

Update of the Higher Education Price Index (HEPI): 2017 – 2019

Commissioned report for Universities South Africa (USAf)

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Introduction and objective

The Higher Education Price Index (HEPI) is a very useful tool for the purpose of determining actual expenditure increases of higher education institutions (HEIs), as well as residences. In South Africa, the first HEPI was developed by Unisa's Bureau of Market Research (BMR) for the time period 2004 – 2013. The HEPI provided Universities South Africa (USAf) with valuable input when negotiating with government on subsidy increases.

USAf commissioned the Bureau for Economic Research (BER) to calculate the HEPI for the years 2016 – 2019. Furthermore, it was also requested that two HEPI indices be developed: a Headline HEPI that factors in all expenses per annum and secondly, a HEPI specifically for residences (HEPI Student Accommodation).

Given that the HEPI is strictly a price index that does not take volume changes into account, the Finance Executives Forum (FEF) also expressed the need for a Higher Education Volume Index (HEVI) and a Higher Education Budget Index (HEBI).

This report is a follow up to the HEPI 2016 – 2018 report. We will provide a brief recap of the methodology. For more detail, as well as an overview of the purpose and use of price indices, please refer back to the HEPI 2016 – 2018 report. The revised results of the HEPI and HEBI for 2017 and 2018, as well as the results for 2019 will be shown in this report. The results will be presented separately for headline and residence spending.

Methodology

Similar to the BMR, the BER also followed the International Labour Organisation's (ILO) internationally accepted guidelines for the compilation of price indices. According to the ILO, a price index is calculated by taking the average period-to-period price growth for different expenditure groups and using the average amount spent per expenditure group as weights. The BER used actual expenditure data supplied by the HEIs to USAf for the calculation of relative contributions (i.e. weights) of each expenditure group. A unique price index was assigned to all the main expenditure categories. As a final step, the HEPI was calculated by multiplying the price growth of each expenditure item with their respective weights and then summing the results.

It is important to point out that universities need to adjust their expenditure in line with price changes (as calculated by the HEPI) if they would like to maintain the same level of quality and real output. However, volume changes should also be taken into account when estimating total budgetary requirements.

Volume can be measured either at the production side (number of workers) or on the consumption side (number of students). Other possible measures of real output include the number of degrees issued or the number of research papers published. Ideally, a volume index should correlate well with budget increases.

We opted to use the number of students enrolled as a measure of the volume of higher education output as this number is objective and easy to measure. We included a question in our survey to obtain the number of full time equivalent (FTE) students. The annual percentage increase in the total number of FTEs was used to calculate a Higher Education Volume Index (HEVI). Budget provisions are calculated by taking

the price of an item multiplied by the number of items needed. As a final step, we calculated the Higher Education Budget Index (HEBI) as the product of the HEPI and the HEVI.

Data sources and analysis

Expenditure data

For the purpose of the original HEPI, the BMR designed a detailed Higher Education Expenditure Template. Initially, USAf continued to use the BMR's template for the collection of the 2014 – 2016 data. However, after the first round of calculations and results by the BER, the FEF expressed their concerns about the length of the template and the accuracy of the data that was submitted. Furthermore, the original dataset did not make a distinction between council controlled (unrestricted)¹ and restricted funds². The BER and the FEF agreed that, for the purpose of the HEPI, one should only include council controlled/unrestricted expenditure data in the calculations. With the help of some members of the FEF, the BER redesigned the data template.

Towards the end of 2019, the BER calculated the HEPI using the new data template for the time period 2016 – 2018. As a follow up to the previous report, the BER was requested to calculate the HEPI for 2019. In this round, data was collected for 2017 and 2019 – allowing for sample consistency, especially for volume measurements. An added advantage is that more definitive and better historical data can now be used for historical years. In the end, the reported data turned out to be very consistent with the reports of last year, resulting in only minor revisions of the historical indices (mostly in volumes).

Similar to the previous round, USAf collected the expenditure data on behalf of the BER. USAf received completed templates from 19 of its 26 members – a 73% response rate. Please refer to Table 1 for a list of universities that provided USAf with expenditure statistics for 2017 to 2019³.

Table 1: List of universities that submitted expenditure data for 2017 – 2019

University	
Nelson Mandela University	NMU
University of Zululand	UZL
University of Cape Town	UCT
University of the Witwatersrand	Wits
University of Pretoria	UP
Central University of Technology, Free State	CUT
University of KwaZulu-Natal	UKZN
North-West University	NWU
University of Johannesburg	UJ

¹ Referring to funds, mainly from government and tuition, which are not earmarked for very specific purposes.

² Referring to funds, mainly from donations and contracts, which are earmarked for very specific purposes, mostly research.

³ University of Mpumalanga and Vaal University of Technology were part of the previous sample, but didn't submit data this time. Mangosuthu University of Technology (MUT) and University of Limpopo (UL) provided data this time, but not in the previous round.

University	
Rhodes University	RU
University of the Free State	UFS
Durban University of Technology	DUT
Tshwane University of Technology	TUT
Stellenbosch University	SU
University of South Africa	UNISA
Sol Plaatje University	SPU
University of the Western Cape	UWC
Mangosuthu University of Technology	MUT
University of Limpopo	UL

As shown in Table 1, the majority of South Africa's provinces are represented, with the exception of Mpumalanga. The sample furthermore includes a number of research intensive universities (for example, the University of the Witwatersrand (Wits), the University of Cape Town (UCT), the University of Pretoria (UP), universities of technology (for example, Durban University of Technology (DUT) and Tshwane University of Technology), as well as historically disadvantaged universities (for example, University of the Western Cape (UWC)). It can therefore be concluded that the samples are representative enough of the public universities in South Africa.

Weights

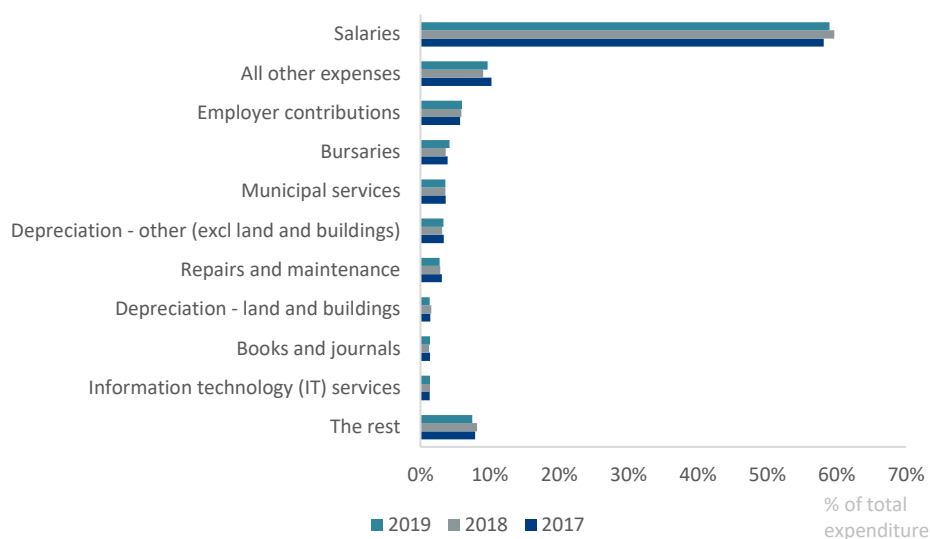
Headline spending

The weights are calculated using the estimated total expenditure for 2017 – 2019 of all the universities that provided USAf with expenditure statistics. A set of weights were calculated for the restricted and unrestricted functions respectively, with the headline HEPI based on the weights of the unrestricted spending. The expenditure figures were used to calculate the relative percentage (%) contribution of each category to the total expenditure of all universities in a specific year. The percentage contributions were taken as **weights** of each category. Weights were derived for 2017, 2018 and 2019 respectively. Please refer to Appendix 1 for a detailed table of the weights for the respective years.

Figure 1 shows the relative contributions (i.e. weights) of the top 10 expenditure categories⁴, as well as the remaining 12 expenditure categories lumped together into a separate category (referred to as *the rest* in the figure below). The expenditure template only included spending categories for the top 90% of expenditure (based on the original 2016 dataset). All the other expenditure categories are lumped together into an *all other expenses* category. As shown in Figure 1, the *all other expenses* category was the second biggest spending category and did indeed represent approximately 10% of total spending.

⁴ Please note that the top 10 expenditure categories are based on 2017 rankings. In 2018 and 2019, the rankings looked slightly different, but the top 10 remained the same.

Figure 1: Headline spending: weights for the main expenditure categories (2017 – 2019)



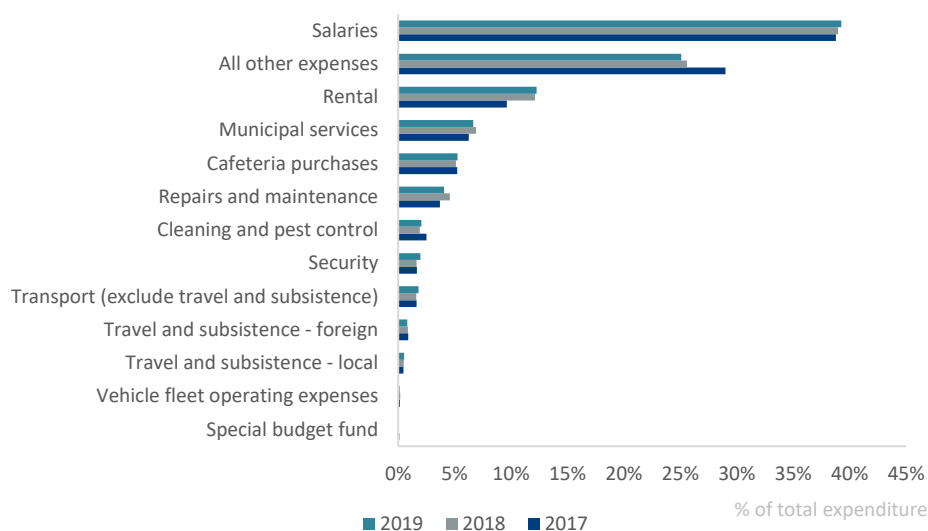
Source: BER calculations using USAf data set

As expected, staff-related expenditure, specifically *salaries* and *employer contributions*⁵ made up the bulk of expenditure – more than 60% of the total – in all three years. This implies that staff-related spending was the main driver of the HEPI in 2017 to 2019.

Residence spending

Figure 2 shows the relative contributions (i.e. weights) of the main expenditure categories for residences.

Figure 2: Residence spending: weights for the main expenditure categories (2017 – 2019)



Source: BER calculations using USAf data set

⁵ Including contributions to pension funds, medical aid and UIF etc.

Together, expenditure on *salaries, rentals, municipal services* and *cafeteria purchases* made up approximately 60% of total expenditure of residences in all three years. This implies that spending on these categories had a relatively big impact on the HEPI Student Accommodation.

Price indices

The next step was to assign an appropriate price index to each expenditure group (see Table 2).

Table 2: Price index per expenditure category

Expenditure category	Price index	Source
Salaries	HE salary index	USAf
All other expenses	CPI Headline	Stats SA
Employer contributions	HE salary index	USAf
Bursaries	CPI Tertiary education	Stats SA
Depreciation - other (excl land and buildings)	PPI Metals, machinery, equipment and computing equipment	Stats SA
Municipal services	CPI Water and other services	Stats SA
Repairs and maintenance	CPI Maintenance and repair	Stats SA
Security	CPI for services	Stats SA
Depreciation - land and buildings	BER Building Cost Index	BER
Books and journals	Rand/Real US dollar	SARB & US BLS
Information technology (IT) services	CPI Postal services and telecommunication services	Stats SA
Cleaning and pest control	CPI Supplies and services	Stats SA
Consultants	Private sector wage rate	BER
Consumables	CPI Books, newspapers and stationery	Stats SA
Travel and subsistence - local	CPI Public transport	Stats SA
Rental	CPI Actual rentals for housing	Stats SA
Transport (exclude travel and subsistence)	CPI Public transport	Stats SA
Travel and subsistence - foreign	Rand/Real US dollar	SARB & US BLS
Laboratory costs	PPI Chemicals, rubber and plastic products	Stats SA
Training and conferences	CPI Tertiary education	Stats SA
Research	CPI Headline	Stats SA
Cafeteria purchases	CPI Food and non-alcoholic beverages	Stats SA

Source: USAf & BER

As mentioned above, the large weighting of staff-related expenditure implies that the HEPI is very sensitive to price growth in staff costs. The BER did an analysis of Stats SA's Quarterly Employment Statistics (QES) for university employees (gross earnings and employee numbers). The findings on average annual increases in gross earnings per employee were not in line with reality and the BER therefore decided to commission a poll among USAf members. Respondents were asked to indicate percentage increases in average total remuneration per employee (cost-to-company). This had to be supplied separately for academic and support staff, with subcategories for permanent and contract employees. Respondents also had to indicate the number of employees per category. This allowed us to calculate a weighted average for academic and non-academic salary increases per year (by using the number of employees of each university as the weight for its particular salary increase). A total salary increase was then calculated as the weighted average of the academic and non-academic increases, also using the number of employees per staff category as the weight (see Table 3 for the results).

Table 3: Headline spending: salary growth (2017 – 2019)

	2017	2018	2019
Higher education (HE) salary index: headline spending	7.0%	7.1%	7.2%
Academic salary index	6.9%	6.9%	7.0%
Non-academic salary index	7.1%	7.2%	7.3%
CPI inflation	5.3%	4.6%	4.1%

Source: BER calculations using USAf data set

As shown in Table 3, total salary increases were respectively 1.7, 2.5 and 3.1 percentage points (% pts) higher than headline inflation in 2017, 2018 and 2019.

A similar method was used for residences, except that no difference was made between academic and non-academic staff. See Table 4 for results.

Table 4: Residence spending: salary growth (2017 – 2019)

	2017	2018	2019
Higher education (HE) salary index: residence spending	7.1%	7.0%	7.4%
CPI inflation	5.3%	4.6%	4.1%

Source: BER calculations using USAf data set

Table 4 shows that salary increases for residence staff were respectively 1.8, 2.4 and 3.3% pts higher than consumer inflation in 2017, 2018 and 2019.

Results

Headline spending

HEPI

The price indices shown in Table 2 were set to 100 in 2015 (as a base year). As a final step, the HEPI was calculated by multiplying the price index of each expenditure category with their respective weights and then summing the results.

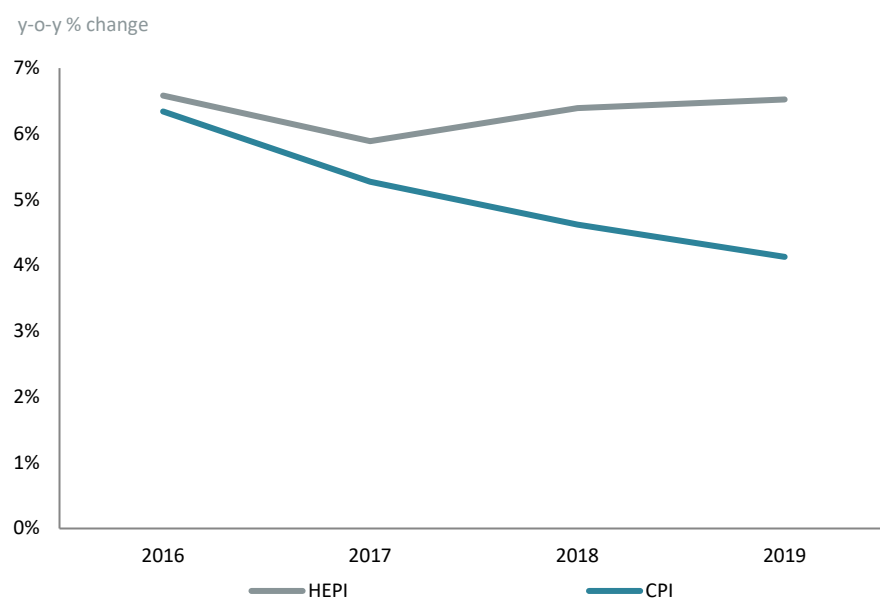
Table 5: Headline spending: comparison between the HEPI and CPI

Year	HEPI	CPI
Index		
2015	100.0	100.0
2016	106.6	106.3
2017	112.9	111.9
2018	120.1	117.1
2019	127.9	122.0
y-o-y % change		
2015		4.6%
2016	6.6%	6.3%
2017	5.9%	5.3%
2018	6.4%	4.6%
2019	6.5%	4.1%

Source: BER calculations using USAf data set

In 2016, consumer inflation rebounded to 6.3% (from 4.6% previously) due to drought induced higher food prices. This implies that the HEPI was only marginally higher than CPI in 2016 (see Figure 3). For 2017, 2018 and 2019, the HEPI was respectively 0.6, 1.8 and 2.4% pts higher than CPI (as CPI moderated from the 2016 high).

Figure 3: Headline spending: comparison between HEPI and CPI



Source: BER calculations using USAf data set

The HEPI is a useful tool when calculating what expenditure increases are necessary to simply offset the effect of price increases when buying the same inputs used in previous years. However, these figures do not take other effects such as an improvement in the product offering (education) and/or higher student numbers (volumes) into account.

HEVI and HEBI

As mentioned earlier, the FEF expressed the need for a volume index. The annual percentage increase in the total number of FTEs was used to calculate a Higher Education Volume Index (HEVI)⁶ (see Table 6).

Table 6: Headline HEPI, HEVI and HEBI

Year	HEPI	HEVI	HEBI
Index			
2015	100,0	100,0	100,0
2016	106,6	100,9	107,6
2017	112,9	102,6	115,7
2018	120,1	105,8	127,1
2019	127,9	108,5	138,8
y-o-y % change			
2016	6,6%	0,9%	7,6%

⁶ Unisa's large weighting in terms of student numbers imply that the volatility in their student numbers from year to year skewed the sample. It was therefore decided to exclude Unisa from the volume index.

2017	5,9%	1,6%	7,6%
2018	6,4%	3,2%	9,8%
2019	6,5%	2,5%	9,2%

Source: BER calculations using USAf data set

The BER found that the HEBI growth was 7.6%, 9.8% and 9.2% for 2017, 2018 and 2019 respectively. Going forward, the HEBI can be a useful tool in assisting universities to calculate total expenditure requirements that are necessary to offset the effect of BOTH spending and volume increases, assuming that productivity remains the same.

Residence spending

HEPI

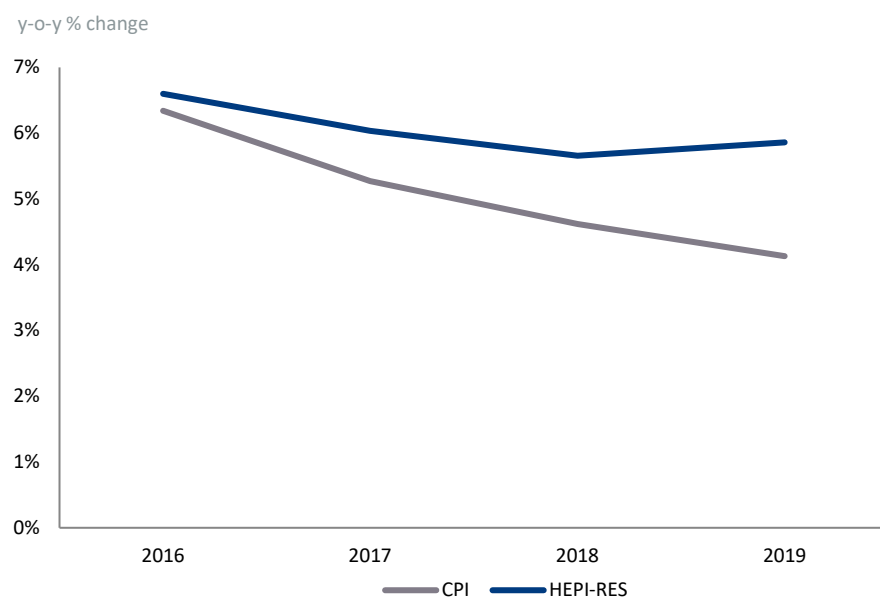
The HEPI for residences was 0.7, 1.1 and 1.8% pts higher than headline inflation in 2017, 2018 and 2019 respectively (see Table 7 and Figure 4).

Table 7: Residence spending: comparison between HEPI & CPI

Year	HEPI	CPI
Index		
2015	100.0	100,0
2016	106.6	106,3
2017	113	111,9
2018	119.4	117,1
2019	126.4	122,0
y-o-y % change		
2015		4.6%
2016	6.6%	6.3%
2017	6.0%	5.3%
2018	5.7%	4.6%
2019	5.9%	4.1%

Source: BER calculations using USAf data set

Figure 4: Residence spending: comparison between HEPI & CPI inflation



Source: BER calculations using USAf data set

HEVI and HEBI

The BER found that the HEBI growth was 6.8% in 2017. Student numbers (i.e. our proxy for volumes) jumped by 8.3% in 2017 and by 10.6% in 2019 (see Table 8). The relatively large uptick in volumes result in a HEVI growth of 14.4% and 17.1% in 2018 and 2019 respectively.

Table 8: Student accommodation HEPI, HEVI and HEBI

Year	HEPI	HEVI	HEBI
Index			
2015	100	100	100
2016	106.6	100.9	107.6
2017	113	101.6	114.9
2018	119.4	110	131.4
2019	126.4	121.7	153.9
y-o-y % change			
2016	6.6%	0.9%	7.6%
2017	6.0%	0.7%	6.8%
2018	5.7%	8.3%	14.4%
2019	5.9%	10.6%	17.1%

Conclusion

The BER's analysis of the 2017 – 2019 dataset found that the cost of higher education was higher than headline inflation at the time.

Appendix 1

	2017	2018	2019
Salaries	58.1	59.6	58.9
All other expenses	10.2	9.0	9.7
Employer contributions	5.7	5.9	6.0
Bursaries	3.9	3.6	4.2
Municipal services	3.6	3.6	3.6
Depreciation - other (excl land and buildings)	3.3	3.1	3.3
Repairs and maintenance	3.1	2.9	2.8
Depreciation - land and buildings	1.4	1.5	1.3
Books and journals	1.4	1.2	1.4
Information technology (IT) services	1.3	1.4	1.4
Security	1.3	1.3	1.2
Consultants	1.0	1.3	1.0
Cleaning and pest control	1.0	0.7	0.6
Consumables	0.9	0.9	1.0
Travel and subsistence - local	0.7	0.7	0.7
Transport (exclude travel and subsistence)	0.7	0.7	0.7
Rental	0.5	0.6	0.5
Travel and subsistence - foreign	0.5	0.6	0.5
Training and conferences	0.5	0.5	0.5
Laboratory costs	0.3	0.3	0.2
Research	0.3	0.4	0.4
Cafeteria purchases	0.1	0.2	0.1

Source: BER calculations using the USAf data set

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