

Learning in the Time of COVID-19

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Background

- January 2020: For other research purposes, began collecting data from Michigan State University students enrolled in introductory economics courses
- March 2020: MSU moves to online learning
- April 2020: Collect information on students' perceptions about the move to remote education during the pandemic

This Paper

- Using data collected from two surveys, how did students respond to the disruption generated by COVID-19, specifically:
 - ⇒ Do demographic and academic factors predict how students respond?
 - ⇒ How are students' final grades in their economics course related to their response?

Institutional Context

- MSU is a land-grant public university in the state of Michigan
- The university serves 50,000 students – 39,000 of which are undergraduates – in a residential setting
- White: 68% | Black: 7% | Asian: 6% | Hispanic: 5% | International: 10%
- 20% of students are Pell-eligible

Survey

- Surveys were administered using Qualtrics, students were emailed and texted links to the surveys
- The two surveys:
 - Initial Survey – General information and grade students expected to earn in the class
 - Final Survey – Students’ reactions to the COVID-19 pandemic and remote learning
- Response rates:
 - Of the 3,043 eligible students, 1,634 participated (55%)
 - Of the 1,634 students who participated, 1,256 (77%) responded to the final survey; 1,161 students (71%) answered at least one of the COVID-related questions

Final Survey

- Asked students to what degree (using a 5-point Likert scale) they agree with nine statements:
 1. My internet connectivity is sufficient to complete my economics coursework.
 2. My economics course seamlessly moved online.
 3. My economics course content changed very little.
 4. My final grade in my economics course will be unaffected.
 5. My overall semester GPA will be unaffected
 6. My time available for studying has increased.
 7. My ability to focus on my studies has declined.
 8. My anxiety about my studies has increased
 9. My financial situation has worsened.

Sample Descriptives

	N	% of Total Sample
Female	553	47.6
Male	608	52.4
First-Generation	203	17.5
Race/Ethnicity		
White	871	75.0
Black	46	4.0
Hispanic/Latinx	51	4.4
Asian	62	5.3
2 or more Races	28	2.4
Other or Not Reported	14	1.2
International	89	7.7
Enrolled in Intro to Microeconomics	613	52.8
Enrolled in Intro to Macroeconomics	568	48.9
Year at MSU		
1 st Year	495	42.6
2 nd Year	428	36.9
3 rd Year	164	14.1
4 th Year or Later	68	5.9
	Mean	SD
Final Grade in Econ (4.0 scale)	3.25	0.728
GPA (4.0 scale)	3.43	0.505

Empirical Strategy

- To investigate whether demographic and academic factors significantly predict student responses to the nine COVID-related statements, we estimate the following regression:

$$Y_i = \beta_0 + \beta_1 FirstGen_i + \beta_2 Female_i + \beta_3 Race_i + \beta_4 GPA_i + \beta_5 YrCol_i + \beta_6 ExpGr_i + \varepsilon_i$$

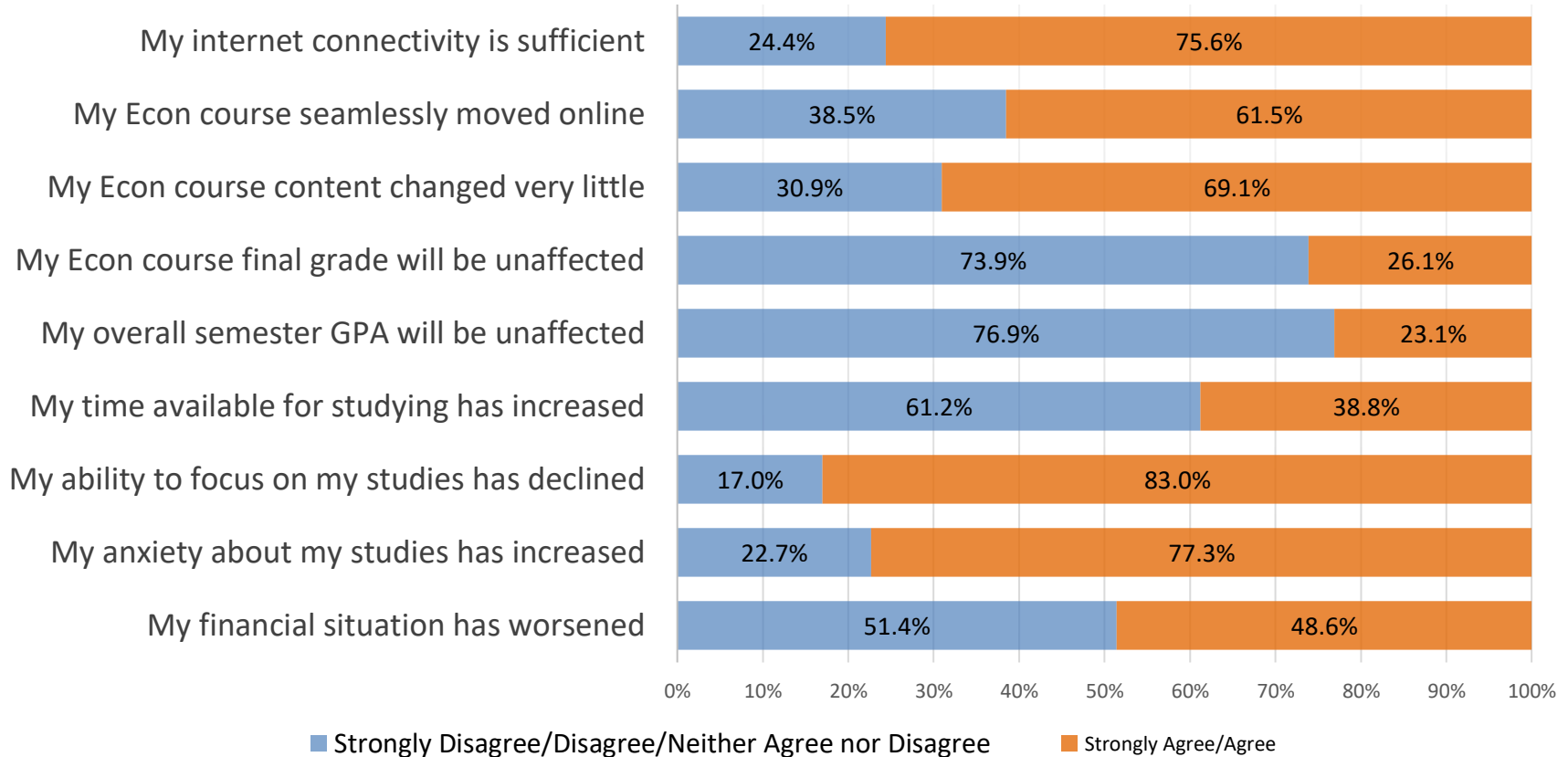
- Y_i is an indicator for whether the student agrees or strongly agrees with the statement

Empirical Strategy

- To analyze how students' final grades in their economics course are related to their response to the pandemic and virtual learning, we estimate the following regression model twice using two different measures for the COVID-related questions:

$$FinalGrade_i = \beta_0 + \mathbf{X}_i\boldsymbol{\beta} + \mathbf{W}_i\boldsymbol{\Gamma} + \varepsilon_i$$

- \mathbf{X} is a vector of COVID-related questions
 - In the first model, the COVID-related questions are binary where it equals 1 if the student responded “strongly agree” to the question and 0 otherwise.
 - In the second model, the COVID-related questions equal 1 if the student responded “agree” or “strongly agree” to the question and 0 otherwise.
- \mathbf{W} are the student background characteristics, year in college, GPA, and expected grade at the start of the semester



Demographic and academic factors that predict how students respond

	Internet connection is sufficient	Overall GPA will be unaffected	Time to study has increased	Ability to focus has decreased	Anxiety has increased	Financial situation has worsened
	b/se	b/se	b/se	b/se	b/se	b/se
First-Generation	0.006 (0.04)	0.034 (0.03)	0.009 (0.04)	0.030 (0.03)	-0.023 (0.03)	0.207*** (0.04)
Female	-0.020 (0.03)	-0.016 (0.03)	-0.036 (0.03)	0.019 (0.02)	0.080** (0.03)	0.090** (0.03)
Race/Ethnicity						
Black	-0.003 (0.07)	-0.003 (0.06)	0.009 (0.07)	-0.050 (0.06)	-0.015 (0.06)	-0.165* (0.07)
Hispanic/Latinx	0.032 (0.06)	0.008 (0.06)	-0.004 (0.07)	-0.059 (0.06)	-0.074 (0.07)	-0.071 (0.07)
Asian	-0.120 (0.06)	0.002 (0.06)	-0.016 (0.06)	-0.020 (0.05)	0.063 (0.05)	-0.012 (0.06)
2 or More Races	-0.157 (0.09)	-0.009 (0.08)	-0.063 (0.09)	-0.070 (0.08)	0.002 (0.08)	0.062 (0.09)
International	0.044 (0.05)	0.195*** (0.06)	0.125* (0.06)	-0.201*** (0.05)	-0.128* (0.05)	-0.085 (0.06)
Other or Not Reported	0.004 (0.12)	0.122 (0.13)	-0.094 (0.13)	-0.139 (0.12)	0.014 (0.11)	-0.031 (0.13)
GPA	0.088** (0.03)	0.038 (0.03)	-0.025 (0.03)	0.014 (0.02)	-0.079*** (0.02)	-0.077* (0.03)
Year in College						
2nd year	0.059* (0.03)	0.030 (0.03)	0.002 (0.03)	-0.023 (0.03)	-0.019 (0.03)	0.049 (0.03)
3rd year	0.037 (0.04)	0.012 (0.04)	-0.037 (0.04)	-0.017 (0.03)	0.013 (0.04)	0.077 (0.04)
4th year or beyond	0.019 (0.06)	0.060 (0.05)	-0.047 (0.06)	0.071 (0.04)	-0.005 (0.05)	0.168** (0.06)
Expected grade at the start of the semester	0.045 (0.04)	0.123** (0.04)	0.068 (0.05)	-0.033 (0.04)	-0.076* (0.03)	-0.102* (0.05)
Constant	0.283 (0.16)	-0.365** (0.14)	0.245 (0.17)	0.914*** (0.13)	1.294*** (0.14)	1.010*** (0.17)

* p<0.05, ** p<0.01, *** p<0.001

Demographic and academic factors that predict how students respond

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* p<0.05, ** p<0.01, *** p<0.001

Demographic and academic factors that predict how students respond

- No differences in gender or race/ethnicity in ability to focus, except for International students

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- Increase in anxiety for female students and students with lower GPAs

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Demographic and academic factors that predict how students respond

- The financial situation has worsened for first-generation college students, women, lower performing students, and students in Year 4+

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Demographic and academic factors that predict how students respond

- Lower performing students experience insufficient internet connectivity

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3rd year	0.037 (0.04)	0.012 (0.04)	-0.037 (0.04)	-0.017 (0.03)	0.013 (0.04)	0.077 (0.04)
4th year or beyond	0.019 (0.06)	0.060 (0.05)	-0.047 (0.06)	0.071 (0.04)	-0.005 (0.05)	0.168** (0.06)
Expected grade at the start of the semester	0.045 (0.04)	0.123** (0.04)	0.068 (0.05)	-0.033 (0.04)	-0.076* (0.03)	-0.102* (0.05)
Constant	0.283 (0.16)	-0.365** (0.14)	0.245 (0.17)	0.914*** (0.13)	1.294*** (0.14)	1.010*** (0.17)

* p<0.05, ** p<0.01, *** p<0.001



Final grade earned in economics course

	Answered “strongly agree” b/se	Answered “agree” or “strongly agree” b/se
COVID-Related Questions		
Internet connection is sufficient	0.092* (0.04)	0.124* (0.05)
Econ course moved seamlessly online	0.098 (0.06)	0.055 (0.05)
Econ course content changed very little	0.103 (0.06)	0.114* (0.05)
Final grade in Econ will be unaffected	-0.080 (0.09)	0.215*** (0.05)
Overall GPA will be unaffected	0.021 (0.09)	-0.027 (0.06)
Time to study has increased	0.209*** (0.06)	0.051 (0.04)
Ability to focus has decreased	-0.085* (0.04)	-0.079 (0.05)
Anxiety has increased	-0.138** (0.04)	-0.072 (0.04)
Financial situation has worsened	-0.066 (0.05)	-0.046 (0.04)
First-Generation	-0.101 (0.05)	-0.109 (0.06)
Female	0.013 (0.04)	-0.006 (0.04)
Race/Ethnicity		
Black	-0.273 (0.15)	-0.254 (0.15)
Latinx/Hispanic	-0.071 (0.09)	-0.098 (0.09)
Asian	0.095 (0.08)	0.127 (0.08)
2 or More Races	0.237* (0.09)	0.244* (0.10)
International	0.315*** (0.07)	0.319*** (0.07)
Other or Not Reported	-0.042 (0.14)	-0.022 (0.14)
Expected grade at the start of the semester	0.450*** (0.07)	0.419*** (0.06)
GPA	0.440*** (0.04)	0.449*** (0.04)
Year in College		
2nd year	0.038 (0.04)	0.031 (0.04)
3rd year	0.067 (0.06)	0.061 (0.06)
4th year or later	0.005 (0.08)	0.001 (0.08)
Constant	0.145 (0.24)	0.059 (0.25)

* p<0.05, ** p<0.01, *** p<0.001

Final grade earned in economics course

- Students with insufficient internet connection earned lower final grades

	Answered “strongly agree” b/se	Answered “agree” or “strongly agree” b/se
COVID-Related Questions		
Internet connection is sufficient	0.092* (0.04)	0.124* (0.05)
Econ course moved seamlessly online	0.098 (0.06)	0.055 (0.05)
Econ course content changed very little	0.103 (0.06)	0.114* (0.05)
Final grade in Econ will be unaffected	-0.080 (0.09)	0.215*** (0.05)
Overall GPA will be unaffected	0.021 (0.09)	-0.027 (0.06)
Time to study has increased	0.209*** (0.06)	0.051 (0.04)
Ability to focus has decreased	-0.085* (0.04)	-0.079 (0.05)
Anxiety has increased	-0.138** (0.04)	-0.072 (0.04)
Financial situation has worsened	-0.066 (0.05)	-0.046 (0.04)
First-Generation	-0.101 (0.05)	-0.109 (0.06)
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Latinx/Hispanic	-0.071 (0.09)	-0.098 (0.09)
Asian	0.095 (0.08)	0.127 (0.08)
2 or More Races	0.237* (0.09)	0.244* (0.10)
International	0.315*** (0.07)	0.319*** (0.07)
Other or Not Reported	-0.042 (0.14)	-0.022 (0.14)
Expected grade at the start of the semester	0.450*** (0.07)	0.419*** (0.06)
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3rd year	0.067 (0.06)	0.061 (0.06)
4th year or later	0.005 (0.08)	0.001 (0.08)
Constant	0.145 (0.24)	0.059 (0.25)

* p<0.05, ** p<0.01, *** p<0.001

Final grade earned in economics course

- Students who reported their ability to focus decreased and those whose anxiety increased earned lower final grades

	Answered “strongly agree” b/se	Answered “agree” or “strongly agree” b/se
COVID-Related Questions		
Internet connection is sufficient	0.092* (0.04)	0.124* (0.05)
Econ course moved seamlessly online	0.098 (0.06)	0.055 (0.05)
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4th year or later	0.005 (0.08)	0.001 (0.08)
Constant	0.145 (0.24)	0.059 (0.25)

Conclusions

- As students continue to grapple with the educational fallout of the pandemic, we need to pay attention to the stress and anxiety students – particularly women, first-generation, and lower performing students – are experiencing
- Requiring access to instruction via online learning has showcased the need for quality internet access
- The coronavirus pandemic has raised a lot of questions about the future of online education, it is important to keep in mind the ways in which students are impacted by such a move

Thank you!

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