

DEMONSTRATING THE ECONOMIC VALUE OF

Scotland's Colleges

EXECUTIVE SUMMARY

September 2015

ANALYSIS OF THE SOCIAL & ECONOMIC IMPACT OF LEARNING

emsi



INTRODUCTION

Scotland's colleges create value in many ways. Colleges are committed to putting learners on the path to success and play a key role in helping them increase their employability and achieve their individual potential. With a vast range of courses and apprenticeships, the colleges' provision enables learners to acquire qualifications and develop the skills they need in order to have a fulfilling and prosperous career. Colleges also provide an excellent environment for learners to meet new people and make friends, while participation in college courses improves the learners' self-confidence and promotes their mental health. All of these social and employment-related benefits have a positive influence on the health and well-being of individuals.

However, the benefits of Scotland's colleges consist of so much more than solely influencing the lives of learners. The colleges' provision supports a range of employment sectors in Scotland. This provision supplies employers with the skilled workers they need to make their businesses more productive. The expenditure of Scotland's colleges, along with the spending of their staff and learners, further supports the local economy through the output and employment generated by local suppliers. Lastly, and just as importantly, the economic impact of Scotland's colleges extends as far as the Exchequer in terms of increased tax receipts and

decreased public sector costs.

In this report we aim to assess the economic benefits of Scotland's colleges on their key stakeholder groups: learners, society, taxpayers, and the local community. The fact that learning makes a difference to these groups is well known, but comparatively little research has been done to quantify the monetary value of the impacts. One of the more recent studies includes Fujiwara's (2012)¹ analysis of the impact of adult learning. Although the approaches used in this and other similar studies vary, they all contribute valuable information to the growing body of evidence that proves the value of investing in education.

The approach in this study is twofold. We begin with a standard investment analysis to determine how the investments in Scotland's colleges will perform for a given investor over time. The investors in this case are learners, society, and taxpayers, all of whom pay a certain amount in costs to support the learning activities at Scotland's colleges. The learners' investment consists of their direct outlays, such as those for books, plus the opportunity cost of spending time learning opposed to earning income through employment. Society invests

¹ Daniel Fujiwara, 'Valuing the Impact of Adult Learning' (National Institute of Adult Continuing Education: Leicester, 2012).

ACKNOWLEDGEMENTS

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in learning by forgoing the services that it would have received had government not funded the colleges and the business output that it would have enjoyed had learners been employed instead of learning. Taxpayers contribute their investment through government funding via organisations such as the Scottish Funding Council. In return for these investments, learners receive a lifetime of higher earnings, society benefits from an expanded tax base and a reduced demand for social services, and taxpayers benefit from higher tax receipts and avoided public sector costs. To determine the feasibility of the investment, the model projects benefits into the future, discounts them back to their present value, and compares them to their present value costs. Results of the investment analysis for learners, society, and taxpayers are displayed in the following three ways: 1) net present value of benefits, 2) rate of return, and 3) benefit/cost ratio.

The second component of the study focuses on the economic impacts created by Scotland's colleges on the business community in Scotland. Economic impact analysis is distinct from investment analysis in that it focuses on a single time period and does not project impacts into the future, nor does it factor in costs

incurred by stakeholders. To derive results, we rely on a specialised input-output (IO) model to calculate the additional income created in Scotland's economy as a result of the increased consumer spending and added skills generated by Scotland's colleges and their learners. Results of the economic impact analysis are measured in terms of the added income created by the following two impacts: 1) impact of staff and college expenditure, and 2) impact of the skills acquired by learners still active in Scotland's workforce.

Data and assumptions used in the study are based on several sources, including the financial and learner data from Scotland's colleges, industry and employment data from Nomis official labour market statistics, demographic and earnings data from the Office for National Statistics (ONS), and EMSI's input-output model. The study applies a conservative methodology and follows standard practice using only the most recognised indicators of investment effectiveness and economic impact. For more information on the data used to derive the results, we encourage our readers to contact Colleges Scotland for full documentation of the study.

STUDY HIGHLIGHTS

The results of this study show that Scotland's colleges create significant positive benefits on their main stakeholder groups: learners, society, taxpayers, and the business community. Using a two-pronged approach that involves an investment analysis and an economic impact analysis, we calculate the benefits to each of these groups. Key findings of the study are as follows:

INVESTMENT ANALYSIS

BENEFITS TO LEARNERS

- Learners as a whole invested a total of **£1.2 billion** to attend Scotland's colleges in 2013-14. The majority of these costs, around **£1.1 billion**, represent foregone earnings that they would have generated had they been working instead of learning.
- In return for the monies that learners invest in Scotland's colleges, they will receive a present value of **£7.4 billion** in increased earnings over their working lives.
- Every £1 that learners pay for their education at Scotland's colleges yields **£6.30** in higher future wages. This translates to a **14.8%** annual rate of return.

BENEFITS TO SOCIETY

- Society as a whole invested **£3.2 billion** in Scotland's colleges through direct outlays and the loss of potential output from learners who spent time at the colleges rather than working.
- In return, society will receive a present value of **£19.9 billion** over the course of the learners' working lives, in the form of an expanded tax base and a variety of social

benefits related to reduced crime, lower unemployment, and increased health and well-being.

- Society will receive **£6.30** in benefits in return for every £1 invested in Scotland's colleges. The average annual rate of return on investment is **16.4%**.

BENEFITS TO TAXPAYERS

- Taxpayers paid **£598.3 million** to support the operations of Scotland's colleges in 2013-14.
- The net present value of the added tax revenue stemming from the learners' higher lifetime incomes and the increased output of businesses amounts to **£3.0 billion** in benefits to taxpayers. Avoided costs to the public sector adds another **£358.3 million** in benefits due to a reduced demand for government-funded social services.
- Taxpayers see an average annual rate of return of **15.6%** from their investment in Scotland's colleges. The corresponding benefit-cost ratio is **£5.70** in benefits returned for every £1 in costs.

ECONOMIC IMPACT ANALYSIS

IMPACT OF STAFF AND COLLEGE EXPENDITURE

- Scotland's colleges employed **10,238** full-time equivalent (FTE) staff 2013-14. Staff costs amounted to **£392.9 million**, much of which was spent in Scotland to purchase groceries, clothing, and other household goods and services.
- The colleges are buyers of goods and services and spent **£272.9 million** to support their operations in 2013-14. This expenditure further benefited many local suppliers in Scotland.
- The net impact of staff and college expenditure in Scotland comes to approximately **£700.8 million** in added income in the Scottish economy each year.

IMPACT OF ADDED WORKFORCE SKILLS

- Many learners of Scotland's colleges stay in Scotland. Their enhanced skills and abilities bolster the output of local employers, leading to higher Scottish income and a more robust economy.
- The accumulated impact of former learners of Scotland's colleges who are currently employed in the Scottish workforce amounts to **£14.2 billion** in added income in Scotland's economy each year.

TOTAL IMPACT ON BUSINESS COMMUNITY

- Altogether, the economic impact of Scotland's colleges to the business community in Scotland is **£14.9 billion** each year.
- Total added income created by the colleges and their learners is equal to **8.8%** of the total economic output of Scotland and represents roughly **593,246** average wage jobs.

METHODOLOGY & RESULTS

Scotland's colleges generate a wide array of benefits. Learners benefit from higher lifetime earnings, society and taxpayers benefit from an expanded tax base and avoided social costs, and the business community benefits from increased consumer spending and higher skill levels in the workforce. In this study, Scotland's colleges investigate the benefits they create to each of their main stakeholder groups, i.e., learners, society, taxpayers, and the business community. The following two analyses are presented: 1) investment analysis, and 2) economic impact analysis. Benefits to learners, society, and taxpayers fall under the investment analysis, and benefits to the business community fall under the economic impact analysis. The methodology and results for both of these analyses are described more fully below.

of all enrolments, followed by SVQ 1, which comprised 23% of all enrolments.

In order to go to the colleges and depending on their level of funding, learners at Scotland's colleges pay money to cover direct outlays such as books and supplies. All learners also forgo earnings that they would have generated had they been working instead of learning. Together these two cost factors comprise the learners' total investment in their education at Scotland's colleges, equal to £1.2 billion in 2013-14. This translates to an average cost of £4,380 per learner, the bulk of which comprises the opportunity cost of spending time learning rather than working.

In return for the costs of education, learners receive a

INVESTMENT ANALYSIS

Investment analysis is the process of evaluating total costs and measuring these against total benefits to determine whether or not a proposed venture will be profitable. If benefits outweigh costs, then the investment is worthwhile. If costs outweigh benefits, then the investment will lose money and is thus considered unprofitable. In this section, we consider Scotland's colleges as an investment from the perspectives of learners, society, and taxpayers. The backdrop for the analysis is the entire UK economy.

Benefits to Learners

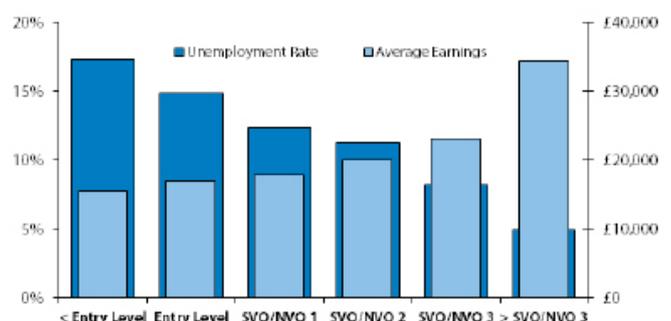
In 2013-14, Scotland's colleges served 267,226 unique learners across various qualifications and levels. Table 1 shows the breakdown of enrolments at Scotland's colleges by education level, beginning with entry level up through greater than SVQ 3. As indicated, the bulk of the colleges' provision was at SVQ 2, comprising

TABLE 1. Breakdown of enrolments at Scotland's colleges, 2013-14

EDUCATION LEVEL	%
Entry Level	3%
SVQ/NVQ 1	23%
SVQ/NVQ 2	52%
SVQ/NVQ 3	14%
> SVQ/NVQ 3	8%
Total	100%

Source: Data supplied by the Scottish Funding Council.

FIGURE 1. Unemployment rate and average annual earnings by education level received by individuals in Scotland at the mid-point of their career



stream of higher future earnings that continues to grow throughout their working lives. As shown in Figure 1, mean income levels received by average-aged workers at the midpoint of their career increase as individuals attain higher levels of education. Employment prospects also increase, so unemployment levels decrease as learners gain higher education levels. Table 2 shows the average lifetime earnings that learners can expect to receive at each education level.

The marginal differences between education levels form the basis for determining the earnings benefits that accrue to learners in return for their education investment. For example, the average SVQ 3 achiever from Scotland's colleges will see an increase in earnings of £3,015 each year compared to someone with SVQ 2 qualifications. This amounts to a present value of approximately £135,674 in higher earnings over a working lifetime.

To calculate the learners' return on investment, we use the differences in wages to attach a monetary value to the learners' achievement level at Scotland's colleges in 2013-14. We then project this earnings increase into the future over the course of the learners' working career by applying the well-known human capital earnings function developed by Jacob Mincer, where earnings gradually increase from the time learners enter the workforce, come to a peak shortly after the career midpoint, and then dampen slightly as learners approach retirement. The result is a stream of projected future benefits tailored to the learners' specific achievement levels at Scotland's colleges.

TABLE 2. Average lifetime earnings by education level received in Scotland, undiscounted

EDUCATION LEVEL	EARNINGS	DIFFERENCE
< Entry level	£693,768	n/a
Entry	£756,901	£63,133
SVQ/NVQ 1	£800,395	£43,495
SVQ/NVQ 2	£900,270	£99,874
SVQ/NVQ 3	£1,035,943	£135,674
> SVQ/NVQ 3	£1,545,928	£509,984

Source: Derived from data supplied by ONS. Figures are weighted according to the specific gender and ethnicity profile of the learner population of Scotland's colleges.

TABLE 3. Present value of benefits and costs, learner perspective (£ thousands)

A. Present value of future earnings stream	£7,387,154
B. Present value of learner costs	£1,170,433
Net present value (A – B)	£6,216,721
Benefit/cost ratio (A / B)	6.3
Rate of return	14.8%

Source: EMSI.

The final step is to discount the stream of future earnings to the present in order to account for the time value of money. For the learner perspective we assume a discount rate of 3.5%. The present value of the benefits is then compared to the costs that learners pay for their education (i.e., direct outlays and forgone earnings) to derive the investment analysis results, expressed in terms of a net present value, benefit/cost ratio, and rate of return. Results appear in Table 3.

As shown in the table, the present value of the higher future earnings that accrue to learners yields a cumulative sum of £7.4 billion. Costs are provided in the second row of Table 3, equal to £1.2 billion, which includes books and supplies, and the opportunity cost of time. By dividing the £7.4 billion in benefits by the £1.2 billion in costs, we derive a benefit-cost ratio of 6.3. This means that, for every £1 learners invest at Scotland's colleges in the form of direct outlays and forgone earnings, they will receive a cumulative £6.30 in higher future earnings over the course of their working life. Recall that the bulk of the learners' investment comprises their opportunity cost, so even if they spend little to no money on tuition fees, this does not necessarily mean that their returns will also have a correspondingly small value.

The rate of return is perhaps the most recognised indicator of investment effectiveness. Given the cost of education and the stream of associated future benefits, the rate of return indicates how much a bank would have to pay a depositor of like amount to yield an equally rewarding stream of future payments. Table 3 shows learners of Scotland's colleges earning an average annual rate of return of 14.8% on their investment of time and money. This is an impressive return compared, for example, to the less than 2.7% return per annum that can be expected from saving money in today's Individual Savings Accounts (ISAs).

Benefits to Society

Scotland's colleges are in many ways social enterprises. They aim to improve the lives of young people and adults by increasing their employability and raising their individual potential. They help to create shared wealth in the UK economy through the higher incomes of learners and the increased output of businesses. Further, they tackle social problems such as crime, unemployment, and poor lifestyle habits by positively influencing the health and well-being of their learners.

From the perspective of society, the social value created by Scotland's colleges takes on two forms. The first and largest component is the added income created in the UK. As discussed in the previous section, learners

earn more because of the skills and qualifications they acquire while attending Scotland's colleges. Businesses also earn more because the enhanced skills of learners make capital more productive (i.e., buildings, machinery, and everything else). This in turn raises profits and other business property income throughout the national economy. Together, increases in earnings and business output stimulate corresponding increases in value added, thereby raising prosperity in the UK and expanding the tax base for society as a whole.

The social value of Scotland's colleges also consists of the savings that accrue to society through the improved lifestyles of learners. Learning is statistically correlated with a variety of life changes that generate social savings in three main categories: 1) health, 2) crime, and 3) unemployment. Health savings include avoided medical costs associated with smoking, obesity, and mental disorders. Crime savings consist of reduced security expenditure and insurance administration, lower victim costs, and reduced Criminal Justice System expenditures. Unemployment savings comprise the reduced demand for income assistance and Jobseeker's Allowance benefits. By combining data sets that relate learning to improved social behaviour, we are able to quantify how education contributes to the lowering of social costs and ultimately improves quality of life.

Table 4 shows the present value of the added income and social savings that occur in the UK over the working lifetime of learners attending Scotland's colleges. As shown, added income amounts to a present value of £18.4 billion, due to the increased lifetime earnings of learners and associated increases in business output. Social savings amount to £1.5 billion, the sum of health, crime, and unemployment savings in the UK (see also Figure 2). Altogether, the total social value of Scotland's colleges is £19.9 billion. Note that the figures in Table 4 have been adjusted to account for counterfactual outcomes where Scotland's colleges do not exist.

In order to calculate society's return on investment, we must first determine what it cost society to support Scotland's colleges during the reporting year. Costs to society break down into two main categories, direct outlays and opportunity costs. Direct outlays simply refer to operating and non-operating revenues of Scotland's colleges, equal to £657.9 million in 2013-14. Opportunity costs refer to the loss of earnings and output that would have been generated in the UK economy had learners chosen to work full-time rather than learning. Opportunity costs also include the government services that would have been undertaken had taxes been collected on the incomes that learners forgo. Together direct outlays and opportunity costs

TABLE 4. Present value of added income and social savings that accrue to society (£ thousands)

	TOTAL
ADDED INCOME	
Increased income in the UK	£18,389,150
SOCIAL SAVINGS	
Health savings [†]	£300,350
Crime savings	£1,120,171
Unemployment savings [‡]	£65,262
Total	£19,874,934

[†] Includes savings from reduced smoking, obesity, and mental disorders.

[‡] Includes savings from a reduced number of JSA claimants.

Source: EMSI.

FIGURE 2. Present value health, crime, and unemployment savings to society (£ thousands)

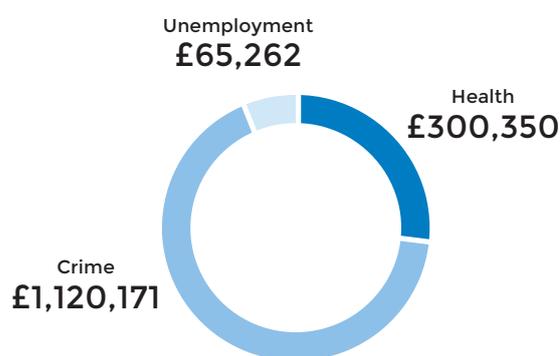


TABLE 5. Present value of benefits and costs, social perspective (£ thousands)

A. Present value of social benefits	£19,874,934
B. Present value of social costs	£3,169,456
Net present value (A - B)	£16,705,478
Benefit/cost ratio (A / B)	6.3
Rate of return	16.4%

Source: EMSI.

equal £3.2 billion in costs to society during the reporting year.

Table 5 shows the investment analysis results. In return for the £3.2 billion that society invests in Scotland's colleges, it receives a net gain (in present value terms) of £16.7 billion. The associated benefit-cost ratio is 6.3 for every £1 spent, and the average return on investment is 16.4% annually.

Benefits to Taxpayers

Benefits and costs under the taxpayer perspective only look at the monetary gains and losses that accrue to the public sector as a result of Scotland's colleges. Learners earn more, which means they make higher income tax payments and National Insurance contributions. The

portion of their higher earnings that learners spend also leads to higher value added tax (VAT) receipts. Further, as employers increase their output and make more purchases for supplies and services, they benefit the Exchequer through their higher corporation tax and VAT payments. Altogether, the present value of the added tax receipts that accrues to taxpayers amounts to £3.0 billion.

A portion of the social savings enjoyed by society also accrues strictly to taxpayers. As learners become more employable, the demand for Jobseekers' Allowance benefits reduces. Learners put less of a demand on the National Health Service (NHS) for medical treatment as a result of their improved health habits. Further, the reduced probability that learners will commit criminal offences leads to a reduced demand on the Criminal Justice System for law enforcement services. Figure 3 illustrates in present value terms how the £1.5 billion in health, crime, and unemployment savings to society translates to £358.3 million in savings to taxpayers. These represent the monies that taxpayers do not have to spend as a result of the reduced demand for government-supported social services.

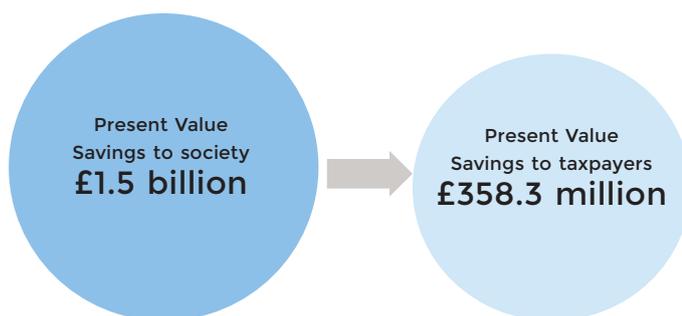
Summing the present value of the added tax revenues and savings to taxpayers yields £3.4 billion (net of the same counterfactual adjustment applied to the social perspective). This value appears in the top row of Table 6. Also shown in the table are the costs to taxpayers, equal to £598.3 million. These represent

TABLE 6. Present value of benefits and costs, taxpayer perspective (£ thousands)

A. Present value of taxpayer benefits	£3,393,429
B. Present value of taxpayer costs	£598,265
Net present value (A – B)	£2,795,164
Benefit/cost ratio (A / B)	5.7
Rate of return	15.6%

Source: EMSI.

FIGURE 3. Present value savings to society and associated savings to taxpayers



the total funding received by Scotland's colleges from taxpayers in 2013-14.

By comparing taxpayer costs to the £3.4 billion in benefits, we derive a benefit/cost ratio of 5.7. This means that for every £1 of public money invested in Scotland's colleges, taxpayers receive a cumulative value of £5.70 over the course of the learners' working lives. This translates to a 15.6% annual return on investment to taxpayers for their support of Scotland's colleges, again a solid investment that compares favourably with other long-term investments in both the private and public sectors.

ECONOMIC IMPACT ANALYSIS

Scotland's colleges promote economic growth in Scotland in a variety of ways. The colleges are employers and buyers of goods and services. In addition, Scotland's colleges are a primary source of education to local residents and a supplier of trained workers to local industry.

In this section we examine the economic impacts of Scotland's colleges on the business community through the increased consumer spending and enhanced business productivity generated by the colleges and their learners. The impacts reflect the economic relationships among Scotland's industries and are calculated using EMSI's proprietary input-output (IO) model. The model places particular reference on how much each industry purchases from every other industry by using NUTS3 (county and unitary authority level) area data from the Office for National Statistics' (ONS) Supply and Use Tables (SUTs), as well as Scottish and UK industry jobs totals and UK sales-to-jobs ratios. The results are then expressed in terms of income (as opposed to sales) in order to present a more accurate picture of the colleges' actual impacts by accounting for monies that leave the economy.

The following pages present the results of the analysis broken down according to the following two impacts: 1) impact of staff and college expenditure, and 2) impact of the added skills of former learners attending Scotland's colleges who are still employed in Scotland's workforce.

Impact of Staff and College Expenditure

Scotland's colleges are important employers in Scotland, providing jobs for a wide range of staff across a number of occupations. In 2013-14, the colleges employed 10,238 full-time equivalent staff. Of these, approximately 100% were Scotland residents. Total staff costs at Scotland's colleges in 2013-14 amounted to £392.9 million,

which became part of Scotland's overall income. Staff expenditure on groceries, eating out, clothing, and other household costs also helped support local shops and businesses.

In addition to their staff, Scotland's colleges are large-scale buyers of goods and services. In 2013-14, the colleges spent £272.9 million to support their operations. Much of this expenditure benefited local suppliers in Scotland, creating a knock-on multiplier effect that generated additional employment and income throughout the Scottish economy.

The impact of payroll and purchases at Scotland's colleges is subdivided into the following two main effects: the direct effect and the indirect effect. The direct effect comprises the colleges' payroll and employee benefits, less monies paid to individuals working outside Scotland. The indirect effect refers to the additional income created in the economy as employees and suppliers of Scotland's colleges spend money in Scotland to purchase even more supplies and services.

To calculate the indirect effect, we remove any expenditures that occur outside of Scotland and map the remainder to the 19 top-level industry sectors of the IO model. We then run the data through the model's multiplier matrix to estimate how the spending of the colleges and staff affects the output of other industries in the area. Finally, we convert the sales figures to income by means of value added-to-sales ratios, also provided by the IO model. Table 7 shows the results, a total of £729.0 million in gross impacts attributable to the direct effect of staff costs plus the indirect effect that occurs as the colleges and their staff spend money in Scotland.

One adjustment must be made to the gross impact before deriving the net impact of staff and college expenditure. Scotland's colleges received an estimated 9.5% of funding from local sources in Scotland, whether from local residents or from other private and public sources located in Scotland. Given this phenomenon, a portion of the income that the colleges create in Scotland's economy is offset by the income that they withdraw from the economy. As such, not all of the impacts generated by Scotland's colleges and their staff can be considered new monies brought to Scotland.

To determine the 'net' impact of Scotland's colleges payroll and purchases, we take the estimated portion of funding that originated from local sources and convert it to spending. We then bridge the spending figures to the individual sectors of the IO model, calculate the multiplier effect, and convert the amounts to income. The result, equal to £28.2 million, allows us to see what income would have been created in Scotland anyway,

TABLE 7. Impact of staff and college expenditure (£ thousands)

	TOTAL
Total income in Scotland	£169,680,054
Direct effect of staff costs	£392,920
Indirect effect	£336,093
Gross total impact	£729,013
Alternative use of funds adjustment	-£28,187
Net total impact	£700,826

Source: EMSI.

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 even if Scotland's colleges did not exist.

Subtracting the £28.2 million in alternative uses of funds from the £729.0 million in gross impacts yields a net impact of £700.8 million in added income in the Scottish economy. This value appears in the bottom row of Table 7. Assuming that Scotland's colleges employ approximately the same number of people and spend approximately the same amount each year, this value may be considered an annual figure.

Impact of Added Workforce Skills

The strong focus of Scotland's colleges on workforce development manifests itself at all levels of the colleges' provision. In addition to delivering specific training and consultancy solutions to businesses, the colleges maintain close links with local employers in order to target the type of employee training that best meets their growth strategies. Further, the colleges' vocational learning programmes and apprenticeships allow employers and the colleges to work together to develop industry-specific training schemes that benefit both the learners and employers. All of these services provide valuable resources to businesses and help develop the skills of the existing Scotland labour force.

Employee training and development is just one way that employers benefit from the presence of Scotland's colleges. By aligning their provision with key employment sectors in Scotland, Scotland's colleges help produce the skilled workers that are needed to support Scotland labour market. Table 8 presents the percentage breakdown of Scotland's colleges instructional activity by top-level subject sector categories. Health comprises the highest percentage of activity (16%), followed by Special Programmes (10%) and Engineering (9%).

Many learners attending Scotland's colleges stay in Scotland and are more productive because of the quality education they invested in at the colleges. Over time, the skills of former learners of Scotland's colleges accumulate, steadily increasing the training level and experience of Scotland's workforce. As the skills embodied by former learners stockpile, a chain reaction occurs in which higher learner incomes generate additional rounds of consumer spending, while new

skills and training translate to increased business output and higher property income, causing still more consumer purchases and multiplier effects. The sum of all these direct and indirect effects comprises the total impact of the learners' added skills in Scotland's economy.

Assigning a monetary value to the added skills acquired by learners that are still active in Scotland's workforce requires data on the historical enrolments and corresponding achievement levels of learners of Scotland's colleges over the past 15-year-period. Using these data in conjunction with the wage differentials from Table 2, we can determine the total amount of higher earnings associated with the educational achievements of past and present learners. We then convert this to value added using the ratios supplied by the IO model. The result, equal to £8 billion, appears in Table 9 and represents the accumulated direct effect of the added skills acquired by learners whom Scotland's colleges have served over the last 15 years.

To calculate the indirect effect, the model allocates increases in income to specific industrial sectors and augments these to account for both demand-side and supply-side multiplier effects. Demand-side effects refer to the increased demand for consumer goods and services as the higher incomes of skilled workers and their employers are spent in the local economy. Supply-side effects occur through a process of 'agglomeration,' whereby growth becomes to some degree self-perpetuating. The presence of one industry, for example, attracts other industries that use the first industry's outputs as inputs, which produces subsequent rounds of industry growth, and so on. Both demand-side and supply-side effects are calculated using the multiplier matrix and value-added to sales ratios provided by the Scottish IO model.

Altogether, the accumulated impact of former learners from Scotland's colleges who are currently employed in the Scottish workforce amounts to £14.2 billion, the sum of £8 billion in direct effects and £6.3 billion in indirect effects. These results appear in Table 9.

TABLE 8. Scotland's colleges breakdown of instructional activity by subject sector

SECTOR SUBJECT AREA	% OF TOTAL
Health	16%
Special Programmes	10%
Engineering	9%
Construction	9%
Social Studies	9%
Art & Design	9%
Computing	5%
Sport & Recreation	5%
Business & Management	5%
Food Technology & Catering	4%
Social Work	4%
Transport	4%
Agriculture & Horticulture	3%
Science & Maths	3%
Office & Secretarial	2%
Personal Development	1%
Minerals & Materials	1%
Printing	<1%
Total	100%

Source: Data supplied by the Scottish Funding Council.

TABLE 9. Impact of added workforce skills (£ thousands)

	TOTAL
Total income in Scotland	£169,680,054
Direct effect of added workforce skills	£7,966,523
Indirect effect	£6,266,445
Total impact	£14,232,968

Source: EMSI.

Total Impact on the Scottish Economy

Altogether, the results of this study show that the economic impact of Scotland's colleges to the business community in Scotland is approximately £14.9 billion each year. This is equal to around 8.8% of Scotland's total economy and represents roughly 593,246 average wage jobs.

These results demonstrate several important points. First, Scotland's colleges promote Scottish economic growth through their operations spending and through the increase in productivity as former learners from Scotland's colleges remain active in the Scottish workforce. Second, the impact of added skills in the Scottish workforce is by far the largest and most important impact of Scotland's colleges, stemming from higher incomes of learners and their employers. And third, income in Scotland would be substantially lower without the educational activities of Scotland's colleges.

CONCLUSION

The results of this study demonstrate that Scotland's colleges create value from multiple perspectives. The colleges address the needs of employers by providing them with staff development opportunities and supplying the workforce with qualified, trained workers. Local businesses benefit from the patronage of Scotland's colleges and the expenditure of college staff and learners. The colleges also indirectly benefit taxpayers by generating increased tax receipts and reducing the demand for public sector services.

The most important value that Scotland's colleges create, however, is the impact they have on their learners. The experiences that learners receive at the colleges have the power to shape the rest of their lives and put them on the path to becoming happy and productive members of their communities. This, after all, is the colleges' mission, and for as long as they continue to deliver excellence to learners, all other stakeholder groups will see the positive impacts of learning in their lives too.

ECONOMIC IMPACT ANALYSIS

BENEFITS TO BUSINESS COMMUNITY

£0.7 BILLION	Added income created by staff and college expenditure
£14.2 BILLION	Added income created by added skills
£14.9 BILLION	Total income created in the Scottish economy
8.8%	% of total output of the Scottish economy
593,246	Total output as number of average wage jobs

INVESTMENT ANALYSIS

BENEFITS TO LEARNERS

£7.4 BILLION	Net present value of higher future earnings over working life
14.8%	Rate of return
6.3	Benefit/cost ratio

BENEFITS TO SOCIETY

£19.9 BILLION	Net present value of added income and social externalities
16.4%	Rate of return
6.3	Benefit/cost ratio

BENEFITS TO TAXPAYERS

£3.4 BILLION	Net present value of added tax receipts and avoided costs
15.6%	Rate of return
5.7	Benefit/cost ratio

ABOUT EMSI Economic Modelling Specialists International (EMSI) provides employment data and economic analysis via web tools and custom reports. The company has also produced more than 1,300 comprehensive impact analyses for colleges and universities in the UK, US, Canada, and Australia. Founded in 2000, EMSI is located in Moscow, Idaho with branch offices in the UK, and it serves education, economic, and workforce development institutions and organisations. Visit our website at www.economicmodelling.co.uk for more information.