remunerated well.
- 9.6. The jurisdictional allocation of profits is an issue that would benefit from further research in order to conclude whether transfer prices agreed with HMRC are truly reflective of the level of added value in production and the development and delivery of services.
- 9.7. In conclusion, little had changed since the original "Understanding Productivity in NI" paper in 2016. The income gap remains, in a slightly narrower form. Lower productivity remains the largest driver of lower GVA per capita and the sectoral employment structure and productivity levels are similar too. Whilst 2014-17 saw some improvements in both the employment rate and rates of productivity growth, these are still far short of the rates required to boost the NI economy to a significant degree.

¹⁶ On a per productive job basis

10. Policy considerations

- 10.1. In summary, low productivity, wages, employment rates and the sectoral composition still, despite some improvements, present significant economic policy challenges for NI. Combining these factors should lead policy makers to focus more heavily on GVA per capita (or relative income) as an overarching policy objective, which encompasses a broad perspective of the impact of economic policy in NI.
- 10.2. Monitoring productivity is desirable as a driver of overall competitiveness of the NI economy and at an enterprise development level. Cascading targets should be used by Government to ensure that activity, inputs and policy innovations in the drivers of overall competitiveness are measured and reported upon, retaining and potentially increasing policy focus. Figure 10 illustrates this concept as investments are made at the policy input level, influencing productivity as an intermediate step and ultimately leading to improvements in GVA per capita.
- 10.3. As the economy works its way through the fourth industrial revolution, it will be important to increase employment rates for all skill levels, support and encourage the development of new, higher value adding sectors and refocus those in low value-added activities to boost productivity and as a result, the competitiveness of NI. Higher wages will help in terms of social cohesion in NI and also make a range of jobs more attractive. The key policy questions are;
- Is it a change in the sectoral balance, an improvement in sectoral performance, or both that is required?
 - If productivity is to remain a policy goal (or wage levels are to be prioritised), what might a stretching, but achievable target be? Might specific median basic wage targets at sectoral level be a more robust and specific way of targeting high productivity activity?
- 10.4. It may be useful for follow up research to map the policy inputs across Government Departments and agencies in order to establish the amount of resource that is allocated and the effectiveness and efficiency of the current policy framework in the context of competitiveness.

Figure 10 – Illustration of the policy framework



Source: UUEPC

11. Conclusion

- 11.1. Productivity is a key driver of standards of living, competitiveness and long-term economic growth for both national and regional economies. It has featured prominently in a national and regional economic development strategies and with the UK due to exit the EU in October based on the current political situation, international competitiveness will be more important as the UK seeks to maintain and improve living standards for its citizens. Whilst NI and other devolved regions are a small element of the overall UK economy, they will be required to play their part.
- 11.2. This paper has outlined the existing evidence and found that:
- Alongside lower employment rates, productivity remains a key economic policy challenge for NI, as low levels and insufficient rates of growth to move the dial are the main contributory factors to relatively lower levels of income per capita. Despite productivity being the focus of a range of economic development policies it has lagged the rest of the UK regions for a number of years;
 - Low productivity is a factor of both what NI does (its sectoral structure) and how well it does it (productivity within sectors);
 - Significant changes to NI's sectoral structure and productivity are required if NI is to match current UK levels of productivity;
 - Whilst there are apparent issues with the data that are worthy of further investigation, focussing on closely related proxy indicators such as wages can be a useful alternative; and
 - Productivity could be monitored as a measured as an intermediate measure of policy success. However, overall success could be measured using GVA per capita and inputs and activities at the level of the policy drivers (innovation, R&D, skills, enterprise, competition).
- 11.3. In summary, productivity is an important factor in determining and growing the standard of living in NI, as measured by income per capita. It is an area in which NI has improved slightly but remains relatively weak and further improvements could be made. The drivers of productivity are well understood and investment in these factors by Government and the private sector will, in time, improve NI's productivity performance.

12. Annex A – Data issues

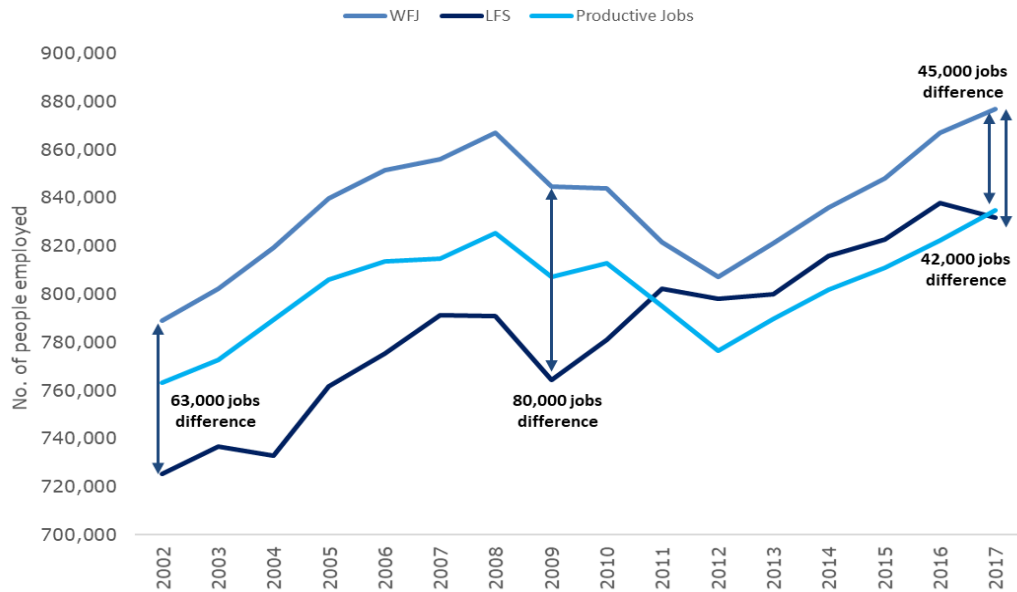
12.1. Data sources

- 12.1.1. Productivity data is calculated using GVA and employment. As with many sources of data that are based on survey evidence, they are subject to a degree of error. Indeed, when the four sources of employment data, the Labour Force Survey, workforce jobs series, LFS reconciled to workforce jobs and productivity jobs are examined for Northern Ireland there are discrepancies between the series, which are illustrated below. GVA can also be difficult to measure accurately at a regional level. For example, when dealing with large enterprises that involve a number of branch plants and headquarters located across a number of UK regions it is difficult to calculate accurately the amount of profits that should be assigned to each of the regions.

12.2. Employment data

- 12.2.1. The Office for National Statistics (ONS) conducts numerous surveys measuring the employment in NI and the UK. The two most widely recognised measures of employment in the UK are the Labour Force Survey (LFS) and the Workforce Jobs (WFJ) series. There are also two additional series that are less commonly used - LFS reconciled to workforce jobs and productivity jobs
- 12.2.2. The LFS is a household survey which provides local data including employment estimates. Its completion is a requirement by EU legislation. The LFS is the primary source of labour market statistics throughout the EU and the recommended data source for total employment. The WFJ series is a business survey which estimates employment. It is the recommended data source for sectoral employment. Productivity jobs is the recommended data source for examining productivity issues, although no sectoral data is published for NI and the workforce jobs sectoral shares are applied to productivity jobs for NI to derive a sectoral estimate.
- 12.2.3. As published, the LFS series is measure of people and the WFJ a measure of jobs. If a person has two jobs they are counted in the LFS once and twice in WFJ. This means that on balance, the LFS measure should always be lower than the WFJ measure. It is possible to create an LFS jobs measure using the data on second jobs but this is not published and rarely used in any policy work. There are other definitional differences, although one would expect similar movements in the two series.
- 12.2.4. The productive jobs series comes from two principal sources within ONS: The Short Term Employment Survey (STES) data and the LFS. This “jobs” series is distinctly different from the number of workers where the data is collected directly from the LFS. Similarly, hours worked (known as productivity hours) are derived from estimates of average hours (derived in turn from LFS micro-dataset) and the productivity jobs.
- 12.2.5. These data series present a very different pattern of job creation, particularly during the 2009-2011 period as LFS relative employment rates converged with the UK whilst the WFJ series diverged – see figure A1. Productivity jobs broadly follows the patterns exhibited by the workforce jobs series.

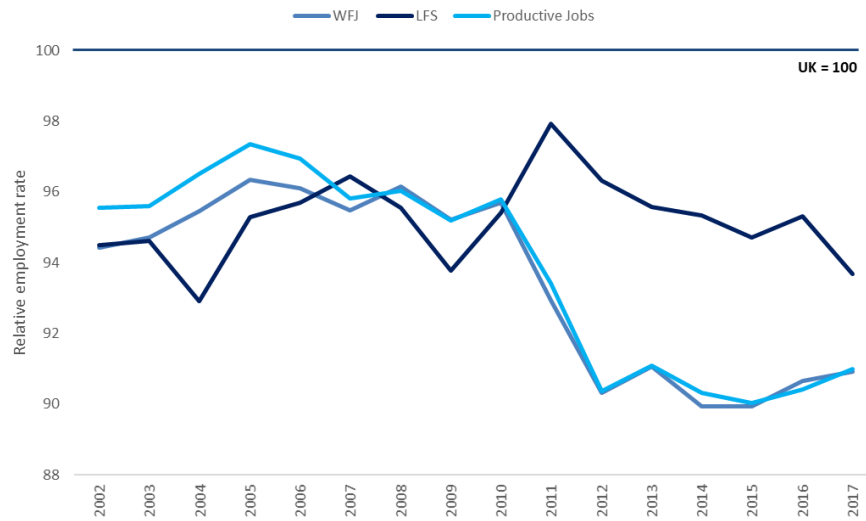
Figure A1 – Comparison of employment in WFJ and LFS data series, 2002 - 2017



Source: ONS workforce jobs and Labour Force Survey
Note: Workforce jobs measures jobs and LFS measures people in employment (who can have more than one job). Therefore, WFJ will always be greater, although the overall trend should be similar.

- 12.2.6. The LFS series suggests that NI suffered only a minor recession in employment terms, recovering quickly and now employs more people than at any point over the last two decades. The workforce jobs and productivity jobs series both illustrate a more severe and prolonged recession.
- 12.2.7. All three series suggest that the NI employment rate gap relative to the UK is increased in recent years, with some recovery in Workforce and Productivity jobs, as illustrated in figure A2.

Figure A2 – Relative employment rate, NI to UK (UK=100), 2002-2017



Source: ONS workforce jobs and Labour Force Survey

Note: Workforce jobs measures jobs and LFS measures people in employment (who can have more than one job). Therefore, WFJ will always be greater, although the overall trend should be similar. In technical terms the WFJ employment rate is not truly a rate but rather number of jobs / working age population but when presented as a relative this factor is not important to the conclusion from the chart, i.e. the inconsistency in relative performance.

12.2.8. The differential between the LFS and productive jobs and workforce jobs has narrowed in recent years it is measured in the tens of thousands and the differential in the employment rate is 2.3 percentage points in NI and 3.0 percentage points in the UK. Therefore, the use of one or two others will result in different conclusions and policy responses.

12.3. GVA data

12.3.1. As discussed earlier in the paper, some caution is required in the use of GVA data, particularly at sectoral level. As figure A3 and A4 illustrate, there are significant variations at sectoral and sub sectoral level between the ABI and Regional Accounts. Overall, the ABI reports 16% less GVA than the Regional Accounts for the sectors that are included. (£19.8bn in the ABI and £23.5bn in the Regional Accounts). The use of either dataset will lead to different outcomes for productivity and as a result, different policy conclusions.

12.3.2. There are reasons for the differences between Regional Accounts and ABI data, although on a sectoral basis some are significantly larger in the ABI and others are significantly smaller, suggesting that the adjustments have differential effects by sector or subsector. The main reasons for the differences are listed as¹⁷;

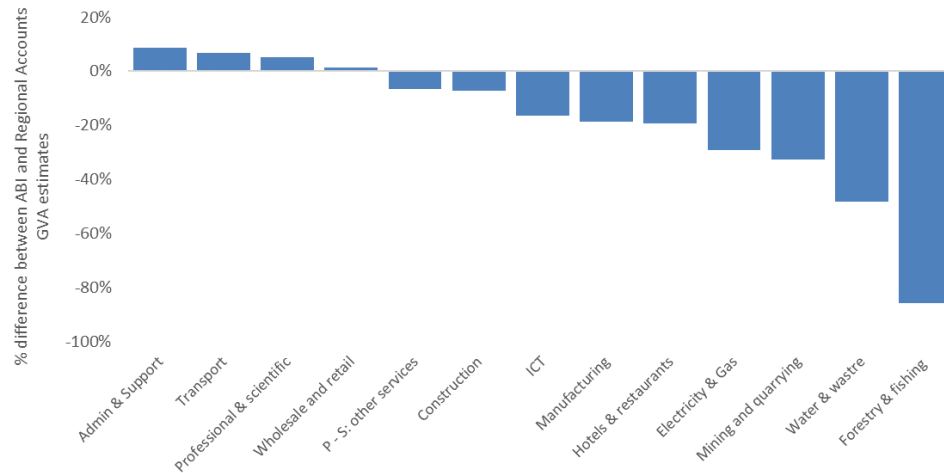
- removal of non-market activity included in the ABS coverage;
- adjustment to align with estimates of net taxes on production used in the National Accounts;
- adjustment to align with estimates of inventories (finished goods, stocks of materials, storage and fuels, and work in progress) used in the National Accounts;
- coverage adjustments;

¹⁷ ONS, 2014, A Comparison between Annual Business Survey and National Accounts Measures of Value Added

- conceptual adjustments;
- addition of own-use and non-market output using data from other sources;
- coherence (balancing) adjustments.

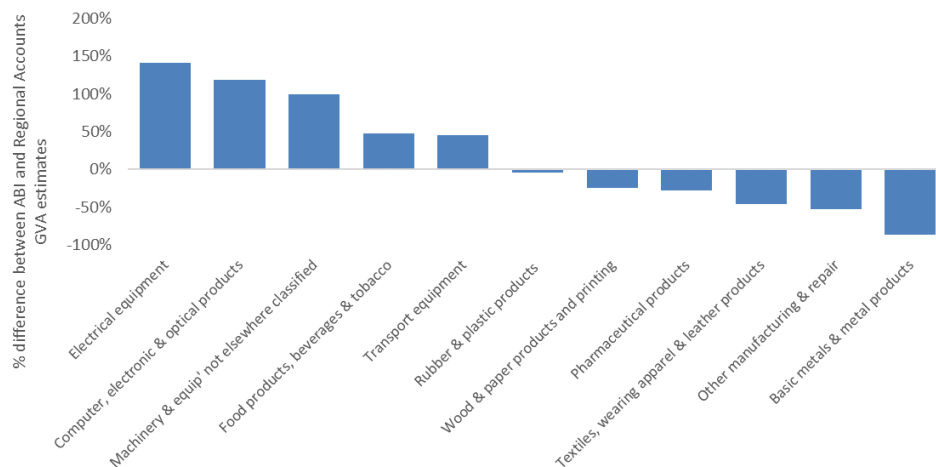
12.3.3. More careful examination and comparisons with the ABI are necessary before it could be used in any meaningful way to develop policy targets. Whilst precision of these data may be an issue, the broad messages and trends may be enough to inform the direction of policy development and target setting.

Figure A3 – Differential between Regional Accounts GVA and Annual Business Inquiry GVA by broad sector, 2017



Sources: Regional Accounts and Annual Business Inquiry
Notes: Agriculture, Finance and Insurance Services, Public admin and defence, education & healthcare are excluded as they are not reported on within the ABI. Arts, entertainment & recreation, Other service activities and the activities of households are grouped together as P- S: Other Services. Real Estate is excluded as imputed rent data included within Regional Accounts makes the sectoral data incomparable to the ABI

Figure A4 – Differential between Regional Accounts GVA and Annual Business Inquiry GVA by manufacturing sub-sector, 2013



Sources: Regional Accounts and Annual Business Inquiry
Note: Coke and refined petroleum products is excluded as it is not reported on within the ABI.