

Title: The Choice Is Yours: You Can Win With This, or You Can Win With That¹

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ABSTRACT

This study investigates who benefits from extra credit by examining the points earned by students in two different extra credit assignments administered in a large Principles of Macroeconomics course in spring 2017. The first assignment is a competitive assignment consisting of music suggestions and explanations made by students, in which students can “win” extra credit points by being picked as the first or second place winner. The second assignment consists of a Student Expenditure Basket spreadsheet in which all students who complete the spreadsheet earn extra credit points; both assignments are completed outside the classroom. The study then proceeds to investigate the determinants of extra credit and the importance of extra credit in the student’s final grade. Class participation, gender and race play a significant role in extra credit points with students who have higher classroom participation rates, females and non-Caucasians more likely to gain from the two extra credit opportunities. The association between the extra credit points earned and classroom participation rates indicate a positive relationship between within and outside the classroom effort. Results also show that only a small percentage of students invest the effort necessary to complete and/or win the optional extra credit assignments. It is also found that students with higher previous collegiate GPAs, classroom participation rates, and extra credit completion rates earn higher grades in the course.

¹ This study has been approved by the Internal Review Board at the University of South Carolina.

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Introduction

Until recently, the teaching of economics has relied heavily on the traditional chalk-and-talk lecture method (Becker and Watts (2008)). While the teaching of economics has been slow to adopt non-traditional teaching methods, many successful instructors have recently started to incorporate various active learning methods within their classroom, with the use of music now becoming common practice particularly in Principles of Economics courses. The use of music in class increases student enjoyment of economics, makes the classroom atmosphere more engaging, helps students apply their knowledge, results in higher classroom participation, increases student evaluations of teaching, increases students' understanding of economic concepts and could even generate discussions about economics outside the classroom (Hall and Lawson (2008); Hall et. al (2008); Harter (2003), Huey (2011); Medcalfe (2010); McClough and Heinfeldt (2012), Raehsler (2009); Tinari and Khandke 2000). Some economic educators have even created song lists on their websites for other economic instructors to use in their classes together with suggestions on how these songs are related to economic concepts².

Most previous work suggest using specific songs chosen by the instructor to illustrate economic concepts. However, allowing students to create their own lyrics can result in classroom participation and grade improvements (Raehsler (2013)). An idea gaining popularity recently is the idea of student music video competitions in which students modify the lyrics of popular songs to reflect economic concepts (Al-Bahrani, Abdullah et. al (2017); Holder et. al (2015)). In this paper, I introduce a unique method of incorporating music in the classroom. Students enrolled in my Principles of Economics courses make their own song suggestions and provide a brief

² See [http://dirkmateer.com/media-library?filters\[sort\]=helpful&filters\[media_type\]\[\]=3.](http://dirkmateer.com/media-library?filters[sort]=helpful&filters[media_type][]=3.)

explanation as to how these songs relate to economics on the course website's online Discussion Board. I then proceed to pick the top two winners by reading all suggestions and proceed to announce the winners at the beginning of each class. This method helps students feel that their opinions are valued, particularly within a large classroom setting. Knowing that the instructor has taken her time to read all suggestions and pick the best suggestion provides students with a sense of visibility and importance. Furthermore, student learning outcomes could also be positively impacted with this technique, particularly as students brainstorm ideas while outside of the classroom setting. Many students have told me how the subject of their song suggestion is commonly discussed among themselves outside of the classroom, as they enjoy competing with each other to win and eagerly look forward to each class to learn about the outcome.

Does incorporating music within the classroom really increase student grade outcomes? If so, are there specific students who benefit more than others? In this paper, I compare two different extra credit opportunities which were offered to students enrolled in my Principles of Macroeconomics course in spring 2017. The first opportunity to "win" extra credit was through the competitive music suggestion, and the second was through a non-competitive extra credit opportunity in which all students who completed a simple Student Expenditure Basket (SEB) spreadsheet created by Sankaran, Mulroney Jr. and Corcoran (2016) earned extra credit points.

This paper investigates the differences and similarities between the students who complete these two different types of extra credit, and also examines if the completion of these assignments affects students' grades in the course. Preliminary results show that students with higher previous collegiate GPAs are more likely to earn extra credit points from both assignments, with the "B" student, females and non-Caucasians more likely to benefit. The results also indicate that the extra credit points are related to a student's participation within classroom, indicating that the two are

measures of effort, with one being effort within the classroom and the other outside the classroom. Results also show that only a small percentage of students invest the effort to complete the optional extra credit assignment outside of classroom time. Finally, it is found that student's participation within the classroom as well as on the extra credit assignments positively impact the student's grade in the course.

Background

Principles of Macroeconomics at the University of South Carolina is enrolled largely by a similar subset of students who are mostly freshmen or sophomore business and economics majors enrolled in the Darla Moore School of Business at the University of South Carolina³. While some students might have completed Principles of Microeconomics before enrolling in the Principles of Macroeconomics course, Micro Principles is not a prerequisite for the Macro Principles course. Therefore, the beginning of the course covers the basic concepts of economics such as opportunity costs, scarcity, the Production Possibilities Frontier, positive and normative statements, and supply and demand before proceeding to Macroeconomics concepts such as Gross Domestic Product, Consumer Price Index, Unemployment, Inflation, Production and Growth, the Monetary System, the Aggregate Demand-Aggregate Supply model and so on. The class was structured to closely follow the material presented in Gregory Mankiw's (2015) Principles of Macroeconomics textbook.

During the semester, students had opportunities to earn extra credit points through two different assignments. Both assignments were to be submitted by students online through the Blackboard course learning management system. The first way for students to earn extra credit

³ The course is only open for enrollment by Business and Economics students. Since economics is offered both in the Business School and as part of the College of Arts and Sciences, 26 out of the 282 students were not enrolled in the Business School.

points was through a unique method of “competitive extra credit” in which students were encouraged to find ways to relate the lyrics of popular songs to economic concepts. This extra credit opportunity was announced on the first day of class and also listed on syllabus. Students had the opportunity to “win” competitive extra credit points throughout the semester by suggesting songs to be played in the beginning of class and discussing how these songs relate to the economic concepts taught during lectures. Students would suggest songs together with a brief description of how the lyrics relate to economics on the Discussion Board on Blackboard.

The instructor then chooses the winners based on how well the explanation provided in the song submission relates to the course material, while paying attention to the students’ peer ratings of the proposals. The song choice of the first place winner is played at the beginning of each class. Slides displaying the names, suggestions and explanations provided by the first and second place winners are displayed as Announcement slides a few minutes before class starts. Rather than the instructor making the song choice without any input from students, this method helps students in large classrooms feel that their opinions are valued and that the instructor cares about their input. It also helps instructors avoid outdated songs that might not be relatable to students. Table 1 illustrates some of the winning student suggestions.

Table 1: Examples of Winning Student Song Suggestions

Song	Student Explanation
Opportunity Cost by G-Eazy	G-Eazy talks about the opportunity cost of being famous. He became famous but while becoming famous he "gave up"/ "lost" important relationships/ friendships in his life. This is only one example, this song contains over 10 opportunity cost examples all relating to the opportunity cost of being famous. His opportunity costs include not being able to grow personal relationships, missing out on family events, and the list goes on. He sees a world of drugs, somberness, and missing the average life

	of having a family and living in a house. However, he mentions in the beginning of the song, "If I stayed I just went crazy" showing that it was a better choice for him to earn money by having the fame and become a rapper than the other way around. He created a cost-benefit analysis of his life and became a rapper since his Marginal Benefits of becoming a rapper was greater than his Marginal Cost.
"Power" by <i>Moon Boots</i>	In this song, the artist is giving the "power" to someone he doesn't know that well yet but is hoping to know better soon. By giving this person the power, he is putting his trust in this mysterious person's hands. This relates perfectly to what we are studying in class because if all the power was in the magical market forces of supply and demand, then a <u>perfectly competitive market</u> would exist. But if the power was in the seller's hand, then a <u>monopoly</u> would be taking place. The artist has decided to put the power in the magical market forces of supply and demand than in the seller's, just as in a perfectly competitive market.
She Works Hard for Her money by <i>Donna Summers</i>	"She Works Hard For The Money" by Donna Summer is about a woman who refuses to sell herself out for a dollar bill no matter how tough things may get. She works hard for her money even though she only receives a small amount of cash in return. In class we discussed income and production which relates to the song; for her to earn her money, she has to work long shifts. Why does she work long shifts and only earn a small amount of cash in return? According to economics, she has <u>low human capital and therefore low productivity rates and low wages.</u>
Big Yellow Taxi by <i>Joni Mitchell/counting Crows</i>	The lyric "they paved paradise and put up a parkin' lot" relates to an example discussed in class of a trade-off that our society faces (an opportunity cost): clean environment vs. high level income. By cutting down trees and putting in a parking lot, businesses can open there, creating higher income for the society in return for destroying the environment. Another example of opportunity cost comes up in the lyrics, "Hey farmer put away the DDT I don't care about spots on my apples leave me the birds and bees please!" By spraying chemicals on the produce to increase the quantity, animals like bees and birds will no longer be able to gain nutrients from the produce without ingesting the chemicals. Yet another example of clean environment vs. higher income, and a negative externality where the social cost is higher than the private cost.
"ATM" by <i>Jay Cole</i>	This song is about the earning and saving of money, associates health to money. Health is a type of investment in human capital. Healthier workers are more productive and therefore earn more. We also learned that while how much money you have might not truly reflect your happiness, it can make things easier, as you can buy the things you need to enjoy a higher materialistic standard of living stress. These concepts illustrate the strengths and weaknesses of the GDP.

Note: More examples can be provided on request.

While students had the opportunity to submit an unlimited number of song suggestions accompanied with their explanations throughout the semester with the first and second place

winner being picked for each class meeting, the students also had the opportunity to complete a SEB spreadsheet to earn extra credit. The SEB spreadsheet required students to plug in specific numbers which represented their expenditures while attending college and was made available online for all students to complete during a short period of time (two days). Multiple announcements on multiple days were made in class as well as online regarding the availability of the assignment. Both optional extra credit assignments were to be completed by students completed during their own time outside of the classroom setting.

The following proceeds to investigate which group of students were more likely to earn points by completing and “winning” the assignments. I also examine the impact of the extra credit points on students’ final grades in the course.

Methodology

Using data from 282 students enrolled in my Principles of Macroeconomics (ECON 222) course at the University of South Carolina in spring 2017, I investigate the determinants of which students gain points from the extra credit assignments and the impact of these points on student grades.

Equation (1) below is the main baseline regression specification:

$$EC_j = \beta_0 + \beta_1 Participation_j + \beta_2 Aptitude_j + \beta_3 Y_j + \beta_4 X_j + \epsilon_j \quad (1)$$

where EC_j is the extra credit points of student j enrolled in my Principles of Macroeconomics course in the spring 2017 semester; the variable EC_j is measured using three different methods: *EC total* which consists of the total extra credit points of the individual student, *EC SEB* which is awarded to each student who completed the Student Expenditure Basket extra credit assignment,

and *EC Music* awarded to students who won extra credit points from their music suggestions. Y_j is a variable indicating the student's year of study (freshman=1, sophomore=2, junior=3, senior=4) in spring 2017; $Participation_j$ is student j 's participation points measured as 50% attendance points and 50% on answering at least ½ of the daily in-class clicker questions correctly⁴; $Aptitude_j$ is student j 's aptitude, using either his/her cumulative college GPA before spring 2017 or his/her college entrance score (ACT or SAT) as proxies⁵. X_j is a set of individual specific control variables which includes gender and race; ϵ_j is the stochastic error term.

In equation (2) below, the variable $Grade_j$ represents the final grade of student j in Principles of Macroeconomics at the end of the Spring 2017 semester measured either in total points (out of 400 possible points) or in GPA points based on the letter grade (A=4.0; B+=3.5, B=3.0, C+=2.5, C=2.0, D+=1.5, D=1.0 and F=0.0). $ECON_j$ is a dummy variable which indicates the student's completion of Principles of Microeconomics at the University of South Carolina before spring 2017. For this equation, $Aptitude$ is proxied solely by the student's previous collegiate GPA before the spring 2017 semester as previous studies have shown that this measure is a better measure of performance in college courses compared to college entrance scores (Sankaran, Al-Bahrani and Williams (2018))⁶. All other variables are as defined previously.

$$Grade_j = \beta_0 + \beta_1 EC_j + \beta_2 Aptitude_j + \beta_3 ECON_j + \beta_4 X_j + \epsilon_j \quad (2)$$

Results

⁴ The clicker questions are administered throughout the class lecture, with the questions normally immediately following the lecture material on important and new concepts. Since students are able to discuss the clicker questions among themselves in class and the questions are also made available before class, students should easily be able to get 50% of the questions correct with minimal effort and if paying attention in the class.

⁵ The ACT scores and Sat scores are analyzed separately as determinants of aptitude since there was a change made by the College Board on the calculation of the SAT scores in 2016, making conversions inaccurate as the dates when students took the exams are not available. Students enrolled in Principles of Macroeconomics in spring 2017 could have taken these exams either before or after then change occurred.

⁶ Regression results using ACT and SAT scores as proxies for aptitude are not reported for equation (2) because the estimated coefficients were statistically insignificant.

Table 2 which presents the Summary Statistics shows that the average student enrolled in the course had a previous GPA of 3.305 with a SAT score of 1173.395 and an ACT score of 25.7931. While there are 282 observations in the dataset, test score data on the SAT was available only for 215 students and 174 students for the ACT⁷. The average extra credit points in the dataset is 1.99 with extra credit from music averaging at 0.63 and from the student expenditure basket at 1.37. Based on the maximum total extra credit points of students in the dataset of 17 (out of 400 points available), it might not appear as though the extra credit points made a difference in a student's grade. However, the student who received the 17 points gained 4.25 percent more in grades, pushing him/her from a grade of a C to a C+; this illustrates that the extra credit points made a difference for students near the margin of a grade cutoff at the end of the semester.

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ecpts	282	1.992908	3.051157	0	17
ecmusic	282	.6276596	1.793528	0	12
ecseb	282	1.365248	2.218797	0	5
grade	283	2.730488	.9857455	0	4
totalpts	282	314.7211	56.57735	0	399.9055
genderflm0	279	.3763441	.4853385	0	1
caucasian	256	.921875	.2688939	0	1
econ221	282	.606383	.4894201	0	1
attendance	282	23.51241	4.97939	0	28
class	280	1.814286	.7437743	1	4
previousgpa	280	3.305	.5071991	1	4
sat	215	1173.395	104.4617	910	1520
act	174	25.7931	3.153631	18	35

A closer investigation of the data in Table 3 shows that only 104 students received any extra credit points with 43 winning points for music and 79 completing the SEB extra credit

⁷ 114 students reported both their ACT and SAT scores, with 60 students reporting only their ACT scores.

assignment; of these students, 21 students completed both assignments. This provides evidence that even if an extra credit assignment is made available to all students online, such as the SEB exercise, only a small percentage of students invest the effort to complete an optional extra credit assignment outside of classroom time. It appears that the “B” student is most likely to complete the extra credit assignments, with students with a slightly higher grade winning the music extra credit and students slightly below a B completing the SEB assignment.

Table 3: Summary Statistics on Extra Credit Assignments

	Mean	Std. Error	[95% Confidence Interval]		Observations
EC Points	3.0359	0.0891	2.8592	3.2125	104
EC Music	3.2844	0.1219	3.0383	3.5304	43
EC SEB	2.9712	0.1023	2.7675	3.1749	79

Table 4 below presents regression results to investigate the determinants of who obtains extra credit points. Gender seems to be a significant determinant of extra credit, with females more likely to gain points from the completion of the extra credit assignments than males. There is only one model in which the gender variable is not statistically significant, the model that determines extra credit from music completion which includes the classroom participation variable. This is likely because of an interaction between classroom participation and gender⁸. Other races are more likely to take advantage of the extra credit opportunities than Caucasians. Classroom participation

⁸ An introduction of a gender-classroom participation interaction term shows that females have higher class classroom participation rates than males but the difference is not statistically significant.

plays a significant determinant of extra credit completion, with students who attend class likely to gain more extra credit points from both methods of extra credit administration.

Table 4: Determinants of Extra Credit

	<i>Model 1</i> EC Total	<i>Model 2</i> EC Music	<i>Model 3</i> EC SEB	<i>Model 4</i> EC Total	<i>Model 5</i> EC Total	<i>Model 6</i> EC Music	<i>Model 7</i> EC SEB
Gender	1.4259*** (0.3687)	0.4793* (0.2212)	0.9466*** (0.2685)	1.1815** (0.3755)	1.0117** (0.3686)	0.2484 (0.2270)	0.7632** (0.2761)
Caucasian				-1.4946* (0.6787)	-1.3247* (0.6629)	-0.6456 (0.4082)	-0.6791 (0.4964)
Classroom participation					0.1467*** (0.0387)	0.0507* (0.0238)	0.0960** (0.0289)
Constant	1.4598*** (0.2262)	0.4540*** (0.1357)	1.0058*** (0.1647)	2.8911*** (0.6840)	-0.6967 (1.1565)	-0.0745 (0.7122)	-0.6222 (0.8662)
Observations	279	279	279	256	256	256	256
R-squared	0.0512	0.0167	0.04295	0.06258	0.11329	0.0386	0.0913

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Table 5 below investigates other possible determinants of extra credit by adding in the three proxies for aptitude, SAT, ACT and previous collegiate GPA. While a student's previous GPA significantly impacts his/her extra credit points, neither the SAT or ACT scores are significant determinants of extra credit. This could possibly illustrate an effort component, whereby students with higher previous collegiate GPAs understand the importance of effort, as shown through the completion of the extra credit assignments and subsequent points earned. The gender variable continues to be significant in all models, with females more likely than males to obtain extra credit points. While the significance of the Caucasian variable differs based on the model, the sign on the coefficient remains negative in all specifications indicating that Caucasian students are less likely to earn extra credit points compared to non-Caucasian students. Classroom participation remains positive and statistically significant in all models. Finally, the coefficient on the year of study variable is negative though not statistically significant. This could indicate that the majority of the students following the proper path of study are enrolled in Principles of Macroeconomics in

their sophomore year. Students enrolled as seniors or juniors are more likely to be repeating the course, and/or less likely to invest additional effort into making a high grade in the course⁹.

Table 5: Other Possible Determinants of Total Extra Credit

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
SAT	0.0002 (0.0020)			
ACT		0.0130 (0.0713)		
Previous GPA			1.0708** (0.4027)	
Year of Study				-0.2387 (0.2610)
Gender	1.0115* (0.4316)	1.2357** (0.4672)	0.8472* (0.3695)	1.0359** (0.3697)
Caucasian	-1.0562 (0.7514)	-0.4435 (0.8494)	-1.3097* (0.6551)	-1.3368* (0.6632)
Classroom participation	0.1578*** (0.0446)	0.1007* (0.0513)	0.1017* (0.0418)	0.1432*** (0.0389)
Constant	-1.4074 (2.6087)	-0.9844 (2.3862)	-3.1496* (1.4687)	-0.1936 (1.2811)
Observations	198	162	256	256
R-squared	0.1133	0.0781	0.1376	0.1162

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Table 6 below shows the determinants of the grades of students in Principles of Macroeconomics. A student's previous GPA, extra credit points and classroom participation are all statistically significant measures of final grades in the course. Table 7 shows a high correlation between classroom participation and grades. When classroom participation and EC points are included in the same model (Model 4 and Model 8 in Table 6), the extra credit variable becomes statistically insignificant. It is possible that both classroom participation and extra credit measure

⁹ Model specifications that include the year of study together with the aptitude proxies are not reported in Table 5 above since there are correlations between these variables.

are proxies for effort, with the former measuring within the classroom effort and the latter measuring effort invested outside of the classroom setting¹⁰.

Table 6: Determinants of Grades

	<i>Model 1</i> Points	<i>Model 2</i> Points	<i>Model 3</i> Points	<i>Model 4</i> Points	<i>Model 5</i> Grade	<i>Model 6</i> Grade	<i>Model 7</i>	<i>Model 8</i>
EC points	4.4059*** (1.0764)	2.0992** (1.0557)		0.4078 (0.8336)	0.0799*** (0.0187)	0.0332* (0.0180)		0.0131 (0.0164)
Previous GPA		54.1331*** (6.4351)	27.5181*** (5.3720)	27.1082*** (5.4467)		1.0824*** (0.1098)	0.7741*** (0.1057)	0.7608*** (0.1071)
Micro Principles		11.4924* (6.1257)	-2.2870 (4.8803)	-2.1643 (4.8942)		0.1462 (0.1043)	-0.0202 (0.0960)	-0.0163 (0.0962)
Caucasian		7.4934 (11.1736)	10.1839 (8.6307)	10.7247 (8.7143)		0.0763 (0.1902)	0.0975 (0.1698)	0.1148 (0.1713)
Gender		-0.1650 (6.3163)	-0.7111 (4.8658)	-1.0581 (4.9244)		0.0120 (0.1075)	0.0125 (0.0957)	0.0014 (0.0968)
Classroom participation			7.3241*** (0.5631)	7.2796*** (0.5713)			0.0880*** (0.0111)	0.0866*** (0.0112)
Constant	305.9406*** (3.9180)	117.8703*** (24.2882)	42.7572* (19.6201)	43.9589* (19.8029)	2.5713*** (0.0682)	-1.0775** (0.4134)	- (0.3859)	- (0.3892)
Observations	282	256	256	256	282	256	256	256
R-squared	0.0565	0.2730	0.5595	0.5600	0.0609	0.3315	0.4591	0.4604
Prob > F	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Table 7: Correlation Matrix

	Grade	Total Points	Classroom Participation	EC Points	EC Music	EC SEB
Grade	1.0000					
Total Points	0.8938	1.0000				
Classroom Participation	0.6030	0.7215	1.0000			
EC Points	0.2468	0.2376	0.2625	1.0000		
EC Music	0.2335	0.2044	0.1509	0.6947	1.0000	
EC SEB	0.1507	0.1615	0.2389	0.8136	0.1470	1.0000

Conclusion

After introducing a unique method for students to earn “competitive” extra credit through music suggestions, this paper proceeded to investigate the type of students who were most likely to earn points from two different types of extra credit assignments and if earning these points

¹⁰ Once classroom participation is added into the models in Table 6, the sign on the completion of Micro Principles changes from positive to negative. While statistically insignificant, this could indicate a negative relationship between the previous completion of Micro Principles and classroom participation in Macro Principles implying that students who complete Principles of Micro are less likely to attend their Principles of Macro lectures.

impacted the student's final grade in the course. Results indicate that females, non-Caucasian students and students who participate in the classroom lectures were the most likely to benefit from the extra credit opportunities. This study also finds that students who earn extra credit points are more likely to participate in the classroom lectures, and that participation in both assignments can positively affect the student's final grade in the course. A student's previous collegiate GPA is also an important determinant of student performance in the course as well as the completion of the extra credit assignment. This is possibly because students with higher previous collegiate GPAs understand the importance of taking advantage of additional opportunities to earn points in the course. Surprisingly, only a small percentage of students took the opportunity to earn points from the extra credit assignments. While not every student who submitted song suggestions would have been able to "win" extra credit points, all students who completed the SEB exercise earned points. Surprisingly, only 79 out of 282 students completed the SEB assignment. However, the students who completed the assignments are also the ones who were more likely to participate in the classroom.

Overall, the results in this paper indicate that instructors should consider providing students with extra credit opportunities since to reward students who invest effort into the course. Since females and minority students appear to benefit more, this might provide a good method to narrow the racial and gender achievement gap in economics. Future studies attempting to assess the effectiveness of alternative teaching methods and extra credit could compare results from student evaluations of teaching of the instructor, surveys and the overall grades in the class from two different sections of the course taught by the same instructor.

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