De Anza College Office of Institutional Research and Planning

To: Ravjeet Singh, Economics Department Chair

From: Mallory Newell, De Anza Researcher

Date: 10/3/2013

Subject: Success in ECON1 based on prior success in Math 212, Math 114, or Math 10

Question: What are the success rates of students who take Math 212 prior to enrolling in ECON1?

Methodology: Students who enrolled in ECON1 and Math 212 or higher, Math 114 or higher or Math 10 or higher over four academic years, between 2007-08 and 2011-12, excluding summer terms, were tracked. Only the first attempt of the ECON1 course was included while the last attempt of the math course was included. Students were only included in the analysis if they had enrolled in the math course prior to enrolling in ECON 1. Success is A, B, C or P grades while non success is D, F, NP, I or W grades.

ECON1 Students

The chart below displays the distribution of students who took ECON1 over the time frame and their enrollment in math. 7,442 students took ECON1 over the time frame, while 5,498 students took a math class and ECON1, 1,944 students did not take any math class but took ECON1. 1,051 students took a math class prior to enrolling in ECON1.

Figure 1. ECON1 Students – Enrollment in Math

Took ECON1	Took a Math Class and ECON1	% Took a Math Class and ECON1	Did not take a Math class but took ECON1	% Did not take a Math class but took ECON1	Took a Math Class Prior to ECON1	% Took a Math Class Prior to ECON1
7,442	5,498	74%	1,944	26%	1,051	14%

- 74% of ECON1 students took some type of math class while 26% did not take any math class. 14% of ECON1 students took a math class before taking ECON1.

Figure 2. ECON2 Students – Enrollment in Math

Took ECON2	Took a Math Class and ECON2	% Took a Math Class and ECON2	Did not take a Math class but took ECON2	% Did not take a Math class but took ECON2	Took a Math Class Prior to ECON2	% Took a Math Class Prior to ECON2
6,359	4,734	74%	1,625	26%	890	14%

- Similar to ECON1, 74% of ECON2 students took some type of math class while 26% did not take any math class. 14% of ECON2 students took a math class before taking ECON2.

Figure 3. Math Placement for Students who Took ECON

	Took a Math Class and ECON				Did not Take Math but Took ECON				Took a Math Class Prior to ECON			
	ECON001		ECON002		ECON001		ECON002		ECON001		ECON002	
Statistics or Above	2,600	47%	2,397	51%	418	22%	363	22%	452	43%	445	50%
Math 114 - Intermediate Algebra	1,187	22%	995	21%	223	11%	180	11%	228	22%	200	22%
Math 212 - Elementary Algebra	1,151	21%	855	18%	219	11%	190	12%	241	23%	169	19%
Math 210 - Pre-Algebra	114	2%	93	2%	33	2%	25	2%	21	2%	10	1%
No Math Test	446	8%	394	8%	1,051	54%	867	53%	109	10%	66	7%
Total	5,498	100%	4,734	100%	1,944	100%	1,625	100%	1,051	100%	890	100%

Note: Includes lowest placement score.

- Of the students who took a math class and ECON1 or ECON2, about 90% placed into Math 212 or higher.

- Of the students who did not take a math class but took ECON1 or ECON2, about 40% placed into Math 212 or higher.

- Of the students who took a math class prior to enrolling in ECON1 or ECON2, about 90% placed into Math 212 or higher.

Figure 4. ECON1 Students who did not take a Math Class – Success in ECON1

	Success		Non Success		Total	
	Grades	Percent	Grades	Percent	Grades	Percent
ECON1 No Math Class	1,225	63%	719	37%	1,944	100%
ECON1 Math Class	3,979	73%	1,519	275	5,498	100%

- Students who took ECON1 and did not take a math class during the time frame had a success rate of 63% in ECON1, compared to 73% for students who took a math class.

Figure 5. Students who took a Math Class Prior to ECON1 by Ethnicity

	Above Math 10		MATHD010.		MATHD114.		MATHD212.		MATHD210.		Total	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent	Students	Percent
African American	4	1%	11	3%	9	7%	3	3%	1	6%	28	3%
Asian	260	69%	238	55%	52	36%	14	25%	8	29%	572	56%
Filipino	14	4%	15	4%	16	11%	11	20%			56	6%
Latino/a	17	4%	55	13%	24	17%	20	35%	9	33%	125	12%
Native American	4	1%	5	1%	3	2%			1	3%	13	1%
Pacific Islander	3	1%			1	1%					4	0%
Unknown	34	9%	39	9%	11	8%	3	3%	2	16%	89	8%
White	52	12%	64	15%	32	19%	12	13%	4	13%	164	14%
Total	388	100%	427	100%	148	100%	63	100%	25	100%	1,051	100%

- The highest concentration of targeted ethnic groups (Latino, African American, and Filipino) took a lower level math class compared to Asian students, where their enrollment is largely concentrated at the upper levels of math classes.

Chi Square Test

A chi square test was used to test whether the 2 X 2 matrix is considered to be statistically significant. The test examines whether there is enough of a difference to reject the null hypothesis, that there is no difference between the success rate in ECON1 for students with a math class. A 0.10 level of significance may be used to determine if there is a statistical difference.

Math 212 or Higher

Figure 6. ECON1 Students who took Math 212 or Higher

	Took MATH 212 or Higher Prior to ECON1	Took MATH 210 Prior to ECON1	Total
Number	1,026	25	1,051
Percent	98%	2%	100%

- 98% of students took Math 212 or higher prior to taking ECON1.

Figure 7. 2 X 2 Matrix - Math 212 or Higher – Number

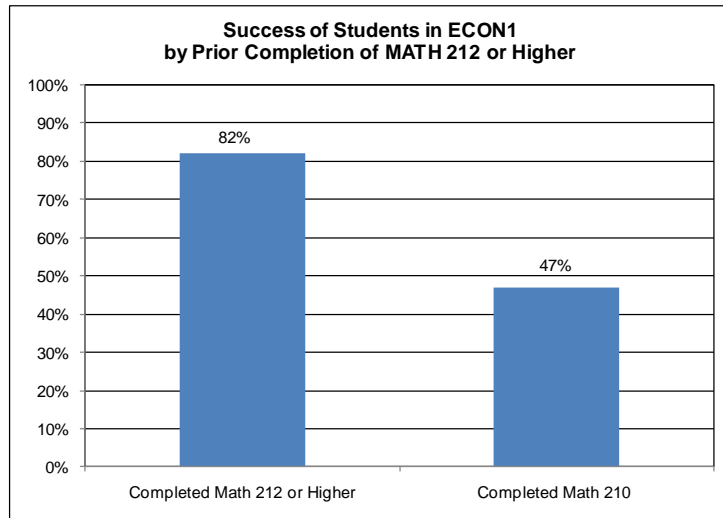| Successfully Completed Math 212 or Higher	Success in ECON1	Non Success in ECON1	Total
Yes	606	133	739
No	146	166	312
Total	752	299	1,051

Chi-square equals 131.871 with 1 degrees of freedom. The p value is less than 0.0001 which suggests there is a statistical difference between the grades of students who completed Math 212 or higher and students who did not complete Math 212 or higher.

Figure 8. 2 X 2 Matrix – Math 212 or Higher – Percent

Completed Math 212 or Higher	Success in ECON1	Non Success in ECON1	Total
Yes	82%	18%	100%
No	47%	53%	100%

- Of the students who successfully completed Math 212 or higher prior to ECON1, 82% were successful in ECON1.

Graph 1. Math 212 or Higher

The chart above displays students who were successful in MATH 212 or higher and their success in ECON1. In this case, 82% of students that successfully completed MATH 212 or higher successfully completed ECON1, compared to 47% of students who completed MATH 210 prior to ECON1.

Figure 9. ECON1 Students who took Math 114 or Higher

	Took MATH 114 or Higher Prior to ECON1	Took MATH 212 or Below Prior to ECON1	Total
Number	963	88	1,051
Percent	92%	8%	100%

- 92% of students took MATH 114 or higher prior to taking ECON1.

Figure 10. 2 X 2 Matrix – Math 114 or Higher – Number

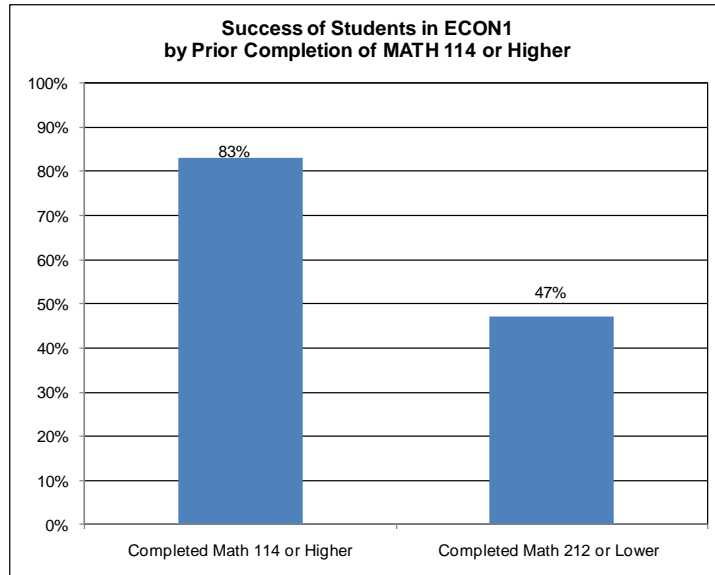| Completed Math 114 or Higher	Success in ECON1	Non Success in ECON1	Total
Yes	598	124	722
No	154	175	329
Total	752	299	1,051

Chi-square equals 142.269 with 1 degrees of freedom. The p value is less than 0.0001 which suggests there is a statistical difference between the grades of students who completed Math 114 or higher and students who did not complete Math 114 or higher .

Figure 11. 2 X 2 Matrix – Math 114 or Higher – Percent

Completed Math 114 or Higher	Success in ECON1	Non Success in ECON1	Total
Yes	83%	17%	100%
No	47%	53%	100%

- Of the students who successfully completed Math 114 or higher prior to ECON1, 83% were successful in ECON1.

Graph 2. Math 114 or Higher

The chart above displays students who were successful in MATH 114 or higher and their success in ECON1. In this case, 83% of students that successfully completed MATH 114 or higher successfully completed ECON1. Compared to 47% of students who completed MATH 212 or Math 210 prior to ECON1.

Math 10 or Higher

Figure 12. ECON1 Students who took Math 10 or Higher

	Took MATH 10 or Higher Prior to ECON1	Took MATH 114 or Below Prior to ECON1	Total
Number	815	236	1,051
Percent	78%	22%	100%

- 78% of students took Math 10 or higher prior to taking ECON1.

Figure 13. 2 X 2 Matrix – Math 10 or Higher – Number

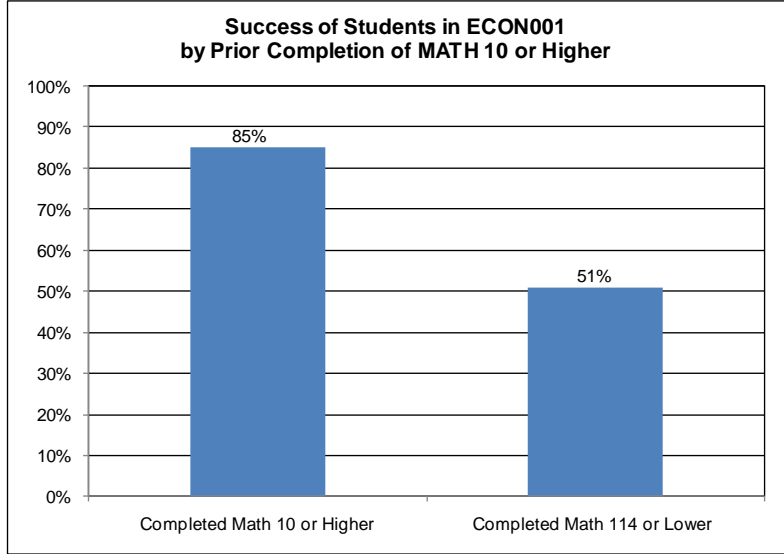| Completed Math 10 or Higher	Success in ECON1	Non Success in ECON1	Total
Yes	541	96	637
No	211	203	414
Total	752	299	1,051

Chi-square equals 140.527 with 1 degrees of freedom. The p value is less than 0.0001 which suggests there is a statistical difference between the grades of students who completed Math 10 or higher and students who did not complete Math 10 or higher.

Figure 14. 2 X 2 Matrix – Math 10 or Higher - Percent

Completed Math 10 or Higher	Success in ECON001	Non Success in ECON001	Total
Yes	85%	15%	100%
No	51%	49%	100%

- Of the students who successfully completed Math 10 or higher prior to ECON1, 85% were successful in ECON1.

Graph 3. Math 10 or Higher

**Success of Students in ECON001
by Prior Completion of MATH 10 or Higher**

A bar chart with two bars. The vertical axis ranges from 0% to 100% in 10% increments. The bar labeled "Completed Math 10 or Higher" reaches 85%. The bar labeled "Completed Math 114 or Lower" reaches 51%.

The chart above displays students who were successful in MATH 10 or higher and their success in ECON1. In this case, 85% of students that successfully completed MATH 10 or higher successfully completed ECON1. Compared to 51% of students who completed MATH 114, 212, or 210 prior to ECON1.

Figure 15. Success in ECON1 Based on Math Course Taken Prior to ECON1

		Success		Non Success		Total	
		Grades	Percent	Grades	Percent	Grades	Percent
MATHD001A	Success	34	89%	4	11%	38	100%
	Non Success	9	60%	6	40%	15	100%
MATHD001B	Success	26	93%	2	7%	28	100%
	Non Success	10	77%	3	23%	13	100%
MATHD001C	Success	16	84%	3	16%	19	100%
	Non Success	9	82%	2	18%	11	100%
MATHD001D	Success	12	100%			12	100%
	Non Success	1	100%			1	100%
MATHD002A	Success	10	100%			10	100%
MATHD002B	Success	5	100%			5	100%
	Non Success	3	100%			3	100%
MATHD010.	Success	308	84%	57	16%	365	100%
	Non Success	37	60%	25	40%	62	100%
MATHD011.	Success	51	85%	9	15%	60	100%
	Non Success	13	68%	6	32%	19	100%
MATHD012.	Success	11	92%	1	8%	12	100%
	Success	3	100%			3	100%
MATHD022.	Non Success	1	100%			1	100%
MATHD041.	Success	12	92%	1	8%	13	100%
	Non Success	7	54%	6	46%	13	100%
MATHD042.	Success	2	67%	1	33%	3	100%
MATHD043.	Success	4	100%			4	100%
	Non Success	3	100%			3	100%
MATHD044.	Success	7	70%	3	30%	10	100%
	Non Success	1	100%			1	100%
MATHD046.	Success	3	60%	2	40%	5	100%
MATHD049A	Success	8	89%	1	11%	9	100%
	Non Success	6	46%	7	54%	13	100%
MATHD049B	Success	7	70%	3	30%	10	100%
	Non Success	6	60%	4	40%	10	100%
MATHD051.	Success	17	77%	5	23%	22	100%
	Non Success	5	45%	6	55%	11	100%
MATHD052.	Success	1	33%	2	67%	3	100%
MATHD114.	Success	57	67%	28	33%	85	100%
	Non Success	16	25%	47	75%	63	100%
MATHD210.	Success	4	40%	6	60%	10	100%
	Non Success	4	27%	11	73%	15	100%
MATHD212.	Success	8	47%	9	53%	17	100%
	Non Success	9	20%	37	80%	46	100%
Math Refresher Course	Success	4	67%	2	33%	6	100%
	Non Success	2	100%			2	100%
Total		752	30.3	299	10.7	1,051	41