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The Influence of Graduate Qualifications on Average Wages and Productivity across the UK

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Background

Northern Ireland has largely solved its traditional economic problem of high unemployment. Under stable macro-economic conditions in the UK job creation has been rapid for over two decades, to the extent that in-migration of labour has become substantial for the first time in almost a century. The remaining economic problems concern low productivity and low wages by the standards of the UK and increasingly also of the Republic of Ireland. The task of raising wages and productivity is complex and to date there is no consensus on how this should be achieved. Attention in InvestNI and elsewhere in Northern Ireland tends to be focused on such issues as inward investment, R&D, innovation, enterprise and skills. In this report we focus on one aspect of skills, graduates and the strong association between graduates and both wages and productivity across the regions and local areas of the UK.

This report examines the relationships between the proportion of graduates in the employed labour force and the levels of wages and productivity. The importance of this relationship is that good evidence exists for a strong relationship across UK regions and local areas. This relationship can be summarised as:

- A high percentage of the employed labour force with graduate qualifications is associated with high wages and productivity
- This relationship only exists for graduates working in the private sector, there is no relationship in the public sector.

In fact, this relationship is so strong that it appears to explain most of the differences between regions and local areas in the level of average wages and perhaps half of the differences in productivity. This is of particular interest to Northern Ireland which has the lowest average wages of any UK region and lower wages than the Republic of Ireland. The policy implications of this relationship are that Northern Ireland needs to encourage its private sector businesses to develop activities that require graduate level skills and to attract new firms with these types of activity. Since, Northern Ireland's schools already produce more recruits to higher education than can be employed locally, we take the view that it is the demand for graduates, rather than their supply, which should be the focus of policy. This is not to say however that a further expansion of higher education within Northern Ireland would be irrelevant to this aim.

The work described in this report continues an earlier project funded by DEL. In this project a strong relationship between graduates and wages was first described. This project was a literature review on the impact of educational attainment and literacy on economic growth and productivity¹. There is a large international literature in economics which attempts to link educational attainment to labour productivity. Although many believe that such a relationship must be important, it has been difficult in practice to show that countries' educational attainment levels have a large impact on their productivity.

The literature review focused on a well-publicised recent international study by Coulombe et al (2004) which indicated that the strongest correlation between educational attainment and per capita GVA across countries came if education was measured in terms of literacy scores². This in

¹ Literature Review and Scoping Study The Impact of Educational Attainment, and Literacy Scores on Economic Growth and Productivity November 2005. Research Report for DEL

² Coulombe S., Tremblay J.H. and Marchand (2004) 'International Adult Literacy Survey: Literacy scores, human capital and growth across fourteen OECD countries.' Statistics Canada

turn implied that educational improvements at the bottom of the achievement spectrum were as important as at the top. One of the key results from the Coulombe study was the conclusion that general literacy matters more than the percentage of people scoring at level 4, the level generally expected of graduates. On detailed inspection, however, the Coulombe effect appeared to be rather weak and to have a significant impact only in the very long-term.

The Coulombe conclusions also appear to contradict the widespread belief that the possession of top-level skills is paramount in modern 'knowledge-based' economies in which research-based activities are particularly important. The apparent falling behind of general literacy in the USA for instance does not appear to have reduced the USA's ability to generate the world's highest levels of labour productivity. Falling literacy levels among the general population may be offset by the USA's ability to dominate the world in first-rate universities (17 of the top 20 science-based universities in the Shanghai Index for instance). In addition the USA's ability to attract post-graduate talent from all corners of the world to its top class universities and to its financial and business services companies may also offset any educational weaknesses in the wider population.

This is not to argue that general literacy scores are unimportant. They clearly are important, and we agree with the conclusion of the OECD UK Country Report (2005) that policy in the UK needs to focus on raising the general low level of skills. As the NIESR company productivity studies in the 1980's and 1990's showed for the UK, and equivalent NIERC studies showed for NI, good levels of literacy are needed to main high productivity in a range of modern industries.

It is likely that basic literacy levels do not vary much between UK regions given the similarity of the school systems in each area and the uniformity in school attendance, even if literacy needs to rise in all parts of the UK. Such uniformity does not however apply to graduates. This is because universities are not equally spread across regions and graduates are mobile, moving easily between regions to where-ever high paying jobs are available. As a result some regions end up with many more graduates than others. The evidence is that the same regions have higher levels of wages and labour productivity, not only for the graduates themselves but also for non-graduates in the same economies.

The Relationship between Graduates and Average Wages

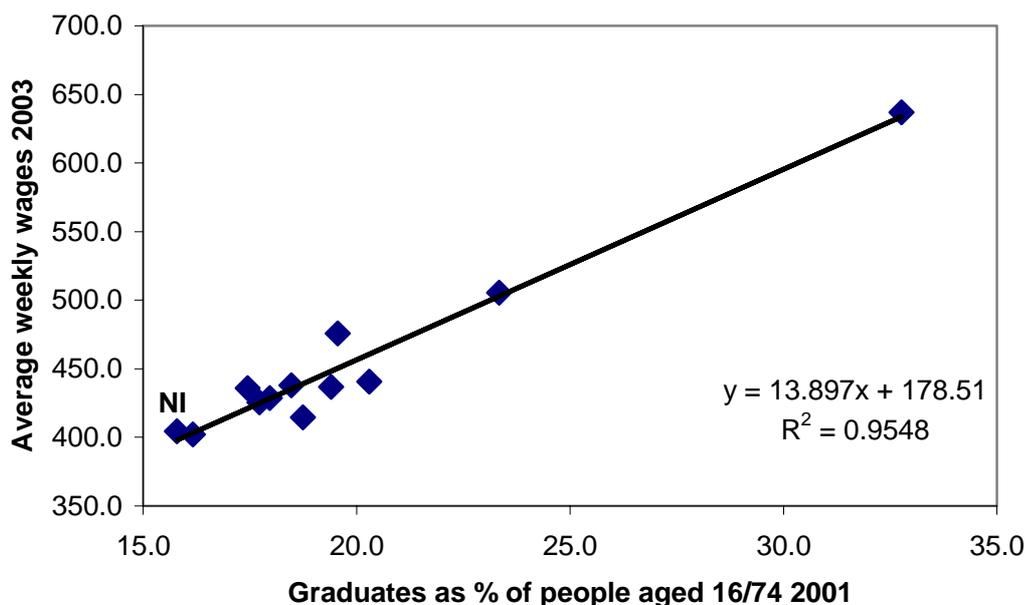
Our own research on UK regional economies suggested that wage levels are closely associated with the proportion of graduates in the labour force³. Figure 1, taken from this previous work, shows the close relationship across the 12 UK government office regions between average wages and the proportion of working-age people with graduate qualifications. Since wages are closely associated with productivity this can also be taken as an indicator a relationship between productivity and graduates. Northern Ireland has the lowest percentage of graduates and one of the lowest average wages on this chart. The highest proportion of graduates is in London, where a third of the population aged 16-74 have level 4/5 (i.e. graduate and post-graduate) qualifications. On average, a single percentage point rise in the proportion of graduates was associated with an increase in weekly wages of £14 per week (3%) in 2003. Note that this refers to wages of all employees and not just the wages of the graduates themselves.

Similarly there was an inverse relationship between average wages and the proportion of people with no qualifications (Figure 2). Again Northern Ireland emerges at the wrong end of the scale,

³ Literature Review and Scoping Study The Impact of Educational Attainment, and Literacy Scores on Economic Growth and Productivity November 2005. Research Report for DEL

with the highest percentage of people possessing no qualifications⁴. London had the lowest recorded proportion of people with no qualifications and a much higher average wage (for all employees). On average a single percentage point decrease in the proportion of employees with no qualifications was associated with a higher overall average wage in 2003 of £10.2 per week.

Figure 1: Graduates (% of all aged 16-74) in 2001 & Average Wages 2003 by UK region



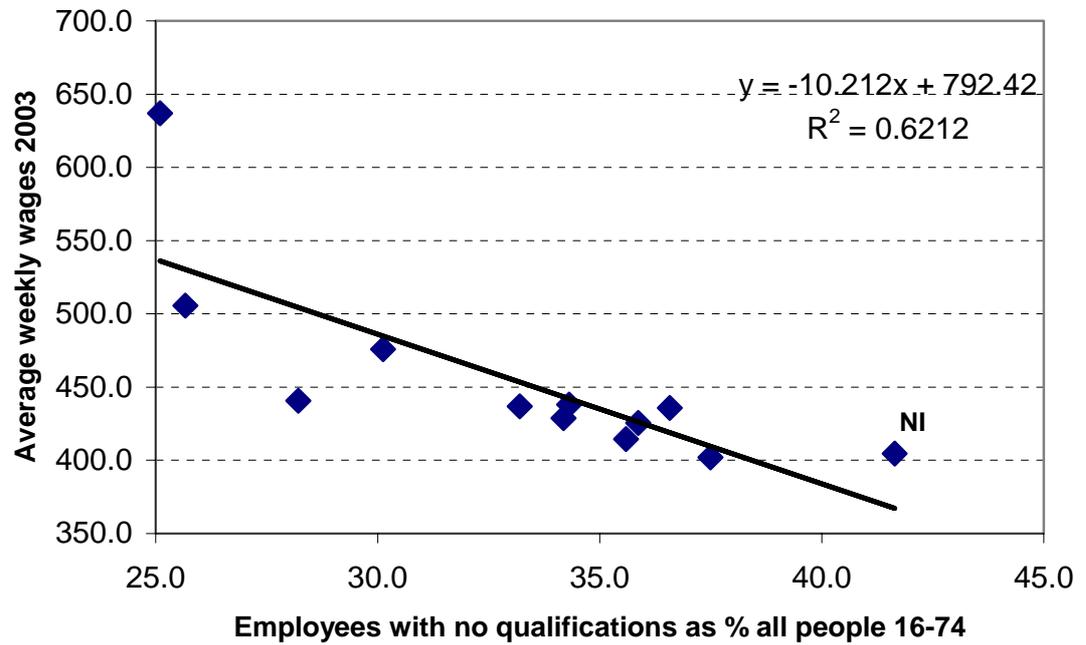
Sources: Qualifications- Census 2001 (level 4/5 qualifications, people aged 16-74 residence-based). Wages- NES 2003—wages of full-time employees, workplace-based.

The previous work for DEL went one step further and asked whether this relationship holds for both the public and private sectors. This was done for individual labour market areas in England and Wales⁵. What emerged was a strong positive relationship between wages and the percentage of graduates working in the private sector (Figure 3). A 10 percentage point increase in the percentage of the workforce who are graduates working in the private sector led to 30% higher wages for all workers (i.e. not only for the graduates themselves). The percentage of private sector graduates 'explains' almost 83% of the differences in wages between labour market areas. Northern Ireland had a low percentage of employees who are graduates working in the private sector but some local areas within England and Wales are lower still (Figure 3). Some of these are rural areas but others like the West midland's 'Black Country' are parts of conurbations.

⁴ It should be noted that census figures, including those in NI, tend to suggest a much higher percentage of people with no qualifications than the LFS. In our view the number of unqualified people is probably over-estimated in the Census.

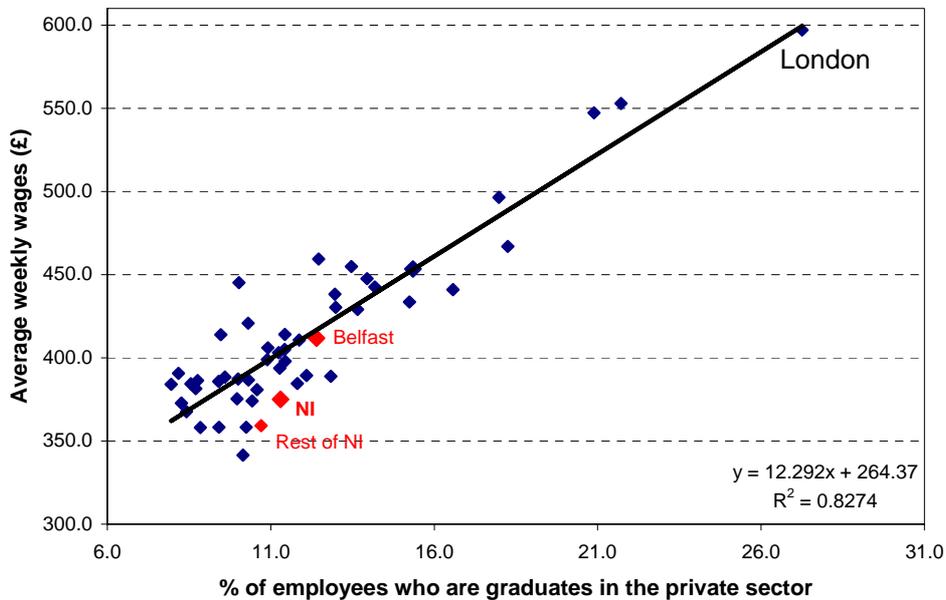
⁵ Data was then unavailable for individual labour market areas in Scotland and Northern Ireland. However NI is included as two regions i.e. the Belfast Metropolitan Area and the Rest of NI.

Figure 2 Level 0 qualifications (% of all 16-74) and wages by region



Sources: Qualifications- Census 2001 (level 0 qualifications, people aged 16-74 residence-based). Wages- NES 2003 –wages of full-time employees, workplace-based.

Figure 3 Percentage of Employed People who were graduates in private sector 2001 and average earnings 2001 (workplace-based)

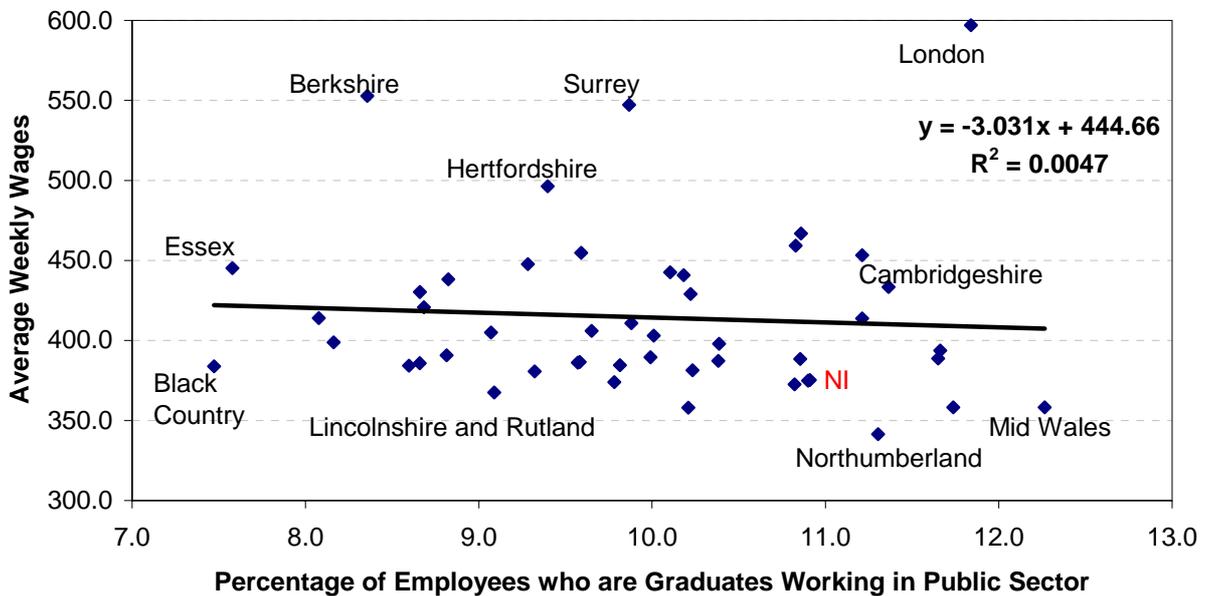


Sources: Graduate Qualifications- Census 2001 (level 4/5 qualifications, residence-based).
 Wages- NES 2001 –wages of full-time employees, workplace-based.

There is no equivalent relationship for graduates working in the public sector (Figure 4). In this case there is no correlation at all between wages and graduates. Indeed if London is omitted the relationship is slightly negative as perhaps expected given the higher need for public services in low wage areas.

We have not yet been able to investigate why high proportions of graduates working in the private sector should raise average wages for all local workers by so much. The direct impact of the wages of the graduates themselves accounts for less than one quarter of the general rise. Hence, the wages of non-graduates must also be higher in areas with large numbers of graduates in the private sector. This could be, for instance, because graduates either create or facilitate the creation of high value added activities which create the demand for specialised (and highly paid) non-graduate labour. Within the UK, large numbers of graduates may also create a demand for all labour in such a way as to bid up wages for non-graduates. It is also possible that the causation runs the other way, i.e. from high wages in an area to high demand for graduates in sectors like finance or legal services. However, the relationship appears too strong for this to be the main effect.

Figure 4: Percentage of employed population 16-74 graduates in public sector 2001 vs average earnings 2001



Sources: Graduate Qualifications- Census 2001 (level 4/5 qualifications, residence-based).
 Wages- NES 2001 –wages of full-time employees, workplace-based.

Even though graduates working in the private sector may be a key differentiating factor for regional wages and productivity, it still may be true that all regions have serious deficiencies at lower levels of literacy. The fact that the UK has a relatively high proportion of graduates compared with other countries, but lacks intermediate and vocational skills, points in this direction. The OECD (2005) believes that attention to these lower level skills should be a key focus of educational policy. In the OECD's words:

“ A relative lack of intermediate and vocational skills appears to be an important impediment to the economy's capacity to absorb innovations, explaining the comparatively low proportion of UK firms engaged in successful innovations. Indeed, while the number of persons having university and advanced research degrees (PhDs) is not much different from that in comparable countries, the UK has a large share of pupils leaving school before completion of the upper secondary level and without an education giving specific competence in a professional field.”

However in this study we focus on the role of graduates as a factor in regional and local differences in wages and productivity, without minimising the importance of improvements at other levels of skill.

The Aims of this Study

Despite its apparent significance, the relationship between graduates and wages or productivity have only been lightly investigated. We believe that its importance merits more rigorous testing. In this study we investigate the relationships in greater depth to ensure that they are robust and that misleading conclusions are not drawn. We propose firstly to test the relationships with greater precision than was possible in the previous work. Secondly we will examine the importance of key sectors. Thirdly we need to investigate the direction of causality in more depth.

The following lists the tasks undertaken in this study.

1. The relationships shown above can be estimated with more precision:
 - i. While graduate proportions are residence based, wages are workplace based. Our first stage will be to make these definitions consistent.
 - ii. Graduate proportions include the self employed but wage data does not. Data issues make it difficult to be fully consistent across areas, but we can investigate the impact across sectors using LFS data.
 - iii. Data for public and private sector graduates can be added for local areas in Scotland and Northern Ireland.
 - iv. It may be possible to estimate the relationship for private sector wages alone (or at least excluding those in public services).
 - v. We can investigate the direct relationship between graduates and GVA per employee (including the self employed) rather than wages.
 - vi. The relationship between employment in the private sector (for all skills levels) and average wages can be investigated, to separate the impact of graduates from that of the sectoral structure.
 - vii. Using median as opposed to mean wages to exclude the impact of a few very highly paid people.
2. We can investigate the importance of individual sectors to the relationship.
 - i. In particular, the relationship between graduates in the financial and business sector to all average wages and GVA per employee.
 - ii. There is some indication on the charts that areas with large engineering firms (in car and aircraft production) have higher wages than expected on the simple graduates relationship.
3. We need to try to clarify the direction of causality. Do graduates influence wages or does the purchasing power of graduates lead to high local proportions of graduates.

This work involves a large amount of data collection from different sources, for different geographical scales and time periods and for different sectors. To cut through the inevitable mass of detail this report will summarise the main conclusions.

Estimating More Precise Relationships

(1) *Extended and More Appropriate Data*

The original work on the graduate – wages relationship for local areas used data from:

- the 2001 Census for England and Wales to obtain the proportion of graduates among people aged 16-74 in each area and (for the public and private sectors) employed people aged 16-74. In this data people were classified on a residence basis.
- the New Earnings Survey (NES) for mean average weekly earnings in 2001 for full-time employees. This data was on a workplace basis.

The use of these sources introduces the possibility of misleading results, firstly through an inappropriate combination of residence-based and workplace-based data. The new analysis is consistent in using the same basis for both the graduate proportions and the wage data. This can in principle be either residence-based or workplace based but should not mix the two. Our preference is to use workplace-based data since this focuses on areas in which graduates work and matches the Gross Value Added (GVA) data used to measure labour productivity. The data in the new analysis is also for those in employment (including the self-employed), rather than for all working age people as in parts of the original analysis. This is more consistent for our correlations between graduates and either wages or productivity.

The wage data is for employees alone as before, and the productivity data refers to all those in employment. However, the new data, from the improved Annual Survey of Hours and Earnings (ASHE) source covers all employees in contrast to the full-time employees in the previous analysis. This is more consistent with the employment data which includes all of those in employment, whether working full-time or part-time. The new wage data can be expressed either on a workplace or residence basis as required.

We have also experimented with a range of periods (as opposed to single years) to reduce sampling variability in the wage data. We have replaced mean average wages with medians in order to reduce the influence of extreme sample values. The data is for 54 local areas across the UK, including Northern Ireland,⁶ and Scotland which was omitted from the original analysis.

In the new analysis our preferred formats are thus:

- workplace data for both employment and wages
- restricted to those in employment (including the self-employed) rather than all working-age people
- median rather than mean wages (to avoid undue influence from a few extreme earners)
- average wages of all employees rather than just full-time employees
- a range of dates for wage data to reduce sampling fluctuations
- use of revised wage data from the Annual Survey of Hours and Earnings (ASHE)

⁶ The data includes 46 counties and metropolitan areas in England, four groups of counties in Wales. Northern Ireland is included as Greater Belfast (Belfast Metropolitan Area) and the rest of NI. Scotland includes Greater Edinburgh and greater Glasgow and the Rest of Scotland.

The results of the analyses in which regression equations are fitted to the data on these different formats are summarised in Table 1 below. The R squared values describe the fit of the equation in each case. A value of unity (i.e. one) indicates a perfect relationship, a value of zero indicates no relationship between the graduates and wages. The top row of Table 1 shows the results for a relationship between:

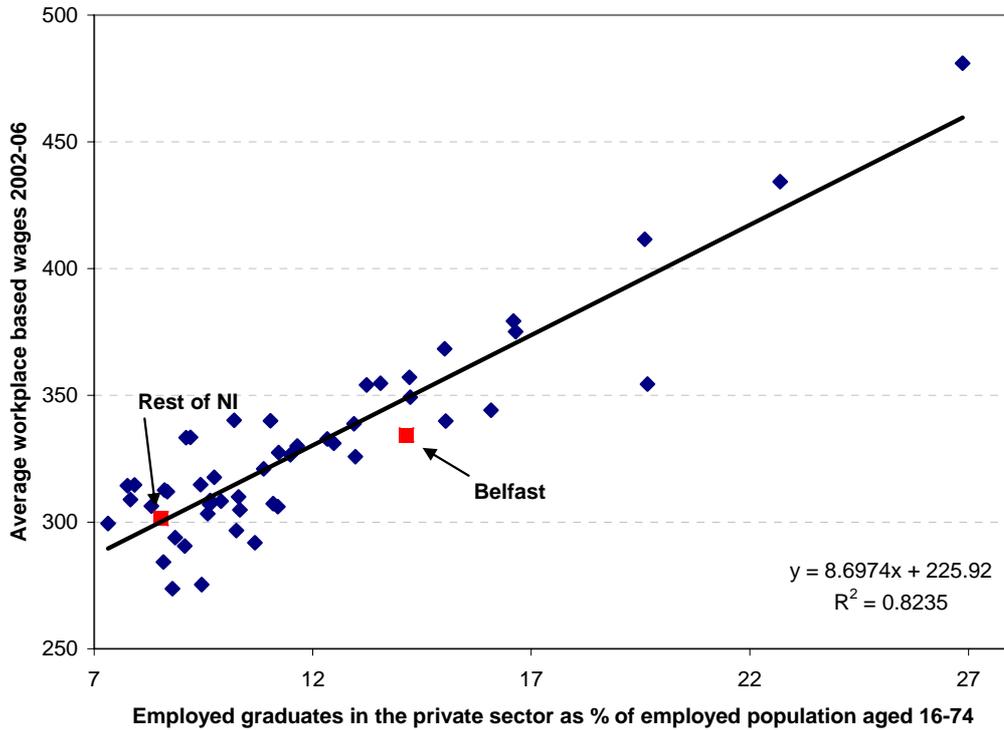
- graduates as a percentage of those in employment in each area on a residence basis
- median weekly wages for each area on a residence basis – annual average for 2002-6

Table 1: Alternative Specifications of Basic Graduates-Wage Relationships

Employment Data	Wage data	Dates	R Square
Residence	Residence	2002-06 1998-	0.51
Residence	Workplace	2006	0.63
Residence	Workplace	2002-06	0.65
Residence	Workplace	2001 1998-	0.59
Workplace	Workplace	2006	0.64
Workplace	Workplace	2002-06	0.64
Workplace	Workplace	2001	0.6

Sources: Employment Census 2001. Median weekly wage all employees- ASHE

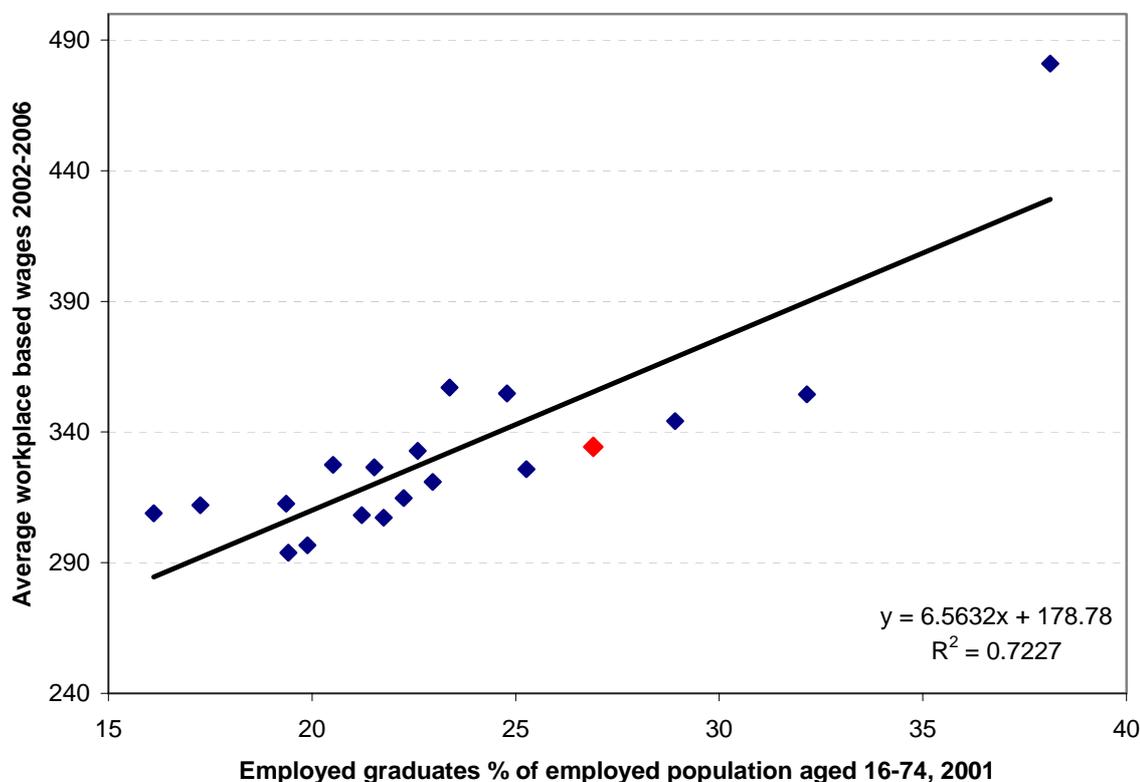
Figure 5: Percentage of employees who were graduates in 2001 and median weekly wage 2002-06



Source: Graduates - census 2001. Wages - ASHE average for all employees 2002-6. Both workplace based. NI areas highlighted in red.

(Although this mixed residence-workplace example is not used in the report, it is included here for comparison with the earlier work). The results in Table 1 show a strong and statistically significant relationship in every case, irrespective of the precise specification. The relationship between the graduate percentage and median wage is strongest when both variables are specified on a workplace basis and also strongest when the median wage is calculated as an average over a period (i.e. rows 5 and 6). The relationship in the penultimate row of table 1 is depicted in Figure 5 above, with Greater Belfast and Rest of NI highlighted in red. The full table of results is given in annex A.

Figure 6: Percentage of employees who were graduates in 2001 and median weekly wage 2002-06 for major urban areas



Source: *Graduates - Census 2001. Wages - ASHE average for all employees 2002-6 Both Workplace based. Belfast is highlighted in red.*

The relationship in Figure 5 shows that the graduate percentage accounts for close to two-thirds of the variation in average wages between areas. On average, a rise of one percentage point in the percentage of graduates raised the average wage by £6.90 a week⁷ (2%). Belfast had an above average percentage of graduates, reflecting the importance of the public sector in the city, but the average wage was rather less than predicted from the graduate proportion. The rest of NI had one of the lowest percentages of graduates but its average wage was exactly as predicted for this level of graduates. The highest value on Figure 5 is for London. The predicted value for London is also the highest, suggesting that most of the high wage level in London reflects the high proportion of graduates in the labour force. However the actual wage level is higher than predicted by around £30 a week (6%).

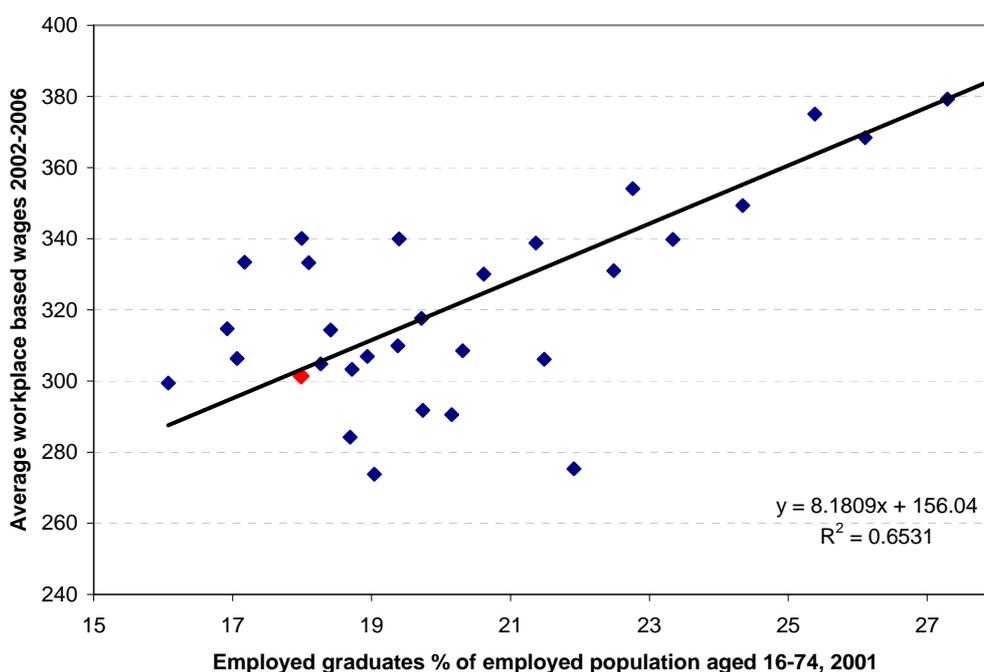
The position of Greater Belfast is clarified further in Figure 6 above which repeats Figure 5 but includes only the major urban areas. Belfast has a high percentage of graduates among its employees, with only Greater Edinburgh, Bristol and London having higher values. Two of these

⁷ The slope of the regression equations were between 6.3 and 7.0 for the different specifications. The values for the constants were between 155 and 198.

are capital cities with large public sectors, many of whom are graduates. Average wages in Greater Belfast were above average, although below those predicted on the basis of the graduate percentage. The average is however pulled up by London. Excluding London, Belfast (and Edinburgh would have wages close to the expected levels).

Similarly, the position of the rest of NI is clarified further in Figure 7 which includes only counties and areas without major urban areas. Northern Ireland, excluding Greater Belfast, has a low percentage of graduates. Only a number of east coast and mainly agricultural counties in England are lower⁸. Wages in the rest of NI are close to those predicted on the basis of the low percentage of graduates. Areas with even lower wage levels are remote rural areas in England and Wales⁹.

Figure 7: Percentage of employees who were graduates in 2001 and median weekly wage 2002-06 for less urban and rural areas



Source: Graduates- Census 2001. Wages- ASHE average for all employees 2002-6 Both Workplace based. Rest of NI highlighted in red.

(2) Excluding the Self-Employed

One inconsistency in the results above is the fact that the employment data includes the self-employed while the wage data refers only to employees. This is unlikely to be a major problem

⁸ These are Norfolk, and Lincolnshire and also Humberside and Essex.

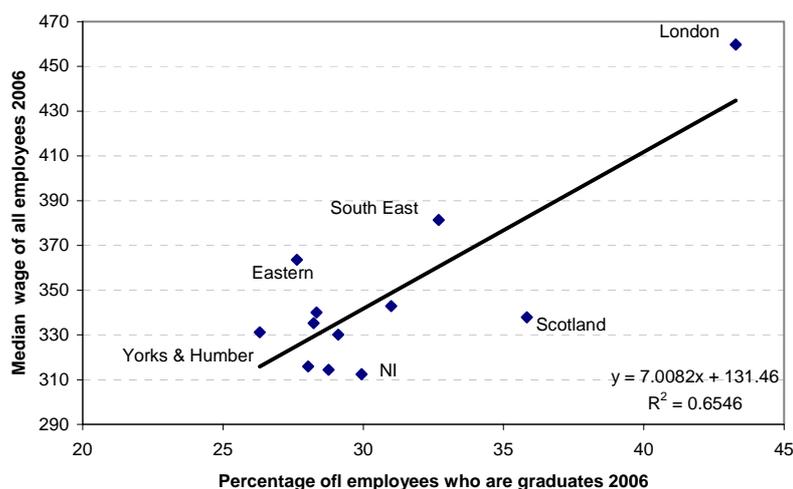
⁹ These are most of rural Wales, Northumberland and Devon and Cornwall

with the analysis, but as a check we have abstracted data for employees alone from the Labour Force Survey. This is shown in Figure 8.

The relationship between the graduate percentage and average wages in Figure 8 is positive and statistically significant as before. The degree of correlation and size of the slope of the line in Figure 8 are almost identical to those in Figure 5 above. This suggests that the exclusion of the self-employed makes little difference to the conclusions.

We might expect the R squared value in Figure 8 to be higher than in Figure 5 because the regional data are more aggregated than the local area data in Figure 5 and this should reduce variability in the data. Also the R squared values is substantially less than in Figure 1 which is also on a regional basis. This is partly because of the anomalous position of Scotland in Figure 8. Excluding Scotland the R squared value rises to 0.8 and the slope coefficient to 8 which are closer to that in Figure 1. However the basis of the analysis differs considerably between Figures 8 and 1 for reasons outlined above, and comparability is not to be expected. Also, because the LFS is a sample survey with self-reported wage levels we can expect a greater degree of sample variation than from a relationship based on census and ASHE data. It would be possible to obtain LFS data for a greater range of years to reduce variability, but we have judged this to be unnecessary. Our conclusion remains that the inclusion or exclusion of the self-employed is unlikely to make much difference to the analysis undertaken here.

Figure 8: Percentage of graduates in 2007 and median weekly wage 2006



Source: Labour Force Survey 2006

(3) Public and Private Sector Relationships

We can now re-examine the graduate-wages relationships separately for the public and private sectors as in the original research. The differences in the new work compared with the original analysis are:

- The average wage data is median wages for all employees rather than mean wages for full-time employees.
- Wage data is averaged over a run of years rather than being for a single year

- The employment data is on either a workplace or residence basis.
- Data for areas in Scotland is included alongside that for England, Wales and Northern Ireland.

The results of the new analyses are summarised in Table 2¹⁰. As in the original work, there is no relationship whatsoever between graduates working in the public sector (as a % of all employed people aged 16-74) and the median wage for all employees in 54 local areas across the UK. This conclusion is unaffected by whether the data is on a residence or workplace basis, nor by the periods over which wage averages are calculated.

Again as in the previous work, there is strong relationship between the percentage of graduates working the private sector (as a % of all employed people) and the median wage for all employees. This relationship is a little stronger when the data is on a workplace basis and when wages data is averaged over a period of years. Our preferred relationship is in the bottom row of Table 2. This uses workplace data, and wage data averaged over the recent four years from 2002-06.

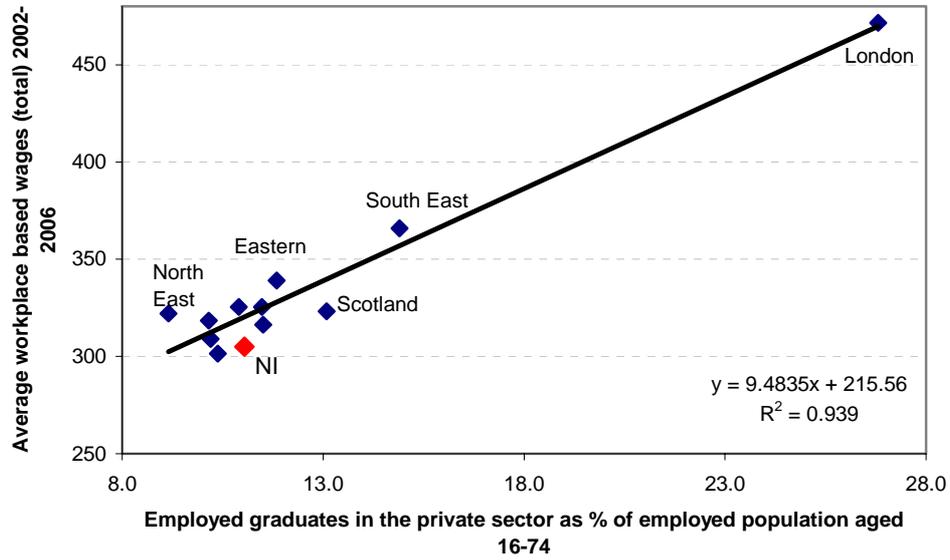
Table 2: Alternative specifications for public and private sector graduate-wages relationships in local areas across the UK

Employment Data 2001	Wage data (Median)	Dates	R Square Public Sector	R Square Private sector
Residence	Residence	2001	na	na
Residence	Residence	1998-2006	na	na
Residence	Residence	2002-06	0.0	0.73
Workplace	Workplace	2001	0.0	0.77
Workplace	Workplace	1998-2006	0.0	0.82
Workplace	Workplace	2002-06	0.0	0.81

Sources: Employment Data: Census 2001. Wages data: ASHE (dates as given) median wages for all employees

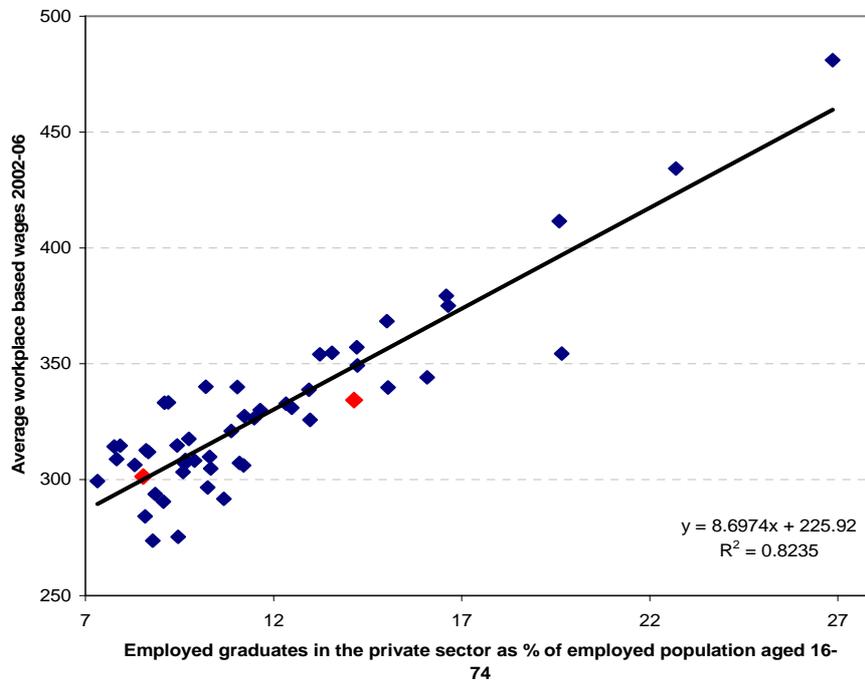
¹⁰ The data for the private sector relationship is given an annex B

Figure 9: Private Sector Graduates 2001 and Median Wages by Region - All Employees 2002-06



Source: Graduates- Census 2001. Wages- ASHE average of medians for all employees 2002-6 Both Workplace based. Rest of NI highlighted in red.

Figure 10: Private Sector Graduates 2001 and Median Wages by Local Areas - All Employees 2002-06



Sources: *Employment Data: Census 2001. Wages data: ASHE all sectors. Greater Belfast and the Rest of NI highlighted in red.*

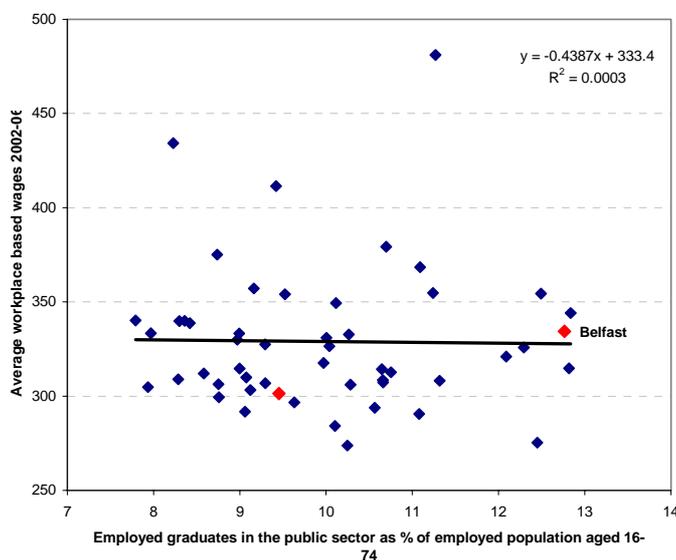
This preferred format is shown in Figures 9 above for regions and Figure 10 for local areas. In both cases the relationship is strong and highly significant in the statistical sense. In both cases an increase of one percentage point in the percentage of graduates is associated with an additional £9 per week (2.5%) on average wages. The correlation (R squared value) is a little higher for regions because amalgamating local areas into regions reduces variability in the data.

Belfast's value for graduates working in the private sector is close to the average, although its average wages are 4% less than would be expected for this percentage of graduates. In this respect Belfast is similar to Glasgow, but lower in both graduate percentage and wages than Edinburgh. We should note however that although Edinburgh had the fourth highest percentage of graduates among our 54 local areas its average wage was 10% below the expected level and the largest negative residual of any area.¹¹

The relationship described in the bottom row of Table 2 for the public sector is shown in Figure 11 below. There is no relationship for graduates in the public sector and the median wages of all employees. Not surprisingly Belfast has one of the highest proportions of its employed population working as graduates in the public sector. The Rest of NI has a level which is a little below the UK average. In neither case does the chart suggest that this makes any difference to average wages.

These results confirm the original findings of a very strong association between graduates working in the private sector and average wages for all employees. The new data on a more consistent basis does nothing to weaken the original finding. It does indeed seem that wage differences between UK regions and local areas are strongly associated with graduates working in the private sector. We have still to investigate the direction of causation. It could be that :

Table 11: Public sector graduates 2001 and median wages - all employees 2002-6



Sources: *Employment Data: Census 2001. Wages data: ASHE. NI areas highlighted*

¹¹ The top four areas for graduates in 2001 were London, Berkshire, Surrey and Greater Edinburgh.

- graduates are a key driver of high productivity and hence high wages through their role in supporting high efficiency and/or innovation in private sector firms.
- Alternatively it could be that high incomes in regions and local areas create a demand for high value added services that require graduate employees.

At this point we can say that the main influence is unlikely to be due to the higher wages of the graduates themselves. If this were the case we would expect a similar relationship in the public sector to that for the private sector. As we have seen, no such relationship exists for the public sector.

(4) How important is the size of the private sector?

The strong relationship between average wages for all employees and the percentage of employed people who are graduates working in the private sector could be due to two separate factors. High wages could simply be due to:

- A large private sector, or alternatively
- A high percentage of graduates within the private sector.

The measure used thus far in this analysis has been:

- the percentage of employed people who are graduates working in the private sector

This can be rewritten as the product of the two effects in the bullet points above, i.e.

$$G_P / E_T = G_P / E_P * E_P / E_T$$

where:

G_P is the number of graduates working in the private sector

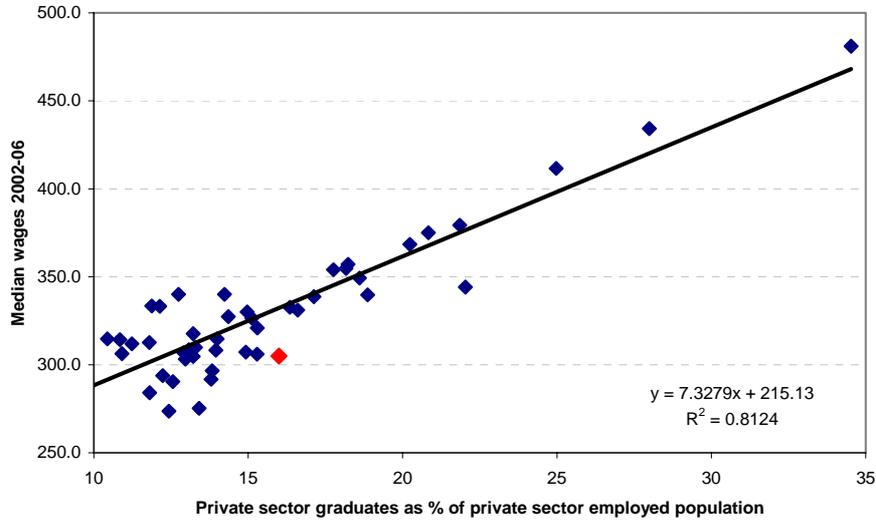
E_T is the total number of employed people

E_P is the number of people working in the private sector (all qualifications)

In this section we attempt to separate the impact on wages of having a large private sector from having a high proportion of graduates within the private sector. The charts below show that both factors are associated with higher wages, but the graduates effect is much the stronger. Together the two effects 'explain' 85% of the wage differences between areas, but graduates alone can account for 80%. Figure 12 shows that median wages for all employees are closely associated with the percentage of private sector employees who were graduates in 2001.¹² The correlation is similar to that in Figure 9 in which the measure was private sector graduates as a percentage of all employed people. The impact of graduates on wages is a little less at £7.3 per week for each percentage point increase in the graduate percentage compared with £8.7 in Figure 9. The similarity is unsurprising since the two measures of graduate percentages used in Figures 9 and 12 are themselves closely correlated (R squared = 0.95). It is also true that where the percentage of graduates within the private is high, the private sector itself tends to be large (R squared = 0.32).

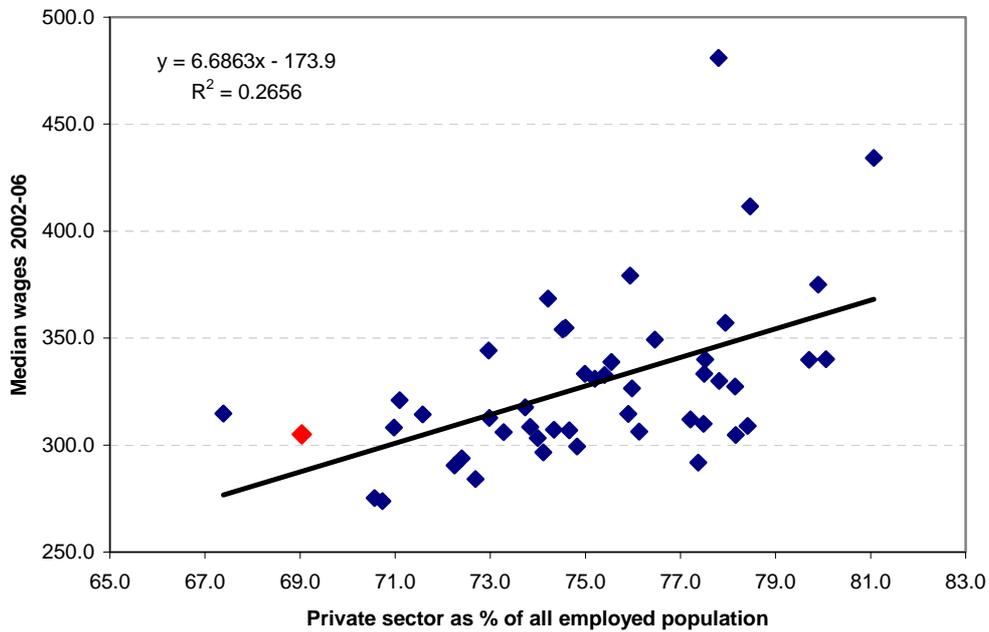
¹² Note that this chart covers areas in England and Wales plus NI as a whole.

Figure 12: Graduates as % of employees in the private sector and average wages 2002-06



Sources: *Employed people – census 2001. Wages – ASHE all sectors*
 Note: This chart covers areas in England and Wales, plus NI as a whole (highlighted in red)

Figure 13: Private sector as % of all employed population and median wage 2002-06



Sources of data: *Employed people – census 2001 wages – ASHE*
 Note: This chart covers areas in England and Wales, plus NI as a whole (highlighted in red)

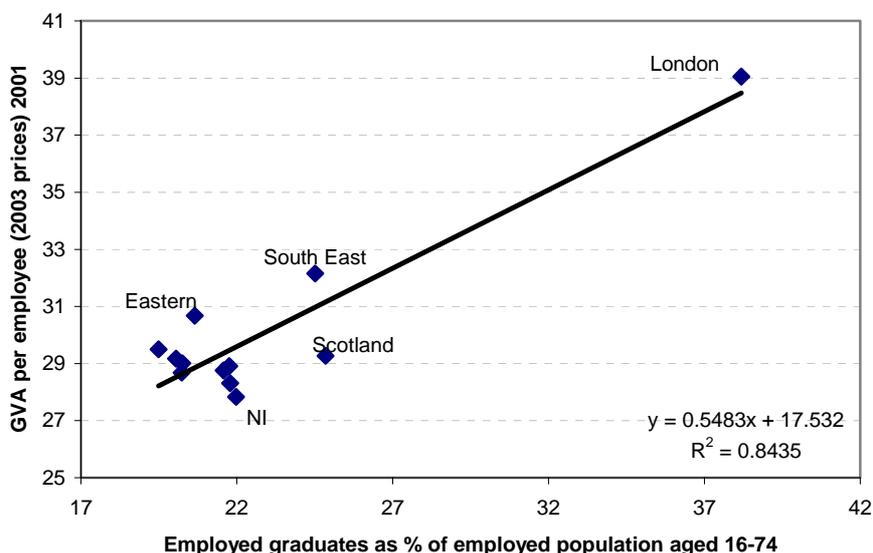
The direct association between the size of the private sector and the average wage is shown in Figure 13. Where the private sector is large, the median wage for all employed people tends to be larger, but the association is not nearly as strong as for the association between graduate percentages and median wages ($R^2 = 0.26$). Figure 13 tells us that even if the percentage of graduates within the private sector were the same in all areas, there would still be a positive relationship between wages and graduates as a percentage of all employed people. This would be the relationship shown in Figure 13.

Our conclusion must be that it is the graduate percentage *within* the private sector that is the most important influence on wages. The size of the private sector itself also influences wage levels, but by a smaller amount.

(5) Graduates and Productivity

We have seen that the percentage of graduates is strongly associated with average wages across the UK. Because wage levels must usually be underpinned by productivity, at least in the private sector¹³, we also expect graduates to be strongly associated with productivity. In this study productivity is measured as Gross Value Added (GVA) per employed person. This measures the value-added generated by each employed person. It is not the same as output per person, which measures physical productivity, but is widely accepted as a measure and is more appropriate for much of the service sector where physical output is hard to measure. GVA consists of wages, profits and rents. Across the whole economy wages account for around 70% of GVA, but this varies from sector to sector.

Figure 14: GVA per employed person and graduate percentage 2001



Source: *Employed Population. – Census 2001. GVA per Employee – Regional Accounts, ABI and LFS. Both Employment and GVA are workplace based.*

¹³ Unless substantial government subsidies support wages in a situation of inefficient industry.

GVA per employed person is positively associated the percentage of graduates across UK regions (Figure 14). Figure 14 suggests that graduate percentages account for 84% of the variation in GVA per employed person across regions. However, this conclusion is heavily influenced by high values for both variables in London. If London were excluded there would be no significant relationship. The majority of regions lie in too narrow a band for a relationship between graduates and GVA to be established.

To get a better sense of the strength of the relationship we need to examine the data for local areas, since there is more variation in the data at this scale. This is done in Figure 15 below, where it can be seen that a significant and positive relationship does exist¹⁴. The association is a little weaker than the equivalent association between average wages and the graduate percentage shown in Figure 5. This is to be expected since GVA includes profits which comprise a variable proportion of GVA from place to place depending on such things as the location of capital intensive industry. This can be seen in the values for Greater Belfast and the Rest of NI in Figure 15. The Rest of NI has the slightly higher level of GVA per employee, whereas the opposite was true for wages. This partly reflects the fact that most of Northern Ireland's capital is

Figure 15: Graduates as % of employed population 2001 and GVA per employee (2003 prices) in 2001



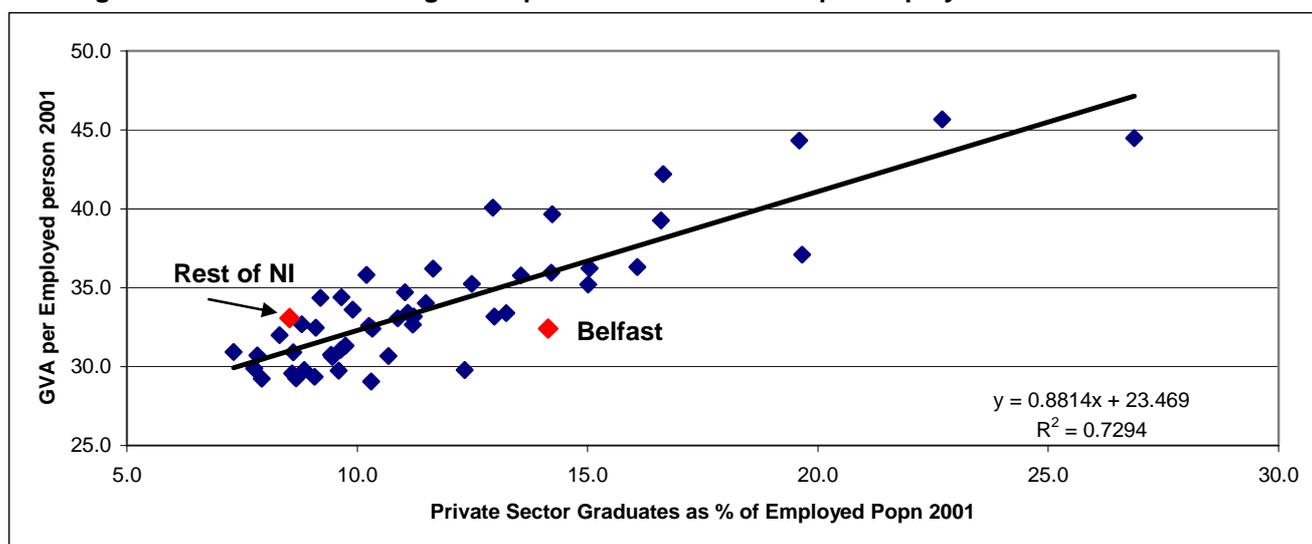
Source of data: *Employed Population. – Census 2001. GVA per Employee – Regional Accounts, ABI. Both variables workplace based. Gtr Belfast and Rest of NI highlighted in red.*

¹⁴ Productivity in this case, and in Figure 16, is measured as GVA per employee, i.e. the self-employed are not included in the denominator since reliable data on self-employment is not available at this scale. It is not thought that the omission of the self-employed will change the relationship by a significant amount.

intensive manufacturing and energy sectors are located outside Greater Belfast. Since the profits from capital intensive firms are usually distributed to shareholders far and wide, it is the wage component of GVA that is most relevant for local living standards, and thus the one we focus on in this study.

As in the case of wages, it is graduates working in the private sector that have the closest association with GVA per employee. Figure 16 shows this relationship for 2001. The chart indicates that graduates working in the private sector (as a percentage of all employed people) accounts for close to three-quarters of the variation between areas in GVA per employee. Greater Belfast, as we have seen previously, has a percentage of private sector graduates that is close to the average for UK areas. However, its GVA per employee is lower than expected for this level of graduates, as was its wages¹⁵. The rest of NI has relatively few graduates in the private sector, but its GVA per employee is a little above the expected level.

Figure 16: Graduates working in the private sector and GVA per employee 2001



Source: *Employed Population. – Census 2001. GVA per employee, all sectors – Regional Accounts and ABI. Workplace based. Greater Belfast and Rest of NI highlighted in red.*

Our conclusion is that graduates, and in particular those working in the private sector, are almost as closely associated with GVA per employee as with average wages. This is not really surprising since many high value activities depend on labour skills, especially in the service sectors. Our view is that although this is a valuable observation, it is the relationship between graduates and wages that is the more important for a small, open, regional economy like Northern Ireland.

¹⁵ London also has a lower level of GVA per employee than expected from its percentage of graduates working in the private sector. As with Belfast this is likely to reflect the large size of its service sector and the relative lack of capital intensive activities.

Sectoral Influences

The aim of this section is to further investigate the relationship between private sector graduates and average wages or productivity. In particular we wish to know which specific sectors within the broader private sector have most influence on wages and productivity. We have investigated three major sectors within the private sector which in most regions account for 70% of private sector employment.

Manufacturing and Energy

The correlations between graduate percentages and median wages are shown in table 3 for each sector. The first obvious conclusion is that there is no correlation between graduates in manufacturing and energy and wages. This is because a large manufacturing sector is not associated with high wages or high productivity, and also because regions with larger manufacturing sectors tend to have fewer graduates in this sector. The result is that graduates in manufacturing comprise around 2% of employed people in all regions and hence are not correlated with regions of high or low wages.

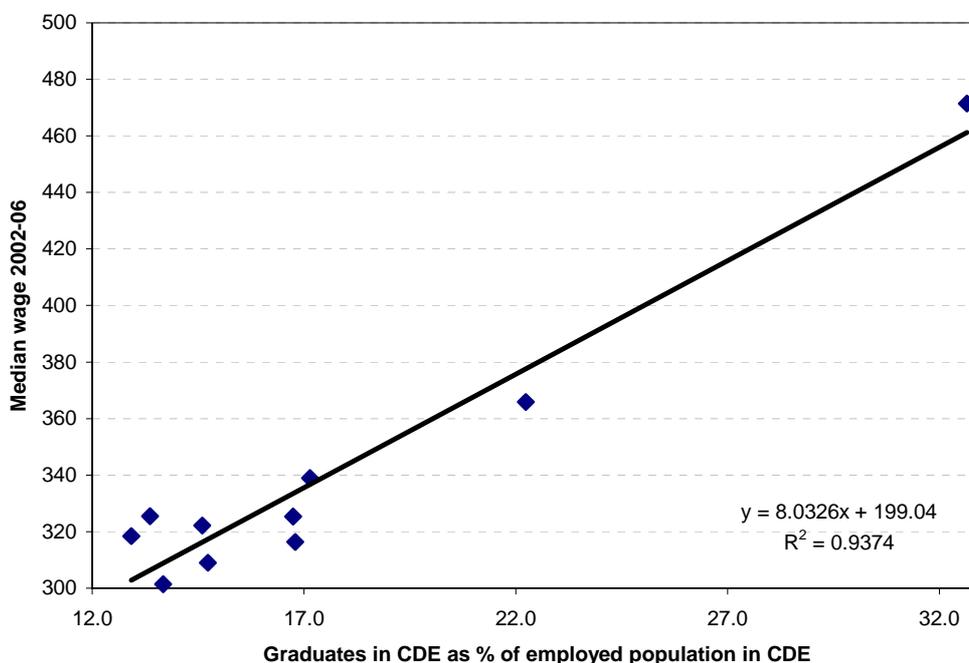
Table 3: Correlations between graduate percentage of employed population and median wages

Sector	SIC Code	Scale	Wage data	R Squared
Financial & Business Services	JK	Region	2001	0.92
Financial & Business Services	JK	Region	1998-06	0.94
Financial & Business Services	JK	Region	2002-06	0.94
Financial & Business Services	JK	Local Areas	2001	0.76
Financial & Business Services	JK	Local Areas	1998-06	0.77
Financial & Business Services	JK	Local Areas	2002-06	0.74
Manufacturing & Energy	CDE	Region	2002-06	0.02
Distribution & Hotels	GH	Region	2002-06	0.87

Sources: *Employment Census 2001 Workplace tables- graduates in each sector as a % of employed population in all sectors. Wages ASHE Workplace based.*

There is however a closer correlation between wages and the percentage of graduates within the manufacturing and energy sector. This is shown in Figure 17 below. The high correlation is heavily influenced by London where a third of those employed in this sector are graduates. Even excluding London there is a significant association.

Figure 15: Graduates in Manufacturing & Energy(as % of Employed Population in Manufacturing & Energy) and Median Wages for All Employees 2002-06



Sources: *Employed Population – Census 2001, workplace basis. Wages ASHE workplace basis.*

Distribution, Hotels and Restaurants

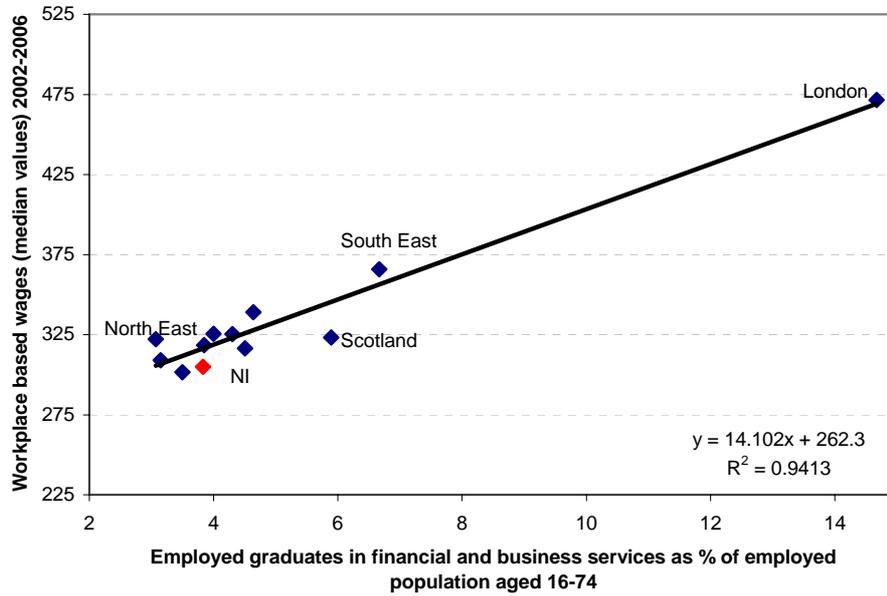
Table 3 shows that the percentage of graduates in distribution, hotels and restaurants is strongly and positively correlated with average wages for all employees. This is equally true if the graduates variable is expressed as the percentage of graduates *within* the sector (R squared 0.93). However both of these relationships have been estimated at a regional scale, and are thus heavily influenced by the extreme value of London. We would need data for this sector at local area level to test the association further, and this has not been obtained for this study.

Financial and Business Services

The financial and business services sector is particularly important due to its large size and rapid growth. It also employs three times as many graduates as manufacturing or distribution and hotels. We know from previous work that high employment in this sector is a major influence on high levels of GVA per employee and hence on all-sector wages.

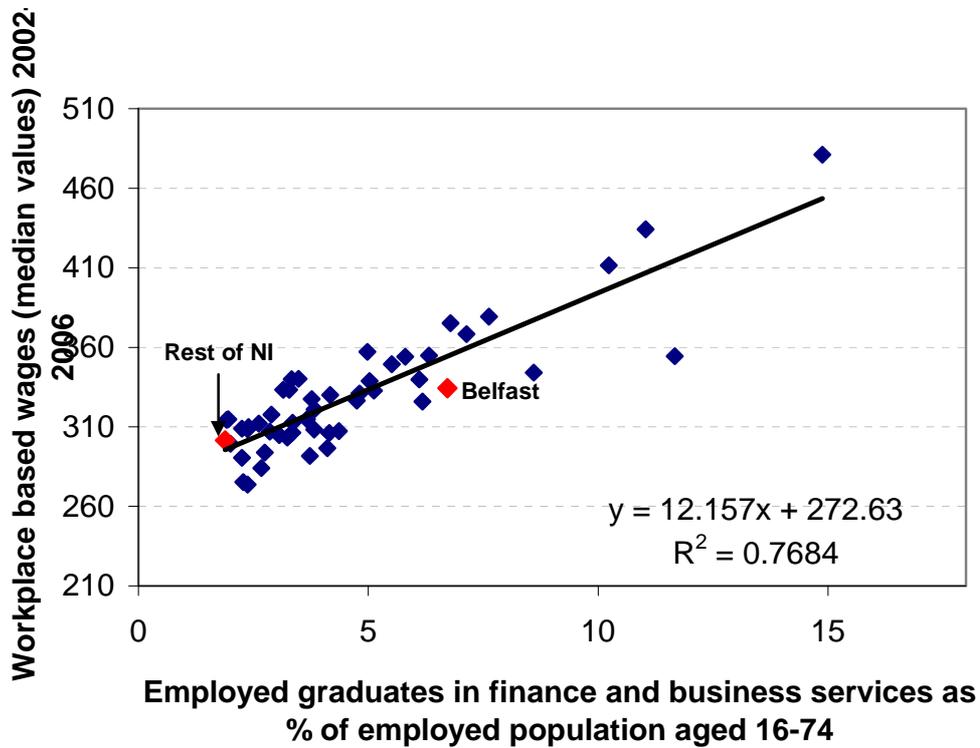
There is a strong correlation between graduates and wages in this sector at both regional and local scales, irrespective of the date of the wage data (Table 3). This is to be expected, given the association between the size of this sector and wages or productivity. The relationship is described in Figure 16 for the regional scale and Figure 17 for the local area scale. Figure 17 shows that Greater Belfast has an average percentage of graduates in this sector but the Rest of NI has a lower percentage than any other area of the UK.

Figure 16: Graduates in finance and business services as % of employed population 2001 and median wage 2002-2006 by region



Source: *Employment – Census 2001 Workplace basis. Wages – ASHE workplace basis*

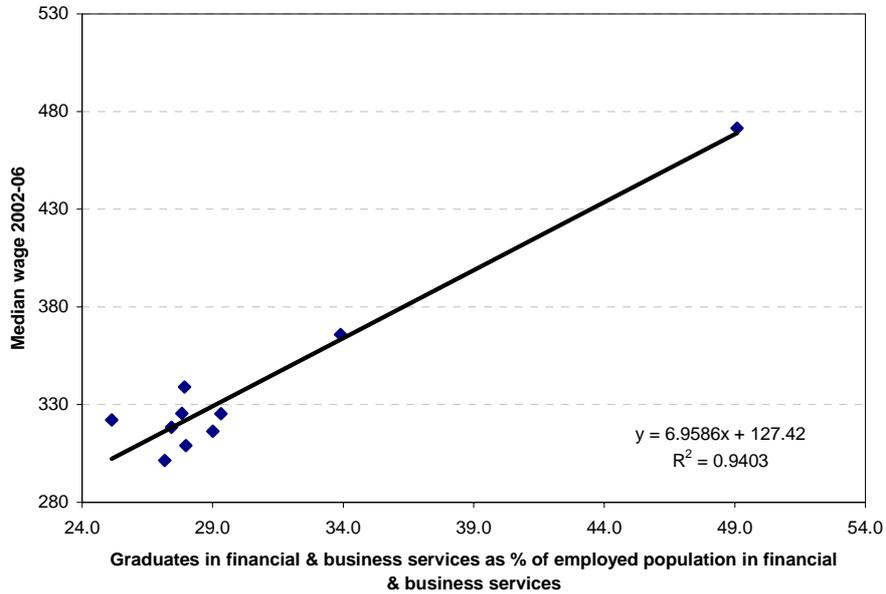
Figure 17: Graduates in finance and business services as % of employed population in 2001 and median wage 2002-06



Source: *Employment – Census 2001 Workplace basis. Wages – ASHE workplace basis*

Since the size of this sector is an important influence on wages and productivity, seemingly irrespective of the qualifications structure, we need to control for the size of sector to attempt to isolate the impact of graduates alone within the sector. This is done in Figure 18 in which the measure is graduates in the sector as a percentage of employed people within the same sector. This shows that the strength of the relationship is much the same as in the previous measure shown in Figure 16.

Figure 18: Graduates in finance & business services as a percentage of employed people in the same sector and median wage 2002-06 regions in England and Wales



Source: *Employed Population – Census 2001 England and Wales only. Wages ASHE. Both variables on a workplace basis*

Conclusion

Our conclusion is that graduates in the financial and business services sector have a strong positive association with wage levels. This is stronger than in the other private sectors we have examined here. However, the percentage of graduates *within* the sector is strongly correlated with wages for each of the three sectors, at least at the regional scale. This is partly because London and the South East have high proportions of graduates in every sector and also have high wages. This may suggest that graduates are always important whatever the private sector, but we need local area data for each sector to confirm this and at present have insufficient data to distinguish further between sectors. We can say however that the numbers of graduates in manufacturing and in distribution and hotels is much smaller than in financial and business services and hence less important in aggregate.

Direction of Causation

The analysis in the previous sections shows clearly that there is strong association between the share of graduates among employed people and the average wage and GVA per employee. This relationship holds strongly for the private sector but not for the public sector. Within the private sector, finance and business services are clearly important, but high wage regions (London and the South East) have high percentages of graduates in most of their sectors.

The important question is then the direction of causality. Does a high proportion of graduates lift wages for all employees and increase productivity. Alternatively the relationship could be the other way around with high wages increasing demand for sophisticated services that employ more graduates.

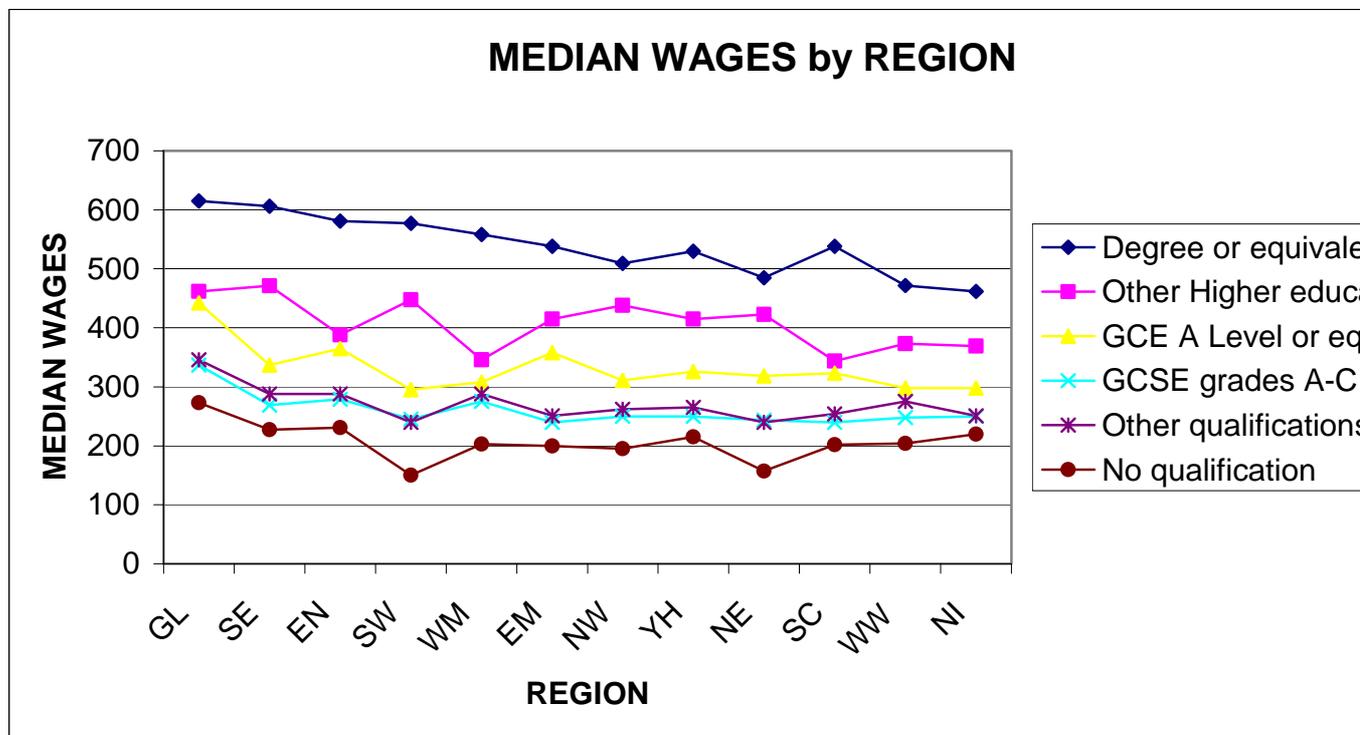
What we know is that the main concentrations of graduates in the private sector are in and around London. London, and the South East employ 42% of the UK's graduates in an area with only 28% of UK employment. This means that firms in London and the South East employ proportionately 50% more graduates than the UK as a whole. The average in other regions is 20% less than in the UK as a whole.

London provides the clearest example of high wages with which to attempt to disentangle cause and effect. London and some neighbouring counties have high wages across a wide range of sectors and also high property prices. This situation arose historically due to concentrations of high incomes and financial and political power in the capital with associated demand for many sophisticated goods and services. Competition for land and labour led to low value-added activities being displaced by high value-added trades. Ship-building and textiles were displaced quite early in London's economic history. More recently manufacturing industry has largely been displaced by the expanding financial and business services sectors. The latter are highly competitive internationally, and recruit large numbers of graduates to maintain and develop that competitiveness, paying high salaries both to attract graduates from across the UK and the wider world, and also to compensate for high prices of property, travel and other services in the region. High costs of living also mean that non-graduates require higher wages to achieve equivalent living standards to those who live in cheaper regions.

In this 'London effect', graduates maintain high value-added activity in firms and help to raise the wages of non-graduates (some of whom may be highly skilled in their own right in specialist trades like jewellery, printing and the theatre). Cause and effect are complex and intertwined. However it is clear that the graduates are necessary to maintain the competitiveness of the London economy. Graduates are recruited from a wide range of locations and often paid very highly to move to London.

We might characterise the causes of high wages in London as being driven by the presence of highly competitive firms which rely on graduate labour and which drive up wages for non-graduates in the same and other firms through raising efficiency, and through higher costs of living. The process is less clear in other regions partly because there is less variation in wages. Figure 19 shows that wages tend to be similar across regions outside the South East for most occupations, although there is a more consistent decline outwards from London in graduate wages.

Figure 19: Median Wages 2006



Source: LFS
 GL is Greater London; SE is South East; EN is East of England; WM and EM are the east and west Midlands respectively; NW is the North West; YH is Yorkshire Humberside; NE is the North East; WW is Wales; SC is Scotland and NI is Northern Ireland.

The London example points to high graduate percentages of employees being a cause of high wages, rather than vice versa, but we will list the range of possible links between graduates and high wages for completeness. In our view, the main potential links can be summarised as follows:

1. Wages are high where graduates are numerous because graduates are generally well paid and hence their pay increases the average wage where they are concentrated
2. If wages and incomes are high for any reason, demand for sophisticated services is likely to be high and these services are likely to employ more graduates. These graduates are likely to be in the private sector since employment in public services is unlikely to be positively correlated with high incomes
3. Graduates are employed in large numbers by firms which aspire to high efficiency and to the generation of innovative and high value products and services. These firms are able to pay non-graduates relatively well. Graduates also form new businesses with relatively high value –added and wages. Non-graduate wages are also higher to compensate for living costs which are driven upwards by the presence of competitive firms.

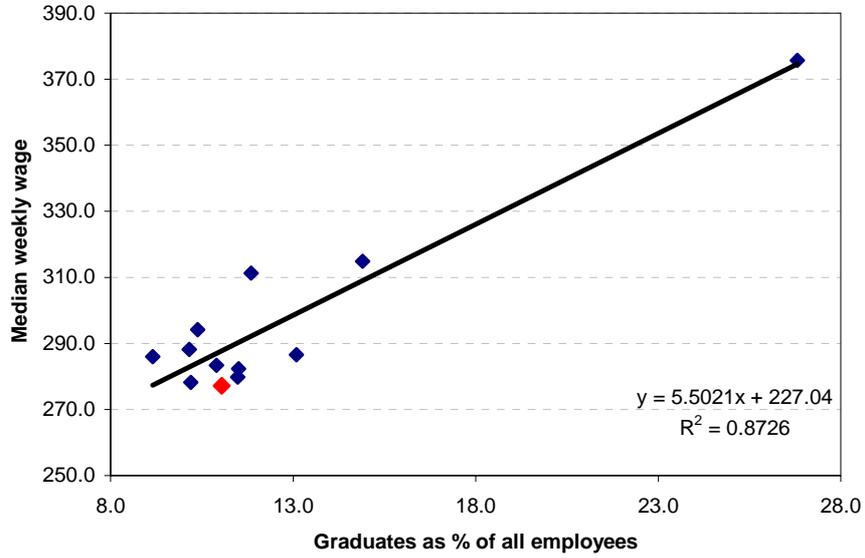
If we take the possible causal interpretations listed above in turn, we can conclude the following:

1. Graduates are paid on average around 65% more than non-graduates across the UK. Hence areas with high concentrations of graduates are bound to have higher average wages (unless high concentrations of graduates were to depress non-graduate wages, which is not likely). A simple calculation suggests that graduate wages are themselves responsible for around one fifth of the observed increase in median wages associated with higher percentages of graduates working in the private sector. Graduate wages are thus a factor in higher average wages for all employees, but a minor one. If it were an important factor we would observe high average wages in areas where public sector graduates are concentrated, but this is not the case.
2. High productivity and associated high wages can be achieved through high non-graduate skills, including manual skills, where these are applied in well managed firms¹⁶. This occurs within the UK in a number of areas, especially those with large competitive manufacturing firms often in engineering. The areas with the largest positive residuals from the regression of median wages on the percentage of graduates working in the private sector are Durham, Essex (electronics), Kent, (pharmaceuticals), Northamptonshire and the West Midlands Black Country (car components). Each of these areas has higher wages than expected on the basis of their graduate percentages. Other centres of skilled engineering also have positive residuals. Each has concentrations of manufacturing skills. These include Birmingham, Coventry, Cambridgeshire (including Peterborough with its large diesel engine plant) and Derbyshire (including Rolls Royce), South Yorkshire and Humberside (steel firms) and Lincolnshire. Skills in these areas are an additional factor in raising wages. There is little evidence that they account for the main graduate-wages relationship through raising demand for graduate-intensive services.
3. The example of London is likely to be applicable to other areas. For London we conclude that competitive firms are developed mainly by graduates, especially in finance and a wide range of legal, accountancy, marketing and other business services and employ a large numbers of graduates. The graduates themselves are well paid. Non-graduate pay is higher in competitive firms (which compete to recruit the most able people). Competition for labour and space raises costs which are then reflected in higher wages for non-graduates.

While London is something of a special case due to its size, including additional pressures on space and the need for long commuting journeys, similar processes are likely to be at work throughout the UK. Figure 19 above shows that graduates are well paid in all regions and Figure 20 below shows that non-graduate pay tends to be higher where the percentage of graduates working in the private sector is high. On average, wages for non-graduates are £5 per week (2%) higher for each additional percentage point of graduates among the employed population.

¹⁶ Good labour skills and well educated labour forces did not lead to high productivity or high wages in the old Soviet bloc due to a lack of competition and the efficiency and innovation which competition engenders. East European skills are now valued in the UK where they are remunerated at much higher rates than in Eastern Europe.

Figure 20: Non-graduate wages 2006 and the percentage of graduates among the employed population 2001



Source: Employment – Census 2001. Wages LFS 2006. NI highlighted in red

Note: This relationship is highly statistically significant (t value on slope coefficient=8). It remains significant (t=2.2) if London is excluded.

Conclusions and Policy Recommendations

This study has confirmed that a strong association exists across UK regions and local areas between the percentage of graduates working in the private sector and the average wages of all employees. A similar relationship exists between graduates and productivity, but no such associations exist for graduates working in the public sector. A large amount of data has been collected, and analyses conducted, to ensure that the variables are measured correctly and consistently, and as far as possible that the relationships remain unchanged over time. As a result we are confident that the conclusions of this study are robust.

Our conclusion is also that the relationship is largely causal, in the sense that concentrations of graduates in a local economy lead to higher productivity and higher wages for all employees and not just for the graduates themselves. This is not to argue that the production of more graduates from higher education institutions will lead automatically to higher wages and productivity. We know that is not so. The high number of graduates produced by the Northern Ireland education system merely leads to an outflow of undergraduates and graduates to other areas where appropriate jobs are available. Given the high mobility of graduates, it is the demand for graduate skills, that is to say the availability of appropriate jobs, that is always most likely to determine where graduates become concentrated.

The important factor is the number of private sector firms employing large proportions of graduates. These will be firms with high value products and services, many involved in change and innovation. These are very much the type of firm that any economic development organisation would wish to attract or develop within its area. What the analyses in this study do is to quantify the advantages of increasing the local representation of such firms. **The research concludes that a 10 percentage point increase in the percentage of graduates in the private sector would usually be associated with a 25% increase in wages or productivity. This would be sufficient to raise wages and productivity in Northern Ireland to the level of South East England and make Northern Ireland one of the most prosperous regions in the UK.**

The key policy question is how to achieve an increase of private sector graduates of this magnitude. We have argued that it is not possible to do so merely by increasing the supply of graduates. Increased supply may have some influence, and it is notable that among employees aged 25-35 Northern Ireland already has a proportion of graduates close to the UK average. However it also seems likely that a significant number of these are under-employed, earning sub-graduate wages in contact centres which have expanded rapidly over recent years. Northern Ireland has the lowest wages of any UK region for employees in contact centres. This may partly account for the fact that Greater Belfast emerged from the analyses in this study as having lower wages than expected on the basis of its percentage of graduates.

The key task is to attract graduate employing businesses to Northern Ireland, paying attractive wages, and to assist existing business to expand their output of goods and services that rely on graduate skills. The Republic of Ireland has had considerable success in this direction through its policy of very low corporation tax which attracts high value-added businesses. InvestNI has also had some recent success in attracting service sector businesses with high graduate employment, most recently as a spin-off from the Republic of Ireland where graduate skills are now in short supply.

We believe that economic development policy in Northern Ireland needs to go much further and to reorient itself around the task of attracting and developing businesses with high graduate

employment potential. Wider policy should also support this aim. Oxford Economics would like to engage in a debate with DEL in respect of expanding the size of NI's HE sector to attract students from elsewhere. Although current DEL policy is to limit the size of the HE sector to match demand for places (which happens to be largely local demand), there is a wider argument based on economic development rather than local educational need. Regions with a concentration of HE institutions tend to have stronger economies, especially when these institutions are world class. A strong HE sector has multiple advantages for economic development. These include links with local employers, and attractions for inward investors, but also a range of social and cultural influences which tend to make cities attractive both for graduates to live in and for employers to seek and retain graduate employees. It is Oxford Economics' view that a new university set up specifically to deliver practical subjects of economic value and with strong links to high productivity business sectors would send out a strong signal of NI's ambitions in this respect

These points are not to say that the development of non-graduate skills is unimportant. As we argue in the report, we agree with the OECD's conclusion that intermediate skills and education are under-developed across the UK. However the analyses in this report suggests that local areas do not usually increase their wage levels by more than about a maximum of 5% without any change in the proportion of graduates in the local private sector. The presence of highly competitive engineering firms, such as Roll Royce at Derby, can raise local wages but only by amounts of this magnitude. Of course greater numbers of such firms would have a bigger impact, and the German economy, with its comprehensive apprentice training system, shows how this can be achieved. However, no part of the UK, or the Republic of Ireland, has succeeded in developing a system involving the state and private companies along German lines. The UK has had much more success in harnessing graduate skills in service sector activities, particularly in financial and business services, and this seems a more promising route for regions like Northern Ireland.

Annex A: Graduates and average wages for local areas

Sources: Graduate percentage – derived from census 2001 workplace tables for those in employment. Median wages – median weekly wage from ASHE 2002-6 (average of 5 years)

LESS URBAN AND Rural areas	Graduates as % of those in employment 2001	Median workplace Wages average for 2002-2006
"Bedfordshire and Luton"	20.6	330.0
"Berkshire"	30.9	434.3
"Cambridgeshire"	26.1	368.4
"Cheshire and Warrington"	23.3	339.8
"County Durham"	18.4	314.3
"Cumbria"	19.4	309.9
"Derbyshire"	19.4	340.0
"Devon and Cornwall"	18.7	284.1
"Essex"	17.2	333.4
"Gloucestershire"	24.3	349.3
"Hampshire and the Isle of Wight"	22.8	354.1
"Herefordshire and Worcestershire"	19.7	291.8
"Hertfordshire"	25.4	375.1
"Humberside"	16.9	314.7
"Kent and Medway"	18.1	333.3
"Lancashire"	19.7	317.6
"Lincolnshire and Rutland"	16.1	299.4
"Milton Keynes, Oxfordshire and Buckinghamshire"	27.3	379.3
"Norfolk"	17.1	306.3
"North Yorkshire"	21.5	306.1
"Northamptonshire"	18.0	340.1
"Northumberland"	19.0	273.7
"RC 1 North Wales"	20.3	308.5
"RC 2 Mid Wales"	20.2	290.5
"Shropshire"	18.7	303.3
"Somerset"	18.9	306.9
"Suffolk"	18.3	304.8
"Surrey"	29.0	411.5
"Sussex"	22.5	331.0
"Wiltshire and Swindon"	21.4	338.8
"RC 3 South West Wales"	21.9	275.3
Rest of NI	18.0	301.4

URBAN AREAS	Graduates as % of those in employment 2001	Median workplace Wages average for 2002-2006
"Birmingham and Solihull"	24.8	354.8
"Bournemouth, Dorset and Poole"	19.9	296.7
"Coventry and Warwickshire"	23.4	357.1
"Greater Manchester"	22.6	332.8
"Greater Merseyside"	22.3	314.7
"Leicestershire"	20.5	327.5
"Nottinghamshire"	21.8	307.3
"RC 4 South East Wales"	23.0	321.0
"South Yorkshire"	19.4	312.7
"Staffordshire"	17.3	312.0
"Tees Valley"	19.4	293.8
"The Black Country"	16.1	308.9
"Tyne and Wear"	21.2	308.2
"West Yorkshire"	21.5	326.5
LONDON	38.1	481.0
Greater Belfast	26.9	334.4
Greater Glasgow	25.3	325.8
Greater Edinburgh	32.2	354.4
"West of England"	28.9	344.2

Annex B Graduates Working in the Private Sector

	Private Sector Graduates as % of those in employment 2001	Median workplace Wages average for 2002-2006	Median workplace Wages average for 2002-2006	Median workplace Wages average for 2002-2006
"Bedfordshire and Luton"	11.6	320.7	330.0	308.4
"Berkshire"	22.7	405.3	434.3	404.1
"Birmingham and Solihull"	13.5	336.5	354.8	337.4
"Bournemouth, Dorset and Poole"	10.3	278.7	296.7	265.5
"Cambridgeshire"	15.0	340.8	368.4	327.0
"Cheshire and Warrington"	15.0	320.4	339.8	321.7
"County Durham"	7.8	303.2	314.3	306.0
"Coventry and Warwickshire"	14.2	329.0	357.1	322.5
"Cumbria"	10.3	287.1	309.9	276.6
"Derbyshire"	11.0	312.4	340.0	287.9
"Devon and Cornwall"	8.6	262.7	284.1	252.3
"Essex"	9.2	314.6	333.4	309.1
"Gloucestershire"	14.2	327.9	349.3	320.2
"Greater Manchester"	12.3	312.2	332.8	297.7
"Greater Merseyside"	9.4	294.5	314.7	284.5
"Hampshire and the Isle of Wight"	13.2	330.3	354.1	325.6
"Herefordshire and Worcestershire"	10.7	279.5	291.8	272.8
"Hertfordshire"	16.6	356.5	375.1	355.2
"Humberside"	7.9	296.9	314.7	287.8
"Kent and Medway"	9.1	312.9	333.3	306.0
"Lancashire"	9.7	297.0	317.6	279.1
"Leicestershire"	11.2	304.8	327.5	293.3
"Lincolnshire and Rutland"	7.3	279.8	299.4	270.5
"Milton Keynes, Oxfordshire and Buckinghamshire"	16.6	357.3	379.3	346.8
"Norfolk"	8.3	291.9	306.3	288.1
"North Yorkshire"	11.2	285.3	306.1	277.3
"Northamptonshire"	10.2	320.3	340.1	316.5
"Northumberland"	8.8	255.6	273.7	238.7
"Nottinghamshire"	11.1	289.2	307.3	280.7
"RC 1 North Wales"	9.7	289.3	308.5	281.8
"RC 2 Mid Wales"	9.1	270.1	290.5	252.4
"RC 4 South East Wales"	10.9	302.9	321.0	289.0
"Shropshire"	9.6	283.1	303.3	270.5
"Somerset"	9.6	285.8	306.9	268.7

	Private Sector Graduates as % of those in employment 2001	Median workplace Wages average for 2002-2006	Median workplace Wages average for 2002-2006	Median workplace Wages average for 2002-2006
"South Yorkshire"	8.6	291.1	312.7	278.5
"Staffordshire"	8.7	293.0	312.0	281.6
"Suffolk"	10.3	283.7	304.8	281.3
"Surrey"	19.6	381.8	411.5	374.3
"Sussex"	12.5	311.9	331.0	304.5
"Tees Valley"	8.9	278.0	293.8	276.0
"The Black Country"	7.8	293.5	308.9	284.9
"Tyne and Wear"	9.9	290.2	308.2	283.4
"West of England"	16.1	322.0	344.2	305.9
"West Yorkshire"	11.5	304.7	326.5	293.2
"Wiltshire and Swindon"	12.9	317.0	338.8	312.5
LONDON	26.9	444.6	481.0	426.8
"RC 3 South West Wales"	9.5	259.6	275.3	251.5
Greater Belfast	14.1	314.9	334.4	305.0
Rest of NI	8.5	274.7	301.4	250.0
Greater Glasgow	13.0	307.0	325.8	298.3
Greater Edinburgh	19.7	330.6	354.4	329.3

Annex B: List of counties/unitary authorities

Bedfordshire and Luton
Berkshire
Birmingham and Solihull
Bournemouth, Dorset and Poole
Cambridgeshire
Cheshire and Warrington
County Durham
Coventry and Warwickshire
Cumbria
Derbyshire
Devon and Cornwall
Essex
Gloucestershire
Greater Belfast
Greater Edinburgh
Greater Glasgow
Greater Manchester
Greater Merseyside
Hampshire and the Isle of Wight
Herefordshire and Worcestershire
Hertfordshire
Humberside
Kent and Medway
Lancashire
Leicestershire
Lincolnshire and Rutland
London
Milton Keynes, Oxfordshire and Buckinghamshire
Norfolk
North Yorkshire
Northamptonshire
Northumberland
Nottinghamshire
RC 1 North Wales
RC 2 Mid Wales
RC 3 South West Wales
RC 4 South East Wales
Rest of Northern Ireland
Rest of Scotland
Shropshire
Somerset
South Yorkshire
Staffordshire
Suffolk
Surrey
Sussex
Tees Valley
The Black Country
Tyne and Wear
West of England

West Yorkshire
Wiltshire and Swindon

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