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Assessing the Impact of the COVID-19 Disruption on Student Success - FS2019 and FS2020 U/G Cohorts

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Abstract:

I will discuss my attempts to assess the system-wide impact of the COVID-19 disruption of the academic schedule during Academic years 2019-20 and 2020-21, on Student Success.

My focus is on cohorts of full-time, degree-seeking, first time college, non-NRA, undergraduate students at the four universities comprising a public, Midwestern, research university system.

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Outline:

The COVID-19 FTC Cohorts

FS2019 FTC Cohort: COVID-19 strikes in March 2020. Shuts down on-campus activity, sends students home, moves instruction on-line. Students and families are impacted by the pandemic.

FS2020 FTC Cohort: Instruction remains largely on-line for FS2020. On-campus activities remain curtailed.

QUESTION: Expected "success" of these "COVID Cohorts"?

Stu Success – COVID Cohorts

UM FT, DS, FTC, non-NRA, U/G Cohorts
FS2019 + FS2020 (sans exclusive auditors)

	# Students	# 4-yr Grads (SS2023 + SS2024)	# 6-yr Grads (SS2025 + SS2026)	# 8-yr Grads (SS2027 + SS2028)
Residential Campuses	12,794			
Commuter Campuses	2,928			
TOTAL	**15,722**			

Stu Success – COVID Cohorts

UM FT, DS, FTC, non-NRA, U/G Cohorts FS2019 + FS2020 (sans exclusive auditors)			
	# Students	# 6-yr Grads (SS2025 + SS2026)	# 6-yr UM Grads (SS2025 + SS2026)
Residential Campuses	12,794		
Commuter Campuses	2,928		
TOTAL	**15,722**		

Stu Success – Before-COVID Cohorts

UM FT, DS, FTC, non-NRA, U/G Cohorts FS2012 + FS2013 (sans exclusive auditors)				
	# Students	(Actuals) # 6-yr UM Grads (SS2018 + SS2019)	p	95% CI for p-hat
Residential Campuses	14,607	10,355	**0.7089**	0.7015 - 0.7162
Commuter Campuses	3,020	1,564	**0.5179**	0.5000 - 0.5357
TOTAL	**17,627**	11,919	0.6762	

Predict Stu Success – COVID Cohorts

UM FT, DS, FTC, non-NRA, U/G Cohorts
FS2019 + FS2020 (sans exclusive auditors)

	# Students	p-est (From Before Covid)	(Simple Forecast) # 6-yr UM Grads (SS2025 + SS2026)	"95% PI"
Residential Campuses	12,794	0.7089	**9,070**	8,974 -- 9,163
Commuter Campuses	2,928	0.5179	**1,517**	1,464 -- 1,569
TOTAL	**15,722**		**10,587**	10,438 – 10,732

Stu Success using Early Acad Perf

- 1st-year success:

  iSuccessful = 1 iff *either*
  (stu here in SP, and SP CUMGPA >= 2.0), *or*
  (stu NOT here in SP, and FS CUMGPA >= 2.0);

  iSuccessful = 0 otherwise

- 1-year retention (1st-year retention)

  iHere_UM_NxtFS = 1 iff enrolled *next* Fall Census at UM;

  iHere_UM_NxtFS = 0 otherwise

Early Acad Perf – Residential Campuses

UM FT, DS, FTC, non-NRA, U/G Cohorts (sans exclusive auditors) Early Acad Perf: Residential Campuses					
	# Students	# 00	# 01	# 10	# 11
FS2012 + FS2013	14,607	1,132	656	1,005	11,814
	100%	7.7%	4.5%	6.9%	80.9%
FS2019 + FS2020	12,794	593	279	827	11,095
	100%	4.6%	2.2%	6.5%	86.7%

Early Acad Perf – Commuter Campuses

UM FT, DS, FTC, domestic, U/G cohorts (sans exclusive auditors) Early Acad Perf: Commuter Campuses					
	# Students	# 00	# 01	# 10	# 11
FS2012 + FS2013	3,020	415	135	325	2,145
	100%	13.7%	4.5%	10.8%	71.0%
FS2019 + FS2020	2,928	337	112	369	2,110
	100%	11.5%	3.8%	12.6%	72.1%

Comments:

- Early Acad Performance for UM **RESIDENTIAL** campuses has a ***different distribution*** for **Before-COVID** Cohorts vs. **COVID** Cohorts.

  Calc Chi-Sq Homogeneity = 241.4 (> 12.59) with 6 = (2)(4-1) dof is significant at the 5% significance level.

- Early Acad Performance for UM **COMMUTER** campuses has a ***different distribution*** for **Before-COVID** Cohorts vs. **COVID** Cohorts.

  Calc Chi-Sq Homogeneity = 11.89 (> 10.64) with 6 = (2)(4-1) dof is significant at the 10% significance level.

Maybe, incorporating Early Acad Perf will yield "better" UM-wide 6-year Grad forecasts for the COVID Cohorts!

Stu Success – Before-COVID Cohorts, using Early Acad Perf

- Apply **Logistic Regression** to the **Before-COVID** (**FS2012** + **FS2013**) **Cohorts**, to model UM-wide 6-year Grads as a function of type of campus and early academic performance.

- Apply the resulting *estimated* model to forecast UM-wide 6-year Grads for the **COVID** (**FS2019** + **FS2020**) **Cohorts**.

Stu Success – Before-COVID Cohorts, using Early Acad Perf

	A	F	G	I	EA	EE	EF	FH
1	CV19_Type	Cmp_Type	iCmp_Type	EMPLID	iSuccessful	iHere_UM_NxtFS	Early_Acad_Perf	iGrad6_UM
2	1. Before COVID-19	1. Resi Campus	1		1	1	11	0
3	1. Before COVID-19	1. Resi Campus	1		1	1	11	1
4	1. Before COVID-19	1. Resi Campus	1		1	1	11	1
17628								
17629	1. Before COVID-19	2. Comm Campus	0		1	1	11	1
17630	2. During COVID-19	1. Resi Campus	1		1	1	11	
17631	2. During COVID-19	1. Resi Campus	1		1	1	11	
17632	2. During COVID-19	1. Resi Campus	1		1	1	11	
33351								
33352	2. During COVID-19	2. Comm Campus	0		0	0	00	
33353								

Logistic Regression:

$$\left(\beta_0 + \beta_1 \cdot \text{iCmp_Type} + \beta_2 \cdot \text{iSuccessful} + \beta_3 \cdot \text{iHere_UM_NxtFS}\right.$$

$$+ \beta_{12} \cdot \text{iCmp_Type} \cdot \text{iSuccessful}$$

$$+ \beta_{13} \cdot \text{iCmp_Type} \cdot \text{iHere_UM_NxtFS}$$

$$\left. + \beta_{23} \cdot \text{iSuccessful} \cdot \text{iHere_UM_NxtFS}\right)$$

$$p = Pr(\text{Receive a Bach at UM within 6 years}) = \frac{1}{1 + exp[-(\quad)]}$$

*** SAS Code ***

```
proc logistic data=cv19_success_rprt_data;
   model iGrad6_UM (event = '1') = iCmp_Type
                                   iSuccessful
                                   iHere_UM_NxtFS
                                   iCmp_Type | iSuccessful
                                   iCMP_Type | iHere_UM_NxtFS
                                   iSuccessful | iHere_UM_NxtFS / cl;
   output out=bbbbb_logistic_Acad_BeforeCV pred=phat lower=L95 upper=U95;
   where CV19_Type = '1. Before COVID-19';
run;
```

Stu Success – Before-COVID Cohorts, using Early Acad Perf

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	7355.2068	6	<.0001
Score	7178.3212	6	<.0001
Wald	3368.0731	6	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.1034	0.2816	212.3446	<.0001
iCmp_Type	1	0.8286	0.2804	8.7344	0.0031
iSuccessful	1	1.4506	0.2719	28.4568	<.0001
iHere_UM_NxtFS	1	2.1150	0.2599	66.2177	<.0001
iCmp_Type*iSuccessfu	1	-0.4859	0.2444	3.9537	0.0468
iCmp_Type*iHere_UM_N	1	0.4808	0.2279	4.4512	0.0349
iSuccessf*iHere_UM_N	1	1.4228	0.1961	52.6445	<.0001

Stu Success – Before-COVID Cohorts, using Early Acad Perf

	A	B	C	D	E	F	G	H	I	J
1	CV19_Type	Cmp_Type	iCmp_Type	iSuccessful	iHere_UM_NxtFS	iGrad6_UM	Early_UM_Perf	L95	phat	U95
2	1. Before COVID-19	1. Resi Campus	1	0	0	1	00	0.0273	0.0364	0.0485
3	1. Before COVID-19	1. Resi Campus	1	0	1	1	01	0.3017	0.3365	0.3731
4	1. Before COVID-19	1. Resi Campus	1	1	0	1	10	0.0744	0.0903	0.1092
5	1. Before COVID-19	1. Resi Campus	1	1	1	1	11	0.8400	0.8466	0.8530
6	1. Before COVID-19	2. Comm Campus	0	0	0	1	00	0.0094	0.0162	0.0279
7	1. Before COVID-19	2. Comm Campus	0	0	1	1	01	0.0797	0.1204	0.1779
8	1. Before COVID-19	2. Comm Campus	0	1	0	1	10	0.0449	0.0658	0.0954
9	1. Before COVID-19	2. Comm Campus	0	1	1	1	11	0.6883	0.7078	0.7266
10										

Stu Success – Before-COVID Cohorts, using Early Acad Perf

UM FT, DS, FTC, non-NRA, U/G Cohorts
FS2012 + FS2013 (sans exclusive auditors)

	Acad Perf	# Stu	# 6-yr UM Grads (Actuals)	p-hat (Logistic Reg)	L95	U95
Resi Campus	00	1,132	44	**0.0364**	0.0273	0.0485
Resi Campus	01	656	218	**0.3365**	0.3017	0.3731
Resi Campus	10	1,005	88	**0.0903**	0.0744	0.1092
Resi Campus	11	11,814	10,005	**0.8466**	0.8400	0.8530
Comm Campus	00	415	4	**0.0162**	0.0094	0.0279
Comm Campus	01	135	19	**0.1204**	0.0797	0.1779
Comm Campus	10	325	26	**0.0658**	0.0449	0.0954
Comm Campus	11	2,145	1,515	**0.7078**	0.6883	0.7266

Predict Stu Success – COVID Cohorts, using Early Acad Perf

UM FT, DS, FTC, non-NRA, U/G Cohorts
FS2019 + FS2020 (sans exclusive auditors)

	Acad Perf	# Stu	p-est (from Before-COVID Logistic)	# 6-yr UM Grads (Logistic Forecast)	L95	U95
Resi Campus	00	593	0.0364	**22**	17	29
Resi Campus	01	279	0.3365	**94**	85	105
Resi Campus	10	827	0.0903	**75**	62	91
Resi Campus	11	11,095	0.8466	**9,394**	9,321	9,465
Comm Campus	00	337	0.0162	**6**	4	10
Comm Campus	01	112	0.1204	**14**	9	20
Comm Campus	10	369	0.0658	**25**	17	36
Comm Campus	11	2,110	0.7078	**1,494**	1,453	1,534

Predict Stu Success – COVID Cohorts

UM FT, DS, FTC, non-NRA, U/G Cohorts
FS2019 + FS2020 (sans exclusive auditors)

	# Students	(Simple Forecast) # 6-yr UM Grads (SS2025 + SS2026)	(Logistic Forecast) # 6-yr UM Grads (SS2025 + SS2026)
Residential Campuses	12,794	**9,070**	**9,585**
Commuter Campuses	2,928	**1,517**	**1,539**
TOTAL	**15,722**	**10,587**	**11,124**

CONCLUSION:

The data suggest that there *is* a "COVID effect" (on Early Academic Performance). (Except, in a counterintuitive way!!)

Incorporating Early Academic Performance in a Logistic Regression model "calibrated" with **Before-COVID Cohort** data, yields different--*better*?--forecasts of UM-wide 6-Year Grads for the **COVID Cohorts**, that reflect the COVID-19 "disruption."

Summary & Conclusion

Q&A

END

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