

**“ESTIMATION AND ANALYSIS  
OF NET MARGINAL COSTS OF SCHOLARSHIP PROGRAMS  
AT WEST LIBERTY STATE COLLEGE”**

**Report submitted to  
West Liberty State College**

**Report submitted by  
Dr. Serkan Catma  
Assistant Professor of Economics, WLSC**

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## Executive Summary

West Liberty State College (WLSC) offers various scholarship opportunities to its prospective and current students. Undergraduate tuition and housing waivers, athletic grants and academic scholarships have been the types of awards historically granted to WLSC students. While the institution awards are any type of waivers and scholarships funded by the Foundation, fee awards such as athletic grants and scholarships are those funded by West Liberty operating dollars. Because the college administration has little to no effect on the amount of money donated to foundation each year, only the tuition waivers, housing waivers and athletic grants and scholarships that are funded by the college's operating budget are analyzed in this study.

There are two main objectives of this study. First, net marginal cost of each scholarship program per student type is determined so that certain recommendations can be made to help the college administration make financially beneficial yet academically sound decisions. Second, WLSC's last 7 year scholarship strategy is documented to be a reference for college administration, faculty, staff, students, and general public.

It is extremely important to conduct a detailed study to achieve the objectives of this study. Estimations made in this study are based on real-life data obtained from the Business Office and Department of Financial Aid. When real-life data wasn't available, certain assumptions were made based on secondary data. The most important assumptions are the following:

1. 50% of scholarship and grant recipients don't receive any type of waiver.
2. 70% of students receiving any type of waiver wouldn't choose WLSC if they weren't offered waivers.
3. 10% of athletic grant and scholarship recipients wouldn't choose WLSC if they weren't offered athletic grants or scholarships.

The first part of this study deals with the estimation of true cost of each scholarship type. While true cost of both athletic grant and scholarship is the summation of direct and indirect costs, true cost of tuition and housing waiver includes indirect and economic costs. Direct cost is the direct outlay of money. In other words, it is the actual amount of money spent by the college for each scholarship program. Indirect cost is the cost of additional faculty needed for upcoming students. Economic cost is the opportunity cost of giving each scholarship type. For example, if college awards tuition waivers to 10 students and if three of them were already going to choose WLSC even if they weren't offered tuition waivers, then the total economic cost would be the foregone tuition revenue the college could have obtained from these three tuition waiver recipients. For athletic grants and scholarships, the economic cost was excluded from the calculation due to insignificance of awarded money. Estimated true cost of each scholarship program per each student type was labeled as gross marginal cost.

After the estimation of gross marginal costs, implicit value of each scholarship type was determined. Implicit values are the potential revenues, if any; the college receives from

each scholarship recipient. Because each scholarship program had different characteristics, implicit values varied as expected.

The final part of this study documented the net marginal cost of each program per student type and made recommendations for the college administration. Net marginal cost was determined by deducting implicit values from gross marginal costs. It should be noted that all estimated costs and implicit values were annualized (covers two semesters). The following is the summary of findings and recommendations based on these findings.

In the Fall of 2008, a total of 47 students (12 in-state, 27 out of state, and 8 metro rate) received athletic grant. Based on the estimations presented in Table 27, the following recommendations could be made for a cost-effective distribution of athletic grants.

- If the number of athletic grant recipients is decreased by at least 6 students, the following cost reduction could be achieved:
  - 42% per each in-state student.
  - 39% per each out of state student.
  - 38% per each metro rate student.
  - 39% on average per student.
- Even if the total number of recipients is increased from 47 to 85, the net marginal cost (NMC) per each student type wouldn't change.
- If no reduction in the total number of recipients is made, total cost of athletic grants to WLSC could be reduced by:
  - Increasing the number of in-state recipients and decreasing the number of metro rate students (holding the number of out of state recipients constant at 27).
  - It should be noted that even if the total number of student recipients is increased by 38, cost per in-state student is 11% and 16% less than the cost per out of state and metro rate students respectively.

In the Fall of 2008, a total of 38 students (24 in-state, 8 out of state, and 6 metro rate) received scholarship at WLSC. The following recommendations could be made based on the estimations presented in Table 28.

- If the number of scholarship recipients is decreased by at least 7 students, the following cost reduction could be achieved:
  - 79% per each in-state student.
  - 97% per each out of state student.
  - 96% per each metro rate student.
  - 90% on average per student.
- Even if the total number of recipients is increased from 38 to 75, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:
  - Increasing the number of out of state recipients and/or metro rate students while decreasing the number of in-state students.

- It should be noted that even if the total number of student recipients is increased by 37, cost per out of state student is 16% and 3% less than the cost per in-state and metro rate student respectively.

In the Fall of 2008, a total of 63 students (18 in-state, 26 out of state, and 19 metro rate) received athletic grant. Based on the estimated net costs presented in Table 29, the following recommendations could be made for a cost-effective distribution of academic tuition waivers.

- Current net marginal cost per in-state, out of state and metro rate students are \$4,370, \$4,879, and \$4,963 respectively. Accounting for implicit values decreases gross marginal cost per each student type by 25% on average. If total number of recipients is decreased by 19, the following reductions in NMC would occur:
  - 59% per each in-state student.
  - 50% per each out of state student.
  - 49% per each metro rate student.
  - 52% on average per student.
- Even if the total number of recipients is increased from 63 to 66, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:
  - Increasing the number of in-state recipients while decreasing the number of out of state or more preferably metro rate students.
  - It should be noted that even if the total number of student recipients is increased by 3, cost per in-state student is 10% and 12% less than the cost per out of state and metro rate student respectively.
- If the total number of recipients is increased by at least 3 and at most 25 students, awarding athletic grants to more in-state and less out of state and metro rate students would make the allocation more cost effective.

Fall 2008 data shows that a total of 57 students (5 in-state, 40 out of state, and 12 metro rate) received athletic tuition waivers at WLSC. The following recommendations could be made based on the results presented in Table 30.

- Current net marginal cost per in-state, out of state and metro rate students are \$4,338, \$4,080, and \$5,150 respectively. Accounting for implicit values has a decreasing effect on gross marginal cost per each student type by 27% on average. If the total number of recipients is decreased by 13, the following reductions in NMC would occur:
  - 56% per each in-state student.
  - 60% per each out of state student.
  - 47% per each metro rate student.
  - 57% on average per student.
- Even if the total number of recipients is increased from 57 to 66, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:

- Increasing the number of out of state recipients while decreasing the number of in-state or more preferably metro rate students.
- It should be noted that even if the total number of student recipients is increased by 9, cost per out of state student is 6% and 21% less than the cost per in-state and metro rate student respectively.
- If the total number of recipients is increased by at least 9 and at most 31 students, awarding more athletic tuition waivers to out of state and less to in-state and metro rate students would make the allocation more cost effective.

In the Fall of 2008, a total of 263 students (170 in-state, 45 out of state, and 47 metro rate) received academic housing waivers. Based on the estimations presented in Table 31, the following recommendations could be made for a cost-effective distribution of academic housing waivers.

- Current net marginal cost per in-state student is \$131. However, awarding academic housing waiver generates revenue of \$1,254 per out of state and \$562 per metro rate student. If the total number of recipients is decreased by 38, the following revenues would be generated:
  - \$829 per each in-state student.
  - \$2,214 per each out of state student.
  - \$1,522 per each metro rate student.
  - \$1,239 on average per student.
- Even if the total number of recipients is increased from 263 to 280, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total revenue to WLSC can be increased by:
  - Increasing the number of out of state and metro rate recipients while decreasing the number of in-state students.
  - Increasing the number of out of state recipients by up to 17, while holding the number of in-state and metro rate students constant.
- If the total number of recipients is increased by at least 17 and at most 73 students, awarding academic housing waivers to more out of state and less in-state and metro rate students would make the allocation more cost effective. It should be noted that awarding a housing waiver to each out of state student would still generate revenue of \$294.

Fall 2008 data shows that a total of 111 students (21 in-state, 67 out of state, and 23 metro rate) received athletic housing waivers at WLSC. The following recommendations could be made based on the results presented in Table 32.

- The results show that awarding athletic housing waiver to each student type currently generates revenue (\$2,637 per in-state, 4,975 per out of state, and \$4,571 per metro rate student). If the total number of recipients is decreased by 54, the revenues documented above would be increased to:
  - \$3,597 per each in-state student.
  - \$5,935 per each out of state student.
  - \$5,531 per each metro rate student.

- If the total number of recipients is increased by 2 students, the revenue per each student type would decrease but still be positive.
- If no reduction in total number is made, total revenue to WLSC can be increased by:
  - Increasing the number of out of state and metro rate recipients while decreasing the number of in-state students.
- If the total number of recipients is increased by at least 2 and at most 57 students, awarding athletic housing waivers to more out of state and less in-state students would make the allocation more cost effective (still positive revenue though for each student type).
- Athletic housing waiver would generate cost only if more than 114 additional athletic housing waivers are awarded to in-state students. Even in that case, each out of state and metro rate student would still generate revenue.

**Table 33 Current Annual Net Cost of Each Scholarship Program per Student Type(\$)**

	In-State	Out of State	Metro Rate	Average
Athletic Grant	2,900	3,222	3,365	3,187
Scholarship	1,524	1,276	1,320	1,370
Academic Tuition Waiver	4,370	4,879	4,963	4,726
Athletic Tuition Waiver	4,338	4,080	5,150	4,261
Academic Housing Waiver	131	(1,254)	(562)	(279)
Athletic Housing Waiver	(2,637)	(4,975)	(4,571)	(4,312)

Table 33 clearly shows that WLSC should allocate 173 currently empty beds through housing waivers. While all other scholarship types impose costs to West Liberty, housing waivers create revenue for the college. Even though, academic and athletic tuition waivers cost more than any other scholarship program, revenues obtained from housing waivers would help reduce these costs.

Current cost of each program per student type was multiplied by the total number of students receiving each scholarship type to have some idea about total annual cost of having all of these programs. After incorporating the implicit values, the annual cost of having all these programs is found to be only \$195,510. This is mainly due to cost lowering characteristic of housing waivers.

## **1. Introduction**

West Liberty State College (WLSC) offers various scholarship opportunities to its prospective and current students. Undergraduate tuition and housing waivers, athletic grants and academic scholarships have been the types of awards historically granted to WLSC students. While the institution awards are any type of waivers and scholarships funded by the Foundation, fee awards such as athletic grants and scholarships are those funded by West Liberty operating dollars. Even though WLSC is a non-profit organization, it is important to determine the economic effectiveness of these scholarship types for a viable long-term financial and academic standing.

The most recent audit reports prepared for Concord University and WLSC were analyzed to compare the total amount of money spent on all scholarship programs in 2007. While Concord University spent 12.7% of its total operating revenues on scholarships and fellowships, WLSC spent only 8.5% of its total operating revenues on various scholarship programs in 2007.

It is extremely important to conduct a detailed analysis to measure the cost effectiveness of current scholarship programs at WLSC. First, the “true” cost of each available scholarship type must be estimated. Second, potential returns of each scholarship program, if any, must be determined so that the net cost of each program can be obtained. The following section briefly introduces the methodology used in this study.

## **2. Methodology**

“True” cost of each scholarship program consists of different types of cost. While true cost of both athletic grant and scholarship is the summation of direct and indirect costs, true cost of tuition and housing waiver includes indirect and economic costs. Direct

cost is the direct outlay of money. In other words, it is the actual amount of money spent by the college for each scholarship program. According to past data, the most significant cost (after direct cost) is the cost of additional faculty. Therefore, indirect cost is the cost of additional faculty needed for upcoming students.

Economic cost is the opportunity cost of giving each scholarship type. For example, if college awards tuition waivers to 10 students and if three of them were already going to choose WLSC even if they weren't offered tuition waivers, then the total economic cost would be the foregone tuition revenue the college could have obtained from these three tuition waiver recipients. For athletic grants and scholarships, the economic cost is excluded from the calculation due to insignificance of awarded money.

The first part of this study deals with the estimation of true cost of each scholarship type. Total true cost of each scholarship type will then be distributed among in-state, out of state and metro rate students based scholarship enrollment data since 2002. Estimated true cost of each scholarship program per each student type is named as gross marginal cost. Because the college administration has little to no effect on the amount of money donated to foundation each year; only the tuition waivers, housing waivers and athletic grants and scholarships that are funded by the college's operating budget are analyzed in this study.

After the estimation of gross marginal costs, implicit value of each scholarship type is determined. Implicit values are the potential revenues, if any, the college receives from each scholarship recipient. Because each scholarship program has different characteristics, implicit values are expected to vary. For example, while tuition revenue is

a part of implicit value of a housing waiver, it is not of a tuition waiver program. More details will be provided in the upcoming sections of this study.

The final part of this study documents the net marginal cost of each program per student type and makes recommendations for the college administration. Net marginal cost is determined by deducting implicit values from gross marginal costs. It is important to note that all estimated costs and implicit values are on annual basis (two semesters).

### **3. Data**

Various cost and enrollment data between Fall of 2002 and 2008 were obtained from the Department of Financial Aid. The set of data includes the amount of money spent on scholarship, athletic grants, number of recipients of each program, total dollar value of academic housing waivers, academic tuition waivers, athletic housing waivers, academic housing waivers and other waivers, tuition, fees, room and board charges per student, number of students enrolled each year, number of full-time faculty members, and number of residents in residence halls. It should be noted that there are three student types at WLSC: in-state, out of state, and metro rate.

WLSC Business office provided bi-yearly financial statements as of and for the years ended June 30 of each year since 2002. Annual tuition and fee revenues, auxiliary enterprise revenues, and total operating revenues were obtained from these financial statements.

Previous years' data were mainly used to determine the average number of recipients of each program by student type. For other calculations, latest data (Fall 2008) was mainly used. Because some values were hard to estimate due to lack of real-life data,

certain assumptions were made to adequately estimate these values. Each assumption is explained under the relevant section throughout this study.

#### **4. Estimation of Costs**

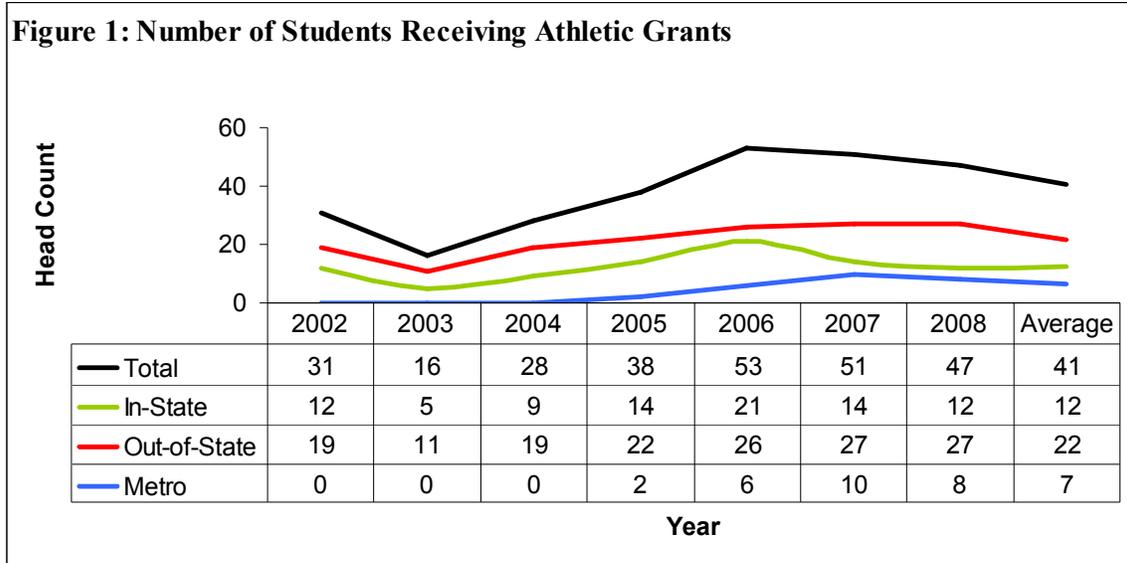
##### **4.1 Athletic Grant**

True costs of athletic grant and scholarship are assumed to be the total amount of money spent on these programs by the college (direct cost) plus the cost of additional faculty needed for increasing number of students (indirect cost). The reason for this assumption is that there is not enough data about how the award money is spent each year. It is also assumed that 50% of scholarship and grant recipients don't receive any type of waiver. Because total money spent on scholarship and athletic grant is not much compared to other programs, estimations are not expected to be significantly biased under these assumptions.

It is also important to clarify the distinctions between in-state, out-of-state, and metro students who receive athletic grants and scholarships. True cost of each dollar spent on grant and scholarship per each student type might be the same but implicit values are different. This is due to different rates of tuition and fees charged to each student type. Calculation of implicit values will be explained in the upcoming parts of our analysis.

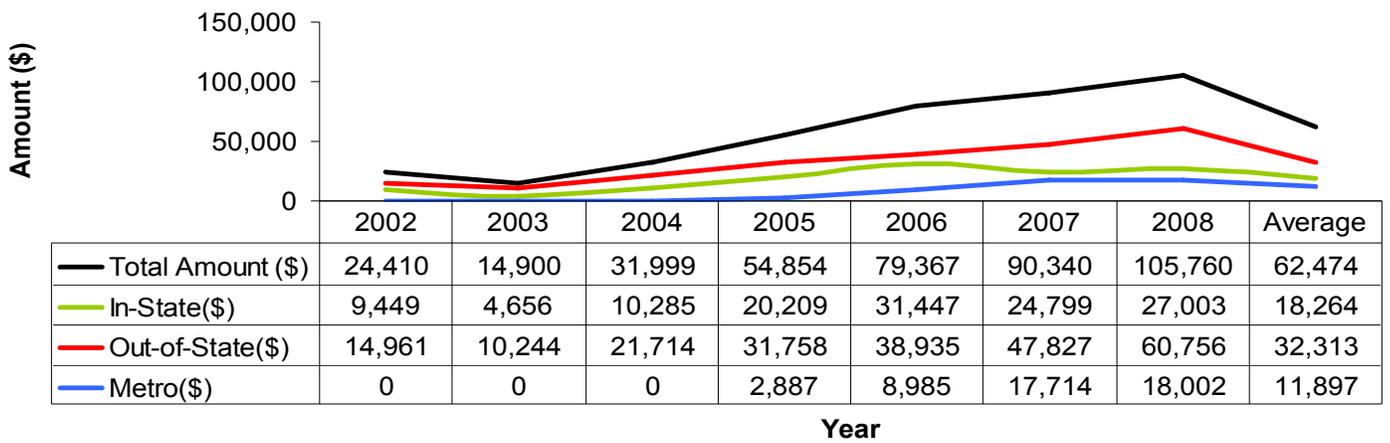
Because athletic grant and scholarship are not tuition waivers, it is reasonable to assume that each student receives the same weighted amount. In other words, total amount of scholarship and grant given in a year would be distributed evenly among different student types based on average historical number of recipients from in-state, out

of state, and metro counties. Figure 1 shows the number of students receiving athletic grants since 2002.



The figure above shows total number of students receiving athletic grants annually since 2002. On average, 16% and 30% of total athletic grant recipients are metro rate and in-state students respectively. Out of state students receive the highest average percentage (53%). As mentioned before, it was assumed that each student received the same weighted amount and 50% of all recipients were assumed not to receive any type of tuition waiver. Figure 2 shows the dollar amount of athletic grants (direct cost) awarded to metro rate, out of state, and in-state students since 2002.

**Figure 2: Total Direct Cost of Athletic Grant To WLSC (\$)**



As shown above, on average, out of state students receive almost double of what in-state students have each year. Metro rate students receive the least amount of money. Total direct cost (Fall 2008) per each student type was divided by the average number of students received athletic grant.

The reason for using average enrollment data rather than the latest enrollment data was potential fluctuations caused by changing economic, social, and other factors. For example, Figures 1 and 2 show that while the number of students receiving athletic grant rose almost every year, a decline was experienced between 2002 and 2003. Using average values would partially eliminate the negative effects of these fluctuations in enrollment data. However, the latest cost data (Fall 2008) rather than average values were considered to provide a more accurate analysis. This was because the average values were significantly lower than the most recent values. Using average values could have underestimated the costs significantly. Table 1 shows the average cost of athletic grant for each student type.

**Table 1 Average Cost of Athletic Grant per Student Type**

	Recent Cost (\$)	Average Student (#)	Average Cost per Student (\$)
Total	105,760	41	<b>2,611</b>
In-State	27,003	12	<b>2,173</b>
Out-of-State	60,756	22	<b>2,816</b>
Metro	18,002	7	<b>2,769</b>

According to Table 1, average cost of athletic grant for each WLSC student, regardless of his location, is \$2,611. While the cost per each in-state student is the lowest (\$2,173), cost per each out of state student is the highest (\$2,816). Cost for metro rate student is the second highest (\$2,769). Because this study's main purpose is to help the college administration make the most financially accurate decision, the above figures would be the base cost. Additional (indirect) costs would be added to these base figures to capture gross marginal cost per each additional student.

It was previously mentioned that 50% of scholarship and grant recipients were assumed not to receive any type of waiver. It means that two additional athletic grant recipients would increase the total cost only by the amount of one student's contribution. The main reason for this type of calculation is not to over estimate total cost and implicit values since the cost of second student will be included later in this study.

After estimating the base (direct) cost of athletic grant per student, next step is to estimate the indirect costs and add them to the base cost to capture the total cost. Total enrollment and faculty data since 2002 was utilized to estimate the number of students per faculty member and are presented in Table 2.

**Table 2 Sub Enrollment and Full-time Faculty at WLSC**

	2002	2003	2004	2005	2006	2007	2008	Average
Sub Enrollment	2,584	2,491	2,334	2,175	2,191	2,241	2,309	2,332
Full-time Faculty	109	104	103	109	103	102	101	104
Students per Faculty	24	24	23	20	21	22	23	22

Sub-enrollment represents total number of enrolled students except high school students taking dual credits. High school students were not included because of their ineligibility to receive any type of scholarship considered in this study.

According to Table 2, average number of students per faculty member is 22. It is now reasonable to assume that for every additional 22 students, a full-time faculty member is needed. However, one critical point is that each grant type is given simultaneously in real life. Assuming that 50% of total athletic grant recipients also receive tuition waivers, a faculty member would be needed for every additional 44 students.

A new faculty member receives approximately \$42,000 for a tenure track assistant professor position at WLSC. Knowing that total employee benefits account for approximately 28% of yearly salary, the cost of one new faculty member to college would be estimated to be \$53,760. Even though each additional student contributes more cost to the college through increasing utility expenses, insurance, etc., the most significant one would be the salary of a new faculty member according to Business Office. Therefore, only the significant expenses (faculty costs) are considered in this study. Table 3 shows the calculation of additional (indirect) cost of athletic grant per student.

**Table 3 Estimation of Additional (Indirect Cost) per Student**

	Average Student (#)	Average Student Distribution Weight	Distribution of 44 Students	Average Base Cost per Student (\$)	Distribution of Additional Cost (\$)	Average Additional Cost per Student (\$)
Total	41	1	44	2,611	53,760	1,252
In-State	12	0.29	13	2,173	15,735	1,222
Out-of-State	22	0.54	24	2,816	28,847	1,222
Metro	7	0.17	7	2,769	9,179	1,311

As mentioned before, for every 44 new students, there would be an additional cost of \$53,760. This cost was allocated among different student types based on average historical distribution. Table 3 shows that average additional cost per metro rate student is \$89 more than that of in-state and out of state students. This is based on the assumption that average student distribution weight wouldn't change over time. Based on these estimations, gross marginal cost curve for each student type was simulated and is presented in Figure 3.

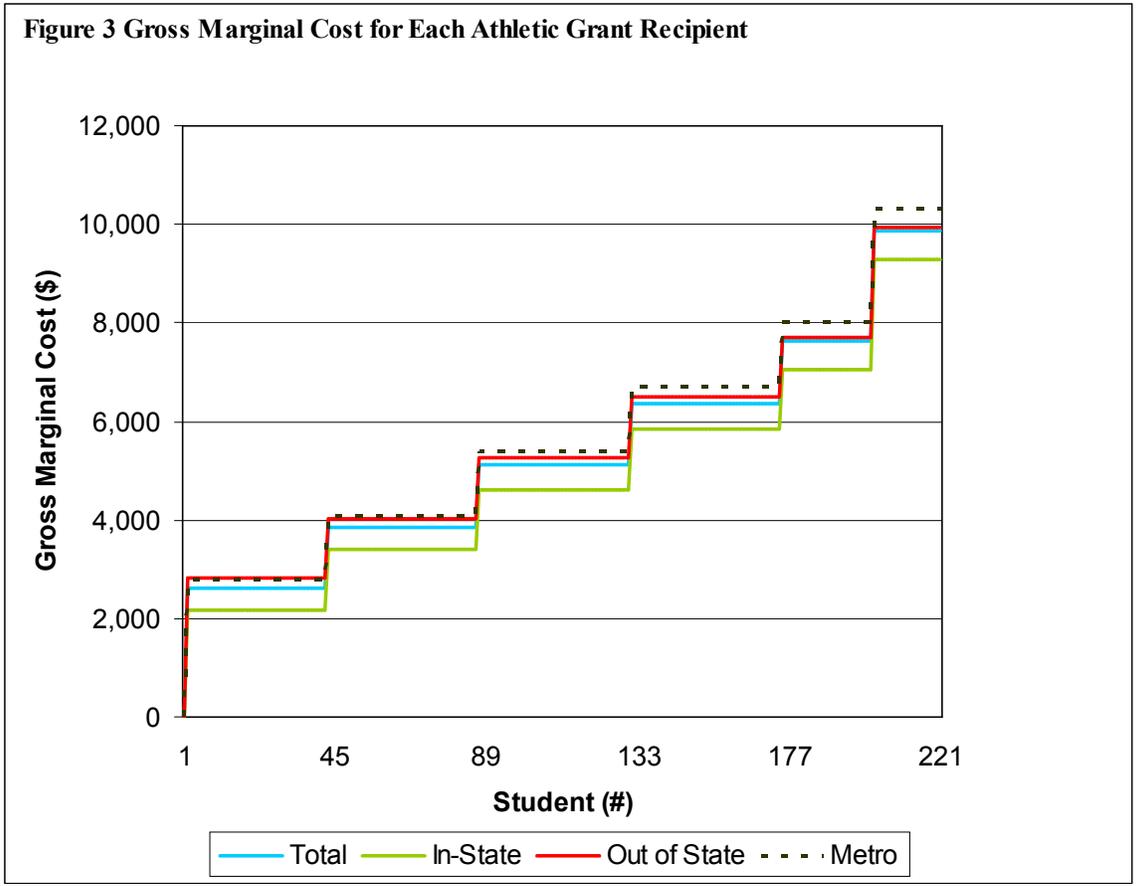


Figure 3 shows gross marginal cost curve for each student type. Marginal cost is gross because it doesn't include implicit value of each dollar spent on athletic grants. It is clear that gross marginal cost (GMC) for each student would increase as more students receive athletic grants. However, while this increase is steady up to 200 students, gross marginal cost increases sharply after the 201st student. This is based on the assumption that if more than 200 additional students receive athletic grants, there would be additional costs other than faculty costs such as cost for new staff, capital investments etc. Because the number of students is not expected to increase from 41 to more than 200, cost beyond 200 students is not estimated in this study.

Gross marginal cost per in-state student is the lowest at any student interval. However, one interesting finding is that gross marginal cost per out of state student is

higher than that of metro rate student at first but as more students are awarded athletic grants, gross marginal cost per metro rate student exceeds that of out of state student.

This would be due to higher additional cost of each metro rate student. Gross marginal cost per each student type is also summarized in Table 4.

**Table 4 Gross Marginal Cost (GMC) per Student Type**

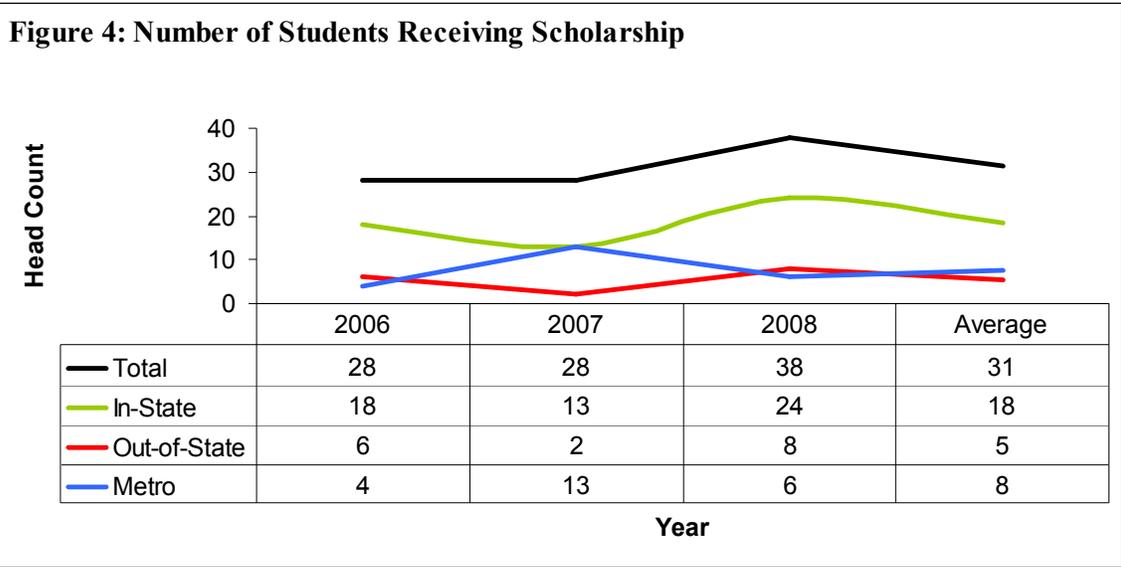
	Student (#)					
	0 to 41	42 to 85	86-129	130-173	174-200	> 200
GMC per Average Student (\$)	2,611	3,863	5,115	6,366	7,618	> 8,869
GMC per In-State Student (\$)	2,173	3,394	4,616	5,838	7,060	>8,282
GMC per Out of State Student (\$)	2,816	4,038	5,260	6,482	7,704	>8,926
GMC per Metro Rate Student (\$)	2,769	4,081	5,392	6,703	8,014	>9,326

Table 4 clearly shows that as more than 41 students are granted athletic grants, gross marginal cost per in-state student would exceed gross marginal cost per out of state student. It should be noted that the direct cost of athletic grant is the base cost when less than 41 students receive athletic grants. As more than 41 students receive athletic grants, the cost per each additional student increases due to estimated cost of an additional faculty member. For example, the cost of 42<sup>nd</sup> student to the college is more than the cost of the 25<sup>th</sup> student.

#### **4.2 Scholarship**

The same assumptions used for athletic grants also hold in the case of scholarship. One main difference though is that scholarships (funded from operating budget) were not available prior to 2006. It should also be noted that approximately 15% of scholarship recipients don't meet the renewal requirements each year according to Scott Cook.

However because the lost scholarship is awarded to another student in the following year or semester, the method used for athletic grant would be the same for scholarship. Figure 4 shows the number of scholarship recipients since 2006.



Unlike athletic grant, scholarship has been mostly given to in-state students on average. While 58% of total recipients are in-state students, this figure is only 26% and 16% for metro rate and out of state students respectively. Figure 5 shows the yearly cost of giving athletic grant to metro rate, out of state, and in-state students.

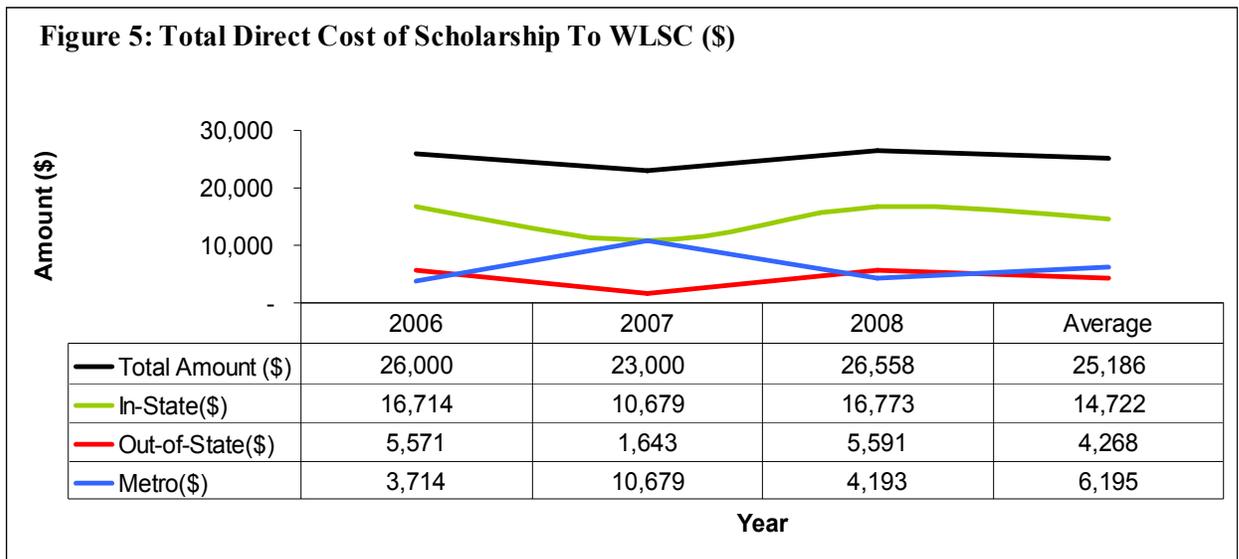


Figure 5 clearly shows that in-state students have received the majority of scholarship based on three-year historical average. Metro rate students have also received slightly

larger amount than out of state students. Based on these estimations, cost of scholarship per each student type was estimated. Results are presented in Table 5.

**Table 5 Average Cost of Scholarship per Student**

	Average Cost (\$)	Average Student (#)	Average Cost per Student (\$)
Total	25,186	31	812
In-State	14,722	18	818
Out-of-State	4,268	5	854
Metro	6,195	8	774

Average estimated base cost of a scholarship is \$812 per student at WLSC. While this average cost is the highest for an out of state student (\$854), it is the lowest for a metro rate student (\$774). The cost per an in-state (\$818) student is slightly higher than the average. There are two main differences between the average cost of scholarship and athletic grant. First, cost of scholarship per student is 3 times more than the average cost of athletic grant. Second, while the cost of athletic grant is the lowest per in-state student, the cost of scholarship is the lowest per metro rate student.

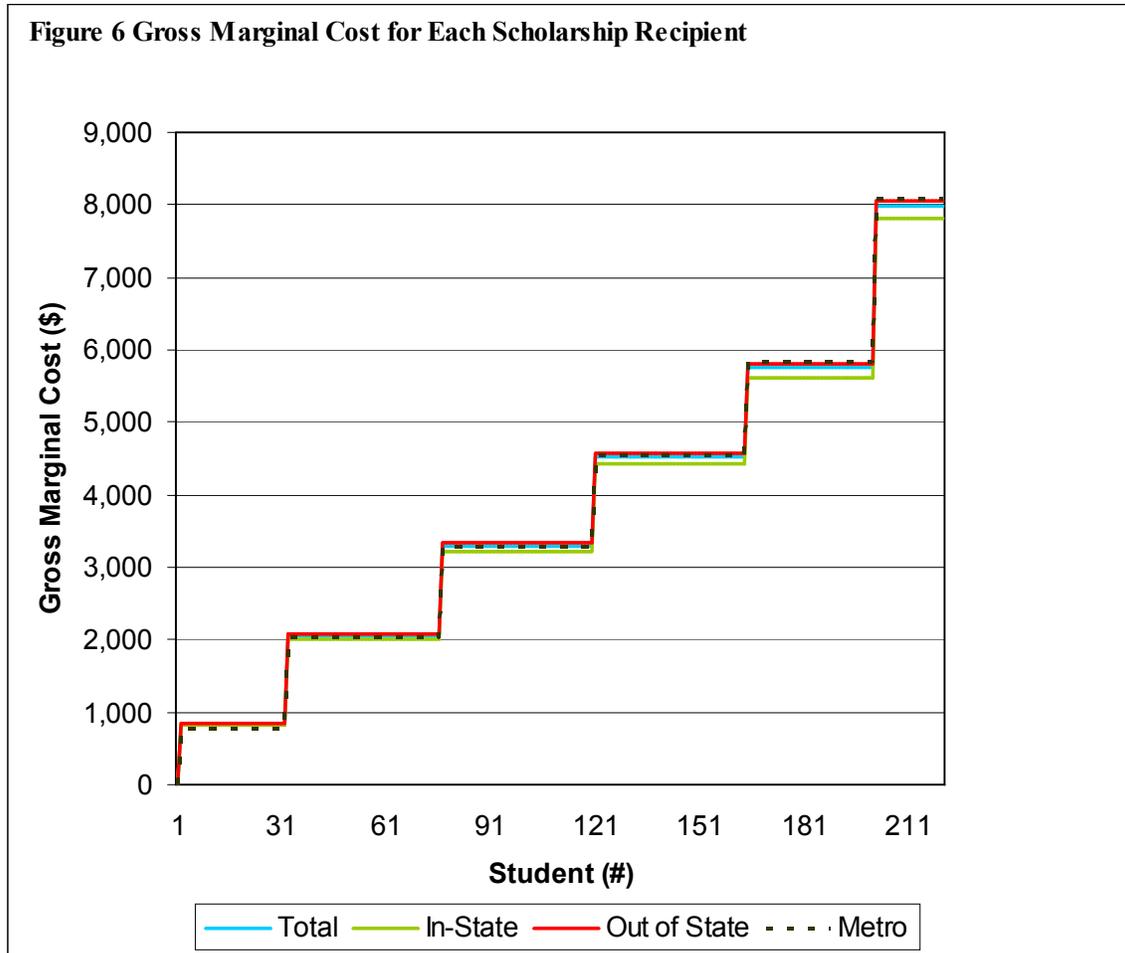
As mentioned before, average student per faculty was 22 (See table 2). However, a faculty member is needed for every additional 44 students since the same assumptions hold here too. Including the benefits, the annual cost of employing a faculty member was estimated to be \$53,760. Table 6 shows average additional cost of scholarship per student.

**Table 6 Estimation of Additional Cost of Scholarship per Student**

	Average Student (#)	Average Student Distribution Weight	Distribution of 44 Students	Average Base Cost per Student (\$)	Distribution of Additional Cost (\$)	Average Additional Cost per Student (\$)
Total	31	1	44	812	53,760	1,234
In-State	18	0.58	26	818	31,215	1,201
Out-of-State	5	0.16	7	854	8,671	1,239
Metro	8	0.26	11	774	13,874	1,261

Average additional (indirect) cost of scholarship per student is determined based on average student distribution. In other words, the cost of additional faculty is distributed among different student types based on the percentage value of each student type.

According to the estimations presented in Table 6, additional cost of scholarship per metro rate student constitutes the highest amount (\$1,261). While the cost per in-state student is the least (\$1,201), the cost per each out of state student is slightly higher (\$1,239). Combining the base (direct) and additional (indirect) costs of scholarship gives us the estimated gross marginal cost of scholarship per student type. Gross Marginal Cost curve for each student type is presented in Figure 6.



According to Figure 6, GMC per student type is increasing as more students receive scholarship. However after the 200<sup>th</sup> student, GMC is increasing sharply due to other additional costs mentioned before. Table 7 documents the actual numbers used to construct the GMC curve for each student type.

**Table 7 Gross Marginal Cost (GMC) per Student Type**

	Student (#)					
	0 to 31	32 to 75	76-119	120-163	164-200	> 200
GMC per Average Student (\$)	812	2,046	3,279	4,513	5,747	> 6,980
GMC per In-State Student (\$)	818	2,018	3,219	4,420	5,620	>6,820
GMC per Out of State Student (\$)	854	2,092	3,331	4,570	5,809	>7,047
GMC per Metro Rate Student (\$)	774	2,036	3,297	4,558	5,819	>7,080

It is clearly seen that the GMC (base) per metro rate student (\$774) is the lowest among all other student types. However, when more than 200 students receive scholarship, GMC per metro rate student becomes the highest one. This finding is almost the same as the one for athletic grant. The difference is that, up to 174 students, giving scholarship to an out of state student is the most expensive option. In the case of athletic grant, out of state option is the most expensive one only if up to 31 students receive athletic grant. GMC per in-state student is the lowest in both cases.

### **4.3 Athletic and Academic Tuition Waivers**

Tuition and housing waivers are two types of institutional awards at WLSC. While housing waivers are only used for room charges, tuition waivers reduce tuition and fees. There are three groups of waivers: academic tuition waivers, athletic tuition waivers and other waivers. Other waivers are classified as special waivers and mostly given to out of state students who don't have degrees they want to pursue available in any of their state colleges. Because of the nature of these waivers and because they constitute very insignificant amounts each year, only academic and athletic tuition waivers are considered in this study. There are also two types of housing waivers: academic and athletic.

The method used to estimate the gross marginal cost of athletic grants and scholarship are somewhat different than the method used to capture the costs of waivers. This is simply because there is no direct outlay of money in the case of waivers. The college is not spending any money from the operating budget. However, this doesn't mean that there are no indirect costs. The following section presents the outlines of data, assumptions and the method used to capture the gross marginal cost of tuition waivers.

Academic and athletic tuition waivers represent dollar amount of tuition and fees waived for students. In other words, each one is lost revenue to the college. Because this study aims to provide an economic analysis, not only accounting costs but also economic costs need to be included. Therefore, there are two different types of costs associated with waivers: indirect and economic costs. There are no direct costs since there is no outlay of money.

Indirect costs are the additional costs (of utilities, faculty member, staff etc) resulting from increasing number of tuition waiver recipients. Economic costs are foregone revenue to the college created by waiving tuition and fees for anticipated students. For example, if 100 students are granted academic tuition waivers for any academic year, would these students still be here if they didn't receive academic tuition waivers?

According to Scott Cook, approximately 70% of students receiving any type of waiver wouldn't choose West Liberty if they weren't offered waivers. Because survey data doesn't exist, "70%" is adopted as a starting assumption in this study. Therefore, economic cost represents the amount of tuition waived for 30 students not 100. Figure 7 shows the number of students receiving academic tuition waivers since 2002.

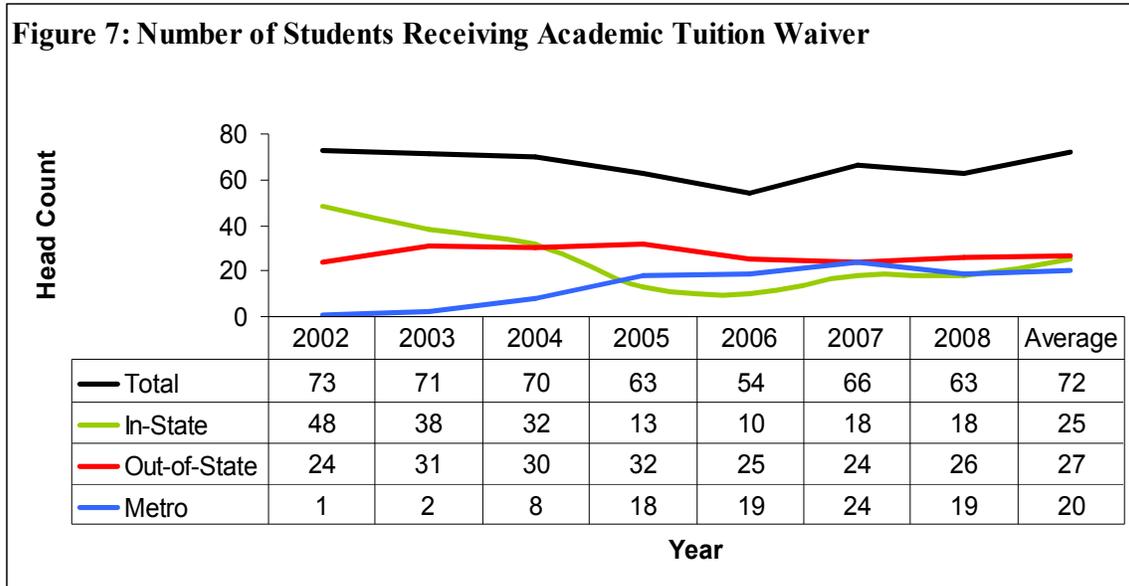
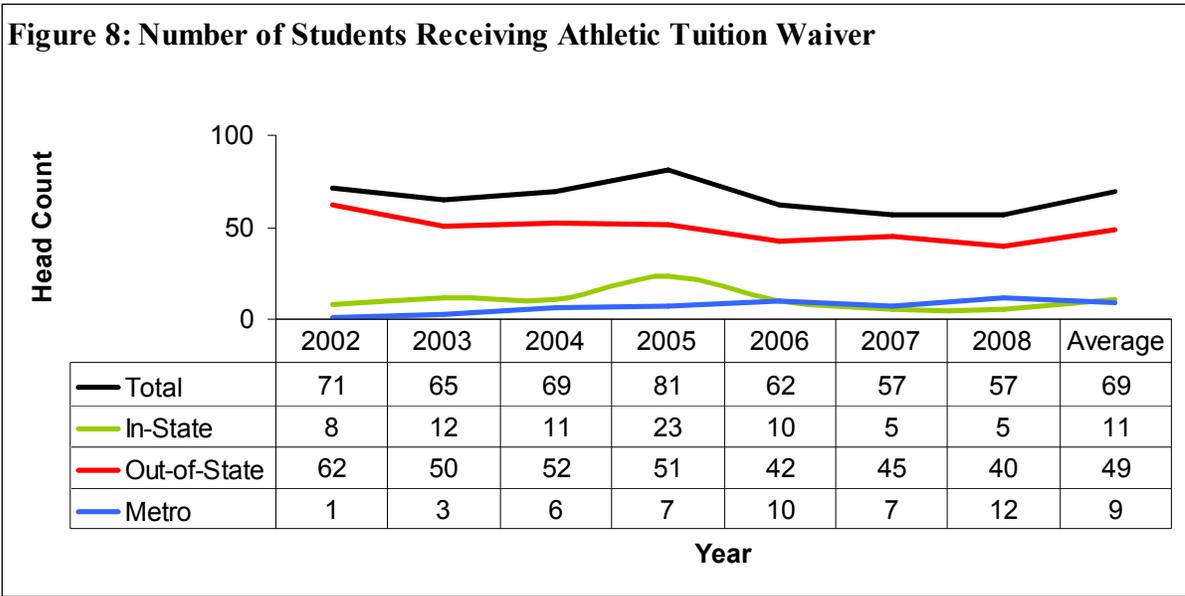


Figure 7 shows total and average number of students receiving academic tuition waivers since 2002. It should be noted that prior to 2006, there wasn't any metro rate tuition. However, there were still students enrolled at WLSC coming from metro counties. To be consistent throughout the study, metro rate students receiving academic tuition waiver before 2006 weren't included in the calculation of average numbers. According to Figure 7, in-state and out of state students constitute 35% and 37% of total recipients on average. The least number of students receiving academic tuition waiver on average are metro rate students (28%). Figure 8 shows the number of students receiving athletic tuition waivers since 2002.



In the case of academic tuition waiver, the number of in-state and out of state recipients is very close. However, as shown in Figure 8, while only 16% and 13% of total athletic tuition waiver recipients are in-state and out of state students respectively, the majority of total recipients (71%) are out of state students. These figures are very close to the ones for athletic grant.

As mentioned before, there are two main costs of tuition waiver: indirect costs and economic costs. Only the cost of additional faculty member is considered as an indirect cost if total number of recipients is less than 200. If it is more than 200, the cost per student is expected to increase significantly due to additional costs. It was previously assumed that 50% of total athletic grant and scholarship recipients also received tuition waivers. Therefore, it was reasonable to assume that a faculty member was needed for every 44 students to avoid double estimation.

It is now reasonable to add the faculty cost for every 22 students receiving waivers. Based on average ratio of each student type receiving athletic and academic

tuition waiver, the additional faculty cost is distributed to estimate the indirect cost per student type. Table 8 shows the indirect cost of giving academic tuition waiver.

**Table 8 Estimation of Indirect Cost of Academic Tuition Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Distribution of 22 Students	Distribution of Direct Cost (\$)	Average Indirect Cost per Student (\$)
Total	72	1	22	53,760	2,444
In-State	25	0.34	8	18,667	2,444
Out-of-State	27	0.38	8	20,160	2,444
Metro	20	0.28	6	14,933	2,444

The above figures show that for every additional 22 academic tuition waivers, in-state and out of state students each receive 8 and metro rate students receive 6 based on historical distribution. Because a new faculty member is needed for every additional 22 students, indirect cost per each student regardless of his origin is estimated to be \$2,444. Table 9 shows the same figures for athletic tuition waiver recipients.

**Table 9 Estimation of Indirect Cost of Athletic Tuition Waiver per Student Type**

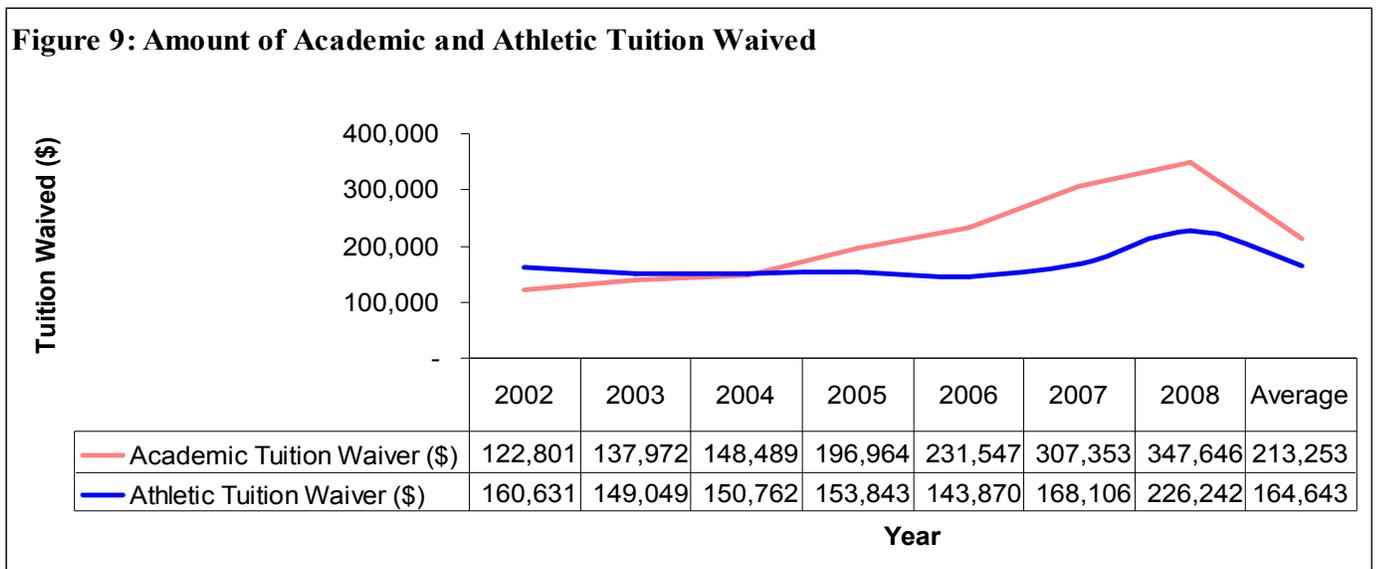
	Average Student (#)	Average Student Distribution Weight	Distribution of 22 Students	Distribution of Direct Cost (\$)	Average Indirect Cost per Student (\$)
Total	69	1	22	53,760	2,444
In-State	11	0.16	4	8,570	2,444
Out-of-State	49	0.71	16	38,177	2,444
Metro	9	0.13	3	7,012	2,444

As presented in Table 8 and 9, average direct cost of athletic and academic tuition waiver is \$2,444. This is not surprising considering that each student regardless the type of

tuition waiver or his origin needs the same faculty member for his/her education.

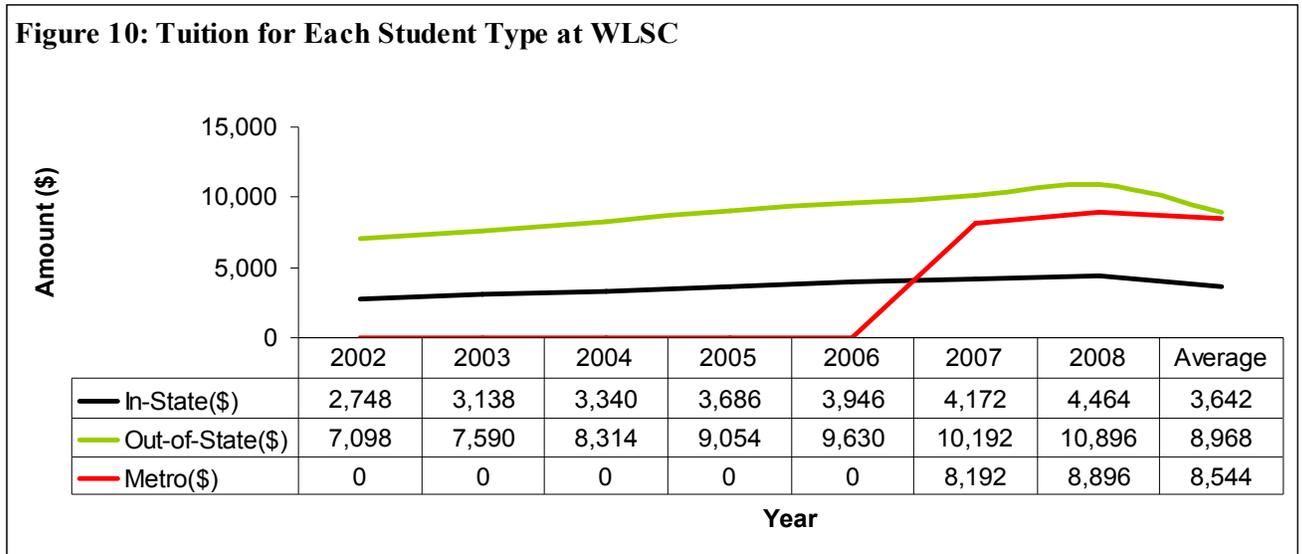
However, distribution of every 22 athletic tuition waivers is somewhat different. Based on historical data, while 16 out of state students receive athletic tuition waivers, only 4 and 3 in-state and metro rate students receive waivers respectively. After estimating the indirect cost per student type, the next step is to estimate the economic cost per student.

Figure 9 shows the total dollar amount of academic and athletic tuition waived since 2002.



According to Figure 9, total dollar amount of academic tuition waiver is 30% higher than the amount of athletic tuition waiver on average. However, both tuition waiver types have been experiencing an increase since 2003. To provide the most accurate analysis, the latest data (Fall 2008) is used in the estimation of economic costs. Knowing that economic costs are the amount of tuition waived for 30% of total student recipients, total economic cost can be distributed among different student types. However, because distribution of the total amount among different student types is unknown, a weighting

system is used based on tuition rate of each student type. Figure 10 shows the tuition rates for each student type since 2002.



As seen above, tuition for each student type has been continuously increasing since 2002.

It should be noted that metro rate tuition wasn't available prior to 2006/2007 academic year. Figure 10 clearly shows that during 2008-2009 academic year, in-state students paid almost 60% and 50% less tuition than what out of state students and metro rate students paid respectively. Table 10 shows how economic cost of academic tuition waiver per each student type is estimated.

**Table 10 Economic Cost of Academic Tuition Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Tuition (\$)	Tuition Distribution Weight	Final Weight	Tuition Waived (\$)	Total Economic Cost (\$)	Economic Cost per Student (\$)
Total	72	1		1	1	347,646	104,294	1,449
In-State	25	0.34	4,464	0.18	0.26	91,090	27,327	1,093
Out-of-State	27	0.38	10,896	0.45	0.41	144,135	43,241	1,602
Metro	20	0.28	8,896	0.37	0.32	112,421	33,726	1,686

Table 10 presents the economic cost of academic tuition waiver per each student type. A final weight for each student type is estimated by taking the average of both student and tuition distribution weights. For example, <sup>1</sup>26% of total amount of tuition waivers are awarded to in-state students each year, which was \$91,090 in 2008. However, total economic cost is only 30% of total tuition waived for in-state students (\$27,327) based on the assumption that 70% of waiver recipients wouldn't choose WLSC if they weren't offered tuition waivers. Therefore, the economic cost per in-state student is estimated to be <sup>2</sup>\$1,093. One interesting finding is that economic cost per metro rate student (\$1,686) is slightly higher than the economic cost per out of state student (\$1,602). Table 11 shows the economic cost of athletic tuition waiver per student type.

**Table 11 Economic Cost of Athletic Tuition Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Tuition (\$)	Tuition Distribution Weight	Final Weight	Tuition Waived (\$)	Total Economic Cost (\$)	Economic Cost per Student (\$)
Total	69	1		1	1	226,242	67,873	984
In-State	11	0.16	4,464	0.18	0.17	38,918	11,675	1,061
Out-of-State	49	0.71	10,896	0.45	0.58	131,131	39,339	803
Metro	9	0.13	8,896	0.37	0.25	56,193	16,858	1,873

Economic cost of athletic tuition waiver per student is estimated by applying the same method used for academic tuition waiver. The final weights are different due to the differences in average student distribution weights. According to Table 11, economic cost of athletic tuition waiver per metro rate student is more than double the cost of out of state student and 77% more than in-state student's cost. It is interesting to see that

<sup>1</sup>  $0.26 = (0.34 + 0.18) / 2$

<sup>2</sup>  $27,327 / 25 = 1,093$

economic cost of athletic tuition waiver (\$803) is significantly less than the economic cost of academic tuition waiver (\$1,602) for each out of state student.

Gross marginal cost of academic and athletic tuition waivers consist of indirect and economic costs. As shown in Table 8 and 9, indirect cost of academic and athletic tuition waiver per student type is \$2,444. However, economic costs of athletic and academic tuition waivers per each type of student are different (see Tables 10 and 11).

The following table combines these two types of costs to capture the gross marginal cost of academic tuition waiver per each student type.

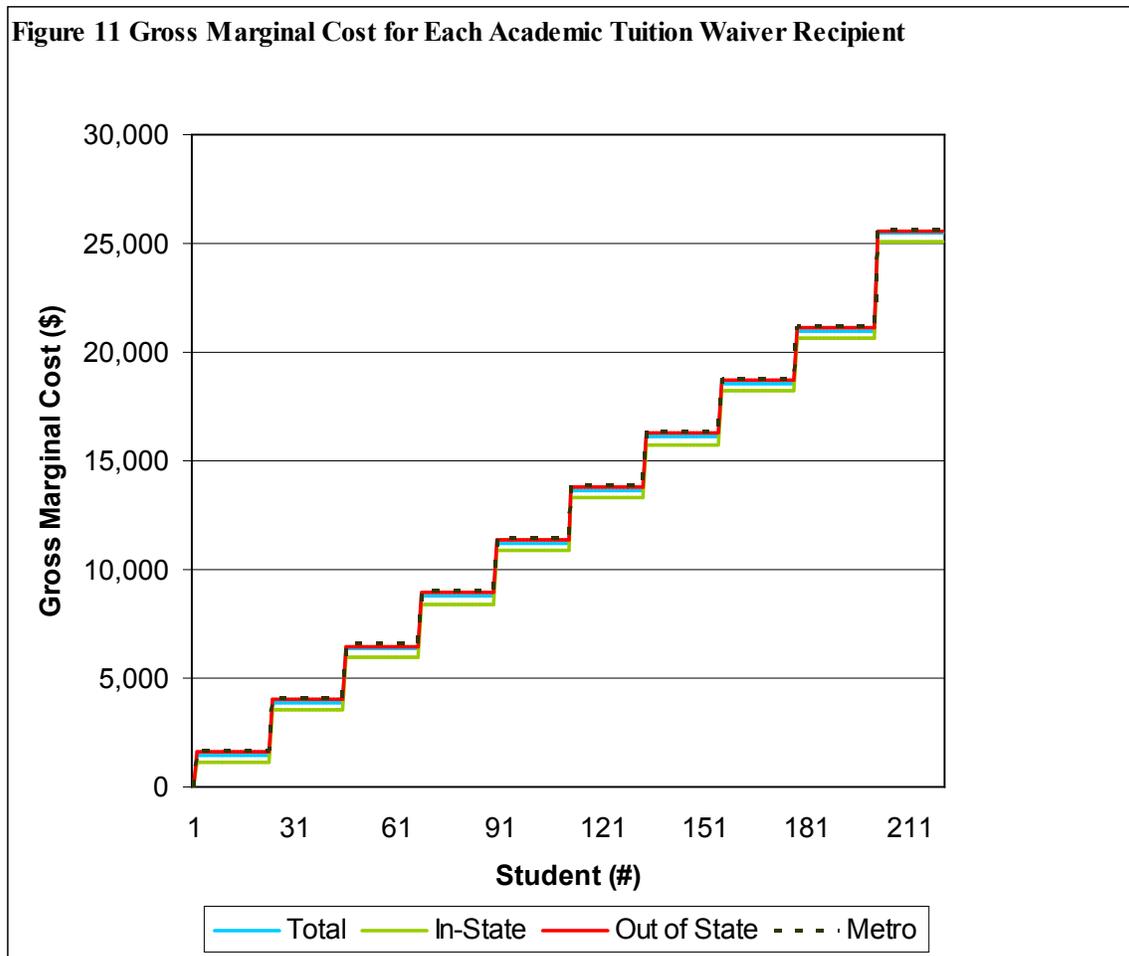
**Table 12 Gross Marginal Cost (GMC) of Academic Tuition Waiver per Student Type**

	Student (#)									
	0 to 22	23 to 44	45-66	67-88	89-110	111-132	133-154	155-176	177-200	> 200
GMC per Average Student (\$)	1,449	3,893	6,337	8,781	11,225	13,669	16,113	18,557	21,001	> 23,445
GMC per In-State Student (\$)	1,093	3,537	5,981	8,425	10,869	13,313	15,757	18,201	20,645	>23,089
GMC per Out of State Student (\$)	1,602	4,046	6,490	8,934	11,378	13,822	16,266	18,710	21,154	>23,598
GMC per Metro Rate Student (\$)	1,686	4,130	6,574	9,018	11,462	13,906	16,350	18,794	21,238	>23,682

As seen in Table 12, gross marginal cost of academic tuition waiver is steadily increasing as more students receive waivers. While the economic cost is constant at different student number, the cost of an additional faculty member (indirect) is added to economic cost for every new 22 students. It should be noted the above figures show the cost per student type for two terms (academic year).

Even though the order of cost (from the highest to the lowest) per each student type is the same at any student interval, differences between the cost of each student type

is steadily decreasing as more students receive academic tuition waivers. For example, when total number of students receiving waiver is less than 22, GMC per out of state student is 47% higher than GMC per in-state student. However, it is only 2.5% more when student number is between 177 and 200. When more than 200 students receive academic tuition waiver, GMC per each student type increases even more because of potential additional costs mentioned before. Figure 11 presents the GMC curve for each student type.



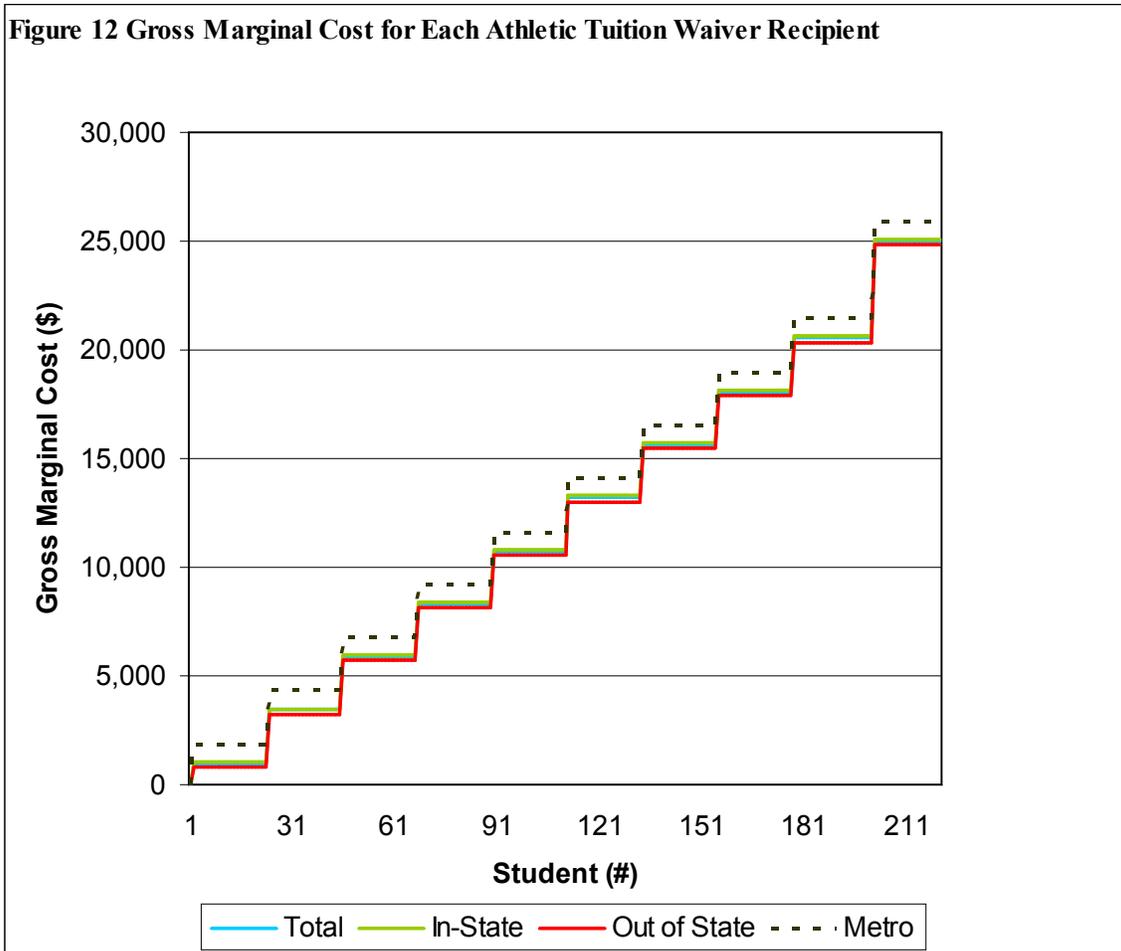
As mentioned previously, GMC per each student type is increasing at a constant rate until the student number is 200. After 200, GMC increases even at an increasing rate due to

additional costs that the college has to incur. Because giving academic tuition waivers to more than 200 students is not anticipated, these additional costs are not estimated in this study. Table 13 shows the GMC of athletic tuition waiver for each student type.

**Table 13 Gross Marginal Cost (GMC) of Athletic Tuition Waiver per Student Type**

	Student (#)									
	0 to 22	23 to 44	45-66	67-88	89-110	111-132	133-154	155-176	177-200	> 200
GMC per Average Student (\$)	984	3,428	5,872	8,316	10,760	13,204	15,648	18,092	20,536	> 22,980
GMC per In-State Student (\$)	1,061	3,505	5,949	8,393	10,837	13,281	15,725	18,169	20,613	>23,057
GMC per Out of State Student (\$)	803	3,247	5,691	8,135	10,579	13,023	15,467	17,911	20,355	>22,799
GMC per Metro Rate Student (\$)	1,873	4,317	6,761	9,205	11,649	14,093	16,537	18,981	21,425	>23,869

As seen in Table 13, gross marginal cost of academic tuition waiver is steadily increasing as more students receive waivers. Unlike the academic tuition waivers, at any given student number, GMC of athletic tuition waiver per out of state student is the lowest among all student types. Metro rate student has the highest GMC. It is clear that GMC of academic and athletic tuition waivers are not significantly different. As in the case of academic tuition waiver, difference between GMCs become less significant as more students receive athletic tuition waivers. Figure 12 summarizes the findings of Table 13 by presenting the GMC curve of athletic tuition waiver per each student type.

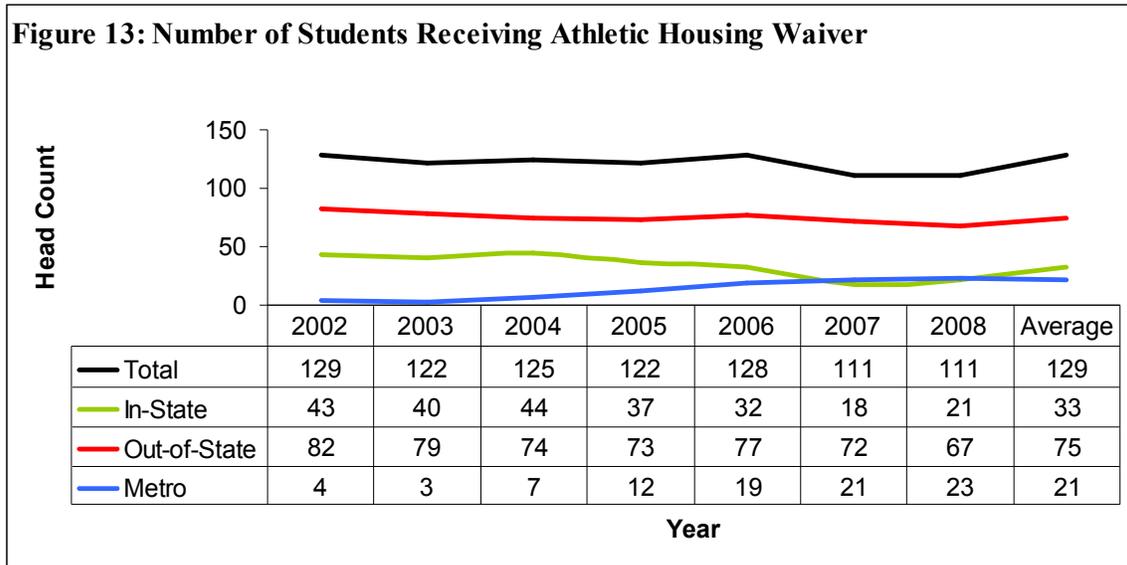


#### 4.4 Athletic and Academic Housing Waivers

Athletic and academic housing waivers are awarded to reduce room charges for students at WLSC. These waivers don't include board and capital fees. It was previously assumed that 70% of students receiving any type of waiver wouldn't choose West Liberty if they weren't offered waivers. This assumption also holds for housing waivers.

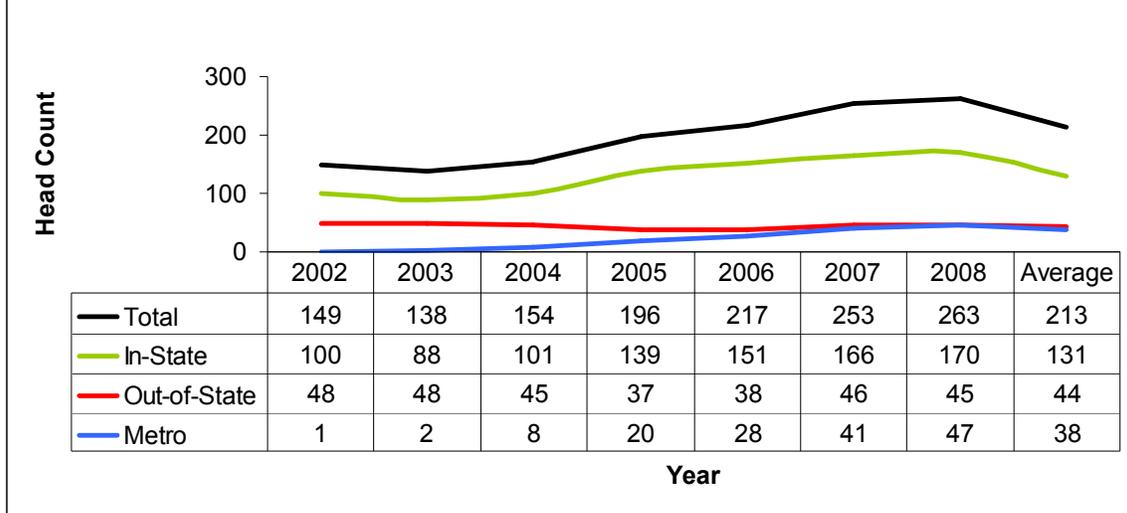
Gross marginal cost (GMC) of a housing waiver per student type consists of indirect and economic costs. However, it is critical not to double count these costs. Because the cost of additional faculty member was distributed among all students receiving tuition waiver, we should only consider the students that don't receive a tuition

waiver in the estimation of economic costs. Before the estimation process is explained, it is better to look at the historical data of housing waivers at WLSC. Figure 13 shows the number of students receiving athletic housing waivers since 2002.



According to Figure 13, on average, 58% of athletic tuition waivers are awarded to out of state students. Knowing that out of state students receive the majority of athletic tuition waivers, this finding was highly expected. While in-state students receive 26% of total, metro rate students are awarded the least amount, 16%. Figure 14 presents the same figures for academic tuition waivers.

**Figure 14: Number of Students Receiving Academic Housing Waiver**



The average number of students awarded academic housing waivers is significantly higher than average athletic housing waiver recipients. On average, 61% of total academic housing waiver recipients are in-state students as opposed to 26% in the case of athletic housing waivers. While out of state students account for 21% of total recipients, metro rate students do only for 18%.

The next step is to estimate the indirect cost of academic and athletic housing waivers. However, only the students who are not receiving tuition waivers must be and will be included in the estimation. The recent enrollment data at WLSC shows that approximately 61% of tuition waiver recipients also received housing waivers in 2008. Therefore, only 39% of housing waiver recipients should be considered in the estimation of economic costs. For each housing waiver type, a faculty member would be needed for every <sup>3</sup>56 students then. Table 14 presents the indirect cost of athletic housing waiver per student type.

<sup>3</sup> (1/0.39)\*22=56

**Table 14 Estimation of Indirect Cost of Athletic Housing Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Distribution of 56 Students	Distribution of Indirect Cost (\$)	Average Indirect Cost per Student (\$)
Total	129	1	56	53,760	960
In-State	33	0.26	14	13,753	960
Out-of-State	75	0.58	33	31,256	960
Metro	21	0.16	9	8,752	960

Table 14 shows that the average indirect cost of an athletic housing waiver is constant (\$960) for each student type. However, for every additional 56 students, \$960 will be added to each student's marginal cost. By using the same method, the average direct cost of an academic housing waiver was also estimated and is presented in Table 15.

**Table 15 Estimation of Indirect Cost of Academic Housing Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Distribution of 56 Students	Distribution of Indirect Cost (\$)	Average Indirect Cost per Student (\$)
Total	213	1	56	53,760	960
In-State	131	0.61	34	32,793	960
Out-of-State	44	0.21	12	11,290	960
Metro	38	0.18	10	9,677	960

As expected, even though the distribution of each student type is somewhat different, average indirect cost of academic tuition waiver (\$960) is the same as the one of athletic tuition waiver. The next step is to estimate the economic cost of each housing waiver type. The latest housing data was used to provide the most accurate analysis. Because

board and capital fees are not included under each housing waiver program, only the room charges are included in the estimation of economic costs.

Each recipient is assumed to choose double occupancy for a conservative approach which costs \$2,800 per year. It should be noted that, in the Fall of 2008, \$260,340 and \$813,288 were waived under athletic and academic housing waiver programs respectively. Based on this information, economic cost of athletic housing waiver per student type was estimated and is presented in Table 16.

**Table 16 Economic Cost of Athletic Housing Waiver per Student type**

	Average Student (#)	Average Student Distribution Weight	Room Charge (\$)	Housing Distribution Weight	Final Weight	Housing Charge Waived (\$)	Total Economic Cost (\$)	Economic Cost per Student (\$)
Total	129	1		1	1	260,340	78,102	605
In-State	33	0.26	2,800	0.33	0.30	78,102	23,431	710
Out-of-State	75	0.58	2,800	0.33	0.46	119,756	35,927	479
Metro	21	0.16	2,800	0.33	0.24	62,482	18,744	893

The results presented in Table 16 are based on the assumption that 70% of housing waiver recipients wouldn't choose WLSC if they weren't offered housing waivers. Housing distribution weight is the same for each student type because of the same housing cost for each student regardless of his origin. However, final weight is not the same due to different distribution of athletic housing waivers among different student types. Housing waivers awarded in the Fall of 2008 were distributed among different students types based on their final weights.

While economic cost per average student was found to be \$605, it was the lowest for an out of state student (\$479). The cost per in-state student (\$710) was slightly lower,

while a metro rate student incurred the highest cost (\$893). Economic cost of academic tuition waiver per each student type was estimated using the same methods and assumptions mentioned above and is presented in Table 17.

**Table 17 Economic Cost of Academic Housing Waiver per Student Type**

	Average Student (#)	Average Student Distribution Weight	Room Charge (\$)	Housing Distribution Weight	Final Weight	Housing Charge Waived (\$)	Total Economic Cost (\$)	Economic Cost per Student (\$)
Total	213	1		1	1	813,288	243,986	1,145
In-State	131	0.61	2,800	0.33	0.47	383,601	115,080	878
Out-of-State	44	0.21	2,800	0.33	0.27	220,943	66,283	1,506
Metro	38	0.18	2,800	0.33	0.26	208,744	62,623	1,648

Table 17 shows that economic cost of academic housing waiver per in-state student is the lowest (\$878). However, economic cost per for out of state (\$1,506) and metro rate student (\$1,648) are significantly higher.

The historic data shows that average ratio of total number of athletic housing waiver recipients to academic housing waiver recipients in a given year is 1 to 1.65. The housing data at WLSC shows that 173 beds are available for use at 10 residence halls as of Fall 2008. If 173 available beds are distributed based on the historic average, then 128 and 45 additional beds would be available for students who receive academic and athletic housing waivers respectively.

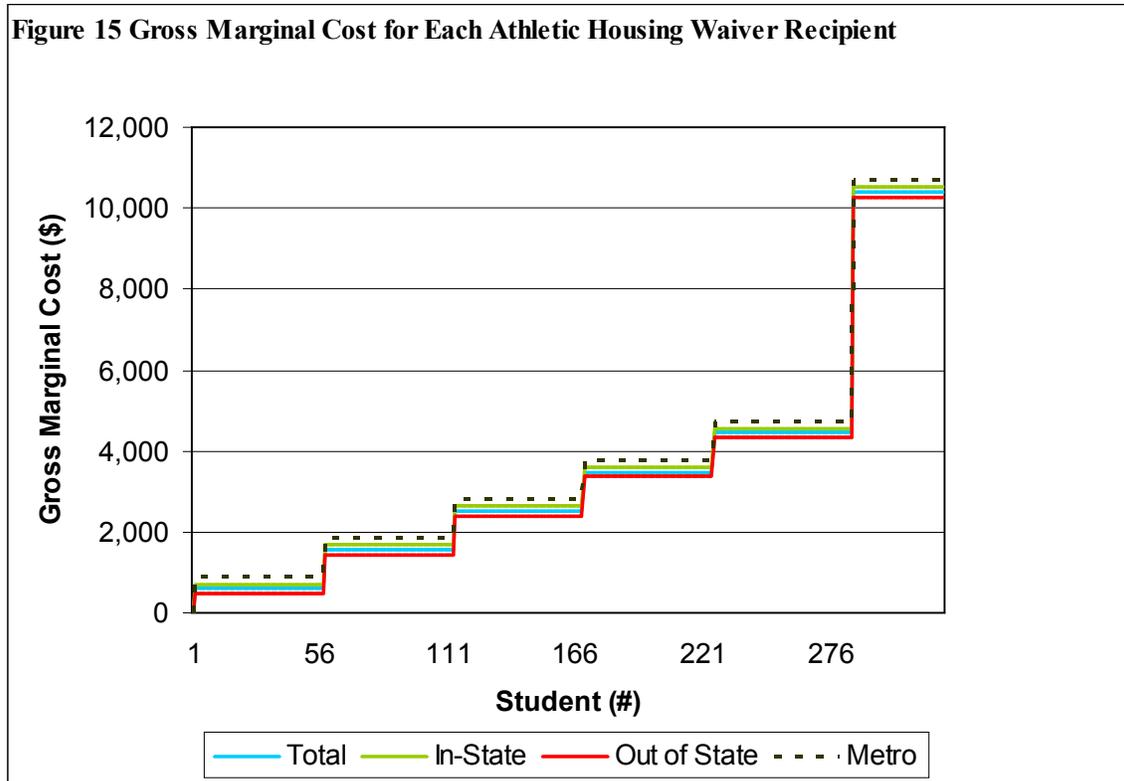
If a total of more than 173 housing waivers are awarded additionally, more capital and labor such as additional buildings, residence hall coordinators etc. would be needed. Therefore, the indirect cost per each recipient would increase significantly. However, the college also has the ability to increase one of the housing waiver types without changing

the other one. In that case, unlike the historic distribution, each housing waiver type may be increased by 173 without significant increase in cost. Different scenarios are discussed later in this report. Gross marginal cost of athletic tuition waiver per student type was estimated and the results are presented in Table 18.

**Table 18 Gross Marginal Cost (GMC) of Athletic Housing Waiver per Student Type**

	Student (#)					
	0 to 56	57 to 112	113-168	169-224	225-284	> 284
GMC per Average Student (\$)	605	1,565	2,525	3,485	4,445	> 5,405
GMC per In-State Student (\$)	710	1,670	2,630	3,590	4,550	>5,510
GMC per Out of State Student (\$)	479	1,439	2,399	3,359	4,319	>5,279
GMC per Metro Rate Student (\$)	893	1,853	2,813	3,773	4,733	>5,693

Table 18 shows that gross marginal cost per metro rate student is the highest at every student level. It also shows that gross marginal cost per out of state student is the lowest. If WLSC awards all additional available housing waivers to athletes, GMC per each student type wouldn't increase sharply until total number reaches 284. However, if the college allocates the waivers based on historic average (1 to 1.65), then the GMC would increase sharply after total number reaches 156. Figure 15 summarizes the findings in Table 18 by presenting a GMC curve for each student type.



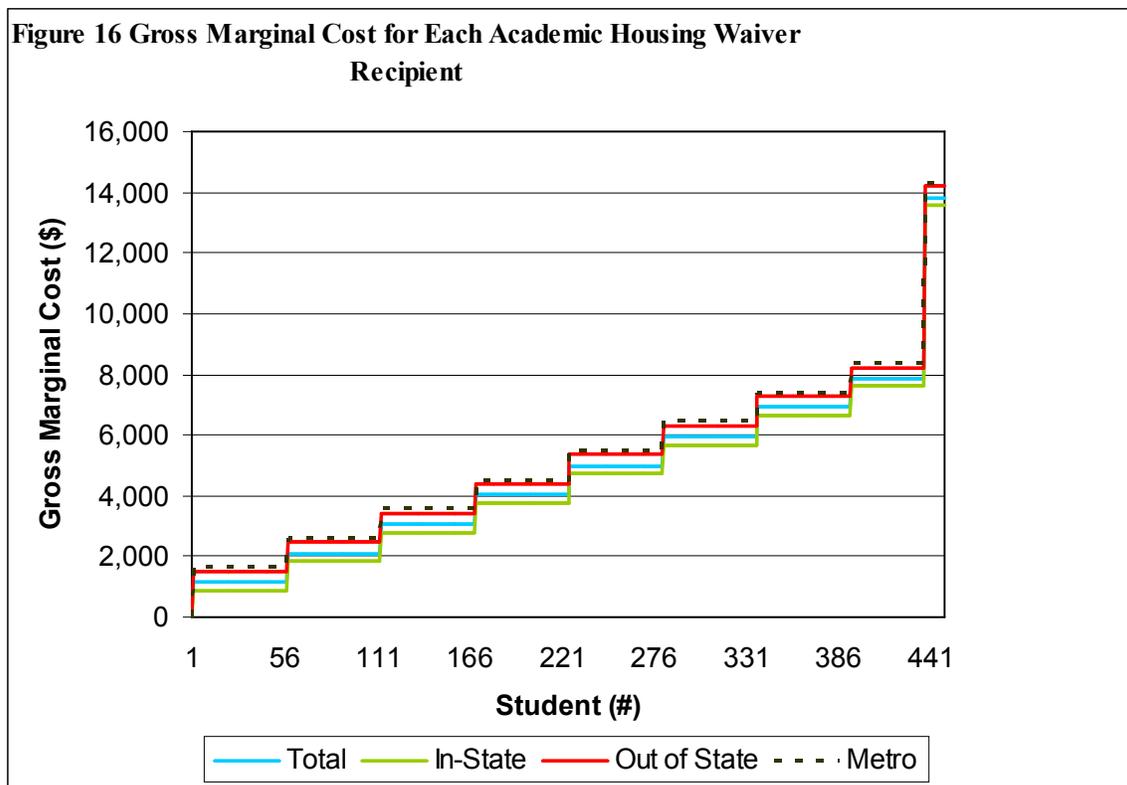
As clearly seen in the figure above, GMC for each student type increases sharply after student number reaches 284, assuming that all additional beds are distributed through athletic housing waivers. Table 19 shows the GMC of academic housing waiver per each student type.

**Table 19 Gross Marginal Cost (GMC) of Academic Housing Waiver per Student Type**

	Student (#)								
	0 to 56	57 to 112	113-168	169-224	225-280	281-336	337-392	393-436	> 436
GMC per Average Student (\$)	1,145	2,105	3,065	4,025	4,985	5,945	6,905	7,865	> 8,825
GMC per In-State Student (\$)	878	1,838	2,798	3,758	4,718	5,678	6,638	7,598	>8,558
GMC per Out of State Student (\$)	1,506	2,466	3,426	4,386	5,346	6,306	7,266	8,226	>9,186
GMC per Metro Rate Student (\$)	1,648	2,608	3,568	4,528	5,488	6,448	7,408	8,368	>9,328

Table 19 shows that the break-even point is 436 students. This is only possible when all additional available housing waivers are awarded through academic housing waivers.

Unlike the athletic housing waivers, GMC per in-state student is significantly lower than other student types' especially when total number of recipients is low. As more students are given academic housing waivers, the differences between GMC of athletic and academic housing waivers are getting smaller. Figure 16 presents the GMC curve of academic housing waiver for each student type.



It should be noted that GMC per each student type would increase significantly if more than 436 students are awarded. This is mainly due to capital costs of additional buildings.

### 5. Estimation of Implicit Values

Incorporation of implicit values is necessary to estimate net marginal cost (NMC) of each scholarship program. NMCs can be obtained by deducting implicit values from

gross marginal costs estimated in the previous section. The logic behind implicit values is the existence of indirect gains from each scholarship type. When a student receives only a housing waiver, the tuition he is expected to pay for four years is the part of implicit values the college would gain.

If WLSC gives athletic grants to athletes and the teams become successful, the advertisement benefits are also expected to be the part of implicit values. Because it is hard to quantify these potential advertisement benefits, a 1% increase in future enrollment would be a good assumption so that some part of resulting tuition revenues would reflect the advertisement benefits. In the case of academic scholarship or tuition waivers, there could still be advertisement benefits such as a successful graduate's advertisement efforts or participation in alumni, his/her achievements after graduation etc. However, because these benefits are expected to occur in the long-run and due to lack of accurate data, a potential 1% increase in enrollment isn't adopted in this study.

### **5.1 Athletic Grant and Scholarship**

Athletic grant can be used to pay any charge assessed to the student at WLSC. It was previously assumed that 50% of scholarship recipients didn't receive any type of waiver. Out of this 50%, it is reasonable to assume that 10% of recipients wouldn't choose WLSC if they weren't offered athletic grants. It should be noted this ratio is 70% for tuition and housing waiver programs because of the significance of waivers. The remainder student's yearly tuition and housing expenses would be the part of annual implicit values. According to the Business Office, approximately 60% of board payments made by residents accounted for revenues to the college. Some special course fees in

addition to tuition and capital fees for housing are also part of total implicit values. Table 20 summarizes the sources of implicit values considered in this study.

**Table 20 Sources of Implicit Values**

	Recent Values	Net Implicit Values (\$)
In-State Tuition (\$)	4,464	4,464
Out of State Tuition (\$)	10,896	10,896
Metro Rate Tuition (\$)	8,896	8,896
Room (\$)	2,800	2,800
Capital Fee (\$)	790	790
Board (\$)	2,692	1,615
Special Course Fee (\$)	150	150
Roads & Walkway Fee (\$)	70	70

The table above shows the sources of implicit values. It should be noted that all these figures are annualized (2 semesters) and based on recent (2008) data. Each tuition type presented above also includes capital fees each student is required to pay. Capital fee presented in Table 20 is the one that has to be paid by each resident at residence halls.

Net implicit value of board is 60% of total charges. Even though there are numerous special fees, only the ones assigned every semester are included in Table 20. The special course fee is the one charged for classes such as math, accounting, Spanish etc. Roads and walkway fees is also imposed every semester. Table 21 presents the implicit value of giving athletic grant to each student type.

**Table 21 Implicit Value of Athletic Grant per Student Type**

	Average Student (#)	Tuition (\$)	Room (\$)	Fee (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	41					28,403	676
In-State	12	2,774	1,740	628	1,004	6,145	494
Out-of-State	22	11,752	3,020	1,089	1,742	17,603	816
Metro	7	2,891	910	328	525	4,654	716

Tuition presented in Table 20 is the annual contribution of average number of recipients to total implicit values. For example, only 50% of total numbers of students are considered since other 50% are assumed to receive tuition waivers. Out of this 50%, only 10% was considered because this was the percentage of total students who wouldn't choose WLSC if they weren't offered athletic grant. This conservative approach is used to avoid overestimation of implicit values. All of these assumptions could be changed for sensitivity analysis purposes if needed.

Fee contribution includes the revenues obtained from capital fees, special course fees and roads and walkways fees. Implicit value per each student type was calculated by dividing total contribution by average number of recipients. While implicit value per each in-state student is the lowest (\$494), implicit value per out of state student is the highest (\$816). Implicit value per metro rate student (\$716) is slightly lower than that of out of state student.

These findings are not surprising since they are correlated with the rate of tuition each student type is required to pay. Table 22 presents the implicit value of scholarship per each student type. It should be noted that the same assumptions listed above also hold in the case of scholarship.

**Table 22 Implicit Value of Scholarship per Student Type**

	Average Student (#)	Tuition (\$)	Room (\$)	Fee (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	31					18,709	676
In-State	18	4,018	2,520	909	1,454	8,900	494
Out-of-State	5	2,724	700	253	404	4,080	816
Metro	8	3,558	1,120	404	646	5,728	716

Table 21 clearly shows that unless previously mentioned assumptions or tuition and fee rates change, implicit value of scholarship and athletic grant per student type is expected to be the same. These results also show that implicit value per each student type is independent of number of students awarded scholarship or athletic grant.

### **5.2 Athletic and Academic Tuition Waivers**

The implicit value of tuition waiver per student type is determined using the same methods mentioned before. Even though most of the previous assumptions hold in this section, some of them are slightly different. First, 100% of all academic and athletic tuition waiver recipients are considered for the analysis. By doing this, 50% of scholarship and athletic grant recipients are included in this part of the study.

Second, it is assumed that 70% of tuition waiver recipients wouldn't choose WLSC if they weren't offered tuition waiver. Another fundamental difference is the inclusion of tuition revenues. Because it is assumed that each student receives full tuition waiver, tuition revenues aren't part of implicit values. However, due to fees each student is required to pay, housing and board expenses contribute to implicit values. In the case of housing, because 60% of tuition waiver recipients receive housing waivers, only the capital fees and board expenses paid by these students are assumed to be the part of

implicit values. Table 23 presents the implicit value of athletic tuition waiver per each student type.

**Table 23 Implicit Value of Athletic Tuition Waiver per Student Type**

	Average Student (#)	Room (\$)	Capital Fee (\$)	Other Fees (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	69					111,187	1,611
In-State	11	8,624	2,433	1,694	4,974	17,725	1,611
Out-of-State	49	38,416	10,839	7,546	22,158	78,959	1,611
Metro	9	7,056	1,991	1,386	4,070	14,503	1,611

Table 23 shows that implicit value of athletic tuition waiver (1,611) is same for each student type. This is because tuition revenue is not a part of total implicit values. All other fees and expenses are the same for each student regardless his/her origin. Room charges, capital fees and board expenses reflect the annual implicit values generated from <sup>4</sup>28% of total recipients. Total number of students is reduced by 60% because only 40% of tuition waiver recipients are assumed not to receive housing waivers. Out of this 40%, only 70% are considered because the other 30% would have chosen WLSC even if they weren't offered any type of tuition waiver. However for other fees (roads and walkways and special course fees), 70% of total number of recipients are considered because these fees are not waived under housing waiver program. Table 24 presents the implicit value of academic tuition waiver per each student type.

<sup>4</sup>  $0.7 * 0.4 = 0.28$

**Table 24 Implicit Value of Academic Tuition Waiver per Student Type**

	Average Student (#)	Room (\$)	Capital Fee (\$)	Other Fees (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	72					116,021	1,611
In-State	25	19,600	5,530	3,850	11,305	40,285	1,611
Out-of-State	27	21,168	5,972	4,158	12,209	43,508	1,611
Metro	20	15,680	4,424	3,080	9,044	32,228	1,611

The implicit value of academic tuition waiver per student is estimated to be the same as that of athletic tuition waiver. This finding is expected since fees, room and board charges aren't changed. These results basically show that every dollar spent on tuition waiver has the same implicit value for each student type regardless of the type of tuition waiver.

### **5.3 Athletic and Academic Housing Waivers**

The estimation of implicit values of housing waivers is somewhat different because only the revenues generated from housing would exist. Because each student type is required to pay different tuition rates, implicit value of housing waiver per each student type is expected to differ. It was previously assumed that 60% of tuition waiver recipients also received housing waiver. By using this assumption, the average percentages of housing waiver recipients who also receive tuition waivers are estimated.

The results show, that on average, 20%, 39% and 26% of in-state, out of state and metro rate athletic housing waiver recipients also receive tuition waivers respectively. It is also assumed that 70% of housing waiver recipients wouldn't choose WLSC if they weren't offered tuition waivers. Based on these assumptions, implicit value of athletic housing waiver per student type was estimated and is presented in Table 25.

**Table 25 Implicit Value of Athletic Housing Waiver per Student Type**

	Average Student (#)	Tuition (\$)	Capital Fee (\$)	Other Fees (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	129					758,101	5,877
In-State	33	82,495	18,249	4,066	37,307	142,116	4,307
Out-of-State	75	347,800	41,475	7,022	84,788	481,085	6,414
Metro	21	97,144	11,613	2,402	23,741	134,900	6,424

Table 25 shows the implicit value of athletic housing waiver per each student type. It is important to note that for each student type, different percentage values are used to capture implicit values from tuition and other academic fees. For example, <sup>5</sup>56% of total in-state students are included in the calculations. It is because of the assumption that 70% of recipients wouldn't choose WLSC if they weren't offered housing waivers. It is also assumed that 80% (100%-20%) of current recipients don't receive tuition waivers. To estimate implicit values generated from capital fees and board, 70% of all recipients are considered.

The results show that while the implicit values per out of state (\$6,414) and metro rate student (\$6,424) are almost the same, the implicit value per in-state student is estimated to be the lowest (4,307). This is not surprising since tuition per in-state student is the lowest among all other student types. One other important finding is that the implicit values of housing waivers are significantly higher than implicit values of tuition waivers. Table 26 presents the implicit value of academic housing waiver per student type. It should be noted that, on average, 11%, 37% and 32% of in-state, out of state and metro rate academic housing waiver recipients also receive tuition waivers respectively. All other previous assumptions hold here too.

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<sup>5</sup>  $0.7 * 0.8 = 0.56$

**Table 26 Implicit Value of Academic Housing Waiver per Student Type**

	Average Student (#)	Tuition (\$)	Capital Fee (\$)	Other Fees (\$)	Board (\$)	Total Contribution (\$)	Implicit Value per Student (\$)
Total	213					1,121,155	5,264
In-State	131	362,477	72,443	17,864	148,096	600,879	4,587
Out-of-State	44	212,036	24,332	4,281	49,742	290,391	6,600
Metro	38	161,907	21,014	4,004	42,959	229,884	6,050

According to Table 26, implicit values of academic housing waivers are \$4,587, \$6,600 and \$6,050 per in-state, out of state and metro rate students respectively. The results are not significantly different than the ones estimated for athletic housing waivers. Implicit value per out of state student is slightly larger than that of metro rate student.

## **6. Final Analysis and Recommendations**

### **6.1 Athletic Grant**

In the first section of this study, gross marginal cost of each scholarship program per student type was estimated. While gross marginal costs included direct and indirect costs in the case of athletic grants and scholarship, GMCs of tuition and housing waivers included indirect and economic costs.

The second part of this study dealt with estimation of implicit values of each scholarship program. Revenues generated from tuition, room charges, board, capital fees, special course fees and other fees were estimated using appropriate assumptions and real-life data.

In the last section of this study, net marginal cost (NMC) of each scholarship program per student type is estimated by deducting implicit values from gross marginal costs. These results along with the recommendations for WLSC administration are presented in this section so that financially beneficial yet academically sound decisions

could be made. Table 27 shows gross and net marginal costs of athletic grant per student type.

<b>Table 27 Net Marginal Cost of Athletic Grant per Student Type (\$)</b>								
	In-State		Out of State		Metro Rate		Average	
<i>Student (#)</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 41	2,173	1,678	2,816	2,000	2,769	2,053	2,611	1,935
42 to 85	3,394	2,900	4,038	3,222	4,081	3,365	3,863	3,187
86-129	4,616	4,122	5,260	4,444	5,392	4,676	5,115	4,439
130-173	5,838	5,344	6,482	5,666	6,703	5,987	6,366	5,690
174-200	7,060	6,565	7,704	6,888	8,014	7,298	7,618	6,942
> 200	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

NMC of athletic grant per student type, when total number of recipients is greater than 200, is specified as “not cost effective” because significant cost increases are expected. Table 27 clearly shows that once implicit values are incorporated, as more students are awarded athletic grants, differences between gross and net marginal costs in percentage values decrease. For example, if up to 41 students are awarded athletic grant, including implicit value decreases the cost of each athletic grant by 29% for each out of state student. However, if between 174 and 200 out of state students receive athletic grant, net cost per each student decreases only by 11%.

At any student level, it should be noted that incorporating implicit values decreases the net cost per out of state student the most. Another important finding is that as more students receive athletic grants, NMC increases at a decreasing rate. For example, instead of having between 0 and 41 out of state students, if there are between 42 and 85 out of state recipients, net marginal cost per each out of state student increases by

61%. However, if total number of recipients increases from any number between 130-173 to 174-200, then NMC per out of state student increases only by 22%.

In the Fall of 2008, a total of 47 students (12 in-state, 27 out of state, and 8 metro rate) received athletic grant. Based on the estimations presented above, the following recommendations could be made for a cost-effective distribution of athletic grants.

- If the number of athletic grant recipients is decreased by at least 6 students, the following cost reduction could be achieved:
  - 42% per each in-state student.
  - 39% per each out of state student.
  - 38% per each metro rate student.
  - 39% on average per student.
- Even if the total number of recipients is increased from 47 to 85, the NMC per each student type wouldn't change.
- If no reduction in the total number of recipients is made, total cost of athletic grants to WLSC could be reduced by:
  - Increasing the number of in-state recipients and decreasing the number of metro rate students (holding the number of out of state recipients constant at 27).
  - It should be noted that even if the total number of student recipients is increased by 38, cost per in-state student is 11% and 16% less than the cost per out of state and metro rate students respectively.

## 6.2 Scholarship

Net Marginal Cost (NMC) of scholarship per student type is estimated using the same assumptions and methods explained above. Table 28 presents the gross and net marginal costs of scholarship per each student type.

<i>Student (#)</i>	In-State		Out of State		Metro Rate		Average	
	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 31	818	323	854	38	774	58	812	136
32 to 75	2,018	1,524	2,092	1,276	2,036	1,320	2,046	1,370
76-119	3,219	2,725	3,331	2,515	3,297	2,581	3,279	2,603
120-163	4,420	3,925	4,570	3,754	4,558	3,842	4,513	3,837
164-200	5,620	5,126	5,809	4,992	5,819	5,103	5,747	5,071
> 200	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

As in the case of athletic grant, if total number of recipients is more than 200, net marginal cost of scholarship per student type would increase sharply due to additional costs. It is clear that at any student level, cost of giving athletic grant is significantly higher than the cost of giving a scholarship for any student type. After implicit values are incorporated, cost per out of state and metro rate student decreases by 96% and 92% respectively while the rate of decrease is only 60% for each in-state student.

It is interesting to see that total cost of giving scholarships to out of state and metro rate student is less than \$100. However, if between 32 and 75 students receive scholarships, NMC per in-state, out of state and metro rate student increases by 371%, 3290% and 2161% respectively. Despite these sharp increases, scholarship still stays

more cost effective than athletic grant. Another important finding is that the net cost of scholarship is the least for an out of state recipient.

The latest data shows that a total of 38 students (24 in-state, 8 out of state, and 6 metro rate) received scholarship at WLSC. The following recommendations could be made based on our estimations.

- If the number of scholarship recipients is decreased by at least 7 students, the following cost reduction could be achieved:
  - 79% per each in-state student.
  - 97% per each out of state student.
  - 96% per each metro rate student.
  - 90% on average per student.
- Even if the total number of recipients is increased from 38 to 75, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:
  - Increasing the number of out of state recipients and/or metro rate students while decreasing the number of in-state students.
  - It should be noted that even if the total number of student recipients is increased by 37, cost per out of state student is 16% and 3% less than the cost per in-state and metro rate student respectively.

### 6.3 Academic Tuition Waiver

Net Marginal Cost of academic tuition waiver is estimated for every 22 additional recipients. Table 29 summarizes the gross and marginal costs of academic tuition waiver per each student type.

<i>Student (#)</i>	In-State		Out of State		Metro Rate		Average	
	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 22	1,093	(518)	1,602	(9)	1,686	75	1,449	(162)
23 to 44	3,537	1,926	4,046	2,435	4,130	2,519	3,893	2,282
45-66	5,981	4,370	6,490	4,879	6,574	4,963	6,337	4,726
67-88	8,425	6,814	8,934	7,323	9,018	7,407	8,781	7,170
89-110	10,869	9,258	11,378	9,767	11,462	9,851	11,225	9,614
111-132	13,313	11,702	13,822	12,211	13,906	12,295	13,669	12,058
133-154	15,757	14,146	16,266	14,655	16,350	14,739	16,113	14,502
155-176	18,201	16,590	18,710	17,099	18,794	17,183	18,557	16,946
177-200	20,645	19,034	21,154	19,543	21,238	19,627	21,001	19,390
> 200	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

Table 29 presents gross and net marginal costs of academic tuition waiver per student type. Because implicit values are incorporated, NMC per in-state and out of state student (when total number is between 0 and 22) is negative. It means that the college makes money per in-state and out of state recipient as long as less than or equal to 22 students are awarded academic tuition waivers.

If between 23 and 44 students receive tuition waivers, net marginal cost per student type increases significantly. However, as more students receive tuition waivers, net cost per student type increases at a decreasing rate. For example, if total number of

recipients is increased from 40 to 60, the average net marginal cost would go up by 107%. On the other hand, if total number is increased from 60 to 80, the average net marginal cost would only increase by 52%.

In the Fall of 2008, a total of 63 students (18 in-state, 26 out of state, and 19 metro rate) received athletic grant. Based on the estimated net costs presented above, the following recommendations could be made for a cost-effective distribution of academic tuition waivers.

- Current net marginal cost per in-state, out of state and metro rate students are \$4,370, \$4,879, and \$4,963 respectively. Accounting for implicit values decreases gross marginal cost per each student type by 25% on average. If total number of recipients is decreased by 19, the following reductions in NMC would occur:
  - 59% per each in-state student.
  - 50% per each out of state student.
  - 49% per each metro rate student.
  - 52% on average per student.
- Even if the total number of recipients is increased from 63 to 66, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:
  - Increasing the number of in-state recipients while decreasing the number of out of state or more preferably metro rate students.

- It should be noted that even if the total number of student recipients is increased by 3, cost per in-state student is 10% and 12% less than the cost per out of state and metro rate student respectively.
- If the total number of recipients is increased by at least 3 and at most 25 students, awarding athletic grant more to in-state and less to out of state and metro rate students would make the allocation more cost effective.

#### 6.4 Athletic Tuition Waiver

Table 30 presents gross and net marginal costs of athletic tuition waiver per each student type.

	In-State		Out of State		Metro Rate		Average	
<i>Student (#)</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 22	1,061	(550)	803	(808)	1,873	262	984	(627)
23 to 44	3,505	1,894	3,247	1,636	4,317	2,706	3,428	1,817
45-66	5,949	4,338	5,691	4,080	6,761	5,150	5,872	4,261
67-88	8,393	6,782	8,135	6,524	9,205	7,594	8,316	6,705
89-110	10,837	9,226	10,579	8,968	11,649	10,038	10,760	9,149
111-132	13,281	11,670	13,023	11,412	14,093	12,482	13,204	11,593
133-154	15,725	14,114	15,467	13,856	16,537	14,926	15,648	14,037
155-176	18,169	16,558	17,911	16,300	18,981	17,370	18,092	16,481
177-200	20,613	19,002	20,355	18,744	21,425	19,814	20,536	18,925
> 200	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

Table 30 presents gross and net marginal costs of athletic tuition waiver per student type. As in the case of academic tuition waiver, as long as total number of recipients is less than 22, NMC per in-state and out of state student is both negative. However, Table 30

clearly shows that net return from each out of state student (\$808) is larger than the return from an in-state student (\$550). As the number of recipients increases, net cost per each student type increases at a decreasing rate. This is the common finding of all scholarship types analyzed so far.

The latest data shows that a total of 57 students (5 in-state, 40 out of state, and 12 metro rate) received athletic tuition waivers at WLSC. The following recommendations could be made based on the results presented in Table 30.

- Current net marginal cost per in-state, out of state and metro rate students are \$4,338, \$4,080, and \$5,150 respectively. Accounting for implicit values has a decreasing effect on gross marginal cost per each student type by 27% on average. If total number of recipients is decreased by 13, the following reductions in NMC would occur:
  - 56% per each in-state student.
  - 60% per each out of state student.
  - 47% per each metro rate student.
  - 57% on average per student.
- Even if the total number of recipients is increased from 57 to 66, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total cost to WLSC could be reduced by:
  - Increasing the number of out of state recipients while decreasing the number of in-state or more preferably metro rate students.

- It should be noted that even if the total number of student recipients is increased by 9, cost per out of state student is 6% and 21% less the cost per in-state and metro rate student respectively.
- If the total number of recipients is increased by at least 9 and at most 31 students, awarding athletic tuition waiver more to out of state and less to in-state and metro rate students would make the allocation more cost effective.

### 6.5 Academic Housing Waiver

Net Marginal Cost of academic housing waiver per student type is estimated by deducting implicit values from gross marginal costs. Table 31 shows GMC and NMC of academic housing waiver per student type.

<b>Table 31 Net Marginal Cost of Academic Housing Waiver per Student Type (\$)</b>								
	In-State		Out of State		Metro Rate		Average	
<i>Student (#)</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 56	878	(3,709)	1,506	(5,094)	1,648	(4,402)	1,145	(4,119)
57 to 112	1,838	(2,749)	2,466	(4,134)	2,608	(3,442)	2,105	(3,159)
113-168	2,798	(1,789)	3,426	(3,174)	3,568	(2,482)	3,065	(2,199)
169-224	3,758	(829)	4,386	(2,214)	4,528	(1,522)	4,025	(1,239)
225-280	4,718	131	5,346	(1,254)	5,488	(562)	4,985	(279)
281-336	5,678	1,091	6,306	(294)	6,448	398	5,945	681
337-392	6,638	2,051	7,266	666	7,408	1,358	6,905	1,641
393-436	7,598	3,011	8,226	1,626	8,368	2,318	7,865	2,601
> 436	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

Table 31 shows gross and net marginal cost of academic housing waiver per student type. It is clear that as long as total number of recipients is less than 224, awarding academic housing waiver to each student type would generate revenue for the college. Net cost per

in-state student would be positive but highly insignificant (\$131) if between 225-280 students are awarded housing waivers annually.

Housing waiver per each out of state student would generate cost only if total number of recipients exceeds 336. This limit is 280 for each metro-rate student.

Awarding housing waivers wouldn't be cost effective due to additional costs if more than 436 students receive housing waivers in a given year. It should be noted that 436 is set based on the assumption that additional athletic housing waivers are not awarded by the college. Knowing that only 173 beds are available, if, for instance, 73 additional athletic housing waivers are awarded, the cost effectiveness limit would be decreased to 363 for academic housing waivers. If all 173 beds are awarded through athletic housing waiver program, then the limit would be 263.

In the Fall of 2008, a total of 263 students (170 in-state, 45 out of state, and 47 metro rate) received academic housing waivers. Based on the results of this study, the following recommendations could be made for a cost-effective distribution of academic housing waivers.

- Current net marginal cost per in-state student is \$131. However, awarding academic housing waiver generates revenue of \$1,254 per out of state and \$562 per metro rate student. If total number of recipients is decreased by 38, the following revenues would be generated:
  - \$829 per each in-state student.
  - \$2,214 per each out of state student.
  - \$1,522 per each metro rate student.
  - \$1,239 on average per student.

- Even if the total number of recipients is increased from 263 to 280, the NMC per each student type wouldn't change.
- If no reduction in the total number is made, total revenue to WLSC can be increased by:
  - Increasing the number of out of state and metro rate recipients while decreasing the number of in-state students.
  - Increasing the number of out of state recipients by up to 17, while holding the number of in-state and metro rate students constant.
- If the total number of recipients is increased by at least 17 and at most 73 students, awarding academic housing waivers to more out of state and less in-state and metro rate students would make the allocation more cost effective. It should be noted that awarding housing waiver to each out of state student would still generate revenue of \$294.

## **6.6 Athletic Housing Waiver**

NMC of athletic housing waiver is computed using the same methods mentioned previously. Table 32 shows the gross and net marginal costs of athletic housing waivers per each student type.

<b>Table 32 Net Marginal Cost of Athletic Housing Waiver per Student Type (\$)</b>								
	In-State		Out of State		Metro Rate		Average	
<i>Student (#)</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>	<i>GMC</i>	<i>NMC</i>
0 to 56	710	(3,597)	479	(5,935)	893	(5,531)	605	(5,272)
57 to 112	1,670	(2,637)	1,439	(4,975)	1,853	(4,571)	1,565	(4,312)
113-168	2,630	(1,677)	2,399	(4,015)	2,813	(3,611)	2,525	(3,352)
169-224	3,590	(717)	3,359	(3,055)	3,773	(2,651)	3,485	(2,392)
225-284	4,550	243	4,319	(2,095)	4,733	(1,691)	4,445	(1,432)
> 284	NCE	NCE	NCE	NCE	NCE	NCE	NCE	NCE

GMC=Gross Marginal Cost; NMC=Net Marginal Cost; NCE=Not Cost Effective

Table 32 presents the estimation of GMC and NMC of athletic housing waiver per each student type. It is obvious that athletic housing waiver per each student type generates revenue for the college as long as total number of recipients is less than 225. Only the cost per in-state student is positive (\$243) when between 225 and 284 students receive athletic housing waivers. Like in the case of academic housing waivers, the cost per out of state student is the lowest while the cost per in-state student is the highest. It should be noted that at any given student level, net cost of athletic housing waiver is less than the net cost of academic housing waiver for any student type.

Awarding athletic housing waivers aren't expected to be cost effective if more than 284 students receive waivers. It should be noted that 284 is set based on the assumption that additional academic housing waivers are not awarded. Knowing that only 173 beds are available, if 84 additional athletic housing waivers are awarded, the breakeven student number would be decreased to 200. If all 173 beds are awarded through academic housing waivers, then the limit would be 111.

The latest data shows that a total of 111 students (21 in-state, 67 out of state, and 23 metro rate) received athletic housing waivers at WLSC. The following recommendations could be made based on the results presented in Table 32.

- The results show that awarding athletic housing waiver to each student type currently generates revenue (\$2,637 per in-state, 4,975 per out of state, and \$4,571 per metro rate student). If the total number of recipients is decreased by 54, the revenues documented above would be increased to:
  - \$3,597 per each in-state student.
  - \$5,935 per each out of state student.
  - \$5,531 per each metro rate student.
- If the total number of recipients is increased by 2 students, the revenue per each student type would decrease but still be positive.
- If no reduction in the total number is made, total revenue to WLSC can be increased by:
  - Increasing the number of out of state and metro rate recipients while decreasing the number of in-state students.
- If the total number of recipients is increased by at least 2 and at most 57 students, awarding athletic housing waiver to more out of state and less in-state students would make the allocation more cost effective (still positive revenue though for each student type).
- Athletic housing waiver would generate cost only if more than 114 additional athletic housing waivers are awarded to in-state students. Even in that case, each out of state and metro rate student would still generate revenue.

## 6.7 Current Net Costs

Knowing that Fall 2008 data is the latest available data, current annual cost of each scholarship program per student type is summarized in Table 33.

**Table 33 Current Annual Net Cost of Each Scholarship Program per Student Type(\$)**

	In-State	Out of State	Metro Rate	Average
Athletic Grant	2,900	3,222	3,365	3,187
Scholarship	1,524	1,276	1,320	1,370
Academic Tuition Waiver	4,370	4,879	4,963	4,726
Athletic Tuition Waiver	4,338	4,080	5,150	4,261
Academic Housing Waiver	131	(1,254)	(562)	(279)
Athletic Housing Waiver	(2,637)	(4,975)	(4,571)	(4,312)

Table 33 clearly shows that WLSC should allocate 173 currently empty beds through housing waivers. While all other scholarship types impose costs to West Liberty, housing waivers create revenue for the college. Even though, academic and athletic tuition waivers cost more than any other scholarship program, revenues obtained from housing waivers would help reduce these costs.

Current cost of each program per student type was multiplied with total number of students receiving each scholarship type to have some idea about total annual cost of having all of these programs. After incorporating the implicit values, the annual cost of having all these programs is found to be only \$195,510. This is mainly due to cost lowering characteristic of housing waivers.