

The economic impact of Cardiff University

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Summary of Overall Economic Impact Results

Impact of Cardiff University on the UK and Wales

- Total revenue of the University was £455.7million
- International revenue amounted to £92.3 million which, together with the estimated off-campus expenditure of international students (£75.8 million) represented a total of £168.1 million of export earnings.
- The University provided 5319 fulltime equivalent jobs across a range of occupations and skill levels.
- 6091 full time equivalent jobs were generated outside the universities, with most (4741) based in Wales.
- The University's own output was £455.7 million. Through knock-on effects it generated an additional £ 613 million in other industries throughout the UK, with the majority (£458million) in Wales.
- The University attracted 6605 students from outside the UK to study in Wales.
- Non-EU students' personal off-campus expenditure (£62.4 million) generated £93.6 million of output and 792 full time equivalent jobs throughout the UK (£70 million of output and 587 jobs in Wales.)
- The personal off-campus expenditure of students from the rest of the EU (£13.4 million) generated £20.1 million of output and 170 full time equivalent jobs throughout the UK (£15 million of output and 126 jobs in Wales.)
- The University also attracted 12045 students from other parts of the UK (outside Wales) to study .
- The personal off-campus expenditure of students from the rest of the UK (£135.9 million) generated £152.6 million of output and 1279 fulltime equivalent jobs in Wales.
- The personal off-campus expenditure of the 11,535 students from Wales (£138.5 million) also had an impact on the economy, generating £155.5 million of output and creating 1303 full time equivalent jobs in Wales.
- Overall the university, together with the expenditure of its international students and students from the rest of the UK, generated 13,355 jobs in Wales. This was equivalent to nearly 1% of all 2013 Welsh employment. ¹
- The University alone generated £518 million of Wales GVA (direct plus secondary.)
- The total combined impact on Wales GVA of the University and its students came to £696 million. This was equivalent to 1.34% of all 2013 Wales GVA.² (Total Wales GVA in 2013 was £52.07 billion (StatsWales2014.)

¹ Total Welsh Workplace employment in 2013 stood at 1,350,800 (StatsWales 2014)

² Total Wales GVA in 2013 was £52.07 billion (StatsWales2014.)

The local economic impact of the University on Cardiff

- The University's economic impact was strongest in its immediate host City of Cardiff. However impact was felt across Wales.
- The University and its students generated £883.6 million of output and 9360 fulltime equivalent jobs in Cardiff– equivalent to around 4.1% of all Cardiff jobs.³
- The University alone directly generated £298 million of GVA in 2013/14, equivalent to 2.7% of 2013 Cardiff and Vale of Glamorgan GVA.⁴
- The total combined impact on Wales GVA of the University and its students came to £696 million.
- Overall the University and its students generated £696 million of Regional GVA. This was equivalent to 1.34% of all 2013 Wales GVA.⁵ Around £498 million of this can be attributed to university activity in Cardiff, with the remaining £198 million generated through knock-on effects on other parts of Wales.

- Total Output generated (£m)

	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	455.7	230.5	197.4	883.6
Rest of Wales	0	227.8	195.8	423.6
Total	455.7	458.3	393.2	1307.2

- Jobs Generated (FTE)

	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	5319	2386	1655	9360
Rest of Wales	0	2355	1640	3995
Total	5319	4741	3295	13355

³ Cardiff 2013 workplace employment was 227,800 (StatsWales 2014)

⁴ Total 2013 Cardiff & Vale of Glamorgan GVA amounted to £11.01 billion (StatsWales2014)

⁵ Total Wales GVA in 2013 was £52.07 billion (StatsWales2014.)

- Contribution to Regional GVA (£m)

GVA	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	298	110.9	89.2	498.1
Rest of Wales	0	109.5	88.4	197.9
Total	298	220.4	177.6	696

Table Totals may not sum exactly due to rounding

Section One. Introduction and Overview

1.1 This project was undertaken during winter 2014/15 for Cardiff University. The project analysed the University's economic impact on Wales and on the rest of the UK in terms of jobs and output generated and contribution to Welsh GVA. It went further to analyse the distribution of University impact across Wales. The study focusses on the academic and financial year 2013/14, which is the most recent year for which key data were available.

1.2 The project report is structured as follows:

- **Section One** gives the introduction and background to the study.
- **Section Two** presents an analysis of the University's impact on Wales and on the rest of the UK as a major enterprise in itself, generating employment and contributing to Welsh and UK GDP.
- **Section Three** presents analysis of the distribution of University impact across Wales. Using a gravity-modelling approach, analysis was undertaken to show the flow of University impact across Wales, from its immediate host city of Cardiff to other parts of Wales.
- **Section Four** draws reflections and conclusions from the findings.

Section Two: The economic impact of Cardiff University on Wales and the rest of the UK

Cardiff University in Context

Cardiff University is situated in Cardiff, the capital city of Wales. It has two campuses, the main Cathays campus in the heart of the city and the second Heath Park Campus to the North which is also home to the University Hospital Wales. The University's origins go back to the 1880s and it was granted a Royal Charter as the University College of South Wales and Monmouthshire in 1884. It was one of the founding institutions of the University of Wales but formally became a separate University awarding Cardiff University, rather than University of Wales, degrees in 2005. Today it is the largest University in Wales, with around 22% of all the Welsh University student population studying at Cardiff. Its annual income makes up one third of all the Welsh University sector income and it also employs one third of all University staff in Wales.

Cardiff is a leading UK University with an extensive educational and research portfolio. It hosts 26 academic schools across 3 Colleges of Arts, Humanities and Social Sciences, Biomedical and Life Sciences, Physical Sciences and Engineering. The University's strategy (*The Way Forward 2012-2017*) emphasises creativity and innovation in research and education as well as the importance of extending the global presence of the University through internationalisation of the university experience. 22% of its students come from abroad and the University is committed to increasing the international mobility and cultural awareness of its domestic students, with a target for 2017 of 17% of all Cardiff domestic students spending at least 1 month working, studying or volunteering abroad as part of their university career. The University also has a commitment to wider engagement and knowledge exchange with the surrounding business and civic communities, aiming to ensure that Cardiff is embedded in the civic, cultural and business life of Wales.

In this study, major economic characteristics of the University are examined, including its revenue, expenditure and employment. The study also includes modelled analysis of the economic activity generated in other sectors of the economy through the secondary or 'knock-on' effects of the expenditure of the University and its staff as well as the impact generated by the off-campus expenditure of its students. The model used for UK and regional analysis was the most recent version of the *Universities UK economic impact modelling system*.⁶, which was updated and revised

⁶ The Universities UK economic impact modelling system is a purpose-built system, designed for higher education institutions. The current version was revised and updated by Viewforth Consulting in Spring 2013 as part of a project for Universities UK.

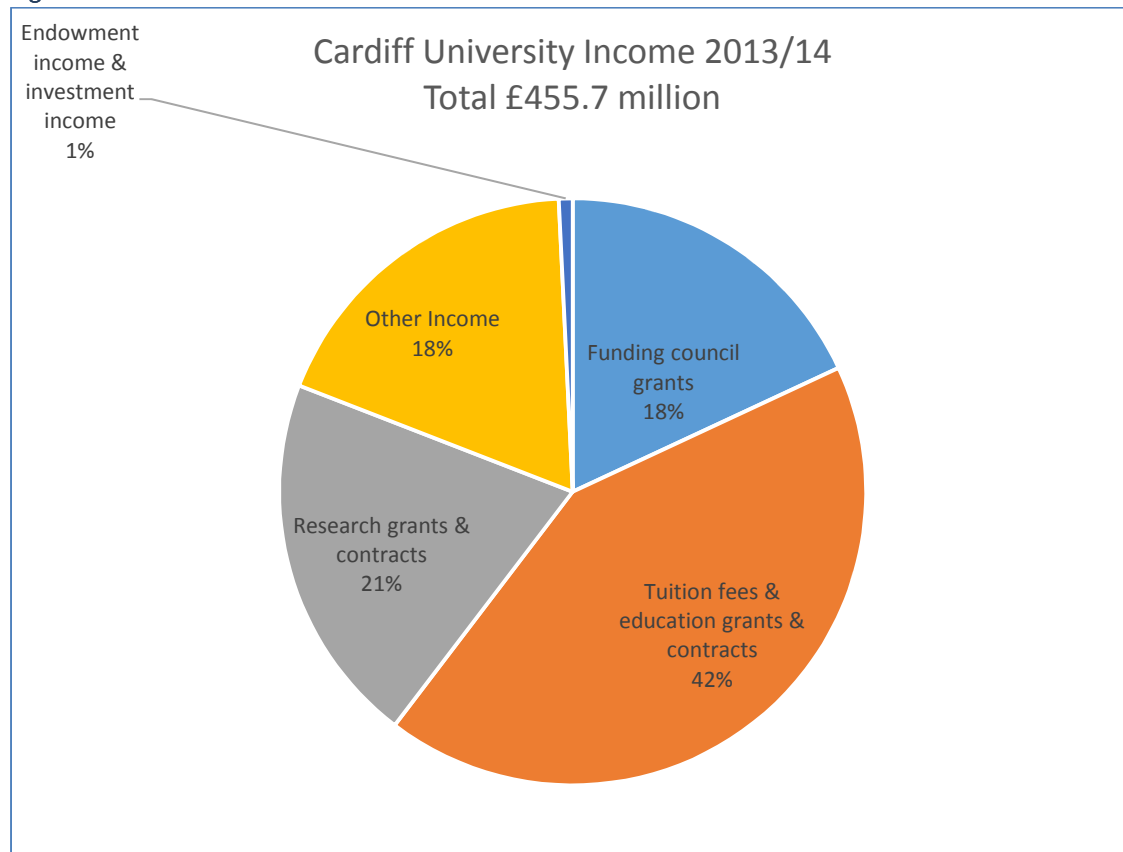
by Viewforth Consulting in Spring 2013. Additional modelling was then undertaken using a ‘gravity modelling’ approach to assess the pattern and distribution of University impact across Wales, radiating out from Cardiff. A description of the methodology and data sources used is included as Appendix One. Overall this study presents an up-to-date examination of the quantifiable contribution of the Cardiff University to the Welsh economy, as well as its impact on the rest of the UK.

Key University characteristics

Revenue

- The University had total revenue of £ 455.7 million in the study year of 2013/14.. This was earned for a wide range of educational and related services. This is shown in Figure 1.

Figure 1: Institutional Revenue



Source: Cardiff University

- The largest part of institutional revenue (81 %) was earned for delivering teaching and research (Funding Council grants, Tuition Fees and Research Income.) This came from a range of sources, individual student fee payments and research contracts with private and

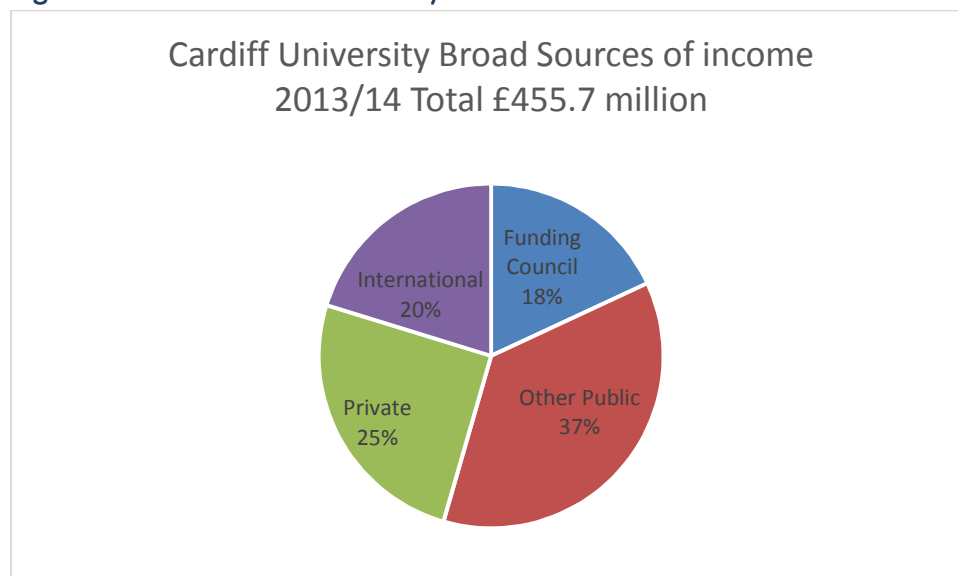
international clients as well as from the public sector. In addition to money for teaching and research the University also earns 18 % of its income from other services including, for example, consultancy services, the provision of residence and catering services, conference support or facilities hire. Income from endowments and investments (frequently these come from charitable or philanthropic donations) stands at 1% - this appears relatively modest but is typical of UK Universities, few of which have endowment income more than 1% of total income. Among the University's strategic aims for the future is to strengthen the research base through attracting more research funding. It is worth highlighting that, in line with its goal, the University's research income increased by 6% in the one year between 2012/13 and 2013/14.

- Around 55% of university revenue in the study year was estimated as being derived from public sector sources. 18% of the University's income came directly from the Higher Education Funding Council for Wales (HEFCW) . 'Other' public sector income , which includes the Welsh Government additional Tuition Fee Grant for students (administered through the Student Loans Company)⁷, makes up an estimated 37% of total university income. 'Other ' public sector income also includes Research Council funding, any tuition fees paid by public sector agencies , or research and consultancy contracts with public sector bodies – much of which is won in competition with other bodies such as consultancy firms.) 25% of university revenue comes from the UK private sector and 20% from international sources. Private revenue includes individual student fee payments (whether made directly by individuals or through tuition fee loans via the Student Loans Company), payments for other services such as residence and catering, consultancy or research contracts with private firms. International revenue (estimated as amounting to £92.3 million) includes overseas student fees (£56.7 million) as well as residence and conference income and research and consultancy contracts with international agencies. At 20% of total income, the University's international revenue is relatively high compared to other Welsh Universities. (The most recently observed average for the Welsh HE sector was 17%. ⁸) This reflects one of the University's distinctive features, which is its emphasis on international engagement and building extensive international networks.

⁷ Estimates of the amount of Welsh Government Tuition Fee Grant were made based on HEFCW resource allocation information.

⁸ The economic impact of Higher Education in Wales 2013 (Kelly et al). This was based on the 2011/12 year. Since that date changes in tuition fee arrangements for domestic students (including Welsh Government Funding support for individual Welsh students) will have altered the balance between Funding Council/Other Public and private sources of income. However international sources are unlikely to have changed.)

Figure 2. Institutional Revenue by Broad Source ⁹



Source: Derived from analysis of Cardiff University Finance Data and HEFCW Funding Allocations

Export earnings

- The University's international revenue of £92.3 million together with the estimated off-campus expenditure of international students (£75.8 million) represents a total of £168.1 million of export earnings. This is an important contribution to the UK balance of trade.

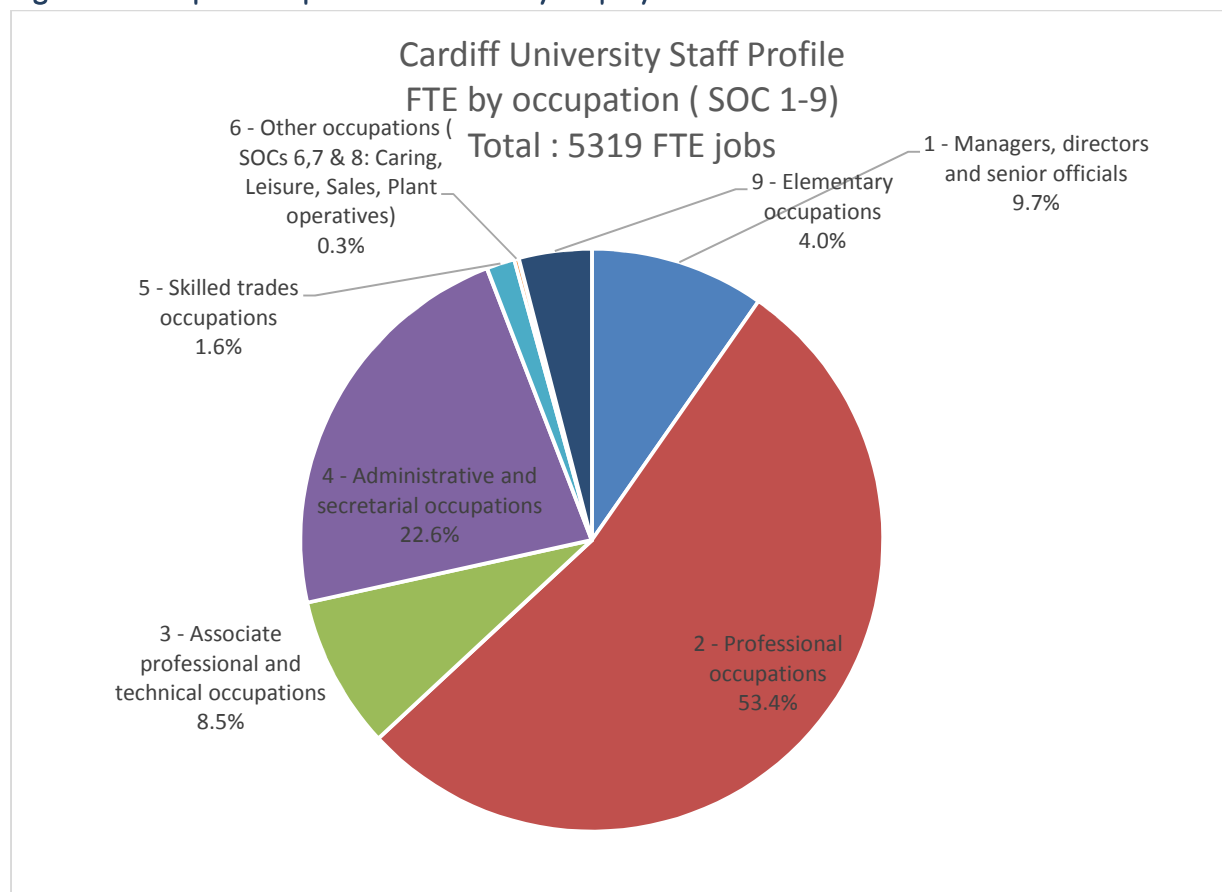
Employment

- The University directly provided 5319 full-time equivalent jobs in 2013/14 . The occupational profile (by standard occupational classification) is shown in Figure 3. Just over 53% of jobs were in 'professional' (mostly academic) occupations (SOC 2) , with a further 40% in other 'white collar' occupations including, Management , Associate Professional and Administration (SOCs 1,3 and 4) . However the University also provided 6% of its employment in other occupations, reflecting the need to manage its estate, which includes lecture halls, laboratories, offices as well as halls of residence, cafeteria and related facilities for students such as sports facilities. 5319 FTE jobs was equivalent to 2.3% of all 2013 Cardiff workplace jobs.¹⁰

⁹ In this analysis, based on HESA Finance Plus information, tuition fees paid through the Student Loans Company are classed as 'private' as the payments are made on behalf of specific private individuals who are then responsible for repayment to the SLC.

¹⁰ Source: StatsWales (2014) All Cardiff Workplace employment in 2013 amounted to 227,800 jobs.

Figure 3: Occupational profile of University employment



Source: Cardiff University & HESA Staff data 2013-2014

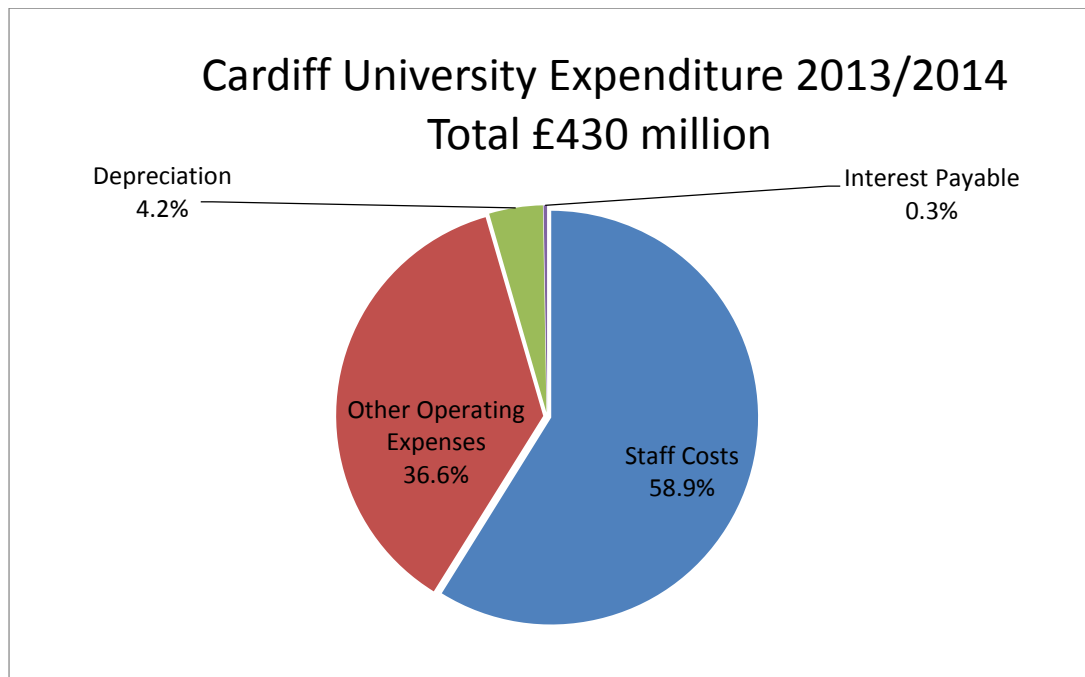
The University has an Academic to Support Staff balance of 48% academic and 52% support staff, which has a slightly greater emphasis on academic staff compared to the Welsh and UK averages. The average 2013/14 staffing balance for the Welsh University sector overall was 45% academic to 55% other staff and for the UK was 47% academic to 53% other staff.¹¹

Expenditure

- University expenditure, together with the expenditure of university staff and students generates economic activity through secondary or 'knock-on' effects.
- In 2012/13 the University had a total expenditure (including staff salaries) of £430 million.

¹¹ Source: HESA Staff in Higher Education 2013/14

Figure 4: University Expenditure



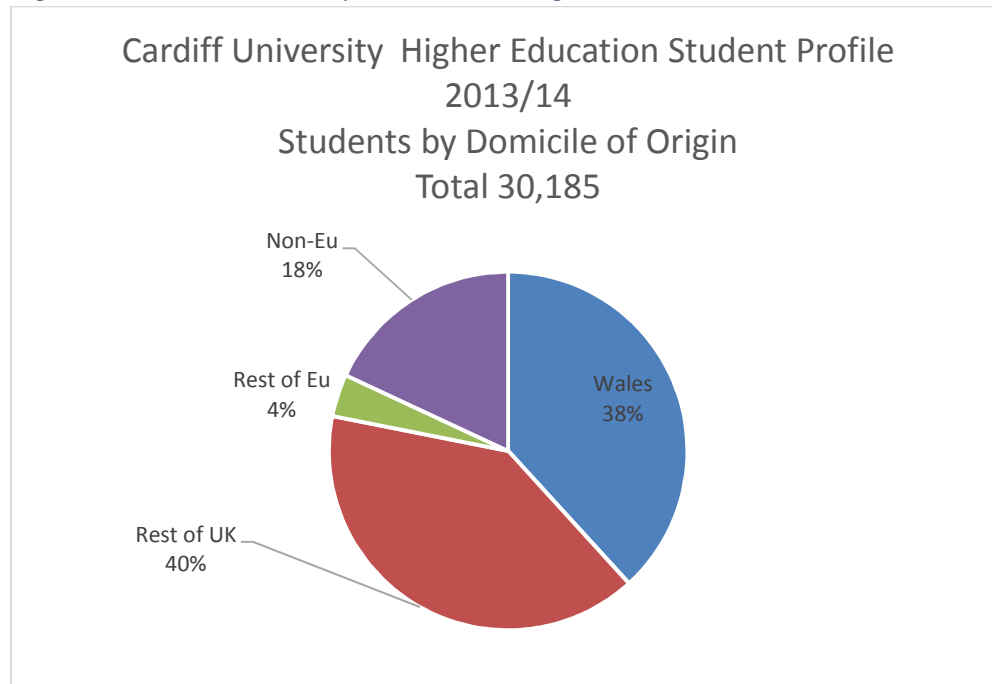
Source: Cardiff University

Students at Cardiff University

- There was a total (headcount) population of higher education students (degree-seeking) of 30,185 in 2013/14.¹²
- The University attracted 6605 students from outside the UK. This included 1155 students from other parts of the EU (outside the UK) and 5450 students from further afield outside the EU. As well as paying fees to the university, international students spend money on rent, food and other living expenses, much of which accrues to the local area. International student off-campus personal expenditure (both EU and non-EU students together) amounted to an estimated £75.8 million.

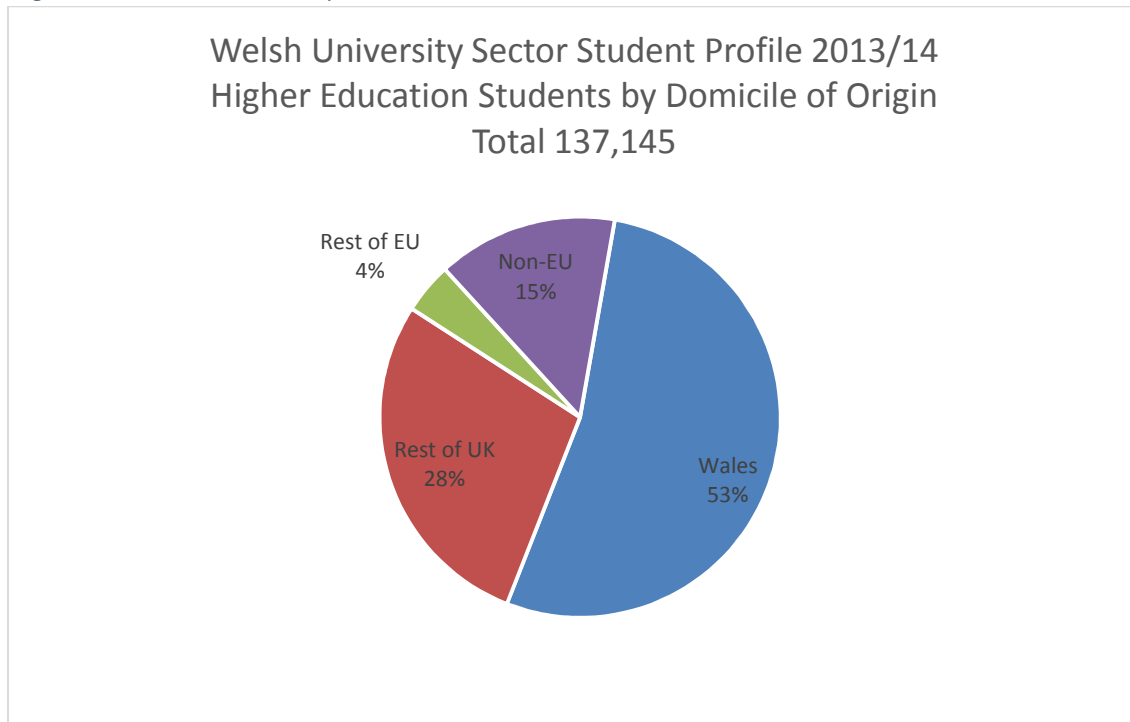
¹² Student data is taken from HESA Students in Higher Education 2013/14

Figure 5: Student Profile by Domicile of Origin



- In addition, the University attracted 12045 students from other parts of the UK who spent an estimated £136 million on living and personal expenses. The expenditure of domestic students from outside Wales can be regarded as an injection into the Welsh economy.
- The University also enrolled 11535 students from Wales. While the expenditure of Welsh students is not additional to the country, the University arguably helped retain these students and their expenditure within Wales. Welsh domiciled students spent an estimated £139 million and this too generated jobs and output across Wales.
- The University has a relatively strong international profile, particularly in the attraction of students from outside the EU, compared to Welsh Higher Education Institutions overall. The proportion of students who come from other EU countries(4%) is similar to the overall proportion of students from the rest of the EU studying in Wales. However Cardiff attracts 18% of its HE student population from outside the EU compared to 15% for all Welsh Higher Education. Figure 4 gives the comparative profile for all Welsh Higher Education Institutions.

Figure 6: Welsh University Sector Student Profile



It can be seen from Figures 5 and 6 that the University also attracts a relatively higher proportion of its students from other parts of the UK compared to Welsh Higher Education sector as a whole. 40% of Cardiff students are from other parts of the UK compared to 28% for the Welsh Higher Education Sector as a whole.

Additional students associated with Cardiff University

It is worth highlighting that in addition to the 30,185 degree-registered students, the University also has around 8000 other students (fulltime and part-time) taking a range of diploma, certificate and further education level classes, including classes in the Welsh Language. Most of these additional students are Welsh-domiciled students.¹³

Secondary or 'Knock-on' effects on the economy

The higher education sector generates economic impact through its expenditure. Known as 'knock-on' effects, this impact is chiefly recognised as occurring in two ways:

- Indirect effects: through the universities buying goods and services from a wide range of suppliers (from books and stationery to legal services, laboratory equipment to catering

¹³ Source: Cardiff University Registry. It should be noted that the expenditure of these additional students is NOT included in the impact of student expenditure, which focuses on HE degree registered students only.

supplies) ; the suppliers also have to make purchases in order to fulfil the university orders and their suppliers in turn make other purchases and so on, rippling through the economy.

- Induced effects: through the universities paying wages to their employees, who in turn spend their salaries on housing, food and other consumer goods and services. This creates income for employees in other businesses and sectors , who also spend their income and so on.

In the case of universities that are long established in a particular location, purchasing linkages will be highly developed within their host region (previous studies of universities in the UK have shown that universities have a relatively high propensity to spend on UK, rather than imported, goods and services, generating greater regional economic impact than businesses that rely more heavily on imports.) With its historic roots in Cardiff and in Wales going back well over 100 years, Cardiff University will be well-integrated into the city and surrounding area, with strong business and community links.

Staff expenditure tends to follow a different pattern from institutional expenditure, being more consumer oriented, but while staff expenditure will have a higher proportion of expenditure on imported consumer goods and goods from elsewhere in the UK (e.g. through online shopping), there is still an observable reliance on local goods and services – such as cafes, pubs, restaurants, fast food outlets, taxi services or personal services such as hairdressing etc. The ‘snapshot’ analysis of the impact of expenditure will reflect the composition of those linkages.

In this particular study, the impact of Cardiff University expenditure on the UK as a whole was modelled and then analysis made of the proportion of that impact accruing to Wales. This took into account the business and industry structure of Wales as well as consideration of purchases that are most likely to be more locally based- for instance the goods and services of local pubs and coffee shops, grocery stores and personal services such as hairdressers.

Output generated by the University

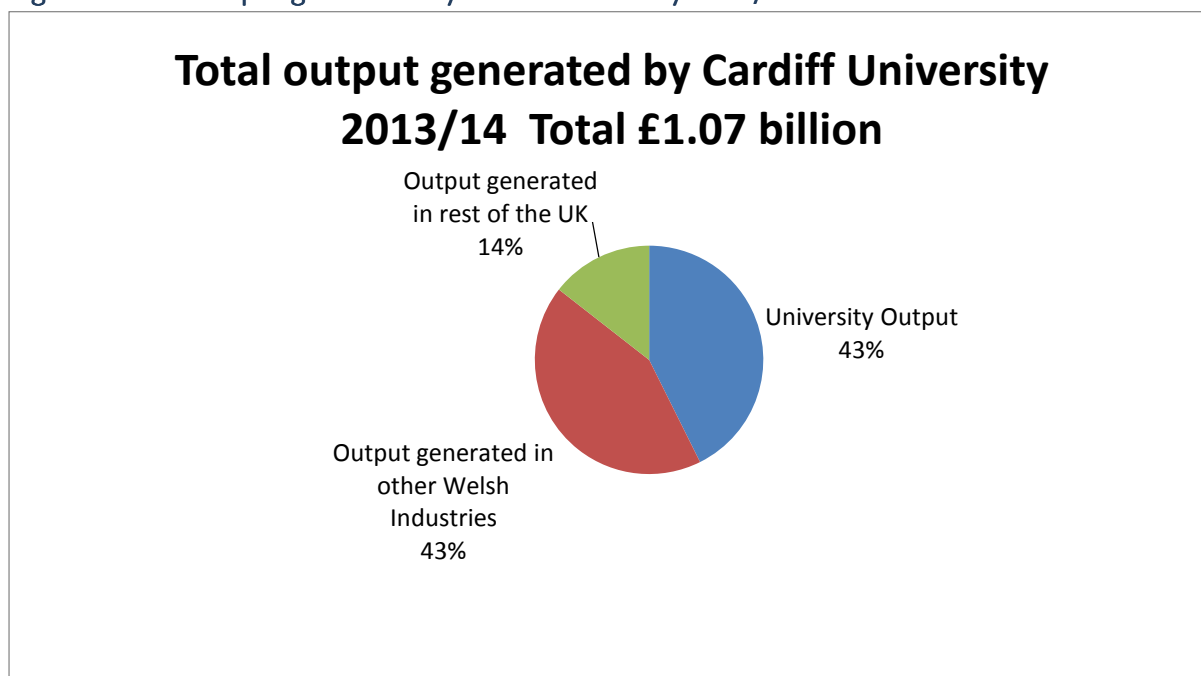
- The University’s output in 2013/14 was £455.7 million.¹⁴ Through the ‘knock-on’ effects of its expenditure in that year, the University generated an additional £613 million in other industries throughout the UK, with the majority (£458 million) accruing in Welsh Industries.

¹⁴ Institutional revenue or ‘turnover’ equates to institutional output.

Table 1: Output Generated by Cardiff University 2013/14

	Cardiff University (2013/14) (£mn)
Output (direct)	£455.7m
Output (knock-on) on Wales	£458.3m
Output (knock-on) on rest of UK	£154.8m
Total Output Generated in Wales (Direct and Secondary)	£914.0m
Total Output generated Overall across UK (Direct and Secondary, incl Wales)	£1068.8m

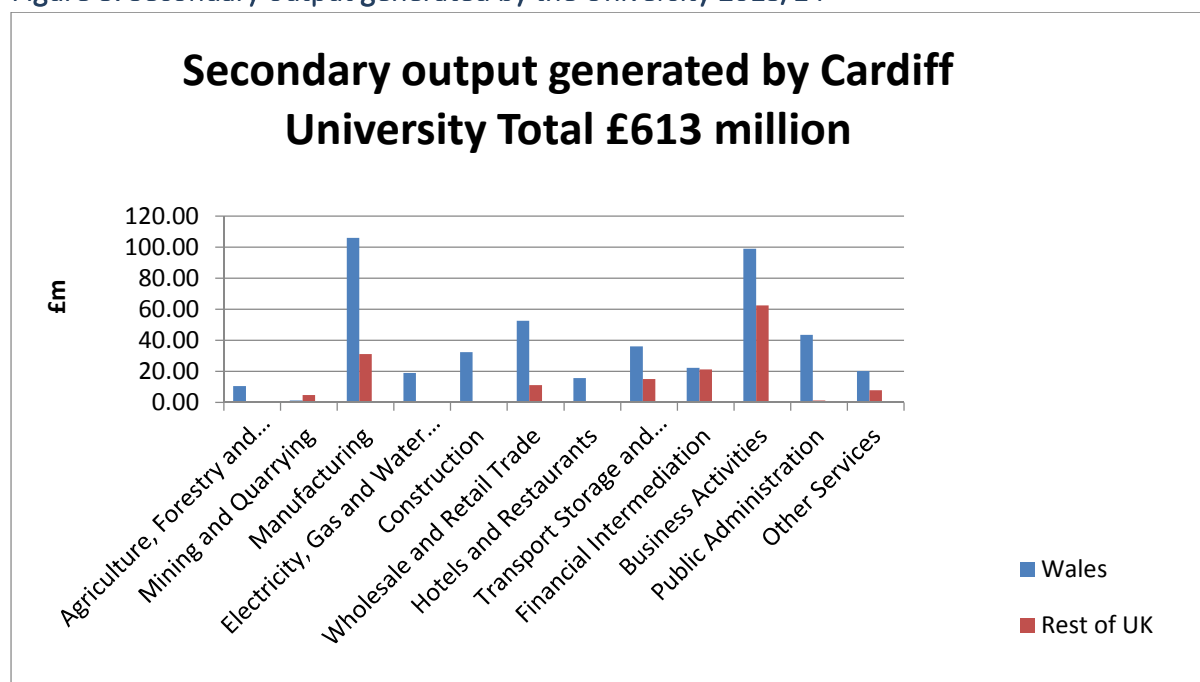
Figure 7: Total output generated by Cardiff University 2013/14



Source: Viewforth modelling system (2013) analysis

- The impact was spread across a range of other industries, with an emphasis on manufacturing, wholesale and retail, and business activities. The spread of impact is determined by the types of goods and services bought by the university and its staff – as well as from whom they are bought. A University may buy laboratory equipment direct from a manufacturer, for instance, or through a wholesaler. The University may purchase legal services from a local firm of solicitors. University staff expenditure tends to be more oriented towards consumer goods and services, many of these from local companies and shops. Figure 8 shows the pattern of output impact across industries.

Figure 8: Secondary output generated by the University 2013/14



Source: Viewforth modelling system analysis

Output multipliers

The impact is generated by institutional expenditure. By studying the volume of impact generated by 2013/14 university expenditure it is possible to calculate ‘multipliers.’ Analysis of the output impact enabled Type II output multipliers for the Welsh higher education sector to be derived. These were:

- UK: 2.35
- Wales: 2.01

In other words, every £1 million of university revenue will generate a further secondary output impact of £ 1.01 million in Wales plus a further £0.34 million in the rest of the UK.

Employment generated by the University

- In addition to directly providing 5319 time equivalent (FTE) jobs, university expenditure generated additional jobs in other parts of the economy.
- Over 6091 more FTE jobs were generated outside the University. The majority of the additional jobs (4741) were generated in the Wales.
- Total employment generated by the University amounted to 11,410 full time equivalent jobs.

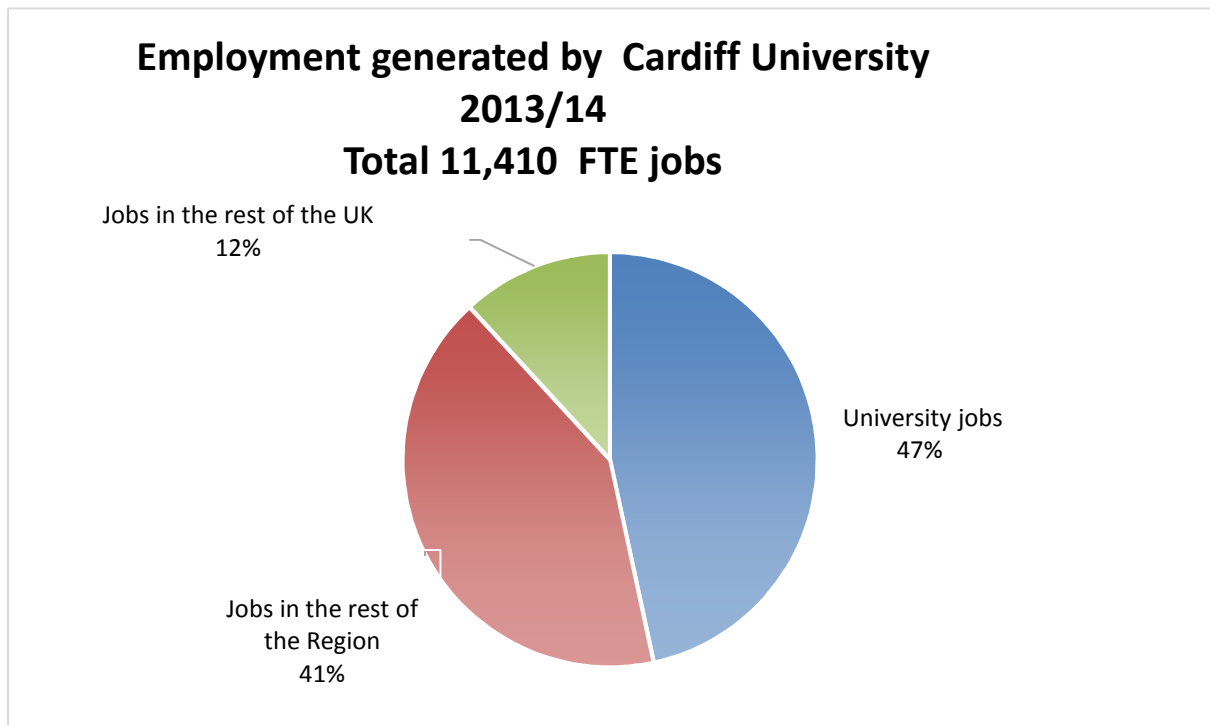
- Results are presented in Table and graphic form below (Table 2 and Figure 9.) The total Welsh jobs generated of 10,060 fte was equivalent to over 0.7% of Welsh 2013 employment.

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Table 2: Employment generated by Cardiff University 2013/14

	Cardiff University (2013/14) (fte jobs)
Fte jobs (direct)	5319
Fte jobs (knock-on) in Wales	4741
Fte jobs (knock-on) in rest of UK	1350
Total fte jobs Generated in Wales (Direct and Secondary)	10,060
Total fte jobs generated Overall across UK (Direct and Secondary, incl Wales)	11,410

Figure 9: Employment generated by the University

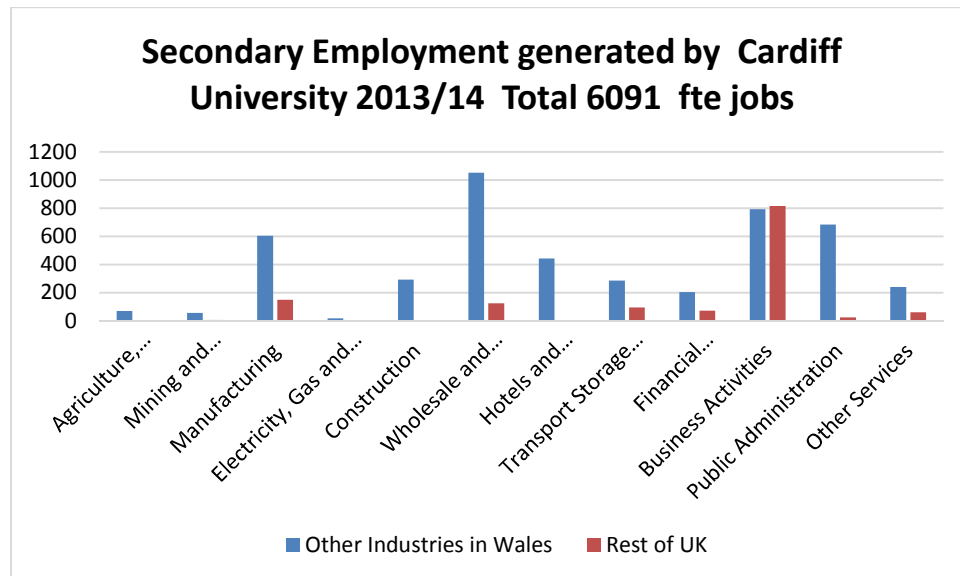


Source: Viewforth modelling system (2013) analysis

¹⁵ Source: StatsWales (2014) Total Welsh workplace employment amounted to 1,350,800 jobs

Figure 10 shows the other industries within which the additional jobs would be generated. This pattern of employment generated has a particular emphasis on the wholesale and retail trade, business activities and public administration. This is because of a combination of two major factors – that the University had a relatively high output impact in these areas and also that these industries tend to be relatively labour intensive.

Figure 10: Secondary employment generated by Cardiff University¹⁶



Source: Viewforth modelling system (2013) analysis

Employment multipliers

As with the analysis of output impact, it is possible to calculate ‘multiplier’ values.

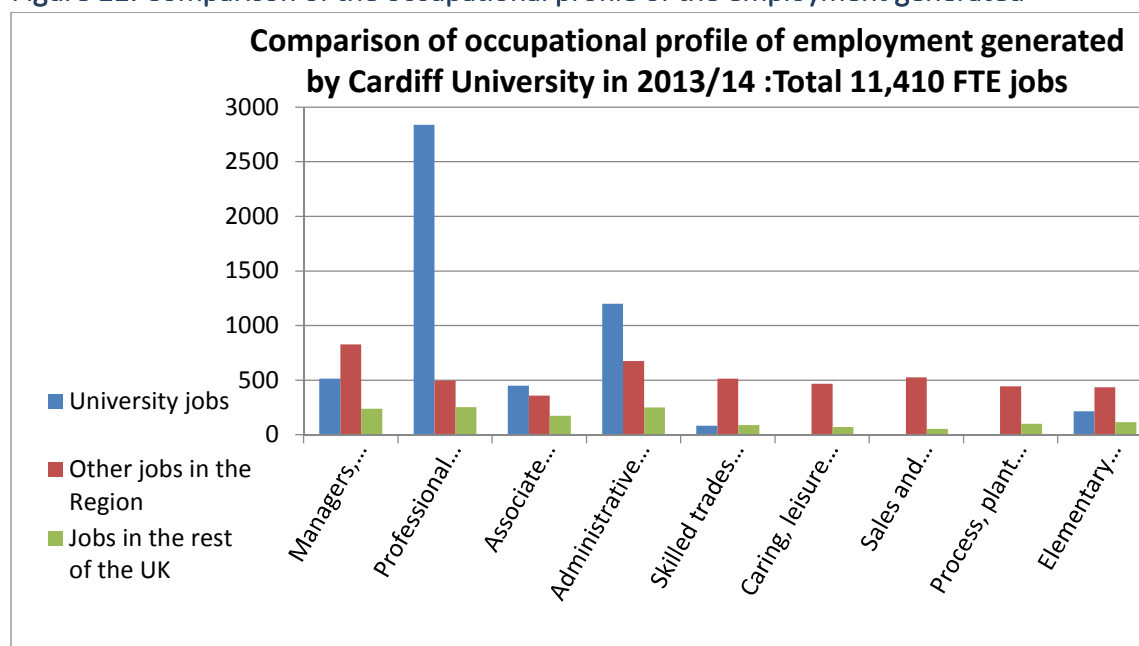
- The Type II employment multipliers derived for Cardiff University were observed to be as follows:
 - UK :2.15
 - Region: 1.89
- In other words, for every 100 direct full time equivalent (FTE) jobs created in the University itself, another 115 UK jobs would be generated outside the universities in other industries, 89 of which would be in the Wales..

¹⁶ The economic model used is based on SIC 2003 descriptors, which at a 1 digit level are not significantly different from SIC 2007. Hence the industry descriptors used here are SIC 2003.

- The total UK employment impact of £1M received by the University is 25.03 FTE jobs. Every £1 M of sectoral output¹⁷ creates:
 - 11.67FTE jobs directly in the university
 - plus 10.40 FTE additional (secondary impact or ‘knock-on’) jobs in Wales
 - plus 2.96 FTE secondary impact jobs in the rest of the UK.
 -

Figure 3 has shown how the University’s employment profile covers a range of skill levels and occupations. By translating the institutional employment profile into Standard Occupational Classifications, it is possible to compare the profile of higher education employment with that generated outside the university. Figure 11 compares the University occupational profile with that of the employment created outside the University in the rest of Wales and in the rest of the UK.¹⁸

Figure 11: Comparison of the occupational profile of the employment generated



Source: Viewforth modelling system (2013) analysis

As figure 11 illustrates, University employment is relatively specialised in high skilled ‘white collar’ jobs compared to jobs in the rest of the economy. This might be expected from the knowledge intensive nature of University activity. The relatively fewer ‘managerial’ occupations in universities compared to the jobs generated in the rest of the economy will tend to be more of a reflection of how universities classify their own staff – with many academics (who are classed as professional

¹⁷ University output is definitionally equivalent to revenue or ‘turnover’.

occupations, rather than managers) undertaking managerial roles . It can also be noted that the University generates employment across the full range of occupations, even where it does not directly hire people in those occupations. The University itself, for instance, does not provide employment in plant and process roles – but jobs in these occupations are generated by the knock-on effects of the University’s expenditure. Where the University outsources some types of services (e.g. some cleaning or ancillary services) and so those employed on such work are not hired directly by the University , those jobs will be still captured in the ‘knock-on’ effects of University activity and be part of the ‘Other jobs in the region’ .

GVA generated by the University

The importance of the University to the Welsh economy can be seen by its generation of significant levels of gross output and employment. However another key measure of the University’s contribution to the economy is the GVA generated. GVA or ‘Gross Value Added’ is a measure of the value created by the sector – GVA is the industry level measure of GDP (O) . GDP (O) is a production measure of the net change in wealth or prosperity in the economy as a whole over the year. The University’s direct GVA in 2013/14 amounted to £298 million and through secondary or ‘knock-on’ effects it generated a further £300 million of GVA in other industries across the UK (£220 million of GVA was related to Welsh industries.)

The £518 million contribution to Welsh GVA (comprising £298m Direct and £220m secondary) was equivalent to around 1% of All Welsh GVA in 2013 – which is very significant for a single organisation.¹⁹

The University’s direct contribution to Welsh GVA of £298million was equivalent to 2.7% of all 2013 Cardiff and Vale of Glamorgan GVA.²⁰

Table 3: GVA generated by Cardiff University 2013/14

	Cardiff University (2013/14) (£mn)
GVA (direct)	£298m
GVA (knock-on) in Wales	£220m
GVA (knock-on)in rest of UK	£80m
Total GVA generated in Wales (Direct and Secondary)	£518m
Total GVA generated Overall across UK (Direct and Secondary, incl Wales)	£598m

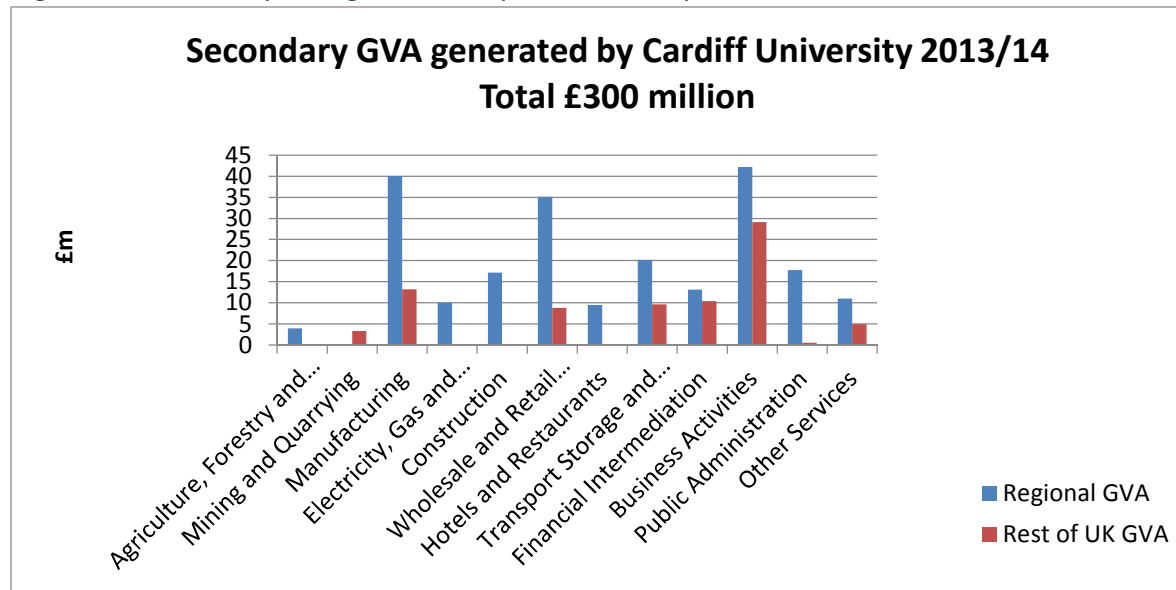
Source: Viewforth modelling system (2013) analysis

¹⁹ Total Welsh GVA in 2013 was £52.07 billion (StatsWales 2014))

²⁰ Cardiff & Vale of Glamorgan 2013 GVA amounted to £11.01 billion (StatsWales 2014)

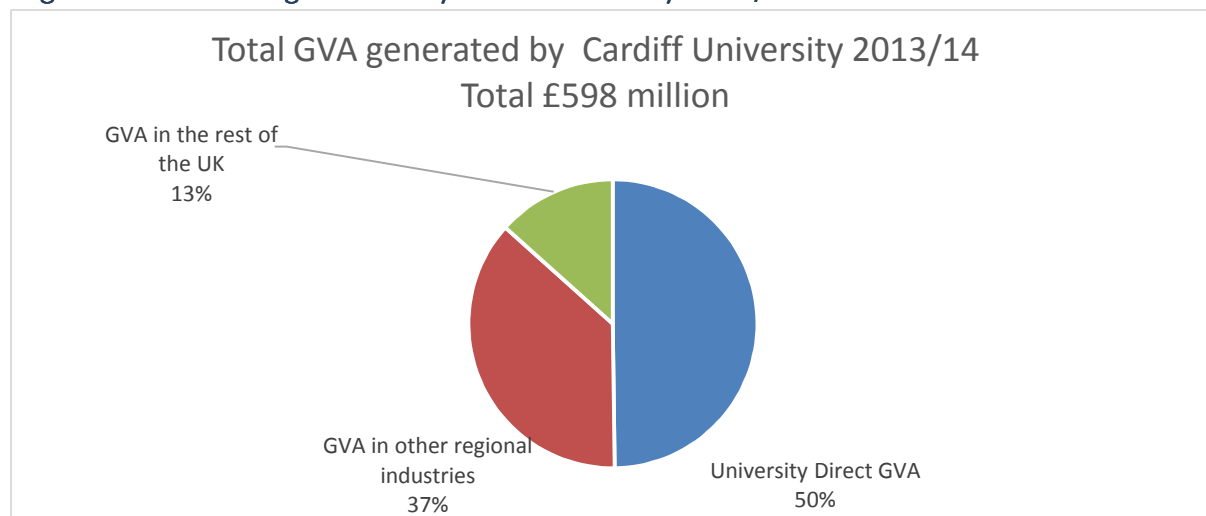
Figure 12 shows the pattern of industries in which secondary GVA was generated and Figure 13 illustrates the total GVA impact (Direct plus Secondary.)

Figure 12: Secondary GVA generated by the University 2013/14



Source: Viewforth modelling system (2013) analysis

Figure 13: Total GVA generated by Cardiff University 2013/14



Source: Viewforth modelling system (2013) analysis

The GVA multipliers were calculated as being:

- UK: 2.01
- Wales: 1.74

In other words, for every £1m of University Direct GVA, a further £1.01m was generated in other UK industries, £0.74 million of which would be in Welsh Industries.

The additional impact of student personal expenditure

As well as providing educational opportunities for local students, with around 38 % of all students coming from Wales itself, the University attracts a substantial number of students from the rest of the UK and from overseas. 40 % come from the rest of the UK and 22% from other countries. (See Figure 5.)

By attracting students from further afield to study in Wales, the University is attracting additional money into the region and boosting export earnings. The fees paid by all students to the universities are captured in the university accounts and their impact is included in analysis of the overall institutional impact at sectoral level. However, in addition to any fees or other monies they pay to the University, students spend money off-campus. This can be on private sector rental, food, entertainment, consumer goods, travel etc. In relation to both Non-EU and EU students (all international students) their additional personal expenditure can be regarded as an injection into the UK economy and treated as export earnings.²¹

International Students : Non-EU

- In 2013/14 the University attracted 5450 students from outside the EU. (Non EU students alone paid the universities over £56.7 million in fee income in 2013/14, which is captured in the University impact.) However, in addition to any fees or other monies they pay to the University, international students spend money off-campus. In 2013/14 this off-campus personal expenditure of international students was estimated as £62.4 million.
- The off-campus expenditure of non-EU students generated £ 93.7 million of output (of which £70.1 million was in Wales) and 792 full time equivalent jobs throughout the UK (of which 587 were in Wales.) Non-EU student expenditure generated £43.4 million of GVA in the UK. (£31.6 million Welsh GVA.)

²¹ International Student off-campus expenditure was estimated by drawing on the detailed analysis of International student expenditure carried out for the HM Government *International Education Strategy Paper International Education: Global Growth and Prosperity* (July 2013) and updated by the CPI. Overall student spend figures were adjusted downwards to reflect the estimated amount (13%) spent on campus (for residence, catering etc.) This was to avoid double counting. Amounts spent on campus are already included in the University impact.) The analysis by BIS of international student expenditure took account of 'UK-sourced' income e.g. from part-time work and excluded UK-sourced income so that only expenditure from non-UK sources was counted – hence can be reliably classed as export earnings.

International Students – Students from the rest of the EU

- In 2013/14 the University attracted 1155 students from other EU countries. EU students also spent money off campus on food, private sector rent, travel, clothes, recreation etc. In 2013/14 this off-campus expenditure of EU students was estimated as £13.4 million.
- The off-campus expenditure of EU students generated £ 20.1 million of output (of which £15 million was in Wales) and 170 full time equivalent jobs throughout the UK (of which 126 were in Wales.) EU student expenditure generated £9.3 million of GVA in the UK. (£6.8 million Welsh GVA.)

Domestic students

All student expenditure, domestic as well as international, can be very important to the local economy and is seen by local businesses as a core part of their own revenue stream. There is a visible impact on the areas surrounding a university. The most casual observer can see the plethora of bars, cafes and shops and other services that spring up to serve the student population. Local landlords also benefit from the need for rented accommodation.

Students from the rest of the UK

The off-campus expenditure of domestic students who come from outside Wales, from other parts of the UK is not additional to the UK economy as a whole but it can be regarded as an injection into the Welsh economy.

- In 2013/14, there were 12,045 students from the rest of the UK (outside Wales) registered at Cardiff University ²²
- The off-campus expenditure of the 12,045 students from the rest of the UK was estimated to be £136 million.
- The off-campus expenditure of students from the rest of the UK generated £152.6 million of output in Wales and 1279 fte jobs in Wales.
- The off-campus expenditure of students from the rest of the UK generated £68.9 million of Welsh GVA.

Welsh Students

The expenditure of Welsh students is also important. It can be argued that the University helped *retain* the expenditure of these students in Wales and – particularly in the areas most immediately surrounding the university, the expenditure of local students also generates jobs and output.

²² Source: HESA *Students 2013/14* and Cardiff University

- There were also 11,535 Welsh HE students at the University.
- The off-campus expenditure of the 11,535 Welsh students studying at the University was estimated to be £139 million.
- The off-campus expenditure of Welsh students generated £155.5 million of output in the region and 1303 fte jobs in the region.
- The off-campus expenditure of students from Wales generated £70.2 million of Welsh GVA.

Table 4: Impact of Off-Campus Expenditure of Cardiff University Students 2013/14

Impact of Off-Campus Expenditure of Cardiff University students 2013/14							
	Estimated Off Campus Expenditure (£m)	Output Impact On Wales (£m)	Output Impact on Rest of UK (£m)	Jobs Generated in Wales (FTE)	Jobs generated in rest of UK (FTE)	GVA generated in Welsh Industries (£m)	GVA generated in rest of UK (£m)
Non-EU students	£62.4m	70.1	23.6	587.1	205.2	31.6	11.8
Rest of EU Students	£13.4m	15.0	5.1	125.9	44.0	6.8	2.5
Rest of UK students	£135.9m	152.6	N/A*	1278.9	N/A*	68.9	N/A
Welsh Students	£138.5m	155.5	N/A*	1303.2	N/A*	70.2	N/A
TOTAL		393.2	28.6	3295.1	249.2	177.6	14.3

Source: Viewforth modelling system (2013) analysis

**Impact generated by international students is clearly additional to both the UK and Welsh economies. Impact of students from the rest of the UK is included here on the basis that Cardiff University attracted RUK students and their expenditure into Wales and hence it is an injection into the Welsh economy. Analysis of domestic Welsh student expenditure is also included here on the basis that Cardiff University retained these Welsh students and their expenditure in Wales. In both the case of RUK students and Welsh students, it is the impact on Wales that is important, impact on RUK is not relevant as it is not additional to the UK economy and could be regarded as displacement.*

Summary of impact on Wales and the UK

A summary of the results for the modelled analysis for the University's impact on Wales and on the UK is provided in Tables 5, 6 and 7. The study shows the University to be of significant economic importance to the Welsh economy bringing immediate benefits to the region in terms of output generated, jobs created and its contribution to Welsh GVA.

Table 5: Overall Output impact (University and Students) 2013/14

Total impact of the University together with its students on Welsh output came to £1.3 billion.

OUTPUT	Direct (£m)	Knock on Impact on Wales (£m)	Knock on Impact on Rest of UK (£m)	Total Impact on Wales (Direct plus Secondary) (£m)	Total Impact on UK (Direct Plus Secondary) (£m)
Cardiff University	455.7	458.3	154.8	914.031	1068.8
Plus Non-EU Students	0	70.1	23.6	70.1	93.6
Subtotal	455.7	528.4	178.3	984.1	1162.4
Plus EU students	0	15.0	5.1	15.0	20.1
Subtotal	455.7	543.4	183.4	999.1	1182.5
Plus Rest of UK Students	0	152.6	N/A*	152.6	152.6
Subtotal	455.7	696.0	183.4	1151.7	1335.1
Plus Welsh-domiciled Students	0	155.5	N/A*	155.5	155.5
Total Combined impact	455.7	851.5	183.4	1307.2	1490.6

. Source: Derived from Cardiff University accounts together with analysis of the secondary impacts modelled in the Viewforth modelling system.

* Because of the wider displacement effects of domestic student expenditure, the knock-on impact of domestic student expenditure only on the UK as a whole is defined to be identically equal to the estimated impact on Wales

Overall impact on employment

The total combined impact on Welsh employment of the University and its students came to 13,355 FTE jobs . This was equivalent to nearly 1% of all 2013 Welsh employment. ²³

²³ Total Welsh Workplace employment in 2013 stood at 1,350,800 (StatsWales 2014)

Table 6: Overall Employment Impact (University and Students)2013/14

Jobs	Direct (FTE)	Knock on Impact on Wales (£m)	Knock on Impact on Rest of UK (FTE)	Total Impact on Wales (Direct plus Secondary) (FTE)	Total Impact on UK (Direct Plus Secondary) (FTE)
Cardiff University	5319	4741	1350	10060	11410
<i>Plus Non-EU Students</i>	0	587	205	587	792
Subtotal	5319	5328	1555	10647	12202
<i>Plus EU students</i>	0	126	44	126	170
Subtotal	5319	5454	1599	10773	12372
<i>Plus Rest of UK Students*</i>	0	1279	N/A*	1279	1279
Subtotal	5319	6733	1599	12052	13651
<i>Plus Welsh-domiciled Students*</i>	0	1303	N/A*	1303	1303
Total Combined impact	5319	8036	1599	13355	14954

Source: Derived from Cardiff University accounts together with analysis of the secondary impacts modelled in the Viewforth modelling system.

*Because of the effects of displacement, the impact on UK jobs for both RUK students and Welsh students is assumed to be equal to the impact on Welsh jobs.

Overall impact on GVA

Table 7 summarises the results for impact on GVA . The University alone directly generated £298 million of GVA in 2013/14, equivalent to 2.7% of 2013 Cardiff and Vale of Glamorgan GVA. Total 2013 Cardiff & Vale of Glamorgan GVA amounted to £11.01billion (StatsWales2014)

The total combined impact on Wales GVA of the University and its students came to £696 million. This was equivalent to 1.34% of all 2013 Wales GVA. (Total Wales GVA in 2013 was £52.07 billion (StatsWales2014.)

Table 7: Overall GVA impact (University and Students) 2013/14

GVA	Direct (£m)	Knock-On Impact on Welsh GVA (£m)	Knock on Impact on Rest of UK (£m)	Total Impact on Wales (Direct plus Secondary) (£m)	Total Impact on UK (Direct Plus Secondary) (£m)
Cardiff University	298.0	220.4	76	518.4	594.4
<i>Plus NON EU students</i>	0.0	31.6	11.8	31.6	43.4
Subtotal	298.0	252.0	87.8	550.0	637.8
<i>Plus EU STUDENTS</i>	0	6.79	2.52	6.8	9.3
Subtotal	298.0	258.8	90.3	556.8	647.1
<i>Plus Rest of UK Students*</i>	0	68.9	N/A*	68.9	68.9
Subtotal	298.0	327.7	90.3	625.7	716.0
<i>Plus Welsh-domiciled Students*</i>	0	70.23	N/A*	70.2	70.2
Total Combined impact	298.0	398.0	90.3	696.0	786.2

Source: Derived from Cardiff University accounts together with analysis of the secondary impacts modelled in the Viewforth modelling system.

*Because of the effects of displacement, the impact on UK GVA for both RUK students and Welsh students is assumed to be equal to the impact on Welsh GVA.

Section Three: The economic impact of Cardiff University across Wales

The previous section presented results of the analysis of the impact of the University and its students on the UK and Wales as a whole. However there is also policy interest in the distribution of University impact across Wales. The University itself is based in the centre of Cardiff and a large proportion of its impact is likely to be felt in the city itself, close to the campus and in the areas where staff and students live. There is likely to be a large concentration of student expenditure in the areas immediately surrounding the University – with student trade supporting coffee shops, pubs, and food retailers as well as many other local services and businesses – such as taxis, entertainment venues etc. With the University main campus being close to the city centre there will also be a flow of both staff and student expenditure into city centre shops and malls. The University’s institutional expenditure will have a mix of local and more national expenditure sources.

However there will be knock-on benefits of all expenditure – of the University, its staff and students – accruing to other parts of Wales, as the impact of the expenditure ripples through the economy.

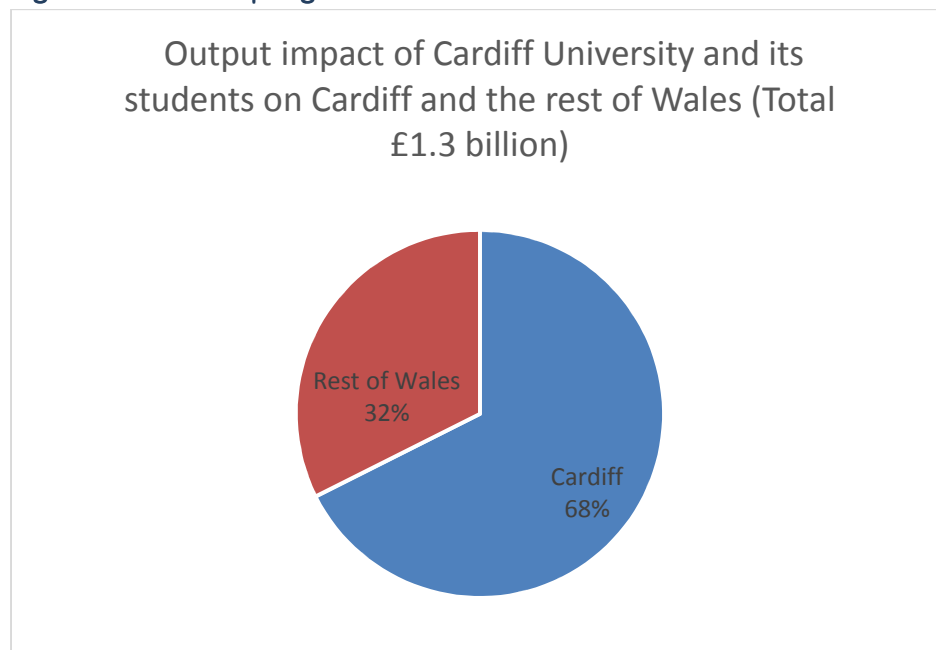
In order to analyse the flow of impact across Wales, the team developed a Wales-specific ‘gravity-model’ covering all 22 of the Welsh Local Authority areas (LAU1) identified in StatsWales. The ‘gravity modelling’ approach developed for this study involved firstly identifying positive ‘mass’ or ‘attraction’ variables (in this case population and employment .) These were then combined with negative ‘distance’ or ‘repulsion’ variables reflecting the estimated travel time (by road) between the Cardiff University main campus and the main Administrative centre of each of the regions . Travel time was based on estimates given by the web-based ‘Distancefrom’ routemapping site²⁴ which gives both distance and average road travel time between any two UK points,

A modelled combination of these variables was applied to derive estimates of the pattern of impact distribution. The results are presented below in graph and tabular format.

Impact on Cardiff and the rest of Wales

Output Impact

Figure 14 Total output generated in Cardiff and in Wales



Source: Viewforth Gravity Model Analysis

²⁴ See: <http://www.distancesfrom.com/>

The University’s own direct output impact (which is Cardiff-based) combined with the secondary impact generated through the expenditure of the university, its staff and students amounted to a total impact on Cardiff output of £883.6 million. This comprised 68% of all of the output impact generated by the University, with the remaining 32% generated in other parts of Wales.

Table 8: Total Output generated in Cardiff and rest of Wales (£m)

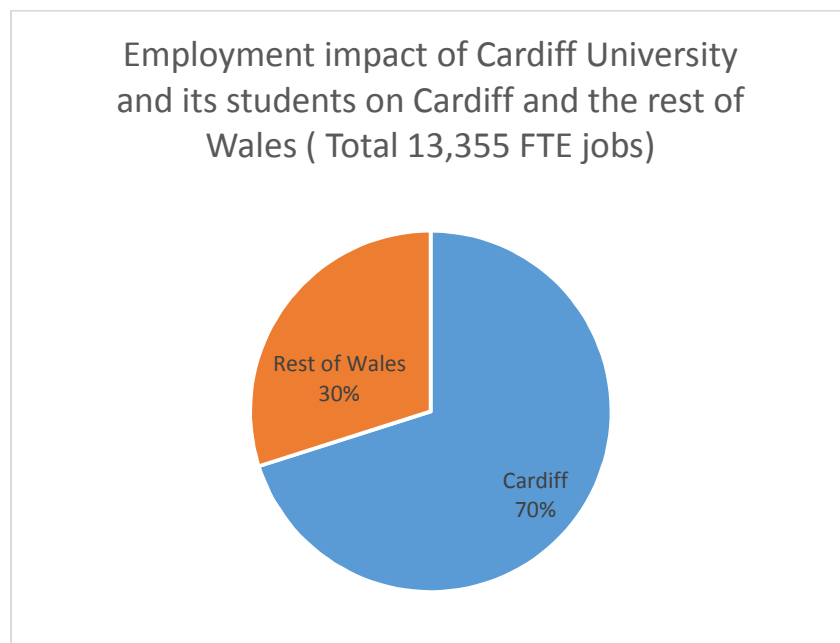
	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	455.7	230.5	197.4	883.6
Rest of Wales	0	227.8	195.8	423.6
Total	455.7	458.3	393.2	1307.2

Source: Viewforth Gravity Model Analysis

Employment impact

Combining the direct employment provided at the University together with the employment generated across the City by the expenditure of the University, its staff and students shows a total impact on Cardiff jobs of 9360 – 70% of all of the jobs generated.

Figure 15 Total employment impact generated in Cardiff and the rest of Wales



Source: Viewforth Gravity Model Analysis

Table 9: Total Employment Impact generated in Cardiff and rest of Wales

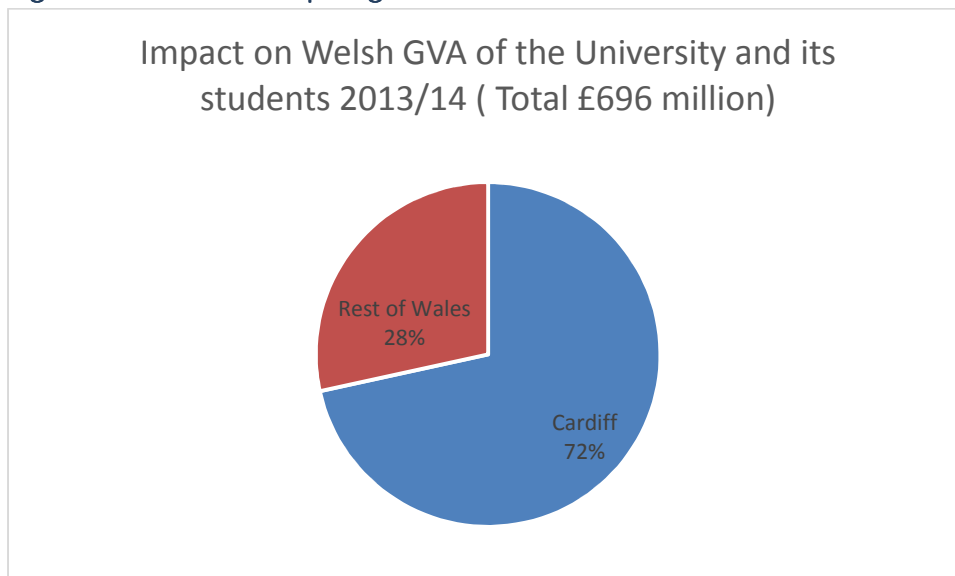
	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	5319	2386	1655	9360
Rest of Wales	0	2355	1640	3995
Total	5319	4741	3295	13355

Source: Viewforth Gravity Model Analysis

GVA impact

In terms of GVA, 72% of the GVA impact was concentrated in Cardiff, with 28% generated in the rest of Wales. The combined impact of the University's direct GVA and that generated through secondary effects by the expenditure of the University, its staff and students came to just over £498 million in Cardiff with nearly £198 million generated in other industries across Wales.

Figure 16: Total GVA impact generated in Cardiff and the rest of Wales.



Source: Viewforth Gravity Model Analysis

Table 10: Contribution to Regional GVA (£m)

GVA	University Direct	University 'Knock-on' impact	Impact of Student personal expenditure	Total Impact
Cardiff	298	110.9	89.2	498.1
Rest of Wales	0	109.5	88.4	197.9
Total	298	220.4	177.6	696

Source: Viewforth Gravity Model Analysis

The impact on Cardiff was slightly more pronounced in terms of contribution to GVA and jobs compared to output. This is because of the economic characteristics of Cardiff University itself and the University's direct effect on the City – the University is a highly skilled, labour intensive organisation and this will have increased the overall impact on jobs and GVA in Cardiff. The share of secondary impact on output, jobs and GVA is in the same proportions in Cardiff and in the rest of Wales. This may be seen more clearly in the detailed analysis of impact distribution across Wales.

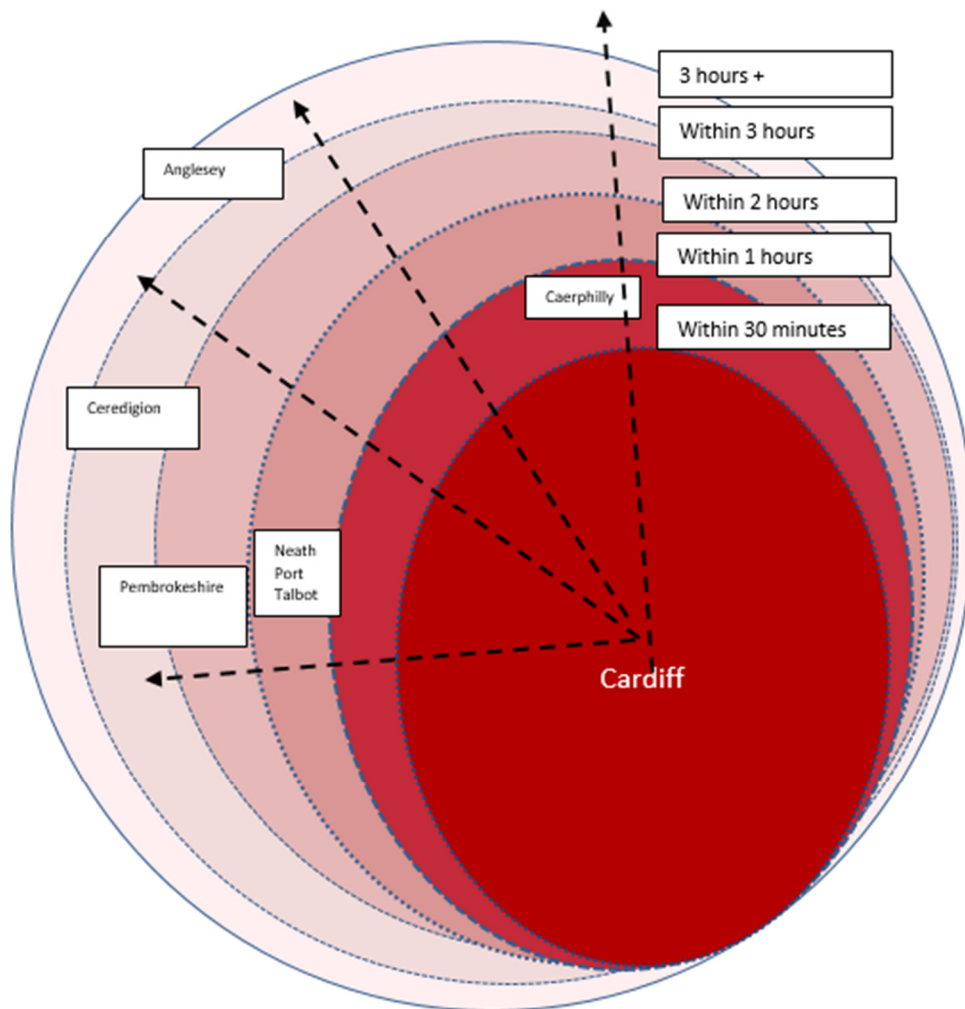
Distribution of impact across Wales

While the majority of economic impact occurred in Cardiff, where the University is based, the University also had a significant effect on the economy in other parts of Wales, with nearly one third of all economic impact occurring outside of Cardiff and in other parts of Wales. This reflects the way in which the expenditure impact ripples through the economy, so that even locations relatively distant from Cardiff will still have benefitted from the University's activities.

The gravity model for the impact of Cardiff University on Wales was based on a combination of distance and mass variables. Larger centres of employment and population tend to attract concentrations of expenditure impact. This is moderated by distance - the further the distance travelled from the original source of impact, the weaker the ripples of impact become. The resultant analysis reflects the demographics, industry and employment

characteristics of Wales as well as geographical location factors. A significant proportion of impact is pulled beyond Cardiff itself because, particularly in the South of Wales, there are a number of other centres of population and employment to which the impact will naturally flow. However the impact lessens the further the distance to be travelled from Cardiff. The concept is illustrated in Figure 17.

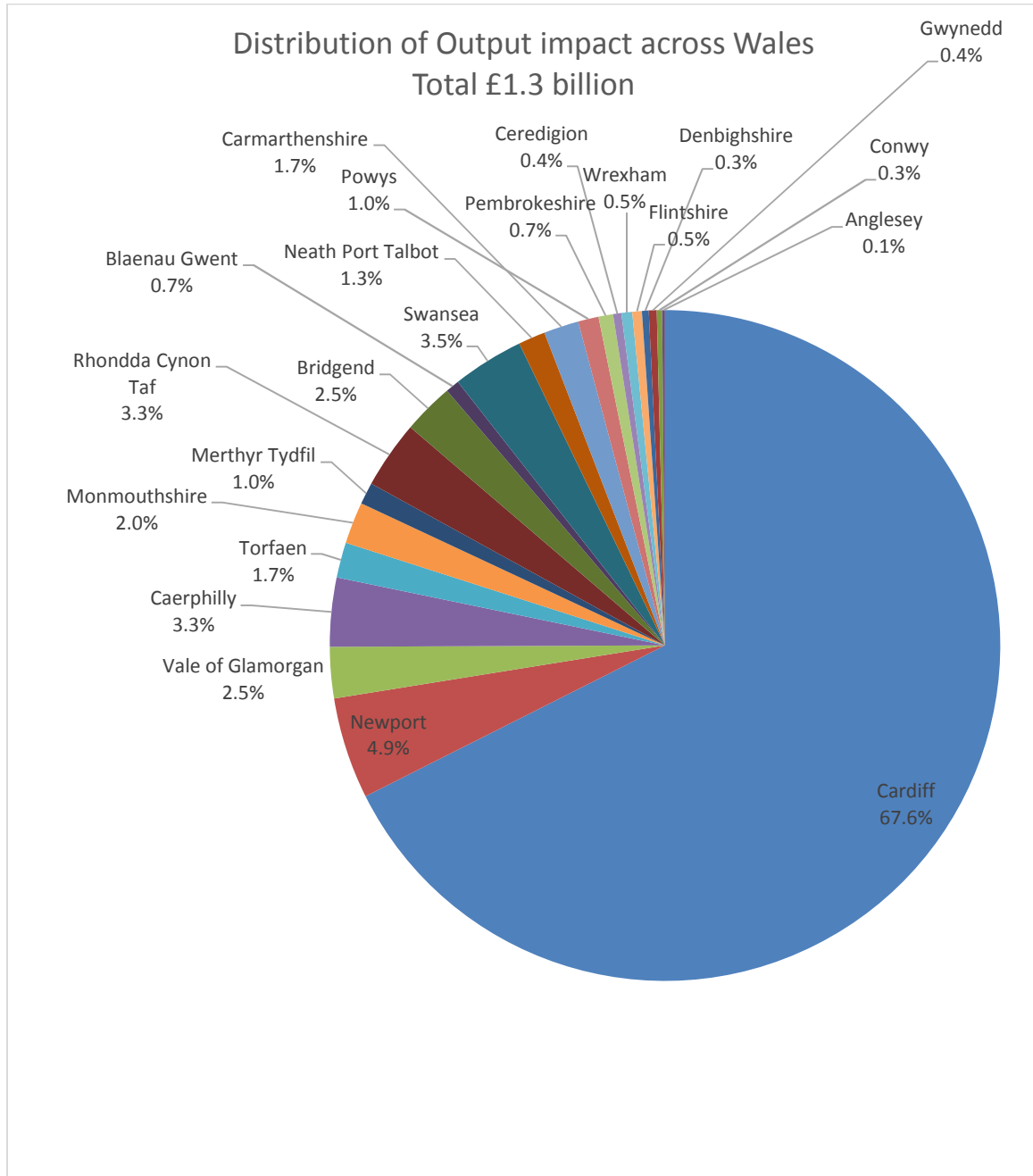
Figure 17: Impact over distance travelled distance (average road travel time)



The results for detailed analysis of impact across the 22 regions of Wales are presented below.

Output impact

Figure 18 : Distribution of Output impact across Wales



Source: Viewforth Gravity Model Analysis

Table 11 : Distribution of Output Impact across Wales

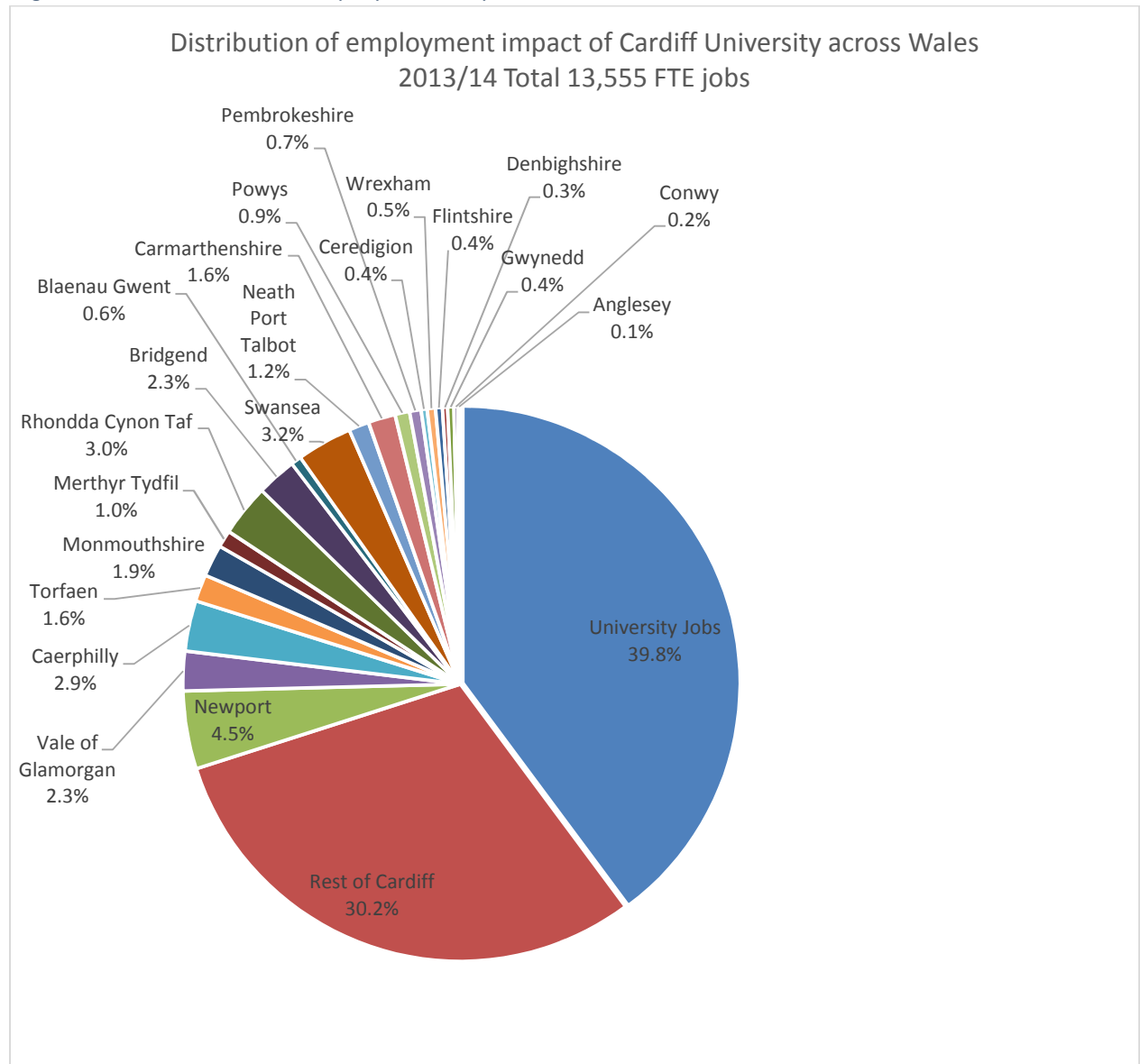
AREA	University Direct £	Secondary £	Student Impact £	Total Impact £
Cardiff	455.7	231	198	884
Newport	0	34	29	64
Vale of Glamorgan	0	17	15	32
Caerphilly	0	23	20	43
Torfaen	0	12	10	22
Monmouthshire	0	14	12	26
Merthyr Tydfil	0	7	6	14
Rhondda Cynon Taf	0	23	20	43
Bridgend	0	17	15	32
Blaenau Gwent	0	5	4	9
Swansea	0	24	21	45
Neath Port Talbot	0	9	8	17
Carmarthenshire	0	12	10	22
Powys	0	7	6	13
Pembrokeshire	0	5	4	9
Ceredigion	0	3	2	5
Wrexham	0	4	3	7
Flintshire	0	3	3	6
Denbighshire	0	2	2	4
Gwynedd	0	3	2	5
Conwy	0	2	2	3
Anglesey	0	1	1	2
	455.7	458	394	1307

Source: Viewforth Gravity Model Analysis

Note: Totals may not sum exactly due to rounding

A similar pattern can be observed for employment impact across Wales.

Figure 19: Distribution of employment impact across Wales



Source: Viewforth Modelled analysis

Figure 19 shows the overall employment impact, direct and secondary. Direct University jobs accounted for just under 40% of the total employment impact with the remainder generated in Cardiff and across Wales. The FTE job figures are shown in Table 12.

Table 12: Distribution of employment impact across Wales (Direct and Secondary)

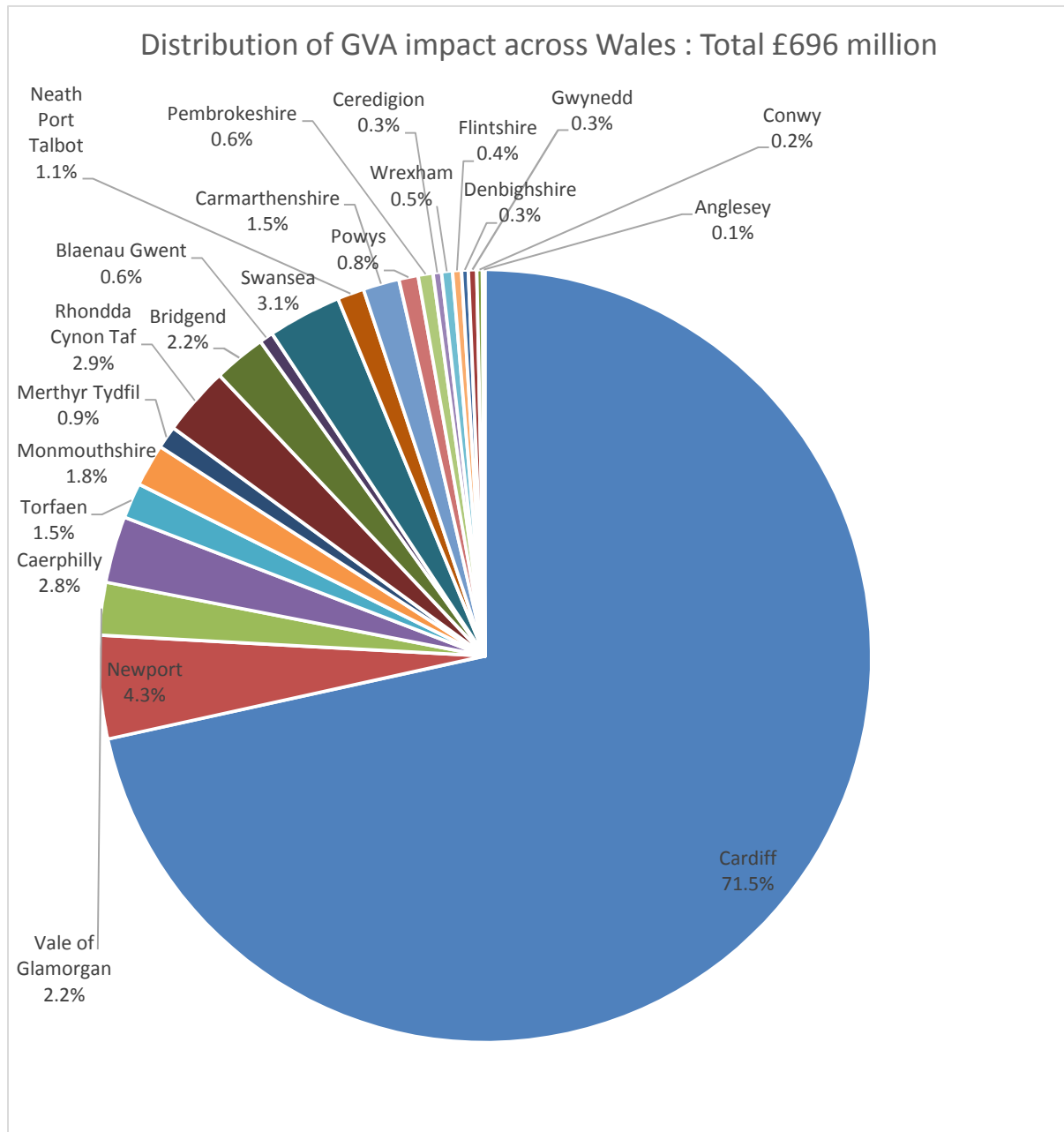
University Jobs	5319
Rest of Cardiff	4037
Newport	606
Vale of Glamorgan	309
Caerphilly	393
Torfaen	209
Monmouthshire	249
Merthyr Tydfil	132
Rhondda Cynon Taf	405
Bridgend	309
Blaenau Gwent	80
Swansea	432
Neath Port Talbot	157
Carmarthenshire	212
Powys	114
Pembrokeshire	88
Ceredigion	48
Wrexham	64
Flintshire	53
Denbighshire	40
Gwynedd	48
Conwy	32
Anglesey	16
TOTAL	13355

Source: Viewforth Gravity Model Analysis

GVA Impact

GVA impact follows the same broad pattern, as Figure 20 shows.

Figure 20 Distribution of GVA impact across Wales



Figures 18,19 and 20 illustrate how the pattern of secondary impact across Wales is similar, with the small differences attributable to the University's direct effect through its own jobs and GVA. The distribution by percentage for each impact measure is shown in Table 13 below.

Table 13: Distribution of Cardiff University Impact across Wales by percentage

Percentage of Distribution	Output (Total £1.3 billion)	Jobs (Total 13355 fte)	GVA (Total £696 million)
Cardiff	67.6	70.1	71.6
Newport	4.9	4.5	4.3
Vale of Glamorgan	2.5	2.3	2.2
Caerphilly	3.3	2.9	2.8
Torfaen	1.7	1.6	1.5
Monmouthshire	2.0	1.9	1.8
Merthyr Tydfil	1.0	1.0	0.9
Rhondda Cynon Taf	3.3	3.0	2.9
Bridgend	2.5	2.3	2.2
Blaenau Gwent	0.7	0.6	0.6
Swansea	3.5	3.2	3.1
Neath Port Talbot	1.3	1.2	1.1
Carmarthenshire	1.7	1.6	1.5
Powys	1.0	0.9	0.8
Pembrokeshire	0.7	0.7	0.6
Ceredigion	0.4	0.4	0.3
Wrexham	0.5	0.5	0.5
Flintshire	0.5	0.4	0.4
Denbighshire	0.3	0.3	0.3
Gwynedd	0.4	0.4	0.3
Conwy	0.3	0.2	0.2
Anglesey	0.1	0.1	0.1

Section Three: Conclusions and Reflections

This report has focussed on Cardiff University as a business, generating jobs and output through its expenditure. It has examined the impact that the University has through its expenditure and that of its students, on Cardiff, across Wales and on the rest of the UK.

The analysis shows the University to be of significant economic importance bringing immediate benefits to Cardiff and to Wales more generally in terms of output generated, jobs created and its contribution to regional GVA.

The University's role may have been particularly important during the recent recession because Universities tend to be countercyclical. While they may not grow as fast as other organisations and industries during boom times, neither do they contract as much in lean times. This has been shown to be true of Cardiff University. Rather than contracting, between 2011 and 2014 its income increased from £413.03 million to £455.7 million – an increase of around 7% in real terms.²⁵ The University is a non-profit-making organisation and its increased revenue therefore led to increased expenditure (expenditure was up £27.5 million – increased to £430 million in 2013/14 from £402.5 million in 2010/11) and this generated additional economic activity, output and jobs in the region.

The majority of impact was felt in the immediate Cardiff area, within the City itself. However significant impact was also observed in other parts of Wales. The distribution of impact reflects the demographic, employment and industry characteristics of Wales. While the majority of impact was felt in Cardiff, impact also spread out from Cardiff to other areas particularly where there were relatively large concentrations of population and employment. Impact became more diluted by distance from Cardiff but all areas of Wales still benefitted from the University's activities.

²⁵ Using the Service Producers' Price Index between 2011 - 2014

Appendix One: Methodology and Data Sources

The primary focus of the study was Cardiff University as a business and the impact generated by its activity during the academic and financial year 2013/14. The study also examined the impact of the off-campus expenditure of international students who were studying at the University in that year.²⁶ It also analysed the additional injection into the Welsh economy of the expenditure of students from other parts of the UK. The expenditure of local Welsh students was also analysed, on the basis that it is *retained* in the region by the University.

There was a three-stage approach to the estimation of the economic impact of the University. The impact of the University on the UK economy was modelled, using a purpose-designed economic model of the UK. Analysis was then undertaken, using a Location Quotient approach, to estimate the share of the institutional impact on the UK likely to have accrued to the region. Finally, in order to refine the analysis of Welsh impact and to take into account the distribution of University impact across Wales, a Wales-specific 'gravity-model' was developed. The 'gravity modelling' approach developed for this study involved firstly identifying positive 'mass' or 'attraction' variables (in this case population and employment) in all 22 of Welsh Local Authority areas (LAU1) included in StatsWales. These were combined with negative 'distance' variables reflecting the estimated travel time (by road) between the Cardiff University main campus and the main Administrative centre of each of the regions. Travel time was based on estimates given by the web-based 'Distancefrom' route mapping site (<http://www.distancesfrom.com/>) which gives both distance and average road travel time between any two UK points,

A modelled combination of these variables was applied to derive estimates of the pattern of impact distribution. Cardiff is both the geographical location of the University AND the city is also the largest overall centre of economic activity in Wales. A large proportion of the University's impact will inevitably therefore accrue to Cardiff itself. However the gravity-modelling approach enables analysis of how far impact may also be felt through 'knock-on effects' in industries across Wales.

²⁶ In this context 'International students' refers to all students whose permanent domicile is recorded as outside the UK, including other parts of the EU as well as non EU students.

The UK input-output model used was a 'Type II' input-output model based on actual UK data derived from the UK Input-Output Tables (Office of National Statistics) together with Labour Force Survey and Annual Business Inquiry data and the 2008 UK Bluebook. The modelling system was updated in 2013 to reflect productivity increases and related economic changes. Additional data sources included the Producers' Prices Index, ONS Regional Accounts and Welsh specific data from the Welsh Government Statistics through StatsWales. The core modelling system is based on SIC 2003 classifications and this has been used for the 1 digit aggregate presentation of results. The modelling system used was purpose-designed for UK higher education institutions and is the most recent version of the Universities UK modelling system. The technical specification for the model is included in *The impact of universities on the UK economy* Kelly, McLellan and McNicoll Universities UK 2014.

Other data sources and issues arising

The main source of University data was Cardiff University itself, supplemented by data published by the Higher Education Statistics Agency (HESA) relating to HE Finance, staffing and students. Estimates were made of the pattern of public/private/international split of income based on information supplied by the University together with tacit knowledge and observations from previous detailed studies of the income sources of individual universities (making the assumption that the broad pattern of other income sources, e.g. for Residence and Catering, is likely to be similar for most institutions.) Estimates of Welsh Government Tuition Fee Grant were made based on HEFCW published allocations. Estimates of student expenditure were made drawing on the most recent (2014) Welsh Government Student Income and Expenditure survey as well as Department for Business and Innovation (BIS) estimates of international student expenditure.

Appendix Three: **Bibliography**

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