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5-2016

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The Effect of Medicaid Expansion on Emergency Department Utilization in Kentucky

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ABSTRACT

This paper analyzes the impact of a major healthcare reform in Kentucky on outpatient emergency department (ED) visits. I exploit the variation in treatment intensity across counties to determine the effect of expanded Medicaid coverage on Medicaid ED usage rate. I find that there was an insignificant 1 percent increase in ED usage following expansion when utilizing fixed effects. Counties with a high percentage of females experience significantly higher ED rates. Additionally, counties with a lower percentage of children under 21 have higher ED rates.

I. Introduction

Following the launch of Kentucky's state-run insurance marketplace, kynect, and Medicaid expansion under the Affordable Care Act (ACA), Kentucky experienced an 11.4 percentage point decline in its uninsured rate (Gallup, 2015). The latest reported uninsured rate was 9 percent in the first half of 2015 (Norris, 2016). Although the uninsured rate has decreased, utilization of care in Kentucky has not yet been determined.

Because hospitals are obligated to provide at least some care to ensure patients are in stable condition (Federal Emergency Medical Treatment and Active Labor Act of 1986), irrespective of insurance status, the emergency department (ED) is an important point of access to hospital care for the uninsured and a key focus for healthcare utilization. Emergency departments offer convenient access to care after-hours and for people without a regular primary care physician or new to the insurance market. One study found that 76 percent of ED visits made by commercially insured patients are not emergencies (Truven Health Analytics, 2013). If unnecessary ED usage increased due to expansion, then it is notable to consider that a visit to the

ED instead of a primary care doctor costs $580 in 2007 dollars more per visit (New England

Healthcare Institute , 2010).

Rumors are widespread about an increase in ED usage following expansion in Kentucky due to

lack of health literacy and access to care. In a USA Today article, Ungar (2014) reports "…since

the Affordable Care Act took effect in January [January 1, 2014], Norton Hospital has seen its

packed emergency room become even more crowded, with about 100 more patients a month."

However, little research has been completed to determine the validity of these anecdotes. This

paper analyzes the impact of the Medicaid expansion in Kentucky on ED utilization among

Medicaid enrollees. This analysis of ED usage post expansion will help inform changes in access

to care patterns among the beneficiary population.

II. Background

Medicaid is a combined state and federal program that provides healthcare coverage to certain

low-income individuals. The Centers for Medicare & Medicaid Services oversees the design and

operation of state Medicaid programs at the federal level. The program is funded through federal

and state budgets; in the fiscal year (FY)[1] 2014, total Medicaid spending was $498 billion, where

$303 billion was federal spending and $195 was state spending (MACPAC, 2015). States receive

payments from the federal government based on the Federal Medical Assistance Percentage

(FMAP). This measure is determined by considering the state's per capita income relative to the

national average. According to the National Association of State Budget Officers spring 2013

survey, Medicaid represents the largest portion of total state spending for the FY 2012, estimated

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[1] Unless otherwise noted, years preceded by "FY" refer to the Federal Fiscal Year, which refers
to the period between October 1 and September 30

to account for 23.9 percent of the total state budget (The National Association of State Budget Officers, 2013). Medicaid expansion will increase Medicaid spending across all states due to both coverage gains in the expansion population as well as increased participation among those previously eligible for Medicaid. According to MACPAC's analysis of Medicaid spending trends, historically more than two-thirds of real growth in spending was due to increases in beneficiaries, while the rest was due to increases in spending per beneficiary. Notably, half of this growth was a result of increased enrollment and spending per beneficiary for people eligible based on disability (MACPAC, 2015).

Therefore, increased spending on Medicaid is a great concern because the ACA, or more conventionally known as Obamacare, became national law in 2010 creating a new Medicaid eligibility maximum level that covers most Americans with household incomes up to 138 percent of the federal poverty level (FPL), thereby expanding Medicaid eligibility across the country. In the first years of expansion, the Federal government is expected to pay a 100 percent of the cost of covering the expansion population from 2014 to 2016; though, the cost-share will phase down to 90 percent in 2020 where it will remain at that level (Snyder & Rudowitz, 2015). In 2012, the Supreme Court ruled that the federal government could not require states to expand Medicaid, thus states were given the choice to expand. Kentucky elected to expand Medicaid in May 2013 when then-governor Beshear announced it being "the single-most important decision in our lifetime for improving the health of Kentuckians" (Commonweatlh of Kentucky, 2015).

Since the implementation, Kentucky has been publicized as the ACA's success story because of past-governor Steve Beshear's well-implemented executive order for a state-run health insurance

marketplace, Kynect (Cambellsville University, 2015). To support the marketplace, Kentucky signed contracts with three managed care organizations discussed below to meet the expected demand under the expansion of Medicaid (Kentucky Cabinet For Health And Family Services, 2013), and the state spent approximately $11 million on outreach and marketing for 2014 open enrollment. kynect is a one-stop coverage shopping point for individuals, families, and small businesses, i.e., there are a variety of coverage types available for enrollment, including private insurance plans, Medicaid, and Medicare. Starting October 1, 2013, newly eligible Medicaid individuals were able to choose Anthem, Humana, or Passport as their insurer for coverage effective January 1, 2014.

On November 3, 2015, Matt Bevin was elected as the sixty-second governor of Kentucky (Bacon & Helsel, 2015). Bevin ran his campaign on an anti-Obamacare platform in which he was promising to dismantle Kynect. Within 10 days of Bevin in office, the advertising campaign for Kynect was shut down in the midst of the 2016 open enrollment period (Norris, 2016). Although Bevin has promised progress towards changes in the state's insurance exchange and Medicaid policies recently, these modifications have no effect on this paper's results as the paper focuses on data prior to Bevin's office. The latest plan is that Kynect will be in place through 2017 (Norris, 2016).

Bevin has also expressed interest in eliminating Medicaid expansion; however, currently, he is claiming he will seek a Section 1115 waiver instead of eliminating it (Bacon & Helsel, 2015). As summarized in the Kaiser Family Foundation brief, this waiver gives the Secretary of Health and Human Services authority to waive provisions of the ACA, including certain Medicaid

requirements, and may allow Kentucky to use federal Medicaid funds in ways that are not otherwise allowed under federal law (2015). Six states besides Kentucky are currently implementing or planning to expand Medicaid using the Section 1115 waiver. Each of the waivers is unique; however, commonalities between the states' usage of the waiver include expanding Medicaid "through a premium assistance model; charging premiums; eliminating non-emergency medical transportation, an otherwise required benefit; and using healthy behavior incentives to reduce premiums and/or co-payments" (Kaiser Family Foundation, 2015).

III. History of Managed Care

In 2011, almost ninety percent of the Medicaid beneficiaries were enrolled in managed care (Center for Medicaid and CHIP Services). Over the past couple of decades, the state has had various programs to cover different types of healthcare. As depicted in Figure I. below, it can be seen that Kentucky's Medicaid programs began covering more services for the Medicaid population, while introducing commercial managed care organizations (MCOs) over the course of 30 years. In January 2014, Kentucky expanded managed care through an Alternative Benefit Plan (ABP). The newly eligible persons are enrolled in the existing MCOs, which were required to provide adequate provider networks and ensure access to the full range of services provided in the ABP (Center for Medicaid and CHIP Services).

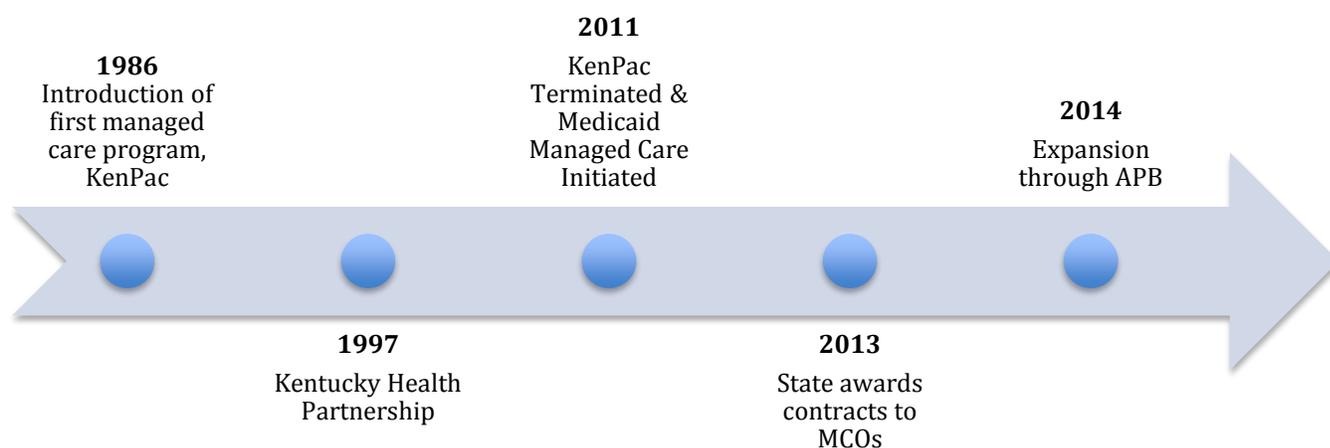**Figure I.** History of Managed Care in Kentucky

1986: Kentucky Patient Access and Care (KenPac) Program primary care case management program (PCCM) enrolled low-income adults and children on a mandatory basis and covered acute, primary, and specialty care coordinated by providers

1997: Kentucky Health Partnership (KHP) a comprehensive risk-based managed care program; Passport Health Plan (a regional partnership of providers) covered acute, primary, and some specialty care (excluding behavioral health). Today, KHP is mandatory in several of Kentucky's highly populated counties.

2011: KenPac (PCCM) was terminated and managed care was expanded statewide to cover beneficiaries in regions not served by KHP. Medicaid Managed Care is a mandatory program that uses regional networks to deliver acute, primary, specialty services (including behavioral health and dental services)

Source: www.Medicaid.gov/Medicaid-CHIP-Program-Information

2013: The state started awarding contracts to additional commercial MCOs in regions served by KHP and Passport Health Plan

2014: Kentucky expanded managed care through APB. ABP provided services outside of managed care such as intermediate care facilities for intellectually disabled persons, hospice services, school-based health services, nurturing development services, early intervention program services, and nursing facility services.

2011
KenPac
Terminated &
Medicaid
Managed Care
Initiated

1986
Introduction of
first managed
care program,
KenPac

2014
Expansion
through APB

1997
Kentucky Health
Partnership

2013
State awards
contracts to
MCOs

IV. Literature Review

Insurance coverage expansion is of great concern because many economists have theoretically

and empirically proven moral hazard, i.e., health insurance increases the demand for medical

care (Arrow 1963; Manning et al. 1987; Bajari 2014). If the demand for medical care increases when an individual becomes insured, then the additional healthcare purchases are regarded as inefficient because they represent care that is worth less to consumers than it costs to produce. Bajari et al., most recently, created a two-step semiparametric model to estimate asymmetric information in healthcare markets and illustrated, employing a large self-insured employer's claims data, substantial evidence of moral hazard. Additionally, previous studies have examined the specific effect of expansion in healthcare utilization and outcomes; however, many of these studies have focused on specific subpopulations. For example, Currie and Gruber (1996) reviewed the effect of Medicaid expansion for children on their utilization of care and health outcomes. They found expansion increased physician care utilization significantly. Additionally, Finkelstein et al. (2012) completed a renowned study in healthcare economics that exploited a randomized design to analyze the effect of expanding access to public health insurance in Oregon on healthcare use. Similar to Currie and Gruber, Finkelstein et al. found that the treatment group used more care; however, they also found that this treatment group had lower out-of-pocket medical costs, and better self-reported health. If this research is applied to Kentucky's case, it may be possible that ED usage increased due to expansion. The increased healthcare utilization and better self-reported health findings that Finkelstein et al. (2012) discovered in the randomized study may be further empirically established if similar results are observed in another state, such as Kentucky. This paper can show broader geographic implications on healthcare utilization, since Kentucky's Medicaid population is different from Oregon's.

A precursor to the ACA, the 2006 Massachusetts healthcare reform gave researchers an opportunity to study the effect of near-universal expansion on hospital care and preventative care. Kolstad and Kowalski (2012) found that the reform in Massachusetts decreased length of stay and the number of inpatient admissions from the emergency room; however, Kolstad and Kowalski did not examine the outpatient impact on emergency department usage and quality of care. Miller (2011), however, did determine that the Massachusetts reform reduced ER usage by between 5 and 8 percent in non-urgent visits. Since it is difficult to determine the degree to which a visit is preventable or truly emergent, Miller assigned a probability to each visit of being in each of the following six categories based on the particular diagnosis code. These findings suggest that Kentucky may have experienced a decrease for non-urgent visits as well. This decrease in Kentucky may be a result of a successful campaign for Medicaid expansion and/or sufficient access to primary care.

Although Miller's research is similar to this paper, its findings may not extend to Kentucky's healthcare market. The two states have considerably different populations and health reforms (discussed in Section V. below). Therefore, it would be interesting to quantify Medicaid expansion's success in Kentucky by measuring the change in emergency department utilization.

V. Kentucky Reform vs. Massachusetts Reform

Massachusetts initiated a state-based marketplace called Health Connector prior to the passage of the ACA in 2006 with the goal of providing health insurance to nearly all of its residents (The Henry J. Kaiser Family Foundation, 2013). In many ways, Massachusetts's reform was a model for the ACA. While many economists have completed studies on the effect of Medicaid expansion in Massachusetts on healthcare utilization and costs, it is still vital that Kentucky's

expansion efforts are examined since the two states have different healthcare markets. For example, expanding Medicaid in Massachusetts was less stringent for the separate Children Health Insurance Program (CHIP) when compared to Kentucky's eligibility requirements. In Massachusetts, CHIP beneficiaries and pregnant women are eligible at up to 300 percent and 200 percent of the FPL, whereas, Kentucky's eligibility requirements are 213 percent and 195 percent above the FPL (Center for Medicaid and CHIP services, 2016).

Because there are underlying differences in regional preferences that would drive support for expanded coverage and varying availability of affordable public insurance coverage, the demand for Medicaid in Kentucky and Massachusetts is also different—388,368 people were determined as eligible for Medicaid and CHIP in Kentucky in November 2015, whereas 272,747 people were deemed eligible for those programs in Massachusetts (Kaiser Family Foundation, 2015). Kentucky spent $5,937 per enrollee (full or partial benefit) in FY 2011 while Massachusetts spent $8,717. Unfortunately, more recent data has not been released on a per enrollee basis; however, there are data reviewing the total Medicaid spending in FY 2014. Kentucky spent almost $8 Billion, whereas Massachusetts spent $14.6 Billion (Kaiser Family Foundation, 2015).

These numbers are drastically different for a combination of reasons; however, it is noteworthy that Medicaid was expanded in 2006 in Massachusetts, while Kentucky expanded in 2014. Therefore, even though the population is higher in Massachusetts—specifically by 2.3 million— there were most likely fewer people enrolling in Medicaid/CHIP since the programs were expanded years ago. Below a comparison of the two states using various parameters provided by

the United States Census Bureau and Kaiser Family Foundation help portray a more complete

picture of the two unique healthcare markets.

Table I.

Kentucky vs. Massachusetts Demographics (2014)		
Population	**Kentucky**	**Massachusetts**
Population	4,413,457	6,745,408
Population per square mile	109.9	839
Age & Sex		
Under 5	6.3%	5.4%
Under 18	22.9%	20.6%
65 and Over	14.8%	15.1%
Female	50.8%	51.5%
Race		
White	85.4%	74.3%
Black	8.2%	8.3%
Hispanic	3.4%	10.8%
Asian	1.4%	6.3%
Income & Poverty		
Median household 2010-2014	$43,342	$67,846
Per capita income (2014 dollars)	$23,741	$36,441
Persons in Poverty, percent*	19.1%	11.6%
Education		
High school graduate or higher	83.5%	89.5%
Bachelor's degree or higher	21.8%	40.0%
Rate of natural increase		
Birth Rate per 1000 females ages 15-44	65.8	52.5
Death Rate per 100,000 population	906.3	663
Health Status		
Percent of Smokers	26.2%	14.7%
Obesity (BMI 25-29.9)	66.7%	58.9%
Percent of Adults who Participate in Physical Activity	71.8%	79.9%

*These percentages cannot be compared according to US Census Bureau

Population

Although Kentucky is six times larger in terms of land area, according to the US Census Bureau

(2015) estimates for 2014, Massachusetts's population is approximately 2.3 million larger than

Kentucky's (Refer to Table I). Therefore, Massachusetts has a higher population density due to

human and physical (geographical) factors; for instance, Massachusetts was colonized before Kentucky and thus has a longer history of political and economical development than Kentucky.

Age & Sex

The age and sex composition of the two states is fairly comparable according to the 2014 US Census Bureau estimates. The largest difference is the percent of the population that is under 18 (Refer to Table I). In this category, there are 11 percent more people under the age of 18 in Kentucky than Massachusetts.

Race

There is about an 11-percentage point difference in the percent of white only (non-Hispanic) people living in Kentucky and Massachusetts in 2014, the former has a larger white population. Notably, Massachusetts has prominent Hispanic and Asian populations when compared to Kentucky's; specifically, Massachusetts has 7.4-percentage points higher Hispanic population and 4.9-percentage point higher Asian population (United States Census Bureau, 2015).

Education

In 2014, Massachusetts had a higher percent of people 25 or older that have completed high school or higher. The state also had a significantly greater percentage of people with a Bachelor's degree or higher. This difference may be stemming from a higher concentration of universities or because of political agendas emphasizing education.

Income and Poverty

The 2014 median household income is $24,504 less in Kentucky than in Massachusetts. Although the percentages cannot be compared, note 19.1 percent of Kentucky's population is living in poverty, while 11.6 percent of Massachusetts's population has a family total income

less than the family's threshold. The thresholds are determined by following the Office of Management and Budget's (OMB) Statistical Policy Directive 14. The Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty.

Health & Rate of Natural Increase

The health status indicators shown in the table and chart above (Kaiser Family Foundation, 2015) depict the varying health characteristics of the two states. Kentucky has higher percentage of smokers and obese individuals. The birth rate and death rates in Kentucky are higher than Massachusetts, and due to the significantly greater birth rates Kentucky has a higher natural rate of increase (crude birth rate minus the crude death rate).

VI. Empirical Model

This analysis exploits the variation in treatment intensity across counties to determine the effect of expanded Medicaid coverage on Medicaid ED usage. The fourth model attempts to account for possible omitted variables that may be correlated with the estimators for ED rate by utilizing fixed effects; fixed effects models control from time-invariant confounders. Because the reform in Kentucky motivated near-universal coverage throughout the state, there was variation in the percent of Medicaid patients enrolled in each county; for example, counties with low rates of Medicaid coverage due to the eligibility requirements prior to the reform experienced a larger change in Medicaid coverage than counties with high pre-reform coverage rates. It would be a reasonable assumption that we should observe similar increases in ED use in counties that had low pre-expansion Medicaid coverage rates.

If the newly insured Medicaid patients use the ED more frequently, the ED usage should increase the most in counties that experienced the largest increase in insurance coverage. To explore this concept, I regress county ED Rate on $Post_t$, a dummy variable representing the time when there was no expansion, $Pct\ Expansion_i$, and $Post_t * Pct\ Expansion_i$, a variable that reflects the intensity of expansion (where i stands for the variation in the county and t stands for the variation over time). The null and alternative hypotheses for this paper are as shown below:

$$H_0: \beta_1 Post.Pct_{Expansion} = 0$$

$$H_A: \beta_1 Post.Pct_{Expansion} \leq 0$$

The null hypothesis here states that expansion had no affect on ED rate. While the alternative hypothesis states the increase in coverage is inversely related to the ED rate as seen in Miller's examination of the Massachusetts Medicaid expansion (2011). I estimate the ED rate that varies by time and county by Model (1) described by Equation I; this model does not control for demographic variables or fixed effects. In Model (2), I include demographic variables that may affect the ED rate (Refer to Equation II).

I control for county and year fixed effects by employing variables that may affect the county ED rate in Model (3) and Model (4) as shown in Equation III and Equation IV below. Demographic variables including age, measured by children under the age of 21 and adults over the age of 21, and sex were added to the (Refer to Equation IV).

Equation I.

$$ED\ Rate_{it} = \beta_0 + \beta_1 Post_t + \beta_2 Pct\ Expansion_i + \beta_3 Post_t * Pct\ Expansion_i + \varepsilon_{it}$$

Equation II.

$$ED\ Rate_{it} = \beta_0 + \beta_1 Post_t + \beta_2 Pct\ Expansion_i + \beta_3 Post_t * Pct\ Expansion_i$$
$$+ \beta_2 Pct_{Female_{it}} + \beta_3 Pct_{Under21_{it}} + \varepsilon_{it}$$

Equation III.

$$ED\ Rate_{it} = \beta_0 + \beta_1 Post_t * Pct\ Expansion_i + \mu_i + \mu_t + \varepsilon_{it}$$

Equation IV.

$$ED\ Rate_{it} = \beta_0 + \beta_1 Post_t * Pct\ Expansion_i + \beta_2 Pct_{Female_{it}} + \beta_3 Pct_{Under21_{it}} + \mu_i + \mu_t + \varepsilon_{it}$$

VII. Data

The purpose of this section is to introduce the data employed for the analysis of the expansion. To measure ED utilization of Medicaid patients, I use yearly data on Medicaid outpatient ED visits from 2009 to 2014 (Kentucky Department of Medicaid Services. Frankfort (KY): DMS; 2009-2014 [cited 2016 Jan 15]. Available from: http://chfs.ky.gov/os/oig/Open+Records+Request.htm). Hospitals in Kentucky are required to report the number of ED visits on an annual basis. Data of statewide ED utilization by Medicaid patients were obtained from the Kentucky Department of Medicaid Services through an Open Records Request. The data contained ED member count, ED claim count, and total cost for ED visits, inpatient, and outpatient services utilized by Medicaid patients for each county in Kentucky during the years 2009 through 2014. In addition to these variables, the state provided demographics (age and sex) of the Medicaid population for 2014 by county. The total enrollment by county was also split by visits from patients who qualified for Medicaid under the expansion and those who would have been eligible under previous guidelines. I requested calendar years 2009 to 2013 to analyze years prior to expansion in Kentucky as well to the passage of the Affordable Care Act. By including these years, I measure the immediate effect of expansion while comparing the effect to the Medicaid ED utilization trends over the past couple of years.

The ED utilization trends across counties for Medicaid patients for 2009-2014 are shown in the graph below (Figure II). The Medicaid ED utilization rate had been trending downward for the last few years. Note that after the passage of the ACA in 2010 the ED rate increased; however, the years following it began decreasing again. According to the "Healthcare in Kentucky report" published by the Cabinet for Health and Family Services (2010) there were no major legislative changes in 2010 that could have affected the ED rate. Studying the ED utilization trends in the graph below shows that the average ED rate among Medicaid enrollees was consistent between 34-37 percent without large deviations during the pre-expansion years. I generated Medicaid ED visit rates by dividing ED member counts in a county by the estimates for total Medicaid enrollment for each county provided by enrollment estimates (2009-2013) calculated from the Kentucky Department of Medicaid Services (Refer to Equation V). While calculating the rates, I excluded ED member counts that belonged to a guardianship and out-of-state Medicaid patients, since the numbers were very small each year relative to the county data and those member counts were difficult to incorporate into rates. The percent expansion was calculated by dividing the expansion enrollees by the sum of the expansion and previously eligible enrollees for each county (Refer to Equation VI). The average county experienced 31 percent Medicaid enrollment increase with a small standard deviation.

Figure II.
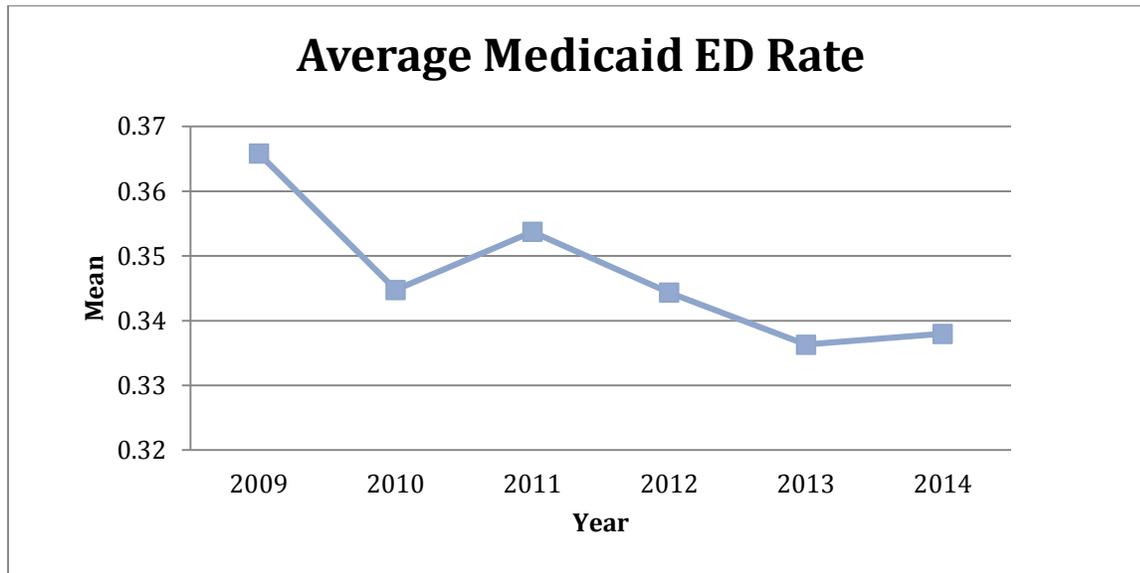
The table below ([Table II](#)) summarizes the demographic variables. The demographic variables were also constructed by employing the yearly enrollment estimates. The variables utilized from Kentucky Department of Medicaid Services were as follows: Enrollment by Female, Enrollment by Male, Enrollment of Children Under 21, and Enrollment of Adults over 21. The state department provided the aforementioned variables by county and year. The shares were calculated by dividing by the total enrollment in a given year.

Table II. Demographics of Medicaid Population Pre-Expansion

Pre-Expansion					
Variable	Mean	Std. Dev.	Median	Max	Min
Female	0.57	0.02	0.57	0.62	0.52
Over 21	0.44	0.06	0.44	0.60	0.32
Post-Expansion					
Variable	Mean	Std. Dev.	Median	Max	Min
Female	0.55	0.02	0.55	0.59	0.52
Over 21	0.58	0.04	0.58	0.68	0.48

A preliminary look at the descriptive statistics for the variables shows that the data is normally distributed. The pre-expansion Medicaid population was 57 percent female and 43 percent male. The distribution of the average age groups in the pre-expansion Medicaid population was 56 percent under 21 years of age and 44 percent over 21 years of age. Post-expansion, the demographics fluctuate some: the percentage of females decrease by 2 percentage points and the percentage of adults increase by 14 percentage points as shown above. The demographic distribution indicates the result of the individual mandate and the extension of coverage to childless adults.

These data offer several advantages that portray unique information about expansion in Kentucky. Most importantly, the data is administrative; therefore, these data have the most complete information about enrollment of expansion beneficiaries versus previously eligible beneficiaries. However, a drawback of the data is that there is limited information on the overall Medicaid population as well as the urgency of the outpatient visits.

VIII. Results

The empirical model employed variation across counties within the state to refine my results of the impact of expansion. As stated in Section VI above, if the newly insured Medicaid patients use the ED more frequently, the ED usage should increase the most in counties that experienced the largest increase in insurance coverage. The regression results from Model (1), i.e. without fixed effects and demographic controls, suggest that there was a 20 percent increase in ED usage following expansion; however, it was not significant (Table III). Additionally, in counties that had a high potential for expansion already had high ED rates relatively; therefore, expanding Medicaid did not change the ER usage thus far. The regression results from Model (2) indicate that controlling for demographic variables weakens the effect of expansion on ED rate, as the percent increase in ED predicted by expansion decreases to 10 percent. However, these models do not control for county and year fixed effects.

The results for the fixed effects model are shown in Table III as well. The ED usage in Model (3) increased by 14 percent, however this change was insignificant, as shown by the coefficient on the Post*Pct_Expansion term listed under the third column in the table. In Model (4), the addition of the demographic variables and fixed effects resulted in a further weakening of the estimate indicating the effect of expansion on ED rate. The final model indicates that there was an insignificant 1 percent increase in ED rate following expansion. The demographic regressors in each of the models were significant. Counties with a high percentage of females experience significantly higher ED rates. Additionally, counties with a lower percentage of children under 21 (higher percentage of people over 21) have higher ED rates. Because Post*Pct_Expansion term was insignificant in the fixed effects model that controlled for age and sex, I fail to accept

that expansion had an inverse relationship with ED rate as proposed by my alternative hypothesis in Section VI.

Table III. The Effect of Medicaid Expansion on ED Rate

The Effect of Medicaid Expansion on ED Rate				
	ED Rate			
	Without Fixed effects		Fixed effects	
Variable	**(1)**	**(2)**	**(3)**	**(4)**
Post	-0.07	-0.07	--	--
	(0.07)	(0.07)	--	--
Pct_Expansion	-0.06	-0.08	--	--
	(0.08)	(0.08)	--	--
Post.Pct_Expansion	0.20	0.10	0.14	0.01
	(0.23)	(0.22)	(0.21)	(0.21)
Pct_Female	--	0.38***	--	0.28***
	--	(0.13)	--	(0.13)
Pct_Under21	--	-0.25***	--	-0.23***
	--	(0.03)	--	(0.03)
Year Fixed effects	N	N	Y	Y
County Fixed effects	N	N	Y	Y
Observations	720	720	720	720

Note: *** indicates $p<0.01$

IX. Conclusion

The analysis in this paper shows that there was an insignificant increase in ED usage post expansion. The increase in ED rate due to expansion weakened as demographic variables and fixed effects were included in the model. Previous research found that ED usage for the counties that were most affected by expansion experienced the greatest reductions in outpatient ED usage. My paper was unable to show a similar result in Kentucky. However, this may have been the

case due the small panel available for study. Future research would be able to exploit the advantages of a larger sample of years post expansion.

The hypothesis followed previous research supporting that insurance coverage may impact healthcare usage by increasing access to care and increasing efficiency, thereby lowering ED rates. However, the results were inconclusive towards the former theories as well as theories suggesting expansion causes unnecessary usage of care. Unfortunately, because of the data's limitations, it is not possible to indicate a direct positive or negative relationship. In spite of concerns about EDs being overcrowded by uptakes in ED utilization, I do not find moral hazard to be an issue in Kentucky—a southern state with a relatively high fraction of residents living in poverty as well as a high-uninsured rate prior to the ACA's adoption.

There were several limitations surrounding this examination of Kentucky's Medicaid expansion and ED usage. For example, it is unclear to what extent the results can be generalized to other states with expanded Medicaid eligibility. Each state has unique characteristics that determine its usage of care. In this case, Kentucky is unique because it was part of a broader expansion than Massachusetts and Oregon. While there are limits to what I can infer from the results, it provides further evidence for states to study Kentucky's experience with Medicaid expansion and ACA implementation. The relationship between ED usage and Medicaid expansion most likely varies across states. Finally, there may be other variables that affect ED rates, e.g. race and health status. Including these variables in the regression would allow for better estimates as well as eliminate potential omitted variable bias.

In conclusion, this research found that expansion has had an insignificant effect on ED usage thus far. Future research should employ a large data set for post-expansion and attempt to determine the urgency and necessity of ED utilization. Additionally, an analysis of Medicaid inpatient/outpatient claims data and total ED volume would allow for more concrete results and conclusions about the effect of Medicaid expansion on emergency department outpatient visits.

X. Appendix

Equation V. County ED Rate

$$ED\ Rate = \frac{Medicaid\ ED\ Member\ Count}{Total\ County\ Medicaid\ Population}$$

Equation VI. Percent Expansion by county

$$Pct\ Expansion = \frac{Number\ of\ Expansion\ Enrollees}{Total\ County\ Medicaid\ Population}$$

Table IV. ED Utilization Trends for Medicaid Patients

Medicaid ED Rate					
Year	Mean	Std. Dev.	Median	Max	Min
2009	0.37	0.05	0.36	0.47	0.23
2010	0.34	0.05	0.35	0.47	0.21
2011	0.35	0.05	0.36	0.47	0.24
2012	0.34	0.05	0.35	0.46	0.24
2013	0.34	0.05	0.34	0.43	0.23
2014	0.34	0.04	0.34	0.44	0.26

Table V. Percent Expansion

Percent Expansion					
Year	Mean	Std. Dev.	Median	Max	Min
2014	0.31	0.02	0.31	0.37	0.25

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