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Funding for Postsecondary Education Impacts Kentucky's Undergraduate Enrollment Trends

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Funding for Postsecondary Education Impacts Kentucky's Undergraduate Enrollment Trends

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Capstone - Spring 2021

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Abstract

In the Commonwealth of Kentucky, public universities have consistently seen their state funding decrease over the past several years. Using data from the Kentucky Council on Postsecondary Education and Kentucky Office of State Budget Director, this paper analyzes the relationship among postsecondary education state and federal funding and full-time undergraduate student enrollment in Kentucky's 4-year public universities and the Kentucky Community and Technical College System. According to the Courier Journal, in 2019 "Kentucky was 1 of only 5 states to cut money for higher education" (Watkins). With the fluctuation of higher education funding in Kentucky, the concern is how universities will be forced to react to meet financial needs and how tuition increases impact student enrollment. Trends from previous years in Kentucky help provide insight into the relationship state and federal funding has had with enrollment in public higher education institutions. Two regressions models illustrate the correlation between state and federal funding changes and enrollment. In-state tuition rates, out-of-state tuition rates, and Kentucky's unemployment rate were also considered. Following the two initial regressions, institutional-based regressions were ran to illustrate how each individual institution reacts to state and federal funding changes, resident and out-of-state tuition rate changes, and the unemployment rate fluctuations. The results from the regressions did not provide enough evidence to reject the null hypothesis. Each institution responds differently to the variables.

Background

The Chronicle of Higher Education published an article in 2018 titled “Kentucky’s New Budget Carries Big Consequences for Public Colleges” (Wyllie). In this piece, Julian Wyllie covers the Kentucky General Assembly’s decision in April of 2018 to cut funding to public colleges. Overall, the budget cut appropriations to public colleges by a total of 6.25 percent over the following two years. The University of Kentucky was projected to lose \$16 million and the University of Louisville’s budget would be cut by \$8.3 million. More specifically, Kentucky lawmakers cut public universities and community colleges funding by 2.4% in the 2019 fiscal year, which is reported as the second-largest percentage drop across the nation. The Center on Budget and Policy Priorities reported that this decrease in funding equated to more than \$7 billion less during the 2018 school year as compared to 2008. (Watkins, 2019). After the 2019 gubernatorial election, the newly elected KY Governor, Andy Beshear, stated his dedication to infuse more dollars back into higher education funding (Watkins, 2019). U.S. News published an article in January of 2020 stating that the president of the Kentucky Council of Postsecondary Education claimed that public colleges will seek a 6.2% increase in the upcoming fiscal cycle and another 8.8% increase in the 2022 fiscal year over current base funding levels (Watkins, 2019).

During the virtual Rally for Higher Education in February of 2021, Governor Beshear stated that an additional \$17 million in funding for postsecondary institutions was pledged. This would be a 2% increase in the general fund investment (Plank, 2021). During the rally, Beshear said, “I believe that every child in Kentucky should be able to go to college, and the governor, nor the General Assembly should tell them what they should study. If we truly want to be competitive with other states, we need to stop the rhetoric that pushes people away and recognize

that we want every Kentuckian to get either a four year degree, a two year degree or a skilled certificate and everybody ought to be on that path” (Plank, 2021).

Problem Statement

This research will seek to draw a correlation between state and federal funding trends and the impact that funding has on Kentucky’s public higher education enrollment numbers. Funding and enrollment trends will be analyzed from 2005 to 2020. This will take into account the impact of the 2008 recession. Changes in in-state and out-of-state tuition rates and Kentucky’s annual unemployment rate will also be considered. The research question is, how does state funding and federal funding for Kentucky’s public 4-year universities and the KCTCS system impact full-time undergraduate student enrollment?

Literature Review

Federal Funding and the 2008 Recession

The financial roller coaster of public universities is largely driven by fluctuations in the national economy. As a recession begins and worsens families’ ability to pay for college, funding cuts historically have resulted in tuition increases at the same time (McPherson & Schapiro, 2003). Even with substantial federal support, public research universities receive nearly half their educational revenue from state and local governments (McPherson & Schapiro, 2003). Robert B. Reich, professor of public policy, University of California at Berkeley, and former U.S. Secretary of Labor said, “Higher education is not recession proof. Eighty percent of college students attend public universities, most of whose budgets are being cut because state tax revenues are leveling off or declining. A deep recession will cause more belt tightening.” (Wolverton, 2008).

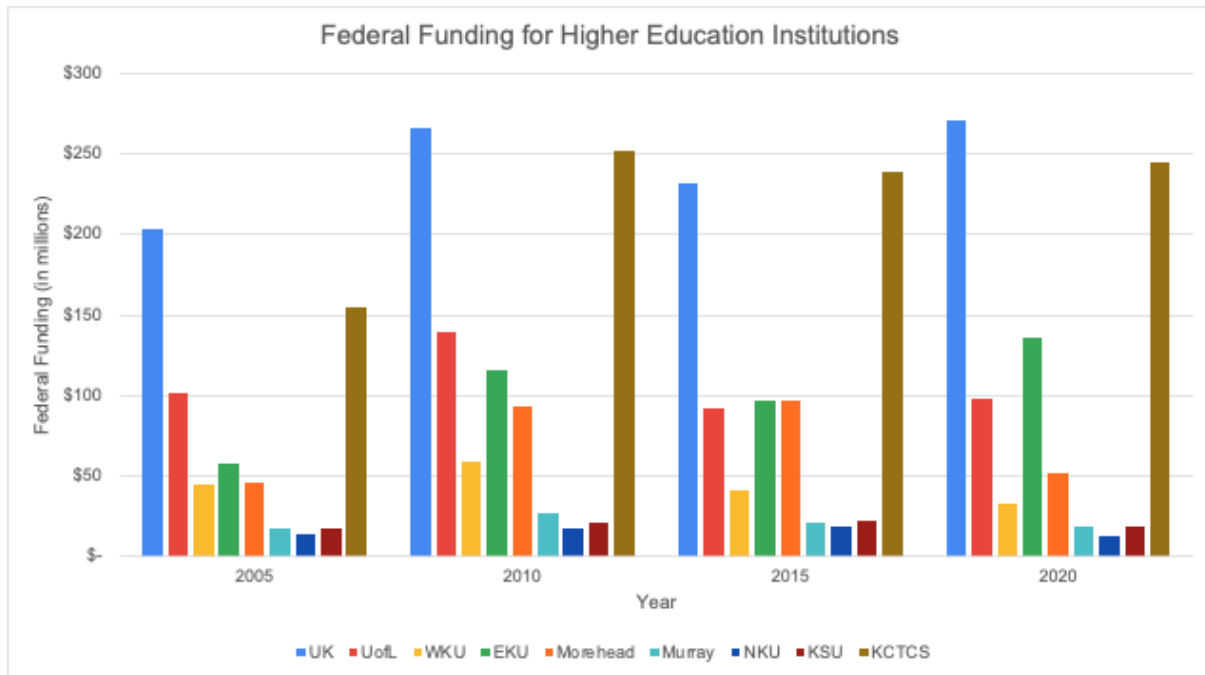
After the 2008 recession, state funding for higher education saw damaging cuts as state governments faced the challenge of the economic downturn and reluctance to raise additional

revenues needed. Since the Great Recession, state spending declined while federal investments in higher education grew sharply. This was driven by increases in the Pell Grant program, a need-based financial aid program that is the biggest component of federal higher education spending (Pew Trusts, 2015). Between 2007 and 2014, the amount of aid distributed through the Federal Pell Grant Program more than doubled, reaching over 3.6 million more students (Mitchell & Leachman, 2015). The average grant award rose by 24%, up to \$3,688 from \$2,969.

Nationally, annual published tuition at four-year public universities has grown by \$1,850 or 27% since the 2007-2008 academic year (Oliff, Palacios, Johnson, & Leachman, 2015). The increases in federal student aid and tax credits have fallen short of covering these increases. (Oliff, Palacios, Johnson, & Leachman, 2015).

Even after the efforts of the Obama Administration, the maximum Pell Grant covers only about 30 percent of the cost of a four-year public college education, which is the lowest proportion in history and less than half of what it covered in 1980 (U.S. Department of Education). Congressmen have proposed to cut the real purchasing power of Pell Grants even further, increasing access barriers to college. Recent federal government action has focused on community college access and vocational training.

Chart 1: Federal Funding for Kentucky’s Public Higher Education Institutions



**Note: Data is from the Kentucky Office of State Budget Director. Funding was recalculated using the consumer price index to put funding in current dollars.*

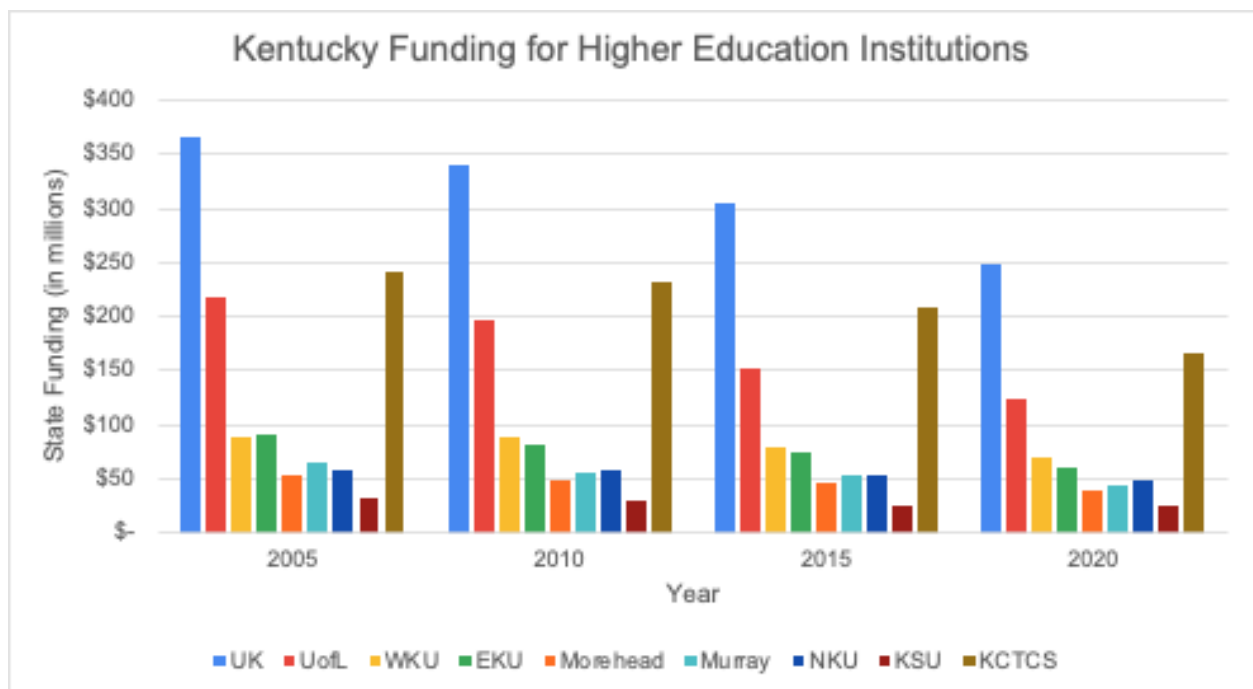
Since 2005, federal funding for Kentucky’s public higher education institutions has varied per institution. For example, when re-calculated to current dollars, as of 2005 the University of Kentucky received \$204,016,101, Morehead State University received \$46,336,940, Kentucky State University received \$16,716,544. The KCTCS system received \$154,949,847 in 2005. Following the beginning of the recession, in 2009 Western Kentucky University and Murray State University saw a decrease in funding. In 2009, all other public institutions saw an increase in federal funding. The only institution that saw a funding cut in 2010 was Northern Kentucky University (decrease of \$1,550,372). By 2015, Kentucky’s public institutions saw an overall total decrease of \$132,750,409 in federal funding compared to 2010 funding. In 2020, the University of Kentucky, Eastern Kentucky University, and Morehead State University saw an increase in federal funding, whereas the other institutions saw decreases.

Despite these decreases, overall Kentucky saw a \$26,499,226 increase in federal funding from 2019 to 2020.

Kentucky's Recent Trends in Higher Education

Adjusting for inflation, the Center on Budget and Policy Priorities (2013) finds that states are spending \$2,353 or 28% less per student on higher education nationwide in 2013 versus 2008. Kentucky comes in with a 26.3% decrease in funding. When funding is cut, universities have to make a choice to cut spending, raise tuition, or both to cover the funding gap (Oliff, Palacios, Johnson, & Leachman, 2015).

Chart 2: Kentucky Funding for Public Higher Education Institutions

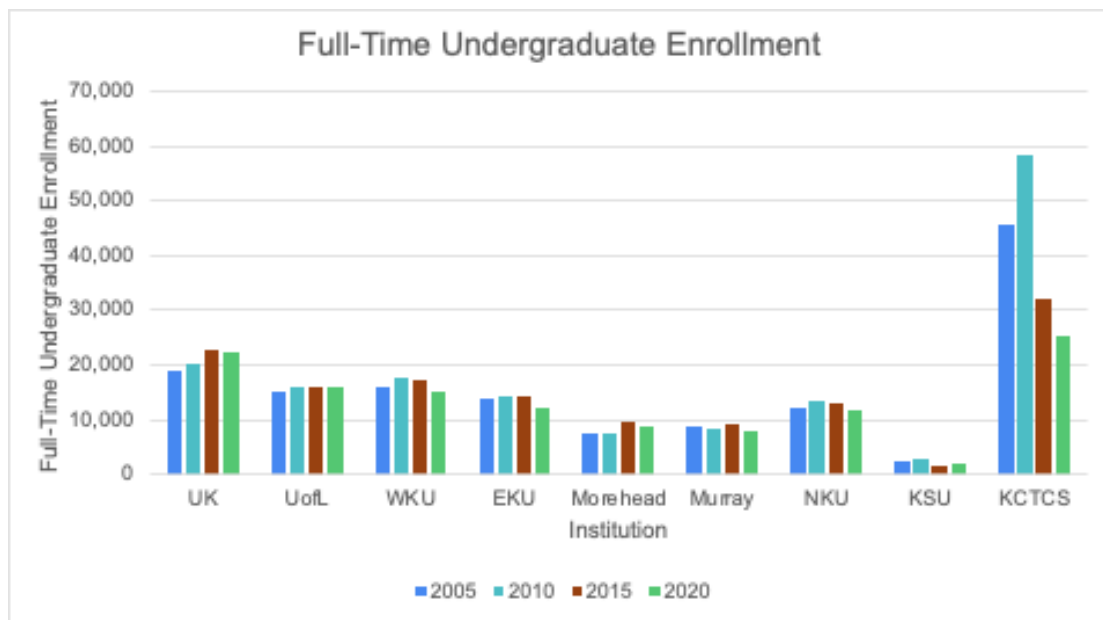


**Note: Data is from the Kentucky Office of State Budget Director. Funding was recalculated using the consumer price index to put funding in current dollars.*

As shown in chart 2, state funding for Kentucky's public higher education institutions has steadily declined overall. For reference, when re-calculated to current dollars, as of 2005 the University of Kentucky received \$366,765,321, Morehead State University received

\$53,308,239, Kentucky State University received \$31,268,221. The KCTCS system received \$242,420,279.00 in 2005. Following the start of the recession, all of Kentucky's public higher education institutions saw a decrease in state funding between 2009 and 2010. By 2015, the University of Kentucky's received \$305,910,724 in state funding, Morehead State University received \$44,899,556, Kentucky State University received \$25,633,320, and KCTCS received \$208,048,411. The other institutions had also experienced decreases in funding. By 2015, Kentucky's saw an overall total decrease of \$135,880,636 in state funding compared to 2010 funding. In 2020, each of Kentucky's public higher education institutions experienced a further reduction in their state funding. Kentucky's public institutions saw a \$145,537,612 decrease in funding in 2020 as compared to 2015, and a \$27,135,813 decrease in state funding from 2019 to 2020.

Chart 3: Full-time Undergraduate Enrollment



**Note: Data is from the Kentucky Council on Postsecondary Education.*

Table 1: Full-time Undergraduate Enrollment

Institution	2005	2010	2015	2020
University of Kentucky	18,732	19,988	22,761	22,246
University of Louisville	15,057	15,818	15,985	16,118
Western Kentucky University	15,978	17,827	17,315	15,287
Eastern Kentucky University	13,942	14,396	14,327	12,070
Morehead State University	7,549	7,399	9,783	8,621
Murray State University	8,585	8,429	9,268	7,939
Northern Kentucky University	12,107	13,517	12,806	11,672
Kentucky State University	2,228	2,606	1,433	2,148
Kentucky Community and Technical College System	45,654	58,578	31,932	25,342
<i>Total 4-year institution full-time undergraduate enrollment</i>	94,178	99,980	103,678	96,101
<i>Total full-time undergraduate enrollment (including KCTCS)</i>	139,832	158,557	135,610	121,443

**Note: Data is from the Kentucky Council on Postsecondary Education.*

As shown in table 2, Kentucky's total full-time undergraduate enrollment peaked in 2010 with a total of 158,557 full-time undergraduate students across all institutions. Data shows a steady increase in Kentucky's total full-time undergraduate enrollment between 2005 and 2010, but total enrollment has been decreasing since 2011. In 2010, KCTCS reached 58,578 full-time undergraduate students, but has been declining in full-time undergraduate enrollment since 2011. As of 2020, KCTCS has a full-time undergraduate enrollment of 25,342. While KCTCS is declining in enrollment, Kentucky's 4-year public institutions had steady growth from 2005 to 2014, when the total 4-year institution enrollment hit a high of 104,094 full-time undergraduate students. None of the 4-year public institutions have shown consistent growth or declines in

enrollment trends since 2014. Each individual institution has experienced fluctuations in full-time enrollment totals. For example, the University of Louisville had a full-time undergraduate enrollment of 16,162 students in 2014, down to 15,985 students in 2015, and back up to 16,029 in 2016.

Chart 4: Kentucky Resident Tuition and Fees

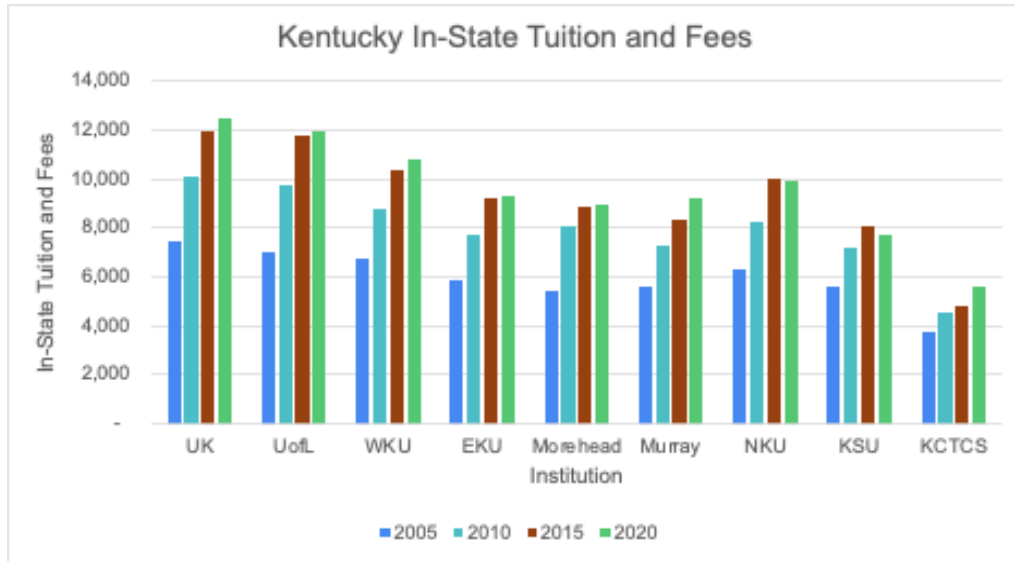
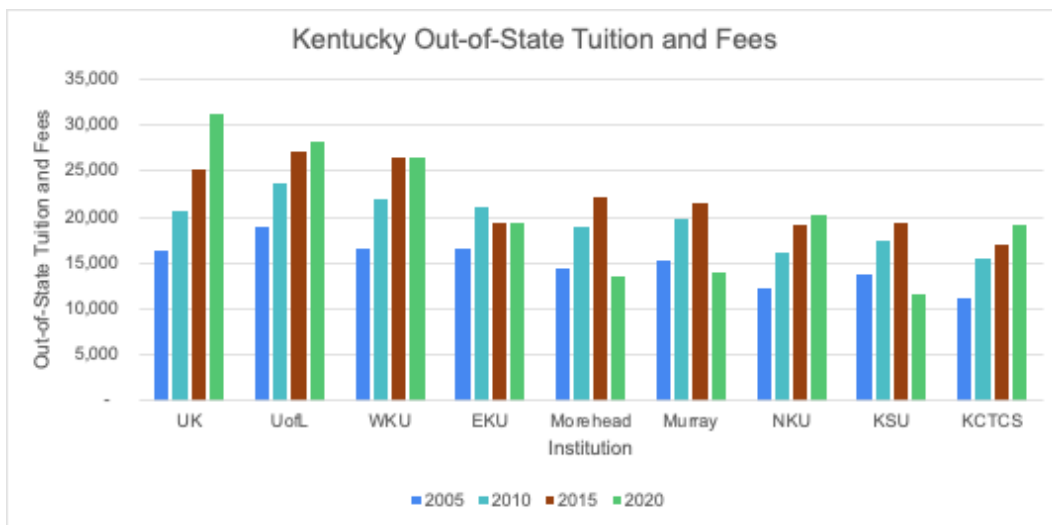


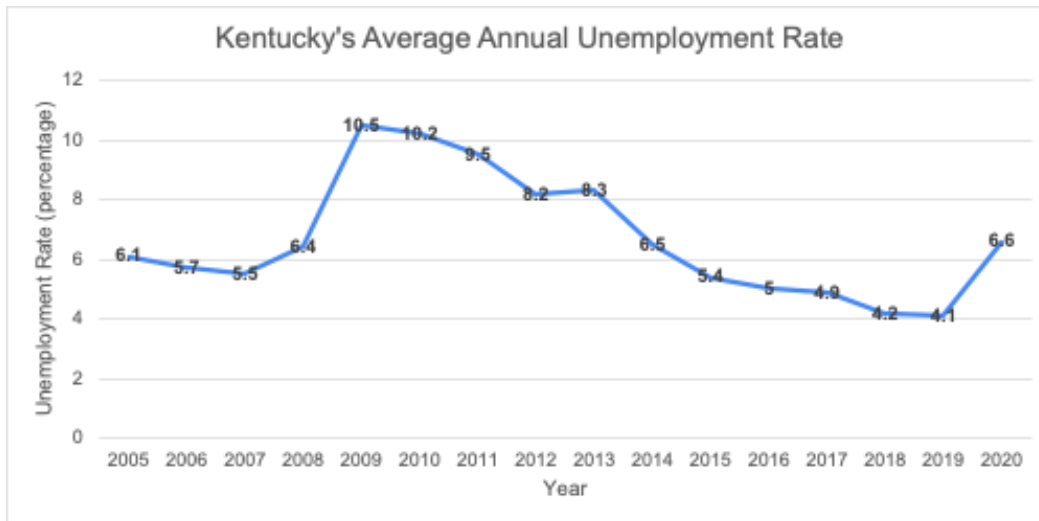
Chart 5: Out-of-State Tuition and Fees



**Note: Data in charts 4 and 5 are from the Kentucky Council on Postsecondary Education. Funding was recalculated using the consumer price index.*

In Kentucky, tuition increased sharply at public colleges and universities by 28.1% between the 2007-2008 and 2013-2014 academic years (Mitchell & Leachman, 2015). Dr. Thompson, President of the Kentucky Council on Postsecondary Education, said that last year Kentucky saw a 7% increase in tuition rates (Plank, 2021). Tuition costs are deterring some students from even enrolling in college due to the increase in sticker price. At the same time, even though the cost of attendance is increasing at each university over time, the state grants and scholarships are not increasing at nearly the same rate. In 2011 state grants covered an average of 6% of the cost of attendance at WKU and 9% at UK. In 2015 this decreased to 6% at UK. The same is happening with institutional need-based aid. This in return is leaving more students to fill the gap between scholarships, grants, and loans on their own.

During the 2021 Rally for Higher Education, Dr. Thompson stated, “Now we have had budget cuts, substantial budget cuts over the last many years. Matter of fact, we’ve reduced problem state appropriations about \$3,000 per student over that many years (since he started his position at CPE in 2018), and our tuition has risen significantly but not enough to cover that. So what has happened is that we’ve shifted a lot of that balance to families and students that we have to focus on” (Plank, 2021).

Chart 6: Kentucky Unemployment Rate (2005 - 2020)

**Note: Data is from the U.S. Bureau of Labor Statistics*

Another factor that needs to be considered in Kentucky is changes in the unemployment rate. The opportunity cost, the money a student could earn by entering the workforce instead of pursuing a college path, impacts enrollment. When unemployment rates are higher, the opportunity cost is lower, whereas when unemployment rates are low and jobs are plentiful, the opportunity cost is higher. Inside Higher Ed reported that, “For middle- and higher-income students, it is easy to choose the much greater long-term benefit over the short-term prospect of poor wages in a low-skill job. But for those with no savings or support from family members...work may seem like the only viable option.” Therefore, when unemployment goes up, enrollment increases. A national trend shows that, “For every 1 percentage point change in the unemployment rate from May to May, community colleges can expect a 2.5 percent change (up or down) in fall full-time enrollment” (Johnson, 2015).

Long-Term Impact of Higher Education Funding

According to the U.S. Department of Education, three-quarters of the fastest-growing occupations require education and training beyond a high school diploma. The concern is that nearly half the students who begin college in the United States don't finish within six years. As tuition continues to increase, college becomes further out of reach for the families that need it most to join the middle class.

In 1980, the share of high education revenue from students and parents 35% and by 2007 this raised to 53% (Zumeta, 2010). On the other hand, two-year colleges have held tuition rates closer to the inflation rate. College Board shared that the price of attending a four-year college, with increases in aid, has grown significantly faster than the growth in median income. This rise in tuition burdens students with a surge in debt. Between 2007-08 and the 2010-11 academic years, the average amount of debt accrued by the average bachelor's degree recipient grew from \$11,800 to \$13,600 (Oliff, Palacios, Johnson, & Leachman, 2015). That is 15% in just three years. This has led to a dramatic increase in the college enrollment gap between youth from higher and lower socioeconomic groups (Oliff, Palacios, Johnson, & Leachman, 2015).

Theory and empirical studies suggest that enrollment decisions of students from low-income backgrounds are more sensitive to the variation in costs of college attendance (McPherson & Schapiro, 2003). Authors Michael Mitchell and Michael Leachman opened the piece stating, "Even as states restore some funding that was cut in recent years, their support for higher education remains well below pre-recession levels, straining college affordability—especially for students whose families struggle to make ends meet" (2015).

In 2012, 79% of students from families in the bottom income quartile that graduated with a bachelor's degree had loans, compared to 55% of students from wealthier families (Mitchell &

Leachman, 2015). As of 2013, the average student graduated with \$25,600 in student debt (up by 16%). This jeopardizes the economic future for both states and students as it is associated with lower rates of homeownership among young adults, reduces the likelihood for graduation, and even can deter STEM students from pursuing a graduate degree.

Impact of COVID-19 on Higher Education

Beginning in August of 2020, the US Census Bureau has conducted biweekly surveys and the results have indicated that anywhere from 7.7 million to 10 million adults canceled their plans to take college courses last fall because of financial constraints related to the pandemic. Although data continues to show “little impact of COVID-19 on high school graduation in 2020”, it was reported by the National Student Clearinghouse Research Center that the number of high school graduates that immediately went on to college in fall 2020 declined 6.8% compared with the previous year (2021). This exemplifies how “the pandemic is hindering educational opportunities for the most vulnerable students, likely limiting their career options and earning potential” (National Student Clearinghouse Research Center, 2021).

Historically, during an economic downturn, college enrollment has increased as those that are unemployed return to school (Reilly, 2021). Despite predictions that students would opt to save money by enrolling in community college during the pandemic, community colleges saw the largest dip in enrollment this past year at 7.5% (Hess, 2020). CNBC reported that while community colleges saw this dip, public 4-year institutions saw little change in overall enrollment compared to what was expected. Nationally, enrollment at four-year public colleges and universities fell by 1.4% overall, and 13.7% for first-year undergraduates (Wall Street Journal, 2020).

Hypothesis

With a research question of, “how does state funding and federal funding for Kentucky’s public 4-year universities and the KCTCS system impact full-time undergraduate student enrollment?”, the null hypothesis is that state and federal funding decreases will not be related to a decrease in student enrollment in public universities. Based on enrollment and funding trends since 2005, I expect that the model will reject the null hypothesis. This suggests that students would not be as likely to enroll in a public university in years when state and federal funding is decreased.

Research Purpose

Based on the inference made in the hypothesis, the roller coaster of state funding for higher education impacts university enrollment trends. In Kentucky, public universities are about to face a budget concern surrounding COVID-19. Despite the goal of each institution to increase enrollment numbers for the upcoming freshmen class, the decrease in state funding and increase in tuition may prohibit admissions teams from reaching their goals. This research will seek to draw a correlation between state and federal funding trends and Kentucky public institution enrollment numbers.

Data Sources and Methods

Panel data from 2005 through 2020 will be pulled from the Kentucky Council on Postsecondary Education, the Kentucky Office of State Budget, and the US Census. To estimate the impact of state and federal funding on undergraduate enrollment in Kentucky public higher education institutions, two regression will be used. STATA will be used to run the regressions. This will allow me to analyze the relationship between the dependent variable and independent variables in the dataset, ultimately allowing me to look at the time series and forecast trends for

the future based on varying assumptions. The first regression will be ran including KCTCS data and the second regression will be ran without KCTCS data.

Several explanatory variables will be used in the analysis to establish correlation. The explanatory variables were selected to look at the fluctuation in each institution's tuition rates each year and look at the economy of the state through the lense of Kentucky's unemployment rate each year. By including these variables in the regression, a larger scan of the environment surrounding higher education enrollment numbers can be considered.

Regression Variables

Dependent variable: Undergraduate enrollment

- Unit of Analysis: Kentucky public postsecondary institutions including the University of Kentucky, Eastern Kentucky University, University of Louisville, Western Kentucky University, Morehead State University, Murray State University, Kentucky State University, Northern Kentucky University and Kentucky Community and Technical College System

Primary independent variables: federal funding and state funding

Explanatory Variables: resident tuition and fees, out-of-state tuition and fees, Kentucky unemployment rate

Year and Institution Fixed-Effects

Regression Analysis

Table 2: Regression Results (with KCTCS)

	Dependent variable: Undergraduate enrollment (full-time students)
Kentucky Funding	0.058*** (0.017)
Federal Funding	-0.036** (0.0129)
Resident Tuition and Fees	1.044*** (0.321)
Out-of-State Tuition and Fees	-0.009 (0.132)
Kentucky Unemployment Rate	501.281*** (146.092)
Constant	-377.492
Observations	144 9 groups (16 observations each)
R-squared within	0.2227
R-squared between	0.0563
R-squared overall	0.0689

*Note: Data is from the Kentucky Council on Postsecondary Education, U.S. Bureau of Labor Statistics, and Kentucky Office of State Budget Director.; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.*

Table 3: Regression Results (without KCTCS)

	Dependent variable: Undergraduate enrollment (full-time students)
Kentucky Funding	-0.017*** (0.004)
Federal Funding	0.002 (0.004)

Resident Tuition and Fees	0.054 (0.772)
Out-of-State Tuition and Fees	0.017 (0.031)
Kentucky Unemployment Rate	85.394* (35.381)
Constant	12712.24
Observations	128 8 groups (16 observations each)
R-squared within	0.3120
R-squared between	0.5709
R-squared overall	0.4682

*Note: Data is from the Kentucky Council on Postsecondary Education, U.S. Bureau of Labor Statistics, and Kentucky Office of State Budget Director.; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.*

Table 4: Descriptive Statistics of the Data (with KCTCS)

Variable	Mean	Std. Dev.	Min	Max
Kentucky Funding	\$120,116	\$98,002	\$25,259	\$395,919
Federal Funding	\$94,081	\$83,504	\$13,075	\$300,230
Resident Tuition and Fees	\$8,426	\$2140	\$3706	\$12,724
Out-of-State Tuition and Fees	\$19,669	\$4,440	\$11,119	\$31,294
Kentucky Unemployment Rate	6.69%	1.99%	4.1%	10.5%

Note: Data is from the Kentucky Council on Postsecondary Education, U.S. Bureau of Labor Statistics, and Kentucky Office of State Budget Director. Kentucky Funding and Federal Funding are shown in \$1,000's of 2020 current dollars. Resident Tuition and Fees and Out-of-State Tuitions and Fees are in 2020 current dollars.

Table 5: Descriptive Statistics of the Data (without KCTCS)

Variable	Mean	Std. Dev.	Min	Max
Kentucky Funding	\$107,631	\$96,352	\$25,529	\$395,911
Federal Funding	\$77,744	\$72,139	\$13,075	\$279,884
Resident Tuition and Fees	\$8,890	\$1,780	\$5,446	\$12,724
Out-of-State Tuition and Fees	\$20,130	\$4,420	\$11,50	\$31,294
Kentucky Unemployment Rate	6.69%	1.99%	4.1%	10.5%

Note: Data is from the Kentucky Council on Postsecondary Education, U.S. Bureau of Labor Statistics, and Kentucky Office of State Budget Director. Kentucky Funding and Federal Funding are shown in \$1,000's of 2020 current dollars. Resident Tuition and Fees and Out-of-State Tuitions and Fees are in 2020 current dollars.

In the first regression, when KCTCS data was included, the overall r-squared value was 0.0689, which suggests that the overall fit for the model is poor. When KCTCS data were excluded in the second regression, the overall r-squared value was larger, at 0.4682. In this regression, state funding and the unemployment rate were found to have a meaningful association with enrollment. For every \$1,000 increase in state funding, enrollment decreased by 0.017 students. Federal funding did not have a significant effect on enrollment in the second regression. For every \$1,000 increase in federal funding, enrollment increased by 0.002 students. Additionally, for every \$1.00 increase in in-state tuition, enrollment increased by 0.054 students and for every \$1.00 increase in out-of-state tuition resulted in a increase of 0.017 students. Neither in-state or out-of-state tuition was found to have a meaningful relationship with enrollment. Lastly, the regression showed that for every 1% increase in Kentucky's unemployment rate, there was an increase in enrollment of 85 students. This was significant.

The associations with state funding and the unemployment rate are consistent with the literature review. Between 2005 and 2014, the overall 4-year public institution enrollment

increased each year (individual institutions varied in whether they saw a slight increase or decrease). Although state funding saw an increase between 2005 and 2008, since 2008 the total funding allocated for public higher education institutions in Kentucky has steadily decreased. While state funding decreased, enrollment in 4-year public universities in Kentucky continued to see an overall decrease in enrollment between 2014 (when enrollment peaked) and 2020. The changes in enrollment are indicated in the table 6 below.

Table 6: Changes in Full-Time Undergraduate Enrollment

Institution	2015	2016	2017	2018	2019	2020
University of Kentucky	487**	-87**	-197**	-289**	88**	-30**
University of Louisville	-177**	44**	-291	96**	240**	44**
Western Kentucky University	-144**	286**	65**	-631**	-1,128**	-620
Eastern Kentucky University	388**	-34**	-150**	-744*	-737**	-592
Morehead State University	-169*	-29*	-88**	-266*	-436**	-343
Murray State University	-176*	-382**	-250**	-494**	73**	-276
Northern Kentucky University	-304**	-163**	-71**	-414**	-100**	-386*
Kentucky State University	-321**	135**	189**	91	363	119
Kentucky Community and Technical College System	-3,576**	-946**	-1,520**	-787**	-872**	-2,465**
<i>Change in 4-year institution full-time undergraduate enrollment</i>	-416	-230	-793	-2,833	-1,637	-2,084
<i>Change in full-time undergraduate enrollment (including KCTCS)</i>	-3,992	-1,176	-2,313	-3,620	-2,509	-4,549
<i>Unemployment rate</i>	5.4%	5.0%	4.9%	4.2%	4.1%	6.6%

Note: Data is from the Kentucky Council on Postsecondary Education. A green box indicates an increase in enrollment. An increase in resident tuition = *. An increase in both resident and out-of-state tuition = **.

Regressions at the Institutional Level

As shown in table 6, each institution varied in enrollment trends each year despite the total overall decrease in enrollment over the years. Therefore, due to the results of the regressions and the lack of variance they were able to show between individual institutions, a regression was ran for each individual institution. The initial regressions expressed the overall relationships of the independent and dependent variables when all institutions were considered together. This was done to measure the impact the dependent variables have on each individual 4-year public university and KCTCS. The results of each regression are shown below. To help with the analysis, the institutional results were organized by institution type (land grant, regional, or KCTCS).

Table 7: Regressions at the Institutional Level

Land Grant Institutions	
University of Kentucky	Dependent variable: Undergraduate enrollment (full-time students)
Kentucky Funding	-0.022* (0.007)
Federal Funding	-0.019* (0.008)
Resident Tuition and Fees	0.866*** (0.177)
Out-of-State Tuition and Fees	-0.165 (0.092)
Kentucky Unemployment Rate	-8.884 (89.681)
Constant	27094.34
R-squared	0.960
Kentucky State University	

Kentucky Funding	0.822*** (0.183)
Federal Funding	-0.016 (0.015)
Resident Tuition and Fees	0.113 (0.076)
Out-of-State Tuition and Fees	-0.065*** (0.138)
Kentucky Unemployment Rate	120.142*** (20.486)
Constant	-458.365
R-squared	0.933
Regional Institutions	
University of Louisville	Dependent variable: Undergraduate enrollment (full-time students)
Kentucky Funding	0.001 (0.004)
Federal Funding	-0.002 (0.002)
Resident Tuition and Fees	0.235 (0.273)
Out-of-State Tuition and Fees	-0.006 (0.167)
Kentucky Unemployment Rate	55.792* (22.619)
Constant	13031.97
R-squared	0.902
Western Kentucky University	
Kentucky Funding	0.062* (0.024)
Federal Funding	0.049

	(0.024)
Resident Tuition and Fees	-2.071* (0.923)
Out-of-State Tuition and Fees	1.067* (0.357)
Kentucky Unemployment Rate	56.291 (88.473)
Constant	3714.903
R-squared	0.800
Eastern Kentucky University	
Kentucky Funding	0.013 (0.046)
Federal Funding	-0.043 (0.021)
Resident Tuition and Fees	0.753* (0.298)
Out-of-State Tuition and Fees	0.057 (0.193)
Kentucky Unemployment Rate	288.479* (109.279)
Constant	7622.146
R-squared	0.629
Morehead State University	
Kentucky Funding	-0.037 (0.075)
Federal Funding	-0.011 (0.038)
Resident Tuition and Fees	0.473 (0.272)
Out-of-State Tuition and Fees	0.248 (0.261)

Kentucky Unemployment Rate	-124.469 (146.138)
Constant	4134.516
R-squared	0.744
Murray State University	
Kentucky Funding	-0.064 (0.052)
Federal Funding	0.003 (0.044)
Resident Tuition and Fees	-0.547 (0.373)
Out-of-State Tuition and Fees	0.093 (0.058)
Kentucky Unemployment Rate	-7.065 (76.561)
Constant	14579.21
R-squared	0.257
Northern Kentucky University	
Kentucky Funding	-0.028 (0.031)
Federal Funding	0.084 (0.050)
Resident Tuition and Fees	1.302* (0.550)
Out-of-State Tuition and Fees	-0.671* (0.294)
Kentucky Unemployment Rate	182.657* (67.037)
Constant	11630.94
R-squared	0.8423

Kentucky Community and Technical College System	
	Dependent variable: Undergraduate enrollment (full-time students)
Kentucky Funding	0.119 (0.088)
Federal Funding	-0.029 (0.039)
Resident Tuition and Fees	-6.124 (11.621)
Out-of-State Tuition and Fees	0.358 (2.371)
Kentucky Unemployment Rate	2392.214*** (737.327)
Constant	26672.5
R-squared	0.892

*Note: Data is from the Kentucky Council on Postsecondary Education, U.S. Bureau of Labor Statistics, and Kentucky Office of State Budget Director. Robust standard errors clustered by school; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.*

The institutional-based regression results shown in table 7 show that Kentucky's two land grant institutions, the University of Kentucky (UK) and Kentucky State University (KSU), have a significant relationship with state funding and enrollment. For every \$1,000 increase in state funding, at UK there is a decrease of 0.022 students enrolled. State funding has the opposite effect on KSU. For every \$1,000 increase in state funding, at KSU there is an increase of 0.822 students. Federal funding showed a significant relationship at UK, but not KSU. AT UK, for every \$1,000 increase in federal funding there would be a decrease of 0.019 students.

The only regional institution that showed a significant relationship with state funding and enrollment was Western Kentucky University (WKU). For every \$1,000 increase in state

funding, WKU increased enrollment by 0.062 students. None of the regional institutions showed a significant relationship with federal funding and enrollment.

The results for the Kentucky Community and Technical College System (KCTCS) did not show any statistically significant results for state or federal funding. The Kentucky unemployment rate did show a meaningful relationship with enrollment. For every 1% increase in the unemployment rate, enrollment in KCTCS increases by 2,392 students. As shown in table 7, other institutions had a statistically significant correlation with enrollment and the unemployment rate, but KCTCS had the strongest relationship with this dependent variable.

Table 7 also shows that each institution varies on how both resident and out-of-state tuition and fees impact enrollment. For some institutions, like UK, an increase in resident tuition correlates with an increase in enrollment, whereas for WKU there is a decrease in enrollment. Some institutions even show that there is not a statistically significant relationship between tuition rates and enrollment. This exemplifies how each student has to consider a multitude of factors when selecting a college (beyond just price) and how each institution has to consider the best method for their individual school to recruit and retain students. There is not a uniform impact that state and federal funding has on enrollment.

Limitations of Research

Within the scope of this research design and the data used, a few limitations were present. The first limitation is that data describing how each institution used the allocated state and federal funds was not pulled for consideration. A breakdown of what amount of each institution's budget goes towards facilities management, personnel, research, student resources, etc., could have helped provide information about how the institution is dividing their funds.

On the same note, the performance based funding model that was introduced in Kentucky starting in the 2018-2019 fiscal year was not considered in the data collection. Under this model, funding is distributed based on the components of student success (35%), course completion (35%), and operational support (30%). If performance based funding was reviewed and considered for the past few fiscal years, a greater insight could have been provided as to why tuition rates increased/decreased or why an institution received the amount of funding they did.

Another limitation is that this research initially focused on the overall impact that state and federal funding has on public higher education enrollment in Kentucky. Once the variation were shown per institution in the second round of regressions, it is important to note that the individual preferences and choices of both the student population and the institutions' enrollment management teams plays a key role in enrollment. For instance, on the student end, their academic area of interest, geographic location preference, student body size, athletics, education broad opportunities, and employability rate after graduation are just a few of the variables that they may consider and are hard to collect data on and measure. On the enrollment management team side, FAFSA completion rates, acceptance rates, and ACT/SAT admissions criteria can play a role in determining the quality of student that is admitted to the institution, later impacting retention rates if quantity of students replaces quality of the student population. These considerations were not able to be made when pulling the data used for the regressions.

Conclusion

After concluding the research, there was not enough evidence found to reject the null hypothesis. A few relationships can be inferred from the results. Although the initial regression analysis showed a statistically significant relationship between an increase in state funding and a small decrease in enrollment in Kentucky's public higher education institutions, the variation per

institution needs to be considered when analyzing higher education trends. Land grant institutions, regional institutions, and community colleges all have different missions and will, as shown by the institutional level regressions, react to funding changes differently. Some will make up the difference in funding with tuition increases, while others may lower tuition slightly to attract more students to enroll. One meaningful relationship that can be concluded is that as the unemployment rate increases, there is a correlation in students enrolling in the KCTCS system instead of a 4-year public institution. This was shown in the first two regressions and again in the KCTCS regression.

As Kentucky's public higher education institutions look ahead and set expectations for enrollment during the pandemic and post-COVID-19, Kentucky's performance based funding model does need to be considered, however other variables should be considered as well. These may include, ACT/SAT test admissions and scholarship eligibility criteria, out-of-state enrollment verses in-state enrollment, and acceptance rates. Undergraduate recruitment efforts are expected to shift after COVID-19. It will be interesting to see how Gen Z and institutions react to state funding and federal funding in the future.

References

- Callan , P. M. (2002). Coping with Recession: Public Policy, Economic Downturns and Higher Education. *The National Center for Public Policy and Higher Education*.
- Causey, J., Harnack-Eber, A., Ryu, M., & Shapiro, D. (March 2021), A COVID-19 Special Analysis Update for High School Benchmarks, Herndon, VA: National Student Clearinghouse Research Center.
- College Affordability and Completion: Ensuring a Pathway to Opportunity. (n.d.). Retrieved from <https://www.ed.gov/college>
- Data Center. (n.d.). Retrieved from <https://cpe.ky.gov/data/>
- Ellis, L. (2020, July 22). How the Great Recession Reshaped American Higher Education. Retrieved October 23, 2020, from <https://www.chronicle.com/article/how-the-great-recession-reshaped-american-higher-education/>
- Heller, D. E. (1999). The effects of tuition and state financial aid on public college enrollment. *The Review of Higher Education*, 23(1), 65. Retrieved from <http://ezproxy.uky.edu/login?url=https://www-proquest-com.ezproxy.uky.edu/docview/1308037767?accountid=11836>
- Hess, A. (2020, October 01). College enrollment is down because of the pandemic-and

community colleges have been hit the hardest. Retrieved April 02, 2021, from <https://www.cnn.com/2020/10/01/how-the-coronavirus-pandemic-has-impacted-college-enrollment.html>

Mepheron, M. S., & Schapiro, M. O. (2003). EDUCATION: Funding Roller Coaster for Public Higher Education. *Science*, 302(5648), 1157–1157. doi: 10.1126/science.1091568

Mitchell, M., & Leachman, M. (2017, October 11). Years of Cuts Threaten to Put College Out of Reach for More Students. Retrieved from <https://www.cbpp.org/research/state-budget-and-tax/years-of-cuts-threaten-to-put-college-out-of-reach-for-more-students>

Plank, M. (2021, March 2). Rally for higher education: Tuition cost, state funding, more. Retrieved April, 2021, from <https://www.thenortherner.com/news/2021/03/02/rally-for-higher-education-tuition-cost-state-funding-more/>

Recent Deep State Higher Education Cuts May Harm Students and the Economy for Years to Come. (2017, October 11). Retrieved from <https://www.cbpp.org/research/recent-deep-state-higher-education-cuts-may-harm-students-and-the-economy-for-years-to-come>

Reilly, K. (2021, March 31). Applying to college was hard. covid-19 made it impossible. Retrieved April 06, 2021, from <https://time.com/5951236/college-applications-covid-19/>

The Pew Charitable Trusts. (2015, June). Federal and State Funding of Higher Education. Retrieved October 23, 2020, from https://www.pewtrusts.org/~media/assets/2015/06/federal_state_funding_higher_education_final.pdf

Wall Street Journal. (2020, October 15). How Covid-19 has affected college enrollment.

Retrieved April 02, 2021, from

<https://www.wsj.com/articles/how-covid-19-has-affected-college-enrollment-1160278346>

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Watkins, M. (2019, February 17). Kentucky's 1 of only 5 states to cut money for higher

education this year. Retrieved from <https://www.courier-journal.com/story/news/politics>

[/2019/02/11/kentucky-colleges-university-louisville-uk-face-budget-cuts/2704766002/](https://www.courier-journal.com/story/news/politics/2019/02/11/kentucky-colleges-university-louisville-uk-face-budget-cuts/2704766002/)

Wolverton, B. (2008, March 28). How Might a Recession Impact Higher Education? Retrieved

October 23, 2020, from <http://www.csun.edu/pubrels/clips/March08/03-25-08Z.pdf>

Zumeta, W. (2010). The Great Recession: Implications for Higher Education. *The NEA 2010*

Almanac of Higher Education.