# De Anza College Office of Institutional Research and Planning

**To:** Ravjeet Singh, Economics Department Chair

**From:** Mallory Newell, De Anza Researcher

**Date:** 4/19/2013

**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. 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 3. 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 4. 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 5. 2 X 2 Matrix - Math 212 or Higher – Number**

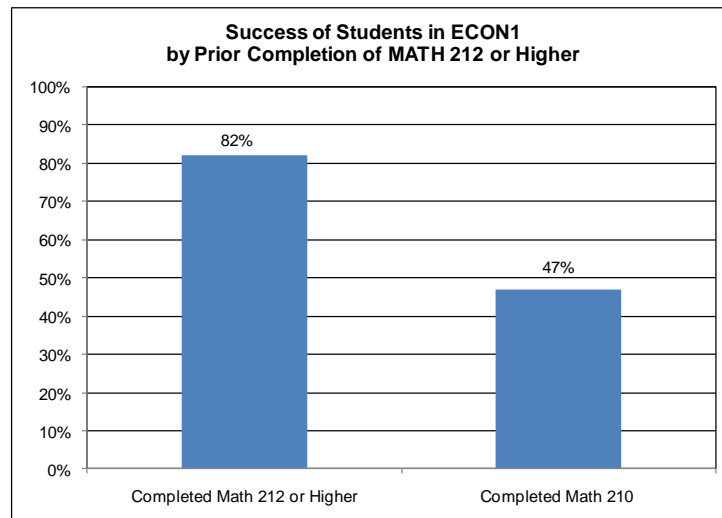| Successfully Completed Math 212 or Higher | Success in ECON1 | Non Success in ECON1 | Total |
|---|---|---|---|
| Yes | 606 | 133 | 739 |
| No | 146 | 166 | 312 |
| Total | 752 | 299 | 1,051 |

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 6. 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 7. 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 8. 2 X 2 Matrix – Math 114 or Higher – Number**

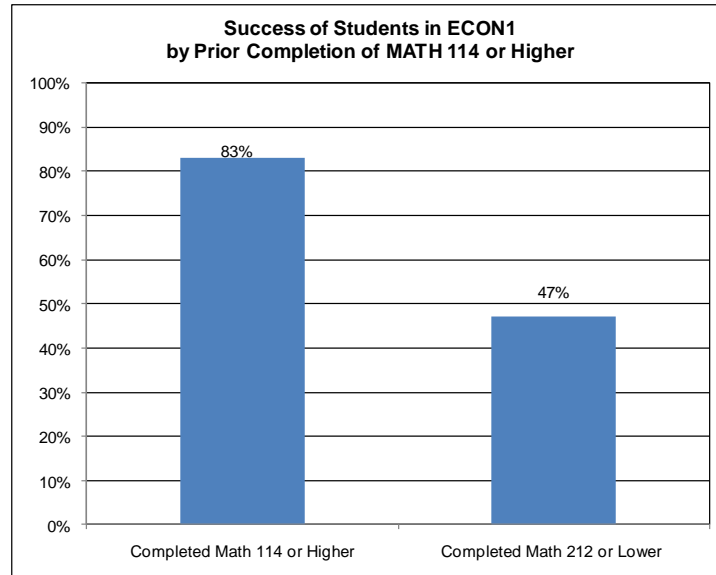| Completed Math 114 or Higher | Success in ECON1 | Non Success in ECON1 | Total |
|---|---|---|---|
| Yes | 598 | 124 | 722 |
| No | 154 | 175 | 329 |
| Total | 752 | 299 | 1,051 |

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 9. 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**

**Success of Students in ECON1**
**by Prior Completion of 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 10. 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 11. 2 X 2 Matrix – Math 10 or Higher – Number**

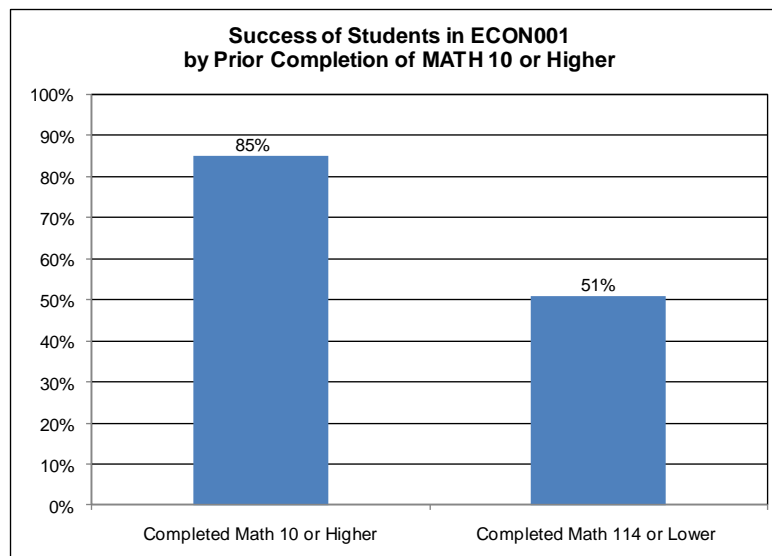| Completed Math 10 or Higher | Success in ECON1 | Non Success in ECON1 | Total |
|-----------------------------|------------------|----------------------|-------|
| Yes   | 541 | 96  | 637   |
| No    | 211 | 203 | 414   |
| Total | 752 | 299 | 1,051 |

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 12. 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**



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 13. 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 |