BUREAU FOR ECONOMIC RESEARCH

Economic impact assessment of Stellenbosch University on the local municipal area

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Executive summary of the Economic Impact Assessment results

The objective of this study is to give a credible assessment and measurement of the economic contribution of Stellenbosch University (SU) to the economy of the Stellenbosch Municipal area[1]. In order to quantify the economic impact of SU on the local economy, an Economic Impact Assessment (EIA) was done using the university's operating and capital expenditure as well as spending by staff and students as an estimate of the initial impact of SU.

An EIA is a quantitative tool to calculate the *economy-wide benefit* of SU, as the initial spending by SU is only the tip of the iceberg of the total economic impact. A so-called economy-wide impact (or total economic impact) of an institution includes the direct, indirect and induced impacts, which are trigged by the initial spending of the institution. The EIA provides estimates for the impact on *output* (which is the broadest measure of economic activity and measures all sales and transactions that were triggered by the initial injection of demand), g*ross domestic product at basic prices* (GDP, which measures the value added to the local economy and only includes the value of final goods and services), *labour remuneration* and *employment* (total, highly skilled, skilled, unskilled and informal).

Importantly, because the purpose is to estimate the impact on the *local* economy, the study had to estimate the local proportion of student and staff as well as university spending. For staff and students, surveys were employed to determine the total expenditure and to estimate the proportion of the expenditure occurring within the Stellenbosch region for both local residents as well as staff and students residing outside of the region.

For university expenditure, the location of the supplier also had to be determined in order to exclude suppliers from outside the region. The spending occurring outside of the region undoubtedly has a significant positive economic impact on the Western Cape, and even South Africa as a whole, but the analysis was restricted to the local impact.

The results of the EIA show that the total economic impact of SU on output is estimated to be R5 112 million in 2016 – this measures all sales and transactions that were triggered by the initial injection of demand. The majority of this comes from student expenditure (61%), followed by staff expenditure (23%), creditor payments (14%) and diverse payments (2.5%). The economy-wide impact on Stellenbosch's GDP is a significant R2 688 million – this measures the value of final goods and services. The presence of SU also generates R1 108 million in labour remuneration and sustains 13 406 jobs in the local economy.

[1] The study was commissioned by the vice-chancellor and chief operating officer (COO) of SU and conducted by the Bureau for Economic Research (BER) during the second half of 2017. The research was completed in February 2018.

Please refer to the glossary on the BER's website for explanations of technical terms.

To put the magnitude of the impact of SU in perspective, the table below compares some of the key outcomes with economic data available for the Stellenbosch municipal area.

As a result of multiplier effects, the total economic impact of the university community stretches far beyond its initial expenditure in the local economy. Indeed, SU has a significant impact on the Stellenbosch economy. In fact, SU contributes more than 15% to the total of production (or output) generated in the region, close to 19% of gross value added, as well as more than 20% to total formal employment.

This is a very conservative estimate in the sense that it does not include expenditures made by visitors, spin-off companies or local businesses that are related to the university. Although not quantifiable in monetary terms, the SU serves as a so called anchor institution, which stimulates additional benefits in the region. Examples for these include research centre STIAS, Innovus and Maties Sport.

Total economic impact of SU on the Stellenbosch economy in perspective

Indicator	Economy-wide impact of SU	Stellenbosch Municipality	*Share (%)*
Output	5 112 868 640	32 896 947 000[2]	*15.5*
GDP at basic prices	2 688 175 857	14 497 245 000[3]	*18.5*
Employment – formal	11 510	54 601	*21.1*
Employment – informal	1 896	21 694	*8.7*

Source: BER calculations, Quantec Research

[2] Nominal output at basic prices in 2016 (Quantec Research, 2017). This is an estimate, because regional national account data for 2016 was not yet available at the time of writing.
[3] Nominal gross value added at basic prices in 2016 (Quantec Research, 2017). This is an estimate, because regional national account data for 2016 was not yet available at the time of writing.

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1. Objective of the study

The objective of this study is to give a credible assessment and measurement of the contribution of Stellenbosch University (SU) to the **Stellenbosch Municipal area**[4]. The study was commissioned by the vice-chancellor and chief operating officer (COO) of SU and conducted by the Bureau for Economic Research (BER) during the second half of 2017. The research was completed in February 2018.

SU is part of the fabric of Stellenbosch and it would be difficult to imagine the region without the university. The integration comes, in part, from the fact that the campus of SU is not a separate closed-off section, but rather forms part of the structure of the town of Stellenbosch. University buildings, residential housing (both for students and non-students), commercial office blocks, shops, restaurants, hotels and other hospitability businesses are often located right next to each other. The students also make up a significant part of the Stellenbosch local population, with the absence of students during holidays being noticeable. Furthermore, the university is a significant employer within the region. This means that the expenditure of SU also has a large **local impact** because of the wages earned by SU staff. There are considerable intangible benefits of having a university present, such as the promotion of spin-off companies as well as other cultural and socio-economic benefits. Overall, the economic benefits of a university stretches beyond the primary role of being a knowledge centre and driving force of innovation within a region.

In order to quantify the **economic impact** of SU on the local economy, an Economic Impact Assessment (EIA) was done. This is similar to the process followed by Oxford Economics (2016) estimating the economic impact of the University of Bath, for example. The EIA starts with the economic benefits stemming from **SU's operational and capital expenditure**. However, this direct economic impact, although significant, constitutes only a small portion of its total contribution, and, therefore, the study also captures the so-called indirect and induced impact. These stem from the related upward and downstream activities (including producers, suppliers, distributors, retailers and other services providers), which generate additional income, tax revenue and employment. These, in turn, induce further economic benefits throughout the economy. In the case of SU, it is important to capture the **spending by staff and students** which (at least partially) takes place in the local economy because of the presence of SU. This spending, like spending by SU directly, stimulates indirect and induced effects through the local economy. The EIA captures all these ripple effects.

Overall, the EIA allows one to measure the full economy-wide impact in terms of value added (i.e. gross domestic product, GDP), intermediate output (i.e. production), employment and remuneration. Importantly, as requested, the focus of the research is on the impact of SU on the local Stellenbosch economy. The analysis is thus restricted in the sense that it does not measure the economic benefits created outside of the region.

[4] Unless otherwise mentioned, from here on any reference to Stellenbosch will refer to the broader Stellenbosch Municipal Area and not just the town located in the municipal area.

In addition to the quantitative analysis, the study briefly identifies other economic, social and cultural benefits of the university. Due to data constraints and the difficulty of accurately measuring the impact, these benefits will be assessed through a qualitative discussion.

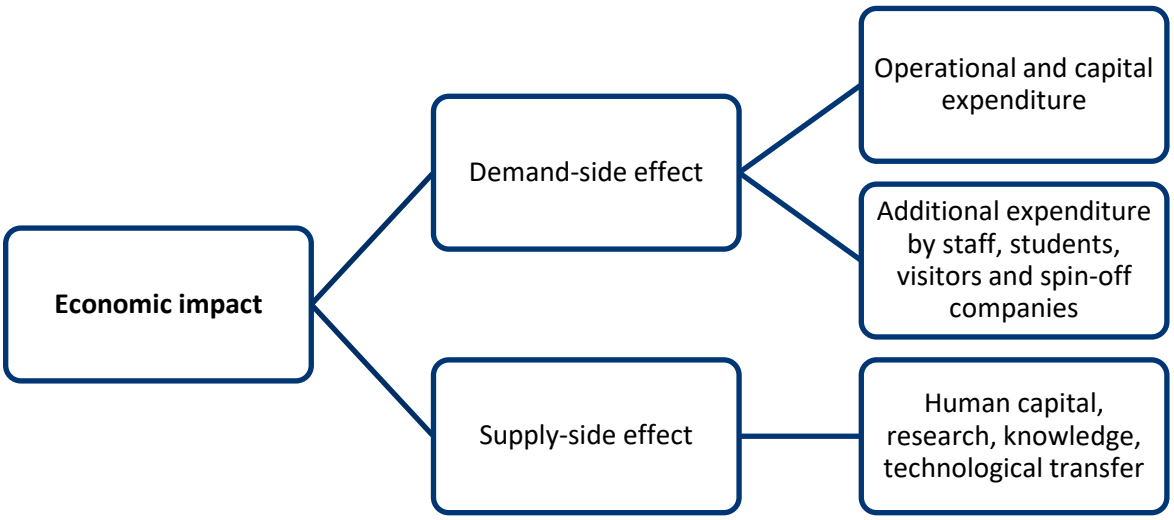
2. Overview of comparable studies

This section reviews comparable studies to the SU study which aim to explore the economic impact of higher educational institutions on the local and/or regional economy. The focus of the section is to describe how the economic impact is measured and to highlight the different types of economic benefits that can be distinguished in typical university towns. The benefits range from the impact of the direct expenditure by a university to more indirect benefits from a higher education institution serving as a so-called anchor institution. Importantly, this section also highlights the limitations of this type research, which often pertains to a lack of (reliable) data and the difficulty in estimating the counterfactual – i.e. how would the structure of the local economy be different if the university was not present or located elsewhere. This section does not refer to the SU or assumptions relating to this particular EIA as these will be described in detail later, but rather serves as a broad introduction to these type of economic impact studies.

Economic impact studies for universities are often initiated by the educational institution itself, and are mainly used in capital campaigns to support requests for donations (Blackwell, et al., 2002). These economic impact assessments are also useful to illustrate the value of an educational institution to public officials and policy makers, especially in terms of justifying the initial investment in establishing the institutions (Ohme, 2003). However, it is important to note that the positive effect of a higher educational institution stretches far beyond the economic benefits, and also, among other factors, affects demographics, infrastructure, culture and the attractiveness of a region and/or town (Garrido-Yserte et al., 2008).

Beck, et al., (1995) define the **economic impact** as the difference between the existing economic activity in a region given the presence of the institution, and the level of economic activity if the institution had not existed. Florax (as cited in Garrido-Yserte et al., 2008) unpacks the concept further and argues that the economic impact can be classified into two distinct categories. Namely, **demand-side effects**, which are related to additional expenditure and the multiplier impact on the economy, as well as **supply-side effects,** which refer to the human capital formation, research and enhancement of an area's technological base (see Figure 1). Demand-side effects can also be referred to as backward linkages and include incremental expenditure attributable to the operations of the institution, as well as additional expenditure that flows into the area due to the purchase of goods and services by university staff, students, spin-off companies and visitors. Supply-side effects can be referred to as forward linkages as they generate increased supply of goods and services to upstream industries. According to Garrido-Yserte et al. (2008), the demand-side effect of a higher education institution will initially be greater than the supply-side effect. However, as time goes by, the benefits of knowledge creation and human capital accumulation will result in increased productivity and higher lifetime earnings, and as such, may even exceed the impact of the demand-side effects. The benefits of human capital formation are multidimensional and affect the entire population rather than the narrow impacts of localised spending for example.

Figure 1: The economic impact of a higher educational institution



Source: BER

When considering the demand-side impact, it is important to *include* expenditure from non-local sources resulting from the operation of the institution (so called **export effects**), as well as spending from local sources that would have occurred elsewhere had the institution not existed (**import substitution effects**) (Blackwell et al., 2002).

Studies estimating the demand-side impact

Universities have significant operating budgets which include compensation for faculty and staff members, research, the purchase of goods and services, capital spending, scholarships and employment benefits (PriceWaterhouseCoopers, 2009). The literature shows that the majority of the expenditure is in the form of wages and salaries[5]. However, the impact of the direct spending is propagated through indirect and induced effects on the economy, which, for example, support employment in other local industries and contribute to the existence of a vibrant local economy.

In estimating the total demand-side impact, most studies referred to below use an expenditure-based approach to incorporate the university's direct expenditure. However, it is also possible to follow an income approach. Regardless of the approach followed, while direct expenditure accounts for a substantial portion of the demand-side economic impact of a university, other spending streams can also make a significant contribution to the total economic impact. To account for this, EIA studies incorporate student and visitor spending induced by the presence of the university in their analysis. Some studies even include other

[5] This is also the case for SU. According to the SU's Annual Integrated Report (2016), 47.5% of the total cost in 2016 went towards employees, 45.8% were operating costs and the remaining 6.7% were other expenditures (such as depreciation and finance charges).

demand-side impacts, such as gifts received from non-local sources, new capital expenditure and the impact of additional expenditure related to the construction and maintenance of facilities.

These different approaches, expanded upon in the literature, are outlined in the following subsections. A summary table of the methodologies and final estimates reached by the studies referred to in this section is included in Appendix 1. It is not practical to refer to the outcomes of the different studies in the text because the studies concern different universities and time periods – the results are thus not directly comparable. The goal of this section is to explain the relevant assumptions made and methodologies followed.

University expenditure: some previous studies

PriceWaterhouseCoopers (2009) incorporated operating and research *expenditure* by the University of Manitoba in their analysis. Expenditure which occurred outside of the relevant region and spending on capital asset acquisition were excluded from their analysis. The former was excluded to avoid the inclusion of irrelevant expenditures, while the latter was excluded to avoid double-counting effects generated by the university's capital expenditures. Health and disability insurance benefits were also excluded as these were already incorporated in the study's analysis of household consumption spending by employees. The total economic impact of operating and research expenditures was then calculated by itemising operational expenditures according to North American Industrial Classification System (NAICS) codes and incorporated into the economic impact model. An economic multiplier analysis, estimated using an input-output model developed by Statistics Canada, was then applied to estimate the indirect and induced effects of the university's expenditures on gross output, value added, employment and tax generation within the local economy.

O'Connor et al. (2015) used total expense data from the University of Saskatchewan's Annual Financial Report. This methodology was preferred to a revenue approach due to the lags between receiving funds and the actual spending thereof. Similar to PriceWaterhouseCoopers (2009), O'Connor et al. (2015) utilise an input-output model developed by Statistics Canada to estimate the total economic impact of the University of Saskatchewan's expenditure on regional and national GDP and employment.

Kelly & McNicoll (2011) performed a similar economic impact analysis for the University of Kent in the United Kingdom. The study analysed the impact of university expenditure, including staff costs, on output and employment within the South-East region of the United Kingdom as well as the national economy. A Type II input-output model developed by the Office for National Statistics was applied to incorporate the multiplier effects of university expenditure into their analysis.

Sun & Naqvi (2014) used a short-term cash flow model to quantify the economic stimulus generated through the direct spending by the Simon Fraser University. The indirect and induced economic impact of direct university expenditure was then accounted for through the application of multipliers obtained using an input-output model developed by Statistics Canada.

In contrast to these studies, Sudmant (2009) employed an *income-based approach* to measure the University of British Columbia's economic impact. The author argued that this approach was best suited to

the analysis because the majority of a university's expenditure translated into income to faculties and staff[6]. A local income multiplier was then applied to the estimated total income to include the indirect and induced effects of direct spending by the university.

Sudmant (2009) restricted the analysis to estimate the impact on the local economy – as did PriceWaterhouseCoopers (2009). In practice, however, the demand-side economic impact is not restricted to just the local economy surrounding the university, but can filter through to the provincial and even national economy. EIA studies such as Briggs & Jennings (2013) and Kelly & McNicoll (2011) therefore went further to estimate the economic impact at the provincial and national level. Complicating the EIA analysis, is that due to the nature of university expenditure, the location of its impact is not directly observable[7].

Staff spending

As mentioned above, expenditure on staff wages and salaries comprises a significant portion of a university's expenditure. This not only has a direct effect, but if one assumes that the staff expenditure would have occurred out of town and now happens locally due to the existence of the university, the spending creates additional indirect and induced effects. However, it is important to decipher to what extent this additional expenditure occurs within the region studied. Some studies exclusively focus on expenditure from non-local sources resulting from the operation of the institution (export effects). However, it is also important to include spending from local sources that would have occurred elsewhere had the university not been there (import substitution effects) (Blackwell et al., 2002).

To determine the impact of staff spending within the local economy, various methods can be used. If information is available from the university, the addresses of staff and faculty members can be used to weigh the total expenditure on wages and salaries by location. In addition, (or should the address information not be available), surveys can be employed. Ohme (2003) utilised staff survey data to determine spending patterns of respondents and derived weightings to isolate the portion of spending which took place within the local region.

[6] To differentiate between local and non-local spending, the author estimated that only 35% of non-salary spending resulted in local income. This estimate was based on the notion that non-local expenditure (such as spending on journals, books and equipment) was specialised in nature and hence not available in the local economy. However, in the case of construction income, it was assumed that 100% of this expenditure was local. The author acknowledged, however, that spending on construction materials was not local and assumed a value-added ratio of 0.78 to total construction costs to account for this.

[7] In order to decipher the proportion of the economic impact attributable to university expenditure at different levels, studies allocate the impact based on various measures. PriceWaterhouseCoopers (2009) did so by weighing the impact of spending by the weighting of the local economy's share of industry employment. Kelly & McNicoll (2011) used a two-staged approach. The authors first estimated the economy-wide impact of the University of Kent on the entire United Kingdom economy using a purpose-designed economic model of the national economy. The authors then applied a Location Quotient approach to estimate the impact which accrued in the South East region where the university is situated specifically. Sun & Naqvi (2015) adjusted the sub-sectors of expenditure according to their estimates of the proportion of which was spent within the local economy.

Student spending

In general, universities attract many out-of-town students. This contributes to the overall economic impact through spending on student housing, food, transportation and education. Most studies incorporate the proportion of out-of-town students into their estimates using survey and enrolment data to adjust their estimates. Doing so allows for the measurement of additional export effects attributable to the presence of the institution.

This methodology was employed by PriceWaterhouseCoopers (2009) to estimate the additional economic impact of out-of-town students on the local economy surrounding the University of Manitoba. Enrolment data was used to derive the relevant weightings of students who originate from outside the area, while survey data provided estimates of living expenses of students. This information was captured for five expenditure categories; namely, transportation, retail and miscellaneous, food, housing and entertainment. It was assumed that out-of-town students stayed within the region for eight months of the year, and only 50% of expenditure for part-time students was included. Furthermore, 100% of housing and 50% of food expenditure was deducted from total expenditure by students living in on-campus accommodation. A multiplier obtained from Statistics Canada was then applied to this total figure to estimate the indirect and induced economic impacts on gross output, value added and employment within the regional economy stemming from out-of-town students.

Sudmant (2009) restricted the analysis to full-time students, using part-time student enrolment as a proxy for spending if the University of British Columbia had not been established in the region. Similarly, the analysis of the economic impact of New York University (Appleseed, 2015) excluded part-time students. The author states that these students would be living within the area regardless of the presence of the university.

Visitor spending

A common characteristic of universities worldwide is that the institutions attract visitors. Visitors could come to a university to attend academic conferences or workshops, present or attend guest lectures, partake or spectate sporting and cultural events, or to simply visit friends and/or family studying at the university. These visitors also generate an additional economic impact through spending on food, accommodation, transportation and various other avenues. The quantum of visitor spending is probably enhanced when the institution is based in tourism friendly and attractive areas.

In order to obtain an estimate of the economic impact of these visitors, a measurement of visitors to a region is needed, as well as a method of formulating what proportion of visitors were attracted by the university rather than something else. In an EIA for the University of Manitoba, PriceWaterhouseCoopers (2009) used out-of-town visitor numbers and expenditure estimated by the university and other EIA studies. Sun & Naqvi (2014) and O'Connor et al. (2015) used visitor numbers estimated by the university and expenditures estimated by the official tourism boards in their respective areas.

Other

In addition to analysis of the direct expenditure as well as staff, student and visitor expenditures, there are examples of EIA's trying to estimate the economic impact of other demand-side effects often ignored by the conventional literature. For example, Blackwell et al. (2002) quantify gifts received by the university from non-local sources as a source of income. O'Connor et al. (2015) provide a detailed estimate of new capital expenditure in their study. Similarly, Sudmant (2009) and Sun & Naqvi (2014) estimate the impact of construction spending and maintenance. Construction is local by nature, and thus such capital expenditures by universities can have a significant impact on the local economy.

Briggs & Jennings (2013) used a survey-based approach to estimate the impact of the University of Alberta, rather than the traditional demand-side approach. The authors used Alumni survey data to quantify the effect of organisations started by Alumni on the local economy. Beyond a purely financial approach, the author's survey aimed to identify businesses which had a cultural, environmental or social mission. Dyason and Kleinhans (2017), for example, identified the university-sector links by applying a bill-of-goods approach to identify which sectors benefit as a result of an operational university campus for the Potchefstroom Campus of NWU. This is intended to enhance the ability of regional SAM models to better simulate the economic impact of a university as SAM models are not readily available for such micro levels in South Africa.

The presence of a university positively impacts local businesses. These businesses often employ a number of university students and alumni. Furthermore, the students attracted to the area by the university provide additional customers to these businesses. Ohme (2003) used a survey of local businesses situated within a five-mile radius of the University of Delaware's campus to investigate these benefits. This qualitative analysis showed a positive perception of the university's presence among local business owners (reporting that they considered the university as an asset to their business). Furthermore, some respondents stated that their success was based solely on the presence of the university and many added that the university improved the local community through cultural enrichment.

Studies estimating the supply-side impact

In addition to the economic impact induced by increased expenditure, higher educational institutions affect future output through various supply-side factors. These factors include, but are not limited to, human capital formation, an increase in the region's technological base, the impact of university research, and the promotion of collaboration between universities and local businesses. However, due to measurement challenges and data restrictions, most studies reviewed in this section focused only on the expenditure approach to estimate the economic impact of higher learning institutions and as such have inadequately dealt with the supply-side effects (Blackwell, et al., 2002).

This section aims to provide a qualitative overview of these supply-side economic impacts in order to acknowledge the important contributions to the regional economy through these channels.

Human capital

Education, especially higher education, is an investment in human capital which increases future output and the lifetime earnings of graduates. Universities lead to a more educated and higher earning workforce within a region, leading to increased spending within a local economy (Wayne & Lee, 2011). As such, universities and colleges have been singled out as the premier institutions for generating and maintaining a nation's professional labour force (Bluestone, 1993). Furthermore, Benos & Karagiannis (2016) argued that tertiary education has a productivity enhancing impact on labour. Greenwood *et al.* (as cited in Blackwell et al., 2002) argue that, in addition to increased productivity, the presence of higher education in a region attracts further business activity. It is thus through this channel that universities can drive productivity and longer-term economic growth in a region. The magnitude of this impact is determined by the extent to which graduates remain in the area following graduation.

Although most studies acknowledge the fact that higher educational institutions contribute to a region's human capital, most choose not to quantify its effect due to measurement challenges and a lack of reliable data. Bluestone and Black (both cited in Blackwell et al*.,* 2002) used discounted lifetime earning differentials, obtained from alumni surveys, in an attempt to quantify the impact of higher education on human capital. However, the authors failed to account for ability differences in their analysis which biased the outcomes of their study. Many Canadian studies have attempted similar estimations using wage differential data from the 2006 Census made available by Statistics Canada[8].

A key complication when it comes to the measurement of the human capital impact comes from the fact that one needs to distinguish between the effects of a specific institution's education on future activity levels, and what the effect would have been had the students studied elsewhere. This would allow one to measure incremental economic impact. However, even if information on a student's alternative educational choice was available, it would be impossible to objectively attach a quantitative value to the educational gains of one university versus another. Even if these estimates were made, determining the appropriate discount rate to apply to the future income streams would also prove to be challenging (Blackwell et al., 2002).

Technological base

Another important impact that universities can have on regional economic development is the attraction of highly competitive companies (Garrido-Yserte et al., 2008). Universities play a catalytic role in driving innovation and increasing economic opportunity, allowing regions with universities to embrace innovation and remain globally competitive (O'Connor et al., 2015). This means that higher education institutions

[8] In Sudmant's (2009) economic impact assessment of the University of British Columbia, the author calculates the net present value of a university degree in terms of increased wages, and subtracts the financial and opportunity costs of acquiring the degree to give an estimate of the economic effect of having a university education. Sun and Naqvi (2014) use a similar method, and carefully disaggregate earnings premia by degree type. Notably, these studies highlight the difficulty of quantifying these effects. Pinfold (2011) provides a comprehensive summary of the effects of higher education on earnings differentials in Canada and other developed nations. The author uses a similar technique to the aforementioned studies to quantify the impact of university education on earnings and estimates the marginal tax benefits of obtaining a degree from Dalhousie University.

contribute to an area's technological base to the extent that companies locate to the region and receive inputs from the institution's research efforts and link academic research to the real world (O'Connor et al., 2015). Such innovation positions regional companies, industries and labour force to adapt to a changing economy. The ability of local companies to adapt to changing markets and technologies through innovation determines the degree of dynamism within a region.

Universities can directly create and develop new technologies. In addition, Lester (2005) draws on cross-country studies of innovation enabled industrial change to show that universities can also contribute to local innovation processes in several other ways. Firstly, universities facilitate the transfer of new technology to the economy and attract new human capital, knowledge and financial resources from elsewhere. Secondly, universities facilitate the adaption of foreign technologies to local business conditions and practices. Thirdly, universities can aid in the integration of previously separated areas of technological activity as well as unlock and redirect knowledge in an area that has been developed, but has yet to be put to productive use.

According to Guerrero et al. (2014), in order for a region to sustain a positive per capita growth rate in the long run, there must be continued advances in technological knowledge in the form of new goods, markets, or processes. In this regard, research activities and knowledge transfer initiated through the majority of the universities in the United Kingdom have significantly contributed towards economic growth and development. The authors further state that, through the endogenous growth perspective, "the entrepreneurial university serves as a conduit of spill overs contributing to economic and social development through its multiple missions of teaching, research and entrepreneurial activities."

The measurement of these contributions presents challenges similar to those of estimating the human capital impact of the university. In order to measure these impacts, differences in future economic activity due to the presence of the university in the area, versus what it would have been in the absence of the university, must be calculated and discounted (Blackwell et al., 2002).

Spin-offs

There is growing recognition of the important role that business investment or spin-off ventures play in economic development (Abor & Quartey, 2010). Additionally, Drucker & Goldstein (2007) concluded that "external benefits of knowledge production in the form of spatial spill-overs lead to increased innovation among other regional firms". In order to address spin-off ventures or business investment, the first steps are taken through the academic institution's departments. Business ventures are often characterised by the dynamic interaction of different individuals with varying competencies throughout the start-up process (Clarysse & Moray, 2004). Departmental management reinforces the universities' effective resource allocation and facilitation to these spin-off ventures (Ramussen & Borch, 2010).

The extent to which a spin-off company can be attributed to a university is determined by the strength of the linkages between the two organisations. The spin-off or attribution relationship can be categorised as follows (PriceWaterhouseCoopers, 2009):

- **Transfer of Technology** includes spin-offs created by technologies transferred from the university to either a university-sponsored venture, or ventures started with licensed and/or unlicensed university technology.
- **Transfer of Knowledge (research)** includes companies that have benefited from an intellectual transfer from the university which has been key to their success. This includes research partnerships, joint ventures, and employment of current staff and students.
- **Transfer of Knowledge (people)** includes companies with no direct links to the university, but founded by graduates, faculty or staff.

Research impacts

Dalziel et al., (2009) presented a two-dimensional classification of university research activities and their contribution to regional and national transformation through knowledge transfer. The first dimension explains the type of researcher's inspiration which includes basic and applied research. Dalziel, et al., (2009) explains that "the second dimension creates a distinction based on whether new knowledge produced by university research is part of the university's contribution to non-marketed open science", where the results are open to the public, "or is disseminated in the form of marketed intellectual property". Following the classification used by Dalziel, et al., (2009), the following points briefly clarify the various sources of research inspiration.

- Researcher-inspired research is primarily motivated through a university staff member creating new knowledge out of curiosity and for their own sake, but could eventually be used for commercial usage.
- Government-inspired research is initiated through the response to government policy objectives or requests for research proposals.
- Industry-inspired research has a close link with the government through determining a country's research and development policies in response to the needs of a particular industry.
- Enterprise-inspired research results in contract or consultancy projects for a firm's needs. This is not generally seen as an open science, but more for commercial use. However, there are areas where firms do allow open science. For instance, a technology firm may relocate closer to a university or technology park near a university for engagement in open science among the researchers (Lindelöf & Löfsten, 2004).
- Student-orientated research, such as theses or research essays, is driven by the requirements students need for their completion of a degree, diploma or certificate.

Table 1: Two dimensional classificiations of university reasearch activities in producing new knowledge

	Dissemination of new knowledge	
	Non-marketed open science	Marketed intellectual property
Research-inspired	Conference presentations; journal articles, books and other publications; media and other public statements;	Patents and licenses; spin-off firms; new start incubators
Government-inspired	Contributions to research environment; peer esteem	Public science funds; contract research for policy; University policy institutes
Industry-inspired	Public science funds; tertiary sector ; research assessments exercise	Industry research levies; joint ventures; university research centres
Enterprise-inspired	Research precinct or technology park close to the university	Research sponsored by firms; staff consultancy; university research offices
Student-orientated	Dissertations; research projects ; Master or PhD theses; publications	Employment in a relevant firm; new starts by graduates

Source: Dalziel, et al. (2009)

Several studies have attempted to incorporate the economic impact of university research in their analysis. PriceWaterhouseCoopers (2009) included expenditure of the university on research to measure the impact of research on the local economy surrounding the University of Manitoba. Other studies (Sudmant, 2009; Sun & Naqvi, 2014) estimate the economic impact of university research using total factor productivity (TFP), while others prefer a qualitative analysis (O'Connor et al., 2015; Pinfold, 2011).

3. Stellenbosch Municipality in context

The Stellenbosch Local Municipality (better known as Stellenbosch Municipality) covers the towns of Stellenbosch, Klapmuts, Franschhoek and Pniel – an area of 831km^2. The municipality falls within the Cape Winelands District Municipality and is located in the Western Cape Province. Please note that, as mentioned earlier, the study measures the impact of SU on the broader municipality, not just the town of Stellenbosch.

Economic profile

According to data from Quantec Research (2017), the Stellenbosch economy grew by an annual average of 2.8% from 2005 to 2015. The construction sector recorded the fastest growth rate over this period (at an average of 6.5%), followed by transport, storage and communication (at 5.9%), and finance insurance, real estate and business services (at 4.3%). Stellenbosch has not fully recovered from the 2008/09 economic recession, as the average growth rate for 2010 to 2015 is lower than the preceding five years.

According to the National Treasury of the Western Cape Government (2017), Stellenbosch has a marginally higher real GDP per capita (at R61 187 in 2016) compared to the Western Cape Province (at R61 619) when accounting for the different population sizes. The gap used to be bigger, but has narrowed substantially over the past few years. Stellenbosch's GDP per capita is still significantly higher compared to that of the Cape Winelands District (at R50 239). However, the per capita indicator does not give any insights into the distribution of income in the region.

In all, while Stellenbosch covers just 4% of the geographical area (831km^2) of the Cape Winelands District, it contributed 24% to the gross value added in the District in 2015 (Quantec Research, 2017).

The sectoral composition of the Stellenbosch economy is similar to that of the Western Cape, which, in turn, is more services-orientated than the South African economy – see Table 2. Aside from the well-developed tertiary sector, Stellenbosch's manufacturing sector also contributes significantly to the local economy. Compared to the other regions, Stellenbosch has a bigger agricultural sector, but there is virtually no mining and quarrying activity.

Table 2: Sectoral composition of gross value added (at basic prices) in South Africa, Western Cape, Cape Winelands District and Stellenbosch Municipality in 2015[9]

(% share)	South Africa	Western Cape Province	Cape Winelands District	Stellenbosch Municipality
Agriculture, forestry and fishing	2.3	3.7	8.8	**5.6**
Mining and quarrying	7.8	0.2	0.2	**0.2**
Manufacturing	13.4	15.3	15.8	**17.0**
Electricity, gas and water	3.8	2.9	2.2	**1.4**
Construction	4.1	5.9	6.9	**5.6**
Wholesale and retail trade, catering and accommodation	15.0	17.2	18.5	**20.2**
Transport, storage and communication	10.2	11.2	9.8	**11.0**
Finance, insurance, real estate and business services	20.3	25.5	19.9	**21.6**
General government	17.2	11.4	10.4	**10.6**
Community, social and personal services	5.8	6.8	7.6	**6.8**
Total	100.0	100.0	100.0	**100.0**

Source: Quantec Research (2017)

Property market

As highlighted above, the fastest growing sector in Stellenbosch has been the construction sector. This can be linked to the outperformance of the property market in the Western Cape as well as Stellenbosch. To provide some context, Figure 2 and 3 below show the trend in house prices across the country – as measured by the FNB House Price Index from 2001 to 2016. The Western Cape and the City of Cape Town have experienced significantly higher property prices than the national average since 2001. Similarly, housing prices in the Western Cape have increased faster than the national average since early-2011.

[9] Official national account statistics for South Africa's provinces are released with a significant lag and the 2015 figures are the latest available. The figures for Cape Winelands and Stellenbosch are estimates from Quantec Research.

Figure 2: FNB house price index

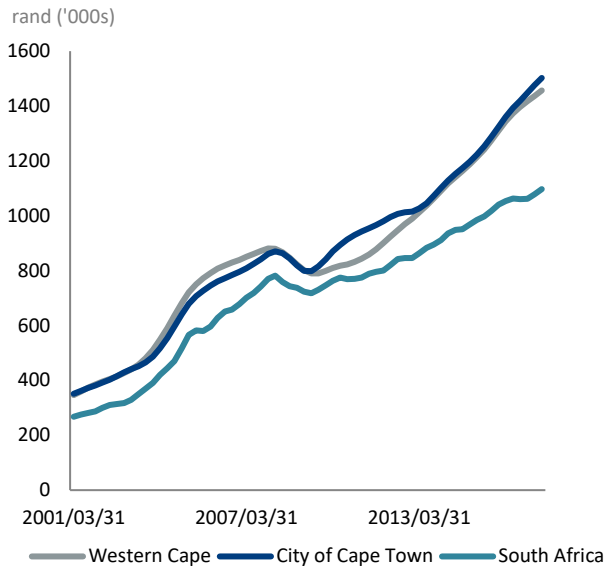
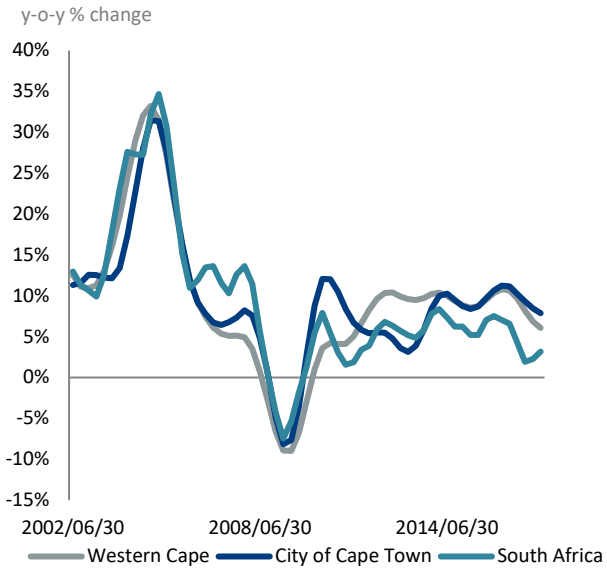


Figure 3: FNB house price index (y/y growth).



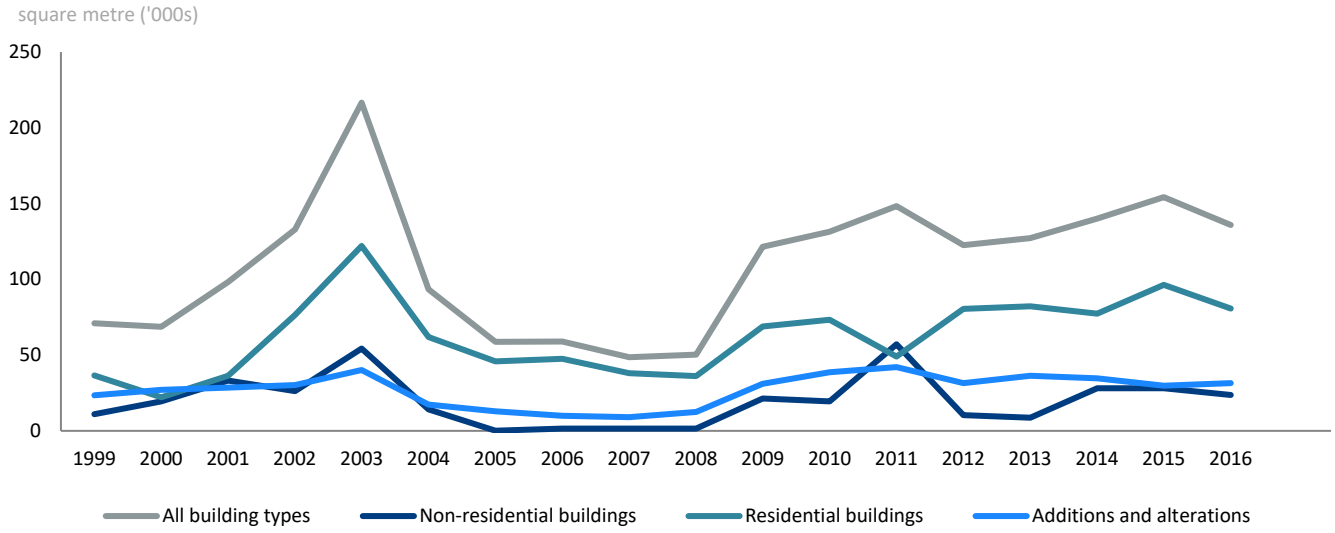
Source: Quantec Research (2017)

Unfortunately there is no specific house price index for Stellenbosch. However, Stellenbosch has also experienced a boom in the local property market, driven by increased demand for housing (and specifically student housing) in the area. SU's student population continues to grow as demand for education at the institution continues to rise, bringing with it an influx of students from various other regions. The demand for accommodation on campus has subsequently risen consistently over the last 20 years. The university currently accommodates 28% of the student body in university-owned accommodation options, with the remaining 72% requiring accommodation in privately-owned accommodation[10]. The scope for the university to expand its residence facilities is limited, thus private investors have entered the market to capitalise on the rising demand for private accommodation.

Figure 4 illustrates the number of building plans passed (in total square metres) per building category in Stellenbosch from 2006 to 2016. The steady growth in total building plans passed is attributable to the growth of residential demand of which a significant proportion has been driven by growing demand for accommodation by students enrolled at SU as the university expanded. Much of this growth has been driven by private developers investing in the area (Western Cape Government Provincial Treasury, 2017).

[10] This will be assessed in detail in a later section (Student residence).

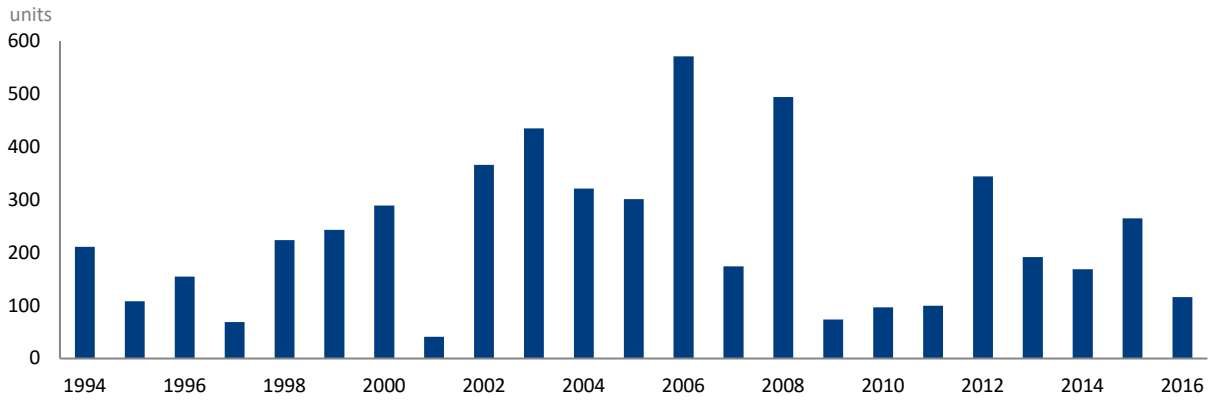
Figure 4: Stellenbosch building plans passed (in total square meters)



Source: Statistics South Africa (2017b)

In an attempt to estimate the impact the presence of SU has had on this strong growth, Figure 5 shows new sectional title schemes within the Stellenbosch municipality from 1994 to 2016. As the figure illustrates, new sectional title schemes have been registered each year. In the aftermath of the global financial crisis which resulted in a recession in South Africa in 2008/09, the number of new sectional title schemes slowed, but again showed some resilience from 2011 to 2014.

Figure 5: New sectional titles, Stellenbosch (units)



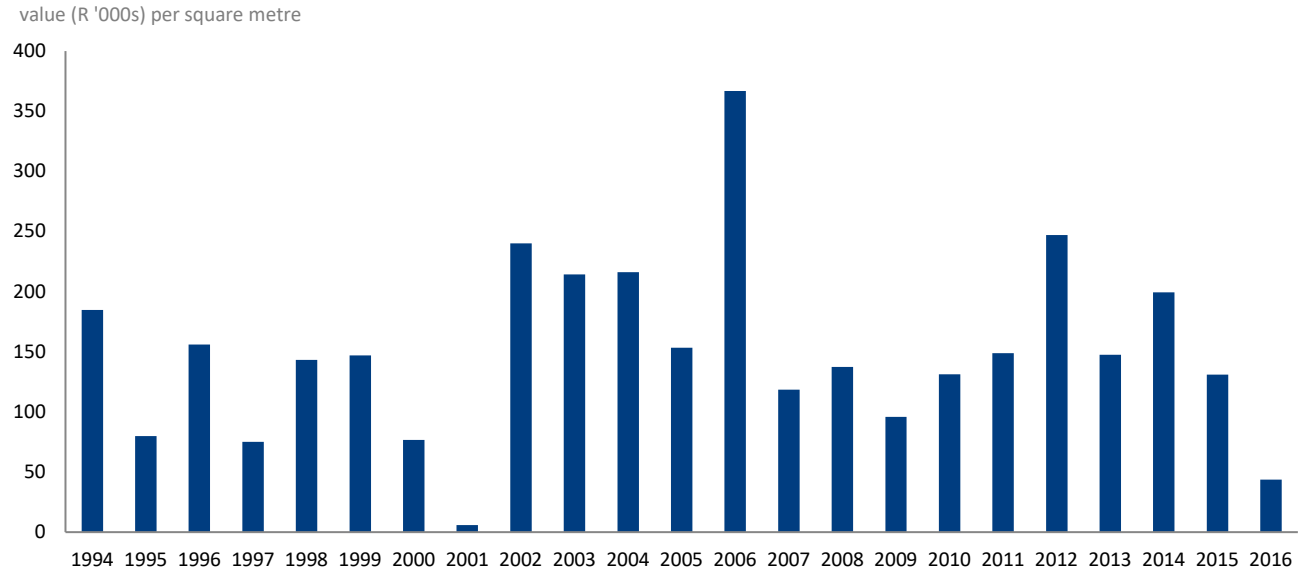
Source: Municipal Records (2017)

Total building plans passed for Stellenbosch illustrated in Figure 4 seems to indicate a less volatile market, but with the same easing of growth from 2014.

The increase in sectional title schemes in Stellenbosch has been matched by a similar increase in value, indicating that the supply of new sectional title schemes has been matched by a similar demand. Figure 6 illustrates the increase in value per square metre of all sectional titles in Stellenbosch over the period from 1994 to 2016. Again, the muted growth in value per metre might imply that many of the new developments might have been designed as more affordable housing options as development started

spreading to the outer areas of town. The values implied here also rely on calculations based on the municipal valuations roll and are not necessarily correlated to market prices.

Figure 6: Sectional titles, Stellenbosch (Value/area)

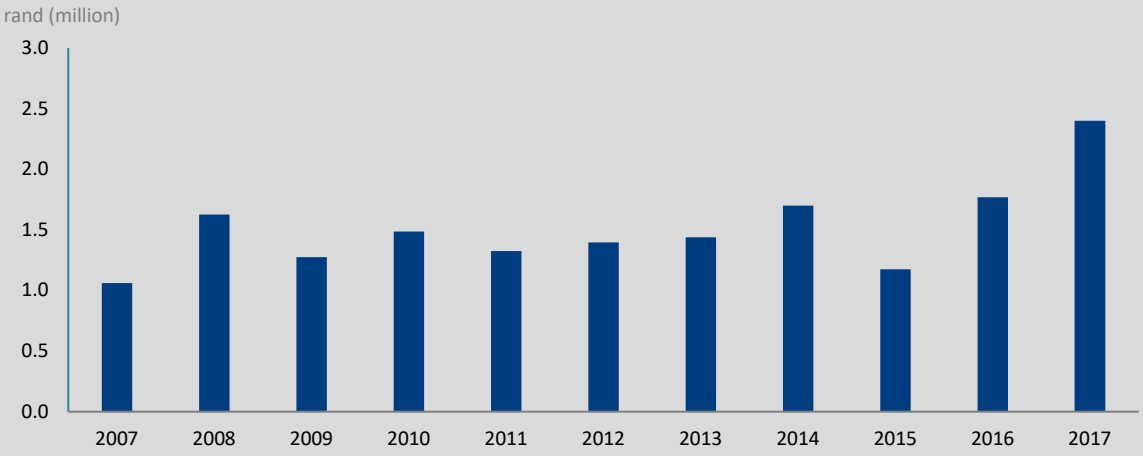


Source: Municipal records (2017)

Case study: East Lynne flats

As the current research focusses on the role of the university on the local economy it is perhaps instructive to rather look at the movements in values on areas/buildings that are perceived to be student orientated. For example, East Lynne flats, located in the centre of town (42 Die Laan) and very close to the main campus is a large complex comprising 70 units. It was first registered as a sectional title scheme in 1993 implying that building costs have long formed part of the underlying capital and tax base of Stellenbosch. East Lynne remains very popular with students and young working professionals, and in general price developments are linked to demand from students to attend SU.

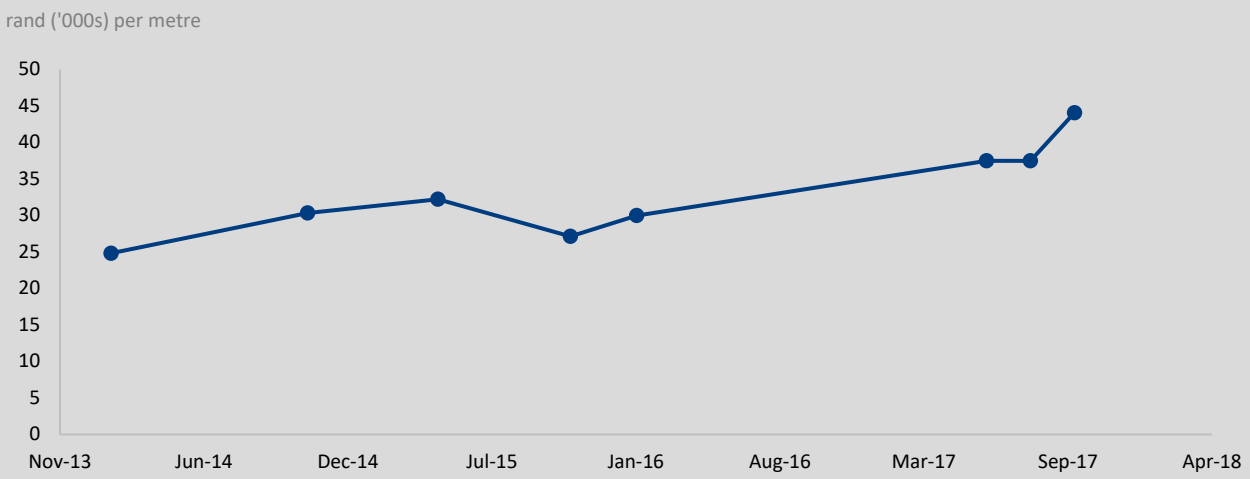
Figure 7: East Lynne prices achieved per apartment (median)



Source: Lew Geffen Sotheby's (2017)

As illustrated in Figure 7, the values of East Lynne properties have remained resilient and more than doubled in ten years even while the rest of the market has remained much more muted. This trend is even more apparent when the actual rate per square meter is used as variable, which takes the varying sizes of apartments into consideration. The last ten sales transactions recorded for East Lynne properties have all occurred from 2014 onwards. During this time, the average rate per metre has increased significantly, as illustrated in Figure 8.

Figure 8: East Lynne sale prices achieved per metre squared



Source: Lew Geffen Sotheby's (2017), BER calculations

The results imply that there has been a near doubling of values in only four years. From this limited example, it might be argued that the portion of the local property market linked to the student market has outperformed or, at least, supported the rest of the property sector to some extent. Without extensive primary research it is not possible to apportion values to the property sector directly linked to the existence of the university other than to say that it is probably highly significant. Elsewhere in this document reference is made to the rental expenses of both students and staff of the university which is a significant support base for the local property market.

In all, it is also important to highlight that building activity is local by nature. This means that it attracts financial flows to the region from other areas. This form of investment provides a direct economic impact to the Stellenbosch region through construction-related expenditure. Furthermore, this expenditure has an indirect effect on the local economy through various channels, including increased spending by employees within the area. The magnitude of this effect is determined by the extent to which local companies and workers are hired in the construction process.

The economic impact of the increased expenditure on capital projects within Stellenbosch as a result of the increased demand for accommodation stemming from SU's student body is thus substantial. Other economic impact studies have included estimates of construction spending in their analysis (see Sudmant (2009) and Sun & Naqvi (2014)), however, the analysis of this paper will not include this expenditure in its estimates of SU's economic impact.

Socio economic profile

The socioeconomic profile of Stellenbosch cannot be interpreted without acknowledging the impact of nationally determined factors, such as wage rates, labour legislation, taxation, energy and the availability of skills. This caveat is highlighted when appropriate and a brief context is provided when it comes to concepts such as unemployment and job growth, but the broader context falls beyond the scope of this study.

Employment, educational attainment and earnings

Stellenbosch employed about 20% of the workforce in the Cape Winelands District in 2015 and about 3% of the total number of people employed in the province. As would be expected, the sectoral **employment** profiles of the different regions (shown in Table 3) are very similar to the output profile illustrated in Table 2 above. The biggest employer in Stellenbosch is the wholesale and retail trade, catering and accommodation sector – this is in line with the national and provincial picture. The tertiary industry in general is responsible for the majority of the jobs in Stellenbosch. However, employment in the agricultural sector is also significant in comparison to the national reading. Furthermore, while agriculture contributed only 5.6% to Stellenbosch's gross value added in 2015, it provides employment to 12.3% of the total workforce. This is due to the labour intensive nature of the type of agriculture (mainly viniculture) in Stellenbosch.

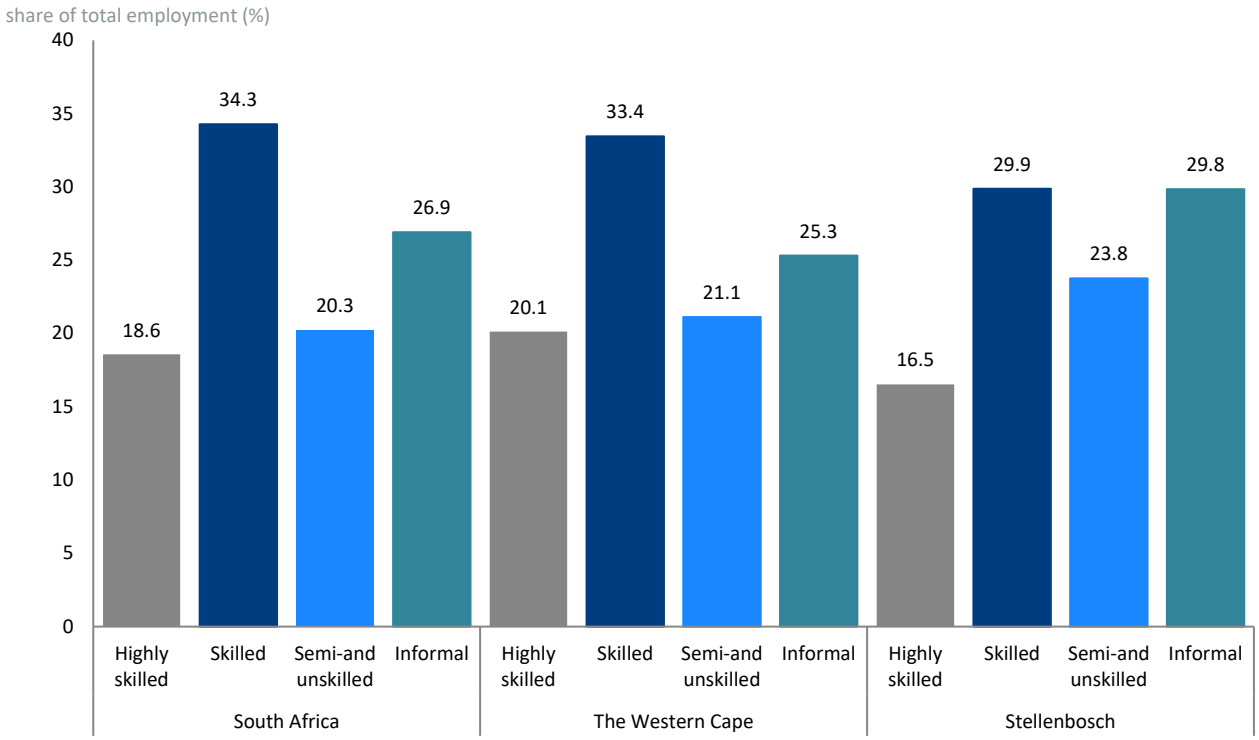
Table 3: Sectoral composition of total employment in South Africa, Western Cape, Cape Winelands District and Stellenbosch Municipality in 2015

(% share)	South Africa	Western Cape Province	Cape Winelands District	Stellenbosch Municipality
Agriculture, forestry and fishing	6.5	9.0	19.2	12.3
Mining and quarrying	3.1	0.1	0.0	0.0
Manufacturing	8.8	9.7	8.2	10.2
Electricity, gas and water	0.4	0.3	0.3	0.2
Construction	8.0	8.0	7.2	6.4
Wholesale and retail trade, catering and accommodation	23.3	23.8	23.1	26.4
Transport, storage and communication	5.5	5.7	4.8	5.7
Finance, insurance, real estate and business services	15.7	17.2	13.5	15.2
General government	12.4	11.7	9.7	9.9
Community, social and personal services	16.5	14.5	14.2	13.5
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: Quantec Research (2017)

The majority (70.2%) of the workers employed in the formal agricultural sector are, however, semi- or unskilled. This, in part, explains why Stellenbosch's employment profile has a higher share of semi-and unskilled workers compared to the national or provincial experience – see Figure 9 below. Overall, the majority of the workforce in Stellenbosch is skilled, followed by employees in the informal sector. The latter could be linked to the tourism-orientated nature of Stellenbosch, which provides work opportunities in the informal sector.

Figure 9: Employment share per skill level for South Africa, the Western Cape and Stellenbosch in 2015



Source: Quantec Research (2017)

The **skills composition** of Stellenbosch has changed over the past two decades. Indeed, while the majority of the workforce was still regarded as semi-and unskilled during the 1990s and early 2000s, this contribution has shrunk over recent years.

This is mainly due to the relatively larger informal sector. The Western Cape and Stellenbosch have always had a lower **unemployment rate** compared to the national average (Quantec Research, 2017). Part of this is because the Western Cape had no Apartheid-era homelands. Another important reason why the Western Cape, but particularly Stellenbosch, experiences a lower unemployment rate is due to higher levels of **educational attainment**. Stellenbosch residents have, on average, a higher level of educational attainment compared to the provincial and national level. This is particularly true for tertiary education. According to the 2011 Census data from Stats SA, 3.9% of Stellenbosch residents have a degree, compared to 2% at a national level. Furthermore, 1.2% of residents has a post-graduate degree, compared to a national average of 0.4%. The presence of a university or higher education institution can be a catalyst for economic growth in a region (PriceWaterhouseCoopers, 2009). Importantly, for a regional analysis, the overall impact is affected by the extent that students remain in the region after graduation. The role as a growth catalyst is not limited to the direct expenditure-based benefits, but also impacts the economy through human capital development. For example, Abel & Gabe (cited in Appleseed 2012) found that in the USA, a one percentage point increase in the proportion of residents with college degrees can be associated with a 2.3% increase in metropolitan GDP per capita. Similarly, Moretti (cited in Appleseed 2012) was able to show that a 1% increase in the percentage of workers who have degrees can be associated with a 1.6% increase in the earnings of workers that only have high school diplomas.

According to data from Statistics South Africa (Stats SA, 2017a), university graduates in South Africa also receive higher **earnings** once employed and generally experience lower levels of unemployment. As measured by the Quarterly Labour Force Survey (QLFS) from Stats SA, the graduate unemployment rate measured just 5.8% in the third quarter of 2017, compared to 32.7% among those with less than matric. The overall unemployment rate (following the narrow definition, thus excluding discouraged workers) stood at 27.7%. Data from Quantec Research (2017) also shows that employees with higher skill levels are rewarded by higher real earnings. Skilled and semi-skilled workers, on average, earn up to four times as much as their low-skilled counterparts – this gap has widened over recent years. Moreover, it is argued that education has an indirect positive effect on health and life expectancy, and promotes general welfare within a region (Socio-economic Profile Stellenbosch Municipality, 2015).

4. Size and structure of SU

This section provides an overview of the structure of SU, as well as the staff and student profile. This is relevant because the reasoning behind many of the key assumptions made and used in the final EIA analysis are set out in the section.

The history of SU dates back to 1685 when regular school education was initiated in Stellenbosch, followed by higher education (Theological Seminary of the Dutch Reformed Church) in 1859. The adoption of the University Act in 1916 led to the establishment of Stellenbosch University in 1918. The institution started with 40 lecturing staff members and just over 500 students. In the past 100 years, SU has grown considerably, not only in terms of its staff complement and student numbers, but the academic offerings have also been significantly expanded.

Today, the university is spread over five main campuses: Stellenbosch main campus, Tygerberg medical campus, Saldanha (military science), Bellville Park (housing the Graduate School of Business, School of Public Leadership, and the University of Stellenbosch Business School – Executive Development (USB-ED)), as well as the Ukwanda Rural Clinical School situated in Worcester (where medical and related health sciences students can complete their studies in a rural setting).

These five campuses house the university's ten faculties: AgriSciences, Economic and Management Sciences, Medicine and Health Sciences, Engineering, Military Services, Arts and Social Sciences, Science, Education, Law and Theology. These faculties offer an array of certificate, diploma and degree programmes.

In addition, Elsenburg College (officially known as the Cape Institute for Agricultural Training: Elsenburg) offers a bachelor's degree in agriculture in association with the Faculty of AgriSiences at SU. The degree is accredited by SU and thus these students are included in SU's enrolment figures. Furthermore, the African Institute for Mathematical Sciences (AIMS) offers courses as part of their master's programmes in Mathematical Sciences. The institute, which is located in Muizenburg, is a partnership project between the universities of Stellenbosch, Cambridge, Oxford, Paris-Sud XI, Cape Town and the Western Cape. Academics associated with SU present classes as part of the AIMS master's programme.

Rankings and research at SU

SU has cemented its reputation as a world-class institution of higher education. According to the Quacquarelli Symonds World University Rankings, SU held the 361st position out of 950 universities covered in 2017/18. This places SU as the second-highest university in South Africa. SU has consistently improved its position on the global ranking, largely due to its increased research output and internationalisation. SU has also improved its ranking on the Times Higher Education University Rankings from 2017 to 2018, and is currently placed in the 351-400 category of the more than 1 000 universities rated. A driving factor behind SU's improved performance in the rankings was the significant improvement in the research pillar of the scoring process.

SU strives to be locally relevant, with a regional impact, while simultaneously being globally competitive in its research. The university is one of the top research-focused universities in South Africa and the African continent. SU

hosts 430 National Research Foundation (NRF) rated researchers (Stellenbosch University, 2017). SU's research footprint is diverse. In 2017, the university received more than 2 500 research contracts and conducted more than 70 joint projects with national science councils. In addition, SU is home to seven centres of excellence and 38 research chairs.

SU's reputation as a leading research institute attracts large inflows of funding. In 2015, the university received R865 million in funding for research (Stellenbosch University, 2017). This represents a significant direct inflow of funds into the Stellenbosch economy, and acts as a catalyst for innovation at the university.

Staff[11]

A university is a so-called stable employer because, unlike private companies, it is unlikely to close or relocate in difficult economic circumstances (Oxford Economics, 2016). This reduces the risk of economic volatility in a region. This benefit extends beyond just the university's direct suppliers through the entire supply-chain and local staff spending, fostering a greater degree of stability and confidence in the region (Oxford Economics, 2016).

As of May 2017, the university employed a total of 5 273 staff members across all campuses. As indicated in Table 4, 3 549 staff were employed at the Stellenbosch main campus, constituting 67% of the total staff employed by SU. As such, the university is a significant employer in Stellenbosch as around 6.5% of the total number of formal-sector jobs in the municipal area were directly offered by SU (Quantec Research, 2017). This was followed by the Tygerberg campus which employed 1 538 staff, which is 29% of the university's total employment. The Bellville campus employed 137 staff members (2.6%), followed by the AIMS campus with 44 (0.8%), and Saldanha with only 5 employees (0.1%).

Table 4: Staff distribution across campuses

	Number of staff members	*Share of total staff SU staff members (%)*
Stellenbosch	3 549	*67.3*
Tygerberg	1 538	*29.2*
Bellville	137	*2.6*
AIMS (Muizenberg)	44	*0.8*
Saldanha	5	*0.1*
Total	**5 273**	

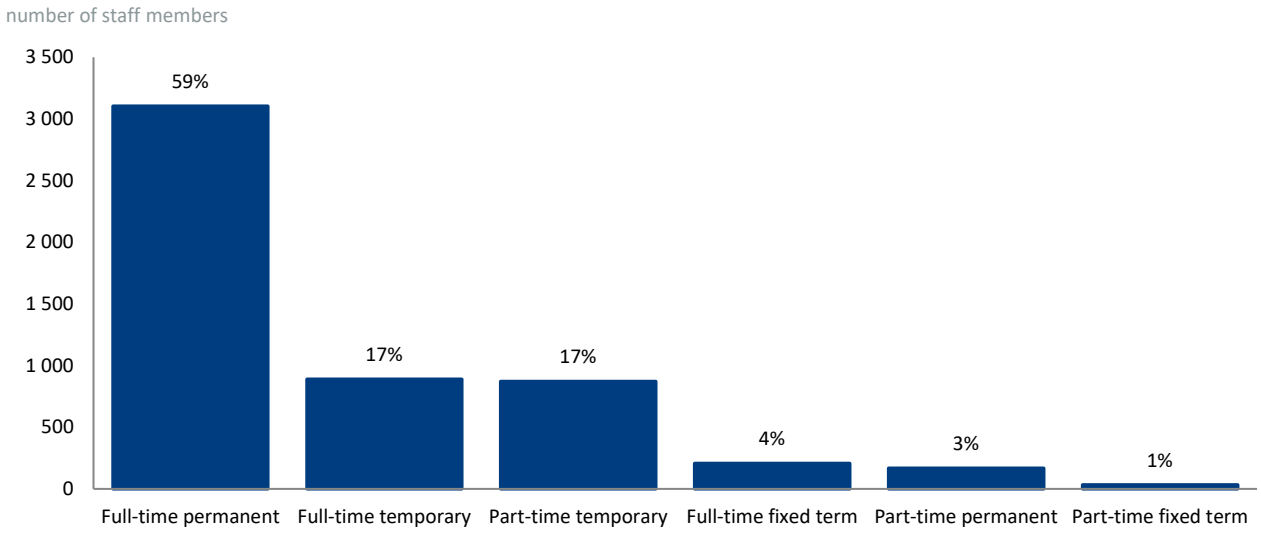
Source: Staff data provided by SU's human resources department

Of the 5 237 staff members employed, 1 509 (28.6%) are academic, while 3 764 (71.4%) are support staff. For Stellenbosch main campus, the distribution between academic and support staff is similar to that of the total staff cohort – 31.6% vs. 68.4%.

[11] This subsection is based on staff data provided by the university's human resources department in May 2017. Please note that staff numbers vary over time due to regular changes in temporary staff members.

As illustrated by Figure 10, the majority (58.8%) of SU's staff is employed on a full-time permanent basis, followed by 16.9% and 16.5% who are employed on a full-time and part-time temporary basis respectively. At Stellenbosch main campus, 71.1% is employed on a full-time permanent basis, followed by 16.1% part-time temporary and 6.5% full-time temporary staff members.

Figure 10: Staff members by assignment category[12]

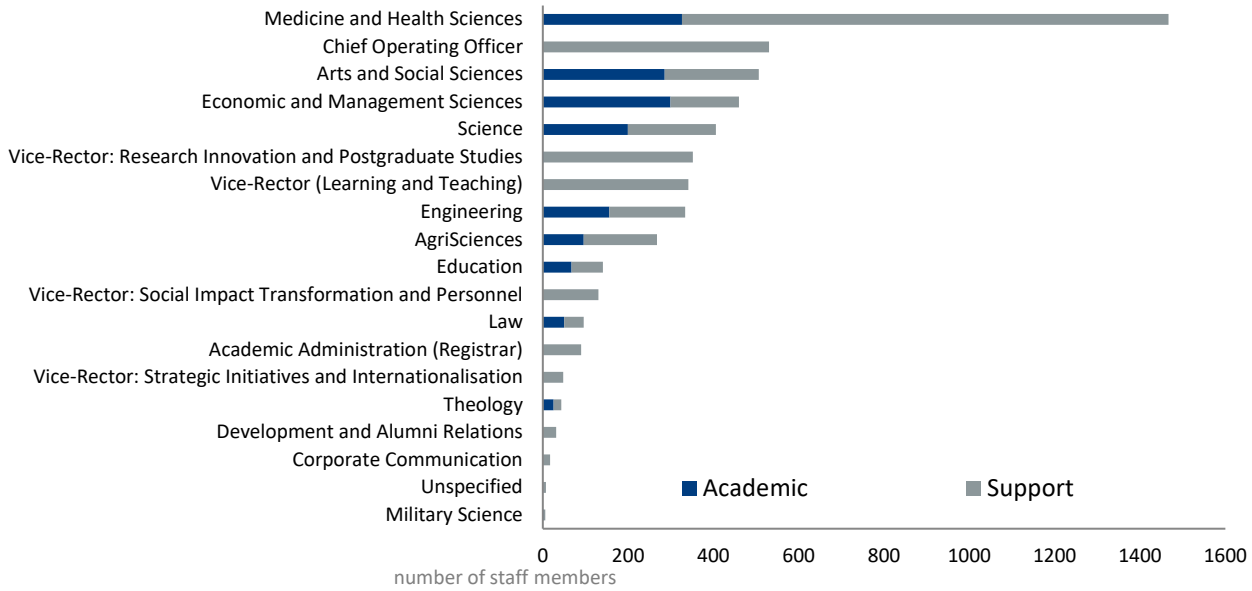


Source: Staff data provided by SU's human resources department

SU employees are distributed across ten faculties and eight departments. The largest employer is the Faculty of Medical and Health Sciences, with 326 academic and 1 141 support staff members. The Chief Operating Officer's (COO's) office constitutes the second largest number of employees with 530 support staff. This is followed by the Faculty of Arts and Social Sciences which employ 286 academic and 220 support staff. Figure 11 shows the breakdown of academic and support staff across the various departments and faculties of the university.

[12] The height of bars refer to the number of staff member shown on the left axis, however, the data labels show the percentage share the particular category contributes to overall employment at SU.

Figure 11: Faculty/department breakdown by academic/support staff



Source: Staff data provided by SU's human resources department

Place of residence of staff

The purpose of the study was to estimate the impact of SU on the Stellenbosch Municipal Area. Staff members who do not live within Stellenbosch have a reduced impact on the local economy because a bigger portion of their expenditure occurs outside of the region. It was therefore important to split university employees into locals (i.e. those residing in the municipal area) and non-locals (i.e. those residing outside the municipal area, for example in Somerset West, Cape Town or Bellvile). Fortunately, the staff data that was provided by SU's Human Resources Department included home addresses[13]. This allowed us to divide the staff members into those who live in Stellenbosch versus those who live elsewhere. Table 5 shows that 52.3% of Stellenbosch (main campus) staff live within Stellenbosch, while the remainder (47.7%) commute to campus. Of the staff employed at the other campuses, only a small proportion lives in Stellenbosch – 98 staff members in total. Given the small number who live and therefore spend a proportion of their salaries and wages in Stellenbosch, it was decided to exclude Tygerberg, Bellville, AIMS and Saldanha from our survey sample – more on this in the methodology section.

[13] Please note that staff members' SU numbers were excluded from the dataset, therefore home addresses could not be linked to a specific staff member.

Table 5: Staff residence by campus

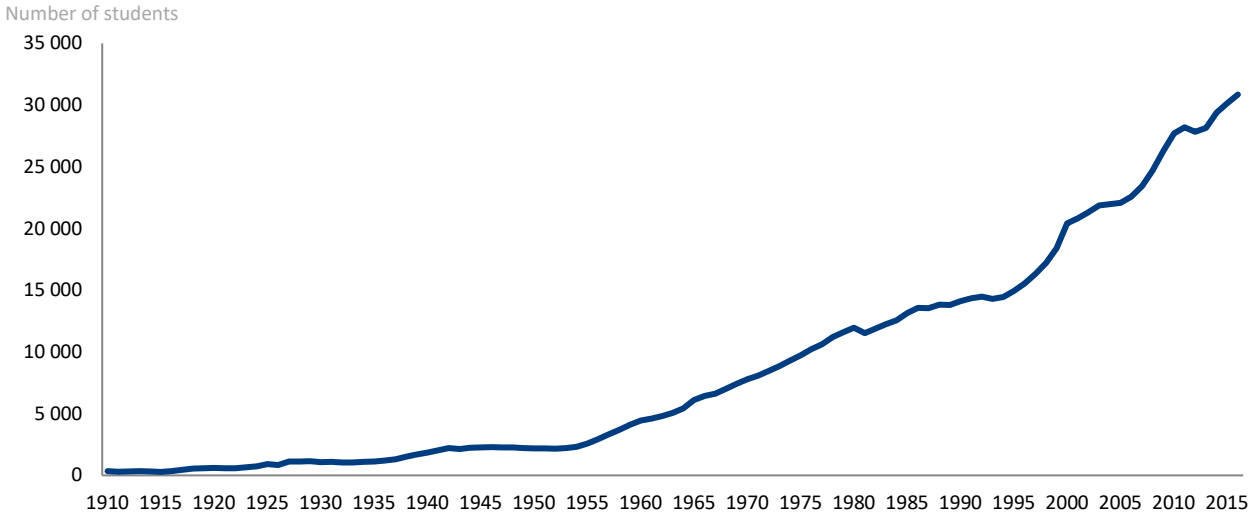
	Total staff numbers per residence area				
	Stellenbosch Municipal Area	*Share of total staff members (%)*	Other	*Share of total staff members (%)*	Total
Stellenbosch (main campus)	1 855	*52.3*	1 694	*47.7*	3 549
Tygerberg	75	*4.9*	1 463	*95.1*	1 538
Bellville	20	*14.6*	117	*85.4*	137
AIMS	3	*6.8*	41	*93.2*	44
Saldanha	0	*0.0*	5	*100.0*	5

Source: Staff data provided by SU's Human Resources department

Students[14]

Figure 12 shows how the number of students have grown since the early 1900's. SU's student body has grown consistently since the 1950s. In December 2017, SU awarded 5 720 degrees, certificates and diplomas. This is 420 qualifications more than December 2016 and 700 more as in 2015.

Figure 12: Number of students enrolled at SU: 1910 – 2016



Source: Statistical Profile, 2016

At registration in 2017, SU had a total enrolment of 32 003 students in all ten faculties. The distribution across the five campuses is included below in Table 6. Students enrolled at the main campus comprise 77.3% of SU's total enrolment, or 24 725 students. This is followed by 4 434 at the Tygerberg Campus, 1 954 at Bellville Park, 629 at Saldanha, and 261 at Elsenburg.

[14] This subsection is based on the 2017 registration data as captured by SU's Student Information System Support.

Table 6: Number of students per campus

Campus	Number of students	*Share of total students (%)*
Stellenbosch	24 725	*77.3*
Tygerberg	4 434	*13.9*
Bellville Park	1 954	*6.1*
Saldanha	629	*2.0*
Elsenburg	261	*0.8*
Total	**32 003**	

Source: Student data provided by SU's Student Information System Support

As shown in Table 7, the majority of students (61.7%) enrolled for an undergraduate bachelor's degree at the beginning of 2017. Being a research-intensive institution, the student body also consists of a sizeable postgraduate contingent. Students enrolled in a postgraduate degree, certificate or diploma comprise another 33% of the total student body.

Table 7: Number of students enrolled by programme type

Programme	Number of students	*Share of total students (%)*
Undergraduate bachelor	19 730	*61.7*
Masters	4 808	*15.0*
Honours	1 886	*5.9*
Postgraduate diploma	1 735	*5.4*
Doctoral	1 598	*5.0*
Special student	1 319	*4.1*
Postdoctoral	309	*1.0*
Postgraduate bachelor	192	*0.6*
Postgraduate certificate	189	*0.6*
Undergraduate diploma	129	*0.4*
Bridging diploma	101	*0.3*
Undergraduate certificate	7	*0.0*
Total	**32 003**	

Source: Student data provided by SU's Student Information System Support

White students comprise 19 131 of students, or 59.8%, of the total enrolment at Stellenbosch University. Followed by black students with 6 111 students (19%) and coloured students (5 779 or 18%) – see Table 8.

Table 8: Racial profile of SU students

Race	Number of Students	*Share of total students (%)*
White	19 131	*59.8*
Black	6 111	*19.1*
Coloured	5 779	*18.1*
Indian	973	*3.0*
Unknown	9	*0.0*
Total	**32 003**	***100***

Source: Student data provided by SU's Student Information System Support

International students at Stellenbosch University

SU has established a vast international network including agreements and membership with over 15 international consortia, granting local and international students, staff and postdoctoral researchers an array of study and development opportunities at 150 universities, spanning 44 countries and 6 continents across the globe.

In 2017, there were 3 723 international students enrolled at SU which represents 11.6% of the university's total enrolment. A significant contributor to this figure is the high representation of international students from other African countries. In 2017, 2 452 students from the rest of Africa were enrolled at SU, comprising 7.7% of the total student population. Furthermore, as Table 9 illustrates, students from other African countries constitute a significant portion of SU's postgraduate student body, especially at doctoral and postdoctoral level. These figures illustrate that SU is a leading institution for driving educational progress on the African continent.

Table 9: Distribution of postgraduate students by nationality

	Honours	Masters	Doctoral	Post-doctoral
International students: other African countries	93	825	399	51
International students: other	25	119	108	83
South African students	1 768	3 864	1 091	175
Total	**1 886**	**4 808**	**1 598**	**309**

Source: Student data provided by SU's Student Information System Support

Although this study is largely focused on the impact of SU on the local economy, the figure illustrates that SU is well established as a leading research institution, both on the African continent and internationally. This reputation attracts postgraduate students from other tertiary institutions. This holds particularly true for international students from other African countries who choose to pursue their postgraduate qualifications at SU. This leads to a transfer of knowledge and skills which can be implemented in their respective countries upon their return.

From an economic impact perspective, it is also important to note that many of these international students receive visitors from home during the course of their studies. While in Stellenbosch, these visitors often require accommodation, visit restaurants and pay fees to enter local cultural and entertainment attractions etc. This stimulates further economic activity in the region.

Student residence

Due to the objective of the study being to estimate the impact on the Stellenbosch region rather than the total impact, it was critical to isolate our estimates to the economic impact from student expenditure within the Stellenbosch Municipal Area. The student data included residence addresses, which allowed us to divide students into those who live in Stellenbosch and those who do not. It is important to note that the majority of students from the Tygerberg, Saldanha and Bellville campuses do not live in Stellenbosch. As Table 10 indicates, only 136 (7.0%) of the students enrolled at the Bellville campus, 132 (3.0%) Tygerberg students and 1 (0.2%) student enrolled at the Saldanha campus live in Stellenbosch. As a result, this study excludes spending by these students when assessing the economic impact of student

spending. However, given the sizeable proportion of Elsenburg students living in Stellenbosch, it was decided to include Elsenburg in our survey sample. Going forward, we will therefore mainly focus on Stellenbosch (main campus) and Elsenburg students.

Table 10: Student residence by campus

	Total student numbers per residence area				
	Stellenbosch Municipal Area	*Share of total students (%)*	Other	*Share of total students (%)*	Total
Stellenbosch (main campus)	16 963	*68.6*	7 762	*31.4*	24 725
Tygerberg	132	*3.0*	4 302	*97.0*	4 434
Bellville	136	*7.0*	1 818	*93.0*	1 954
AIMS	212	*81.2*	49	*18.8*	261
Saldanha	1	*0.2*	628	*99.8*	629

Source: Student data provided by SU's Student Information System Support, BER assumptions

Various housing options are available to Stellenbosch main campus students. As of 2017, university accommodation on main campus accommodated 5 667 students in university residences, 976 students in university apartments, and 302 students in university houses.

In addition to these facilities, Academia, a privately-owned student residence associated with the university, provides accommodation for 703 students. Furthermore, several private accommodation options have been developed to take advantage of the surplus demand for accommodation on or close to campus. Students living in private accommodation are members of Private Student Organisations (PSO's) and make up the majority of students. Of the 24 725 main campus students, 17 076 live in private housing – of which 9 314 are situated within Stellenbosch and 7 762 elsewhere (see Table 11).

Elsenburg students are offered accommodation in the Elsenburg College Hostel, which housed 182[15] of the 261 students enrolled at the college in 2017. The Elsenburg College Hostel is independent of SU, and thus the students are captured as PSO members in our dataset. Students who do not qualify to be housed in the hostel for the academic year are required to find alternative housing solutions. Of the remaining students, 28 live in private housing, 3 live in SU residences and 1 student lives in Academia.

[15] Students who recorded their address as 'Elsenburg' at registration were assumed to live in the Elsenburg College Hostel.

Table 11: Stellenbosch main campus and Elsenburg: Housing option and local/non-local split

Stellenbosch (main campus)	Stellenbosch local municipality	%	Other	%	Total
PSO	9 315	*54.9*	7 762	*100*	17 076
Academia	703	*4.1*	-		703
University apartment	976	*5.8*	-		976
University house	302	*1.8*	-		302
University residence	5 667	*33.4*	-		5 667
Total	**16 963**		**7 762**		**24 725**
Elsenburg campus	**Stellenbosch local municipality**	*%*	**Other**	*%*	**Total**
PSO	210	*98*	47	*100*	257
Academia	1	*0.5*	-		1
University residence	3	*1.5*	-		3
Total	**214**		**47**		**261**

Source: Student data provided by SU's Student Information System Support, BER assumptions

Determining the residence: data challenges and limitations

For the purpose of this study, it was important to know whether students and staff reside in Stellenbosch or not, as this would affect their spending in town.

There were many inconsistencies in the student data provided by the University's Student Information System Support department. This meant that the data first had to be 'cleaned' and certain assumptions had to be made in the process. This box highlights just some of the challenges we faced during this process.

For example, the student data included columns on 'accommodation', 'residence address' and 'parent address'. However, in the accommodation column some students would say that they live in university housing (student residence/house/apartment) or Academia, but at residence address they would give an address in another town. Therefore, the residential addresses for anyone staying in university housing or Academia had to be changed to a Stellenbosch address. In addition, there were a number of students who did not provide an address, but based on their accommodation type (student residence/Academia etc.) they were classified as either Stellenbosch locals or not. Unfortunately, this was impossible to do for PSO students and all the blanks were lumped under non-Stellenbosch in order not to over-estimate the impact. Almost 10% of Stellenbosch main campus students provided addresses in other countries (or more than 100km away) or left residence address blank. Given that the majority of these students studied full time, it is impossible for these to live so far away from campus. Again, these were all lumped together as non-locals. The impact of this assumption is expected to be negligible.

In the staff data there were also full-time permanent staff members who provided addresses in other countries (or more than 100km away). These were all lumped together as non-locals. Again, the impact of this assumption is expected to be negligible.

5. Methodology

As mentioned earlier, this study will largely focus on the quantification of the economic benefits resulting from:

- The University's operational and capital expenditure within the local economy and,
- Local expenditure by staff and students

Please note that the BER will not attempt to quantify the additional expenditure by **visitors** or **spin-off companies**. However, in the next section, an overview of the US Woordfees as an example of an event that attracts visitors to Stellenbosch is provided. In addition, a qualitative discussion of Stias and Innovus will address some of the benefits of spin-off companies.

Economic impact assessment

An EIA provides a quantitative tool to calculate the economy-wide benefits of a particular event on the economy. The event can either include changes (i.e. opening, closing, expansion or contraction) in an industry or project, or in this case, the presence of an existing institution (i.e. SU) or industry. An EIA estimates the effects of an increase in demand by way of multiplier analysis, which measures the response of the economy to a **change in demand for goods and services**. The name, economic multiplier, is derived from the **multiplicative** effect of a specific event or institution on an economy. The stronger the linkages between sectors, the larger the multiplier effects will be. In addition, the size of the multiplier effects furthermore depends on the structural features of the economy, such as the proportion of goods and services that are locally produced – in this case within Stellenbosch. For example, if locally consumed goods and services are largely produced outside of Stellenbosch (and are thus effectively 'imported' in the region), it implies that a large proportion of local expenditure leaks out of Stellenbosch without any feedback effect. In general, larger leakages will reduce the multiplier effect and therefore result in a smaller response.

The term economy-wide refers to the direct, indirect and induced effects created by the event, due to the linkages between different sectors in the economy.

- **Direct impacts** are related to the sectors that are directly affected by the local expenditure of the university, staff and students. So-called "first round" suppliers would receive expenditures and revenues as a direct consequence of the university's local capital and operational expenditure, as well as staff and student spending in town.
- **Indirect impacts** result from the "first round" suppliers of the affected industries, purchasing goods and services and hiring additional workers to meet increased demand.
- **Induced impacts** result from a change in spending on goods and services, due to change in incomes of employers in both the directly and indirectly affected sectors/industries.

Various methods, including input-output analysis, supply-use table (SUT) and social accounting matrix (SAM) analyses can be used to measure economy-wide impacts of an event, institution or industry.

Quantifying demand-side effects

This impact assessment is based on a comprehensive 2011 input-output analysis of the Western Cape economy. According to Garrido-Yserte et al., 2008, input-output analysis is the technique mostly used in these types of studies. Regional input-output tables are developed and maintained by Quantec Research. The Western Cape table distinguishes between 43 industries that are specific to the regional economy. South African input-output tables are constructed according to Stats SA's Standard Industrial Classification (SIC) codes. Ideally, one would like to narrow the economic impacts down to municipal level, but unfortunately municipal input-output tables are still being developed for South Africa. This analysis is therefore based on the assumption that the structure of the Western Cape economy is similar to that of the Stellenbosch economy and therefore we used the Western Cape multipliers as proxies for the Stellenbosch economy[16].

Every EIA begins with an injection of demand into the economy – the so-called initial impact. The model uses the initial injection, together with matrices of inter-industry technical coefficients and multipliers in order to estimate the total impact of the development on all the other sectors of the economy. For the purpose of this project, we were specifically interested in the impact on the local economy of Stellenbosch. One should therefore attempt to account for **leakages**. Leakages include, among other, 'import' payments that flow out of the domestic economy, decreasing the share of local content in domestic consumption. In general, fewer leakages will result in larger multiplier effects and therefore a stronger response to external demand. For the purpose of this project, leakages are accounted for by using only 1) the university's expenditure on local suppliers and 2) staff and student spending within the local economy as initial injections to stimulate the local economy. This approach prevents accounting for local economic effects that actually accrue to other towns/cities from which goods and services are 'imported'. The BER acknowledges that we do not have sufficient information to fully control for all leakages, especially when it comes to indirect and induced impacts (i.e. we do not have enough information to determine whether the second, third etc. round suppliers are also local goods and/or services providers).

Student and staff expenditure[17]

It is important to account for the so-called export and import substitution effects from SU being located in Stellenbosch. In this regard, the study assumes that if SU had not existed, all students that were originally from Stellenbosch, would have studied elsewhere. The student data provided by the university's Student Information System Support department included a column with parent addresses, which indicated that only 4% of the Stellenbosch main campus student population originates from Stellenbosch.

[16] The BER acknowledges that the structure of the Stellenbosch local economy differs from the structure of the Western Cape economy as a whole. However, given the data and time limitations, the BER worked with the broad structure of the Western Cape as a point of departure.

[17] The student and staff expenditure data was collected during 2017, while the university expenditure data and regional national account estimates refer to 2016. Due to the different expenditure categories within staff and student spending, it was not practical to account for the inflationary impact between 2016 and 2017. This may, therefore, slightly overstate overall student and staff expenditure data in comparison to the university data and estimated regional data for 2016. In all, however, this should not have a significant impact on the results.

The study assumes that all staff members residing in Stellenbosch would have worked outside of Stellenbosch (and not at a different employer within the region). This assumption is necessary because it is impossible to determine where staff members would have worked had the university not existed.

Survey design and sample

Surveys were administered to all staff and students from Stellenbosch main campus, as well as all students from Elsenburg campus[18]. These surveys contained detailed questions on staff and students' typical monthly expenditures. A panel of BER staff members (both Stellenbosch locals and non-locals) provided inputs into the design of the staff survey, based on their personal expenditure profiles. The student survey included inputs from two master's students. The BER also used the student village survey results as a guideline for expenditure categories in the student survey. One can never account for everything, but the surveys covered the most prominent expenditure categories. Please refer to Appendix 2 for the staff and student questionnaires.

In assessing the local economic impact of the university, it was necessary to distinguish between staff and students who reside in Stellenbosch and those who do not, as their typical expenditure categories will most likely differ. For example, staff and students who do not reside in Stellenbosch will not have any accommodation-related expenditure in Stellenbosch. The survey therefore redirected the respondent to specific set of questions based on whether one resided in Stellenbosch or not. However, staff members residing in Stellenbosch spend a proportion of their salaries and wages in other towns. In an attempt to get the most accurate estimate of staff spending *in* Stellenbosch, the survey first asked for average monthly expenditure on a specific expenditure category and then asked what proportion of spending occurs in other towns (i.e. outside of Stellenbosch). For example:

Question 8: Your household's average monthly expenditure on groceries (including pet food, stationery, toiletries, cleaning products, all beverages and tobacco, baby products) (R):___

Question 9. What proportion of your household's groceries do you buy in other towns (for example, we do 10% of grocery shopping in Somerset West/Cape Town/Paarl) (%)?___

This approach allowed the BER to narrow survey responses down to **expenditure in the local economy.**

Whereas the staff questionnaire specifically asked for the proportion of certain expenditure categories in other towns, the student survey assumed that students who live in Stellenbosch during the academic year spend most of their money in Stellenbosch. For staff and students *not* residing in Stellenbosch, the survey instructions and questions specifically asked for expenditure within Stellenbosch.

The majority of questions required responses regarding the average monthly expenditure on specific categories. However, certain expenses do not occur on a monthly basis (for example, car services or doctor's appointments). For these expenditure categories, annual estimates were calculated. These were,

[18] Please refer back to the Student residence subsection in the size and structure of SU section for the reasoning behind the survey sample.

for example, weighed by the average times a year that the respondent takes their vehicle for maintenance and the average amount spent per car service.

The student survey specifically asked for expenditure during the *academic year*, seeing that students typically leave town during the holidays (and therefore do not spend anything in Stellenbosch during those three months). Furthermore, the student survey had specific questions depending on the respondent's housing option, as the typical expenditure categories for someone who lives in private accommodation will differ from someone who lives in a university residence.

Given the detailed nature of the staff and student surveys, it was decided to incentivise respondents to participate in the survey. From the BER's extensive experience with running survey-based questionnaires, we knew that response rates to long surveys are typically very low. The introduction of an incentive was thus an attempt to reach a sufficient response rate (i.e. to make sure that the sample was large enough). After the completion of the survey, respondents were redirected to a new site where they automatically became eligible for the incentive. In order to ensure the anonymity of the survey responses, the incentive site could not be linked back to the primary survey.

Given the BER's expertise in survey design and administration, it was decided to manage the surveys internally. After receiving institutional and ethical clearance from the university, the BER received student and staff email addresses from Student Information System Support and Human Resources, respectively. Due to the confidential nature of staff and student information, the BER agreed to delete these lists immediately after data collection was completed. The survey was created and distributed via Checkbox 6[19]. Individual survey responses were protected with multiple permission layers and SSL encryption. Furthermore, limits were set on the responses received from each recipient in order to ensure the authenticity of the survey.

Analysing the survey results : data challenges and limitations

The results of the **student survey** are unpacked below. Where appropriate, footnotes indicate where we thought the results may have been affected by dynamics not captured by the survey. For example, many students responded that they do not have any rental expense, because the family owned the property they reside in. This would have pulled down the average for monthly rent. The PSO sample also included students who live with their parents, so their expenditure on rent, utilities and household services was zero, which pulled down the averages. Furthermore, a number of respondents indicated that their expenditure on certain non-fixed categories varied greatly from month to month. For example, it is likely that one buys toiletries or make-up, stationery or gifts only once every few months. This may have impacted the accuracy of feedback.

[19] Checkbox is an online survey tool for survey creation, distribution, data collection and analysis.

Student survey results

In September 2017, the student survey was sent to a sample of 24 269 undergraduate and postgraduate students[20]. The BER received 2 300 responses of which 68 had to be excluded due to either incomplete responses or outliers that distorted the data (for example, one respondent stated that he/she spent on average of R600 000 a month at liquor stores and another one stated that he/she spent on average R30 000 on tutors or extra lessons per month). This implies a response rate of 9.2%. **The final dataset was weighed in order to give the correct representation of students by local versus non-local status, as well as residence status (PSO, university housing etc.)[21].**

Furthermore, the survey specifically asked for the expenditure during the academic year, so to determine annual figures (which are required for the EIA analysis) the monthly figure was multiplied by nine. The exception was monthly rent, which was multiplied by twelve, because rental contracts are for a full year. Table 12 shows the survey results for student expenditure for students living in Stellenbosch.

[20] A large number of emails bounced. The reason why the student sample differs from the student numbers presented in section 4 is due to the fact that student data and addresses were shared a few months apart – the numbers in section 4 are based on registration data, whereas student email addresses were extracted in September. It is likely that a number of students terminated their studies during the course of the year.

[21] Please refer back to the Student residence subsection in the size and structure of SU section for the reasoning behind the weighting.

Table 12: Student expenditure in Stellenbosch for **students residing in Stellenbosch**[22]

	MONTHLY		ANNUAL	
	Average expenditure per student (rand)	Total student expenditure (rand)	Average expenditure per student (rand)	Total student expenditure (rand)
Accommodation				
PSO				
Monthly rent[23]	4 510	42 951 227		515 414 720
Utilities[24]	322	3 070 511		27 634 597
Cleaning services[25]	121	1 156 458		10 408 123
Academia			70 800[26]	49 843 200
University apartment			39 152[27]	38 212 027
University house			31 350[28]	9 467 700
University residence			37 146[29]	210 619 238
Annual food quota at residence[30]			10 143	57 510 997
Other categories				
Laundry[31]	115	1 987 306		17 885 750
Food from grocery stores/supermarkets[32]	1 373	23 589 296		212 303 664
Liquor stores	195	3 352 616		30 173 548
Takeaways/restaurants/weekend markets	556	9 547 346		85 926 113
Bars/clubs	225	3 870 630		34 835 672
Clothes/shoes (including university apparel)	234	4 014 178		36 127 605

[22] Please note that due to rounding, the numbers in the tables in this section do not add up.

[23] A number of respondents indicated that their parents owned the flat they lived in (i.e. the expenditure on monthly rent was zero), which may have pulled down the average.

[24] A number of respondents indicated that utilities were included in the rent, which may have pulled down the average.

[25] A number of respondents indicated that cleaning services were included in the rent, which may have pulled down the average.

[26] Based on 2017 fees. Average calculated for all the unit types. Water & electricity included.

[27] Based on estimated fees for 2017, according to the University's website. Average of single and double rooms (include a list of flats in footnote). Water and electricity included.

[28] Based on estimated fees for 2017, according to the University's website. Average of single and double rooms. Water and electricity included.

[29] Based on estimated fees for 2017, according to the University's website. The average of women single and double, men single and double and women and men single and double rates

[30] Payments for boarding and meals in university housing were excluded from the EIA in order to avoid double counting. These expenditure streams are captured by the university's finances.

[31] A number of respondents indicated that their laundry was done at home, which may have pulled down the average.

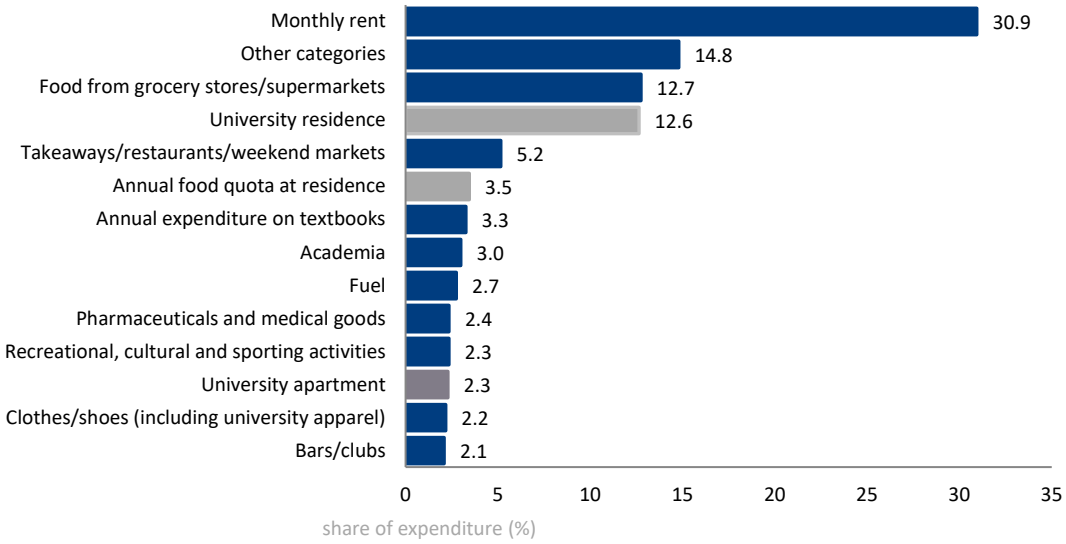
[32] A number of students indicated that they bring frozen meals from home, implying that they do not buy a lot of food in Stellenbosch, which may have pulled down the average.

Public transport	78	1 336 351		12 027 160
Fuel	296	5 082 404		45 741 635
Annual expenditure on vehicle maintenance			771	13 243 608
Recreational, cultural and sporting activities	253	4 346 983		39 122 844
Annual expenditure on textbooks			3 171	54 466 747
Extra lessons/tutors	55	937 16		8 434 464
Stationery	90	1 541 499		13 873 494
Books (excluding textbooks), magazines and newspapers	77	1 317 772		11 859 949
Photocopies and printing	97	1 666 710		15 000 392
Annual expenditure at medical practitioners			1 205	20 699 271
Pharmaceuticals and medical goods	254	4 359 017		39 231 155
Toiletries and make-up	178	3 064 496		27 580 465
Hair, nail & beauty treatments	84	1 440 712		12 966 408
Gifts	91	1 650 892		14 858 025
Total				**1 665 468 570**

Source: Student survey, calculations by BER

As would be expected, as illustrated in Figure 14 below, the biggest spending category is monthly rent by PSO students, which makes up 31% of all expenditure. This is followed by expenditure on food from grocery stores / supermarkets (12.7%) and the cost of accommodation at university residence (12.6%). To be sure, a typical student would not have both the expenditure of monthly rent and university residence, but this is the weighted average of all students.

Figure 13: Student expenditure in Stellenbosch for **students residing in Stellenbosch** per category (%)[33]



Source: Student survey, calculations by BER

Importantly, as explained in the methodology, the actual expenditure by students needs to be allocated to the relevant sectoral categories for the EIA analysis – see Table 13 below. Note that the total expenditure used for the EIA differs from the actual total spending by students' expenditure on university housing and food at residences is excluded. From the remaining expenditure, the bulk falls in the business services (41.9%) and wholesale & retail trade (37%) sectors.

Table 13: Student expenditure in Stellenbosch for **students residing in Stellenbosch** per sector

Sectors	Expenditure (rand)	*Share of total (%)*
Business services	565 312 037	*41.9*
Wholesale & retail trade	499 459 895	*37.0*
Catering & accommodation	120 761 785	*8.9*
Other community, social and personal services	88 818 682	*6.6*
Government	27 637 498	*2.0*
Medical, dental & other health & veterinary services	20 699 271	*1.5*
Printing, publishing and recorded media	15 000 392	*1.1*
Transport & storage	12 027 160	*0.9*
Total	**1 349 716 720**	

Source: Student survey, calculations by BER

[33] The figure only shows categories which received more than 2% of total expenditure, others are lumped together in the 'other categories' bar. The annual university residence, apartment and annual food quota at residence are shaded in a different colour to highlight that these expenditure category are not included in the EIA analysis for students, as this is captured by SU spending.

The same procedure is used for students residing outside of Stellenbosch. Table 14 shows the expenditure profile of students residing outside of Stellenbosch. Because these students do not live in Stellenbosch, their expenditure on accommodation is not included in the EIA analysis because the expenditure occurs outside of the local area.

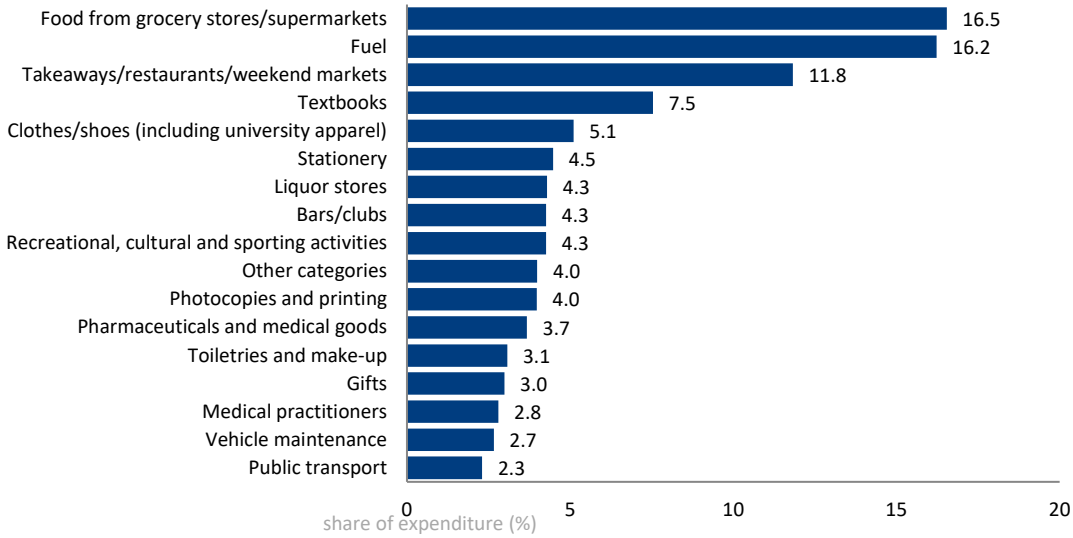
Table 14: Student expenditure in Stellenbosch for students **residing outside of Stellenbosch**

	MONTHLY		ANNUAL	
	Average expenditure per student (rand)	Total student expenditure (rand)	Average expenditure per student (rand)	Total student expenditure (rand)
Food from grocery stores/supermarkets	474	3 702 768		33 324 908
Liquor stores	123	960 805		8 647 247
Takeaways/restaurants/weekend markets	339	2 647 603		23 828 431
Bars/clubs	122	954 298		8 588 680
Clothes/shoes (including university apparel)	146	1 143 015		10 287 137
Public transport	66	515 719		4 641 474
Fuel	465	3 633 354		32 700 188
Annual expenditure on vehicle maintenance			686.11	5 357 841
Recreational, cultural and sporting activities	122	954 189		8 587 704
Annual expenditure on textbooks			1944.79	15 186 878
Extra lessons/tutors	37	302 056		2 718 508
Stationery	128	1 001 884		9 016 955
Books (excluding textbooks), magazines and newspapers	38	298 125		2 683 124
Photocopies and printing	114	889 684		8 007 153
Annual expenditure at medical practitioners			722.29	5 640 376
Pharmaceuticals and medical goods	105	823 551		7 411 961
Toiletries and make-up	88	687 734		6 189 609
Hair, nail & beauty treatments	38	293 515		2 641 638
Gifts	86	668 239		6 014 150
Total				**201 473 962**

Source: Student survey, calculations by BER

Without spending on monthly rent dominating the spending profile, the structure of the spending by non-locals seems more diverse compared to local students. Again, it is important to highlight that this is not the total expenditure of the students, but rather the total *local* expenditure. In practice, these students would still likely spend around a third of their expenditure on accommodation. However, in terms of local expenditure, the biggest categories are food from grocery stores/super markets (16.5%), fuel (16.2%) and takeaways/restaurants/weekend markets (11.8%) – see Figure 15.

Figure 14: Student expenditure in Stellenbosch for **students residing outside of Stellenbosch** per category (%)[34]



Source: Student survey, calculations by BER

As for local students, the expenditure categories are allocated to the relevant SIC sectors – see Table 15. More than two-thirds of expenditure (67.9%) falls in the wholesale & retail trade sector, followed by the catering & accommodation sector (16.1%).

Table 15: Student expenditure in Stellenbosch for **students residing outside of Stellenbosch** per sector

Sectors	Expenditure (rand)	*Share of total (%)*
Wholesale & retail trade	136 819 998	*67.9*
Catering & accommodation	32 417 111	*16.1*
Other community, social and personal services	13 947 850	*6.9*
Printing, publishing and recorded media	8 007 153	*4.0*
Medical, dental & other health & veterinary services	5 640 376	*2.8*
Transport & storage	4 641 474	*2.3*
Total	201 473 962	

Source: Student survey, calculations by BER

[34] Only expenditure categories receiving more than 2% of total expenditure are shown in the figure, others are lumped together under 'other categories'.

Staff survey results

In September, the staff survey was sent to a sample of 3 227 full-time and part-time employees on the Stellenbosch main campus[35]. In order to ensure enough responses, a reminder was sent a week after the survey was dispatched. The BER received 632 responses, of which 12 had to be thrown out due to incomplete responses. This implies that the staff response rate was 19.2%. Of the 620 respondents, 319 resided in Stellenbosch and 301 elsewhere. **The final dataset was weighed in order to correctly represent the overall percentages of staff by local / non-local status.** As discussed in Section 4, 1855 (52.3%) of main campus staff members live in Stellenbosch, while the remaining 1 694 (47.7%) live elsewhere[36].

For the interpretation of the results, it is important to explain that averages were calculated for the total sample, instead of only those who answered a specific question. This means that zeros pulled down the averages. For example, only a small proportion of staff members have pets (and thus have expenditure on vet services or pet grooming), and a large number of staff members do not own a car. However, for the questions about expenditure on school-going children as well rent and/or bond expenditure, the average was calculated using the number of respondents replying to the specific question instead of total number of respondents. Furthermore, blanks were treated as zeros, which may have pulled down some of the averages. In particular, the question about bond payments was often not answered, possibly because respondents do not know the specific amount or felt uncomfortable with disclosing the amount. Fortunately, bond spending is not considered to be local and is not included in the final EIA analysis – so any distorting impact of expenditure being underreported does not affect the final result.

Table 16 gives an overview of the unweighted and weighted survey results and reflects local staff expenditure within the **Stellenbosch local economy**:

[35] Please note that the BER received a list of 3 381 staff members from human resources and email addresses for 154 staff members were missing. A large number of emails bounced and we also received numerous out of office responses. Please note that the reason why the staff sample differs from the staff numbers presented in the size and structure of SU section is due to the temporary nature of part-time staff members (the earlier section was based on staff data that was received in May 2017). The survey results were weighted to be representative of the main campus staff population as presented in the size and structure of SU section (3 549 staff members).

[36] Please refer back to the Staff residence subsection in the size and structure of SU section for the reasoning behind the split between Stellenbosch-residing and non-Stellenbosch residing staff members.

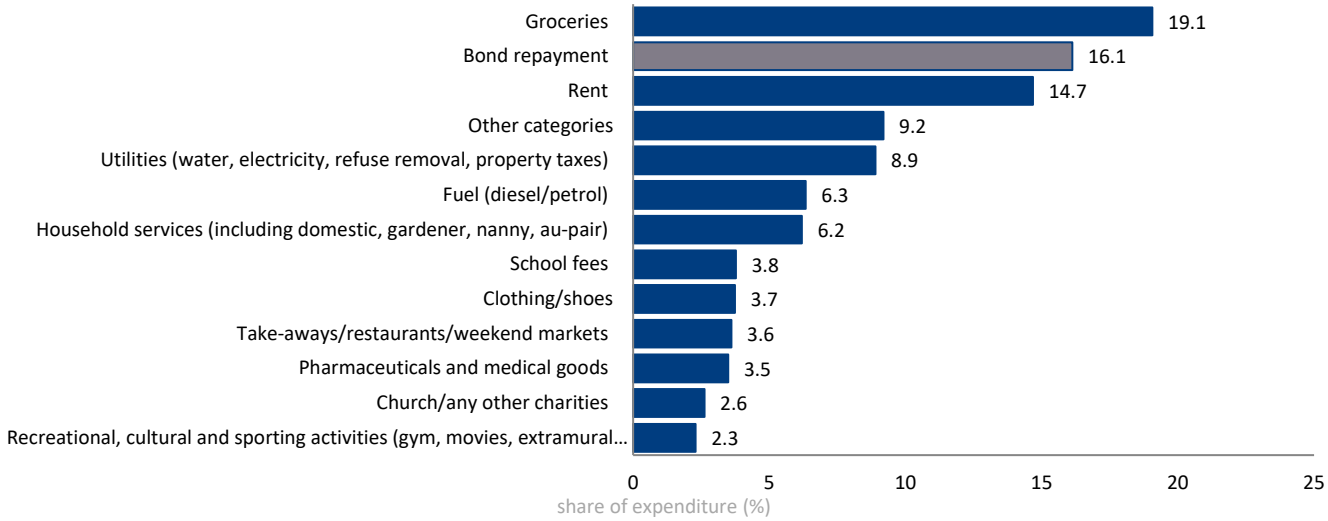
Table 16: Staff expenditure in Stellenbosch for staff **residing in Stellenbosch**

	MONTHLY		ANNUAL	
	Average expenditure per staff member (rand)	Total staff expenditure (rand)	Average expenditure per staff member (rand)	Total staff expenditure (rand)
Bond repayment	7 352	7 268 312		87 219 746
Rent	7 638	6 617 871		79 414 452
Utilities (water, electricity, refuse removal, property taxes)	2 161	4 008 556		48 102 670
Security (including Private security company, neighbourhood watch)	341	632 439		7 589 264
Household services (including domestic, gardener, nanny, au-pair)	1 505	2 792 008		33 504 091
Groceries	4 632	8 592 947		103 115 368
Take-aways/restaurants/weekend markets	877	1 626 804		19 521 654
Wines from local wine estates			1 687	3 128 670
Medical practitioners			3 523	6 535 395
Pharmaceuticals and medical goods	848	1 572 493		18 869 921
Veterinary services			571	1 060 054
Pet grooming	62	114 527		1 374 328
Public transport (taxis/busses/uber)	142	262 608		3 151 290
Fuel (diesel/petrol)	1 539	2 854 636		34 255 628
Motor maintenance (service, tyre replacement, new battery etc.)			2 892	5 364 224
School-going children who attend school/playschool/crèche/day care in Stellenbosch				
Yes	*118*	*37%*		
No	*201*	*63%*		
School fees	2 477	1 699 410		20 392 926
Allowance/tuckshop money for school-going children	189	129 385		1 552 618
Tutors for school-going children	271	185 762		2 229 140
Clothing/shoes	910	1 687 416		20 248 994
Recreational, cultural and sporting activities (gym, movies, extramural activities for the kids, school outings etc.)	557	1 033 471		12 401 653
Hair & beauty treatments	284	526 104		6 313 243
Gifts	208	385 398		4 624 777
Hardware	304	563 812		6 765 746
Church/any other charities	636	1 179 582		14 154 987
Total expenditure by staff members who live in Stellenbosch				**540 890 839**

Source: Staff survey, calculations by BER

As illustrated in Figure 15, the majority of local staff's expenditure in Stellenbosch goes towards groceries (19.1%), bond repayments (16.1%) and rent (14.7%).

Figure 15: Staff expenditure in Stellenbosch for **staff residing in Stellenbosch** per category (%)[37]



Source: Staff survey, calculations by BER

For the purpose of the EIA, total staff expenditure had to be classified according to the categories in the input-output tables – see Table 17. Please note that the total for the staff expenditure for staff members residing in Stellenbosch does not correspond to the total referred to above. This is because bond payments are excluded from the EIA-analysis because this expenditure technically does not affect the local economy. The majority of expenditure goes towards wholesale & retail trade (42.9%), other community, social and personal services (19.9%) and business services (19.2%).

Table 17: Staff expenditure in Stellenbosch for staff **residing in Stellenbosch** per sector

Sectors	Expenditure (rand)	*Share of total (%)*
Wholesale & retail trade	194 797 275	*42.9*
Other community, social and personal services	90 370 369	*19.9*
Business services	87 003 717	*19.2*
Government	48 102 670	*10.6*
Catering & accommodation	19 521 654	*4.3*
Medical, dental & other health & veterinary services	7 595 449	*1.7*
Transport & storage	3 151 29	*0.7*
Beverages & tobacco	3 128 670	*0.7*
Total	453 671 093	

Source: Staff survey, calculations by BER

[37] Only categories receiving more than 2% of expenditure are illustrated in the figure, the others are lumped together in the "other categories" category. Bond repayments are shaded in grey because they are not included in the EIA.

The exercise is repeated for local expenditure by non-local staff, with the expenditure results shown in Table 18 below. As for the students, there were no questions covering accommodation because the staff resided outside of Stellenbosch and accommodation expenditure is thus not local.

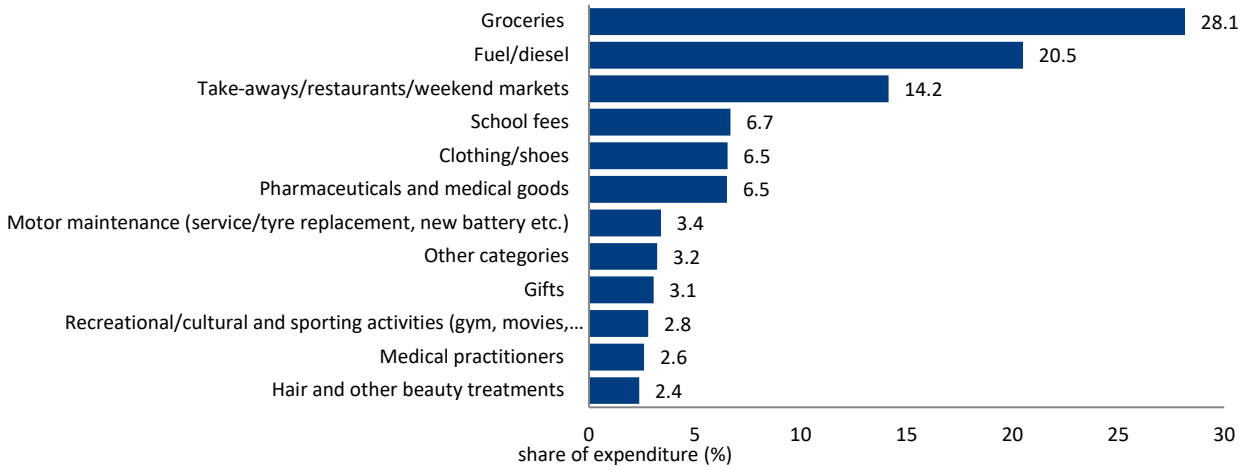
Table 18: Staff expenditure in Stellenbosch for staff **residing outside of Stellenbosch**

	MONTHLY		ANNUAL	
	Average expenditure per staff member (rand)	Total staff expenditure (rand)	Average expenditure per staff member (rand)	Total staff expenditure (rand)
Groceries	1 351	2 288 307		27 459 684
Take-aways/restaurants/weekend markets	679	1 150 468		13 805 616
Wines from wine estates in Stellenbosch			672	1 138 357
Medical practitioners			1 499	2 539 396
Pharmaceuticals and medical goods	313	530 115		6 361 381
School-going children who attend school/playschool/crèche/day care in Stellenbosch?				
Yes	*31*	*10%*		
No	*270*	*90%*		
School fees	3 113	543 155		6 517 859
Allowance/tuckshop money for school-going children	182	31 798		381 572
Tutors for school-going children	126	21 949		263 386
Fuel/diesel	984	1 666 367		19 996 404
Motor maintenance (service/tyre replacement, new battery etc.)			1 960	3 320 009
Clothing/shoes	31	532 287		6 387 449
Recreational/cultural and sporting activities (gym, movies, extramural activities for kids etc.)	134	227 474		2 729 692
Hair and other beauty treatments	114	192 671		2 312 057
Gifts	147	248 438		2 981 260
Hardware	67	113 233		1 358 802
Total expenditure by staff members who do not live in Stellenbosch				**97 552 924**

Source: Staff survey, calculations by BER

As illustrated in Figure 16, 28.1% of spending by non-local staff in Stellenbosch is on groceries, followed by fuel/diesel (20.5%) and take-aways/restaurants/weekend markets (14.7%).

Figure 16: Staff expenditure in Stellenbosch for **staff residing outside of Stellenbosch** per category (%)[38]



Source: Staff survey, calculations by BER

For the purpose of the EIA, expenditure by non-local staff had to be classified according to the categories in the input-output tables – see Table 19. The majority of spending of non-locals in Stellenbosch goes towards wholesale & retail trade (70%), catering and accommodation (14.2%) and other community, social and personal services (12.1%).

Table 19: Staff expenditure in Stellenbosch for **staff residing outside of Stellenbosch** per sector

Sectors	Expenditure (rand)	*Share of total (%)*
Wholesale & retail trade	68 246 561	*70.0*
Catering & accommodation	13 805 616	*14.2*
Other community, social and personal services	11 822 994	*12.1*
Medical, dental & other health & veterinary services	2 539 396	*2.6*
Beverages & tobacco	1 138 357	*1.2*
Total	97 552 924	

Source: Staff survey, calculations by BER

Finally, Stellenbosch multipliers were applied to total staff and student expenditure in order to determine the economy-wide impact of these expenses on the local economy. These results will be unpacked in the next section.

[38] Only categories receiving more than 2% of expenditure are illustrated in the figure, the others are lumped together in the "other categories" category.

University expenditure

The finance department provided the BER with payment data for the 2016 financial year. Although staff costs (i.e. salaries and wages) made up the majority of the university's expenditure[39], it was decided to exclude that from this part of the analysis, as it would be factored in through the estimated local expenditure of university employees. Financial data included payments to creditors, as well as all diverse payments[40]. In 2016, total payments to creditors amounted to R1.67 billion and diverse payments totalled R825.43 million[41].

Viable sourcing

After the 2015 labour unrests on campus, SU decided that both the interests of the affected employees of external service providers as well as the interest of SU will be best served via a system and process of Viable Sourcing instead of an undifferentiated approach of blanket insourcing or continued outsourcing. Viable **Sourcing** in a transparent manner takes into account the input of various stakeholders, decides on the optimal sustainable solution for the provision of essential non-core services to SU. Upon expiry of non-core services contracts (such as cleaning, catering, gardening/landscaping and security) or when a need for a service is identified, the process of VS is followed by SU to assist in the decision-making to either appoint a preferred external service provider, or to insource a particular service.

The Viable Sourcing process should satisfy the following principles:

- *Human Dignity:* in the case of external service providers, such service providers must have a good record of ensuring the Human Dignity of all their employees. The same applies in case where such services are provided directly by SU – Human Dignity of all employees is non-negotiable.
- *Sustainability of the University:* the sustainability of the University's core business, its academic project, should not be compromised by unsound sourcing decisions.
- *Financial feasibility:* Decisions on Viable Sourcing should be financially feasible and sustainable.
- *Mutual best benefit:* Decisions on Viable Sourcing should be to the mutual benefit of the affected employees, the University and business owners.
- Irrespective of the specific mode of Viable Sourcing, the working conditions of all employees should be governed by a *Code of Conduct* to which all service providers (including the University) should comply.
- *Governance:* all decisions and actions pertaining to Viable Sourcing should fulfil the requirements of Good Governance as per King Requirements
- *Transparency and confidentiality:* Viable Sourcing should be conducted in an open and transparent manner, without breaching the rightful confidentiality requirements of service providers.
- *Input from stakeholders:* The process of Viable Sourcing should provide for the input of stakeholders in an appropriate manner.

[39] According to SU's annual integrated report for 2016.

[40] The BER relied on the completeness and accuracy of data provided by the university and did not attempt to verify it.

[41] The analysis is based on the assumption that the creditor and diverse payments for 2016 is representative of an average year, and therefore the impact estimation will reflect the average annual economic contribution of SU's operational and capital expenditure.

While the process of Viable Sourcing undoubtedly has key benefits for SU and the broader Stellenbosch community over time, due to the dynamic nature of the process, this cannot be captured by an EIA analysis. The intention with a policy such as Viable Sourcing is to change the underlying relationships within the sector to which it is applied. This, assuming success, will, in turn, change the underlying relationships within the economy that can then be captured in future analysis using the methodology employed here. In other words, the fact that there is little impact that may be captured in the current snapshot from this socially desirable policy does not in any way reflect poorly on the policy as the impacts will hopefully accrue in future. It does however reflect the potential of SU to be an important agent of change in the region.

Source: N. Van den Eijkel (Chief Director of Facilities Management Stellenbosch University), 2017, personal communication, 22 December 2017.

Creditor payments

Given the local focus of this study, all expenditures that occurred outside of Stellenbosch had to be excluded from the analysis. Physical addresses were available for all creditors, which allowed the BER to sort the data into local and non-local suppliers. As shown in Table 20, the local/non-local split remained fairly consistent over the past three years. In 2016, almost a fifth of all creditors were based in Stellenbosch. This implies that R319.11 million of expenditure flows to creditors occurred within the local economy and would therefore be used as an initial injection of demand in the EIA.

Table 20: Payments to creditors by local and non-local vendors: 2014-2016

	2014	%	2015	%	2016	%
Local	268 889 842	*20.6*	266 217 017	*19.9*	319 112 962	*19.1*
Non-local	1 033 885 296	*79.4*	1 069 909 833	*80.1*	1 355 197 663	*80.9*
Total payments to creditors	**1 302 775 139**		**1 336 126 850**		**1 674 310 625**	

Source: Data provided by SU's finance department

For the purpose of the EIA, we were interested in how the university's total local expenditure is spread throughout the different sectors of the Stellenbosch economy. As a first step, total local spending (R319.11 million) was therefore grouped according to Stats SA's SIC codes. This allowed the BER to finally 'shock' the relevant categories in the input-output analysis. As shown in Table 21, the largest proportion of local creditor expenditure went towards government (36.9% of total creditor payments). Of the R117.62 million that was classified as payments to government, R117.44 million specifically went to Stellenbosch Municipality, presumably for rates and taxes**.** Expenditure on business services accounted for 12.1% of all creditor payments, followed by wholesale and retail trade (11.1%), construction (10.8%), and transport and storage (7.2%). Together, the top 5 expenditure categories make up more than three-quarters of SU's expenditure flows to local creditors.

Table 21: Sectoral distribution of local creditor payments

Sector	Expenditure (rand)	*Share of total (%)*
Government	117 618 137	*36.9*
Business services	38 551 676	*12.1*
Wholesale & retail trade	35 290 506	*11.1*
Construction	34 538 648	*10.8*
Transport & storage	22 978 671	*7.2*
Printing, publishing & recorded media	20 211 262	*6.3*
Finance & insurance	12 572 849	*3.9*
Catering & accommodation services	12 120 525	*3.8*
Agriculture, forestry & fishing	9 761 065	*3.1*
Textiles	2 547 069	*0.8*
Glass & glass products	1 850 115	*0.6*
Metal products excluding machinery	1 811 627	*0.6*
Other community, social & personal services	1 928 631	*0.6*
Professional & scientific equipment	1 572 507	*0.5*
Machinery & equipment	1 548 504	*0.5*
Water supply	1 141 296	*0.4*
Electricity, gas & steam	914 262	*0.3*
Electrical machinery	477 227	*0.1*
Communication	345 276	*0.1*
Beverages & tobacco	320 454	*0.1*
Medical, dental & other health & veterinary services	285 839	*0.1*
Other chemicals & man-made fibres	262 690	*0.1*
Other industries	163 049	*0.1*
Basic iron & steel	148 398	*0.0*
Furniture	79 947	*0.0*
Wood & wood products	48 597	*0.0*
Food	14 640	*0.0*
Non-metallic minerals	9 496	*0.0*
Total	**319 112 962**	

Source: Data provided by SU finance department, SIC and IO classification done by the BER

Diverse payments

As mentioned above, total diverse payments amounted to R825.43 million in the 2016 financial year. The data that was shared with the BER included payments to staff and other individuals[42], as well as inter-SU payments (i.e. payments between the university's sub-systems)[43]. Table 22 and Figure 17 provide a breakdown of all diverse payments.

[42] The dataset contained a column with SU staff numbers which allowed the BER to easily identify payments to staff members. Payments without staff numbers, but to Mr/Ms/Mrs/Mev/Mnr/Me/Mej/Prof etc. were classified as payments to other individuals.

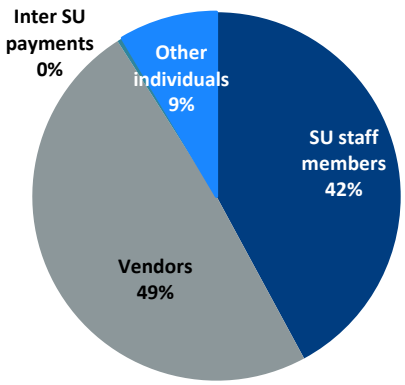
[43] The raw data that was shared with the BER consisted of 89 436 individual transactions.

Table 22: Breakdown of total diverse payments (2016)

Payments to:	Expenditure (R)
SU staff members	347 570 677
Inter SU payments	4 040 418
Other individuals	70 513 021
Vendors	403 301 919
Total diverse payments	**825 426 035**

Source: Data provided by SU finance department, breakdown done by the BER

Figure 17: Share of total diverse payments (2016, share)



Source: Data provided by SU finance department, breakdown done by the BER

Similar to the creditor payment analysis, all payments to SU staff members (R347.57 million) were excluded as this was factored in through the estimated local expenditure of staff members. Furthermore, all inter-SU payments were excluded from the analysis, seeing that this is not technically money that is being spent by the SU, but rather money being transferred around within the organisation (R4.04 million). In terms of payments to other individuals (R70.51 million, almost 4 000 different transactions), the finance department confirmed that a large proportion was actually remuneration (including the pay-out of death benefits, and funeral cover)[44], whereas the rest was payments to individuals for any services or product delivered. Given time and data constraints, as well as the marginal impact that payments to individuals would have on total economy-wide impact (relative to the impact of staff and student spending), it was decided to also exclude this from the analysis.

The remaining R403.30 million, which was paid to external vendors had to be grouped into local and non-local vendors as we were only interested in the university's expenditure within the local economy. Finally, all local vendors had to be assigned to the correct input-output SIC category. However, unlike the creditor data, vendor addresses (and therefore local/non-local status) were not available for the diverse payments data. This implied that the BER had to use internet-based search engines to find every vendor in order to group it according to location, which is a time-intensive process. For all the local vendors, the BER had to rely on additional sources (such as the company's website or social media page) to get a description of the type of service or product delivered by the specific organisation, in order to assign it to the correct input-output category in the EIA analysis. Given the large number of individual transactions, it was decided to do this for the top 85% of all vendor payments. Ultimately there was no information available for 10% of these payments, so the extrapolation worked with the top 75% of payments. Finally, the local/non-local splits, as well as the sectoral classification of the top 75% were extrapolated to total vendor payments. As

[44] Please note that a large proportion of these payments did not have any information in the staff number column and was therefore not initially picked up as payments to SU staff members, however, after the finance department shared more information on these transactions it was concluded that some of the payments to individuals (for example death benefits and funeral cover pay-outs) were actually payments to SU staff members.

shown in Table 23, we worked under the assumption that 15.9% of all vendor payments were to local vendors, whereas the majority (84.1%) went to non-local vendors.

Table 23: Diverse payments by local and non-local vendors

	Top 75% of vendors	Total payments to vendors (extrapolated)	*% of total payments*
Stellenbosch	48 554 855	64 018 346	*15.9%*
Non-Stellenbosch	257 330 368	339 283 573	*84.1%*
Total	**305 885 222**	**403 301 919**	

Source: Data provided by SU finance department, local/non-local classification done by the BER

Total local expenditure (R64.02 million) was finally grouped according to the relevant categories in the input-output tables. As shown in Table 24, the majority of local diverse payments went towards business services (37.6%), followed by other community, social and personal services (16.0%), catering and accommodation services (13.4%) and construction (13.4%). These four sectors combined received more than 80% of the expenditure.

Table 24: Sectoral distribution of local diverse payments

Sector	Expenditure (R)	*% of total*
Business services	24 083 396	*37.6*
Other community, social & personal services	10 232 822	*16.0*
Catering & accommodation services	8 604 917	*13.4*
Construction	8 557 051	*13.4*
Wholesale & retail trade	3 972 802	*6.2*
Communication	3 444 569	*5.4*
Beverages & tobacco	1 260 133	*2.0*
Agriculture, forestry & fishing	1 249 946	*2.0*
Finance & insurance	737 826	*1.2*
Professional & scientific equipment	723 832	*1.1*
Water supply	308 109	*0.5*
Transport & storage	164 736	*0.3*
Printing, publishing & recorded media	137 335	*0.2*
Government	127 444	*0.2*
Wood & wood products	127 218	*0.2*
Medical, dental & other health & veterinary services	83 886	*0.1*
Metal products excluding machinery	72 855	*0.1*
Electrical machinery	65 998	*0.1*
Furniture	63 471	*0.1*
Total	**64 018 346**	

Source: Data provided by SU finance department, SIC and IO classification done by the BER

Again, multipliers were applied to determine the economy-wide impact of the spending. The results thereof are unpacked in the next section.

6. Economic impact of SU on Stellenbosch

Economy-wide impact of student, staff and university expenditure[45]

This section shows the results of the EIA analysis, starting with the economic impact of student spending, followed by staff spending, university expenditure (creditor payments and diverse payments) as well as the total economy-wide impact on Stellenbosch. To provide some context, the section also refers to the contribution SU makes to the local Stellenbosch economy.

The EIA provides estimates for the impact on output (which is the broadest measure of economic activity and measures all sales and transactions that were triggered by the initial injection of demand), gross domestic product at basic prices (GDP, which measures the value added to the local economy and only includes the value of final goods and services), labour remuneration and employment (total, highly skilled, skilled, unskilled and informal). When interpreting the employment statistics, it is important to explain that these numbers refer to employment opportunities. This means that while genuine, the numbers are made up of various fractions of opportunities. It is therefore not possible to physically identify the actual jobs.

For all these indicators the economy-wide impact is broken down in the direct, indirect and induced impact. For student and staff expenditure, the results distinguish between the impact of locals and non-locals. The full results per SIC sector are included in Appendix 3. After the discussion of the EIA results, the section will conclude with an overview of some of the non-economic benefits of SU on Stellenbosch.

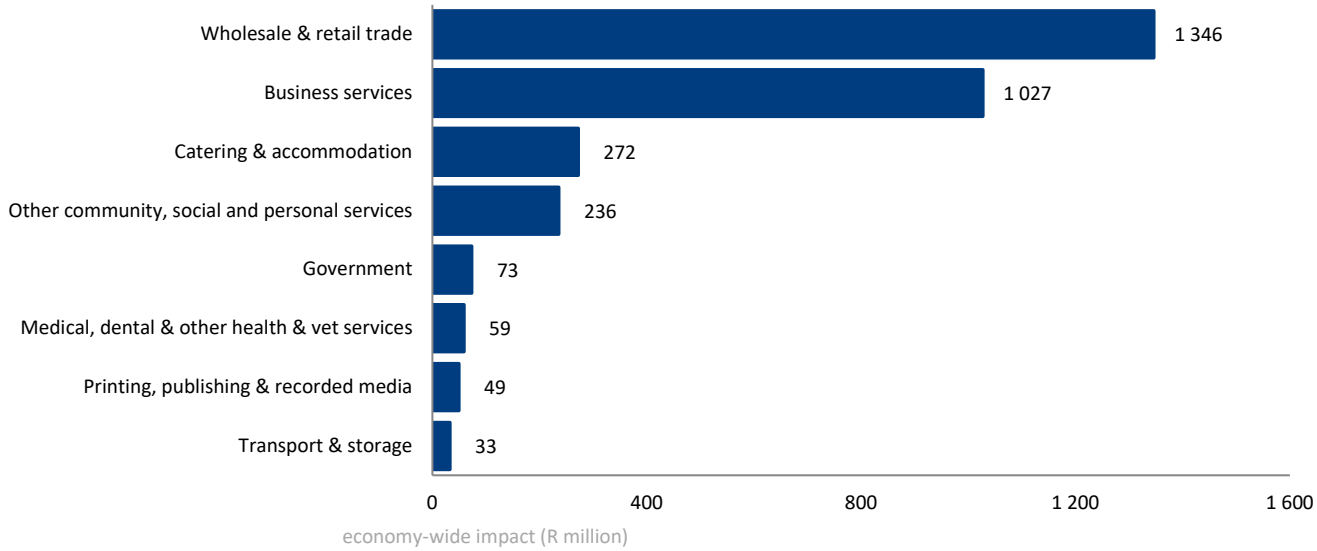
Student expenditure

The economy-wide impact of student expenditure on **output** amounted to R3 096 million, of which R2 678 million (86%) came from students residing in Stellenbosch. Of the total impact, the direct impact is the largest (R2 062 million or 67%), followed by the induced impact (R748 million, 24%) and indirect effect (9%).

From a subsector perspective, most of the output is generated in the wholesale & retail trade (R1 346 million, 43%) as well as the business services sector (R1 027 million, 33%) – see Figure 18 below.

[45] Please note that due to rounding, some of the percentages referred to in the text of this section do not add up.

Figure 18: Economy-wide impact **on output** of total student spending per sector (R million)



Source: BER calculations

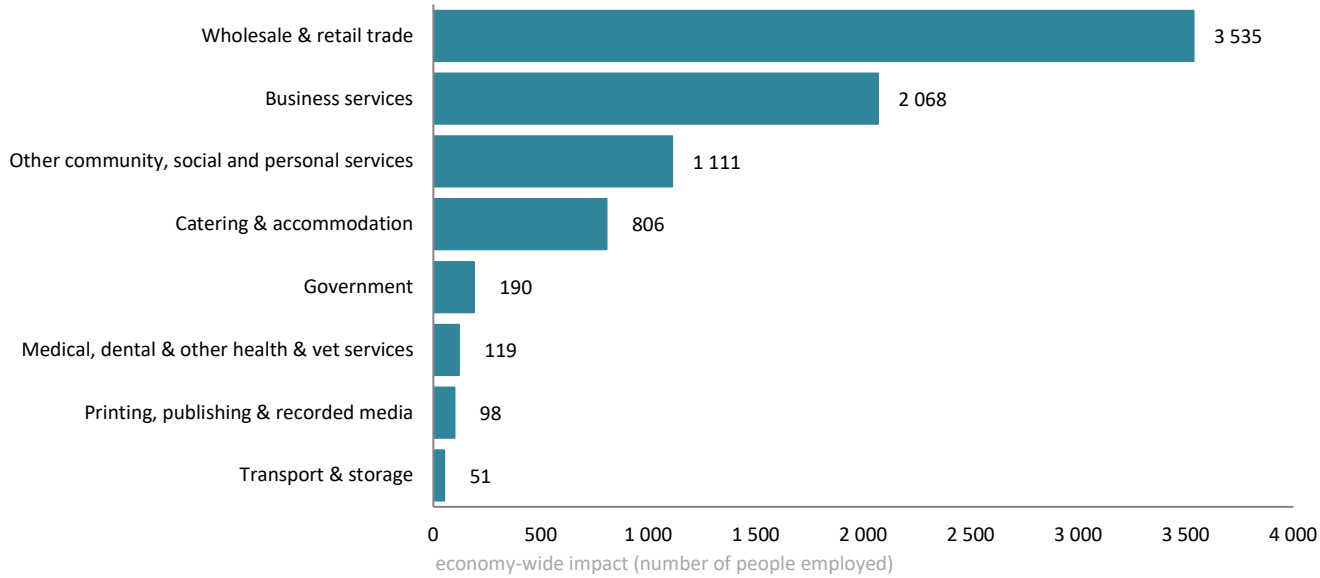
The impact of student spending on **GDP** amounts to R1 647 million. Again, the majority is generated by the direct impact (R1 154 million, 70%), followed by the induced impact (R335 million, 20%) and indirect impact (R285 million, 8%) – see Table 25 and Figure 31.

The contribution to **labour remuneration** of student spending is R630 million. More than 85% of this (R541 million) can be attributed to spending by local students, with the remainder from non-locals.

It follows that the **employment** picture shows a similar trend with 85% (6 822) of the total number of jobs (7977) created linked to spending by locals. Most of the employment is generated by the direct impact (5 881, 74%), but the induced impact is also significant at 20% (1 600). In total, the majority of the employment created falls in the skilled category (3 618, 45%), followed by the unskilled (2 213, 28%), informal (1 182, 15%) and finally highly skilled (963, 12%) categories.

From a subsector perspective, most of the jobs created are in the wholesale & retail trade sector (44%), followed by business services (26%) and other community, social and personal services (14%) see Figure 19.

Figure 19: Economy-wide impact **on employment** of total student spending per sector (number of people employed)



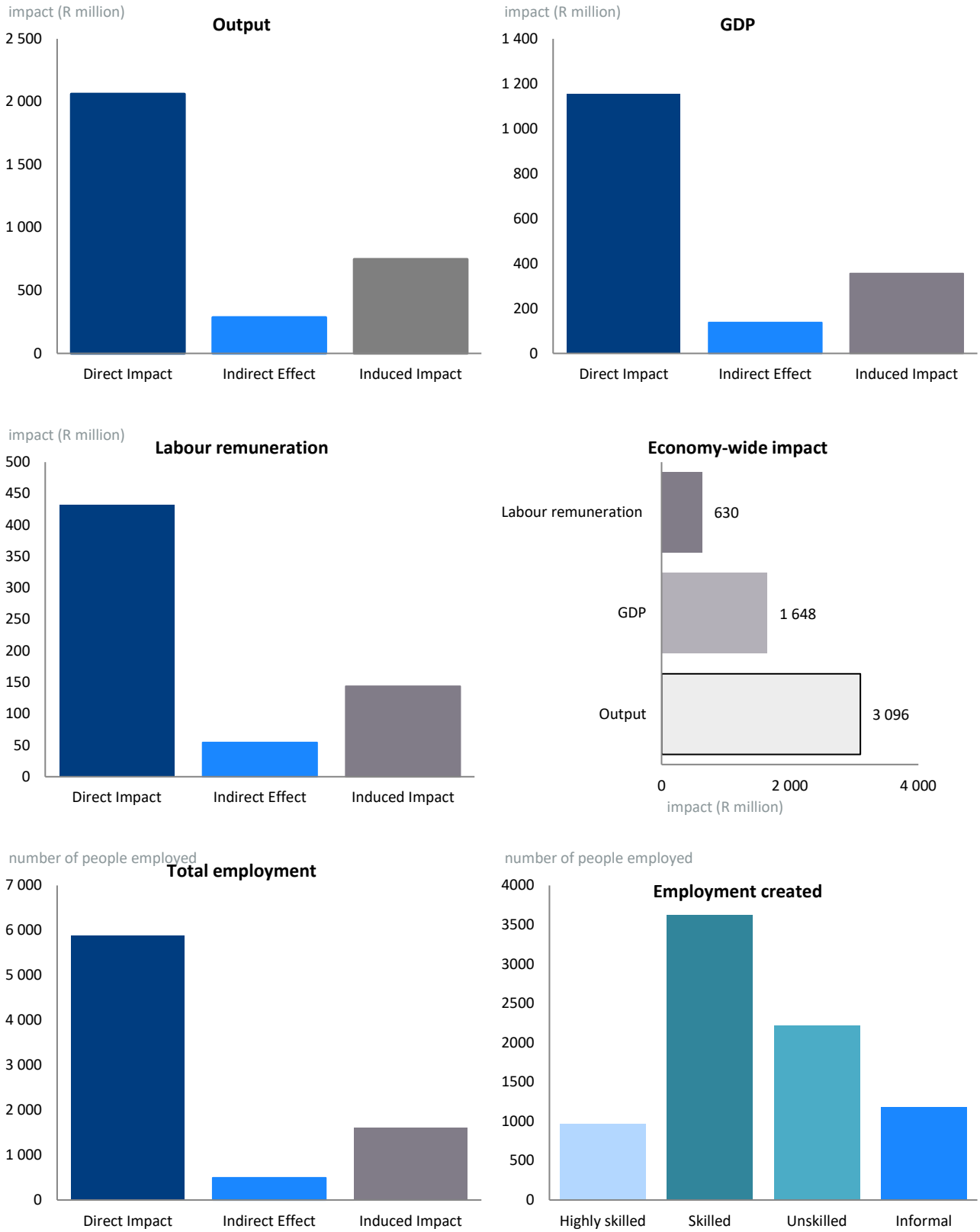
Source: BER calculations

Table 25: Total student impact on the Stellenbosch local economy

Rand million, number of people employed	Students residing in Stellenbosch	Students residing outside of Stellenbosch	Total student impact
Total expenditure in Stellenbosch	*1 349 658 609*	*201 473 962*	**1 551 132 571**
Output			
Direct Impact	1 789 934 711	272 264 573	**2 062 199 284**
Indirect Effect	245 685 231	40 093 867	**285 779 098**
Induced Impact	642 544 862	105 660 163	**748 205 025**
Economy-wide Impact	2 678 164 804	418 018 603	**3 096 183 407**
GDP at basic prices			
Direct Impact	1 003 391 258	151 386 438	**1 154 777 696**
Indirect Effect	118 279 443	19 116 543	**137 395 986**
Induced Impact	305 300 211	50 201 994	**355 502 204**
Economy-wide Impact	1 426 970 911	220 704 974	**1 647 675 886**
Labour remuneration			
Direct Impact	370 937 721	61 252 620	**432 190 341**
Indirect Effect	46 860 443	7 541 748	**54 402 191**
Induced Impact	123 494 064	20 307 906	**143 801 970**
Economy-wide Impact	541 292 227	89 102 275	**630 394 502**
Employment: total			
Direct Impact	5 022	860	**5 881**
Indirect Effect	426	69	**495**
Induced Impact	1 374	226	**1 600**
Economy-wide Impact	6 822	1 155	**7 977**
Employment: highly skilled			
Direct Impact	622	86	**708**
Indirect Effect	58	9	**68**
Induced Impact	161	27	**188**
Economy-wide Impact	842	121	**963**
Employment: skilled			
Direct Impact	2 380	399	**2 779**
Indirect Effect	190	31	**221**
Induced Impact	531	87	**618**
Economy-wide Impact	3 101	517	**3 618**
Employment: unskilled			
Direct Impact	1 282	211	**1 493**
Indirect Effect	122	20	**142**
Induced Impact	496	82	**577**
Economy-wide Impact	1 900	313	**2 213**
Employment: informal			
Direct Impact	737	164	**901**
Indirect Effect	55	9	**64**
Induced Impact	187	31	**218**
Economy-wide Impact	979	204	**1 182**

Source: BER calculations

Figure 20: Graphical illustration of economic impact from total student expenditure

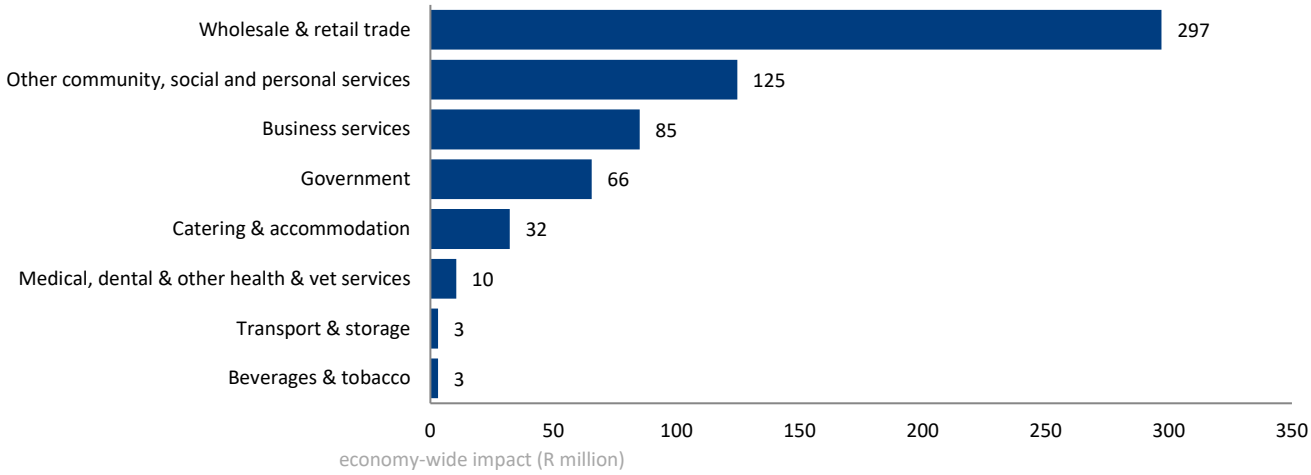


Staff expenditure

The economy-wide impact of staff expenditure **on output** amounts to R1 172 million, of which 83% (R968 million) is generated by spending of staff residing in Stellenbosch and the remainder by non-locals. About 63% (R742 million) of the total output is initiated by the direct impact, followed by 27% (R321 million) by the induced impact and the remaining 9% (R108 million) by the indirect effect – see Table 26 and Figure 23 below.

In terms of GDP, the staff spending has the biggest impact on the wholesale and retail trade sector (48%), followed by other community and personal services (20%) and business services (14%) – see Figure 21.

Figure 21: Economy-wide impact on GDP of total staff spending per sector (R million)



Source: BER calculations

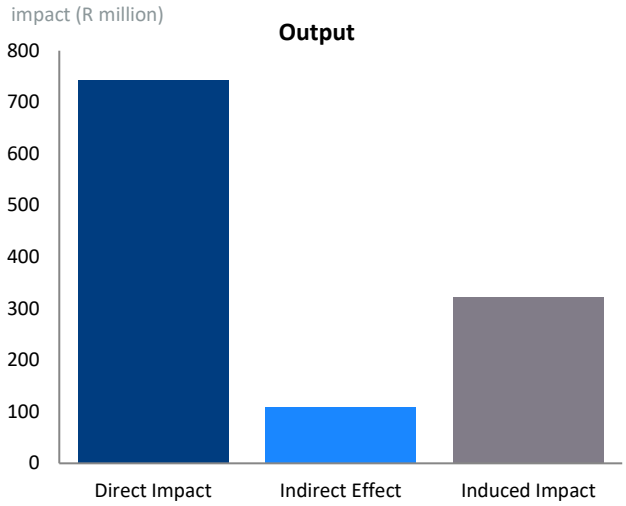
Staff expenditure stimulates R217 million in **labour remuneration** by sustaining 3 456 **employment** opportunities. Most of these jobs are skilled (38%) and unskilled (36%).

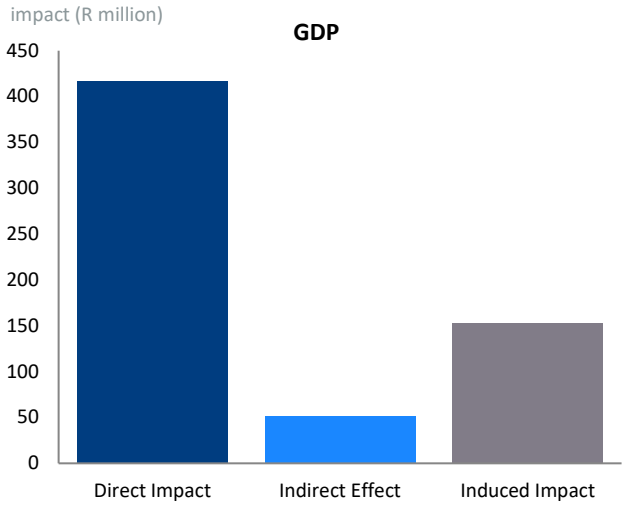
Table 26: Total staff impact on the Stellenbosch local economy

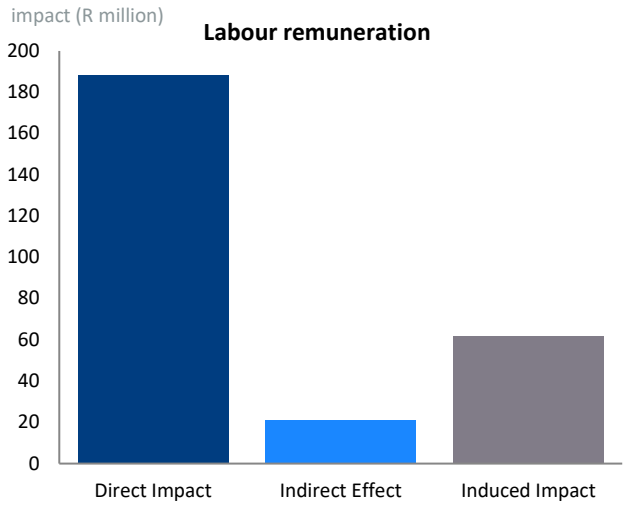
Rand million, number of people employed	Staff residing in Stellenbosch	Staff residing outside of Stellenbosch	Total staff impact
Total expenditure in Stellenbosch	453 671 093	97 552 924	551 224 017
Output			
Direct Impact	610 335 218	132 171 283	742 506 501
Indirect Effect	88 846 825	19 407 978	108 254 803
Induced Impact	269 587 646	52 102 451	321 690 097
Economy-wide Impact	968 769 689	203 681 711	1 172 451 400
GDP at basic prices			
Direct Impact	342 335 282	74 278 056	416 613 338
Indirect Effect	42 626 270	9 292 429	51 918 699
Induced Impact	128 087 137	24 755 055	152 842 192
Economy-wide Impact	513 048 690	108 325 540	621 374 230
Labour remuneration	-	-	-
Direct Impact	158 204 737	30 278 048	188 482 785
Indirect Effect	17 390 853	3 658 134	21 048 987
Induced Impact	51 815 204	10 014 176	61 829 379
Economy-wide Impact	227 410 794	43 950 358	271 361 152
Employment: total	-	-	-
Direct Impact	2 128	449	2 577
Indirect Effect	157	34	191
Induced Impact	577	111	688
Economy-wide Impact	2 862	594	3 456
Employment: highly skilled	-	-	-
Direct Impact	239	41	280
Indirect Effect	23	4	28
Induced Impact	68	13	81
Economy-wide Impact	330	58	388
Employment: skilled	-	-	-
Direct Impact	787	192	978
Indirect Effect	71	15	86
Induced Impact	223	43	266
Economy-wide Impact	1 080	250	1 330
Employment: unskilled	-	-	-
Direct Impact	800	132	933
Indirect Effect	44	10	54
Induced Impact	208	40	248
Economy-wide Impact	1 052	182	1 235
Employment: informal	-	-	-
Direct Impact	301	84	385
Indirect Effect	20	4	24
Induced Impact	78	15	94
Economy-wide Impact	399	104	503

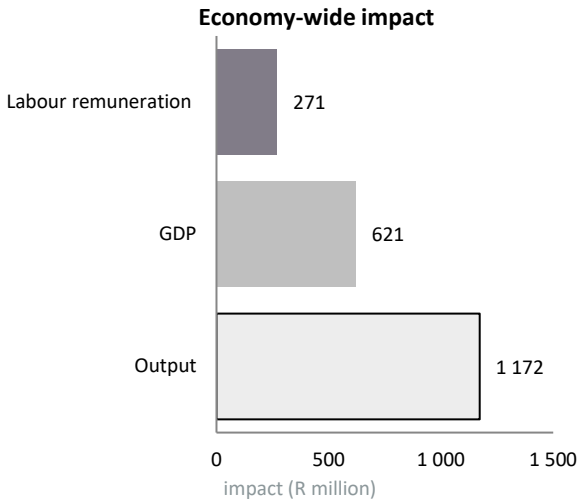
Source: BER calculations

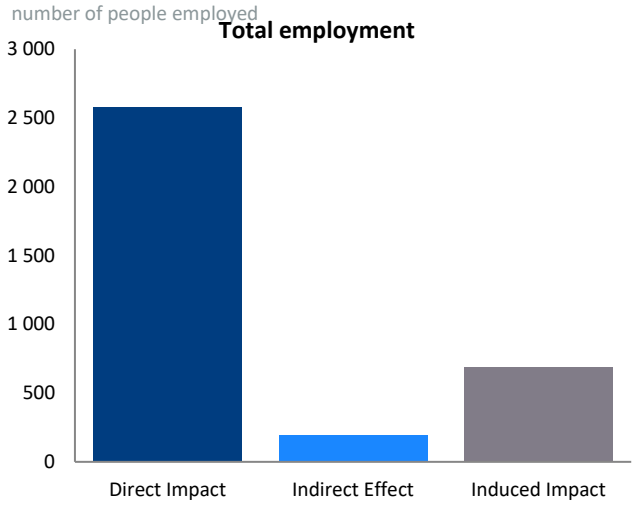
Figure 22: Graphical illustration of economic impact from total staff expenditure

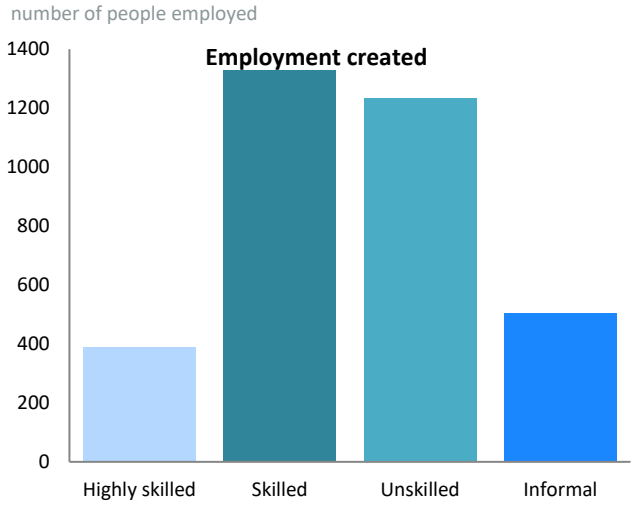












University expenditure

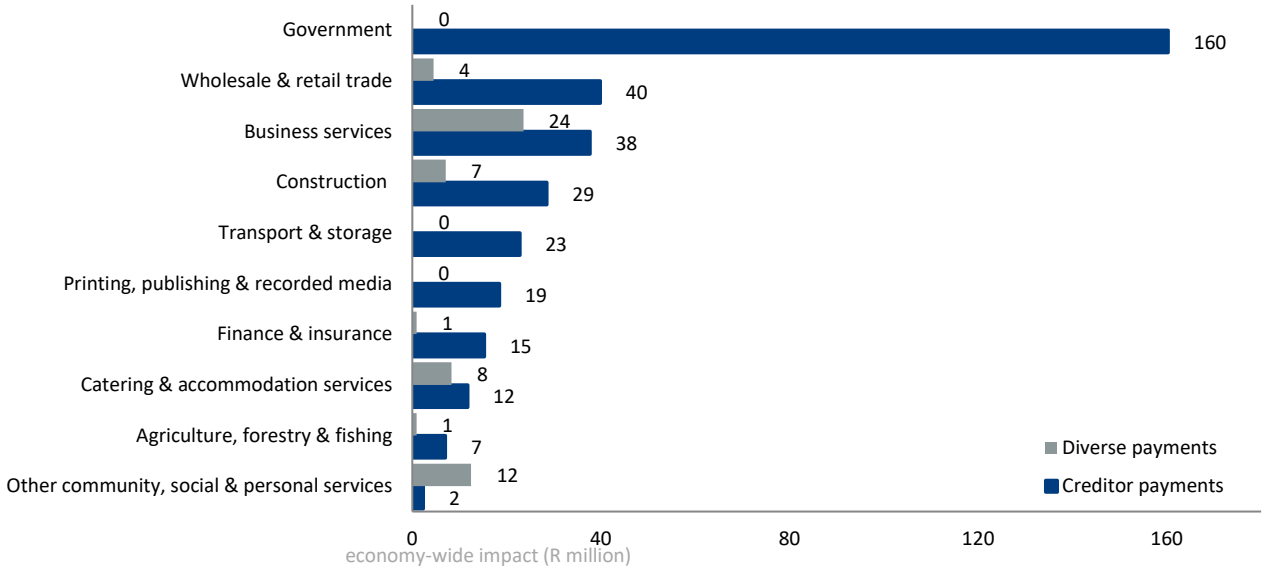
Creditor and diverse payments

Because the total expenditure on creditor payments is significantly larger than the local spending on diverse payments, the economic impact of the former is also larger – see Table 27 and 28.

In all, creditor payments by SU generate R717 million in the value of production (or **output**), while diverse payments generated R126 million.

The total economy-wide impact on **GDP** is R355 million for creditor payments and R63 million for diverse payments. Broken down into sectors, creditor payments have the biggest impact on the government sector (45%), while diverse payments make the biggest impact on the business services sector (38%) – see Figure 23.

Figure 23: Economy-wide impact on GDP of university spending per sector (R million)[46]



Source: BER calculations

In total, creditor payments stimulate R182 million in **labour remuneration** whilst sustaining 1 647 **jobs** in the local economy. Diverse payments generate R24 million in labour remuneration and sustain 327 jobs.

[46] This figure only shows the ten biggest sectors, data for the other sectors is included in Appendix 3.

Table 27: Total impact of **creditor payments** by SU on the Stellenbosch local economy

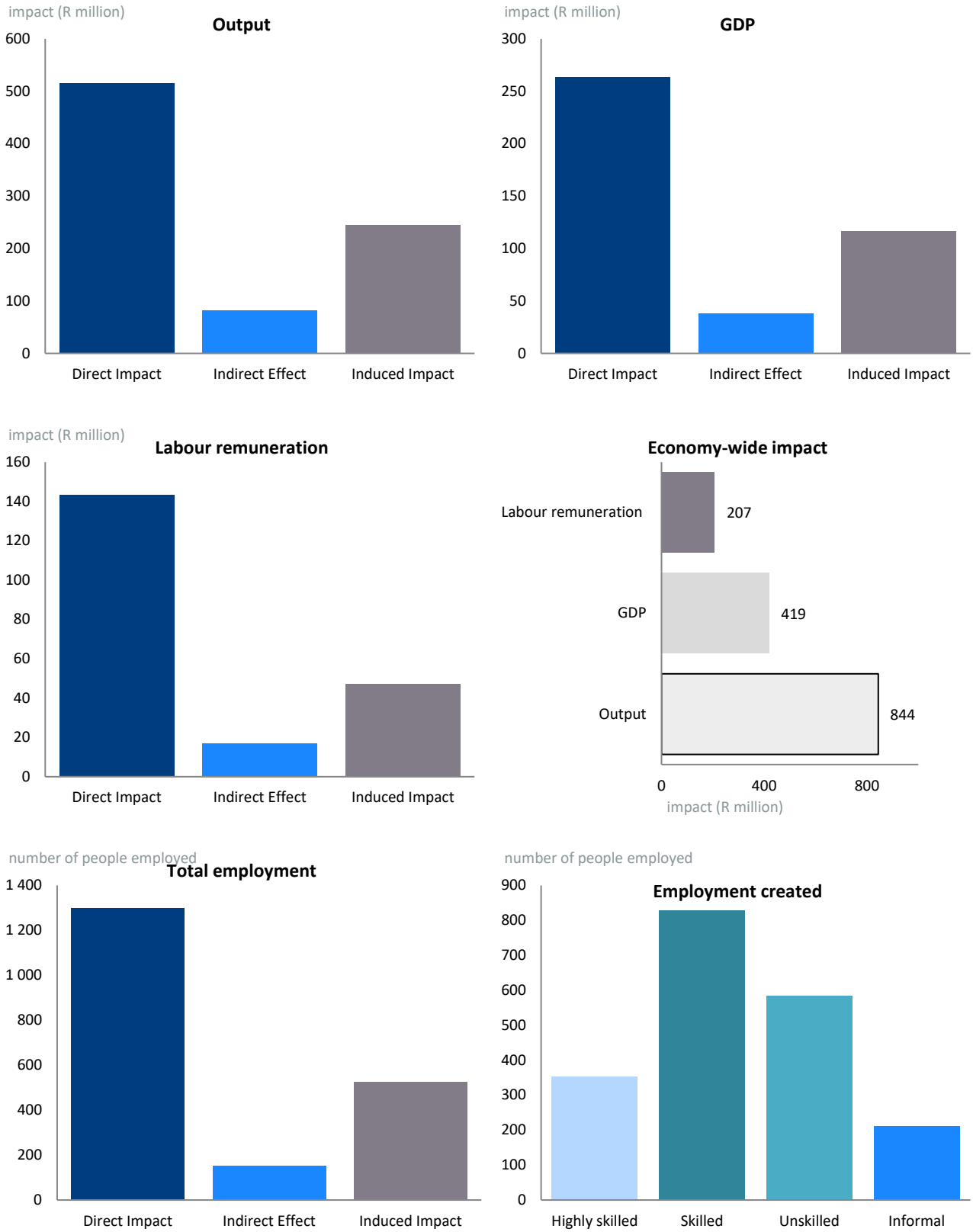
Rand million, number of people employed	**Total impact**
Exp. in Stellenbosch	319 112 962
Output	
Direct Impact	430 787 505
Indirect Effect	69 697 491
Induced Impact	216 829 079
Economy-wide Impact	717 314 076
GDP at basic prices	
Direct Impact	220 037 713
Indirect Effect	32 548 823
Induced Impact	103 022 223
Economy-wide Impact	355 608 759
Labour remuneration	
Direct Impact	126 723 670
Indirect Effect	14 401 911
Induced Impact	41 674 310
Economy-wide Impact	182 799 890
Employment: total	
Direct Impact	1 055
Indirect Effect	128
Induced Impact	464
Economy-wide Impact	1 647
Employment: highly skilled	
Direct Impact	245
Indirect Effect	21
Induced Impact	54
Economy-wide Impact	321
Employment: skilled	
Direct Impact	474
Indirect Effect	56
Induced Impact	179
Economy-wide Impact	709
Employment: unskilled	
Direct Impact	244
Indirect Effect	36
Induced Impact	167
Economy-wide Impact	448
Employment: informal	
Direct Impact	92
Indirect Effect	15
Induced Impact	63
Economy-wide Impact	169

Table 28:Total impact of **diverse payments** by SU on the Stellenbosch local economy

Rand million, number of people employed	**Total impact**
Exp. in Stellenbosch	64 018 346
Output	
Direct Impact	85 337 644
Indirect Effect	12 706 256
Induced Impact	28 875 857
Economy-wide Impact	126 919 757
GDP at basic prices	
Direct Impact	43 869 410
Indirect Effect	5 926 957
Induced Impact	13 720 616
Economy-wide Impact	63 516 983
Labour remuneration	
Direct Impact	16 405 780
Indirect Effect	2 342 973
Induced Impact	5 549 647
Economy-wide Impact	24 298 401
Employment: total	
Direct Impact	243
Indirect Effect	22
Induced Impact	62
Economy-wide Impact	327
Employment: highly skilled	
Direct Impact	22
Indirect Effect	3
Induced Impact	7
Economy-wide Impact	32
Employment: skilled	
Direct Impact	85
Indirect Effect	9
Induced Impact	24
Economy-wide Impact	118
Employment: unskilled	
Direct Impact	106
Indirect Effect	7
Induced Impact	22
Economy-wide Impact	135
Employment: informal	
Direct Impact	30
Indirect Effect	3
Induced Impact	8
Economy-wide Impact	42

Soucre: BER calculations

Figure 24: Graphical illustration of economic impact from SU creditor payments and diverse payments

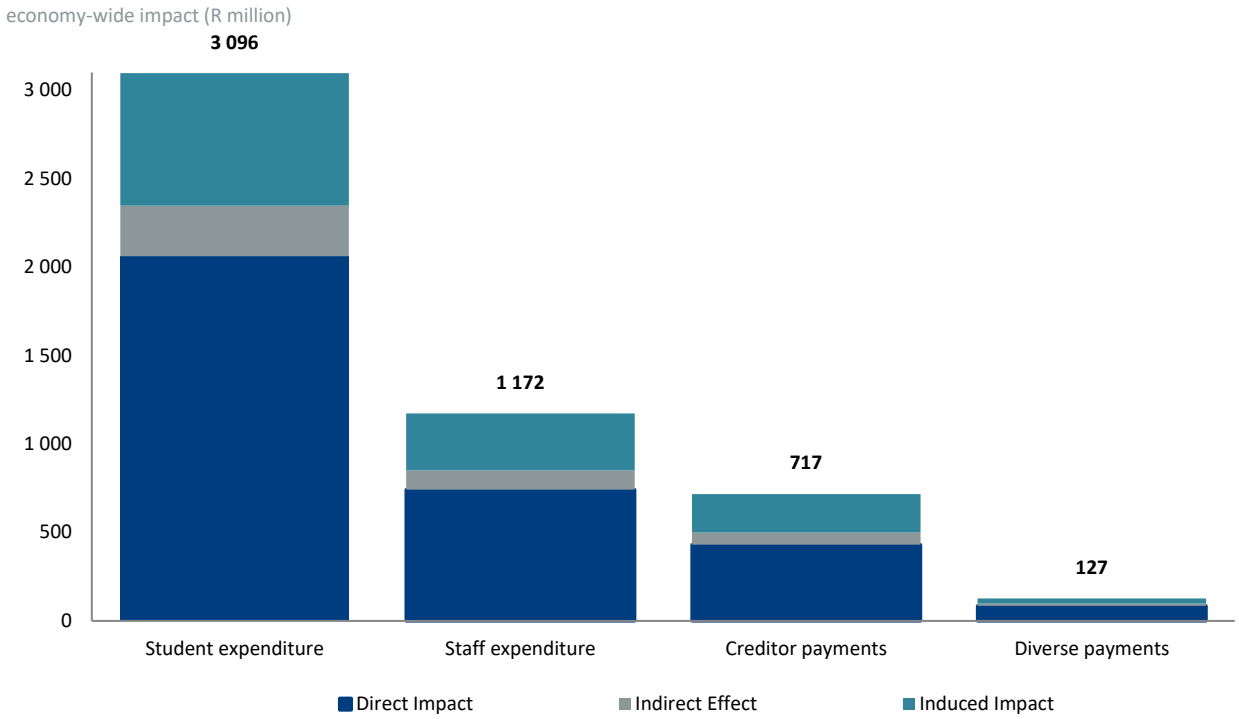


Total impact

This section summarises the **total impact of SU on the local Stellenbosch economy,** taking account of the expenditure of the university itself as well as the demand stimulus from students and staff.

In total, the economy-wide impact of SU on **output** (or value of production) is estimated to be R5 112 million in 2017. The majority of this comes from student expenditure (61%), followed by staff expenditure (23%), creditor payments (14%) and diverse payments (2.5%) – see Figure 25. The majority of the economy-wide impact is stimulated by the direct impact (65%), but the induced impact also makes a sizeable 26% contribution.

Figure 25: Economy-wide impact of SU on output



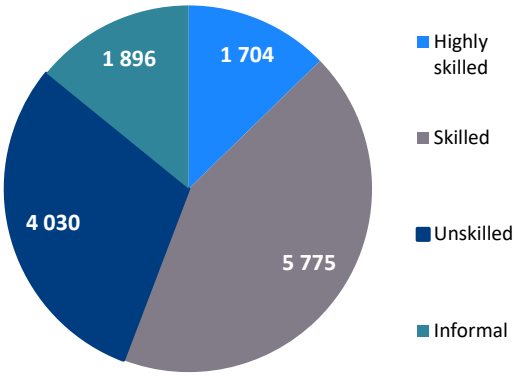
Source: BER calculations

The economy-wide impact on Stellenbosch's GDP is a significant R2 688 million. The composition of the economy-wide impact of SU on **GDP** is similar to that of output, with student spending stimulating the bulk of gross value added – see Table 30.

The presence of SU also generates R1 108 million in **labour remuneration**, of which 69% is attributable to the direct impact, 23% to the induced impact and the remaining 8% to the indirect impact.

Finally, SU also sustains 13 406 jobs in the local economy – see Figure 27. About 60% is linked to student spending, 26% to staff spending, 11% to creditor payments and 2.5% to diverse payments. Most of these jobs are skilled workers, followed by unskilled and informal.

Figure 26: Total employment sustained by SU



Source: BER calculations

Crucially, this is the impact on the *local* Stellenbosch economy. To put the magnitude of the impact of SU in perspective, Table 29 compares some of the key outcomes with economic data available for Stellenbosch municipality.

Table 29: Economy-wide impact of SU on the Stellenbosch economy in perspective

Indicator	Economy-wide impact of SU	Stellenbosch Municipality	Share (%)
Output	5 112 868 640	32 896 947 000[47]	15.5
GDP at basic prices	2 688 175 857	14 497 245 000[48]	18.5
Employment – formal	11 510	54 601	21.1
Employment – informal	1 896	21 694	8.7

Source: BER calculations, Quantec Research

As a result of multiplier effects, the total economy-wide impact of the university community stretches far beyond its initial expenditure in the local economy. Indeed, Table 29 shows that SU has a significant impact on the SU economy and in fact contributes close to 20% of gross value added in the region, as well as more than 20% to total formal employment. This is a very conservative estimate as it does not include expenditures made by visitors, spin-off companies or local businesses that are related to the university – these are unpacked in the next section.

[47] Nominal output at basic prices in 2016 (Quantec Research, 2017).
[48] Nominal gross value added at basic prices in 2016 (Quantec Research, 2017).

Table 30: Total impact of SU on Stellenbosch

Rand million, number of people employed	Student expenditure	Staff expenditure	Creditor payments	Diverse payments	Total
Total expenditure in Stellenbosch	1 551 132 571	551 224 017	319 112 962	64 018 346	**2 485 487 896**
Output					
Direct Impact	2 062 199 284	742 506 501	430 787 505	85 337 644	**3 320 830 934**
Indirect Effect	285 779 098	108 254 803	69 697 491	12 706 256	**476 437 649**
Induced Impact	748 205 025	321 690 097	216 829 079	28 875 857	**1 315 600 057**
Economy-wide Impact	3 096 183 407	1 172 451 400	717 314 076	126 919 757	**5 112 868 640**
GDP at basic prices					
Direct Impact	1 154 777 696	416 613 338	220 037 713	43 869 410	**1 835 298 158**
Indirect Effect	137 395 986	51 918 699	32 548 823	5 926 957	**227 790 465**
Induced Impact	355 502 204	152 842 192	103 022 223	13 720 616	**625 087 234**
Economy-wide Impact	1 647 675 886	621 374 230	355 608 759	63 516 983	**2 688 175 857**
Labour remuneration					
Direct Impact	432 190 341	188 482 785	126 723 670	16 405 780	**763 802 576**
Indirect Effect	54 402 191	21 048 987	14 401 911	2 342 973	**92 196 062**
Induced Impact	143 801 970	61 829 379	41 674 310	5 549 647	**252 855 306**
Economy-wide Impact	630 394 502	271 361 152	182 799 890	24 298 401	**1 108 853 945**
Employment: total					
Direct Impact	5 881	2 577	1 055	243	**9 755**
Indirect Effect	495	191	128	22	**836**
Induced Impact	1 600	688	464	62	**2 814**
Economy-wide Impact	7 977	3 456	1 647	327	**13 406**
Employment: highly skilled					
Direct Impact	708	280	245	22	**1 255**
Indirect Effect	68	28	21	3	**119**
Induced Impact	188	81	54	7	**330**
Economy-wide Impact	963	388	321	32	**1 704**
Employment: skilled					
Direct Impact	2 779	978	474	85	**4 316**
Indirect Effect	221	86	56	9	**372**
Induced Impact	618	266	179	24	**1 086**
Economy-wide Impact	3 618	1 330	709	118	**5 775**
Employment: unskilled					
Direct Impact	1 493	933	244	106	**2 776**
Indirect Effect	142	54	36	7	**239**
Induced Impact	577	248	167	22	**1 015**
Economy-wide Impact	2 213	1 235	448	135	**4 030**
Employment: informal					
Direct Impact	901	385	92	30	**1 408**
Indirect Effect	64	24	15	3	**106**
Induced Impact	218	94	63	8	**383**
Economy-wide Impact	1 182	503	169	42	**1 896**

Visitor spend: SU as an anchor institution

Apart from the university's quantifiable contribution to economic growth in the local economy, it also serves as a significant source of cultural, recreational and social enrichment for Stellenbosch. In this regard, increasingly, attention is being placed on the role of so-called anchor institutions in the local, urban environment and the impact these institutions have on the development of a town or region in general. Anchor institutions, according to a toolkit prepared by the Netter Center for Community Partnerships (2008) at the University of Pennsylvania, can be identified by answering a series of basic questions:

1. Does it have a large stake and remarkable presence in the city or community?
2. Does it have economic impacts on employment and spending patterns?
3. Does it consume sizeable amounts of space or land?
4. Does it have crucial fixed assets that are not likely to relocate?
5. Is it one of the larger purchasers of goods and services?
6. Is it a job generator?
7. Does it attract business and highly skilled individuals?
8. Is it a large employer and able to offer multilevel employment opportunities?
9. Is it a centre of culture, learning and innovation?

Even a superficial observer in Stellenbosch will be able to answer in the affirmative, as all of the above pertains to the university. The benefits of higher education are not limited to only those that earn degrees even though these can be very significant. There are powerful links between human capital formation and economic growth, as highlighted in the socio-economic profile of Stellenbosch. Human capital formation is not simply a function of generating degrees, but has many facets that play their respective parts. In the current context it is beneficial to consider and acknowledge the role that the university plays in the broader community and town. Some of these benefits are direct spin-offs, but some are much harder to quantify.

For example, SU has contributed to Stellenbosch's technological base through many channels. The university stimulates and diversifies technological innovation in the Stellenbosch region by playing a leading role in the establishment of the Stellenbosch Innovation District (SID). The concept of transforming Stellenbosch into an innovation district was introduced in 2013. The forum is a collaboration consisting of academics from SU and members of the local administrative authority. Among other goals, this seeks to provide access to the vast knowledge base that the university has to offer, which can be harnessed to assist the municipality.

The SID hopes to transform Stellenbosch into a smart and sustainable town by 2020 and aims to do this through promoting the exchange of innovations, ideas and resources. Furthermore, the SID seeks to design networks to enable collaboration between new and existing projects and bridge the gap between communities in the area. The SID ultimately strives to develop a culture of collaboration through innovation.

It is through such involvement in the local economy that SU catalyses economic growth in the region. The presence of SU has significantly increased the technological base of the town and these economic impacts are critical to the long-run economic development of the region.

In this section, the study will highlight a few, of many, of the SU's spin-offs, which have become credible enterprises with independent potential and the ability to support economic growth or development in Stellenbosch. Importantly, the existence of these enterprises can be directly attributed to SU and it is useful to illustrate the impact of having an institution such as the university in Stellenbosch. The enterprises considered include **Innovus**, and the Stellenbosch Institute for Advanced Study (**STIAS**). In addition, the benefits of **Maties Sport** and cultural events such as the **US Woordfees** are also unpacked. The qualitative benefits are largely based on findings from interviews with key stakeholders (Maties Sport, Innovus and Facilities Management). In cases where the relevant stakeholders were not available for interviews, they provided us with the relevant information (US Woordfees) or we got information from their annual reports and/or websites (Maties Gemeenskapsdiens).

Innovus[49]

Innovus is the industry interaction and innovation company of SU. The company manages the commercialisation of SU's innovation and intellectual property (IP) portfolio through licensing, patenting and the formation of spin-out[50] companies. Innovus supports the transfer of technology from the University to industry, while providing entrepreneurial support and development for innovation at SU. Furthermore, the company is responsible for managing the entire fifth income stream of SU. In this role, Innovus manages, among others, a dairy company, the Maties Shop, the SU Botanical Garden, the Neelsie Student Centre as well as the university's accommodation facilities. Innovus also encompasses the LaunchLab, SU's Short Courses and Copyright division as well as SU's Commercial Services.

Innovus has an impressive portfolio of patents and provides support, tools and advice for researchers, staff members and students wishing to commercialise their ideas. In this regard, the company also provides IP management and protection to faculty members and staff of SU. This is done, for example, by licensing IP rights to a suitable industry partner, through the formation of a spin-out company or negotiating the terms and conditions on behalf of the inventor. SU spin-out companies receive several services free of charge from Innovus, including company registration, name changes, registration of directors, banking support, and other services. In addition to these services, Innovus also provides spin-

[49] This sub-section is largely based on personal communication with A. Nel (CEO of Innovus and Senior Director: Innovation and Business Development at SU) on 20 October 2017.

[50] Innovus uses the term "spin-out" whereas the rest of the document often refers to "spin-off" in the current context.

out companies with basic accounting (including training), VAT administrative services, administration processing services and various legal and marketing-related support. These services are also made available to external companies at a market-related rate.

Since 2000, Innovus has helped develop 578 business ideas, leading to 23 spin-out companies which include the Maties Gymnasium (formerly known as Stellenbosch University Sport Performance Institute, SUSPI) and the University of Stellenbosch Business School – Executive Development (USB-ED) (Spin-out companies, 2017). In doing so, Innovus obtained 282 provisional patents, 76 licences, and filed 118 PCT applications (Innovus, 2016). Since 2009, the company has earned R30 million in license and patent income, two-thirds of which comes from abroad. Innovus successfully attracted R100 million in financing for its spin-out companies in 2016. In 2016, Innovus had shareholdings of R80 million in 62 companies and a combined company turnover of R224 million. The company's stake in these companies ranges from 6% to 100%. Except for three companies, all are located within Stellenbosch and derive a significant portion of their income from markets outside of the region, leading to additional financial flows into the local economy. These companies created 72 new jobs in 2016, mostly for Stellenbosch alumni. Innovus itself currently employs 26 employees. The job creation enabled through Innovus not only generates a direct economic impact on the local economy through subsequent business expenditures, but also contributes to induced effects through the subsequent expenditure by employees in Stellenbosch.

In all, the spin-out companies and the licensing and patenting of SU's IP generate a significant amount of income for US. This income stream is intended to be continuous and expansive, as the spin-out companies themselves grow and prosper. The licenses and patents have protected the IP rights of inventions created at SU, which has allowed the university to profit from its staff and students' innovations. This has helped to foster innovation at the university through the protection of property rights.

LaunchLab is a business incubator housed in Innovus. It offers various services and opportunities for entrepreneurs, such as providing necessary infrastructure and network services, as well as guidance from academics and leaders in the business world. The LaunchLab acts as an incubator and accelerator for SU's spin-out companies and student-owned enterprises, but also allows access to its services to some external start-up companies that are independent of US. Internal and external service providers are also invited to provide mentoring, support and guidance to its tenants. The LaunchLab has several focus areas including fintech and big data, paid media, cleantech, safety, agritech and food, and edutech.

To encourage entrepreneurship among students, the business accelerator offers a "hot desk" area for students with promising business ideas to benefit from the expertise of mentors in the accelerator program. This also allows students to network with other like-minded individuals.

As of 2016, the LaunchLab had 160 tenants and raised R76 million in funding (LaunchLab, 2016). The initiative attracts additional economic flows to the local economy by attracting businesses from other regions that wish to make use of Innovus' services offered to external companies through the LaunchLab to Stellenbosch. Many of these companies employ SU alumni and generate financial inflows to the region through their business activities.

Innovus and LaunchLab certainly add to the technological and innovation drive that Stellenbosch is striving for. However, for the purpose of this study, it is important to note that impact assessments are tools to measure the impact of an event or institution at a specific moment in time. This means that an EIA is unsuitable to value the intrinsic value embedded in intellectual capital. It is therefore not possible to determine the economic impact of Innovus and/or LaunchLab directly and is thus not included in the final economic impact analysis. However, the goal of this section was to highlight the important benefits of having such a company associated with SU and, as such, Stellenbosch in general.

STIAS

As highlighted earlier, although studies acknowledge the fact that higher educational institutions contribute to a region's human capital, most choose not to quantify its effect due to measurement challenges and a lack of data. Nowhere is the complexity of quantifying the value of a higher education institution better exemplified than when considering The Stellenbosch Institute for Advanced Study (STIAS)[51].

The concept of STIAS was made practically possible by a donation from the Marianne and Marcus Wallenberg foundation during 2005. The institution is situated on the historic Mostertsdrift farm, which is owned by SU and located in the heart of the town and borders the campus. The long-term structural or symbiotic nature of the relationship between STIAS and SU is illustrated by the fact that the parties signed a 99-year lease agreement in 2014, which means that both parties are mutually dependent and have long-term goals in mind. However, quantification exercises such as economic impact assessments try to reduce such relationships into binary outcomes. For example, typically one would discount the 99-year lease to current value.

The centre, which comprises of sustainable architecture and modern, low-impact surroundings, is intended to form a 'Creative Space for the Mind'. In this regard, STIAS states that in "today's knowledge society it is key to be able to access the latest reliable, appropriate, future-orientated, ground-breaking knowledge and to be able to process the technologies and know-how that flow from this knowledge. At the same time it is critical to nurture a future generation of independent thinkers and leaders. Leaders are those who not only understand the realities of a changing world, but who also have the ability and skills to implement these new advances to the benefit of their communities." As such, researchers and intellectual leaders are nurtured and encouraged to try and find sustainable and innovative solutions to pressing issues, facing not only the country and Africa, but also, if appropriate, the rest of the world.

The complex can house up to 20 researchers concurrently, but also caters extensively to associated activities, such as workshops and conferences. During 2016, almost 29 930 people made use of the facility (which translates to 110 people per day on average when taking account of weekends and holidays).

[51] The section on STIAS is based entirely on their annual report (2016) and information gleaned from the website www.stias.ac.za during 2017.

Catering Unlimited, which provides some of the logistical support at STIAS, has 18 employees and is a viable business in its own right[52].

STIAS reported an operating income (including donations) of almost R67 million for 2016. Total expenses of R32 million are also not insignificant. However, as was the case for Innovus and LaunchLab, the true impact is the output directly and indirectly linked to the facility. Indeed, even a cursory glance at the activities of STIAS shows that the impact of the institution is much greater than the income generated or expenses incurred.

For example, STIAS has programmes to attract promising scholars from Africa via its *Iso Lomso* programme and has awarded several full-support programmes to further strengthen the links between various other institutions in Africa. In the annual report, Professor Hendrik Geyer notes that there were 69 fellows based at STIAS during 2016, of which 11 were visiting scholars. STIAS also works with institutions outside of the continent. For example, a STIAS programme in Sweden coincided with 15 fellows and 3 visiting scholars from the Scandinavian country during 2016.

The academic impact is significant, with thirteen books and 51 journal publications being published with STIAS affiliations in 2016. Professor Geyer, in the annual report, uses feedback from one of their fellows to illustrate the point. This quote, taken directly from the annual report, illustrates the true value of STIAS and underscores why reducing the impact to a mere monetary value is simply impossible, and might even be a form of hubris on the side of the researcher:

"The most memorable advantage of being part of STIAS, and what I regard as the unique strength of the fellowship, has been the diversity of the group. The interaction of academics, scientists and writers from all walks of life facilitated the breaking down of the walls immuring various disciplines. It led, at least in my experience, in demystifying some of the myths surrounding various areas of scholarship. True to its mission STIAS provides a meeting point where minds from the South and the North, from the East and the West can meet in constructive dialogue."

But, complicated as it might be, economic theory *does* allow for the study of some of these impacts associated with universities via various methods and the current study is no different. It is, however, appropriate to note that it is very likely that such studies reduce the impact of learning institutions. This is, in part, because the estimates can only be interpreted as indicative at a point in time. Furthermore, such estimates are most probably going to be on the (too) conservative side due to the inability to measure some of the positive impacts.

[52] Email conversation with one of the directors of Catering Unlimited, November 2017

Maties Sport

SU's role as an anchor institution becomes very clear when viewing the extensive and world class sporting facilities that make up so much of the physical space and fabric of the town. While the actual expenditure of the university on sporting-related matters is picked up by the EIA analysis, sport and Stellenbosch cannot really be separated. Indeed, SU rector and vice-chancellor has been that *"sport forms a crucial part of the value proposition of SU. We cannot think of Maties without Maties Sport"* (Maties Sport Review, 2016)[53]

The facilities and sporting heritage of Stellenbosch create their own spin-off industries (such as the Stellenbosch Academy of Sport. This creates a loop where the resources not only directly attract talent (such sportsmen/women and coaches) to the region, but also creates demand for the required support staff (such a physiotherapists, doctors and suppliers to the facilities).

Maties Sports strives to be a model for university sport in South Africa. It facilitates ten high-performance sporting disciplines and 23 other sports. SU is home to world-class sporting facilities including the High-Performance Sports Unit, the Centre for Human Performance Sciences and the SU Sport Performance Institute (SUSPI). These facilities are made available to athletes and students attending SU, as well as external sporting teams and the public. In 2016, 9,646 students formally took part in Maties Sport activities, representing a 60% increase in participation since 2014 (Maties Sport Review, 2016).

Historically, SU has been associated with a world-class sporting performance and is the source of many sportsmen and women who have represented their country across a variety of sporting disciplines. As such, Stellenbosch is a destination for sporting teams from around the world who seek high-performance training. The southern hemisphere climate and the availability of modern training facilities attract many international sportsmen and women to train and base themselves in Stellenbosch during the European winter months. For example, 2017 saw the German, English and Belgian women's and Dutch men's hockey teams training at SU. While training at SU, the teams have access to all of the university's training and conditioning facilities. Furthermore, teams are supported by the sports science and sports medicine centre at SU, which is a gold accredited sport science testing centre. These services directly attract additional expenditure from abroad to Stellenbosch from fees paid by these teams. In addition to this, teams training at SU require accommodation which results in additional flows into the local economy. Data limitations did not allow for these inflows to be quantified, but it is important to highlight the benefit of having the facilities available, which include the intangible benefit of association with the best in the world.

Stellenbosch is also the location for several national and even international sport competitions. For example, in 2016, Maties Sport hosted and participated in numerous Varsity Sports and University Sports South Africa (USSA) competitions, and several athletes represented SU on the international stage. This afforded many athletes from SU to showcase their sporting abilities and take the next step in their sporting careers. Hosting of events such as Varsity Cup rugby, netball, athletics and cricket competitions attracts visitors and athletes from the town and other areas to Stellenbosch. Although many spectators may

[53] Professor Wim de Villiers (Maties Sports Review, 2016: 2)

originate from Stellenbosch, non-local spectators are also drawn to these events. This generates additional expenditure within Stellenbosch in the form of ticket sales and other general entertainment expenses.

This form of sports tourism, induced by Maties Sport, benefits the tourism sector in Stellenbosch as most visitors take advantage of the tourist-friendly town's array of activities. Sporting competitions are accompanied by several intangible benefits for Stellenbosch and SU in particular, such as the fact that they serve as a platform to showcase SU's brand as a world-class institution.

Maties Sport's reputation attracts sporting talents from around the country to SU as they seek to further their sporting careers after finishing high school. Currently, Maties Sport provides bursaries and scholarships for around 280 eligible students across varying sporting disciplines[54].

Stellenbosch University has produced several of the country's top athletes, captains, coaches and support staff over its history which has cemented Stellenbosch's reputation as a location for sporting excellence. It is clear that sport has contributed positively to the SU brand over the years, and benefited the university's reputation as an institution.

Maties Community Service (MGD)

The current concept of the Maties Community Services (which translates to Maties Gemeenskap Diens in Afrikaans, explaining the abbreviation MGD) was formed in 1956 by the first medical students to register at SU. These students identified the need for voluntary after-hour, weekend and holiday clinics in the impoverished communities surrounding the academic hospital of SU. This subsequently led to the formation of the Clinical Organisation of the University of Stellenbosch (USKOR), which offered clinical services to the local communities free of charge. These activities were expanded as time went by and eventually became known as MGD in 1993. Over the last five decades, MGD has positively influenced the lives of generations of SU students and community members in Stellenbosch and its surrounds.

MGD operates as a registered non-governmental organisation (NGO) as well a unit within the organisational structure of SU. The organisation's mission is to provide high-quality services and sustainable development programmes to the communities which it serves (MGD Annual Report, 2013). An important achievement of MGD is how the organisation has served the needs of historically disadvantaged communities over the last five decades.

MGD has centred its approach on community service and enrichment around entrepreneurship development, education and training programmes, which aim to help beneficiaries empower themselves. In addition to this, MGD continues to offer primary health care services to the communities in Stellenbosch and its surrounds. These activities are predominantly run by student volunteers with the help of other professionals and community volunteers. This provides a space for holistic student development through community interaction and guidance from senior programme managers, allowing the students to experience the realities of life which cannot be learnt in the classroom or from a textbook. This not only

[54] Final numbers are not definitive as some athletes are sponsored directly by alumni according to the sources.

has a positive impact on student development, but also on the beneficiaries within the community. Through the community interaction, MGD has a positive effect on poverty alleviation and personal development within the areas benefiting from its activities. This effect cannot be quantified in crude measures such as financial flows, but has a positive effect on the socio-economic well-being of its beneficiaries and as such adds significant value to the region.

A prime example of this, is the organisation's education project where students provide tutoring to school learners (between the ages of 7 and 16) at historically disadvantaged schools. Students provide tutoring in English, Afrikaans, Maths and Maths Literacy, but also encourage the development of life skills among the learners, with a focus on wellness and character building (MGD Annual Report, 2013).

Cultural community: arts, culture and heritage

Arts, culture and heritage have various positive social and economic impacts on a region, both tangible and intangible. Arts, culture and heritage make a tangible contribution to economic growth in a region through various avenues (including visitor expenditure, job creation and skills development) while the intangible benefits are difficult to quantify. This is also because most people do not value arts, culture and heritage based on its economic and social benefits, but rather by the benefit it adds to their personal lives. The final value consists of both instrumental and intrinsic value. Instrumental value refers to the broader social and economic benefits of culture, such as social cohesion and its contribution to skills development, and is essentially an instrument for achieving broader social and economic goals. The intrinsic value of culture includes personal enjoyment and aesthetic pleasure. The intrinsic value is difficult to quantify, but impossible to ignore. Arts, culture and heritage have a positive public spillover effect.

Universities are critical assets for social and cultural impact and economic development (Sun & Naqvi, 2014: vii). As such, the presence of the university adds to the cultural landscape through the presence of museums, theatres, art galleries, botanical gardens and events. The impact of all the cultural institutions, as well as the university in general, contributes to a significantly improved level of cultural activity in the area. While there are many examples, the outstanding performance of the University of Stellenbosch's choir stands out. The choir is currently rated the best choir in the world by Interkultur (2017)[55]. To place a monetary value on such achievements is not always appropriate, as the true value cannot be measured by crude indicators such as monetary impacts.

However, in an attempt to illustrate significance of cultural events linked to the university, the annual US Woordfees festival was identified as an event which had a significant economic and social impact on Stellenbosch, both tangible and intangible. The US Woodfees is a literary and arts festival held in Stellenbosch and has become a popular fixture on the South African cultural calendar since its inception. The event attracts visitors from around the country. Although the focus is largely on Afrikaans, the US Woordfees also features works in English, African languages, Dutch and Flemish.

[55] http://www.interkultur.com/world-rankings/

Over-and-above the economic impact of visitor spending and job creation (see the text box below for an estimate of the economic impact of the festival), the US Woordfees provides artists with a platform to express their creativity in an environment in which they are free to challenge the status quo. As such, to quantify the intangible social and economic impacts of the US Woordfees is beyond the scope of this study; however, its impact is important to consider as it highlights the benefit of the presence of a university within a town through arts, culture and heritage.

Quantifying the tangible impact of the 2017 US Woordfees

This textbox provides an overview of the estimated impact of the 18th Woordfees that took place in March 2017 in Stellenbosch. However, for reasons explained in the final section of the text box, the estimate will not be included in our final impact analysis.

According to the Woordfees Divisional Environment Plan (2017), ticket sales amounted to R7.05 million. This figure has grown steadily from R2.9 million in 2013. However, when determining the economic impact of a cultural event, it is important to distinguish between revenue from locals and spending by tourists. Technically, only the *additional expenditure* that is generated for the local economy should be considered. Spending by locals may simply be alternative, rather than additional. For example, alternative spending happens when a local resident decides to attend a show during the Woordfees instead of going to the local cinema as they usually do. He/she would have spent the money in Stellenbosch in any case, now it is just spent at the Woordfees instead of at the cinema. Therefore, the attraction of visitors from outside of Stellenbosch remains critical for increasing the economic impact of the Woordfees.

A survey conducted by SU during the 2017 Woordfees festival indicated that 23.4% of the respondents visited Stellenbosch for the event from regions other than the Western Cape (Human-Van Eck & Pentz, 2017). Furthermore, 41.5% of the respondents indicated that they were visiting Stellenbosch specifically for the Woordfees festival.

The economic impact of these visitors to the town extends beyond ticket sales. Visitors spend money on accommodation, food, beverages and transport. In the case of overnight visitors, accommodation is a sizeable expense which provides a significant injection of funds into the local economy. Of the 307 survey respondents, 57.7% indicated that they were day visitors. The remaining 42.3% were overnight visitors, the majority of whom spent between 1 and 3 nights in Stellenbosch, but some indicated that they stayed in the town for much longer periods. These positive spillover effects are difficult to accurately quantify, however, one can come to a conservative estimate if certain assumptions are made about the expenditure of these visitors.

Visitor expenditure

Survey respondents were asked to indicate their daily expenditure streams while in Stellenbosch. This expenditure was classified into six categories, namely, transport, accommodation, tickets, food, beverages and ‘other’. The results presented in Table 31 provide a summary of expenditure for the corresponding categories.

Table 31: Average daily spend per person (R)

	Average per day	Transport	Accom-modation	Tickets	Food	Beverage	Art	Other
Average	714	323	1185	497	369	362	610	333
Median	400	150	800	200	200	200	325	250

Source: Human-Van Eck & Pentz (2017).

Estimated impact

At the 2017 SU Woordfees, 72 848 tickets were sold at an average price of R97 (Division Environment Plan, 2017). Tickets were sold at a discounted rate prior to the event, as well as at the venue. Ticket prices varied across the different events and performances, and total sales amounted to R7.05 million for the festival. The majority of visitors (23.2%) attended two paid shows. By assuming that the average attendee attended two shows while at the Woordfees, this gives an estimated attendance of 36 424. This provides a conservative estimate, as we have ignored attendees who chose to only attend free shows.

The SU Woordfees Survey data indicates that 57.7% of attendees were day visitors, while the remaining 42.3% were overnight visitors, which requires overnight accommodation and other additional expenditures while in Stellenbosch. This extends the economy-wide impact of the SU Woordfees across other sectors in the local economy.

Job creation

Job creation is critical to economic growth, particularly in the context of South Africa which currently faces a significant unemployment problem. Festivals and events, such as the Woordfees, provide necessary temporary employment within a community. This provides the direct benefit of additional income for the unemployed within the local community. Additionally, this also promotes skills development to empower people to find long-term employment.

The Woordfees creates more than 600 temporary jobs every year, creating opportunities for members of the local community and its surrounds (Divisional Environment Plan, 2017).

7. Concluding remarks

The objective of the study was to provide an estimate of the economy-wide impact of SU on the local Stellenbosch economy. This was done using an appropriate EIA method to determine the impact of expenditure by University itself (through analysing creditor and diverse payments), as well as the expenditure by staff and students at SU as a demand-side stimulus. Furthermore, a descriptive analysis of spin-offs and the role of SU as an anchor institution was provided to give some indication of the non-quantifiable economic benefits of the institution.

In all, the results shows that the impact of SU on the local economy is highly significant. More than 15% of output and more than 18% of gross value added generated in the municipality is stimulated by the presence of the institution. Furthermore, SU sustains more than 13 000 jobs in the region, which is more than 17% of total local employment. These estimates, however, understate the total impact of the SU as they only pertain to the local benefits. SU has close links with the rest of the province and country. For example, only a small portion of the creditor payments made by the SU were made to local companies, the bulk thus generating large economic benefits outside the region (which was purposefully were not captured by this study). Nonetheless, even at a local level, the benefit of having an institution such as SU in Stellenbosch is very significant and extends beyond the direct economic benefits and fundamentally uplifts and enhances the Stellenbosch community.

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Appendix 1: literature review summary table

This table provides a summary of the methodology used as well as results found by the studies unpacked in section 2.

University	Location	Coun-try	Year	Impact on town and/or region?	Demand-side Effects						Supply-side Effects				Est. Impact
					University Expend.	Staff Spending	Student Spending	Visitor Spending	Other	Multiplier Model	Research	Spin-off's	Education Premium	Other	
University of Manitoba	Winnipeg, Manitoba	Canada	2009	Town of Winnipeg and Province of Manitoba	Direct spending measured using expenditure approach	University expenditure on wages & salaries	On-campus and out-of-town expenditure	Out-of-town visitor numbers and expenditure estimated using university data and previous EIA studies	Maintenance and capital projects	Input-Output model (STATCAN)	Expenditure on research included	Included spin-off business expenditures	NA	NA	CAD 1,476 million (Winnipeg) & CAD 1,768 million (Manitoba)
University of British Columbia	Vancouver, British Columbia	Canada	2009	Province of British Columbia	Direct spending measured using income approach	Income approach for staff salaries and benefits	YES: Only for full-time students	Visitor spending	Construction income	Input-Output model (STATCAN)	Impact of UBC research estimated using Total Factor Productivity (TFP)	NA	Use wage differentials from STATCAN to calculate NPV of holding a degree		CAD 10,055 billion
New York University	New York, New York	USA	2015	New York City & Boston	Direct spending measured using expenditure approach	University expenditure on wages & salaries	YES: Only for full-time students & differentiate between in- and out-of-state students	Not quantified	NA	IMPLAN Input-Output model	Not quantified	NA	Not quantified	Technology transfer and business development - analysed but not quantified	USD 2,2 million (i.t.o output)

Simon Fraser University	Burnaby, British Columbia	Canada	2011/2014	Local economy	Spending approach using a series of impact indicators generated by simple linear cash flow formulas	University expenditure on wages & salaries	Yes: adjusted for continuing studies students who often live outside of the Metro of Vancouver.	University data for visitor numbers & Tourism Vancouver data for average visitor spending	Qualitative assessment of construction spending	Input-Output model (STATCAN)	Impact of research estimated using Total Factor Productivity (TFP)	NA	STATCAN data on university wage premium used. Multiply the premium by number of students graduated since inception (1960's).	Qualitative assessment of long-term impacts of SFU on culture and recreation	CAD 3,652.9 million
University of Saskatchewan	Saskatoon, Saskatchewan	Canada	2015	Saskatchewan province	Direct spending measured using expenditure approach	University expenditure on wages & salaries	Yes: Living expenditures estimated using information about student population and average student room and board expenditures.	YES: Used Tourism Saskatoon to compare to their estimates	New capital expenditures	Input-Output model (STATCAN)	YES: Do not quantify	NA	Earnings premium estimates based on earnings differentials between workers with different levels of educational attainment in Saskatchewan according to 2011 National Household Survey , obtained from STATCAN		CAD 1.2 billion in GDP
University of Alberta	Edmonton, Alberta	Canada	2013	Provincial & State	NA	NA	NA	NA	NA	NA	NA	YES: Using alumni surveys	NA	Used alumni surveys to quantify effect of organisations started by alumni and quantify their estimated effects.	CAD 348.5 billion

Dalhousie University	Hali Fax, Nova Scotia	Canada	2011	Provincial	Expenditures in the economy associated with the university's education and research activities	University expenditure on wages & salaries	YES: Account for large inflow of out-of-province students	YES: Using university estimates for visitinf academics and friends and family	NA	Input-Output model (STATCAN)	Qualitative analysis	NA	Earnings premium estimates based on earnings differentials obtained from STATCAN. Marginal tax benefits calculated	Student retention, socio-demographic returns to higher education - qualitative anlysis	CAD 1 billion
Xavier University	Cincinnati, Ohio	USA	2002	Local economy	Expenditures approach	University expenditure on wages & salaries	YES: Ignore graduate student spending. Used survey to determine where students would have studied had Xavier not existed	NA	Quantify gifts received from non-local sources.	RIMS-II model	NA	NA	Use alumni surveys to estimate human capital impact	NA	USD 66 million
University of Kent	Kent, Canterbury	United Kingdom	2011	South East region & rest of UK	Expenditures approach	University expenditure on wages & salaries	YES: For local, non-local UK, and foreign students	NA		Type II input-output model (ONS)	NA	NA	NA	NA	GBP 571,73 million
North West University	Potchefstroom, North West Province	South Africa	2017		Bill of goods/ sectoral expenditures approach	Excluded	NA	NA	Sectoral linkages used to analyse industry-specific impact of direct expenditure	NA	NA	NA	NA	NA	Sector specific
University of Delaware	Newark, Delaware	USA	2003	Local & State economy	Expenditures approach	Obtained from survey of staff	Obtained from survey of students	NA	Impact on local businesses (using business surveys)	ACE multiplier	NA	NA	NA	NA	$735 million

Appendix 2: survey questionnaires

Stellenbosch University impact study: staff survey

1. Do you live in Stellenbosch? Yes__ No__

Stellenbosch can be defined as the broader Stellenbosch Municipal Area – please refer to the following map if you are unsure of the boundaries: http://ow.ly/F8iF30dTaud

Instruction: If "Yes", go to question 2, if "No", go to question 40

2. Housing: Do you own the house/apartment in which you live? Yes__, No__

Instruction: If "Yes", go to question 3. If "No" go to question 4.

(If you own it):

3. **Monthly** bond repayment (R): ___

(If you don't own it):

4. **Monthly** rent (R):___

Instruction: Everyone who lives in Stellenbosch (answered "yes" in question 1), should answer the following questions (from 5 to 39):

5. Your household's average **monthly** expenditure on utilities (water, electricity, refuse removal, property taxes) (R):___

6. Your household's average **monthly** expenditure on security (including alarm company, neighbourhood watch) (R):___

7. Your household's average **monthly** expenditure on household services (including domestic, gardener, nanny, au-pair) (R):___

8. Your household's average **monthly** expenditure on groceries (including pet food, stationery, toiletries, cleaning products, all beverages and tobacco, baby products) (R):___

9. What proportion of your household's groceries do you buy in other towns (for example, we do 10% of grocery shopping in Somerset West/Cape Town/Paarl) (%)?___

10. Your household's average **monthly** expenditure on takeaways/restaurants/weekend markets (R):___

11. What proportion of your restaurant/weekend market visits takes place in other towns (%)?___

12. Your household's average **annual** expenditure on wines from local wine estates (R):___

13. On average, how many times a **year** do you/your family visit a medical practitioner (doctor/clinic/dentist/optometrist etc.)? 0__, 1__, 2__, 3__, 4__, 5__,6__,7__, 8__, 9__, 10__, 11__, 12__, 13__, 14__, 15__, 16__, 17__, 18__, 19__, 20__, more than 20__

14. Regardless of whether you or your medical aid pay, what is the average total bill per visit (R)?___

15. What proportion of your medical practitioner visits are in other towns (%)?___

16. Your household's average **monthly** expenditure on pharmaceuticals and medical goods (chronic medication, over the counter medication etc.) (R): ___

17. What proportion of your pharmaceuticals and medical goods do you buy in other towns (%)?___

18. On average, how many times a **year** do your pet/s visit the vet? 0__, 1__, 2__, 3__, 4__, 5__,6__,7__, 8__, 9__, 10__, 11__, 12__, 13__, 14__, 15__, 16__, 17__, 18__, 19__, 20__, more than 20__

19. On average, how much do you spend per visit) (R)? ___

20. Your household's average **monthly** expenditure on pet grooming (R):___

21. Your household's average **monthly** expenditure on public transport (taxis/busses/uber) (R):___

22. Your household's average **monthly** expenditure on fuel (diesel/petrol) (R):___

23. On average, how many times a **year** do you take your vehicle/s for maintenance (a service/tyre replacement/new battery etc.) in Stellenbosch? 0__,1__,2__,3__,4__, 5__, 6__, more than 7__

24. On average, how much do you spend per service (R)?___

25. Do you have school going children who attend school/playschool/crèche/day care in Stellenbosch? Yes__, No__

Instruction: If "yes" go to question 26-28, if "no" go to question 29:

26. What are your total **monthly** school fees (if you pay school fees on a quarterly basis, kindly calculate a monthly average) (R)?___

27. Total **monthly** allowance/tuckshop money (R):___

28. Total **monthly** expenditure on tutors (R):___

29. Your household's average **monthly** expenditure on clothing/shoes (including school uniforms, sportswear for the kids) (R): ___

30. What proportion of your clothes/shoes do you buy in other towns (%)?

31. Your household's average **monthly** expenditure on recreational, cultural and sporting activities (gym, movies, extramural activities for the kids, school outings etc.) (R):___

32. Your household's average **monthly** expenditure on hair and other beauty treatments (R):___

33. What proportion of your household's hair and other beauty treatments occurs in other towns (%)?

34. Your household's average **monthly** expenditure on gifts (toys/books/vouchers etc.) (R): ___

35. What proportion of gifts do you buy in other towns (%)?

36. Your household's average **monthly** expenditure on hardware (plumbing/painting/home maintenance related expenses) (R)

37. What proportion of hardware do you buy in other towns (%)

38. Your household's average **monthly** contribution to the church/any other charities in Stellenbosch (R):___

39. Any comments:_____

Thank you for your time, we appreciate your feedback.

If you don't live in Stellenbosch:

Total monthly expenditure in Stellenbosch municipal area:

Please note that we are only interested in **expenditure** that occurs **in the Stellenbosch municipal area**. For example, if you don't do ANY grocery shopping in Stellenbosch, insert a zero for groceries. However, if you buy a sandwich and coffee from the Neelsie on a daily basis, insert your monthly expenditure on lunch and coffee under takeaways/restaurants.

40. Your household's average **monthly** expenditure on groceries in Stellenbosch (including pet food, stationery, toiletries, cleaning products) (R):___

41. Your household's average **monthly** expenditure on takeaways/restaurants/weekend markets in Stellenbosch (R):___

42. Your household's average **annual** expenditure on wines from wine estates in Stellenbosch (R):___

43. On average, how many times a **year** do you/your family visit a medical practitioner (doctor/clinic/dentist/optometrist etc.) in Stellenbosch? 0__, 1__, 2__, 3__, 4__, 5__,6__,7__, 8__, 9__, 10__, 11__, 12__, 13__, 14__, 15__, 16__, 17__, 18__, 19__, 20__, more than 20__

44. Regardless of whether you or your medical aid pays, what is the average bill per visit to the medical practitioner (R)?___

45. Your household's average **monthly** expenditure on pharmaceuticals and medical goods (including chronic medication, over the counter medication etc.) in Stellenbosch (R):___

46. Do you have school going children who attends school/playschool/crèche/day care in Stellenbosch? Yes__, No__

Instruction: If "yes" go to question 47-49, if "no" go to question 50:

47. What are your total **monthly** school fees (if you pay school fees on a quarterly basis, kindly calculate a monthly average) (R)?___

48. Total **monthly** allowance/tuckshop money (R):__

49. Total **monthly** expenditure on tutors (R):__

50. Your household's average **monthly** expenditure on clothing/shoes in Stellenbosch (including school uniforms, sportswear for the kids) (R):___

51. Your household's average **monthly** expenditure on recreational, cultural and sporting activities in Stellenbosch (gym, movies, extramural activities for the kids etc.) (R):___

52. Average **monthly** expenditure on fuel (diesel/petrol) in Stellenbosch (R):___

53. On average, how many times a **year** do you take your vehicle/s for maintenance (a service/battery replacement/new tyres etc.) in Stellenbosch? 0__, 1__,2__,3__,4__, 5__, 6__, more than 7__

54. On average, how much do you spend per service (R)?___

55. Your household's average **monthly** expenditure on hair and other beauty treatments in Stellenbosch (R):___

56. Your household's average **monthly** expenditure on gifts (toys/books/vouchers etc.) in Stellenbosch (R):___

57. Your household's average **monthly** expenditure on hardware in Stellenbosch (plumbing/painting/house maintenance related expenses.) (R):__

58. Keeping the above expenditure categories in mind, what proportion of your household's total **monthly** expenditure takes place in Stellenbosch (%)?___

59. Any comments:_____

Thank you for your time, we appreciate your feedback.

Stellenbosch University impact study: student survey

Instructions:

- Please note that we are only interested in your typical expenditure during the **academic year**
- The majority of the questions ask for average monthly expenditure, but please note that there are some questions that asks for annual estimates (expenditure on textbooks, food quota in the residence etc.).

1. Do you live in Stellenbosch during the academic year? Yes__ No__

Stellenbosch can be defined as the broader Stellenbosch Municipal Area – please refer to the following map if you are unsure of the boundaries: **http://ow.ly/F8iF30dTaud**

Instruction: If "Yes", go to question 2, if "No", go to question 31

If you live in Stellenbosch:

2. Type of accommodation:

Private accommodation:__

Live with parents:___

Academia:__

University apartment:__

University house:__

University residence:__

Instruction: If respondent selected "private accommodation" go to question 3,4 & 5. If respondent selected "university residence", go to question 6. All the others go to question 7.

3. Monthly rent:___

4. Average **monthly** expenditure on utilities (water & electricity):___

5. Average **monthly** expenditure on cleaning services (including domestic, gardener):___

If respondent selected university residence:

6. Annual food quota at residence:___

Instruction: The rest of the questions should be asked to everyone who lives in Stellenbosch:

7. Average **monthly** expenditure on laundry:____

8. Average **monthly** expenditure on food from grocery stores/supermarkets:___

9. Average **monthly** expenditure at liquor stores:___

10. Average **monthly** expenditure on takeaways/restaurants/weekend markets/wine farms (including your daily coffee from the Neelsie):___

11. Average **monthly** expenditure at bars/clubs:___

12. Average **monthly** expenditure on clothes/shoes (including university/residence apparel):_____

13. Average **monthly** expenditure on public transport (taxis/busses/uber/trains)

14. Average **monthly** expenditure on fuel (diesel/petrol)

15. On average, how many times a **year** do you take your vehicle/s for maintenance (service, tyre replacement, new battery etc.) in Stellenbosch? 0__,1__,2__,3__,4__, 5__, 6__, more than 7__

16. On average, how much do you spend per service?

17. Average **monthly** expenditure on recreational, cultural and sporting activities (gym, movies, sports club fees):___

18. Average **annual** expenditure on textbooks:___

19. Average **monthly** expenditure on extra lessons/tutors:___

20. Average **monthly** expenditure on stationery:___

21. Average **monthly** expenditure on books (excluding textbooks), magazines and newspapers:___

22. Average **monthly** expenditure on photocopies and printing:___

23. On average, how many times a **year** do you visit a medical practitioner (doctor/clinic/dentist/optometrist etc.) in Stellenbosch? 0__, 1__, 2__, 3__, 4__, 5__,6__,7__, 8__, 9__, 10__, 11__, 12__, 13__, 14__, 15__, 16__, 17__, 18__, 19__, 20__, more than 20__

24. Regardless of whether you or your medical aid pay, what is the average total bill per visit?

25. Average **monthly** expenditure on pharmaceuticals and medical goods (including chronic medication, over the counter medication, contraceptives etc.): ___

26. Average **monthly** expenditure on toiletries and make up:___

27. Average **monthly** expenditure on hair, nail and other beauty treatments:___

28. Average **monthly** expenditure on gifts (books/vouchers etc.): ___

29. What proportion (%) of your total monthly expenditure (during the academic year) takes place in other towns (for example, Somerset West, Cape Town, Paarl etc.)? ___

30. Other comments:_____

Thank you for your time, we appreciate your feedback.

If you don't live in Stellenbosch:

Please note that we are only interested in expenditure that occurs **in the Stellenbosch municipal area**. For example, if you NEVER fill up your tank at a petrol station in Stellenbosch, insert a zero for fuel. However, if you buy a sandwich and coffee from the Neelsie on a daily basis, insert your monthly expenditure on lunch and coffee under takeaways/restaurants.

31. Average **monthly** expenditure on food from grocery stores/supermarkets in Stellenbosch:___

32. Average **monthly** expenditure at liquor stores in Stellenbosch:___

33. Average **monthly** expenditure on takeaways/restaurants/weekend markets/wine farms in Stellenbosch (including your daily coffee from the Neelsie):___

34. Average **monthly** expenditure at bars/clubs in Stellenbosch:___

35. Average **monthly** expenditure on clothes/shoes in Stellenbosch:_____

36. Average **monthly** expenditure on public transport (taxis/busses/uber/trains) in Stellenbosch:___

37. Average **monthly** expenditure on fuel (diesel/petrol) in Stellenbosch:___

38. On average, how many times a **year** do you take your vehicle/s for maintenance (service, tyre replacement, new battery etc.) in Stellenbosch? 0__,1__,2__,3__,4__, 5__, 6__, more than 7__

39. On average, how much do you spend per service?

40. Average **monthly** expenditure on recreational, cultural and sporting activities (gym, movies, sports club fees) in Stellenbosch:___

41. Average **annual** expenditure on textbooks in Stellenbosch:___

42. Average **monthly** expenditure on extra lessons/tutors in Stellenbosch:___

43. Average **monthly** expenditure on stationery in Stellenbosch:___

44. Average **monthly** expenditure on books (excluding textbooks), magazines and newspapers in Stellenbosch:___

45. Average **monthly** expenditure on photocopies and printing in Stellenbosch:___

46. On average, how many times a **year** do you visit a medical practitioner (doctor/clinic/dentist/optometrist etc.) in Stellenbosch? 0__, 1__, 2__, 3__, 4__, 5__,6__,7__, 8__, 9__, 10__, 11__, 12__, 13__, 14__, 15__, 16__, 17__, 18__, 19__, 20__, more than 20__

47. Regardless of whether you or your medical aid pay, what is the average total bill per visit?

48. Average monthly expenditure on pharmaceuticals and medical goods (including chronic medication, over the counter medication, contraceptives etc.) in Stellenbosch: ___

49. Average **monthly** expenditure on toiletries and make up in Stellenbosch:___

50. Average **monthly** expenditure on hair, nail and other beauty treatments in Stellenbosch:___

51. Average **monthly** expenditure on gifts (books/vouchers etc.) in Stellenbosch: ___

52. Keeping the above expenditure categories in mind, what proportion of your household's total monthly expenditure takes place in Stellenbosch (%)?

53. Other comments:_____

Thank you for your time, we appreciate your feedback.

Appendix 3: EIA results per sector

EIA breakdown for **student expenditure** per sector (rand million and number of people employed)

Students residing IN Stellenbosch	Business services	Government	Other community, social and personal services	Wholesale & retail trade	Catering & accommodation	Transport & storage	Printing, publishing & recorded media	Medical, dental & other health & vet services	Total impact
Expenditure	*565 257 920*	*27 634 596*	*88 817 589*	*499 459 895*	*120 761 785*	*12 027 160*	*15 000 392*	*20 699 271*	*1 349 658 609*
Output									
Direct Impact	728 444 906	37 968 822	118 762 617	684 575 202	154 435 101	16 040 515	18 725 064	30 982 483	1 789 934 711
Indirect Effect	88 731 026	6 568 298	16 916 696	103 314 295	19 015 882	2 363 282	2 785 428	5 990 325	245 685 231
Induced Impact	210 188 046	28 916 637	68 172 080	269 069 237	41 053 396	5 239 674	10 639 679	9 266 114	642 544 862
Economy-wide Impact	1 027 363 978	73 453 757	203 851 392	1 056 958 735	214 504 379	23 643 471	32 150 171	46 238 922	2 678 164 804
GDP at basic prices									
Direct Impact	409 669 679	20 773 297	67 921 522	386 579 669	88 446 851	8 361 440	7 486 650	14 152 150	1 003 391 258
Indirect Effect	43 294 903	3 154 589	8 026 018	49 620 716	9 076 438	1 084 948	1 194 653	2 827 178	118 279 443
Induced Impact	99 877 664	13 738 511	32 388 924	127 838 887	19 508 239	2 489 472	5 055 955	4 402 560	305 300 211
Economy-wide Impact	552 842 246	37 666 396	108 336 465	564 039 273	117 031 528	11 935 860	13 737 258	21 381 887	1 426 970 911
Labour remuneration									
Direct Impact	119 226 260	17 267 560	41 303 652	155 831 878	23 055 802	2 984 420	6 379 919	4 888 230	370 937 721
Indirect Effect	16 963 960	1 591 773	3 165 988	19 536 256	3 522 585	429 263	504 566	1 146 051	46 860 443
Induced Impact	40 394 390	5 557 968	13 103 168	51 716 198	7 889 604	1 007 079	2 044 702	1 780 956	123 494 064
Economy-wide Impact	176 584 610	24 417 300	57 572 807	227 084 332	34 467 991	4 420 762	8 929 187	7 815 237	541 292 227
Employ. Total									
Direct Impact	1 467	114	784	2 024	512	21	36	63	5 022
Indirect Effect	151	13	30	176	36	4	5	11	426
Induced Impact	450	62	146	576	88	11	23	20	1 374
Economy-wide Impact	2 068	190	960	2 775	635	36	64	94	6 822
Employ. Highly Skilled									
Direct Impact	264	42	23	217	45	2	7	22	622
Indirect Effect	21	3	4	24	4	1	1	2	58
Induced Impact	53	7	17	68	10	1	3	2	161
Economy-wide Impact	337	52	45	309	60	4	10	26	842
Employment Skilled									
Direct Impact	846	54	94	1 040	287	10	19	30	2 380
Indirect Effect	68	6	13	80	14	2	2	5	190
Induced Impact	174	24	56	222	34	4	9	8	531
Economy-wide Impact	1 088	84	164	1 342	335	16	30	42	3 101
Employment Unskilled									
Direct Impact	255	17	580	306	106	5	9	5	1 282
Indirect Effect	43	3	9	49	12	1	2	3	122
Induced Impact	162	22	53	208	32	4	8	7	496
Economy-wide Impact	460	42	642	563	150	10	18	15	1 900
Employment Informal									
Direct Impact	103	1	86	460	74	4	2	6	737
Indirect Effect	19	1	4	23	5	1	1	1	55
Induced Impact	61	8	20	78	12	2	3	3	187
Economy-wide Impact	183	11	110	562	91	6	5	10	979

Students residing OUTSIDE Stellenbosch	Other community, social and personal services	Wholesale & retail trade	Catering & accommodation	Transport & storage	Printing, publishing & recorded media	Medical, dental & other health & vet services	Total impact
Expenditure	*13 947 850*	*136 819 998*	*32 417 111*	*4 641 474*	*8 007 153*	*5 640 376*	*201 473 962*
Direct Impact	18 650 396	187 529 727	41 456 325	6 190 292	9 995 370	8 442 463	272 264 573
Indirect Effect	2 656 586	28 301 495	5 104 595	912 029	1 486 851	1 632 313	40 093 867
Induced Impact	10 705 694	73 707 725	11 020 312	2 022 074	5 679 421	2 524 937	105 660 163
Economy-wide Impact	32 012 675	289 538 946	57 581 232	9 124 395	17 161 642	12 599 714	418 018 603
GDP at basic prices							
Direct Impact	10 666 347	105 898 051	23 742 539	3 226 814	3 996 346	3 856 341	151 386 438
Indirect Effect	1 260 400	13 592 896	2 436 465	418 699	637 701	770 382	19 116 543
Induced Impact	5 086 333	35 019 661	5 236 762	960 727	2 698 850	1 199 660	50 201 994
Economy-wide Impact	17 013 080	154 510 608	31 415 767	4 606 240	7 332 897	5 826 383	220 704 974
Labour remuneration							
Direct Impact	6 486 296	42 687 946	6 189 065	1 151 735	3 405 577	1 332 001	61 252 620
Indirect Effect	497 184	5 351 682	945 597	165 660	269 336	312 289	7 541 748
Induced Impact	2 057 712	14 166 923	2 117 873	388 648	1 091 454	485 295	20 307 906
Economy-wide Impact	9 041 192	62 206 552	9 252 535	1 706 043	4 766 367	2 129 586	89 102 275
Employ. Total							
Direct Impact	123	554	137	8	19	17	860
Indirect Effect	5	48	10	1	3	3	69
Induced Impact	23	158	24	4	12	5	226
Economy-wide Impact	151	760	171	14	34	26	1 155
Employ. Highly Skilled							
Direct Impact	4	60	12	1	4	6	86
Indirect Effect	1	6	1	0	0	0	9
Induced Impact	3	19	3	1	1	1	27
Economy-wide Impact	7	85	16	1	5	7	121
Employment Skilled							
Direct Impact	15	285	77	4	10	8	399
Indirect Effect	2	22	4	1	1	1	31
Induced Impact	9	61	9	2	5	2	87
Economy-wide Impact	26	368	90	6	16	12	517
Employment Unskilled							
Direct Impact	91	84	28	2	5	1	211
Indirect Effect	1	13	3	0	1	1	20
Induced Impact	8	57	8	2	4	2	82
Economy-wide Impact	101	154	40	4	10	4	313
Employment Informal							
Direct Impact	14	126	20	2	1	2	164
Indirect Effect	1	6	1	0	0	0	9
Induced Impact	3	21	3	1	2	1	31
Economy-wide Impact	17	154	24	2	3	3	204

Total student expenditure	Business services	Government	Other community, social and personal services	Wholesale & retail trade	Catering & accommodation
Expenditure	*565 257 920*	*27 634 596*	*102 765 440*	*636 279 893*	*153 178 896*
Output					
Direct Impact	728 444 906	37 968 822	137 413 012	872 104 929	195 891 427
Indirect Effect	88 731 026	6 568 298	19 573 281	131 615 789	24 120 476
Induced Impact	210 188 046	28 916 637	78 877 774	342 776 962	52 073 707
Economy-wide Impact	1 027 363 978	73 453 757	235 864 068	346 497 681	272 085 611
GDP at basic prices					
Direct Impact	409 669 679	20 773 297	78 587 869	492 477 721	112 189 390
Indirect Effect	43 294 903	3 154 589	9 286 418	63 213 612	11 512 904
Induced Impact	99 877 664	13 738 511	37 475 257	162 858 548	24 745 001
Economy-wide Impact	552 842 246	37 666 396	125 349 545	718 549 881	148 447 294
Labour remuneration					
Direct Impact	119 226 260	17 267 560	47 789 947	198 519 824	29 244 866
Indirect Effect	16 963 960	1 591 773	3 663 172	24 887 939	4 468 183
Induced Impact	40 394 390	5 557 968	15 160 880	65 883 121	10 007 477
Economy-wide Impact	176 584 610	24 417 300	66 614 000	289 290 884	43 720 526
Employ. Total					
Direct Impact	1 467	114	907	2 578	649
Indirect Effect	151	13	35	224	45
Induced Impact	450	62	169	733	111
Economy-wide Impact	2 068	190	1 111	3 535	806
Employ. Highly Skilled					
Direct Impact	264	42	27	277	57
Indirect Effect	21	3	5	30	5
Induced Impact	53	7	20	86	13
Economy-wide Impact	337	52	52	393	76
Employment Skilled					
Direct Impact	846	54	109	1 325	364
Indirect Effect	68	6	15	102	18
Induced Impact	174	24	65	283	43
Economy-wide Impact	1 088	84	189	1 710	425
Employment Unskilled					
Direct Impact	255	17	671	390	134
Indirect Effect	43	3	11	62	16
Induced Impact	162	22	61	264	40
Economy-wide Impact	460	42	742	717	190
Employment Informal					
Direct Impact	103	1	100	586	94
Indirect Effect	19	1	5	30	6
Induced Impact	61	8	23	100	15
Economy-wide Impact	183	11	127	716	115

Total student expenditure (cont.)	Transport & storage	Printing, publishing & recorded media	Medical, dental & other health & vet services	Total impact
Expenditure	*16 668 635*	*23 007 545*	*26 339 647*	*1 551 132 571*
Output				
Direct Impact	22 230 807	28 720 434	39 424 946	2 062 199 284
Indirect Effect	3 275 311	4 272 278	7 622 638	285 779 098
Induced Impact	7 261 748	16 319 099	11 791 051	748 205 025
Economy-wide Impact	32 767 866	49 311 812	58 838 635	3 096 183 407
GDP at basic prices				
Direct Impact	11 588 254	11 482 996	18 008 490	1 154 777 696
Indirect Effect	1 503 647	1 832 354	3 597 560	137 395 986
Induced Impact	3 450 199	7 754 804	5 602 220	355 502 204
Economy-wide Impact	16 542 100	21 070 155	27 208 270	1 647 675 886
Labour remuneration				
Direct Impact	4 136 155	9 785 496	6 220 231	432 190 341
Indirect Effect	594 923	773 902	1 458 341	54 402 191
Induced Impact	1 395 727	3 136 156	2 266 251	143 801 970
Economy-wide Impact	6 126 805	13 695 554	9 944 823	630 394 502
Employ. Total				
Direct Impact	30	55	81	5 881
Indirect Effect	5	7	13	495
Induced Impact	16	35	25	1 600
Economy-wide Impact	51	98	119	7 977
Employ. Highly Skilled				
Direct Impact	3	10	28	708
Indirect Effect	1	1	2	68
Induced Impact	2	4	3	188
Economy-wide Impact	5	15	33	963
Employment Skilled				
Direct Impact	14	30	38	2 779
Indirect Effect	2	3	6	221
Induced Impact	6	13	10	618
Economy-wide Impact	23	46	54	3 618
Employment Unskilled				
Direct Impact	6	13	7	1 493
Indirect Effect	2	3	4	142
Induced Impact	6	13	9	577
Economy-wide Impact	14	28	20	2 213
Employment Informal				
Direct Impact	6	2	8	901
Indirect Effect	1	1	2	64
Induced Impact	2	5	3	218
Economy-wide Impact	9	8	13	1 182

EIA breakdown for **staff expenditure** per sector (rand million and number of people employed)

Staff residing IN Stellenbosch	Business services	Govt.	Other community, social and personal services	Wholesale & retail trade	Catering & accommo-dation	Transport & storage	Beverages & tobacco	Medical, dental & other health & vet services	Total impact
Expend. in Stellenbosch	*87 003 717*	*48 102 670*	*90 370 369*	*194 797 275*	*19 521 654*	*3 151 290*	*3 128 670*	*7 595 449*	*453 671 093*
Output									
Direct Impact	112 121 232	66 091 131	120 838 919	266 995 178	24 965 088	4 202 847	3 752 023	11 368 799	610 335 218
Indirect Effect	13 657 357	11 433 229	17 212 447	40 294 212	3 073 998	619 214	358 261	2 198 107	88 846 825
Induced Impact	32 351 853	50 334 277	69 363 919	104 941 267	6 636 455	1 372 870	1 186 871	3 400 134	269 587 646
Economy-wide Impact	158 130 441	127 858 638	207 415 285	412 230 657	34 675 541	6 194 932	5 297 155	16 967 040	968 769 689
GDP at basic prices									
Direct Impact	63 055 790	36 159 422	69 108 981	150 772 198	14 297 808	2 190 818	1 557 236	5 193 030	342 335 282
Indirect Effect	6 663 892	5 491 093	8 166 336	19 352 866	1 467 245	284 272	163 156	1 037 413	42 626 270
Induced Impact	15 373 032	23 914 192	32 955 173	49 859 192	3 153 589	652 278	564 194	1 615 488	128 087 137
Economy-wide Impact	85 092 713	65 564 707	110 230 489	219 984 255	18 918 642	3 127 368	2 284 586	7 845 930	513 048 690
Labour remuneration									
Direct Impact	18 351 141	30 057 097	42 025 755	60 776 902	3 727 068	781 961	691 112	1 793 701	158 204 737
Indirect Effect	2 611 069	2 770 748	3 221 338	7 619 450	569 441	112 473	65 798	420 535	17 390 853
Induced Impact	6 217 449	9 674 579	13 332 248	20 170 137	1 275 388	263 869	228 026	653 509	51 815 204
Economy-wide Impact	27 179 659	42 502 424	58 579 341	88 566 488	5 571 897	1 158 304	984 936	2 867 745	227 410 794
Employment: total									
Direct Impact	226	199	797	789	83	6	5	23	2 128
Indirect Effect	23	23	31	69	6	1	1	4	157
Induced Impact	69	108	148	225	14	3	3	7	577
Economy-wide Impact	318	330	977	1 082	103	10	8	34	2 862
Employment: highly skilled									
Direct Impact	41	73	24	85	7	1	1	8	239
Indirect Effect	3	5	4	9	1	0	0	1	23
Induced Impact	8	13	17	26	2	0	0	1	68
Economy-wide Impact	52	91	45	120	10	1	1	9	330
Employment: skilled									
Direct Impact	130	94	96	406	46	3	1	11	787
Indirect Effect	11	11	14	31	2	0	0	2	71
Induced Impact	27	42	57	87	5	1	1	3	223
Economy-wide Impact	167	146	167	523	54	4	2	16	1 080
Employment: unskilled									
Direct Impact	39	30	590	119	17	1	2	2	800
Indirect Effect	7	5	9	19	2	0	0	1	44
Induced Impact	25	39	54	81	5	1	1	3	208
Economy-wide Impact	71	74	653	219	24	3	3	6	1 052
Employment: informal									
Direct Impact	16	2	88	180	12	1	1	2	301
Indirect Effect	19	4	92	189	13	1	1	3	321
Induced Impact	9	15	20	31	2	0	0	1	78
Economy-wide Impact	28	19	112	219	15	2	1	4	399

Staff residing OUTSIDE Stellenbosch	Other community, social and personal services	Wholesale & retail trade	Catering & accommodation	Beverages & tobacco	Medical, dental & other health & vet services	Total impact
Expend. in Stellenbosch	*11 822 994*	*68 246 561*	*13 805 616*	*1 138 357*	*2 539 396*	*97 552 924*
Output						
Direct Impact	15 809 141	93 540 850	17 655 185	1 365 162	3 800 945	132 171 283
Indirect Effect	2 251 874	14 116 940	2 173 916	130 352	734 896	19 407 978
Induced Impact	9 074 758	36 765 815	4 693 268	431 839	1 136 771	52 102 451
Economy-wide Impact	27 135 772	144 423 605	24 522 369	1 927 353	5 672 612	203 681 711
GDP at basic prices						
Direct Impact	9 041 405	52 822 525	10 111 338	566 596	1 736 192	74 278 056
Indirect Effect	1 068 387	6 780 210	1 037 628	59 364	346 839	9 292 429
Induced Impact	4 311 467	17 467 998	2 230 203	205 280	540 108	24 755 055
Economy-wide Impact	14 421 258	77 070 733	13 379 169	831 239	2 623 140	108 325 540
Labour remuneration						
Direct Impact	5 498 155	21 292 980	2 635 764	251 459	599 690	30 278 048
Indirect Effect	421 442	2 669 448	402 706	23 941	140 598	3 658 134
Induced Impact	1 744 234	7 066 539	901 948	82 966	218 489	10 014 176
Economy-wide Impact	7 663 831	31 028 967	3 940 417	358 366	958 777	43 950 358
Employment: total						
Direct Impact	104	277	59	2	8	449
Indirect Effect	4	24	4	0	1	34
Induced Impact	19	79	10	1	2	111
Economy-wide Impact	128	379	73	3	11	594
Employment: highly skilled						
Direct Impact	3	30	5	0	3	41
Indirect Effect	1	3	0	0	0	4
Induced Impact	2	9	1	0	0	13
Economy-wide Impact	6	42	7	0	3	58
Employment: skilled						
Direct Impact	13	142	33	0	4	192
Indirect Effect	2	11	2	0	1	15
Induced Impact	7	30	4	0	1	43
Economy-wide Impact	22	183	38	1	5	250
Employment: unskilled						
Direct Impact	77	42	12	1	1	132
Indirect Effect	1	7	1	0	0	10
Induced Impact	7	28	4	0	1	40
Economy-wide Impact	85	77	17	1	2	182
Employment: informal						
Direct Impact	11	63	9	0	1	84
Indirect Effect	12	66	9	0	1	88
Induced Impact	3	11	1	0	0	15
Economy-wide Impact	15	77	10	1	1	104

Total staff	Business services	Government	Other community, social and personal services	Wholesale & retail trade	Catering & accommo-dation	Transport & storage	Beverages & tobacco	Medical, dental & other health & vet services	Total impact
Expend. in Stellenbosch	*87 003 717*	*48 102 670*	*102 193 364*	*263 043 835*	*33 327 270*	*3 151 290*	*4 267 026*	*10 134 845*	*551 224 017*
Output									
Direct Impact	112 121 232	66 091 131	136 648 060	360 536 028	42 620 273	4 202 847	5 117 185	15 169 744	742 506 501
Indirect Effect	13 657 357	11 433 229	19 464 321	54 411 152	5 247 914	619 214	488 613	2 933 003	108 254 803
Induced Impact	32 351 853	50 334 277	78 438 676	141 707 082	11 329 723	1 372 870	1 618 710	4 536 905	321 690 097
Economy-wide Impact	158 130 441	127 858 638	234 551 057	556 654 262	59 197 910	6 194 932	7 224 508	22 639 652	1 172 451 400
GDP at basic prices									
Direct Impact	63 055 790	36 159 422	78 150 385	203 594 723	24 409 146	2 190 818	2 123 832	6 929 222	416 613 338
Indirect Effect	6 663 892	5 491 093	9 234 723	26 133 076	2 504 873	284 272	222 519	1 384 252	51 918 699
Induced Impact	15 373 032	23 914 192	37 266 639	67 327 190	5 383 792	652 278	769 474	2 155 596	152 842 192
Economy-wide Impact	85 092 713	65 564 707	124 651 747	297 054 989	32 297 811	3 127 368	3 115 825	10 469 069	621 374 230
Labour remuneration									
Direct Impact	18 351 141	30 057 097	47 523 910	82 069 882	6 362 832	781 961	942 571	2 393 391	188 482 785
Indirect Effect	2 611 069	2 770 748	3 642 780	10 288 898	972 146	112 473	89 739	561 133	21 048 987
Induced Impact	6 217 449	9 674 579	15 076 482	27 236 675	2 177 336	263 869	310 992	871 998	61 829 379
Economy-wide Impact	27 179 659	42 502 424	66 243 172	119 595 455	9 512 314	1 158 304	1 343 302	3 826 522	271 361 152
Employment: total									
Direct Impact	226	199	902	1 066	141	6	6	31	2 577
Indirect Effect	23	23	35	93	10	1	1	5	191
Induced Impact	69	108	168	303	24	3	3	10	688
Economy-wide Impact	318	330	1 104	1 462	175	10	11	46	3 456
Employment: highly skilled									
Direct Impact	41	73	27	114	13	1	1	11	280
Indirect Effect	3	5	5	12	1	0	0	1	28
Induced Impact	8	13	20	36	3	0	0	1	81
Economy-wide Impact	52	91	51	162	17	1	1	13	388
Employment: skilled									
Direct Impact	130	94	108	548	79	3	2	15	978
Indirect Effect	11	11	15	42	4	0	0	2	86
Induced Impact	27	42	65	117	9	1	1	4	266
Economy-wide Impact	167	146	188	707	92	4	3	21	1 330
Employment: unskilled									
Direct Impact	39	30	667	161	29	1	3	3	933
Indirect Effect	7	5	11	26	3	0	0	1	54
Induced Impact	25	39	61	109	9	1	1	4	248
Economy-wide Impact	71	74	738	296	41	3	4	8	1 235
Employment: informal	-	-	-	-	-	-	-	-	-
Direct Impact	16	2	99	242	21	1	1	3	385
Indirect Effect	19	4	104	255	22	1	1	4	409
Induced Impact	9	15	23	41	3	0	0	1	94
Economy-wide impact	28	19	126	296	25	2	2	5	503

EIA breakdown for university expenditure **creditor payments** per sector (rand million and number of jobs)

Creditor payments	Govt.	Business services	Wholesale & retail trade	Construction	Transport & storage	Printing, publishing & recorded media	Finance & insurance	Catering & accommodation services
Expend. in Stellenbosch	*117 618 137*	*38 551 676*	*35 290 506*	*34 538 648*	*22 978 671*	*20 211 262*	*12 572 849*	*12 120 525*
Output								
Direct Impact	161 602 584	49 681 343	48 370 261	49 183 180	30 646 445	25 229 819	16 261 976	15 500 223
Indirect Effect	27 955 936	6 051 626	7 299 913	10 296 556	4 515 204	3 753 036	1 747 768	1 908 571
Induced Impact	123 074 747	14 335 229	19 011 716	13 092 304	10 010 737	14 335 714	7 648 005	4 120 415
Economy-wide Impact	312 633 266	70 068 198	74 681 890	72 572 040	45 172 387	43 318 569	25 657 749	21 529 210
GDP at basic prices								
Direct Impact	88 415 131	27 940 259	27 314 690	17 923 198	15 975 074	10 087 380	10 724 968	8 877 165
Indirect Effect	13 426 533	2 952 796	3 506 068	4 389 372	2 072 863	1 609 654	930 253	910 977
Induced Impact	58 473 734	6 811 849	9 032 755	6 221 407	4 756 298	6 812 303	3 633 610	1 957 988
Economy-wide Impact	160 315 398	37 704 904	39 853 513	28 533 977	22 804 235	18 509 337	15 288 831	11 746 130
Labour remuneration								
Direct Impact	73 494 045	8 131 460	11 010 666	6 706 735	5 701 927	8 596 190	4 621 499	2 314 047
Indirect Effect	6 774 889	1 156 975	1 380 380	1 766 495	820 135	679 844	367 322	353 552
Induced Impact	23 655 775	2 754 975	3 654 129	2 516 051	1 924 090	2 754 995	1 470 001	791 858
Economy-wide Impact	103 924 709	12 043 410	16 045 174	10 989 280	8 446 152	12 031 029	6 458 822	3 459 457
Employment: total								
Direct Impact	487	100	143	85	41	48	13	51
Indirect Effect	57	10	12	18	7	7	3	4
Induced Impact	263	31	41	28	21	31	16	9
Economy-wide Impact	807	141	196	131	70	86	33	64
Employment: highly skilled								
Direct Impact	179	18	15	5	4	9	4	5
Indirect Effect	13	1	2	2	1	1	0	0
Induced Impact	31	4	5	3	3	4	2	1
Economy-wide Impact	223	23	22	10	7	13	6	6
Employment: skilled								
Direct Impact	230	58	73	16	20	26	8	29
Indirect Effect	26	5	6	7	3	3	1	1
Induced Impact	102	12	16	11	8	12	6	3
Economy-wide Impact	358	74	95	34	31	41	16	34
Employment: unskilled								
Direct Impact	72	17	22	45	9	12	1	11
Indirect Effect	13	3	3	7	2	2	1	1
Induced Impact	95	11	15	10	8	11	6	3
Economy-wide Impact	180	31	40	62	19	25	8	15
Employment: informal								
Direct Impact	5	7	33	20	8	2	0	7
Indirect Effect	5	1	2	3	1	1	0	0
Induced Impact	36	4	6	4	3	4	2	1
Economy-wide Impact	46	13	40	26	12	7	3	9

Creditor payments (cont.)	Agriculture, forestry & fishing	Textiles	Glass & glass products	Metal products excluding machinery	Other community, social & personal services	Professional & scientific equipment	Machinery & equipment	Water supply
Expend. in Stellenbosch	*9 761 065*	*2 547 069*	*1 850 115*	*1 811 627*	*1 928 631*	*1 572 507*	*1 548 504*	*1 141 296*
Output								
Direct Impact	12 153 034	3 702 633	2 631 630	2 636 944	2 578 873	2 417 419	2 119 727	1 711 804
Indirect Effect	1 693 254	737 376	531 361	601 122	367 338	515 150	385 399	449 715
Induced Impact	2 976 783	1 160 180	1 117 480	1 108 816	1 480 324	763 701	841 570	345 421
Economy-wide Impact	16 823 072	5 600 189	4 280 472	4 346 882	4 426 534	3 696 270	3 346 696	2 506 940
GDP at basic prices								
Direct Impact	4 849 552	928 681	884 149	811 610	1 474 883	770 188	755 115	567 769
Indirect Effect	753 760	330 235	244 982	258 307	174 281	237 158	170 533	185 699
Induced Impact	1 414 852	551 354	530 975	526 853	703 310	362 873	399 854	164 167
Economy-wide Impact	7 018 164	1 810 270	1 660 107	1 596 770	2 352 474	1 370 219	1 325 502	917 635
Labour remuneration								
Direct Impact	1 610 311	612 730	625 017	615 382	896 889	400 851	478 252	155 153
Indirect Effect	299 380	135 774	100 866	105 142	68 748	95 375	69 596	67 010
Induced Impact	571 975	222 947	214 770	213 107	284 529	146 778	161 750	66 374
Economy-wide Impact	2 481 666	971 452	940 654	933 630	1 250 166	643 004	709 597	288 537
Employment: total								
Direct Impact	35	10	4	5	17	4	4	1
Indirect Effect	3	1	1	1	1	1	1	0
Induced Impact	6	2	2	2	3	2	2	1
Economy-wide Impact	44	14	8	9	21	7	7	2
Employment: highly skilled								
Direct Impact	1	1	0	0	1	1	1	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	1	0	0	0	0	0	0	0
Economy-wide Impact	3	1	1	1	1	1	1	0
Employment: skilled								
Direct Impact	3	2	1	2	2	1	2	0
Indirect Effect	1	1	0	0	0	0	0	0
Induced Impact	2	1	1	1	1	1	1	0
Economy-wide Impact	7	3	2	3	4	2	3	1
Employment: unskilled								
Direct Impact	27	6	3	3	13	2	2	0
Indirect Effect	1	0	0	0	0	0	0	0
Induced Impact	2	1	1	1	1	1	1	0
Economy-wide Impact	30	7	4	4	14	3	3	1
Employment: informal								
Direct Impact	3	2	0	1	2	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	1	0	0	0	0	0	0	0
Economy-wide Impact	5	2	1	1	2	1	1	0

Creditor payments (cont.)	Electricity, gas & steam	Electrical machinery	Communi-cation	Beverages & tobacco	Medical, dental & other health & veterinary services	Other chemicals & man-made fibres	Other industries	Basic iron & steel
Expend. in Stellenbosch	*914 262*	*477 227*	*345 276*	*320 454*	*285 839*	*262 690*	*163 049*	*148 398*
Output								
Direct Impact	1 220 087	743 500	519 578	384 300	427 841	411 468	193 422	221 363
Indirect Effect	199 033	188 458	118 185	36 695	82 721	101 383	26 790	70 555
Induced Impact	434 361	256 235	146 870	121 565	127 957	129 528	40 177	62 628
Economy-wide Impact	1 853 480	1 188 194	784 633	542 560	638 520	642 380	260 389	354 546
GDP at basic prices								
Direct Impact	687 501	192 240	190 706	159 500	195 429	114 527	86 347	44 920
Indirect Effect	87 441	81 143	54 382	16 711	39 041	44 160	12 254	32 292
Induced Impact	206 374	121 749	69 782	57 787	60 796	61 544	19 093	29 758
Economy-wide Impact	981 315	395 132	314 870	233 998	295 265	220 232	117 693	106 970
Labour remuneration								
Direct Impact	247 699	133 344	73 966	70 787	67 502	66 420	21 008	27 653
Indirect Effect	35 269	33 209	21 632	6 739	15 826	17 791	4 963	13 007
Induced Impact	83 485	49 247	28 228	23 356	24 593	24 895	7 721	12 036
Economy-wide Impact	366 453	215 800	123 826	100 882	107 922	109 105	33 692	52 697
Employment: total								
Direct Impact	1	1	0	0	1	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	1	1	0	0	0	0	0	0
Economy-wide Impact	2	2	1	1	1	1	0	0
Employment: highly skilled								
Direct Impact	0	0	0	0	0	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	0	0	0	0	0	0	0
Economy-wide Impact	0	0	0	0	0	0	0	0
Employment: skilled								
Direct Impact	0	0	0	0	0	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	0	0	0	0	0	0	0
Economy-wide Impact	1	1	0	0	1	0	0	0
Employment: unskilled								
Direct Impact	0	0	0	0	0	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	0	0	0	0	0	0	0
Economy-wide Impact	1	1	0	0	0	0	0	0
Employment: informal								
Direct Impact	0	0	0	0	0	0	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	0	0	0	0	0	0	0
Economy-wide Impact	0	0	0	0	0	0	0	0

Creditor payments (cont.)	Furniture	Wood & wood products	Food	Non-metallic minerals	Total
Expend. in Stellenbosch	*79 947*	*48 597*	*14 640*	*9 496*	*319 112 962*
Output					
Direct Impact	122 050	78 750	23 780	13 471	430 787 505
Indirect Effect	33 881	22 220	5 096	3 148	69 697 491
Induced Impact	44 140	32 088	7 213	3 174	216 829 079
Economy-wide Impact	200 071	133 058	36 089	19 793	717 314 076
GDP at basic prices					
Direct Impact	30 272	24 633	7 511	4 315	220 037 713
Indirect Effect	14 610	9 572	2 298	1 448	32 548 823
Induced Impact	20 976	15 246	3 427	1 508	103 022 223
Economy-wide Impact	65 857	49 451	13 236	7 271	355 608 759
Labour remuneration					
Direct Impact	22 170	16 726	3 761	1 481	126 723 670
Indirect Effect	6 357	4 144	915	576	14 401 911
Induced Impact	8 482	6 167	1 386	610	41 674 310
Economy-wide Impact	37 010	27 037	6 062	2 666	182 799 890
Employment: total					
Direct Impact	0	0	0	0	1 055
Indirect Effect	0	0	0	0	128
Induced Impact	0	0	0	0	464
Economy-wide Impact	0	0	0	0	1 647
Employment: highly skilled					
Direct Impact	0	0	0	0	245
Indirect Effect	0	0	0	0	21
Induced Impact	0	0	0	0	54
Economy-wide Impact	0	0	0	0	321
Employment: skilled					
Direct Impact	0	0	0	0	474
Indirect Effect	0	0	0	0	56
Induced Impact	0	0	0	0	179
Economy-wide Impact	0	0	0	0	709
Employment: unskilled					
Direct Impact	0	0	0	0	244
Indirect Effect	0	0	0	0	36
Induced Impact	0	0	0	0	167
Economy-wide Impact	0	0	0	0	448
Employment: informal					
Direct Impact	0	0	0	0	92
Indirect Effect	0	0	0	0	15
Induced Impact	0	0	0	0	63
Economy-wide Impact	0	0	0	0	169

EIA breakdown for university expenditure **diverse payments** per sector (rand million and number of people employed)

Diverse payments	Business services	Wholesale & retail trade	Construction	Transport & storage	Printing, publishing & recorded media	Finance & insurance	Catering & accommodation services	Agriculture, forestry & fishing
Expend. in Stellenbosch	*24 083 396*	*3 972 803*	*8 557 051*	*164 736*	*137 335*	*737 826*	*8 604 917*	*1 249 946*
Output								
Direct Impact	31 036 146	5 445 246	12 185 277	219 706	171 436	954 319	11 004 319	1 556 247
Indirect Effect	3 780 477	821 782	2 551 002	32 370	25 502	102 566	1 354 982	216 828
Induced Impact	8 955 278	2 140 230	3 243 657	71 768	97 411	448 816	2 925 272	381 190
Economy-wide Impact	43 771 901	8 407 259	17 979 935	323 844	294 349	1 505 702	15 284 574	2 154 266
GDP at basic prices								
Direct Impact	17 454 399	3 074 931	4 440 525	114 526	68 544	629 385	6 302 307	621 006
Indirect Effect	1 844 624	394 693	1 087 480	14 860	10 938	54 591	646 744	96 522
Induced Impact	4 255 391	1 016 856	1 541 372	34 098	46 289	213 235	1 390 065	181 178
Economy-wide Impact	23 554 414	4 486 480	7 069 376	163 485	125 771	897 211	8 339 117	898 706
Labour remuneration								
Direct Impact	5 079 758	1 239 518	1 661 613	40 877	58 411	271 208	1 642 848	206 207
Indirect Effect	722 767	155 395	437 654	5 880	4 620	21 556	251 003	38 337
Induced Impact	1 721 045	411 361	623 359	13 794	18 720	86 266	562 176	73 244
Economy-wide Impact	7 523 569	1 806 274	2 722 626	60 551	81 751	379 030	2 456 027	317 788
Employment: total								
Direct Impact	63	16	21	0	0	1	36	4
Indirect Effect	6	1	4	0	0	0	3	0
Induced Impact	19	5	7	0	0	1	6	1
Economy-wide Impact	88	22	33	0	1	2	45	6
Employment: highly skilled								
Direct Impact	11	2	1	0	0	0	3	0
Indirect Effect	1	0	0	0	0	0	0	0
Induced Impact	2	1	1	0	0	0	1	0
Economy-wide Impact	14	2	3	0	0	0	4	0
Employment: skilled								
Direct Impact	36	8	4	0	0	0	20	0
Indirect Effect	3	1	2	0	0	0	1	0
Induced Impact	7	2	3	0	0	0	2	0
Economy-wide Impact	46	11	8	0	0	1	24	1
Employment: unskilled								
Direct Impact	11	2	11	0	0	0	8	3
Indirect Effect	2	0	2	0	0	0	1	0
Induced Impact	7	2	3	0	0	0	2	0
Economy-wide Impact	20	4	15	0	0	0	11	4
Employment: informal								
Direct Impact	4	4	5	0	0	0	5	0
Indirect Effect	1	0	1	0	0	0	0	0
Induced Impact	3	1	1	0	0	0	1	0
Economy-wide Impact	8	4	6	0	0	0	6	1

Diverse payments (cont.)	Metal products excluding machinery	Other com., social & personal services	Professional & scientific equipment	Water supply	Electrical machinery	Communi-cation	Med., dental & other health & vet. services	Furniture
Expend. in Stellenbosch	*72 855*	*10 232 822*	*723 832*	*308 109*	*65 998*	*3 444 569*	*83 886*	*63 471*
Output								
Direct Impact	106 046	13 682 838	1 112 749	462 125	102 822	5 183 456	125 559	96 897
Indirect Effect	24 174	1 949 001	237 126	121 407	26 063	1 179 047	24 276	26 899
Induced Impact	44 592	7 854 218	351 535	93 251	35 436	1 465 217	37 552	35 043
Economy-wide Impact	174 812	23 486 057	1 701 410	676 783	164 320	7 827 720	187 387	158 839
GDP at basic prices								
Direct Impact	32 639	7 825 351	354 521	153 277	26 586	1 902 537	57 353	24 033
Indirect Effect	10 388	924 691	109 165	50 132	11 222	542 530	11 457	11 599
Induced Impact	21 188	3 731 582	167 032	44 319	16 837	696 169	17 842	16 653
Economy-wide Impact	64 215	12 481 624	630 718	247 728	54 644	3 141 236	86 652	52 285
Labour remuneration								
Direct Impact	24 748	4 758 662	184 514	41 886	18 441	737 902	19 810	17 601
Indirect Effect	4 228	364 759	43 902	18 090	4 593	215 808	4 644	5 047
Induced Impact	8 570	1 509 638	67 562	17 919	6 811	281 613	7 217	6 734
Economy-wide Impact	37 546	6 633 059	295 978	77 894	29 844	1 235 323	31 672	29 382
Employment: total								
Direct Impact	0	90	2	0	0	4	0	0
Indirect Effect	0	3	0	0	0	2	0	0
Induced Impact	0	17	1	0	0	3	0	0
Economy-wide Impact	0	111	3	1	0	10	0	0
Employment: highly skilled								
Direct Impact	0	3	0	0	0	1	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	2	0	0	0	0	0	0
Economy-wide Impact	0	5	0	0	0	1	0	0
Employment: skilled								
Direct Impact	0	11	1	0	0	2	0	0
Indirect Effect	0	2	0	0	0	1	0	0
Induced Impact	0	6	0	0	0	1	0	0
Economy-wide Impact	0	19	1	0	0	4	0	0
Employment: unskilled								
Direct Impact	0	67	1	0	0	1	0	0
Indirect Effect	0	1	0	0	0	1	0	0
Induced Impact	0	6	0	0	0	1	0	0
Economy-wide Impact	0	74	1	0	0	3	0	0
Employment: informal								
Direct Impact	0	10	0	0	0	1	0	0
Indirect Effect	0	0	0	0	0	0	0	0
Induced Impact	0	2	0	0	0	0	0	0
Economy-wide Impact	0	13	0	0	0	2	0	0

Diverse payments (cont.)	Wood & wood products	Government	Beverages and tobacco	Total
Expend. in Stellenbosch	*127 218*	*127 444*	*1 260 133*	***64 018 346***
Output				
Direct Impact	206 151	175 103	1 511 201	**85 337 644**
Indirect Effect	58 166	30 291	144 297	**12 706 256**
Induced Impact	84 000	133 356	478 035	**28 875 857**
Economy-wide Impact	348 318	338 750	2 133 532	**126 919 757**
GDP at basic prices				
Direct Impact	64 483	95 801	627 207	**43 869 410**
Indirect Effect	25 058	14 548	65 714	**5 926 957**
Induced Impact	39 912	63 359	227 240	**13 720 616**
Economy-wide Impact	129 453	173 708	920 161	**63 516 983**
Labour remuneration				
Direct Impact	43 785	79 634	278 359	**16 405 780**
Indirect Effect	10 848	7 341	26 502	**2 342 973**
Induced Impact	16 145	25 632	91 842	**5 549 647**
Economy-wide Impact	70 777	112 606	396 702	**24 298 401**
Employment: total				
Direct Impact	0	1	2	**243**
Indirect Effect	0	0	0	**22**
Induced Impact	0	0	1	**62**
Economy-wide Impact	1	1	3	**327**
Employment: highly skilled				
Direct Impact	0	0	0	**22**
Indirect Effect	0	0	0	**3**
Induced Impact	0	0	0	**7**
Economy-wide Impact	0	0	0	**32**
Employment: skilled				
Direct Impact	0	0	0	**85**
Indirect Effect	0	0	0	**9**
Induced Impact	0	0	0	**24**
Economy-wide Impact	0	0	1	**118**
Employment: unskilled				
Direct Impact	0	0	1	**106**
Indirect Effect	0	0	0	**7**
Induced Impact	0	0	0	**22**
Economy-wide Impact	0	0	1	**135**
Employment: informal				
Direct Impact	0	0	0	**30**
Indirect Effect	0	0	0	**3**
Induced Impact	0	0	0	**8**
Economy-wide Impact	0	0	1	**42**

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