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An Exercise on Creating a Student Expenditure Basket[1]

The creation of a student expenditure basket as a student-led project engages students in interactive learning and provides an estimate of the cost of living for college students. This exercise is easily adaptable for uses within or outside the classroom setting and can be applied across all class sizes. The results from student surveys show that educational expenditures amount to 66.5 percent of the college student's basket compared to 3 percent of the typical consumer's basket, and housing expenditures represent not more than 12 percent of the student's basket, but makes up 40 percent of the typical consumer's basket. Scholarships and grants reduce the average student's educational expenditures to 52 percent. A spreadsheet that can be adopted by other instructors to replicate this exercise is presented. This exercise develops students' higher-order thinking skills, and provides faculty with a non-lecture teaching technique.

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1. Introduction

The Consumer Price Index (CPI) constructed by the Bureau of Labor Statistics (BLS) provides an estimate of the cost of living for the average consumer and might not be applicable to students since students' basket compositions are very different from the average market basket used to calculate the CPI. Students spend a larger-than-average share of their budget on education expenditures and might experience a different rate of inflation when the costs of education increase more rapidly than the costs of other goods and services in our economy. Furthermore, students are expected to spend a smaller amount of their budget on housing expenditures because most students live in a room in on-campus housing or live in shared housing off of campus.

Recent literature in economics education has emphasized the need to include more interactive learning in undergraduate economics programs. Salemi and Siegfried (1999) propose that undergraduate economic education be restructured to allow students to achieve all five of Hansen's (1986, 2001) proficiencies. According to them, "they should learn how to (i) gain access to existing knowledge; (ii) display command of existing knowledge; (iii) draw out existing knowledge; (iv) utilize existing knowledge to explore issues; and (v) create new knowledge" (p. 356).

Constructing a student expenditure basket is one method through which students can attain the Hansen proficiencies. This exercise would allow students to (i) model research methods listed on the BLS and Federal Reserve Bank of St. Louis websites; (ii) construct a similar expenditure basket and instruct new club members or classmates on the topic; (iii) reinforce the students' understanding of the weaknesses of price indexes; (iv) employ knowledge to answer questions about the costs of higher education and address the problems involved in the construction of the CPI; and (v) create new data and publications for future students and other interested persons. Furthermore, the procedures outlined in this paper also allow faculty to learn a non-lecture teaching technique, which was identified by Salemi and Siegfried (1999) as one of the techniques that need to be employed to guide students towards achieving the Hansen proficiencies.

The active learning exercise outlined in this paper shifts the focus away from the traditional chalk-and-talk student-to-teacher transmission of information to what economics students can "do" with their learning (Hansen 2001). Active learning exercises increase student motivation, retention, and depth of understanding (Christoffersen, 2002) and also help "students think like economists by providing structured opportunities where they apply economic ideas to answer questions and solve problems" (Salemi et al., 2001, p. 440). Furthermore, this exercise on creating a student expenditure basket reinforces the concept of the cost of living while developing students' higher order thinking skills through analysis, synthesis, and evaluation (McGoldrick, Battle, and Gallagher, 2000). Small group exercises, such as the one outlined in this paper, help students gain confidence in their abilities, allow them to voice their ideas and listen to the opinions of other students, and empower them to support their ideas with evidence (Meyers and Jones, 1993).

This paper starts by outlining the methods used, and then proceeds to present the results of, a student expenditure survey. The results of this survey are then used to construct a market basket for the typical student at the Darla Moore School of Business (DMSB) in the University of South Carolina (USC). The survey responses are analyzed by decomposing the sample into different demographic groups by sex, year of enrollment, in-state versus out-of-state students, and Greek versus non-Greek students. The paper concludes by presenting the learning outcomes of this project and presents a spreadsheet that can be adopted by other instructors to

replicate this exercise.

2. Procedures

Motivated by discussions on the weaknesses of commonly used macroeconomic variables, the Gamecock Economics Society (GES), the undergraduate economics society at USC, decided to investigate the differences between the expenditures of the typical American consumer and expenditures of the typical student at USC. This project is in-line with the main mission of the club to get members involved in research and equip them with the tools to prepare them for further education in economics or research in the public or private sector. While the project outlined in this paper was conducted through an undergraduate Economics club, professors can adopt similar teaching models and conduct student expenditure surveys as part of their classes using the attached Excel spreadsheet. This student exercise will be particularly useful to illustrate the shortcomings of the Consumer Price Index (CPI) and to estimate student expenditures.

The student basket presented in this paper contains one of the most complete sets of information from student expenditure surveys in different spending categories currently available. While various websites provide information on the cost of attending college, their calculations are normally based only on undergraduate tuition, room, and board. The College Board provides a Net Price Calculator (2015) for students to help incoming freshmen estimate the sticker costs of attending college. Several differences exist between the Net Price Calculator and the project proposed in this paper. The Net Price Calculator is an estimation of the cost of attending college provided by administrators for full-time incoming freshmen students. The student expenditure basket proposed in this paper is a student-led exercise to estimate the cost of attending college for all students currently enrolled in college based on self-reported data from student surveys.

The student expenditure basket is constructed using survey responses from undergraduate students at USC, and is modeled after the basket used to calculate the CPI by the BLS. The CPI is the most widely used price index to measure inflation in the U.S. economy and is based on the typical consumer's basket of goods. The information for the basket used to construct the current CPI was collected from Consumer Expenditure Surveys for 2011 and 2012 after surveying 7,000 families on their spending habits (Bureau of Labor Statistics, 2015)[1]. Data on more than 200 categories of consumption expenditures were collected and divided into the following eight major groups: Food and Beverages, Housing, Apparel, Transportation, Medical Care, Recreation, Education, Communication, and Other Goods and Services. After determining the basket of the average consumer, the BLS calculates the cost of the basket using market prices for the CPI. The CPI is updated on a monthly basis. Changes in the CPI are used to measure inflation. In addition to the regular CPI, the BLS also calculates the CPI-U for All Urban Consumers and the CPI-W, for Urban Wage Earners and Clerical Workers. Recently, the BLS has started to calculate the CPI for the elderly population on an experimental basis.

The spending categories in the student basket were created by a group of undergraduate economics students to conform to the classifications used in the construction of the CPI's basket, while being representative of the spending patterns of the typical student. Based on these categories, questions for a survey were created to discern the spending patterns of students at USC. Another difference between the baskets used to calculate the CPI and the student expenditure basket presented in this paper deals with the type of data collected from survey respon

1 The BLS also uses information from the census every 10 years to select a new geographic sample.

dents and the method of collection. The BLS collects data on the quantities purchased based on diaries kept by 7,000 families on everything they purchase over a certain period of time, whereas the student expenditure survey collects data on total dollar spending by students in different categories through an online survey to construct the basket.

The initial survey questions were constructed by members of the GES. Before constructing the survey questions, members familiarized themselves with the details of how the basket used to construct the CPI is calculated by researching the Bureau of Labor Statistics' website and various Macroeconomics textbooks (Mankiw, 2015; Hubbard and O'Brien, 2013). This step of the project is an essential part of piquing the interest of students and helping them master the topic as they apply economic theory to a real life situation. The questions were then uploaded to an online survey tool (Qualtrics) along with a welcome message.[2] A sub-set of members of the GES who were not involved in the creation of the questions completed a trial survey and shared their input with the survey design team in February 2015. The final survey consisted of 44 questions in eight different categories as listed in Appendix A. Data were collected through an online survey that was made available to students enrolled at the DMSB from February 18th, 2015 to April 29th, 2015.

Before distributing the final survey to the undergraduate students at the DMSB, the GES researchers distributed a draft survey containing all relevant questions on expenditures to ten members of the club who were not involved in the survey design. These members completed the surveys on laptops during a meeting. General feedback from the members noted that the survey's instructions were not difficult to understand or follow, and completing the survey did not require a lot of time. All ten members of the society completed the survey between eight and 15 minutes. They then reflected on how to make the questions more accurate, and how the survey could be altered to shorten the length and increase completion rates. As a result, the survey was modified to be better adapted to the members of the university. Most of the feedback was on the question types that the respondents preferred – free response question types where respondents can precisely provide information on expenditures or check boxes containing ranges of values. Feedback was mixed as some of the test respondents preferred to give precise answers where they knew exactly how much they spent in one category, while others preferred to be given a range when they did not know how much they spent on a regular basis. Ultimately the researchers decided to format the survey for precision and included mostly free response question types. The researchers also included more multiple choice and drop down answers to make it easier for respondents to answer the survey, thereby increasing completion rates.

The final survey was launched through an email message with the survey link sent to 400 students enrolled in the Principles of Macroeconomics course of the corresponding author of this paper. The corresponding author of this paper introduced the survey as part of her class lecture on the weaknesses of the CPI, and encouraged her students to complete the survey before sending them the email link. Following that, the same email message was sent to all students enrolled in the DMSB and the Economics Program at USC in order to achieve higher response rates. Below is the text of the email that was sent out to students:

> "The Economics Department at the University of South Carolina is conducting a brief survey of USC students to gather data on the college market place and spending habits to gain insights into the expenses and debt incurred by students. Your valuable input will be used to construct a Gamecock Student Basket that will approximate the cost of attending USC-Columbia. We kindly request your assistance

2 Universities and colleges without access to online software can use paper surveys or gather data through student interviews.

in completing the survey. The survey should take around 10 minutes of your time. The Anonymous Survey Link is: [insert link]. Individual responses are confidential. Only aggregate data and statistics will be reported. Thank you for your time."

This message was carefully crafted to motivate students to complete the survey and submit accurate answers. Based on the initial goal to achieve a total of 500 survey responses, the survey was closed after a total of 519 survey answers. Since 35 students opened the survey but did not answer a single question, the first round of filtering produced 484 responses. Further investigation revealed a clear pattern whereby most of the uncompleted surveys had unusually low survey completion times prompting the student researchers to remove all survey responses submitted within less than three minutes. Surveys that were completed within three to five minutes were manually and automatically filtered. It was found that virtually all the surveys completed within the three-to-five minute range were abandoned at the questions that introduce the sections on Education and Debt Financing. Since education expenditures are an important component of this project, these answers could not be used and were dropped from the dataset. The only surveys within the three-to-five minute range that were fully complete were completed closer to the five-minute mark.

The second round of filtering out invalid data involved manually reviewing the answers submitted by the respondents. In this round, students who answered the main questions but failed to answer some important sub-sections were filtered out of the dataset. In order for the student researchers from the GES to be able to use the answers to calculate the basket, respondents needed to answer questions 12 through 33 fully, because these questions relate to all financial expenditures; a complete expenditure basket cannot be calculated for any respondent who did not provide information on questions 12 through 33. Therefore, responses without the sufficient information necessary were considered invalid when calculating the cost of a full basket of goods. The total number of respondents who fully answered questions 12 through 33, as well as the rest of the survey, was 180. These respondents filled out every question that they were prompted with. The survey software used did not make any errors with these respondents and the respondents provided legitimate, valid answers to every question, including those on demographics, and relatively trivial questions. These respondents are the dedicated survey respondents who attempted to provide the most accurate answers.

The demographics of this dataset are mostly representative of the demographics of the typical student at the DMSB, with a few exceptions- the dedicated survey respondents reported higher GPAs, were more likely to be enrolled in an Honors Program, and were more likely to be female. The final dataset used consists of 65 percent female and 35 percent male respondents. This male-female ratio is not too different from the female-male ratio of the original students who attempted the survey but did not make it through all of the questions because there were 63 percent females and 37 percent males in the original dataset. However, it is not representative of the male-female enrollment ratio at the DMSB that tends to be skewed towards males. The racial composition of the dataset is primarily Caucasian with 80 percent of the survey respondents reporting as Caucasian/White, 6.67 percent as Asian, 5 percent as African American/Black, 4.45 percent as Hispanic/Latino, 0.56 percent Native American Indian, and 3.33 percent identifying themselves as "other." This racial composition, though skewed towards being Caucasian, is representative of the population enrolled at the DMSB at USC. With respect to enrollment status, 97.22 percent of those in our sample classify themselves as full-time college students. Only 11.67 percent of the sample are transfer students, and 64 percent of the sample live off campus with 36 percent living on campus. Of those living off campus, 6 percent reported living rent-free at a relative's house.

The average dedicated survey respondent in the sample of 180 used to construct the Stu-

dent Expenditure Basket reported in this paper is 19.96 years old with a mean G.P.A. of 3.65, enrolled in 15.42 credit hours, is more likely to be a Caucasian female attending college full-time, is less likely to be active in Greek Life, is less likely to be a transfer student, and is almost equally likely to be from out-of-state as she could be from in-state. The comprehensive basket calculated in this paper consists of the following eight broad categories, with each category decomposed into sub-categories: Education, Housing, Food, Medical, Transportation, Recreation, Communication and Other Expenses. The average student's basket derived from surveying a sample of students at USC amounted to $19,398 per semester with educational expenditures of $12,908. Differences in the composition of the basket for different demographic groups are investigated. Scholarships and grants help students offset the cost of attending college by reducing the average student's educational expenditures to 52 percent of the basket.

3. The Student Expenditure Basket

The basket presented in this paper was constructed using 180 self-reported student survey responses in the following categories: Education, Housing, Food, Medical, Transportation, Recreation, Communication, and Other Expenses. The data used to create the basket were compiled by students in the GES as a student-led project.

Education expenses include student expenses on tuition, student fees, textbooks, e-text and online resources, as well as miscellaneous spending such as spending on school supplies. Housing expenses include spending for on-campus and off-campus housing as well as utilities. If a student reports living on-campus, the GES researchers calculated with precision the expenses incurred on housing using information on the cost of living in each dorm. Spending on meal plans, outside of meal plans, groceries and eating out at restaurants and bars are included in the food category. Respondents on a meal plan were prompted to state which meal plan they were on, enabling the student researchers to calculate with precision the cost of the meal plan. For medical expenses, respondents were asked to include spending on all medical expenditures such as doctor's visits, psychotherapy, prescription drugs, and over-the-counter medicine. The transportation category includes vehicle maintenance, auto insurance, gas, cab fare and bus fare.[3] Respondents were prompted to include expenditures on phone bills, Linked-In subscriptions, and VPN subscriptions in the communications category.[4] The recreational category includes spending on Netflix, television, toys, games, pets and pet products, sports equipment, admission tickets; the "other" category includes expenses such as those on clothing, jewelry, shoes and accessories, and online shopping.

Figure 1 shows the composition of the basket for the average undergraduate student at USC who completed the survey in its entirety. Student spending on education by far represented the majority of the student's basket at 66.54 percent of all expenditures, with housing expenditures accounting for 12.33 percent, food: 12.21 percent, transportation: 4.85 percent, medical expenses: 1.52 percent, communication: 0.91 percent, recreation: 0.59 percent, and other expenses: 1.06 percent, respectively. Since most students live close to campus, it is not surprising to note that transportation expenditures is only the fifth largest category. The average survey respondent spent $12,907.50 on educational expenses, $2,391.96 on housing, $2,367.55 on food, and $941.15 on transportation. Average spending on all eight categories per semester amounted to $19,398.14.

3 None of the respondents in the sample reported making any major vehicle purchases during the survey period.

4 If the student reported not knowing his/her phone bill of if he/she reported that parents paid his/her phone bill, the student was prompted to guess his/her phone bill.

Figure 1 – Student Expenditure Basket

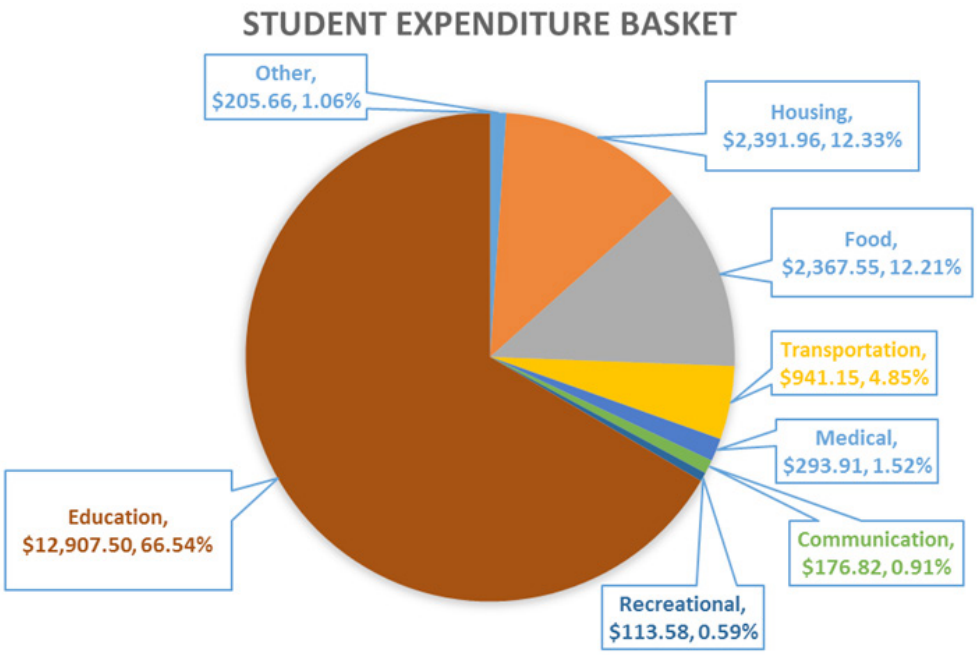


Table 1 decomposes the data of spending on education into subcategories. Tuition, by far, is the largest subcategory of educational expenditures incurred by students accounting for approximately 96 percent of all educational expenditures with an average expenditure of $12,414.20; textbooks, e-texts and online resources as well as miscellaneous educational expenditures rank second, third and fourth respectively. Students reported spending, on average, $275 on textbooks, $152 on e-texts and online resources, and $65 on miscellaneous school supplies per semester. In today's market where one paper textbook can cost more than $200, the possibility exists that students might be underreporting their expenditure on textbooks or are not purchasing many paper textbooks.

Table 1 – Student Basket: Education Category

Sub-Category	Average Cost per Student	Percentages
Tuition	$ 12,414.20	96.18
Textbooks	$ 275.36	2.13
E-Txt & Online Resources	$ 152.45	1.18
Miscellaneous School Supplies	$ 65.49	0.51
Education Category Cost	$ 12,907.50	100.00

Of the average food category expenditures of $2,367.55, it can be deduced from Table 2 that $ 716.23 was spent on meal plans, $508.49 outside the meal plan, $563.16 on groceries, and $579.68 eating out at restaurants and bars per semester.

Table 2 – Student Basket: Food Category

Sub-Category	Average Cost per Student	Percentages
Meal Plan	$ 716.23	30.25
Outside Meal Plan	$ 508.49	21.48
Groceries	$ 563.16	23.79
Restaurants & Bars	$ 579.68	24.48
Food Category Cost	$ 2,367.55	100.00

Table 3 indicates that 64 percent of students surveyed live off campus and 36 percent on campus. It is cheaper to live off campus than on campus; the average student who lives on campus spends $3,104.92 on housing a semester and average housing expenses off campus are approximately $1,988.99 per semester. When t-tests are run on the mean difference, this difference is significant at the one-percent level, indicating that it is significantly more expensive to live on campus than to live off campus.

Table 3: Student Basket: Housing Category

Sub-Category	Average Cost Per Student	Percentage
On-Campus	$ 3,104.92	36
Off-Campus	$ 1,988.99	64
Housing Category Cost	$ 2,391.96	100

4. Decomposition of the Student Basket

In order to gain a closer perspective on the spending habits of students, the basket is decomposed and analyzed for different demographic groups. Of particular interest are the differences between the baskets and the costs incurred by males and females, in-state and out-of-state students, Greek versus non-Greek students, and freshmen, sophomores, juniors and seniors. In order to investigate if statistically significant differences exist between the different demographic groups, two sample t-tests were conducted.

Decomposing the basket by gender exposes differences in spending habits by the females and males in the dataset as illustrated in Figure 2. While females spend a larger percentage on education than males, Table 4 shows that this difference in education expenditures of females and males are not statistically significant. Rather, it seems to stem from the different composition of the males and females in the dataset; 62 percent of males but only 38 percent of females

in the sample are in-state students, and in-state students pay lower tuition than out-of-state students. Table 4 also shows that females spend significantly less on housing and communication than males do.

Figure 2 – Student Expenditure Basket for Males and Females

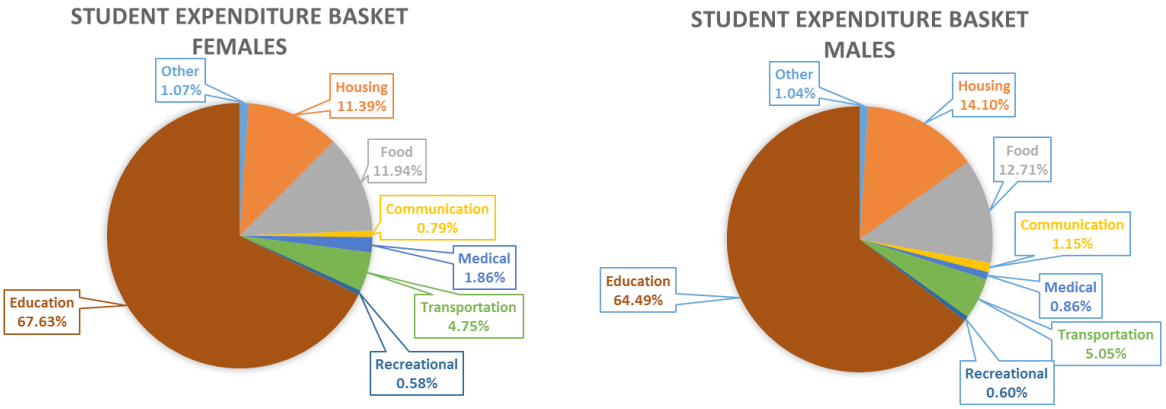


Table 4 – Student Expenditure Basket for Males and Females

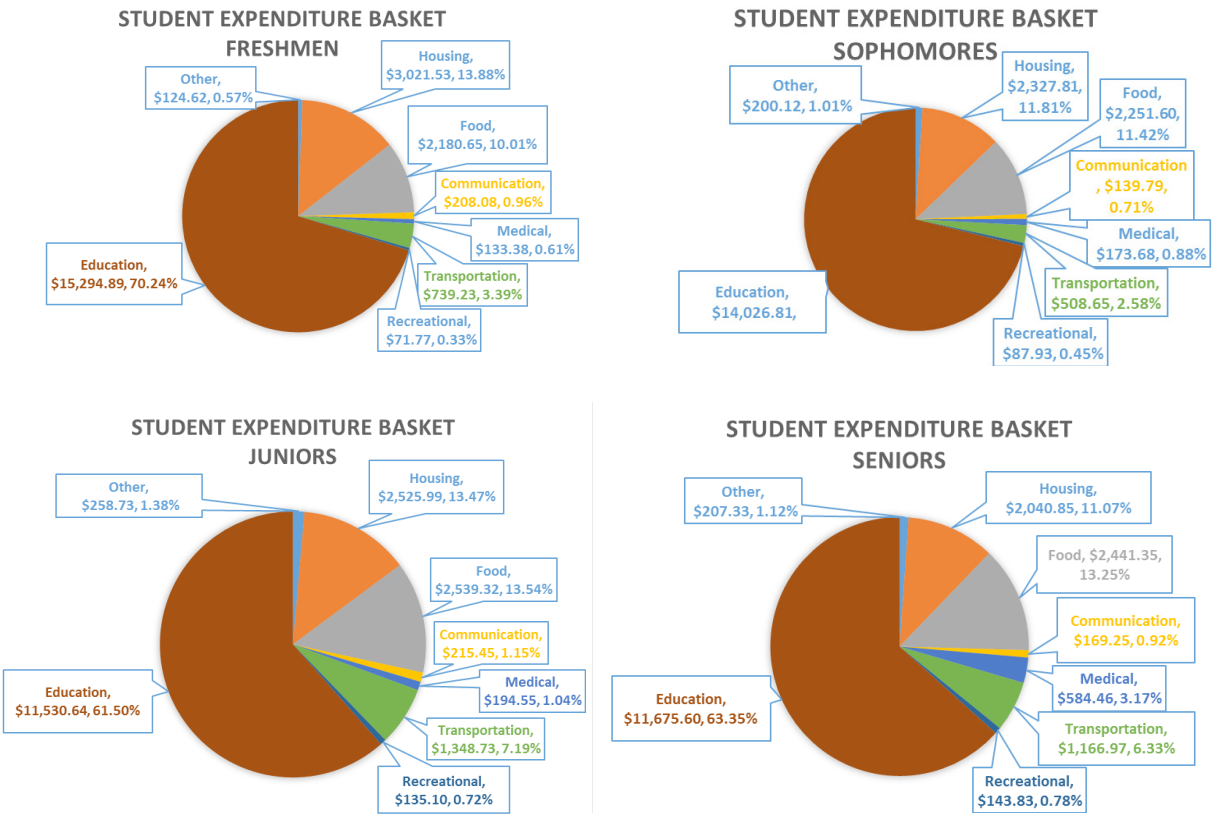
Category	Female	Male	Difference[a]
Education	$13,185.46	$12,391.29	$ 794.17
Housing	$ 2,221.07	$ 2,709.34	($488.27)***
Food	$ 2,327.21	$ 2,442.49	($ 115.28)
Transport	$ 925.71	$ 969.82	($ 44.11)
Communication	$ 153.32	$ 220.48	($ 67.16)**
Medical	$ 363.22	$ 165.21	$ 198.01
Recreational	$ 112.52	$ 115.56	($ 3.04)
Other Expenses	$ 209.19	$ 199.19	$ 10.00
Basket Cost	$ 19,497.70	$ 19,213.38	$ 284.32
Observations	117	63	

* p < 0.1, ** p < 0.05, *** p < 0.01

[a]Difference is found by subtracting the mean expenditure reported by male from the mean expenditure reported by females.

When the basket is decomposed based on a student's year of study at USC, Figure 3 shows that education expenditures represent a larger percentage of the basket for freshmen and sophomores, compared to the baskets of juniors and seniors. Table 5 shows that freshmen spend significantly more on education and housing than juniors and seniors do. Further investigation of the data shows that freshmen report spending more on both tuition and other expenditures such as textbooks. The possibility that more experienced students have learned how to navigate through the university system with lower expenses was brought up by the student researchers who mentioned how all of them purchased all their textbooks from the bookstore their freshman year but have learned to find cheaper alternatives over time. Since all freshmen at USC must live on campus for their first semester, these higher housing costs are driven by higher on-campus housing prices compared to the housing costs of seniors, who are more likely to be living off campus.[5] These findings are as expected because on-campus housing costs are larger than off-campus housing costs.

Figure 3 – Student Expenditure Basket by Year in College



5 A few exceptions are made for freshmen living at home.

Table 5 – Differences[a] in Student Expenditures by Enrollment Year

Category	Freshmen – Sophomores	Freshmen-Juniors	Freshmen-Seniors	Sophomores-Juniors	Sophomores-Seniors	Juniors-Seniors
Education	$1,268.09***	$3,764.26***	$3,619.29**	$2,496.17**	$2,351.20	($144.97)
Housing	$693.72***	$495.54***	$980.68***	($198.18)	$286.96	$485.14**
Food	($70.94)	($358.66)	($260.70)	($287.72)	($189.76)	$97.96
Transportation	$230.58	($609.50)	($427.74)	($840.07)**	($658.32)**	$181.76
Communication	$68.29	($7.38)	$38.83***	($75.67)**	($29.46)	$46.21
Medical	($40.30)	($61.16)	($451.08)	($20.86)	($410.78)	($389.92)
Recreational	($16.16)	($63.33)**	($72.06)***	($47.17)*	($55.90)**	($8.73)
Other Expenses	($75.50)**	($134.11)***	($82.72)**	($58.61)	($7.21)	$51.40
Difference in Basket Cost	$2,057.77	$3,025.66**	$3,344.51*	$967.89	$1,286.74	$318.85

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Observations: Freshmen = 26; Sophomores = 57; Juniors = 44; Seniors = 53.

[a]Difference is taken by subtracting the mean expenditure reported by students of different enrollment years as stated in the title of each column.

In-state and out-of-state students were almost equally represented in this sample with 46 percent of students reporting as in-state students and the rest as out-of-state students. Table 6 shows that educational spending is 58.4 percent of the in-state student's basket in contrast to 71.5 percent of the out-of-state student's basket, due to the cheaper in-state tuition rates. As illustrated in Table 6, in-state students spend $6,894.79 less on education compared to out-of-state students, and this difference is statistically significant at the one-percent level. This results in a highly significant difference of $6,737 in the total expenditure basket of in-state and out-of-state students, with out-of-state students incurring expenditures of $22,542 and in-state students incurring expenditures of $15,805.

Finally, an investigation of expenditure baskets for Greek and non-Greek students in Figure 5 show minor differences in the basket's composition with Greek students spending a larger amount on education than non-Greek students. When the dollar expenditures are investigated in Table 7, significant differences between the cost of the basket for Greek and non-Greek students emerge, with Greek students spending $5,481.78 more than non-Greek students. While Greek students spend more in all categories except for transportation (since most of them live

Figure 4 – Student Expenditure Basket for In-State and Out-of-State Students

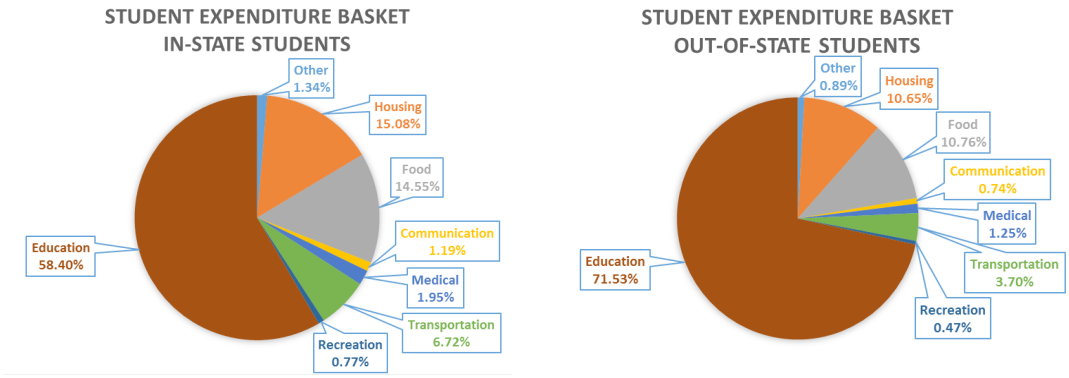


Table 6: Student Expenditure Basket For In-State And Out-Of State Students

Category	In-State	Out-of-State	Difference[a]
Education	$9,230.28	$16,125.07	($6,894.79)***
Housing	$2,383.09	$2,399.73	($16.64)
Food	$2,300.19	$2,426.50	($126.31)
Transportation	$1,062.69	$834.80	$227.89
Communication	$188.55	$166.56	$21.99
Medical	$307.48	$282.05	$25.43
Recreational	$121.10	$107.01	$14.09
Other Expenses	$211.48	$200.58	$10.90
Basket Cost	$15,804.86	$22,542.30	($6,737.44)***
Observations	84	96	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a]Difference is taken by subtracting the mean expenditure reported by out-of-state students from the mean expenditure reported by in-state students.

Note: The three international students in the dataset are included as out-of-state students.

in Greek housing), the significant differences seem to arise from larger spending on education, food and "other" expenses by Greek students.

Figure 5 – Student Expenditure Basket for Greek and Non-Greek Students

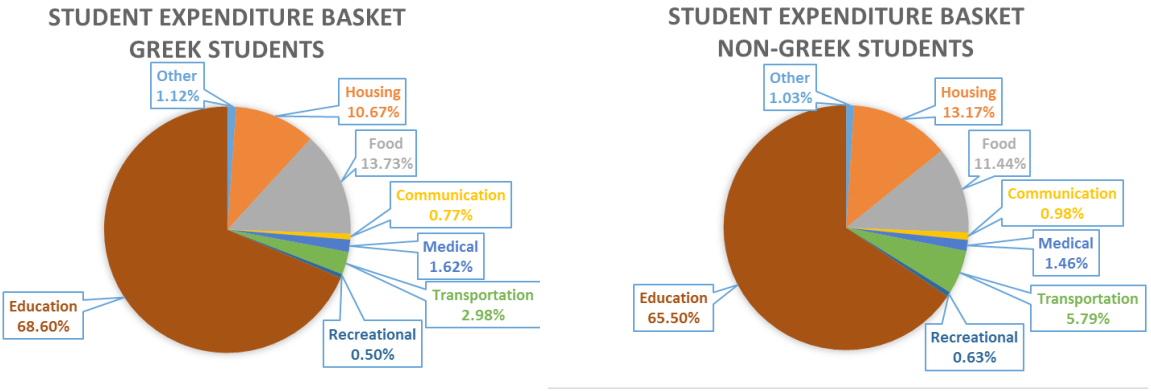


Table 7 – Student Expenditure Basket for Greek and Non-Greek Students

Category	Greek	Non-Greek	Difference[a]
Education	$16,023.30	$11,709.12	$4,314.18***
Housing	$2,491.20	$2,353.80	$137.40
Food	$3,207.84	$2,044.37	$1,163.47**
Transportation	$696.11	$1,035.39	($339.28)
Communication	$180.40	$175.45	$4.95
Medical	$379.20	$261.11	$118.09
Recreational	$116.76	$112.36	$4.40
Other Expenses	$262.40	$183.84	$78.56**
Basket Cost	$23,357.21	$17,875.43	$5,481.78***
Observations	50	130	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[a]Difference is taken by subtracting the mean expenditure reported by non-Greek students from the mean expenditure reported by Greek students.

5. Student Debt and Financing

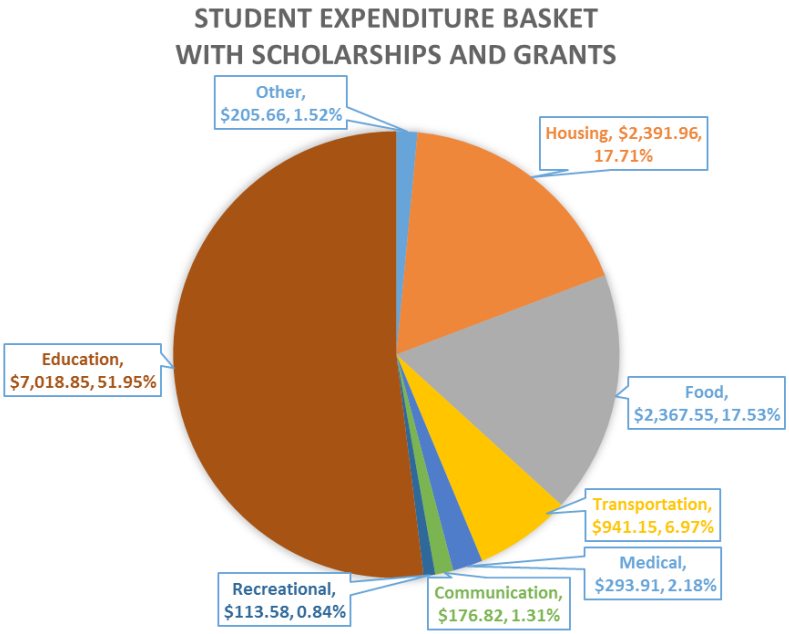
The Gamecock Student Basket calculated in the previous section showed that the self-reported cost of the average student's basket in our sample was $19,398 per semester, with average tuition expenses amounting to $12,908 per semester. This would translate to total spending of $96,990 for five years in college with spending of $64,540 on tuition for the average

student. These costs of attending college are substantial and are normally financed through scholarships, financial aid or debt. This section discusses how the undergraduate students involved in this project financed their education expenditures.

Of this sample, 55 percent expect to graduate with debt as a result of attending college; the average debt reported by students who expect to graduate with debt is $28,645.83. In fact, 46.11 percent of the sample currently have loans. Of those with loans, 30 percent are recipients of federal subsidized loans and 33.89 percent are recipients of federal unsubsidized loans; of the sample, 38 percent reported owning credit cards with average annual percentage rates (APRs) of 13.17 percent. When those on a special zero-percent APR offer for the first year are excluded, the average credit card interest rates reported is 14.9 percent, which is close to the national average of 15.07 percent (Dilworth, 2014). While only 2.78 percent of the sample reported having private loan debt (from banks or other sources), the average private debt incurred is large at $37,600 per student. A majority of students in the sample reported either working or looking for work: 2.4 percent reported working at a full-time job, 36.53 percent reported working at a part-time job, 31.74 percent reported being unemployed, 8.98 percent reported working at a paid internship, and 6.59 percent were working at an unpaid internship.

In addition to financing their college education through loans and work, a large percentage of the students included in this sample were recipients of scholarships, financial aid or grants to help them offset the cost of obtaining an education; 82 percent of survey respondents were recipients of scholarships, 88 percent received financial aid, and 18 percent received grant funding. The average scholarship received by a scholarship recipient per semester was $6,058 and the average grant was $4,250. Figure 6 shows how after applying grants or scholarships toward a student's basket, educational spending was reduced from 66.5 percent to 53 percent of the student's basket. However, even with scholarships and grants applied, students' educational expenditures continue to constitute the largest percentage of the student's basket.

Figure 6 – Student Expenditure Basket with Scholarships and Grants Applied



6. Learning Outcomes

The project presented in this paper was managed and designed entirely by students. Student-owned experiential learning activities such as this supports engagement and fosters deeper student learning (Bosley, 2015). Students not only gained knowledge about the process of constructing a student basket, but also developed a new appreciation for the complexity of macroeconomic indices and the resulting metrics computed using that data. In addition to fostering student learning, this project also utilized their problem solving and critical thinking skills.

Designing the survey questions and determining the sub-categories of spending required deep thinking on the part of the student researchers. The students were creative when they overcame one of the biggest barriers that they faced during the initial step of the project – they realized that they would not be able to construct the basket in a similar method as that used for the CPI due to the unawareness of most students on the quantities of goods and services that they regularly purchased. The student researchers used their resourcefulness to come up with an innovative method of calculating the basket through survey questions that inquired students' costs, rather than the quantities purchased. From this experience, they found that building a perfect model of the BLS's price index using an identical method would be far more detail-oriented than they had originally anticipated. This revelation deepened their understanding of the complexities involved in constructing "simple" macroeconomic indexes.

Through the process of survey design and data collection, students learned how the validity of the index they constructed was largely dependent on their data collection methods. The students quickly learned that the level of detail and specificity in designing data collection methods for producing valid results were extremely demanding. This increased awareness on how their processes were continually open for improvement led them to think critically about the common macroeconomic indexes used in the real world.

No matter how frustrated by their results or by the processes involved in obtaining and interpreting them, the students walked away with a better understanding of what it means to be an economist solving the seemingly simplest of economic questions: on what do people spend and how much? It was an eye-opening experience for many students when they estimated their cost of attending college. With increased awareness of the high educational expenditures they incur, the students involved in this project started to take their education more seriously. As rational individuals, this better understanding of the cost of attending college will have a long-term impact on the students' decision-making processes.

The main teaching opportunity of this exercise is to help students recognize the weakness of a commonly used macroeconomic indicator, the CPI. At the end of this exercise, students should understand that a change in the CPI by a certain percentage does not automatically imply that every individual in the economy will experience this exact same percentage change in his true cost of living due to differences in the basket compositions of individuals. After calculating the student basket, instructors should proceed to show how different basket compositions can result in different changes in the cost of living for individuals. Education only made up 3.1 percent of the CPI-U's basket and 2.4 percent of the CPI-W's basket in 2010 (BLS, 2015),[6] whereas the calculations in this paper show that education makes up 66.5 percent of the average USC student's spending. Spending on housing represented 41.5 percent of total spending for the average urban consumer in 2010, whereas student spending on housing represents only 12.3 percent of the average student's basket. This implies that if the price of education increases by $1,000, the average consumer would see a much smaller increase in her basket cost

6 The basket composition of the CPI can be found at http://www.bls.gov/cpi/cpiri2010.pdf

compared to the average student.

Other teaching topics that can be included throughout this exercise include "using the scientific method to think like an economist," "monopoly pricing," and "product differentiation." This exercise provides the perfect opportunity for instructors to illustrate the economic way of thinking using the scientific method by coming up with a hypothesis, collecting data, analyzing data, and testing the hypothesis. For example, the GES students hypothesized that Greek students would incur higher expenditures and included a question about Greek status in the survey. Then, they tested this hypothesis through the data that were collected and were able to verify that Greek students do indeed incur higher expenditures. After developing the basic student expenditure model, instructors can illustrate how economists test the validity of models. This can be done to verify the answers on tuition spending reported by the respondents by matching up the information provided by each respondent on the number of credits he is enrolled in with the official in-state and out-of-state tuition rates.

The higher price of university housing can be illustrated as an example of a monopoly with price-making power, because freshmen students who must live on campus pay a significantly higher amount on housing expenditures. The bookstore's high prices for new textbooks can also be used as an example of a monopoly; the increase in competition in the textbook market as a result of e-texts and online sites, such as Amazon which sell used textbooks, can be introduced in this discussion. The price difference as a result of product differentiation between on-campus and off-campus housing is another relevant topic that can be discussed. Other discussion topics include why certain demographic groups, such as females and students with higher GPAs, are more likely to complete the survey.

The construction of a student basket not only reinforced the concept of the index, but also fostered both lower and higher order thinking among students who completed this exercise. Lower order thinking skills are those that "involve accessing and making sense of *existing* knowledge" and higher-order thinking skills are those that provide "longer-lasting, more transferable knowledge" (Dubas and Toledo, 2016, p. 12).

7. Conclusion

The student-led exercise presented in this paper increased student learning and engagement. Students were asked to approximate the average expenditures incurred by themselves and their classmates while attending college given the eight different broad categories consistent with the categories in the CPI of education, housing, food, transportation, communication, medical expenses, recreational expenses and "other" expenditures. Students then had to determine the subcategories of expenditures to include. They decided to include expenditures on tuition, textbooks, e-texts and online resources as well as miscellaneous school supplies in the education category. The food category included spending by students on meal plans, groceries, and eating out at restaurants and bars. The housing category included expenditures by students living on campus and off campus. In the next step, students designed a survey to gather data on average expenditures after which they analyzed the overall sample and decomposed the sample for different demographic groups. The students involved in this project also decided to investigate information on student debt and financing after coming to the realization that these should factor into the true cost of attending college.

This paper presents a relatively simple method to engage undergraduate students in an applied research project. Before this project, most students were unaware of the large costs that they incurred, particularly on educational expenditures. As a result of this project, students'

awareness of their expenditures was increased, motivating them to take their education more seriously; during the process, a student exclaimed "I'm going to try not to fail any classes so I can get out of here faster and cheaper!"

Though this project presented some challenges, particularly in the question selection and survey completion process, the problems encountered by students allowed them to come up with creative and practical solutions that are pertinent to solving real-world problems. The challenges that students encountered can be used by instructors as a tool to improve this exercise. The biggest challenge was selecting and constructing the appropriate questions for the survey.[7] Once the questions had been selected, the wording of the questions had to be carefully crafted and the survey had to be tested before being finalized. However, the template of questions developed in this paper can now be easily adopted by other educational institutions that wish to conduct a similar exercise.

The second challenge dealt with overcoming the low survey completion rates. Making the survey shorter by eliminating non-essential questions might increase the response rate for future studies. Offering the survey as part of a course whereby students receive credit for full survey completion will also result in higher completion rates. Third, almost all survey respondents rounded up their answers. However, the goal of this study was not to construct a precise basket, but rather to engage students in a learning exercise. Fourth, many students were not fully aware of all of their expenses. Student awareness of their expenses can be increased by continuing to engage students in the calculation of a basket. A surprising finding is that female respondents were more likely to provide accurate answers on their tuition by reporting the correct number that appeared in their USC fee statement compared to the male respondents. The final challenge encountered dealt with the survey software that occasionally skipped questions when students were taking the survey resulting in some students not being prompted with all the questions in the survey. A paper-based survey or surveys through student-to-student interviews will eliminate this challenge.

Expenditure estimates through survey questions have other limitations as well. While this project doesn't differentiate between individual expenses and household expenditures, many expenditures incurred by the student could be household rather than individual expenses. For instance, the tuition expenditures of a student might be financed by loans taken by a parent; living expenses for the student might be paid by the parents. Furthermore one-time expenditures, such as a purchase of a vehicle, and expenditures that occur annually, such as insurance, might not be reported accurately by students on a monthly basis.[8] Finally, while students were instructed to enter all of their medical expenses, they were not directly prompted to enter their health insurance expenditures. Though differentiating between these expenses is not the focus of this study, it is important to realize that these issues could likely result in less accurate calculations.

While the costs of attending college are fairly standard among all students at USC, the opportunities to receive scholarships and grants are not. Many of the survey respondents in this paper were recipients of scholarships, grants or financial aid. These scholarships and grants

7 The treatment of fixed capital expenditure estimates is an issue that can be addressed by future studies. Capital expenditures, such as a car, could have been purchased outside the time period surveyed and used far beyond it. The same could be true for items such as clothing and furniture. Furthermore, capital expenditures are not depreciated over time in the calculations presented in this paper. How to include these expenditures in the calculation of an index could be an extension to the student exercise.

8 The self-reported student expenditures on transportation can be verified by including a question in the survey about where the off-campus student lives, then using the IRS mileage rates to calculate transportation costs.

help students offset the cost of attending college by reducing the average student's educational expenditures to 53 percent of the basket. The importance of grants, scholarships and financial aid in helping students offset the high cost of obtaining a college degree should not be understated. As a result of this project, students understood the importance of keeping their eligibility for scholarships and grants to offset their large cost of attending college.

This paper has shown that educational expenditures can consist of up to 66.5 percent of the college student's basket compared to only 3 percent of the typical consumer's basket used to calculate the CPI. Furthermore, calculations in this paper show that housing expenditures represent not more than 15 percent of the typical student's basket but makes up around 40 percent of the typical consumer's basket. This is likely because many students rent rather than own housing. Using changes in the CPI to calculate changes in the cost of living for college students can result in inaccurate estimations due to these differences in the basket compositions. These findings can be used as an additional opportunity for instructors to illustrate the weaknesses of official measures of economic indicators and the heterogeneity of consumption between different populations.

The pre-prepared Excel Spreadsheet (attached) will enable students to calculate their individual student baskets. After the calculation of the student expenditure basket, instructors can introduce a discussion on how common macroeconomic indicators are gauges of the overall economy and are not intended to be accurate measures of the experiences of specific individuals. At this point, the instructor could look up the current CPI and mention that just because the CPI shows a certain percentage increase, it doesn't necessarily translate to the student experiencing the exact same increase in his/her cost of living. The instructor can use the findings from the student expenditure surveys to point out differences in the basket compositions of the "typical" consumer and the "typical" student, and proceed to calculate the differential effects that a change in price can have on the cost of living. It would be particularly useful to show students the impact of an increase in educational expenditures, such as tuition rates or the prices of textbooks, on the "typical" student's cost of living and the "typical" consumer's cost of living. A discussion on the different baskets for the elderly, who are likely to have larger health expenses and lower educational expenses than students, can also be introduced.

Another important finding by the student researchers as a result of this project was the need for the adoption of a more appropriate price index for college students. Being that the average student's basket is vastly different from the typical consumer's basket, it might be appropriate for the BLS to create a separate index for college students similar to the one currently being created for the elderly. Furthermore, it might be relevant to include information on debt into the index considering that the largest segment of American debt originates from student loan debt with credit card debt coming in second.

This project is an active learning tool that can be implemented by instructors within or outside of the classroom setting, and in any class size. It increases student involvement, engages undergraduate students in an applied research project, and fosters students' critical thinking skills. This exercise is particularly effective for student learning and retention since students remember 80 percent of what they do with active reflection, but only 10 percent of what they hear, 15 percent of what they see, 20 percent of what they hear and see, and 60 percent of what they do (Phillips, 1984). The construction of a student expenditure basket also provides students with valuable skills in survey design, data collection, and data analysis. By completing this exercise, students learn about the complexity of constructing "simple" economic measures. Instructors can extend this exercise towards calculating a personalized student price index by instructing students to use the attached spreadsheet to calculate the basket, and then asking students to observe prices of the goods and services across locations and over time.

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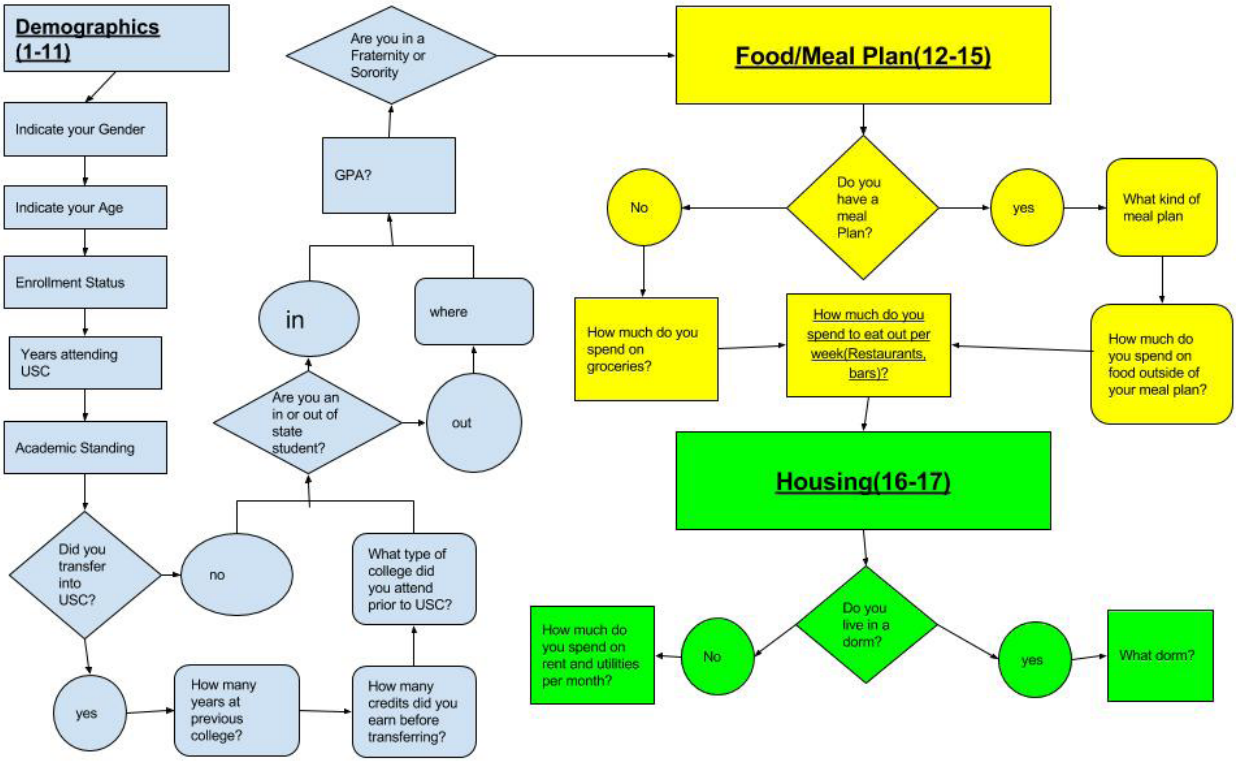
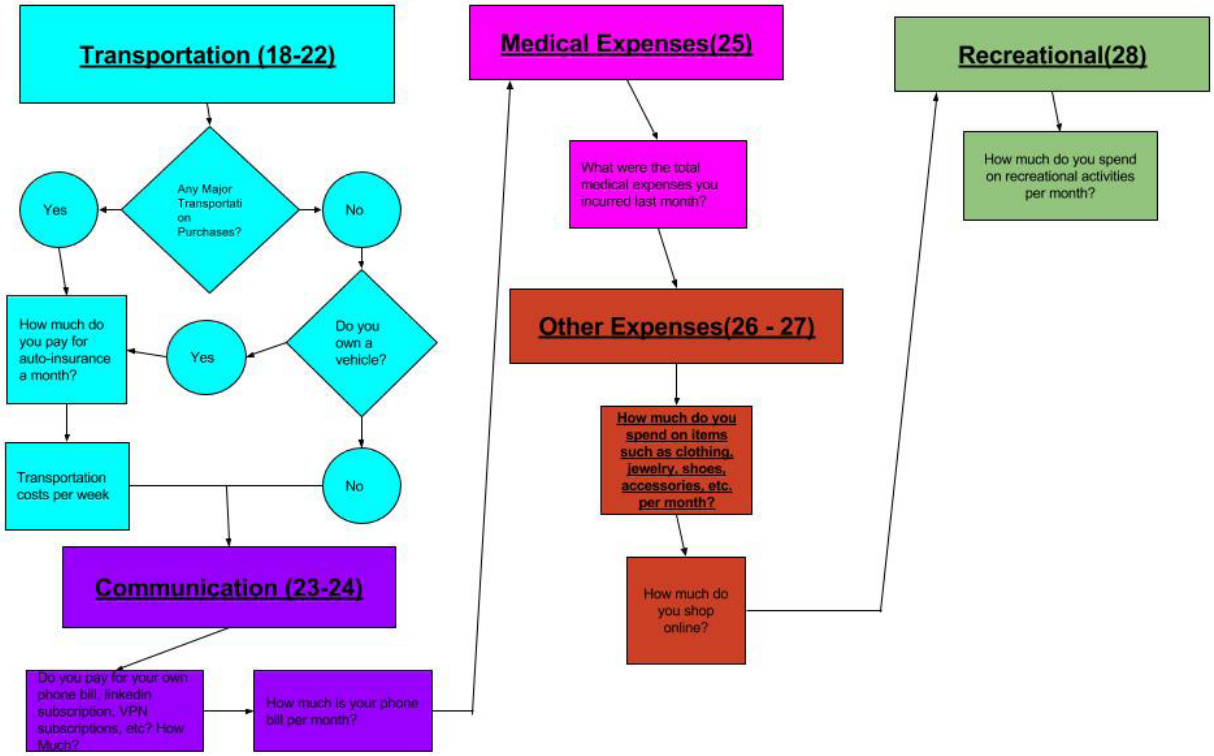
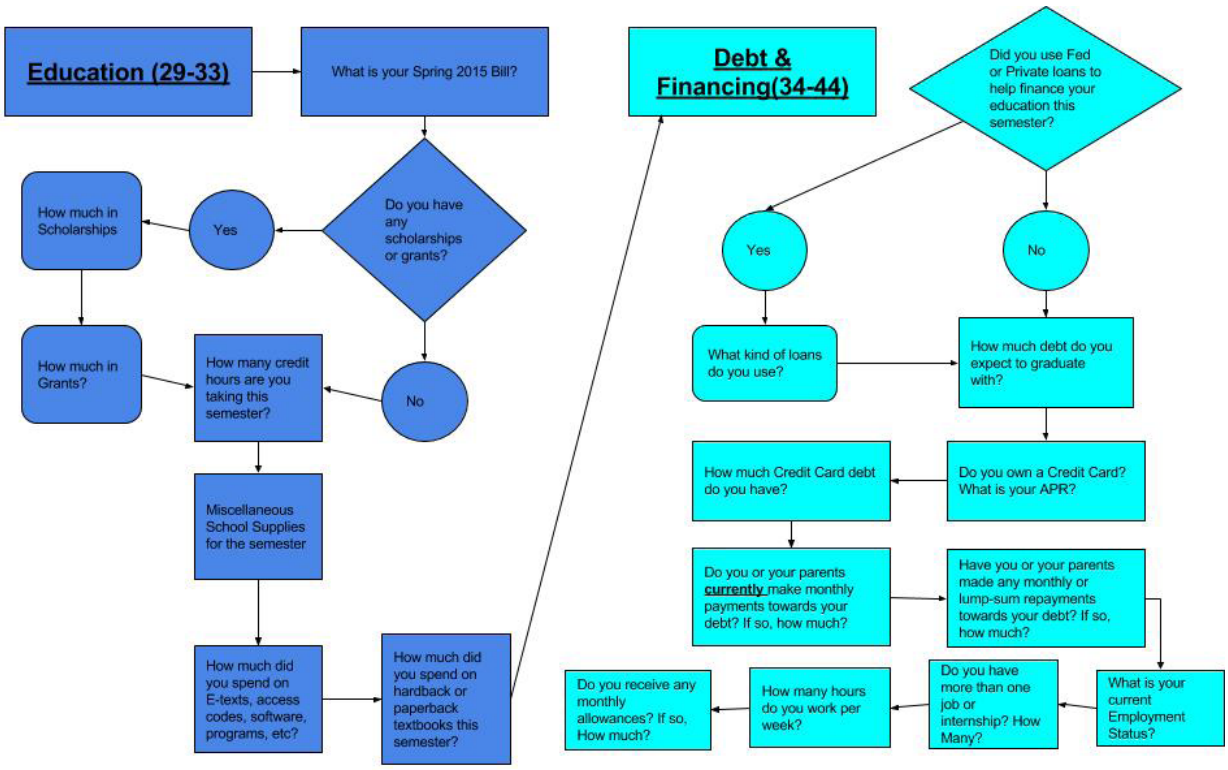
Appendix A: Survey Questions






Education (29-33)
What is your Spring 2015 Bill?
Do you have any scholarships or grants?
Yes
How much in Scholarships
How much in Grants?
No
How many credit hours are you taking this semester?
Miscellaneous School Supplies for the semester
How much did you spend on E-texts, access codes, software, programs, etc?
How much did you spend on hardback or paperback textbooks this semester?
Debt & Financing(34-44)
Did you use Fed or Private loans to help finance your education this semester?
Yes
No
What kind of loans do you use?
How much debt do you expect to graduate with?
How much Credit Card debt do you have?
Do you own a Credit Card? What is your APR?
Do you or your parents currently make monthly payments towards your debt? If so, how much?
Have you or your parents made any monthly or lump-sum repayments towards your debt? If so, how much?
Do you receive any monthly allowances? If so, How much?
How many hours do you work per week?
Do you have more than one job or internship? How Many?
What is your current Employment Status?