

Sample test

Instructions

These questions are similar to the ones used in 2020 Delivery’s selection process. You are permitted to use a calculator during this exercise. Solutions are included at the end of the test for you to check your answers.

Case

The University of Oldtown, a research and teaching institution, has a total enrolment of approximately 15,000 graduate and undergraduate students in 2007-08 across a range of disciplines, including arts and science, nursing, business, engineering, medicine, and law. The student body is predominantly local with a strong international complement of 2,000 students. International students are important to the institution because they pay between 2-3 times the fees of local students.

The University has recently appointed a new Dean to provide experienced leadership through challenging times. University of Oldtown’s reputation has been slipping, and last year was completely omitted from the Top 100 Universities list. The perceived drop in educational quality has led to fewer applications (particularly from international students), greater difficulty attracting and retaining leading scholars and more difficulty in fundraising to pay for new infrastructure and research chairs.

The Dean has hired 2020 Delivery to analyse the current situation and support his decision-making to return the University of Oldtown to its rightful place as one of the world’s leading universities.

Note this historical case is based in 2008.

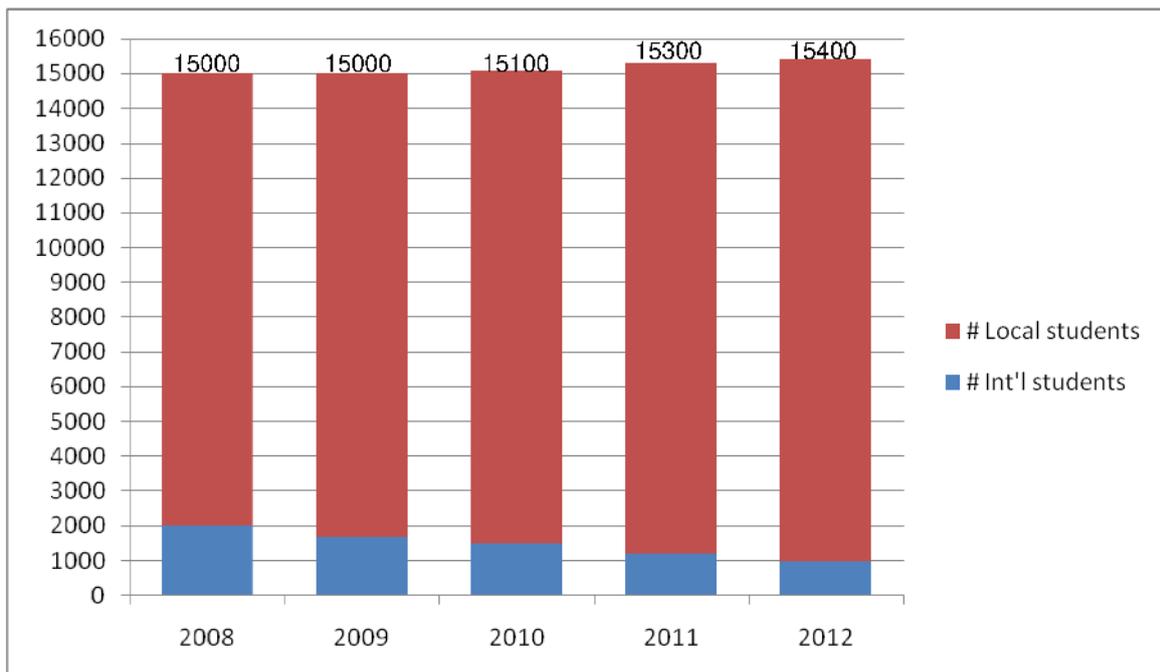
Table 1: Financial summary for 2007-08

Revenue	£ million	Costs	£ million
Student fees	120	Faculty and research	175
Government funding	140	Administration, student services, maintenance and other admin	100
Fundraising, investment income and other income	40	Scholarships and bursaries	30

Question 1

Based on the following chart and the information provided above, what change would you expect in the University's financial situation from 2008-2012, assuming other costs and revenues remain stable?

Chart 1: Total University of Oldtown enrolment projection, 2008-2012



- The financial situation will remain the same
- The financial position will be worse
- The financial position will be better
- There is not enough information to answer the question

Question 2

The 2020 Delivery team considers whether attracting more international students would improve the financial situation. Assume that the average local student fee for 2008-09 is to be set at £ 7,000 and the average international student fee at £ 16,000. Based on 2007-08's enrolment figures, if the University of Oldtown increased international student numbers by 30% and reduced local students by 10%, what would the net financial position be assuming all costs and non-fee revenues remain stable?

- £ 10.1 million surplus
- £ 120.5 million surplus
- £ 1.5 million deficit
- £ 5.0 million deficit

NOTE: The rate at which costs change relative to changes in income is known as a “scaling factor”. A scaling factor of 90% means that for every 100% increase of income relating to student admission, costs only go up by 90%. Likewise, if income from students admitted were reduced by 50%, costs would only fall 45%.

Question 3

The team then examines the impact of increasing the growth in total enrolment. Assuming a scaling factor of 80% for faculty and research, 40% for administration, and 100% for scholarships, project the total net gains/losses over the next two years if the University attracts 5% more students per year. Assume the ratio of international and local students, the fees per student, and all non-fee revenues remain the same as in 2007-08.

- a) £ 23.6 million net loss
- b) £ 3.9 million net gain
- c) £ 3.9 million net loss
- d) £ 28.6 million net loss

The Dean is considering investing in a new programme or school to revitalise University of Oldtown’s infrastructure and improve its long-term financial position. He is sure he can raise the necessary capital investment to cover upfront costs through generous donors, but is aware that running a new school or programme might impose a financial burden. The Dean is hopeful that the new investment might help him pay off the University’s debt, and wants 2020 to determine if this is possible.

The Vice-Principal for Research is lobbying strongly for a new microbiology laboratory and teaching facility that will attract top researchers to the University and create capacity for another 200 students. The Dean, however, thinks the University should develop a top-flight international MBA programme with a strong international component to bolster its world-wide reputation and attract more international students. Other members of the University’s senior management team favour a variety of other programme options. Table 2 provides more details on the options.

Table 2: Projections for potential new programmes

Programme	# Local students	Fee per local student	# International students	Fee per int'l student	# of faculty required	# of class hours taught per faculty member, per week	Average salary per faculty member	Annual administration, maintenance and other costs
iMBA	25	£ 10,000	?	£ 20,000	15	3	£ 65,000	£ 240,000
Microbiology	120	£ 7,000	80	£ 15,000	18	6	£ 45,000	£ 400,000
Other	?	?	?	?	?	?	?	?

Question 4

How many international students must the iMBA enrol in order to generate enough revenue to break even?

- a) 38
- b) 49
- c) 55
- d) 48

Solutions

1. Answer: b) The financial situation will be worse. Chart 1 shows that between 2008 and 2012, total enrolment is expected to rise by 400 (15,000 to 15,400), and the number of international students is expected to fall by 1,000 (2,000 to 1,000). The background information stipulates that international students pay 2-3 times the tuition fees of local students. Losing 1,000 international students' tuition fees will therefore decrease revenue by the equivalent of 2-3,000 local students' fees. Local student enrolment is only expected to rise by 1,400 (13,000 to 14,400), and so overall the University will receive less fee revenue in 2012 than 2008. As all other revenues and costs are assumed to be equal, we can conclude that the University will be worse off financially.
2. Answer: c) £ 1.5 million deficit. To solve the problem, first note that the University has 15,000 total students, of which 2,000 are international. This leaves 13,000 local students. The problem sets out a 30% increase in international students, which can be calculated by multiplying $1.30 \times 2,000 = 2,600$. The problem also notes a 10% decrease in local students, which can be calculated by multiplying $0.10 \times 13,000 = 1,300$, then subtracting 1,300 from the original local student population $13,000 - 1,300 = 11,700$.

Now that we have the correct populations as set out in the problem, we can calculate the student fees generated by those populations. Based on the average fees provided in the problem, total local student revenue is calculated by multiplying $11,700 \times £ 7,000 = £ 81.9$ million and total international student revenue is calculated by multiplying $2,600 \times £ 16,000 = £ 41.6$ million. Total student fee revenue then is $81.9 \text{ million} + 41.6 \text{ million} = £ 123.5$ million.

The problem states that all other revenues and costs remain stable, and these are provided in the case background. To calculate, add student fees (£ 123.5 million) plus government funding (£ 140 million) plus fundraising and other income (£ 40 million), and subtract faculty and research (£ 175 million), administration (£ 100 million) and scholarships (£ 30 million). Total revenues are £ 303.5 million, subtract total costs of £ 305 million = £ 1.5 million deficit.

3. Answer: a) £ 23.6 million net loss over two years. If the ratio of international and local students is held constant, then the only piece of information requiring manipulation on the revenue side is the total student fee figure given in Table 1 (£ 120 million). For example, to find the total expected revenue under year 1 of the 5% growth pattern, multiply $1.05 \times 120 \text{ million} = 126 \text{ million}$. For year two, multiply 1.05×126 . A scaling factor of 80% for faculty and research is provided, leading to a growth pattern of $.8 \times 5\% = 4\%$. The growth pattern for administration is based on a 40% scaling factor, leading to $.4 \times 5\% = 2\%$, and 100% scaling for scholarships leads to a 5% growth pattern. The results are best expressed in a table:

	Category	Baseline	Year 1	Year 2
Revenue (£ m)	Student fees	120.0	126.0	132.3
	Government funding	140.0	140.0	140.0
	Fundraising and other	40.0	40.0	40.0
	Total revenue	300.0	306.0	312.3
Costs (£ m)	Faculty and research	175.0	182.0	189.3
	Administration	100.0	102.0	104.0
	Scholarships	30.0	31.5	33.1
	Total costs	305.0	315.5	326.4
Total		-5.0	-9.5	-14.1

Year one shows a projected loss of £ 9.5m, and year two shows a loss of £ 14.1m. The question asks for the total net profit/loss over the two years, and so adding these makes a total loss of £ 23.6 million.

4. Answer: b) 49 international students. To answer this question, first determine the costs involved in running the programme. Each faculty member is paid £ 65,000 annually, and there are 15 faculty members ($15 \times £ 65,000 = £ 975,000$). There are also £ 240,000 in administration and other costs, bringing the total to $£ 975,000 + £ 240,000 = £ 1,215,000$. On the revenue side, we know there are 25 local students paying £ 10,000 each, making a total of £ 250,000. Total costs (£ 1,215,000) minus local student fees (£ 250,000) leaves £ 965,000 to be covered by international student fees in order for the programme to break even. Dividing this by the fees per international student (£ 20,000) gives an answer of 48.25 international students. Since the school cannot admit one-quarter of a student, they will require 49 international students to break even.