THREE ESSAYS IN HEALTH SERVICES RESEARCH: IMPACT OF THE AFFORDABLE CARE ACT ON ACCESS TO CARE AND HOSPITALIZATION IN TEXAS

A Dissertation

by

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DOCTOR OF PHILOSOPHY

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ABSTRACT

This dissertation presents evaluations of ACA reforms in the state of Texas. In the first essay, I use descriptive analysis to show that after establishment of the ACA Marketplaces in Texas, the rate of hospital discharges decreased for uninsured patients and increased for privately insured patients. In the second essay, I use difference-in-difference method to examine if the Marketplace component of the ACA has affected the uninsured discharge rate for acute care services. I find a causal impact of Marketplaces on the ratio of uninsured discharges. In the third essay, I examine the expansion of Medicaid Managed Care (MMC) that required almost all beneficiaries to shift from Medicaid Fee-for-Service to MMC. I examine if this reform has reduced the volume of discharges overall and for potentially preventable conditions in acute care hospitals. I find no impact of MMC on inpatient care use over the time span of study.

DEDICATION

To my father Ali, my mother Jila, and my brother Adel.

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NOMENCLATURE

ACA	Patient Protection and Affordable Care Act
ACEP	American College of Emergency Physicians
ACS	American Community Survey
ACSC	Ambulatory Care Sensitive Condition
AHA	American Hospital Association
AHRF	Area Health Resources Files
AHRQ	Agency for Healthcare Research and Quality
APR-DRG	All Patient Refined Diagnosis Related Group
CMS	Centers for Medicare & Medicaid Services
COPD	Chronic Obstructive Pulmonary Disease
C-Section	Cesarean Section
DSHS	Department of Health Services
EPO	Exclusive Provider Organization
FFS	Fee-For-Service
FPL	Federal Poverty Level
HCUP	Health Care Utilization Project
HEDIS	Health Employer Data and Information Set
HMO	Health Maintenance Organizations
ICD	International Classification of Diseases
MD	Medical Doctor

MEPS	Medical Expenditure Panel Survey
MMC	Medicaid Managed Care
NP	Nurse Practitioner
PA	Physician Assistant
PCP	Primary Care Physician
POS	Point of Service
PPO	Preferred provider organization
PQI	Prevention Quality Indicators
PUDF	Public Use Data File
STAR	State of Texas Access Reform
THCIC	Texas Health Care Information Collection

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1. INTRODUCTION

The main provisions of the Patient Protection and Affordable Care Act (ACA) enacted in 2010, largely implemented in 2014, allowed states to expand Medicaid and created subsidized private health insurance exchanges, known federally as Marketplaces, to cover more low-income Americans. Exchange enrollees could qualify for federal subsidies to purchase health insurance if their family incomes were below 400 percent of the federal poverty line (Obama, 2016). Some states that selected not to expand Medicaid, requested Section 1115 waivers of federal Medicaid rules to cover low-income adults (Watson, 2015).

Texas experienced federal ACA Marketplaces and expanded Medicaid Managed Care (MMC) programs through an 1115 waiver, although it did not expand Medicaid eligibility. In the first open enrollment period that began in October 2013, and ended in April 2014, more than 700,000 Texans gained coverage through the Marketplace. In the next four open enrollment periods, on average 1,466,377 persons gained their coverage through Marketplaces (Norris, 2020). The expansion of MMC also resulted in the transition of essentially all Medicaid recipients from fee-for-service (FFS) to managed care (Waldman, 2017). Given these policy reforms in the state of Texas, a natural question to ask is how they have affected hospitalization in Texas.

This dissertation is composed of three essays that evaluate the outcome of these reforms. In the first essay, I examine trends in hospitalization in Texas. I provide descriptive analysis of the frequency and pattern of changes in hospitalization stratified by insurance coverages during the pre-ACA (2009-2013), and post-ACA periods (2014−2018). I also examine changes in the availability of health personnel to explain potential impacts of provider supply on changes in hospitalization. I hypothesizes that Texas wouold experienced (1) an increase in privately covered discharges and a decrease in uninsured discharges, and (2) a decrease in the proportion of preventable hospitalizations for all admissions. I use the inpatient Public Use Data File (PUDF) from the Texas Health Care Information Collection (THCIC) for adults between the ages of 18 to 64 years within the period 2009 through 2018, as well as data on health professionals from the Area Health Resources Files (AHRF) over 2011-2018. I exhibit trends in hospitalization, and execute t-tests to compare changes in the mean percentage of discharges in 2014 against year 2013. I analyze changes for different patient demographics (age, gender, race, and ethnicity), type of admissions (emergency, urgent, elective, and trauma), and ten potentially preventable conditions, stratified by health insurance coverages. I map the supply of health care providers over time, and describe changes in care provider availability against changes in the hospitalization. I find consistent declines in uninsured discharges and increases in privately insured discharges within most patient characteristics, emergency admissions and most preventable conditions. I find no noticeable changes in the supply of primary care physician across the state, but I find marked changes in the supply of nurse.

In the second essay, I examine whether the ACA Marketplaces led to reductions in hospitals' uncompensated care as measured by changes in the hospitals' uninsured discharges for adults in Texas. I estimate the effects of the ACA Marketplace in Texas using a difference-in-difference model with the differences coming from the time of the implementation of the ACA and the pre-ACA hospital uninsured discharge rate. I use data on inpatient discharges from Texas hospitals for 32 quarters during 2011-2018 (THCIC, 2018). I find that at the average pre-ACA uninsured discharge rate, the Marketplace decreased the proportion of uninsured discharges by 1.6 percentage points.

In the third essay, I examine whether expansion of MMC has affected hospitalization in the "treated" counties that expanded MMC in Texas for Medicaid members. I measure hospitalization for preventable conditions, alternatively known as ambulatory care sensitive conditions (ACSCs) conditions. I use difference-in-difference models to assess the impact of MMC expansion on changes in hospitalization for ACSCs. I contribute to the current literature by addressing (1) whether MMC expansion resulted in reduced use of inpatient care, and (2) whether MMC expansion had an impact on preventable admissions. I find that the expansion of MMC led to a decreased number of hospital discharges for Medicaid beneficiaries in expansion counties. No changes in discharges was evident for C-Section deliveries. I further find that expansion of MMC has resulted in lower discharges for long-term diabetes.

1.1. References

Obama, B. (2016). United States Health Care Reform: Progress to Date and Next Steps. Jama, 316(5), 525-532.

Norris, L. (2020). Texas health insurance marketplace: History and news of the state’s exchange, eight insurers offering 2020 coverage in the exchange; average individual market rates decreasing slightly. Retrieved from https://www.healthinsurance.org/texas-state-health-insurance-exchange/

Texas Health Care Information Collection Home.Inpatient data reporting requirements. Retrieved from https://www.dshs.texas.gov/thcic/hospitals/HospitalReportingRequirements.shtm

Waldman Deane. (2017). The Saga Of 1115-A Waiver Can Fix Texas Medicaid But Only Temporarily. Texas Public Policy Foundation.

Watson, S. D. (2015). Out of the Black Box into the Light: Using Section 1115 Medicaid Waivers to Implement the Affordable Care Act's Medicaid Expansion. Yale J. Health Pol'y L. & Ethics, 15, 213.

U.S. Department of Health and Human Services Health Resources and Services Sdministration. Area Health Resources File. 2011-2018. https://datawarehouse.hrsa.gov/topics/ahrf.aspx

2. HOSPITALIZATION IN TEXAS: A DESCRIPTIVE STUDY

2.1. Introduction

Major health insurance coverage provisions of the Affordable Care Act (ACA) legislation went into effect in 2014, including Health Insurance Marketplaces for individuals to purchase subsidized private coverage and the option for states to expand Medicaid (Courtemanche et al., 2017). As a result of these reforms, in 2014, about 17 million previously uninsured adults gained insurance coverage (Hayes & Hayes, 2017; Uberoi, Finegold, & Gee, 2016).

In examining the effect of ACA, several studies examined how the coverage expansion has impacted hospitalizations. Studies found that as ACA went into effect, hospitals have experienced greater inpatient utilization (AHA, 2016; Cunningham, & Sheng, 2018; Duggan, Gupta, & Jackson, 2019; MPAC, 2016; Wherry, & Miller, 2016; Young, 2017). A recent poll found that emergency physicians reported that after 2014 they experienced an increase in Medicaid patient volume (ACEP, 2015). Although prior studies find that ACA produced sizable effects on hospitalization, those findings are driven primarily by the expansion of Medicaid (Freedman, et al., 2017; Nikpay, Buchmueller, & Levy, 2015; Nikpay, Buchmueller, & Levy, 2016; Pickens et al., 2018; Sommers, et al., 2016). Yet, the effect of ACA Marketplace on privately insured patients remain less studied.

The primary objective of this study is to examine whether Marketplace component of the ACA affected volume of inpatient care. I examine trends of hospitalization in Texas, which has not implemented the ACA Medicaid expansion. I provide descriptive analysis of the frequency and patterning of changes in hospitalization stratified by insurance coverages during the pre-ACA (2009-2013), and post-ACA periods (2014−2018). Because lower primary care supply in a community can further increase inpatient admissions (Cunningham & Sheng, 2018), I also examine changes in the availability of health personnel.

I hypothesis that Texas have experienced (1) an increase in privately covered discharges and a decrease in uninsured discharges, and (2) a decrease in the proportion of preventable hospitalizations for all admissions. These hypotheses are developed based on the Pickens et al., (2018) arguments as follows. First, because previously uninsured individuals with the greatest medical care needs are among the first to acquire insurance under the ACA coverage expansion, expansion in health insurance coverage should lead to increases in inpatient volume on average. Second, coverage expansion can increase use of primary care in the outpatient setting and reduce rates of inpatient care for potentially preventable admissions.

I use data on the universe of all hospital discharges in Texas for adults between 18 to 64 years within the period 2009 through 2018, as well as data on care provider supply over 2011-2018. I exhibit trends in hospitalization and execute t-tests to compare changes in the mean percentage of discharges in 2014 and 2013. I analyze changes for subgroups defined by different patient demographics (age, gender, race, and ethnicity), type of admissions (emergency, urgent, elective, and trauma), and ten potentially preventable conditions, stratified by health insurance coverages. I map the supply of health care providers over the years and describe changes in care provider availability against changes in the hospitalization.

I find consistent declines in uninsured discharges and increases in privately insured discharges within most patient characteristic subgroups, emergency admissions and most preventable conditions. I find no noticeable changes in the supply of primary care physician across the state, but I find marked changes in the supply of nurses.

2.2. Literature

With regard to effect of Marketplaces, a few research studies have indicated that the creation of health insurance exchanges (i.e. Marketplaces) led to increased admissions for some type of health condition and primary care use. For example, Goldman et al., (2018) analyzed Medical Expenditure Panel Survey (MEPS) results from 2011 to 2014 for adults ages 18–63 with family incomes of 138–400 percent of poverty who had been uninsured for at least six months in year 1. They used a difference-in-differences analysis to compare health outcomes among those who were uninsured before the ACA to those who had stable employer-sponsored insurance in the income range eligible for subsidized Marketplace coverage (138–400 percent of the federal poverty level, FPL). They found that among the previously uninsured group, the ACA led to increased diagnoses of hypertension, compared to a control group with stable employer-sponsored insurance.

Another research study used MEPS data from 2010-2017, and examined primary care visits among persons with private non-group insurance coverage who were eligible for Marketplace coverage with premium subsidies and/or cost-sharing reductions as compared to persons with employer-sponsored insurance. The study found a statistically significant, but modest, increase in the number of primary care visits among the intervention group relative to the control group (Park, Stimpson, & Nguyen, 2020). Additionally, Lavetti, DeLeire, and Ziebarth, (2018) used 2013-2015 All-Payer Claims Data from Utah and found increased demand for high-value care, but also for inefficient low-value care, among the low-income consumers in the ACA Marketplaces, many of whom were previously uninsured.

2.3. Data and Method

The data come from the Texas Health Care Information Collection (THCIC) inpatient Public Use Data File (PUDF) available through the Texas Department of Health Services (DSHS). The PUDF collects data by quarter on all discharged patients attended or treated by physicians for all licensed hospitals. Data used for this study is restricted to urbanized counties with a population more than 35,000, as hospitals in counties outside this domain are statutorily exempt from the DSHS reporting requirement. Data is collected for all hospital stays in any of specialty units, including acute care, psychiatric, coronary care, intensive care, skilled nursing, obstetric, oncology, sub-acute care, nursery, hospice, detoxification, rehabilitation and pediatric (THCIC,2018). Overall, I find 172 counties with hospital records for the years 2009 through 2018.

I collect discharged patients by their age, gender, race, and ethnicity (29,759,458 observation). The data provides 22 age group codes for the general patient ages for all age groups. I restrict my sample to ages 18 to 64 (13,236,827 observation). With respect to gender, data provides three groups of Male, Female, and Unknown. If a hospital has fewer than 5 patients of a particular gender, including unknown, it is recorded as invalid. In terms of race, 5 race groups are provided by the data, including: American Indian/Eskimo/Aleut.; Asian or Pacific Islander; Black; White; and Other. Race is changed to 'Other' and ethnicity is suppressed if a hospital has fewer than ten discharges of a race.

The data provides 24 expected primary sources of payments. I create three insurance coverage categories including: uninsured, private, and Medicaid. Following standard coding used in other studies (Nikpay et al., 2016), I assign those with self-pay and charity or indigent as their primary sources of payment to uninsured group. For privately insured, I include those with commercial, indemnity, Blue-Cross-Blue-Shield, Health Maintenance Organization (HMO), Preferred Provider Organization (PPO), Point of Service (POS), and Exclusive Provider Organization (EPO) as their primary source of payments. Those with invalid source of payments are removed from the data.

I include types of admission and principal diagnosis codes. With regard to types of admission, five categories are identified. These include, emergency, urgent, elective, trauma, and newborn. Because the data are restricted to those ages 18-64 the latter group has only a few records and thus are not included in the analysis.

The data for health professions come from the county-level Area Health Resource File, AHRF (AHRF). I collect data for primary care physician, Medical Doctors (MDs) and nursing. These include registered nurses, nurse practitioners, and advanced registered nurses. I collect the count of supply for each of these health professions for years 2011 through 2018.

2.3.1. Measures

Using THCIC, I estimate the aggregate count of discharges for various coverage groups. I also estimate the proportion of discharges for the uninsured, privately insured, and Medicaid coverage, as a share of all payment sources. I estimate measures for each quarter over years 2009 through 2018. I further estimate proportion of discharges for patient demographics (e.g. gender, race, ethnicity), and types of admissions stratified by coverage categories.

I use the AHRQ Prevention Quality Indicators (PQI) Version v2020 and create ten PQIs. PQI measures are often used to identify admissions that might have been avoided through access to primary care or outpatient services in a community. These include diabetes short-term complications admission rate, diabetes long-term complications admission rate, chronic obstructive pulmonary disease (COPD) or asthma in older adult's admission rate, hypertension admission rate, heart failure admission rate, community acquired pneumonia admission rate, urinary tract infection admission rate, uncontrolled diabetes admission rate, asthma in younger adult's admission rate, and lower-extremity amputation among patients with diabetes rate. To estimate the PQIs, I use International Classification of Diseases Ninth revisions (ICD-9) codes for the third quarter of year 2015 and prior, and ICD-10 codes otherwise as provided by the AHRQ.

I use AHRF to estimate county level provider supply. First, I estimate primary care physician (PCP) density in a county per 10,000 county population. Second, I estimate nursing supply per county per 10,000 population by combining the count of registered nurses, nurse practitioners, and advanced registered nurses. Because, physician assistants (PAs) and nurse practitioners (NPs) are an interchangeable resource (Fraher, Morgan, & Johnson, 2016), I also add PAs to the measure of nursing. Lastly, I estimate the number of Medical Doctors (MDs) per 10,000 population per county.

2.3.2. Analysis

I measure what percentage of discharges in each age, gender, sex, race, and type of admission has been covered by either of self-pay or charity (i.e. uninsured), private insurance, or Medicaid. I graph the trends of estimated percentage by quarter over years 2009 through 2018. I also compare the mean of estimated percentages for year 2013 versus 2014. I compute the percentage change between 2013 and 2014 and use t-test to measure if the change in 2014 was statistically different from 2013. I also provide trends of changes in provider supply over the years 2011 through 2018. I further estimate the mean supply of providers (PCPs, MDs, Nurse) for years 2011 through 2013 per 10,000 population (Pre-ACA). I estimate a similar measure for years 2014 through 2018 (post-ACA). I then calculate the difference between the estimated means for the years prior to ACA and after ACA. I graph the changes for Texas counties in maps. All the analysis is performed using STATA.

2.4. Results

Table 2-1 depicts population demographics over the study period, including age (18-64), race (White, Black, Asian, and other race), ethnicity (Hispanic), marital status (now married, separated, widowed, and divorced), education (high school degree, some college, and college graduate), family structure (households with children less than 18 years old at home), employment, and the household income (ACS, 2019). The data is shown in comparison to all Texas counties. The table suggests that, the population of all the selected counties was 24,501,744 on average per year. That account for 97% of all Texas population (25,207,468) on average per year. It further shows that prior to establishment of the ACA Marketplace, majority of counties population were between 18 to 64 years old, White, employed, married, and without children under 18 years old at home, with at least high school degree. Most of the population had income above 25k. The summary statistics imply that the 172 sample counties are well representing the state.

Table 2-1: Annual Means of Counties' Population Characteristics for Pretreatment Period, ACS (2009-2013)

	Sample Counties mean, (s.d.)	**All Texas** mean, (s.d.)
Population	141,452 (419,787)	99,242 (353,680)
Age <18	0.253 (0.036)	0.248 (0.041)
Age 18-64	0.598 (0.038)	0.593 (0.045)
Age above-64	0.148 (0.044)	0.158 (0.049)
Asian	0.011 (0.019)	0.008 (0.016)
White	0.825 (0.083)	0.848 (0.087)
Black	0.078 (0.068)	0.064 (0.067)
Hispanic	0.307 (0.215)	0.323 (0.229)

Table 2-1: Annual Means of Counties' Population Characteristics for Pretreatment Period, ACS (2009-2013) Continued

	Sample Counties mean, (s.d.)	All Texas mean, (s.d.)
Household with children under 18	0.354 (0.066)	0.340 (0.070)
Married	0.531 (0.057)	0.536 (0.064)
Widowed	0.071 (0.014)	0.074 (0.025)
Separated	0.025 (0.008)	0.024 (0.010)
Divorced	0.112 (0.020)	0.110 (0.024)
Unemployed	0.070 (0.022)	0.070 (0.028)
Less than high school	0.20 (0.08)	0.226 (0.080)
High school degree	0.273 (0.053)	0.320 (0.061)
Some college	0.290 (0.038)	0.284 (0.047)
College graduate	0.141 (0.054)	0.122 (0.047)
Household income < 10k	0.085 (0 .032)	0.084 (0.037)
Household income 10 to 15k	0.070 (0 .020)	0.071 (0.027)
Household income 15 to 20k	0.066 (0 .017)	0.068 (0.024)
Household income 20 to 25k	0.063 (0 .014)	0.065 (0.020)
Household income 25 to 35k	0.120 (0 .021)	0.119 (0.027)
Household income 35 to 50k	0.148 (0 .018)	0.146 (0.028)
Household income 50 to 75k	0.180 (0.021)	0.180 (0.032)
Household income >75	0.264 (0.082)	0.267 (0.084)

Figure 2-1 shows the quarterly counts of all discharges for patients 18-64 from 2009 through 2018. The figure displays that on average, per quarter there have been 330,921 inpatient discharges for patients age 18-64 from 2009 through 2018. A majority of those patients (152,323) had some sort of private insurance as their primary source of payments. About 70,621 discharges had Medicaid as their primary source of payments, and 49,288 had no coverages.

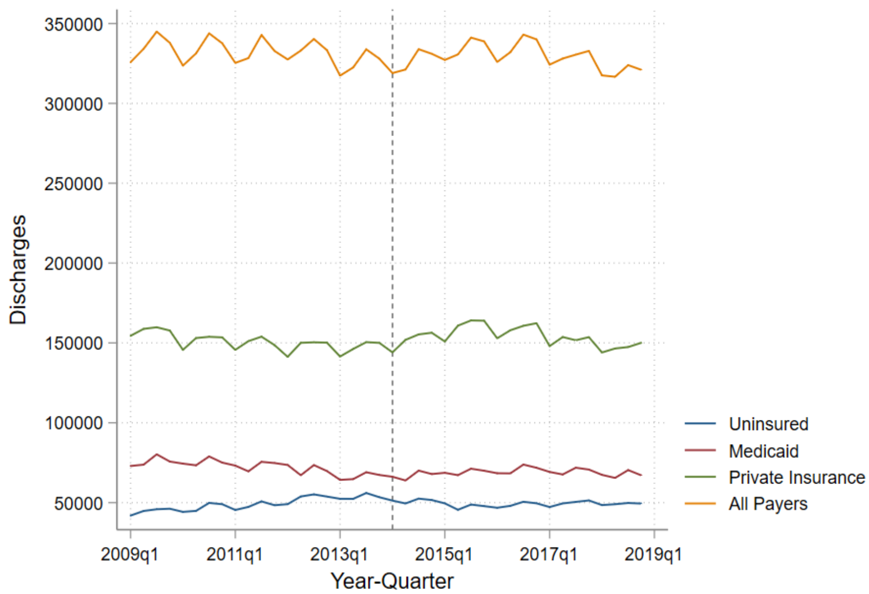

Figure 2-1: Quarterly Counts of Inpatient Discharges for All Patients 18-64 years in Texas, 2009-2018

Table 2-2 provides the percentage of mean differences in the ratio of uninsured, privately insured, and Medicaid discharge between years 2013 and 2014. The table shows the changes for patient characteristics, including age, gender, ethnicity, and race. The table also provides the means differences for the type of admissions e.g. emergency, urgent, and elective. The findings of the table are individually presented and explained below.

Table 2-2: Mean-Differences in the Ratio of Discharges, Year 2014 versus 2013

	Uninsured	**Privately Insured**	**Medicaid**
All patients 18-64	-0.73% *** (0.17%)	1.4%** (0.57%)	0.18% (0.27%)
Age 18-24	-0.19% (0.16%)	0.7%* (0.3%)	0.29% (0.44%)
Age 25-29	-0.81%*** (0.15%)	1.3%** (0.51%)	0.22% (0.52%)
Age 30-34	-0.97%*** (0.20%)	1.7%*** (0.49%)	0.21% (0.37%)
Age 35-39	-0.96%*** (0.15%)	1.08%** (0.53%)	0.55% (0.44%)
Age 40-44	-0.57%* (0.34%)	0.86% (0.81%)	0.70%** (0.25%)
Age 45-49	-0.51%* (0.29%)	1.69%** (0.85%)	0.03% (0.30%)
Age 50-54	-0.35% (0.39%)	1.72%** (0.84%)	-0.16% (0.20%)
Age 55-59	-0.98%** (0.33%)	1.51%* (0.82%)	-0.17% (0.21%)
Age 60-64	-0.89%** (0.28%)	1.78%* (0.97%)	-0.05% (0.19%)
Female	-0.82%*** (0.18%)	1.14 %*** (0.59%)	0.24% (0.35%)
Male	-0.54%* (0.26%)	1.52%** (0.58%)	0.023% (0.15%)

*** p<0.01, ** p<0.05, * p<0.1

Table 2-2: Mean-Differences in the Ratio of Discharges, Year 2014 versus 2013 Continued

	Uninsured	Privately Insured	Medicaid
White	-0.92%*** (0.26%)	1.10%** (0.50%)	0.57%* (0.34%)
Black	-0.46%*** (0.13%)	1.16%** (0.43%)	0.64%* (0.37%)
Asian	-1.4% (1.28%)	2.27% (1.84%)	-0.54% (0.62%)
Other Races	-0.17% (0.29%)	1.65% (1.18%)	-0.52% (0.83%)
Emergency	-1.85%*** (0.33%)	2.18%*** (0.47%)	0.19% (0.31%)
Elective	-0.44% ** (0.16%)	1.29% (0.94%)	-0.51% (0.49%)

*** p<0.01, ** p<0.05, * p<0.1

Figure 2-2 displays trends in discharges by coverages for all patients ages 18-64. The grey line shows the time ACA went into effect. The graph shows that the rate of uninsured discharges declined by 0.73% from 16.42% in 2013 to 15.68% in 2014. Adjust to the size of 2013 uninsured discharges (53,558), this amounts to a decrease of 1,563 uninsured discharges in 2014. This decrease was accompanied by 1.4% increase in privately insured discharges (45.08% to 46.51%) and slightly increase in Medicaid discharges (20.33% to 20.51%).

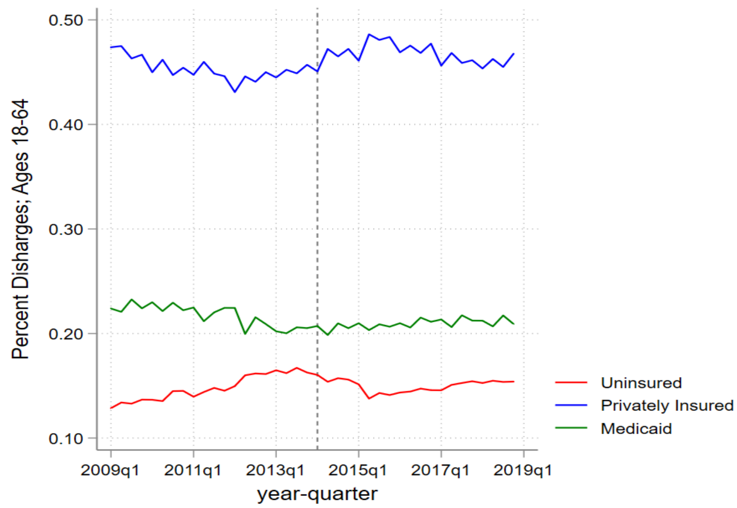

Figure 2-2: Quarterly Rate of Discharges for All Patients 18-64 years in Texas, 2009-2018

Figures 2-3 to 2-11 exhibit trends in discharges by coverages for breakdown of patient ages 18 to 64. The graphs show that the rate of uninsured discharges has declined for all age groups. For those age between 18 and 24, the rate of uninsured discharges from 2013 13.38% in 2013 declined to 13.19% in 2014, however the change in uninsured discharges for this age group was not statistically significant. For those age between 25 and 29, the rate of uninsured discharges from 2013 14.98% in 2013 declined to 14.17% in 2014. For those age between 30 and 34, the rate of uninsured discharges from 2013 16.25% in 2013 declined to 15.27% in 2014. For those age between 35 and 39, the rate of uninsured discharges from 2013 19.52% in 2013 declined to 18.55% in 2014. For those age between 40 and 44, the rate of uninsured discharges from 2013 22.68% in 2013 declined to 22.10% in 2014. For those age between 45 and 49, the rate of uninsured discharges from 2013 22.08% in 2013 declined to 21.57% in 2014. For those age between 50 and 54, the rate of uninsured discharges from 2013 18.18% in 2013 declined to 17.83% in 2014. For those age between 55 and 59, the rate of uninsured discharges from 2013 14.57% in 2013 declined to 13.58% in 2014. For those age between 60 and 64, the rate of uninsured discharges from 2013 12.26% in 2013 declined to 11.37% in 2014. The decrease in uninsured discharges was accompanied by increase in privately insured discharges and no statistically significant changes in Medicaid discharges, except for age group 40-44.

For those ages 18-24, the rate of privately insured discharges in 2013 was 34.55% and increased to 35.28% in 2014. For those age between 25 and 29, the rate of privately insured discharges from 2013 43.99% in 2013 increased to 45.33% in 2014. For those age between 30 and 34, the rate of privately insured discharges from 2013 51.32% in 2013 increased to 53.06% in 2014. For those age between 35 and 39, the rate of privately insured discharges from 2013 49.90% in 2013 increased to 50.98% in 2014. For those age between 40 and 44, the rate of privately insured discharges from 2013 47.64% in 2013 increased to 48.50% in 2014. However, the change was not statistically significant. Yet, this age group has experienced statistically significant increase in their Medicaid discharges from 11.45% in 2013 to 12.16% in 2014. For those age between 45 and 49, the rate of privately insured discharges from 2013 45.29% in 2013 increased to 46.99% in 2014. For those age between 50 and 54, the rate of privately insured discharges from 2013 45.79% in 2013 increased to 47.52% in 2014. For those age between 55 and 59, the rate of privately insured discharges from 2013 46.12% in 2013 increased to 47.64% in 2014. For those age between 60 and 64, the rate of privately insured discharges from 2013 45.75% in 2013 increased to 47.53% in 2014.

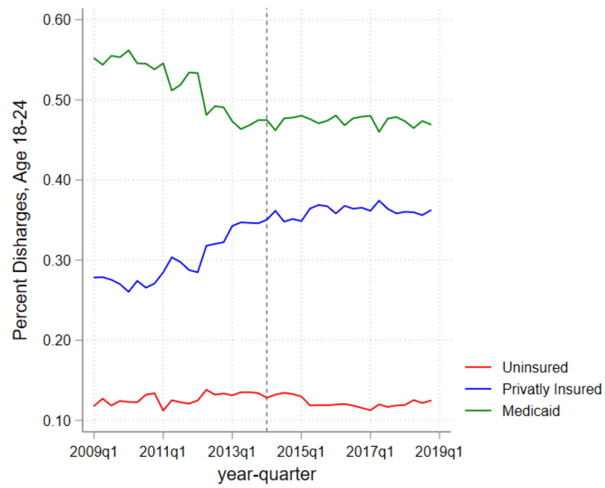

Figure 2-3: Quarterly Rate of Discharges for Patients 18-24 years in Texas, 2009-2018

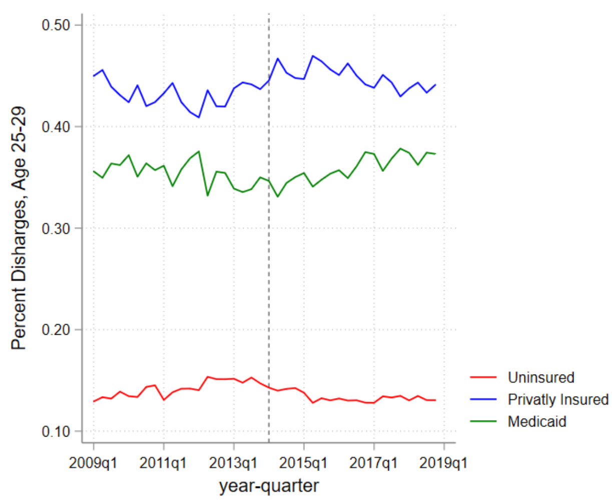

Figure 2-4: Quarterly Rate of Discharges for Patients 25-29 years in Texas, 2009-2018

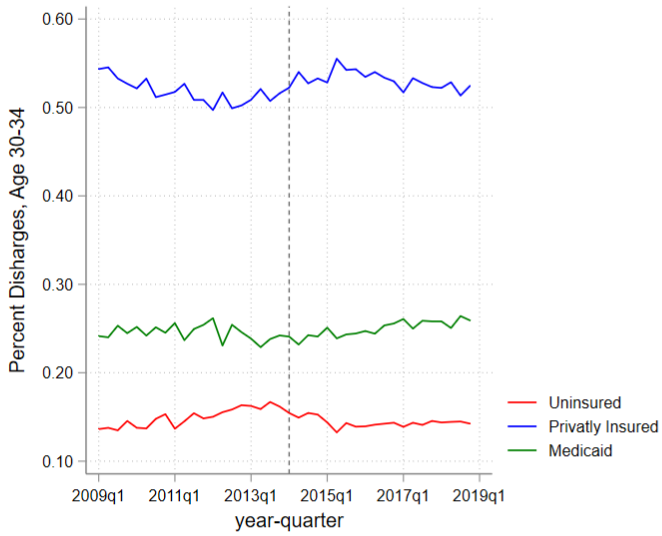

Figure 2-5: Quarterly Rate of Discharges for Patients 30-34 years in Texas, 2009-2018

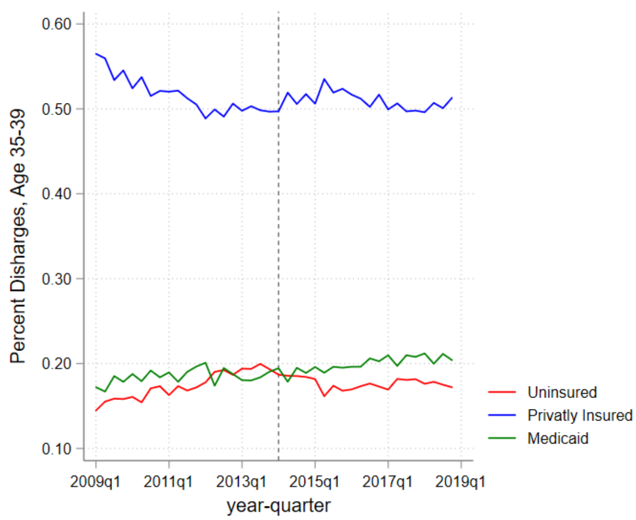

Figure 2-6: Quarterly Rate of Discharges for Patients 35-39 years in Texas, 2009-2018

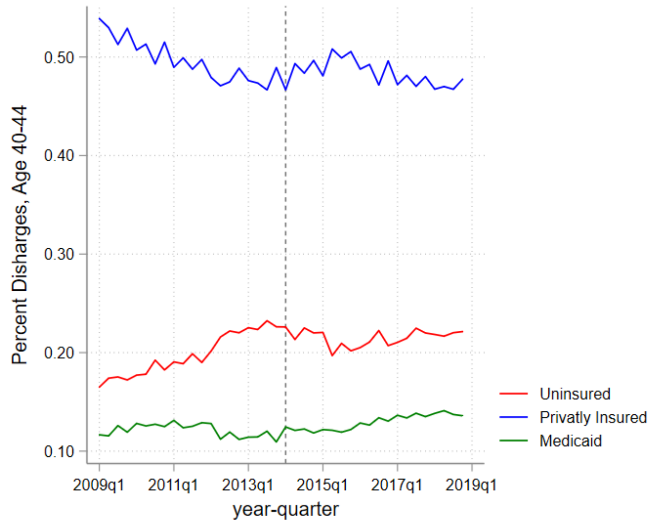

Figure 2-7: Quarterly Rate of Discharges for Patients 40-44 years in Texas, 2009-2018

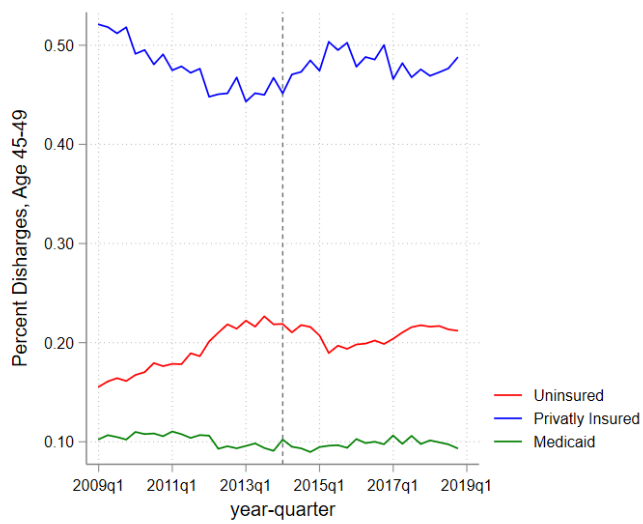

Figure 2-8: Quarterly Rate of Discharges for Patients 45-49 years in Texas, 2009-2018

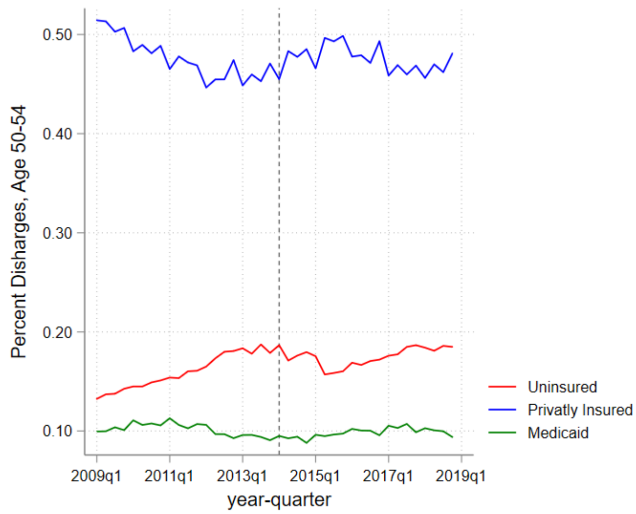

Figure 2-9: Quarterly Rate of Discharges for Patients 50-54 years in Texas, 2009-2018

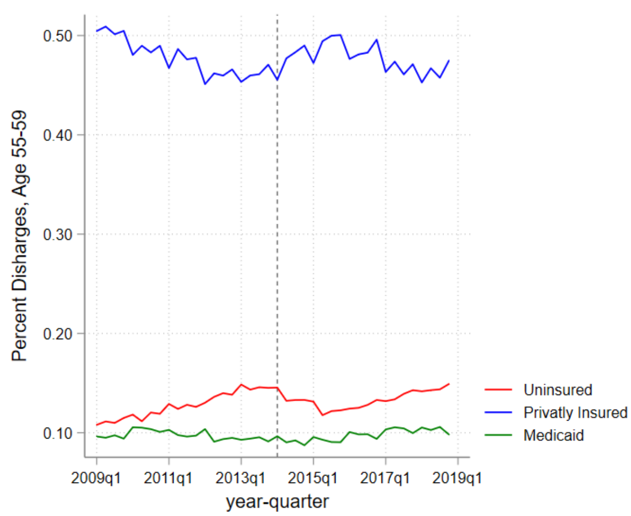

Figure 2-10: Quarterly Rate of Discharges for Patients 55-59 years in Texas, 2009-2018

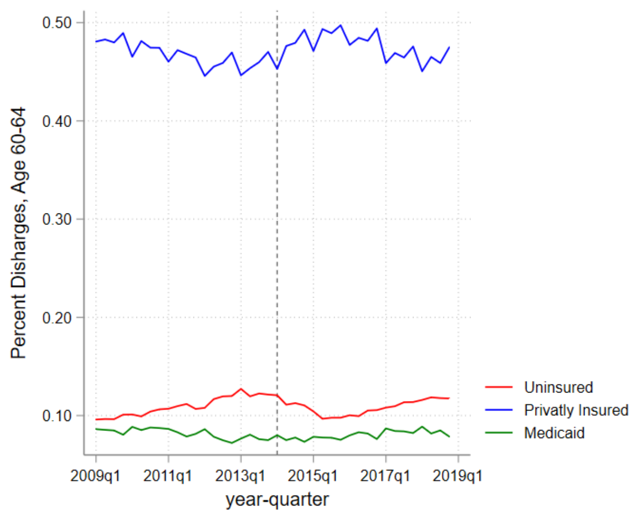

Figure 2-11: Quarterly Rate of Discharges for Patients 60-64 years in Texas, 2009-2018

Trends in discharges by gender are shown in Figures 2-12 and 2-13. Figure 2-12 shows that the uninsured discharge rate for female has declined by 0.82% from 13.47% in 2013 to 12.65% in 2014. The graph shows that the female privately insured discharge rate in 2013 increased from 46.25% in 2013 to 47.64% in 2014. The female Medicaid discharge is also shown that increased from 26% in 2013 to 26.24% in 2014, yet the change was not statistically significant. Figure 2-13 shows the trends of changes in discharges for male. As similar as changes in trends for female, the uninsured discharges for male has significantly decreased from 22.53% in 2013 to 21.99% in 2014. Also, the privately insured discharges for male has increased significantly from 42.62% in 2013 to 44.15% in 2014. The changes for male Medicaid discharges was small (8.84% in 2013 as compared to 8.57% in 2014) and not statistically significant.

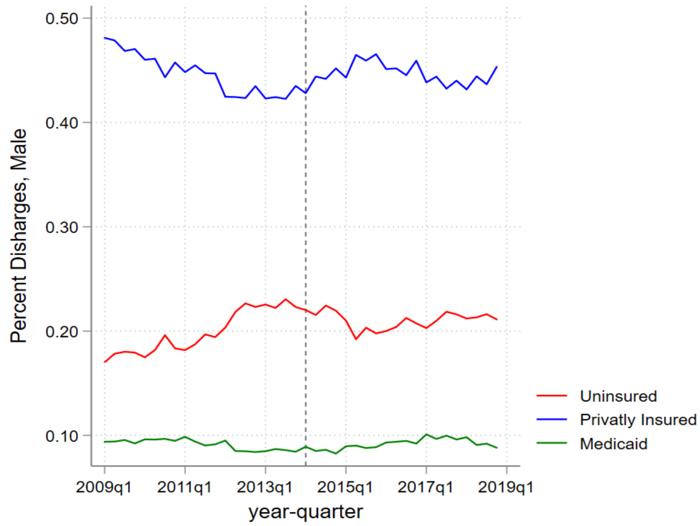

Figure 2-12: Quarterly Rate of Discharges for Female Patients 18-64 years in Texas, 2009-2018

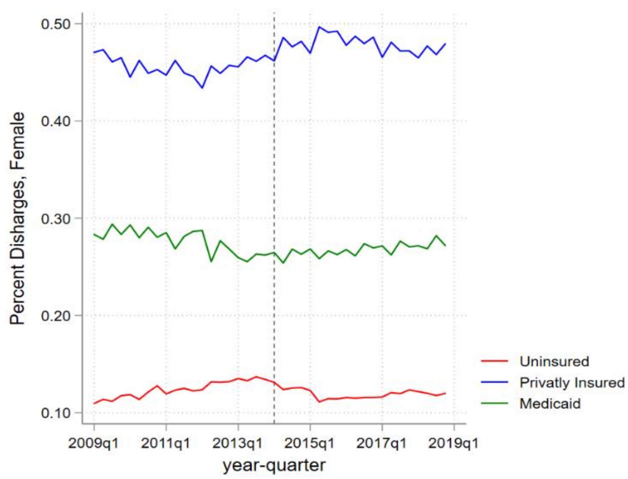

Figure 2-13: Quarterly Rate of Discharges for Male Patients 18-64 years in Texas, 2009-2018

Trends in the rate of discharges by race are shown in Figures 2-14 to 2-16. Figure 2-14 shows that the rate of uninsured discharges for White has decreased from 15.39% in 2013 to 14.47% in 2014. This change was followed by 1.1% increase in the rate of privately insured discharges (50.93% in 2013 versus 52.04% in 2014). There was also an increase in the rate of Medicaid discharges by 0.56% from 16.24% in 2013 as compared to 16.81% in 2014.

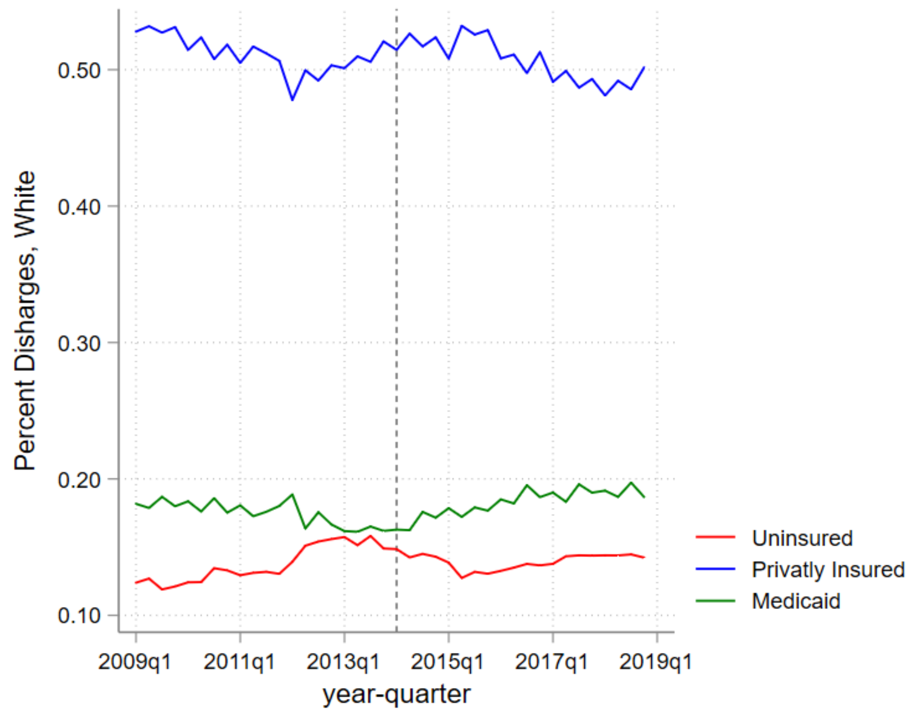

Figure 2-14: Quarterly Rate of Discharges for White Patients 18-64 years in Texas, 2009-2018

Figure 2-15 shows the rate of discharges for Black. According to this graph, the rate of uninsured discharges has decreased by 0.46% from 17.84% in 2013 to 17.37% in 2014. This change was followed by 1.16% increase in the rate of privately insured discharges (33.31% in 2013 versus 34.47% in 2014). There was also an increase in the rate of Medicaid discharges by 0.63% from 23.48% in 2013 as compared to 24.12% in 2014.

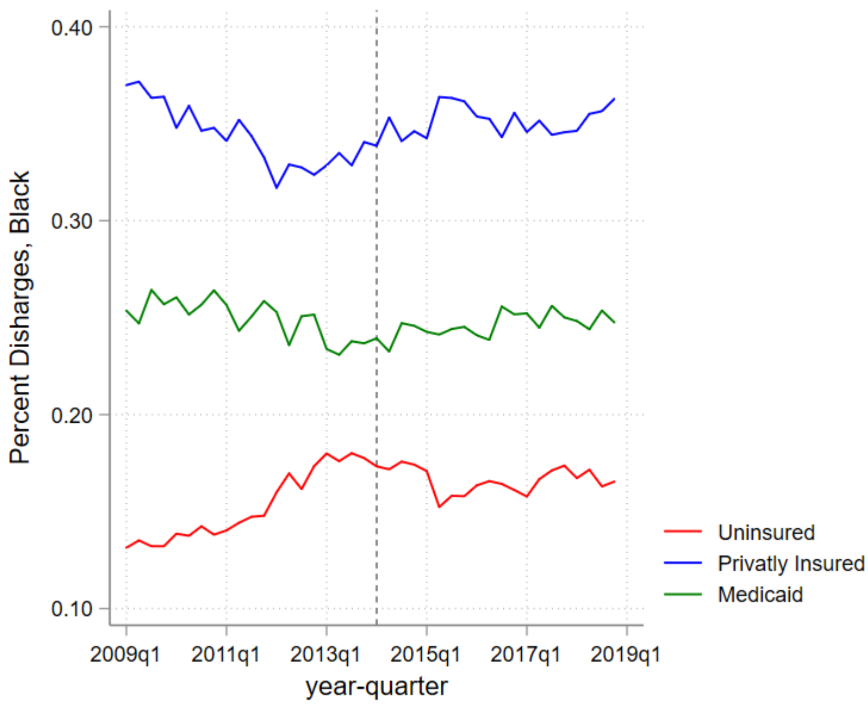

Figure 2-15: Quarterly Rate of Discharges for Black Patients 18-64 years in Texas, 2009-2018

Figure 2-16 displays the rate of discharges for Asian. The figure shows that the rate of uninsured discharges has decreased by 1.38% from 14.50% in 2013 to 13.12% in 2014. This graph also shows that there was 2.27% increase in the rate of privately insured discharges from 57.60 % in 2013 to 59.88% in 2014. There was also decrease in the rate of Medicaid discharges by 0.54% from 17.87% in 2013 to 17.33% in 2014. Yet, none of the changes in uninsured, privately insured, and Medicaid discharges for Asian were statistically significant.

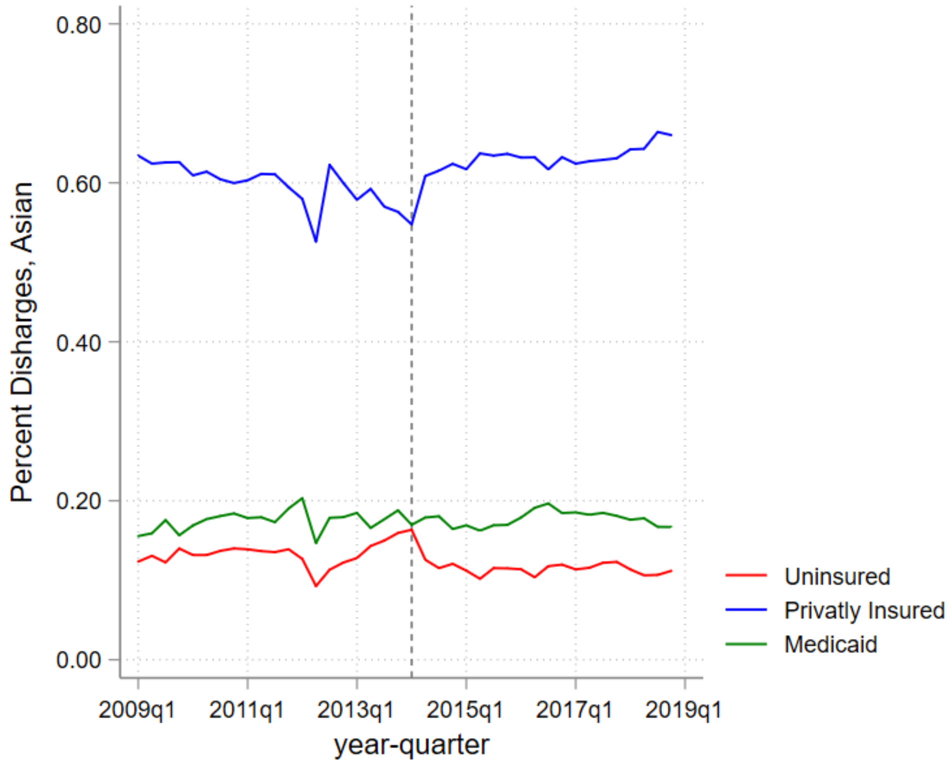

Figure 2-16: Quarterly Rate of Discharges for Asian Patients 18-64 years in Texas, 2009-2018

Figure 2-17 displays the rate of discharges for other races. The figure shows that the rate of uninsured discharges has decreased by 0.17% from 18.27% in 2013 to 18.10% in 2014. This graph also shows that there was 1.66% increase in the rate of privately insured discharges from 36.91 % in 2013 to 38.56% in 2014. There was also increase in the rate of Medicaid discharges by 0.52% from 28.87% in 2013 to 28.35% in 2014. Yet, none of the changes in uninsured, privately insured, and Medicaid discharges for other races were statistically significant.

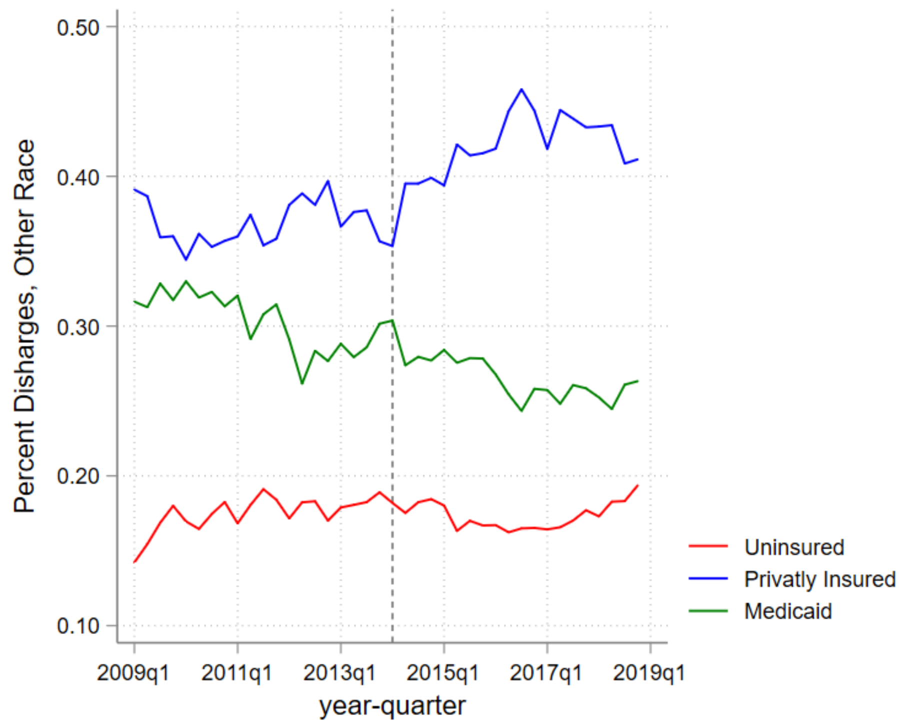

Figure 2-17: Quarterly Rate of Discharges for Other Race Patients 18-64 years in Texas, 2009-2018

Figures 2-18 to 2-19 displays changes in discharge rates by the type of admissions. Figure 2-18 shows that the rate of discharges for emergency admissions. The rate of uninsured discharges has decreased by 1.8% from 23.04% in 2013 to 21.19% in 2014. The graph also shows that there was 2.18% increase in the rate of privately insured discharges from 37.06 % in 2013 to 39.25% in 2014. There was also not statistically significant increase in the rate of Medicaid discharges by 0.19% from 18.15% in 2013 to 18.35% in 2014.

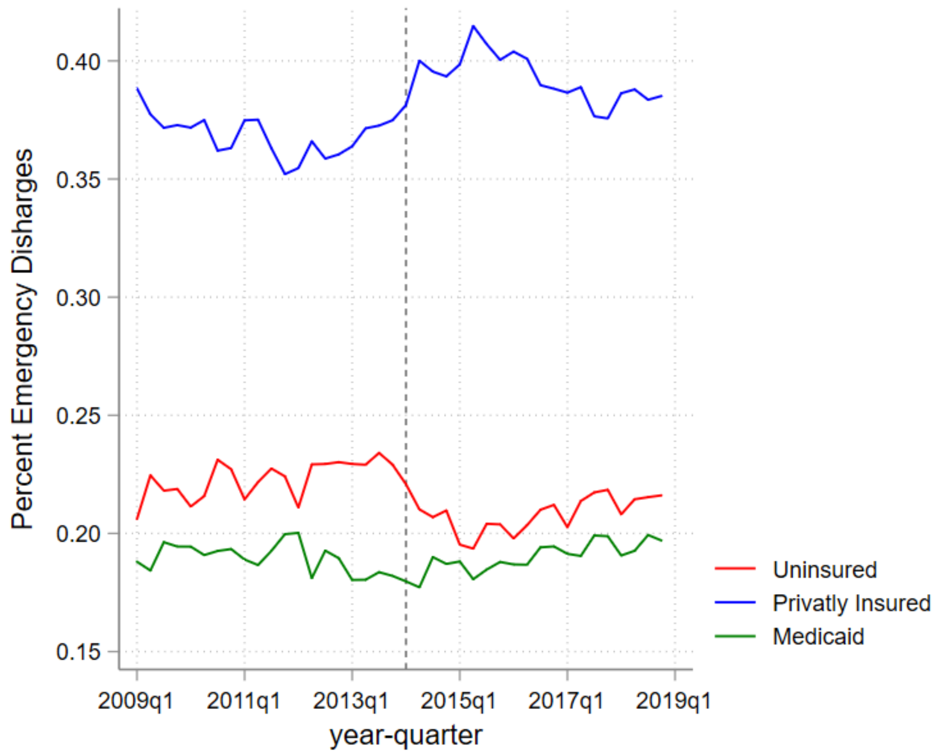

Figure 2-18: Quarterly Rate of Discharges for Emergency Admissions, Patients18-64 years in Texas, 2009-2018

Figure 2-19 shows the rate of discharges for elective admissions. The figure shows that the rate of uninsured discharges decreased by 0.44% from 6.10% in 2013 to 5.65% in 2014. The graph also shows that there was 1.29% increase- not statistically significant -in the rate of privately insured discharges from 57.27 % in 2013 to 58.56% in 2014. There was also increase in the rate of Medicaid discharges by 0.51% from 22.12% in 2013 to 21.61% in 2014.

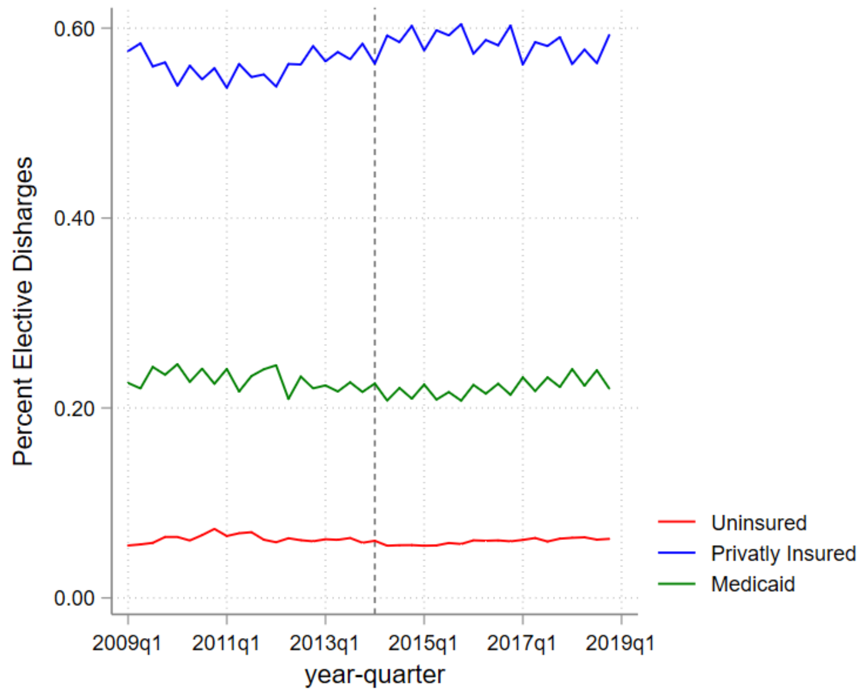

Figure 2-19: Quarterly Rate of Discharges for Elective Admissions, Patients18-64 years in Texas, 2009-2018

Table 2-3 provides the percentage of mean differences in the ratio of uninsured, privately insured, and Medicaid discharge between years 2013 and 2014. The table displays the changes for 10 PQIs. The findings of the table are individually presented and explained as follows.

Table 2-3: Mean-Differences in the Ratio of Discharges for Preventable Conditions, year 2014 versus 2013

Prevention Quality Indicators	Uninsured	Privately Insured	Medicaid
Diabetes Short-term Complications	-2.02%** (0.52%)	3.12%*** (0.81%)	1.03%* (0.60%)
Diabetes Long-term Complications	-0.74% (0.15%)	2.93%*** (0.74%)	-0.19% (0.47%)
COPD or Asthma in Older Adults	-0.79% (0.62%)	1.43% (1.07%)	0.31% (0.73%)
Hypertension	-1.97%* (1.19%)	3.25%*** (1.01%)	-0.58% (0.59%)
Heart Failure	-1.01%* (0.55%)	2.83%*** (0.67%)	-0.51%* (0.27%)
Community Acquired Pneumonia	-1.08% (1.04%)	1.43%** (0.56%)	0.46% (0.35%)
Urinary Tract Infection	-1.57%* (0.76%)	1.77%** (0.61%)	0.82%* (0.45%)

*** p<0.01, ** p<0.05, * p<0.1

Table 2-3: Mean-Differences in the Ratio of Discharges for Preventable Conditions, year 2014 versus 2013 Continued

Prevention Quality Indicators	Uninsured	Privately Insured	Medicaid
Uncontrolled Diabetes	-4.28%** (1.44%)	2.16% (2.08%)	0.22% (0.95%)
Asthma in Younger Adults	-0.31% (0.84%)	0.98% (1.18%)	0.0 % (0.83%)
Lower-Extremity Amputation among Patients with Diabetes	-1.46% ** (0.60%)	3.06%*** (0.71%)	0.37% (0.40%)

*** p<0.01, ** p<0.05, * p<0.1

Figure 2-20 displays the rate of discharges for diabetes short term complications. The figure shows that the rate of uninsured discharges has decreased from 35.70% in 2013 to 33.68% in 2014. This graph also shows that the rate of privately insured discharges increased from 31.46 % in 2013 to 34.59% in 2014. The rate of Medicaid discharges increased from 13.54% in 2013 to 14.58% in 2014. All changes were statistically significant.

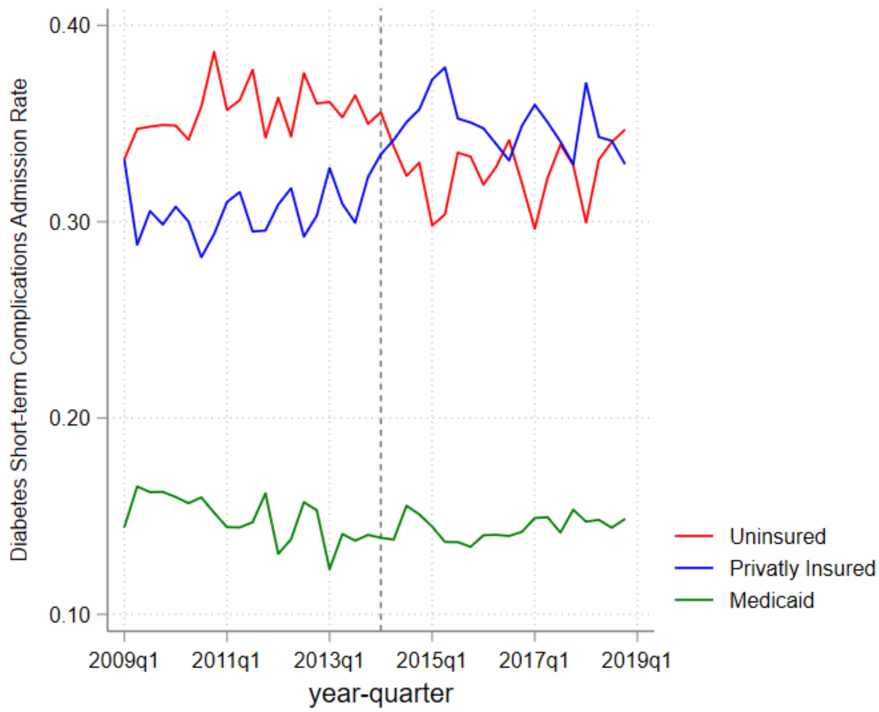

Figure 2-20: Quarterly Rate of Discharges for Diabetes Short Term Complications, Patients18-64 years in Texas, 2009-2018

Figure 2-21 displays the rate of discharges for diabetes long term complications. The figure shows that the rate of uninsured discharges has decreased from 22.17% in 2013 to 21.43% in 2014. This graph also shows that the rate of privately insured discharges increased from 26.82 % in 2013 to 29.76% in 2014. The rate of Medicaid discharges decreased from 11.93% in 2013 to 11.74% in 2014. Only changes in the ratio of privately insured discharges were statistically significant.

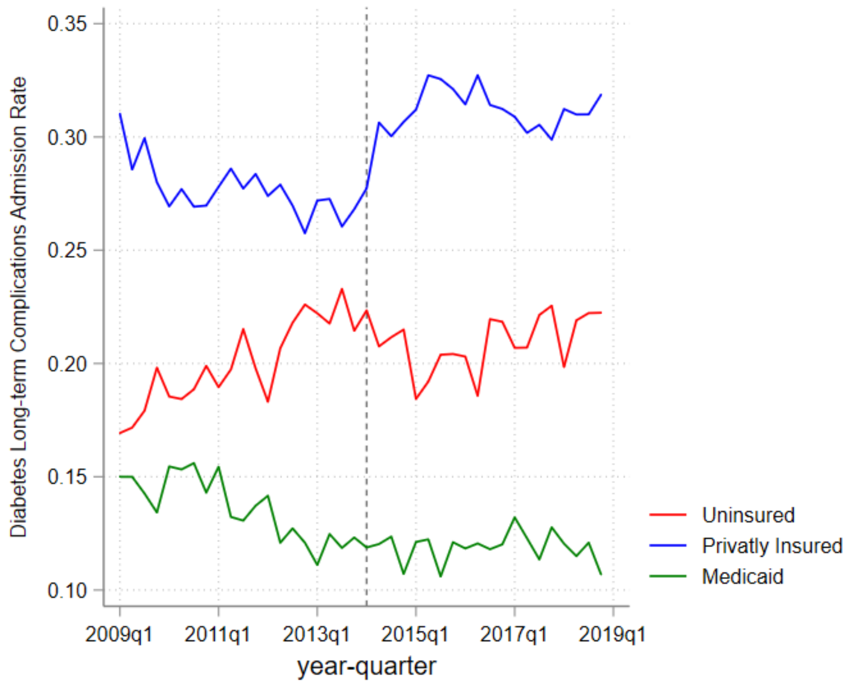

Figure 2-21: Quarterly Rate of Discharges for Diabetes Long Term Complications, Patients18-64 years in Texas, 2009-2018

Figure 2-22 displays the rate of discharges for COPD or asthma in older adults. The figure shows that the rate of uninsured discharges has decreased from 21.69% in 2013 to 20.90% in 2014. This graph also shows that the rate of privately insured discharges increased from 36.23 % in 2013 to 37.66% in 2014. The rate of Medicaid discharges increased from 13.37% in 2013 to 13.68% in 2014. None of changes were statistically significant.

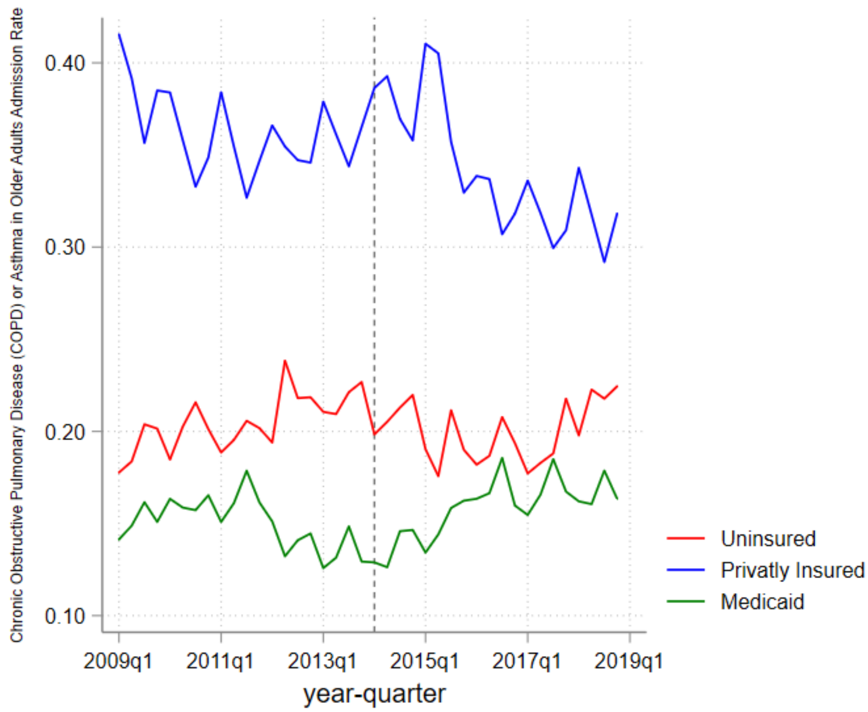

Figure 2-22: Quarterly Rate of Discharges for COPD or Asthma in Older Adults, Patients18-64 years in Texas, 2009-2018

Figure 2-23 displays the rate of discharges for hypertension. The figure shows that the rate of uninsured discharges has decreased from 35.15% in 2013 to 33.18% in 2014. This graph also shows that the rate of privately insured discharges increased from 35.20 % in 2013 to 38.45% in 2014. The rate of Medicaid discharges decreased from 10.04% in 2013 to 9.45% in 2014. The changes in Medicaid discharges were statistically significant.

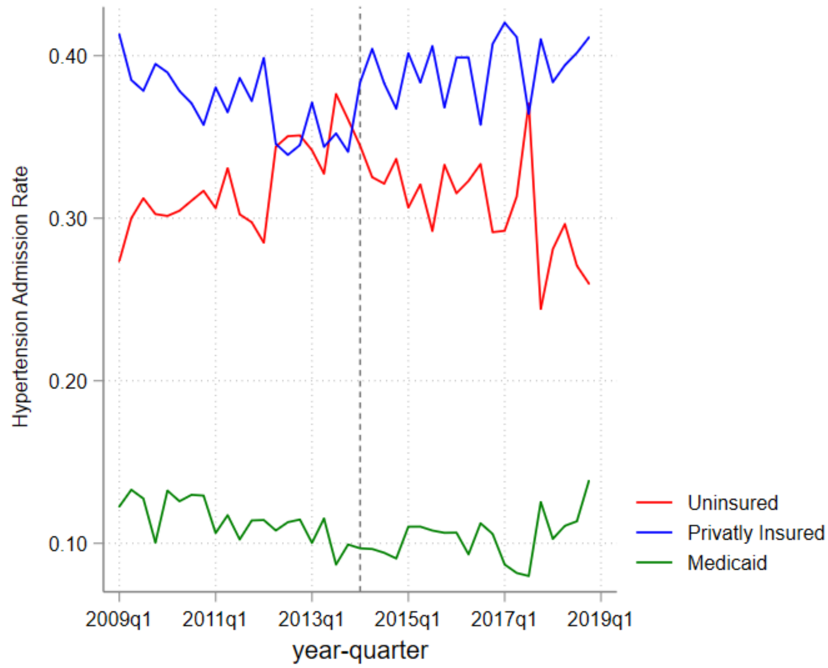

Figure 2-23: Quarterly Rate of Discharges for Hypertension Admission, Patients18-64 years in Texas, 2009-2018

Figure 2-24 displays the rate of discharges for heart failure. The figure shows that the rate of uninsured discharges has decreased from 22.18% in 2013 to 21.17% in 2014. This graph also shows that the rate of privately insured discharges increased from 27.24 % in 2013 to 30.07% in 2014. The rate of Medicaid discharges decreased from 14.98% in 2013 to 14.47% in 2014. All changes were statistically significant.

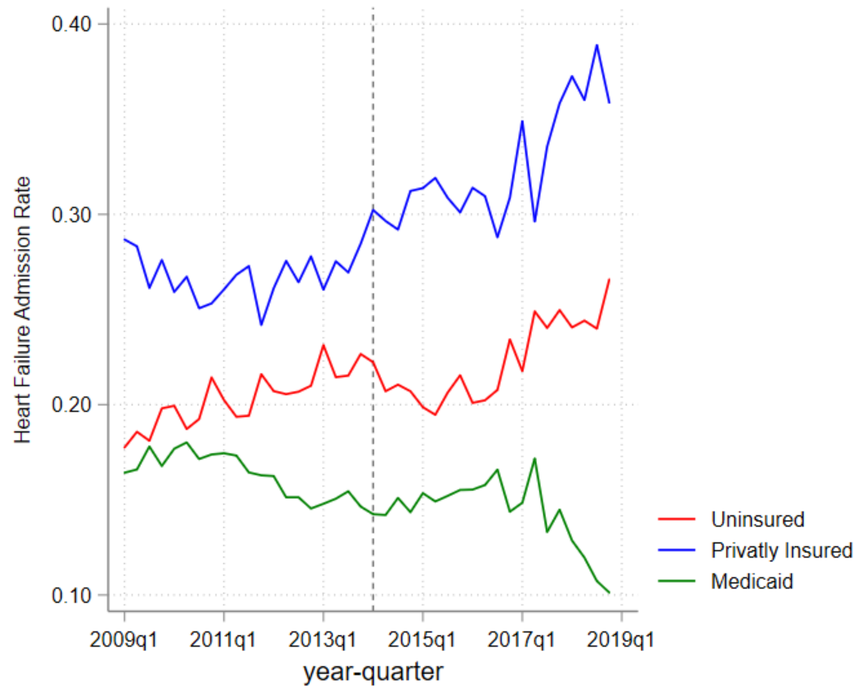

Figure 2-24: Quarterly Rate of Discharges for Heart Failure, Patients18-64 years in Texas, 2009-2018

Figure 2-25 displays the rate of discharges for community acquired pneumonia. The figure shows that the rate of uninsured discharges has decreased from 19.01% in 2013 to 17.92% in 2014. This graph also shows that the rate of privately insured discharges increased significantly from 39.10 % in 2013 to 40.53% in 2014. The rate of Medicaid discharges increased from 11.86% in 2013 to 12.32% in 2014.

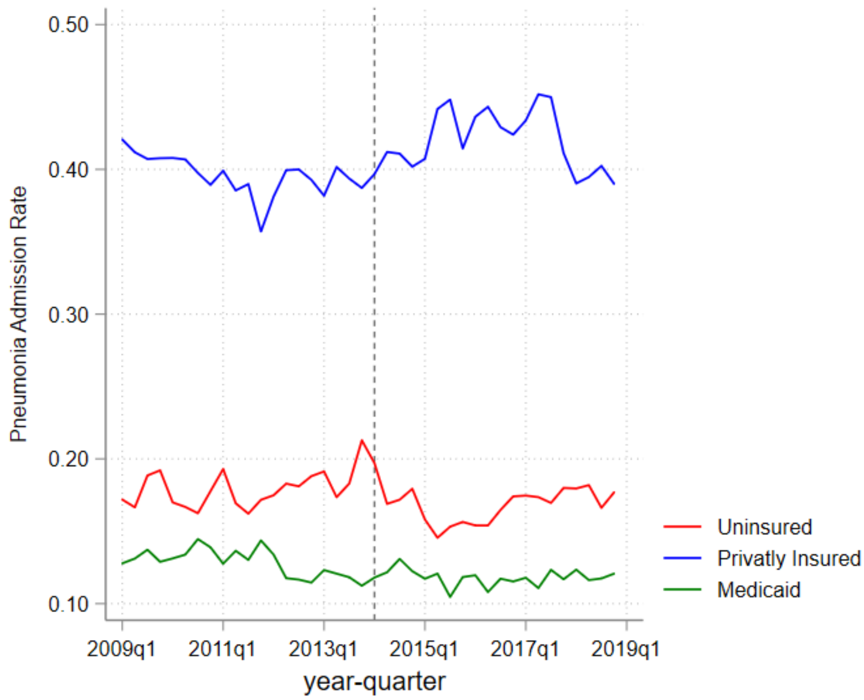

Figure 2-25: Quarterly Rate of Discharges for Community Acquired Pneumonia Admission, Patients18-64 years in Texas, 2009-2018

Figure 2-26 displays the rate of discharges for urinary tract infection. The figure shows that the rate of uninsured discharges has decreased from 24.25% in 2013 to 22.67% in 2014. This graph also shows that the rate of privately insured discharges increased significantly from 35.15 % in 2013 to 36.93% in 2014. The rate of Medicaid discharges increased from 14.29% in 2013 to 15.12% in 2014. All changes were statistically significant.

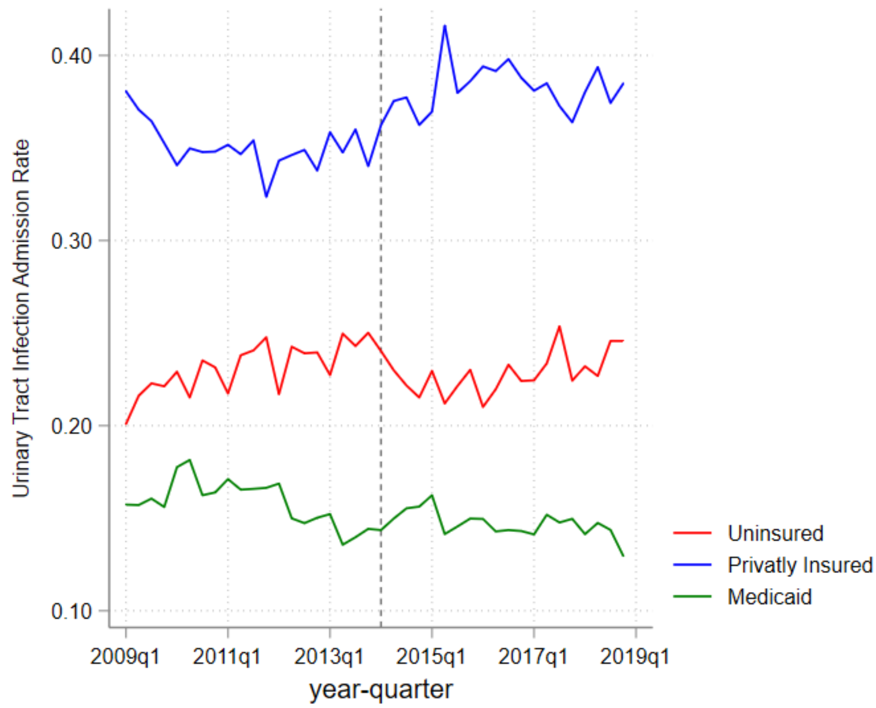

Figure 2-26: Quarterly Rate of Discharges for Urinary Tract Infection Admission, Patients18-64 years in Texas, 2009-2018

Figure 2-27 displays the rate of discharges for uncontrolled diabetes. The figure shows that the rate of uninsured discharges has significantly decreased from 32.62% in 2013 to 28.33% in 2014. This graph also shows that the rate of privately insured discharges increased from 31.60 % in 2013 to 33.77% in 2014. The rate of Medicaid discharges increased from 14.11% in 2013 to 14.34% in 2014.

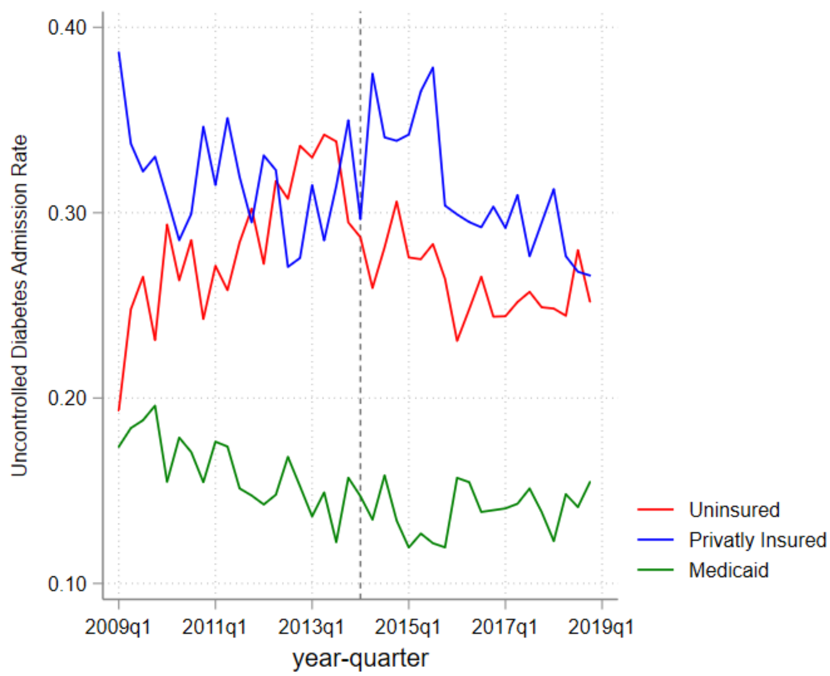

Figure 2-27: Quarterly Rate of Discharges for Uncontrolled Diabetes Admission, Patients18-64 years in Texas, 2009-2018

Figure 2-28 displays the rate of discharges for asthma in younger adults. The figure shows that the rate of uninsured discharges has increased from 24.63% in 2013 to 24.95% in 2014. This graph also shows that the rate of privately insured discharges increased from 35.55% in 2013 to 36.54% in 2014. There was no change in the rate of Medicaid discharges from 2013 to 2014. None of changes were statistically significant.

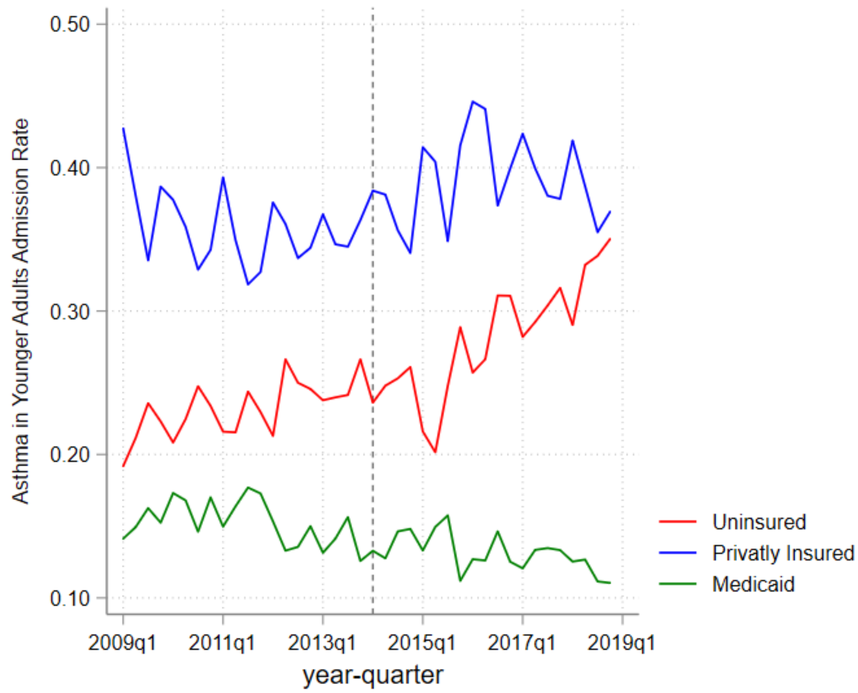

Figure 2-28: Quarterly Rate of Discharges for Asthma in Younger Adults, Patients18-64 years in Texas, 2009-2018

Figure 2-29 displays the rate of discharges for lower-extremity amputation among patients with diabetes. The figure shows that the rate of uninsured discharges has increased from 28.31% in 2013 to 26.84% in 2014. This graph also shows that the rate of privately insured discharges significantly increased from 29.05% in 2013 to 32.05% in 2014. The rate of Medicaid discharges increased from 12.63% in 2013 to 13.00 % in 2014, yet this was not statistically significant.

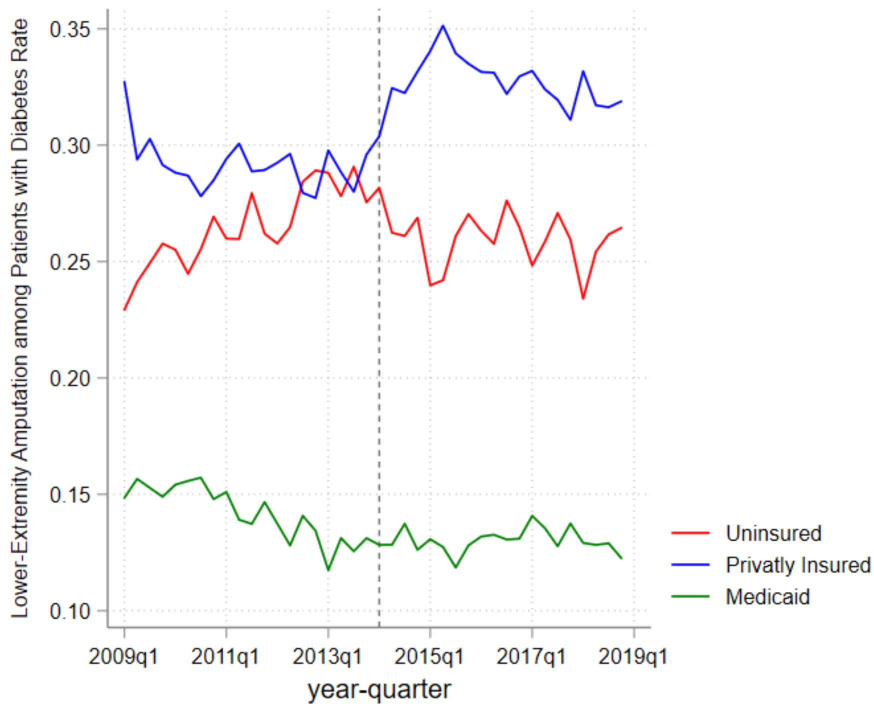

Figure 2-29: Quarterly Rate of Discharges for Lower-Extremity Amputation among Patients with Diabetes, Patients18-64 years in Texas, 2009-2018

Figure 2-30 displays the average annual estimate of providers per 10,000 population in Texas, from 2011 through 2018. As is shown in this Figure, over the years of study, the number of nurse practitioners increased by 82%, from 7.45 per 10,000 people in 2011 to 13.58 in 2018. The number of PCPs per 10,000 remained unchanged with less than 0.6% decrease from 4.65 in 2011 to 4.62 in 2018. Also, the number of MDs per 10,000 remained almost unchanged with 1.3% increase from 9.18 in 2011 to 9.30 in 2018. As follows, I exhibit changes in variation of care providers across counties in Figures 35-37.

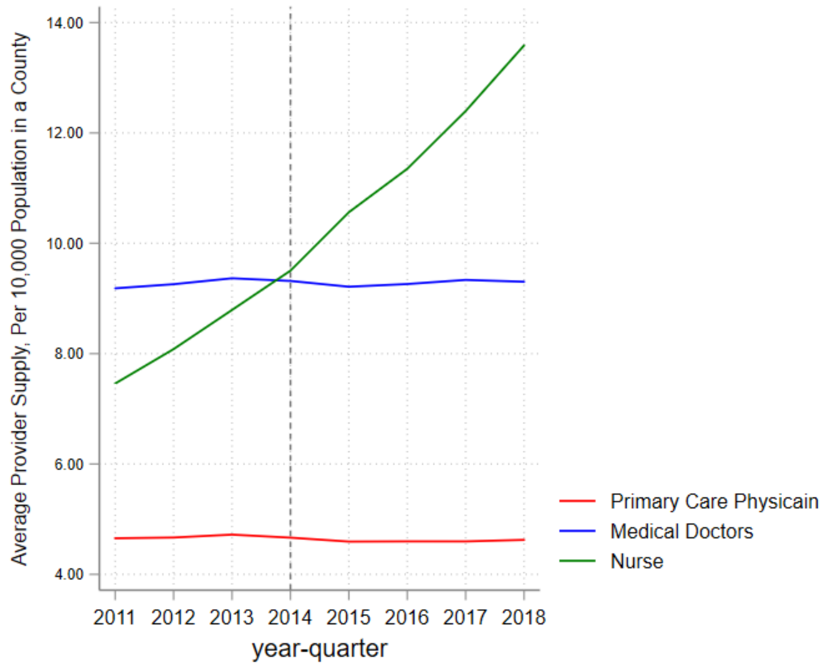

Figure 2-30: Average annual counts of care providers per 10,000 population in Texas

Figures 2-31 to 2-33 show difference between the average counts of providers per 10,000 population over the years 2014 through 2018, and the average counts of providers over the years 2011 through 2013. The green counties have experienced increases in their provider supply and the yellow/red counties saw decreases in their provider supply. For example, in the county of Tarrant the mean count of physician in 2014 and after has decreased in comparison to mean count of physicians prior to 2014, but the count of nurse has increased. Overall, there seems that the supply of primary care physician has decreased in various counties. According to Cunningham, & Sheng, (2018), further increases in inpatient admissions could be attributed to the lower supply of primary care.

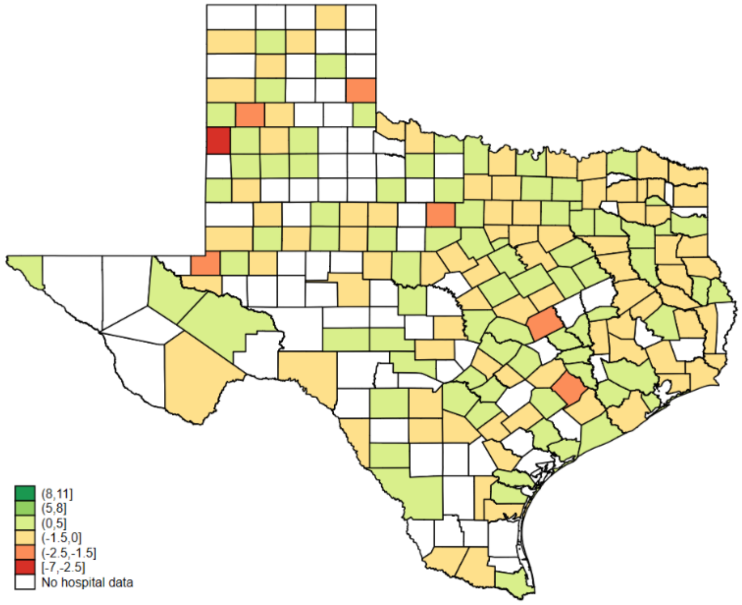

Figure 2-31: Changes in Mean Count of Physician per 10,000 population in years 2014-2018 vs 2011-2013

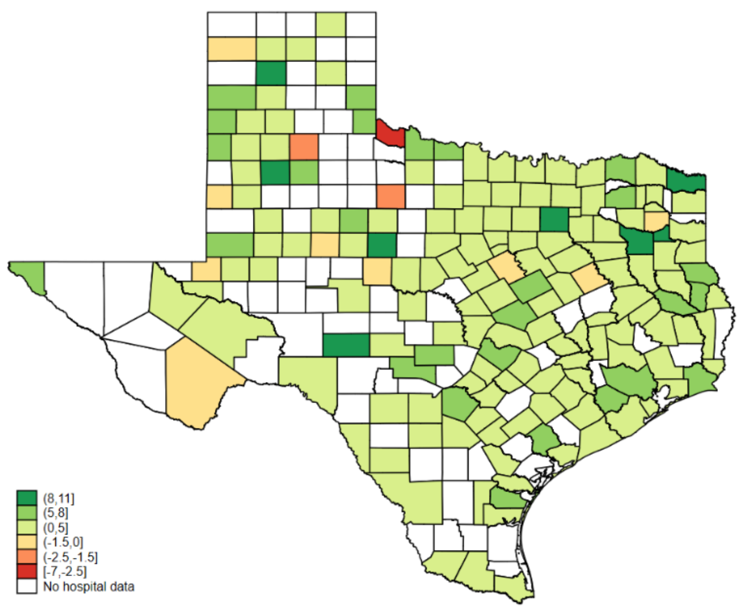

Figure 2-32: Changes in Mean Count of Nurse per 10,000 population in years 2014-2018 vs 2011-2013

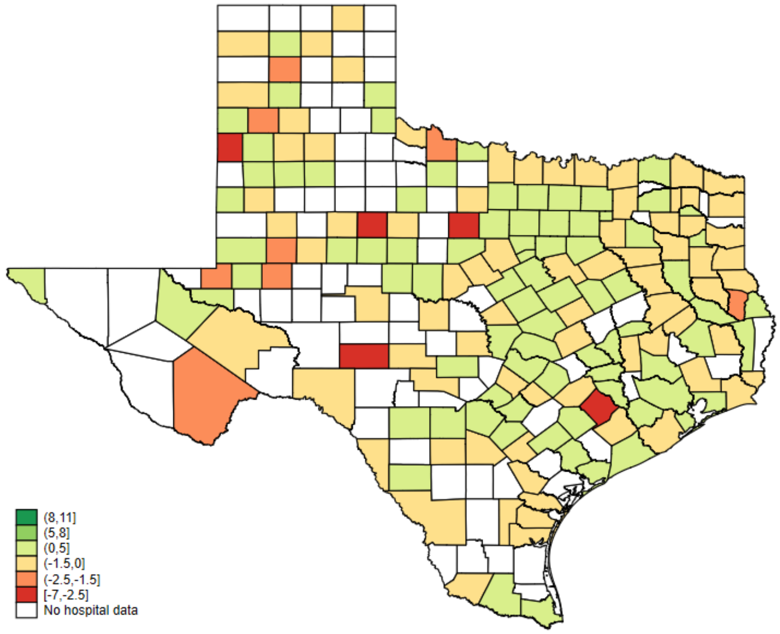

Figure 2-33: Changes in Mean Count of Medical Doctors per 10,000 population in years 2014-2018 vs 2011-2013

2.5. Discussion

The results show support of the first hypothesis, where it finds consistent decline in uninsured discharges and increase in privately insured discharges. When analyzing changes in discharge rates in 2014 against 2013, it appears that there were no statistically significant changes in the uninsured discharge rate for age groups 18-24, and 50-54 years. There were significant increases in privately insured discharge rates for all age groups except for age 40-44 that has not experienced any significant changes. In analyzing gender, the uninsured discharge rate has declined for both men and women, with greater decreases in women. Also, the insured discharge rate has increased for both genders, yet the increase was larger for men. The same pattern of decreases in uninsured discharge rate and increases in privately insured discharge rate was seen for White, and

Black. With respect to the types of admission, uninsured discharge rate has declined for both emergency and elective admissions. However, the increase in privately insured discharge rate was evident only in emergency admissions. The changes in Medicaid discharges were consistently insignificant across all patient characteristics with the exception of increases for those who were 40-44 years, White, and Black.

Further findings seem to support the second hypothesis, where it finds there was a consistent decrease in the proportion of most preventable hospitalizations for uninsured admissions. However, it looks that there was a shift of discharges by the type of coverage from uninsured to privately insured, as there was a consistent increase in the proportion of most preventable hospitalizations for privately insured admissions. That implies the overall preventable hospitalization might have not been reduced. Overall, the findings suggest that Marketplace component of the ACA potentially decreased the rate of uninsured inpatient discharges across various patient groups, and substantially increased privately insured discharge rate.

Additional findings show that there were changes in the supply of primary care physician within counties after the enactment of the ACA. Although such changes could be associated with the increases in hospitalization for privately insured patients, the findings show there was no considerable changes in the count of health profession per 10,000 population statewide. Therefore, no conclusion relating to hospitalization can be drawn from this finding. In fact, a county wide analysis seems proper to find the potential impact of the supply of health care provider on level of hospitalization. I leave this exercise for future work.

There are caveats to the research design here that impose limitations when interpreting the results. First, the results estimate the short term results of the insurance expansion, where the ratio of discharges in 2014 are compared to ratio of discharges in 2013. Thus, the estimated changes in the rate of hospitalization for uninsured and privately insured discharges could have been the outcome of continuous change in trends that started well before the implementation of the main coverage provisions of the ACA. Second, the analysis does not directly control for other factors not related to the ACA that could be responsible for most of the changes. So it is possible that ACA marketplaces did not fundamentally have altered trends of discharges. I leave this exercise for future work to examine the causal impact of ACA marketplaces on reductions in uninsured discharge rate. Third, my research design cannot determine a direct relationship between provider care supply and hospitalization. Last, there are minor issue of excluded small facilities.

2.6. References

American College of Emergency Physicians. 2015 ACEP Poll: Affordable Care Act Research Results. March 2015.

American Hospital Association. TrendWatch Chartbook 2016: Trends Affecting Hospitals and Health Systems. 2016. Washington, DC: American Hospital Association.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2017). Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. Journal of Policy Analysis and Management, 36(1), 178-210.

Cunningham, P., & Sheng, Y. (2018). Trends in preventable inpatient and emergency department utilization in California between 2012 and 2015. Medical care, 56(6), 544-550.

Duggan, M., Gupta, A., & Jackson, E. (2019). The Impact of the Affordable Care Act: Evidence from California's Hospital Sector (No. w25488). National Bureau of Economic Research.

Freedman, S., Nikpay, S., Carroll, A., & Simon, K. (2017). Changes in inpatient payer-mix and hospitalizations following Medicaid expansion: evidence from all-capture hospital discharge data. PloS one, 12(9), e0183616.

Goldman, A. L., McCormick, D., Haas, J. S., & Sommers, B. D. (2018). Effects of the ACA's health insurance marketplaces on the previously uninsured: a quasi-experimental analysis. Health Affairs, 37(4), 591-599.

Hayes, T. O., & Hayes, T. O. (2017, January 5). How Many Are Newly Insured as a Result of the ACA? AAF. https://www.americanactionforum.org/insight/20-million/#_edn11

Lavetti, K., DeLeire, T., & Ziebarth, N. (2018). How Do Low-Income Enrollees in The Affordable Care Act Exchanges Respond to Cost-Sharing? Working paper.

Nikpay, S., Buchmueller, T., & Levy, H. (2015). Early Medicaid expansion in Connecticut stemmed the growth in hospital uncompensated care. Health Affairs, 34(7), 1170-1179.

Nikpay, S., Buchmueller, T., & Levy, H. G. (2016). Affordable Care Act Medicaid expansion reduced uninsured hospital stays in 2014. Health Affairs, 35(1), 106-110.

Park, S., Stimpson, J. P., & Nguyen, G. T. (2020). Association of Changes in Primary Care Spending and Use With Participation in the US Affordable Care Act Health Insurance Marketplaces. JAMA Network Open, 3(6), e207442-e207442.

Pickens, G., Karaca, Z., Cutler, E., Dworsky, M., Eibner, C., Moore, B., ... & Wong, H. S. (2018). Changes in hospital inpatient utilization following health care reform. Health services research, 53(4), 2446-2469.

Sommers, B. D., Blendon, R. J., Orav, E. J., & Epstein, A. M. (2016). Changes in utilization and health among low-income adults after Medicaid expansion or expanded private insurance. JAMA internal medicine, 176(10), 1501-1509.

Texas Health Care Information Collection Home.Inpatient data reporting requirements. Retrieved from https://www.dshs.texas.gov/thcic/hospitals/HospitalReportingRequirements.shtm

The Medicare Payment Advisory Commission. Report to the Congress: Health Care Spending and the Medicare program. June 2016. http://www.medpac.gov/docs/de-fault-source/reports/june-2016-report-to-the-congress-medicare-and-the-health-care-de-livery-system.pdf?sfvrsn=0.

Uberoi, N., Finegold, K., & Gee, E. (2016, March). Health Insurance Coverage and the Affordable Care Act, 2010–2016. https://aspe.hhs.gov

United States Department of Health and Human Services. Health Resources and Services Administration. Bureau of Health Professions. Bureau of Health Professions Area Resource File, 2011-2018.

U.S. Census Bureau (2019). Selected housing characteristics, 2009-2018 American Community Survey 5-year estimates.

Wherry, L. R., & Miller, S. (2016). Early coverage, access, utilization, and health effects associated with the Affordable Care Act Medicaid expansions: a quasi-experimental study. Annals of internal medicine, 164(12), 795-803.

Young, G. (2017). Hospitals in the Post-ACA Era: Impacts and Responses. Also available at https://www. milbank.org.

3. IMPACT OF ACA MARKETPLACE ON UNINSURED DISCHARGES IN TEXAS

3.1. Introduction

The goal of the Affordable Care Act (ACA) was to expand health insurance coverage and reduce the number of uninsured in the United States (U.S.). The premise that reducing the number of uninsured patients would reduce hospitals' burden of uncompensated care, care for which no payment was received from the patient or insurer, was one important aspect in the debate to expand health insurance coverage. Previous studies have shown that the ACA effect driven by Medicaid expansion led to reductions in uncompensated care (Cunningham, Garfield, & Rudowits, 2015; Nikpay, Buchmueller, & Levy, 2016), though studies on the effect of the ACA health insurance exchanges, known as Marketplace, on uncompensated care reductions are lacking.

The ACA Marketplaces offer subsidized private insurance plans to those who have no access to affordable coverage through employers. Health insurance marketplaces are run by the state (i.e. California, Colorado, Connecticut, District of Columbia, Idaho, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Washington) or the federal government to offer access to subsidized private coverage to consumers with family income between 100 percent and 400 percent of federal poverty level (FPL). Additional cost sharing reductions are available to those with incomes below 250 percent of FPL (Burke, Misra, & Sheingold, 2014; Corlette, Blumberg, & Lucia, 2020; DeLeire, et al., 2017; KFF, 2020). Previous work has shown that subsidized Marketplace coverages have accounted for about 40% declines in the uninsurance rate (Frean, Gruber, & Sommers, 2017; Goldman, et al., 2018).

This paper sheds light on whether the ACA Marketplaces led to reductions in hospitals uncompensated care as measured by changes in the hospitals' uninsured discharges for adults in Texas. I estimate the effects of the ACA Marketplace in Texas using a difference-in-difference models with the differences coming from the time of the implementation of the ACA and the pre-ACA hospital uninsured discharge rate. This "bite" strategy has been widely used in the literature to identify policy effects where the policy was implemented nationally or regionally (Courtemanche et al., 2017; Courtemanche et al., 2018 a, b; Courtemanche et al., 2020).

I use data on inpatient discharges from Texas hospitals for 32 quarters during 2011-2018 (THCIC, 2018). I identify 225 hospitals that provide acute care services and continuously are self-identified as acute care facilities. I examine primary payment sources and calculate the ratio of uninsured discharges for these hospitals. I estimate the intensity of changes in uninsured discharge rate after the establishment of the Texas Marketplace.

I find that at the average pre-ACA uninsured discharge rate, the Marketplace decreased the proportion of uninsured discharges by 1.6 percentage points. My study supports prior findings in suggesting that coverage expansion through the health insurance Marketplaces were followed by reductions in uncompensated care costs (DeLeire et al., 2014).

3.2. Literature

There is an extensive literature examining the impact of ACA's coverage expansion policies on hospitals' uncompensated care due to uninsured discharges. In an examination of the Medicaid expansion policy under the ACA and by use of Medicare cost reports, studies provide evidence that suggest there has been a shift from uninsured to Medicaid in expansion states. For example, Nikpay et al., (2015) compared the change in Medicaid volume and uncompensated care in the period 2007–13 for essentially all hospitals excluding Veterans Affairs and selected children's hospitals in Connecticut. These scholars found that early Medicaid expansion in Connecticut has led to an increase in Medicaid discharges and no increase in uncompensated care. These findings led to a conclusion that without Medicaid expansion, uncompensated care would have increased. Dranove, and colleagues examined how the ACA's Medicaid expansion affected uncompensated care costs at general acute care and critical access hospitals in the fifty states plus the District of Columbia. They found that uncompensated care costs fell substantially in expansion states from 2013 to 2014 and that the reduction was driven by hospitals that had the highest levels of uncompensated care in 2013. They also found that the fall in uncompensated care costs in expansion states were largest in areas where more people gained Medicaid eligibility (Dranove, Garthwaite, & Ody, 2016). Camilleri (2018) estimated the effect of the first full year of the ACA Medicaid expansion on hospital provision of uncompensated care, where they found that Medicaid expansion significantly reduced hospital provision of uncompensated care in 2014, with hospitals that treated a larger proportion of low-income patients experiencing greater declines. Blavin (2016) estimated the association between the Medicaid expansion in 2014 and hospital finances by assessing differences between hospitals in states that expanded Medicaid and in those states that did not expand Medicaid. In this analysis, Medicaid expansion was associated with substantial changes in payer mix. Hospitals in states with Medicaid expansion experienced reductions in uncompensated care costs and increases in Medicaid revenue compared with hospitals in states without Medicaid expansion.

Using new data on the expansions, Admon et al., (2019) examined whether increase in hospitalizations funded by Medicaid reflects an isolated payer shift or broader changes in case-mix among hospitalized adults. They used hospital discharge records from 7 states between January 1, 2012 and December 31, 2015 that was obtained from the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SIDs). They found that Medicaid expansion was associated with a shift in payers among nonelderly hospitalized adults without significant changes in case-mix or in several markers of acuity. These findings suggest that Medicaid expansion have reduced uncompensated care without shifting admissions practices or acuity among hospitalized adults.

Cunningham, Garfield, and Rudowits (2015) examined the early experiences with the ACA by Ascension Health, the delivery subsidiary of the nation's largest not-for-profit health system, Ascension, which includes 131 acute-care hospitals and more than 30 senior care facilities in 23 states and the District of Columbia. Ascension is a Catholic healthcare system with service to the poor as an explicit part of their mission, providing almost $1.8 billion in care to persons living in poverty and other community benefit programs that include $600 million in direct charity care assistance to poor and uninsured patients in their 2014 fiscal year. They examined changes in discharge volumes, hospital finances, and other outcomes between the last three quarters of 2013 – just before implementation of the ACA coverage expansions – and the first three quarters of 2014 (through September 30, 2014). Compared to hospitals in states that did not expand Medicaid, Ascension Health hospitals in states that expanded Medicaid experienced larger increases in Medicaid discharge volumes and decreases in uninsured/self-pay volume from 2013 to 2014. Specifically, hospitals in Medicaid expansion states saw a 7.4 percent increase in Medicaid discharge volumes from 2013 to 2014 (compared to 1.4 percent for hospitals in non-expansion states) and a 32.3 percent decrease in uninsured/self-pay discharge volumes (compared to a 4.4 percent decrease in non-expansion states). Correspondingly, Ascension hospitals in expansion states saw an increase in the share of total discharges billed to Medicaid and a decrease in the share of discharges that were uninsured/self-pay.

Nikpay, Buchmueller, and Levy (2016) examined whether reducing the number of uninsured patients would also reduce hospitals' burden of uncompensated care. They used inpatient hospital stays from HCUP Fast Stats for States that expanded eligibility for Medicaid in 2014. They found a significant drop in the uninsured and the significant increase in the Medicaid discharges in expansion—but not in non-expansion—states following the coverage expansions in 2014. Their findings suggest that the majority of uninsured individuals in the expansion states who were sick enough to need hospital care in 2013 gained Medicaid, instead of private coverage, in 2014 because they had very little income. Bazzoli (2016) examined the effects of early California action in expanding coverage for low-income uninsured adults under the ACA on hospitals payer mix. She used the data obtained from the California Office of Statewide Health Planning and Development and the California Department of Health during the period 2009–2012. In her analysis, she found insurance expansions primarily benefited for-profit hospitals, with these facilities experiencing significant decreases in self-pay patients, increases in county-covered patients, and reductions in charity care. Most models yielded no significant change in payer mix and conflicting changes in unreimbursed care for non profit hospitals.

Freedman and colleagues used the FastStats data for the period 2009–2014 for specific conditions (i.e. maternal, surgical, mental health, injury, and diabetes) to compare the change in discharges in Medicaid expansion states on and after the first quarter of 2014 to the change in non-expansion states. They found early changes in payer mix in the first two quarters of 2014 continued through the Medicaid expansion's first year and are distributed across all condition types studied. They found no change in total discharges between Medicaid expansion and non-expansion states, however residents of states that should have been most affected by the Medicaid expansion were less likely to be hospitalized for diabetes (Freedman, et al., 2017). Pickens et al. (2018) used HCUP-SID data for 20 states from 2011 to 2014 to estimate the effects of 2014 Medicaid expansions on inpatient outcomes. They found that, Medicaid expansions did not change all-payer admission volumes, but they were associated with increased

Medicaid and decreased uninsured volumes. Results suggest those previously uninsured with greater needs for inpatient services were most likely to gain coverage. Moreover, the AMA's Physician Practice Benchmark Surveys revealed changes in patient mix, where physicians saw more Medicaid and privately insured patients in 2016 than they did in 2012, and the average uninsured patient share declined.

Courtemanche and colleagues used a novel strategy to identify the effects of the ACA in both Medicaid expansion and non-expansion states on health coverage (Courtemanche et al., 2017) access (Courtemanche et al., 2018 a, b; Courtemanche et al, 2020) disparity (Courtemanche et al., 2019 a, b), and behavior (Courtemanche et al., 2019 c). As study they found, ACA increased the proportion of residents with insurance by 2.8 percentage points in states that did not expand Medicaid.

This dissertation paper follows the method used by Courtemanche et al., (2017) and contributes to current literature by analyzing the effect of coverage expansion through ACA Marketplaces in a non-expansion state. This study examines the inpatient discharges for years 2011 through 2018, thus it measures the changes happening after a few years post enactment of the ACA marketplaces. Overall, my study will contribute the literature by analyzing the impact of Marketplace in a state with largest uninsured population.

3.3. Data and Method

The data come from the inpatient Texas Public Use Data File (PUDF). The PUDF collects data by quarter on all discharged patients attended or treated by physicians for all licensed hospitals, except hospitals that are statutorily exempt from the reporting requirement (THCIC, 2018). Exempt hospitals include hospitals that are in a county with a population less than 35,000, or those located in a county with a population more than 35,000 and with fewer than 100 licensed hospital beds and not located in an area that is delineated as an urbanized area by the United States Bureau of the Census (Census Bureau, 2010).

My sample period is 2011-2018. This timeframe gives me three years of pretreatment data and five years of post-treatment data. I collect payment sources of discharges for those aged 18-64 for sample hospitals. The payment sources include self-pay, charity/indigent, CHAMPUS, Medicare Part A, Medicare Part B, Health Maintenance Organization (HMO) Medicare, Medicaid, Title-V, veteran, workers compensation, liability Medical, liability, disability insurance, commercial insurance, indemnity, Preferred provider organization (PPO), Point of Service (POS), Exclusive Provider Organization (EPO), central certification, Blue-Cross-Blue-Shield, automobile medical, other federal programs and other non-federal programs.

Because uninsured forgo primary and preventive services and seek care only when a medical condition becomes acute and more expensive (Dunn, & Chen, 1994), I limit my sample to acute care hospitals. Acute care hospitals are hospitals that provide inpatient medical care and other related services for surgery, acute medical conditions or injuries (usually for a short-term illness or condition) (CMS, NA). According to Section 134.43 Texas Administrative Code "Acute care hospital" means a health care facility appropriately licensed by the Texas Department of State Health Services that provides inpatient and outpatient medical services to patients experiencing acute illness or trauma” (Code, 2008).

In my data, I exclude those hospitals with name and ZIP code suppressed. These include hospitals with fewer than 50 discharges or hospitals with fewer than 5 patients of a particular gender. I find 804 unique hospitals with at least one quarter of inpatient discharge report between 2011 and 2018. By imposing several exclusion criteria, I narrow my sample to 247 acute care hospitals with 8 full years (32 quarters) of discharge reports and obtain a balanced panel of data.

First, I exclude hospitals based on their reporting status; I exclude hospitals with less than four quarter reports per year (n=719), and those with less than eight years report during 2011-2018 (n=357). Second, I exclude hospitals with discontinuous acute care services and those with low volume discharges; I exclude hospitals that at least in one year have not had any discharges through their acute care units (n=312), and those hospitals with less than 500 average annual discharges (n= 293). Third, I exclude hospitals based on their self-identifications; in my data, hospitals are self-reported to be one or some of the following categories: teaching, psychiatric, rehabilitation, acute care, skilled nursing facility, long term acute care, other long term, and pediatric hospital. Because the self-identified categories are not-mutually exclusive and may change over time, I classify acute care hospitals as those that are self-identified as an acute care, teaching, or both. I include teaching facilities in acute care classification because they often provide inpatient and outpatient medical services to patients experiencing acute illness or trauma, and are categorized as acute care facilities (Mitchell, 2017). Thereby, I retain those hospitals that at least in one quarter indicated that they are acute care and exclude the remaining hospitals (n=268). I also exclude hospitals which at least in one year and in all quarters within that year were self-identified as any of non-acute care facilities described above and never reported to be an acute care in the same year (n=447). Lastly, I exclude hospitals which had no uninsured discharges for at least 3 consecutive years (n=225). This is shown in Table 3-1.

Table 3-1: Acute Care Hospital Sample Selection

Exclusion criteria	**Count of hospitals**
Exclude hospitals with less than four quarter reports per year	719
Exclude hospitals with less than eight years report during 2011-2018	357
Exclude hospitals that at least in one year have not had any discharges through their acute care units	312
Exclude hospitals with less than 500 average annual discharges	293
Exclude hospitals that for all years were not self-identified as Acute Care	268
Exclude hospitals which at least in one year and in all quarters within that year were self-identified as any of non-acute care facilities	247
Exclude hospitals which had no uninsured discharges for at least 3 consecutive years	225

To define the county of hospitals, I use the county of patient residence. I let the county of hospitals to be as same as county of most patients that visited that hospital. I also use the Directory of General and Special Hospitals form the THCIC to check the accuracy of county identification for available hospitals (THID, 2018). I find out of 225 sample hospitals, 192 are located in 45 Metropolitan Statistical Area (MSA), and 33 hospitals are located in 32 non-MSA. MSA refers to a central urban area that is surrounded by other urban areas and has a population of at least 50,000 people with a combined regional population of 100,000 (Ingram, & Franco, 2014). Overall, the hospitals are spread across 77 counties.

For my outcome variable, I follow previous research (Nikpay, Freedman, Levy, & Buchmueller, 2017), and combine self-pay and charity/indigent discharges to measure the count of total uninsured discharges that comprise most of hospital's uncompensated care services (DeLeire, McDonald, & Takeaways, 2014). For each year, I calculate the outcome variable by dividing uninsured discharges estimated quarterly by the total number of discharges in that quarter. This gives me the quarterly percentage of uninsured discharges at the hospital level.

I further follow the Courtemanche et al., (2017) strategy in using uninsured rate discharges in the pre-ACA year of 2013 to measure the implied effect of Marketplace component of the ACA. According to Courtemanche et al., (2019a), this measure captures the "dose" of ACA treatment the county could have received. I estimate the average discharges in year 2013 by taking the mean of quarterly discharges in that year.

I use the U.S. Census Bureau's American Community Survey (ACS) 5-year estimate to construct county-level controls. I control for age (18-24, 25-34, 35-44, 45-54 and 55-64 with below 24 as the reference group), female, race (White, Black, Asian, Hawaiian, two race, and other race with non- White/Black/Asian as the reference group) ethnicity (non-Hispanic and Hispanic with non-Hispanic as the reference), marital status of those above 15 years old (never marries, now married, separated, widowed, and divorced, with never married as the reference group), education (high school degree, some college, and college graduate, graduate degree; less than high school degree as the reference), family structure (households with children less than 18 years old at home; household without children less than 18 years old at home as reference group), citizenship (citizen; foreign born as reference), household income ($10 000-$15 000, $15 000-$20 000, $20 000-$25 000, $25 000-$35 000, $35 000 $50 000, $50 000-$75 000, and >$75 000, with <$10 000 as the reference), and whether the respondent is unemployed (ACS, 2019).

Table 3-2 presents pretreatment means and standard deviations of our outcome of interest pre-treatment (2011 to 2013) and post-treatment (2014-2018). The first column shows the mean annual uninsured discharge rate for 225 sample hospital is 14.6 percent. The second column shows that the mean annual rate of uninsured discharges for the selected sample for years 2014-2018 is 13.9%.

Table 3-2: Means and standard deviations of dependent variable for 225 sample hospitals

	Pre-Treatment (2011-2013)	**Post-Treatment (2014-2018)**
Uninsured Discharge Rate	0.146 (0.097)	0.152 (0.113)

Table 3-3 presents mean annual county statistics for the controls. It is apparent that about 19,788, 923 Texan lives in the selected sample counties. That account for 78% of all Texas population (25,207,468). According to this Table, the pre-treatment (2011-2013) mean annual population of the 77 sample counties was 256, 999 persons, where about 60 percent of these population were between 18 and 64 years, about 81 percent were white, and 32 percent were Hispanic. Nearly 50 percent of over 15 year's old population of a county were married. The annual mean number of households within a county was 88,598 with about 37 percent having under 18 years' old children at home. In terms of education, about 80 percent of those aged above 25 at least had high school degree. The rate of unemployed population was 7.5 percent, and about 25 percent of the households had lower than 25,000 dollars income. Columns two and three in the Table 2 display these values for all Texas counties and for the U.S. counties. Comparing the population in column one among the sample counties with those in Texas shows that the selected county covers most of Texas population.

Table 3-3: Annual Mean of Controls for Pretreatment Period (2011-2013), - vs. Texas and the State

	Sample Counties Mean (s.d.)	**All Texas Counties Mean (s.d.)**
County Population	256,999 (568,343)	99,242 (353,680)
Age 18-24	0.170 (0.037)	0.151 (0.031)
Age 25-34	0.208 (0.022)	0.197 (0.030)
Age 35-44	0.208 (0.016)	0.205 (0.018)
Age 45-54	0.221 (0.013)	0.234 (0.019)
Age 55-64	0.114 (0.019)	0.123 (0.024)
White	0.813 (0.088)	0.848 (0.087)
Black	0.086 (0.071)	0.064 (0.067)
Asian	0.017 (0.025)	0.008 (0.016)
Hispanic	0.323 (0.228)	0.323 (0.229)
Household with children under 18	0.367 (0.067)	0.340 (0.070)

Table 3-3: Annual Mean of Controls for Pretreatment Period (2011-2013), - vs. Texas and the State Continued

	Sample Counties Mean (s.d.)	All Texas Counties Mean (s.d.)
Now Married	0.518 (0.057)	0.536 (0.064)
Separated	0.025 (0.008)	0.024 (0.010)
Widowed	0.063 (0.016)	0.074 (0.025)
Divorced	0.112 (0.020)	0.110 (0.024)
Unemployed	0.075 (0.018)	0.070 (0.028)
Less than high school	0.209 (0.078)	0.226 (0.080)
High school	0.287 (0.057)	0.320 (0.061)
Some college	0.298 (0.038)	0.284 (0.047)
College graduate	0.145 (0.054)	0.122 (0.047)
Graduate degree	0.058 (0.028)	0.045 (0.023)
Household Income < 10k	0.081 (0 .032)	0.084 (0.037)

Table 3-3: Annual Mean of Controls for Pretreatment Period (2011-2013), - vs. Texas and the State Continued

	Sample Counties Mean (s.d.)	All Texas Counties Mean (s.d.)
Household Income 10 to 15k	0.064 (0 .020)	0.071 (0.027)
Household Income 15 to 20k	0.061 (0 .017)	0.068 (0.024)
Household Income 20 to 25k	0.061 (0 .014)	0.065 (0.020)
Household Income 25 to 35k	0.118 (0 .021)	0.119 (0.027)
Household Income 35 to 50k	0.144 (0 .018)	0.146 (0.028)
Household Income 50 to 75k	0.182 (0.021)	0.180 (0.032)
Household Income >75k	0.289 (0.089)	0.267 (0.084)
No. of counties	77	254

3.3.1. Method

My study aims to estimate the effect of the ACA-Marketplace in the non-expansion state of Texas. To estimate this effect, I use a difference-in-difference strategy used in several recent ACA studies. I use the following specification to estimate average effects over the 2014-2018 time period:

$$y_{ht} = \gamma_0 + \gamma_1(2013UNINSURED_h * POST_t) + \gamma_2 X_{ht} + \tau_\tau + \alpha_h + \varepsilon_{ht} \quad (1)$$

where

- y_{ht} is the uninsured discharge rate for hospital h in quarter t in the period of 2011Q1-2018Q4,
- $2013UNINSURED_h$ is the 2013 average uninsured discharge rate in hospital h,
- $POST_t$ equals one in period t if it is in the post-ACA Marketplace establishment of 2014 or later,
- X_{ht} is a vector of controls,
- τ_τ is a year fixed effect,
- α_h is a hospital fixed effect, and
- ε_{ht} is the error term, which is clustered by county and heteroscedasticity-robust.

This model implies hospitals in (hypothetical) area with 0 uninsured discharge rate at baseline experience no effect, yet the effect increases linearly as the uninsured rate rises gradually. In a sensitivity analysis, I use the median uninsured discharge rate across hospitals to estimate the effect Marketplace in Texas.

To estimate how the effects varied over time across years 2014-2018, I estimate event-study models. I interact the 2013 hospitals uninsured discharge rate with year dummies, leaving 2013 as the base year. The regression takes the following form:

$$\mathrm{y_{ht}} = \gamma_0 + \gamma_1(\mathrm{2013UNINSURED_{ht}} * \mathrm{Y2011}) + \gamma_2(\mathrm{2013UNINSURED_{ht}} * \mathrm{Y2012}) + \gamma_3(\mathrm{2013UNINSURED_{ht}} * \mathrm{Y2014}) + \gamma_4(\mathrm{2013UNINSURED_{ht}} * \mathrm{Y2015}) +$$

$$\gamma_5(2013\text{UNINSURED}_{\text{ht}} * \text{Y2016}) + \gamma_6(2013\text{UNINSURED}_{\text{ht}} * \text{Y2017}) + \gamma_7(2013\text{UNINSURED}_{\text{ht}} * \text{Y2018}) + \gamma_8\text{X}_{\text{ht}} + \tau_\tau + \alpha_\text{h} + \varepsilon_{\text{ht}} \quad (2)$$

where

- y_{ht} is the uninsured discharge rate for hospital h in quarter t in the period of 2011Q1-2018Q4,
- $2013UNINSURED_h$ is the average 2013 uninsured discharge rate for hospital h
- $Y2011 - Y2018$ are year dummies,
- X_{ht} is a vector of controls,
- τ_τ is a year fixed effect,
- α_h is a hospital fixed effect, and
- ε_{ht} is the error term, which is clustered by county and heteroscedasticity-robust

The event study model allows me to trace out the effects of the treatment variables over time, relative to a base year of 2013 (Courtemanche et al., 2019b). The event study evaluates the assumption of common pre-treatment trends that the treated units would have followed prior trends if they had not been treated.

3.4. Results

Tables 3-4 displays the coefficients from the estimate of the difference-in-difference regression described in equations (1). Indicators of statistical significance are given at the 0.1%, 1%, and 5% levels. The first column of the Table 3 suggests that at the average pre-ACA uninsured discharge rate (14.6%), the Marketplace decreased the proportion of uninsured discharge rate by 1.6 (0.106*0.146) percentage points over the five-year period of 2014-2018 for 225 Texas acute care hospitals. The second row in

Table 3-4 presents the impact of the ACA-Marketplace for the higher median of the 2013 uninsured discharge rates. It shows that for hospitals with above median uninsured discharge rate, the estimated effect of the ACA marketplace is -2.1 percent point.

Table 3-4: Coefficients of estimate from difference-in-differences regressions

	Sample hospitals (n=225)
2013Uninsured Rate * Post	-0.106*** (0.024)
2013Median Uninsured Rate* Post	-0.021* (0.008)
County Fixed Effects	Yes
Year Fixed Effects	Yes
Number of Hospitals	225

***Statistically significant at 0.1 percent level; **statistically significant at 1 percent level; *statistically significant at 5 percent level

Table 3-5 displays the event study results from equation (2). There are 7 falsification tests (one for each parameter of interest related to 2011 and 2012, and 2014-2018). There are five statistically significant results at 0.1 percent level. These results reject the null hypothesis that if the ACA had not occurred changes in uninsured discharge rates would not have been correlated with the pretreatment uninsured discharge rate. That means reductions in the uninsured discharge rate for years 2014-2018 was led by the creation of ACA Marketplaces with displayed intensity in table 3-4.

Table 3-5: Event Study Results

	Sample hospitals (n=225)
Uninsured discharge rate for year 2013 ×Year 2011	-0.048 (0.042)
Uninsured discharge rate for year 2013 ×Year 2012	-0.031 (0.022)
Uninsured discharge rate for year 2013 ×Year 2014	-0.081*** (0.020)
Uninsured discharge rate for year 2013 ×Year 2015	-0.167*** (0.032)
Uninsured discharge rate for year 2013 ×Year 2016	-0.154*** (0.039)
Uninsured discharge rate for year 2013 ×Year 2017	-0.140*** (0.034)
Uninsured discharge rate for year 2013 ×Year 2018	-0.125*** (0.043)
Number of Hospitals	225

***Statistically significant at 0.1 percent level; **statistically significant at 1 percent level; *statistically significant at 5 percent level

3.4.1. Robustness

I also estimate equation (1) for two variants of sample selection as robustness check. These checks experiment with dropping hospitals that potentially are not acute care facilities. First, I estimate the effect for hospitals with more than 500 average annual admission which at least in one quarter were self-identified as acute care. This suggest that for 268 selected hospitals, at the average pre-ACA uninsured discharge rate

(12.8%), the ACA-Marketplace is predicted to decrease uninsured discharge rate by 1.0 percentage points. Second, I estimate the effect for hospitals restricted to those which in all quarters were self-identified as an acute care. As displayed in the third column, the finding suggests that for the selection of 247 acute care hospitals, at the average pre-ACA uninsured discharge rate (13.8%), the ACA-Marketplace is predicted to decrease uninsured discharge rate by 1.3 percentage points. The findings are presented below.

Table 3-6: Effect of ACA on uninsured discharge rate for different sets of samples.

	Sample 1	**Sample 2**
2013Uninsured Rate * Post	-0.079*** (0.024)	-0.092*** (0.023)
County Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Number of Hospitals	268	247

***Statistically significant at 0.1 percent level; **statistically significant at 1 percent level; *statistically significant at 5 percent level.

3.5. Discussion

I found that the ACA had a strong effect on the reduction of inpatient uninsured discharges in Texas. My results suggest that the causal impact of the health insurance Marketplaces on reducing the quarterly uninsured inpatient discharges in a non-expansion state of Texas from 2014 through 2018 was roughly 1.6 percent. This is estimated effect in a quarter. That implies for the sample hospitals with the annual mean of 905 uninsured discharges prior to establishment of Texas Marketplace, there would be about 58 (905*1.6%*4) fewer uninsured discharges per year after 2014. This result contributes to the literature in various ways. First, previous studies showed between the third quarter of 2013 and the second quarter of 2014, non-expansion states experienced less than one percentage point and not significant changes in the uninsured discharges. With only half a year of post-ACA analysis, these results were limited, in that they may not reflect the experience of hospitals in all of 2014 or in 2015 (Nikpay, Buchmueller, & Levy, 2016). My finding would address the shortcomings of previous research by showing statistically significant results with more than 1.6 percentage point effect per quarter, suggesting about 6.4 percentage points reduction in a year. My finding could also explain the reductions in uncompensated care costs in Texas public hospitals in post 2014 years (Texas Hospital Uncompensated Cost Report, 2019).

The event study presents the coefficient estimates of interest in the pre-treatment years 2011 and 2012 for the 225 sample hospitals to be statistically insignificant. This is in line with what I expected. The coefficients of estimate in years 2014- 2018 shows that treatment has resulted in significant reductions over time.

According to Commonwealth Fund analysis, there was an average rate increase of 5 percent in premium for the Texas exchange for 2015, with lower changes in urban areas, as compared to previous open enrollment period (2016). For 2016, average premiums in the individual market in Texas increased by at least 5.1 percent (and at most 34%), although there was considerable variation from one insurer to another. For 2017, enrollees experienced even higher net premiums. The average premium (before any subsidies were applied) that was $404/month in 2017, grew sharply, to $543/month, in 2018 (Norris, 2021, April 19). In light of such increases in premiums, the majority of lower income Texas workers found health insurance too expensive and thus remained uninsured (Ho, Marks, & Balihe, 2015). Although, in 2016 all insurers stopped offering any preferred provider organization (PPO) plans through the individual market, according to Morrisey and Radcliff (2017), this would have surprised people in the middle class and upper middle class. That suggests, no effect is expected from the elimination of PPO to be seen on the current findings.

My study comes with several limitations. Unfortunately, the hospital data suppress the patient identification. Therefore, I could not estimate the count of unique uninsured patients as there could be multiple discharges for a single patient. Another potential limitation of my analysis is one of external validity: Texas coverage expansion might not be representative of the expansions of non-Medicaid expansion states. Further limitation is that, the data are a snapshot in time. Hospitals must submit data no later than 60 days after the close of a calendar quarter. Depending on hospitals' collection and billing cycles, not all discharges may have been billed or reported. This can affect the accuracy of source of payment data, particularly self-pay and charity that may later qualify for Medicaid or other payment sources.

3.6. References

Admon, A. J., Valley, T. S., Ayanian, J. Z., Iwashyna, T. J., Cooke, C. R., & Tipirneni, R. (2019). Trends in hospital utilization after Medicaid expansion. Medical care, 57(4), 312-317.

Bazzoli, G. J. (2016). Effects of expanded California health coverage on hospitals: Implications for ACA Medicaid expansions. Health services research, 51(4), 1368-1387.

Blavin, F. (2016). Association between the 2014 Medicaid expansion and US hospital finances. Jama, 316(14), 1475-1483.

Burke, A., Misra, A., & Sheingold, S. H. (2014). Premium affordability, competition, and choice in the health insurance marketplace, 2014. Washington (DC): Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation

Camilleri, S. (2018). The ACA Medicaid expansion, disproportionate share hospitals, and uncompensated care. Health services research, 53(3), 1562-1580.

CMS Data Navigator Glossary of Terms (NA). Retrieved from: https://www.cms.gov/Reseach-Statistics-Data-and Systems

Corlette, S., Blumberg, L. J., & Lucia, K. (2020). The ACA's Effect on the Individual Insurance Market: An assessment of how individual health insurance markets evolved between 2014 and 2019, using metrics such as premium changes, insurer participation, and enrollment. Health Affairs, 39(3), 436-444.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2017). Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. Journal of Policy Analysis and Management, 36(1), 178-210.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2018a). Early effects of the Affordable Care Act on health care access, risky health behaviors, and self-assessed health. Southern Economic Journal, 84(3), 660-691.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2018b). Effects of the Affordable Care Act on health care access and self-assessed health after 3 years. INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 55, 0046958018796361.

Courtemanche, C. J., Fazlul, I., Marton, J., Ukert, B. D., Yelowitz, A., & Zapata, D. (2019a). The impact of the ACA on insurance coverage disparities after four years (No. w26157). National Bureau of Economic Research.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., Zapata, D., & Fazlul, I. (2019b). The three-year impact of the Affordable Care Act on disparities in insurance coverage. Health services research, 54, 307-316.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2019c). Effects of the Affordable Care Act on health behaviors after 3 years. Eastern Economic Journal, 45(1), 7-33.

Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A., & Zapata, D. (2020). The impact of the Affordable Care Act on health care access and self-assessed health in the Trump Era (2017-2018). Health services research, 55, 841-850.

Cunningham, P., Garfield, R., & Rudowitz, R. (2015). How are hospitals faring under the Affordable Care Act? Early experiences from Ascension Health. Kaiser Family Foundation, April, 30, 201.

DeLeire, T. C., Joynt, K., McDonald, R., & Takeaways, K. (2014). Impact of insurance expansion on hospital uncompensated care costs in 2014. Washington (DC): Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation.

DeLeire, T., Chappel, A., Finegold, K., & Gee, E. (2017). Do individuals respond to cost-sharing subsidies in their selections of marketplace health insurance plans? Journal of health economics, 56, 71-86.

Dranove, D., Garthwaite, C., & Ody, C. (2016). Uncompensated care decreased at hospitals in Medicaid expansion states but not at hospitals in nonexpansion states. Health Affairs, 35(8), 1471-1479.

Dunn, D. L., & Chen, M. (1994). Uncompensated hospital care payment and access for the uninsured: evidence from New Jersey. Health Services Research, 29(1), 113.

Frean, M., Gruber, J., & Sommers, B. D. (2017). Premium subsidies, the mandate, and Medicaid expansion: Coverage effects of the Affordable Care Act. Journal of Health Economics, 53, 72-86.

Freedman, S., Nikpay, S., Carroll, A., & Simon, K. (2017). Changes in inpatient payer-mix and hospitalizations following Medicaid expansion: Evidence from all-capture hospital discharge data. PloS one, 12(9), e0183616.

Goldman, A. L., McCormick, D., Haas, J. S., & Sommers, B. D. (2018). Effects of the ACA's health insurance marketplaces on the previously uninsured: a quasi-experimental analysis. Health Affairs, 37(4), 591-599.

Ho, V., Marks, E., & Balihe, P. (2015). Health Reform Monitoring Survey–Texas, Issue Brief# 15: The Impact of the Affordable Care Act on Texas Workers.

https://www.kff.org/health-reform/issue-brief/explaining-health-care-reform-questions-about-health-insurance-subsidies/

Ingram, D. D., & Franco, S. J. (2014). 2013 NCHS urban-rural classification scheme for counties (No. 2014). US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.

Mitchell, E. (2017). Types of Hospitals in the US. EOScu. http://blog.eoscu.com/blog/types-of-hospitals-in-the-us

Morrisey, M. A., & Radcliff, T. A. (2017). ACA Exchange Competitiveness in Texas. Risk Management and Insurance Review, 20(2), 249-268.

Nikpay, S., Buchmueller, T., & Levy, H. (2015). Early Medicaid expansion in Connecticut stemmed the growth in hospital uncompensated care. Health Affairs, 34(7), 1170-1179.

Nikpay, S., Buchmueller, T., & Levy, H. G. (2016). Affordable Care Act Medicaid expansion reduced uninsured hospital stays in 2014. Health Affairs, 35(1), 106-110.

Nikpay, S., Freedman, S., Levy, H., & Buchmueller, T. (2017). Effect of the Affordable Care Act Medicaid expansion on emergency department visits: evidence from state-level emergency department databases. Annals of emergency medicine, 70(2), 215-225.

Norris, L. (2021, April 19). Texas health insurance marketplace: history and news of the state's exchange. Healthinsurance.Org. https://www.healthinsurance.org/health-insurance-marketplaces/texas/

Pickens, G., Karaca, Z., Cutler, E., Dworsky, M., Eibner, C., Moore, B., ... & Wong, H. S. (2018). Changes in hospital inpatient utilization following health care reform. Health services research, 53(4), 2446-2469.

Texas Hospital Inpatient Discharge Research Data File, 2011Q1-2018Q4. Texas Department of State Health Services, Center for Health Statistics, Austin, Texas. 2018.

Texas Health and Human Services Commission. (2019, January). Texas Hospital Uncompensated Care Report. https://hhs.texas.gov

U.S. Census Bureau (2019). Selected housing characteristics, 2009-2018 American Community Survey 5-year estimates.

4. IMPACT OF MEDICAID MANAGED CARE EXPANSION ON HOSPITALIZATION IN TEXAS

4.1. Introduction

For more than 20 years, state and federal policy-makers have promoted Medicaid managed care (MMC) with the hope that it will enhance access for enrollees, improve quality of care, and reduce program costs (Holahan et al., 1998; Hu, & Mortensen, 2018). Ergo, in 2010, nearly 70 percent of the nation's 60 million Medicaid beneficiaries were enrolled in some form of managed care (Sparer, 2012). In response to these efforts, states took new initiatives to expand their MMC over the past decade. In California, for example, the state has implemented a new initiative under which more than one million aged and disabled beneficiaries were required to enroll in MMC. New York State has also phased in mandatory managed care for low income beneficiaries. Texas, Florida, Illinois and Louisiana were also engaged in major initiatives to expand the populations and services covered by their MMC initiatives. Even New Hampshire - one of just three states without managed care in Medicaid -has shifted its beneficiaries from fee-for-service to managed care (Sparer, 2012). Because managed care plans essentially offers selective contracting through which it negotiate prices for patient volume (Morrisey, 2013), it remains unclear how MMC expansion affected volume of hospitalization. This type of research study is needed when the scope and extent of impacts can vary within a state (Duggan, & Hayford, 2013; Sparer, 2012).

The objective of this study is to examine whether expansion of MMC has affected hospitalization in the "treated" counties that expanded MMC in Texas for Medicaid members. In Texas, the approval of section 1115 waiver in 2011 led to expansion of the state's managed care programs, including the State of Texas Access Reform (STAR). STAR requires beneficiaries to enroll in MMC and shift from the Fee-for-Service (FFS) to a health maintenance organizations (HMO) plan, the most common type of MMC (Community Health Choice, 2021).

It was expected that Medicaid managed care program affects quantity of services through selective contracting. According to Morrisey (2013), "selective contracting is the process whereby managed care plans enter into contracts with some, but not all, of the providers in the market" (p, 194). With selective contracting, Managed care plans contract with only a subset of the available providers (Zwanizger and Meirowitz, 1998; Gaskin et al., 2002). Given that price plays a role in determining which hospitals get contracts, the evidence on managed care plans have indicated that HMOs and other forms of managed care lead to reduced prices rather than lower quantities (Duggan & Hayford, 2011). In fact, Feldman and colleagues (1990) found that lower hospital prices resulted in more contracts and greater inpatient volume at contracted hospitals.

However, several MMC studies have shown that greater presence of managed care could lead to better access to primary care and reduced hospitalization (Friedberg, Hussey, and Schneider 2010; Hu, & Mortensen, 2018; Porell 2001; May, 2011). The findings of such studies showed that MMC beneficiaries were more likely to have a usual source of care than their FFS counterparts (Sisk et al., 1996) and lower inpatient utilization (May, 2011).

In this study, I focus on the state of Texas. I use difference-in-difference models to assess the impact of STAR expansion on changes in all hospitalization, Cesarean section (C-section) delivery, and preventable hospitalization. Cesarean section (C-section) rates have been one of the many quality indicators proposed by the Health Employer Data and Information Set (HEDIS). Also, because C-sections are more costly than vaginal deliveries, there is a possibility that managed care provides an incentive to avoid C-section delivery (Howell et al., 2004). Preventable hospitalizations are also used as they are quality indicators for access to primary care. I contribute to the current literature by addressing (1) whether MMC expansion resulted in reduced use of inpatient care, (2) and (3) whether MMC expansion had an impact on preventable admissions.

I find that the expansion of MMC led to a decreased number of hospital discharges for Medicaid beneficiaries in expansion counties. However, no significant changes in the rate of discharges were evident for women with C-Section delivery. I further find that expansion of MMC has resulted in lower discharges for potentially preventable admissions, with lowering diabetes long-term complications admission.

4.2. Literature and Background

A central feature of many MMC is that managed care improve access to preventive and primary care. The Lewin Group studied the MMC beneficiaries in Pennsylvania, which was implemented in 25 counties in 1997. The study showed that MMC offered disease management programs to cover individuals with chronic conditions, sickle cell disease and hemophilia, as well as condition-specific management for high-risk pregnancies and transplant cases (May, 2011). Another study found that Managed care increased access or improved quality of care (Brown et al., 2001). A couple of studies also found that managed care has improved access to parental care (Howell et al., 2005; Levinson & Ullman, 1998). Garrett and Zuckerman (2005) found that adult MMC beneficiaries had lower rates of emergency room use and better access to a usual source of care.

To measure preventable hospitalization, studies often used ambulatory care sensitive conditions (ACSCs) (Bindman et al. 1995; Homer et al. 1996). ACSCs are "diagnoses for which timely and effective outpatient care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease or condition" (Billing et al, 1993, p.163). The findings of studies focusing on ACSCs showed that with greater presence of MMC hospitalization for ACSCs has decreased. For example, in California, mandatory MMC was associated with a large reduction (33 percent) of hospitalization for ACSCs (Bindman et al. 2005). In Kentucky, the rate of hospitalizations for ACSCs lowered by 33 percent due to mandatory managed care (Bindman, et al., 2005). MMC patients in Florida led to a slower growth in overall ACSC-related inpatient visits, and slower growth in chronic ACSC-related inpatient visits. The effects were significant in counties with above median MMC penetration rates (Hu, & Mortensen, 2018). Nevertheless, a few studies showed that MMC led to a higher probability of preventable hospitalization (Park, 2019). One study showed that the expansion of MMC in

Massachusetts led to a higher prevalence of ACSC hospitalizations among Medicaid HMO enrollees than FFS enrollees (Porell, 2001). In Florida, Medicaid HMO patients were more likely to be hospitalized for ACSCs than Medicaid FFS patients (Park & Lee 2014). Nonetheless, another study found no effects for preventable admissions in Medicaid HMO enrollees compared to Medicaid FFS (Basu, Friedman, and Burstin 2002).

With regard to C-section, previous research suggests that the incentives to reduce C-section delivery were in place for MMC enrollees. Howell et al., (2005) examined managed care's effect on repeat C-section for women's residing in mandatory HMO enrollment counties to those in voluntary counties. They found that, women who had the same coverage (i.e., either FFS or HMO) for both their deliveries in mandatory counties were significantly less likely to have a repeat C-section, in comparison to FFS women in the voluntary counties. In another study, Koroukian, Bush, and Rimm (2001) found that Managed care enrollees had significantly lower rates of repeat C-section.

4.2.1. Texas MMC: STAR

The first managed care program in Texas, known as STAR started in 1993 with the purpose of covering acute and primary care services for low-income women and children (CMMS-STCs, 2016). Over time, STAR expanded to cover additional populations and services, mostly the state's urban areas. With the expansion of STAR in September 2011 and March 2012, most (traditional) Medicaid beneficiaries were mandated to enroll in MMC, i.e. STAR.

Mandatory participant included pregnant women and children with limited income, newborns, low income families (14% of the Federal Poverty Level), certain former foster care youth, and special populations (such as, children and youth in adoption assistance or permanency care assistance). Participant that were excluded from mandatory enrollment included individuals who reside in institutions, individuals who receive both Medicare and Medicaid services (called dual eligible), have complex medical need, children in foster care, adults and children with disabilities (including those receiving 1915(c) waiver services), and SSI recipients (CMS, 2016). As a result of STAR expansion, the number of MMC enrollees in Texas reached 3 million in 2018, more than twice as the state's number of MMC enrollees in 2011.

4.3. Data and Method

The data come from the inpatient Texas Public Use Data File (PUDF). The PUDF collects data by quarter on all discharged patients attended or treated by physicians for all licensed hospitals, except hospitals that are statutorily exempt from the reporting requirement (THCIC, 2018). Exempt hospitals include hospitals that are located in a county with a population less than 35,000, or those located in a county with a population more than 35,000 and with fewer than 100 licensed hospital beds and not located in an area that is delineated as an urbanized area by the United States Bureau of the Census (THCIC, 2018).

My sample included 200 acute care hospitals that had continuous records of Medicaid discharges over 7 years, from 2009 through 2015. Because data are at patient discharge level, the county of hospitals are not directly provided in the data. To define the county of hospitals, I use the county of patient residence. I let the county of hospitals to be as same as county of most patients that visited that hospital. I also use the Directory of General and Special Hospitals to check the accuracy of county identification (THCIC, 2018). I find 76 counties for the selected sample of hospitals. Figure 4.1 shows Texas counties in relation to STAR implementation, where light blue colored counties display 34 existing STAR covered counties, medium blue display 7 newly STAR expanded counties in September 2011, and dark blue display 35 newly expanded STAR counties in March 2012.

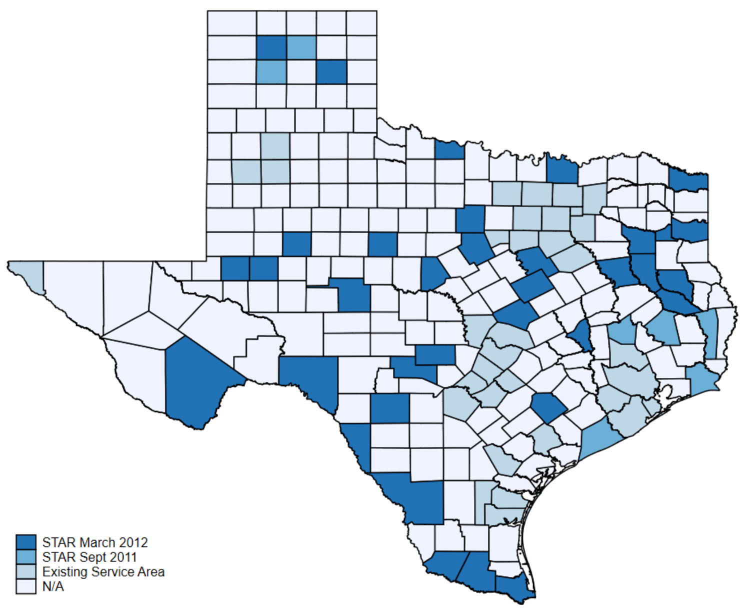

Figure 4-1: Texas STAR Expansion Map (Restricted to 200 Sample Hospitals)

For the outcome variables, I estimate the count of all discharges with Medicaid as their primary source of payments. This will be my first outcome of interest. Changes in this variable will imply that expansion of MMC affected hospitalization to acute care hospitals for all diagnostic categories. Second, I estimate the share of C-section deliveries as a proportion of all deliveries. Third, I follow previous research and identify hospitalization for ACSC's (Hu, & Mortensen, 2018; Saha et al., 2007; Park & Lee, 2014; Purdy et al. 2009; Wilkinson, 2019). I estimate the count of hospital visits related to ACSCs for 10 Prevention Quality Indicators (PQIs), identified by the Agency for Healthcare Research and Quality (AHRQ) (AHRQ 2018). These include (1) Diabetes Short-Term Complications Admission, (2) Diabetes Long-term Complications Admission, (3) COPD or Asthma in Older Adults Admission, (4) Heart Failure Admission, (5) Bacterial Pneumonia Admission, (6) Urinary Tract Infection Admission, (7) Uncontrolled Diabetes Admission, (8) Asthma in Younger Adults Admission, (9) Lower-Extremity Amputation among Patients with Diabetes, and (10) Hypertension Admission. I use the AHRQ proposed coding for International Classification of Diseases (ICD-9) system to identify PQIs.

I also include a range of county level control variables that are obtained from the American Community Survey of 5-year estimate (ACS, 2019). These include demographic controls (e.g. age, sex, race, and citizenship), family controls (e.g. households by presence of people under 18 years, and marital status for the population 15 years and over) and economic controls (Educational Attainment for Population 25 Years and Over, Unemployment Rate for Civilian Population in Labor Force 16 Years and Over, and household income).

4.3.1. Method

To examine the impact of MMC expansion on inpatient utilization, I compare differential changes in outcomes in counties that implemented STAR in 2011 and 2012 relative to changes in counties that had already implemented STAR prior to 2011.I use Difference-in-difference models and estimate the following regression:

$$y_{it} = \alpha_i + \lambda_t + \beta_{it} STAREXPANSION_{it} + \delta X_{it} + \varepsilon_{it}$$

where y_{it} is the outcome in county i in quarter t, α_i are county fixed effects, λ_t are time fixed effect, X_{it} is vector of control variables, and ε_{it} is the error term. $STAREXPANSION_{it}$ is set to one in quarter t if in that quarter of the year STAR was available in the county and zero otherwise. The estimate β identifies the causal impact of the STAR expansions on Medicaid discharges. The count of ACSCs are estimated per 10,000 county population.

4.4. Results

Table 4-1 summarizes the population of sample counties. The values in the table are estimated by taking the average of counties' population in 2009 through 2011. As is shown in Table 1, on average about 60 percent of population in each county is between 18 to 64 years old, and majority of are White, married, employed with some college degree and income above 50 thousand dollars.

Table 4-1: Annual means of controls per county, for pre-treatment period (2009-2011)

	42 Treated Counties	**34 Comparison Counties**
County Population	110,128 (129,017)	493,199 (814,044)
Households	37,072 (38,585)	173,180 (285,602)
Female	0.500 (0.026)	0.500 (0.020)

Table 4-1: Annual Means of Controls per County, For Pre-Treatment Period (2009-2011) Continued

	42 Treated Counties	34 Comparison Counties
Age 18-64	0.602 (0.043)	0.621 (0.027)
Age above-64	0.137 (0.038)	0.109 (0.030)
White	0.794 (0.081)	0.0783 (0.096)
Black	0.092 (0.084)	0.076 (0.055)
Hispanic	0.329 (0.269)	0.335 (0.190)
Native born	0.890 (0.079)	0.894 (0.062)
Household with children under 18	0.368(0.076)	0.393(0.046)
Married	0.516 (0.053)	0.532 (0.060)
Widowed	0.068 (0.013)	0.054 (0.012)
Separated	0.027 (0.008)	0.024 (0.007)
Divorced	0.109 (0.024)	0.107 (0.012)
Unemployed	0.070 (0.018)	0.069 (0.013)
Less than high school	0.242 (0.088)	0.195 (0.060)
High school degree	0.303 (0.051)	0.273 (0.053)
Some college	0.284 (0.044)	0.296 (0.27)

Table 4-1: Annual Means of Controls per County, For Pre-Treatment Period (2009-2011) Continued

	42 Treated Counties	**34 Comparison Counties**
Household Income < 10k	0.101 (0.035)	0.071 (0.032)
Household Income 10 to 15k	0.077 (0.017)	0.053 (0.020)
Household Income 15 to 20k	0.070 (0.014)	0.052 (0.016)
Household Income 20 to 25k	0.068 (0.011)	0.052 (0.012)
Household Income 25 to 35k	0.129 (0.014)	0.105 (0.022)
Household Income 35 to 50k	0.151 (0.015)	0.139 (0.018)
Household Income 50 to 75k	0.174 (0.024)	0.187 (0.017)

Table 4-2 presents the quarterly mean of discharges per 10,000 population for both comparison and treated counties prior to year 2012. The table suggests that the average count of discharges per quarter in comparison counties have been considerably higher than those in treated counties. The highest discharges were for the lower-extremity amputation among patients with diabetes and heart failure.

Table 4-2: Quarter Mean of Outcome Variables by Treatment Groups for years 2009-2011

	All Counties	**Treated Counties**	**Comparison Counties**
All Discharges	33,354 (13,860)	19,864 (711)	46,845 (2023)
C-Section	2,388 (17,682)	3,738 (6,305)	2,378 (17,741)
Diabetes Short-Term Complications Admission	159 (70)	92 (16)	226 (18)
Diabetes Long-term Complications Admission	251 (97)	158 (14)	343 (30)
COPD or Asthma in Older Adults Admission	269 (122)	162 (42)	375 (68)
Heart Failure Admission	394 (163)	241 (32)	546 (64)

Table 4-2: Quarter Mean of Outcome Variables by Treatment Groups for years 2009-2011 Continued

	All Counties	**Treated Counties**	**Comparison Counties**
Bacterial Pneumonia Admission	296 (117)	200 (47)	392 (79)
Urinary Tract Infection Admission	253 (94)	165 (21)	340 (37)
Uncontrolled Diabetes Admission	41 (14)	29 (6)	54 (9)
Asthma in Younger Adults Admission	173 (83)	99 (24)	246 (47)
Lower-Extremity Amputation among Patients with Diabetes	459 (180)	284 (19)	634 (34)
Hypertension Admission	86 (37)	51 (9)	120 (18)

Figure 4-2 presents the trend of all Medicaid discharges for the treated and comparison counties for patients aged 18 to 64 years old. The treated group corresponds to the count of discharges in 68 hospitals within 42 counties. Treated counties are those that expanded STAR on and after 2011. The control group corresponds to discharges in 132 hospitals within 34 counties. These counties are the ones that prior to expansion of MMC had already implemented STAR. Overall, there have been aggregated 1,519,640 discharges across all 9 years for those aged 18–64. This include 1,101,285 discharges in comparison counties and 418,355 discharges in the treated counties.

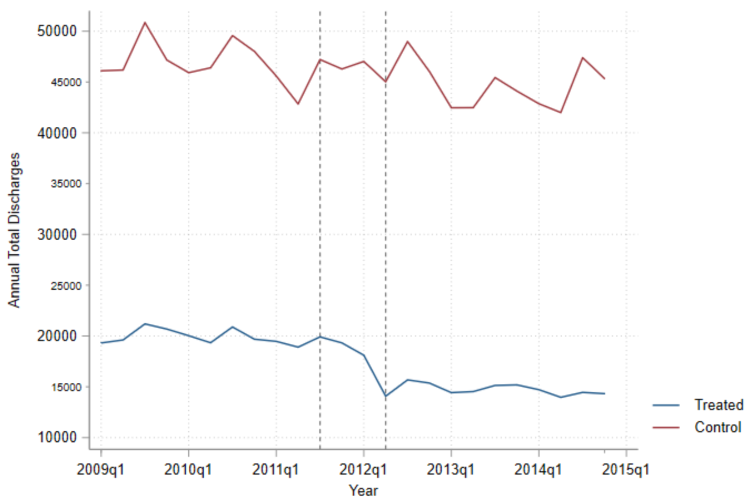

Figure 4-2: Count of all Medicaid Discharges for ages 18-64 years by STAR expansion category

Tables 4-3 show the results of the difference-in-difference regression estimating whether Medicaid discharges have changed after the expansion of STAR. The Table suggests that the expansion of the STAR has reduced the number of Medicaid admissions on average by 22.88 persons per 10,000 population per years. That means in the treated counties with average count of about 186,388 thousand Medicaid population above 21 years old, STAR expansion would have resulted for about 400 less discharges in a year.

Table 4-3: Regression Results for the Effect of STAR on All Medicaid Discharges

	All Admissions
STAR*Post	-5.72** (2.31)
County Fixed Effects	Yes
Year Fixed Effects	Yes
Number of counties	76

*** p<0.01, ** p<0.05, * p<0.1

Figures 4-3 to 4-12 display the count of discharges for treated and control counties for the preventable conditions. It appears that all discharges in treated counties have followed the trend of discharges in control counties.

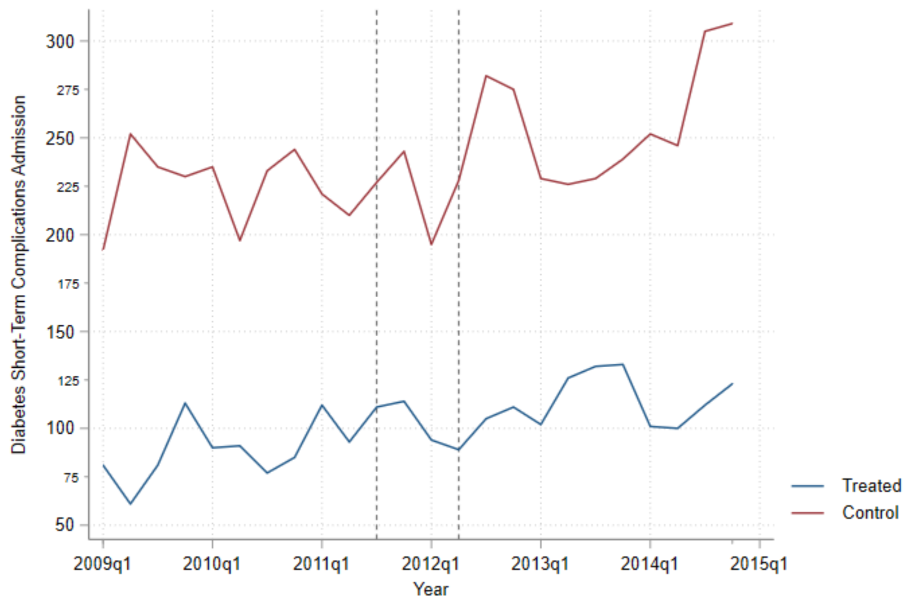

Figure 4-3: Count of Diabetes Short-Term Complications Discharges for ages 18-64

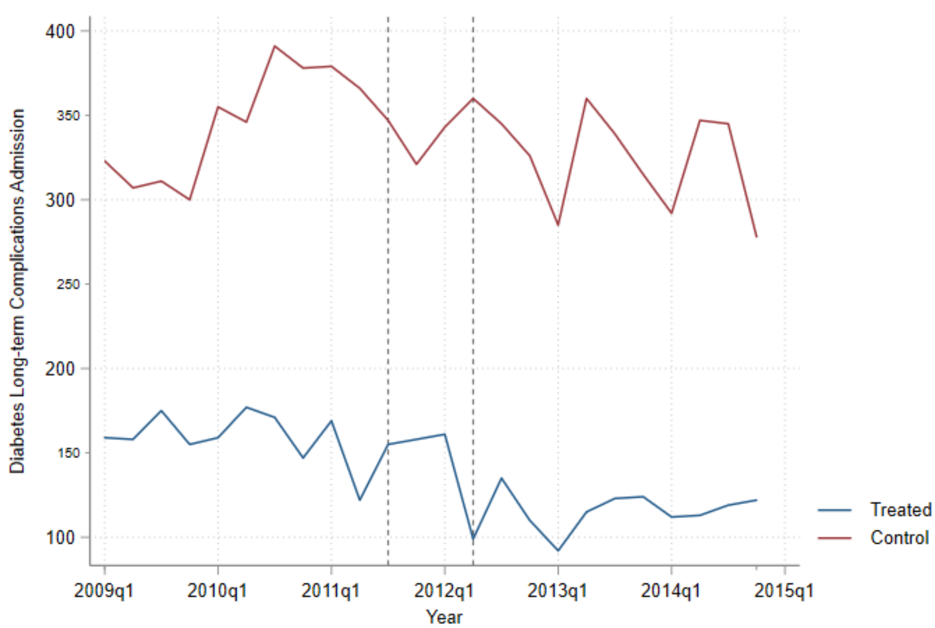

Figure 4-4: Count of Diabetes Long-Term Complications Discharges for ages 18-64

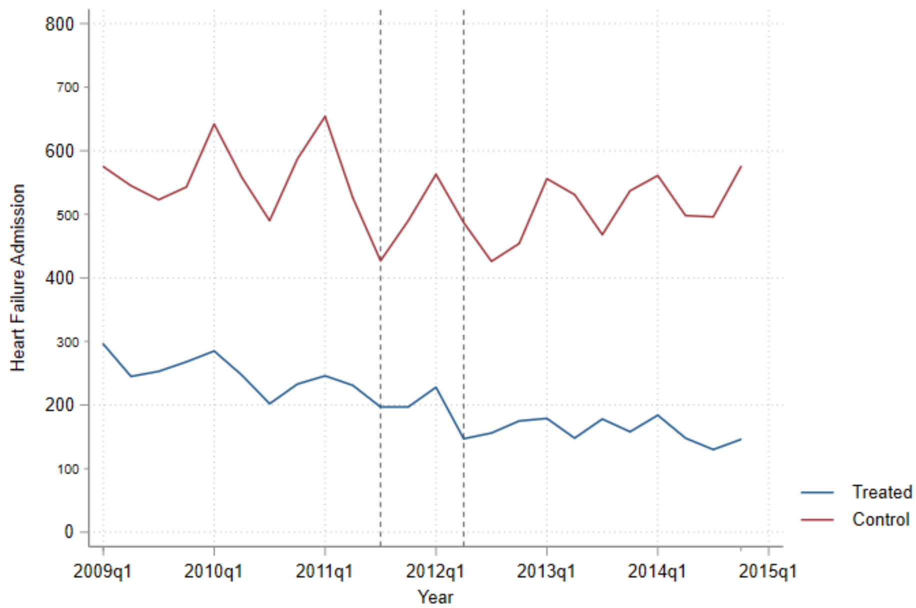

Figure 4-5: Count of Heart Failure Discharges for ages 18-64

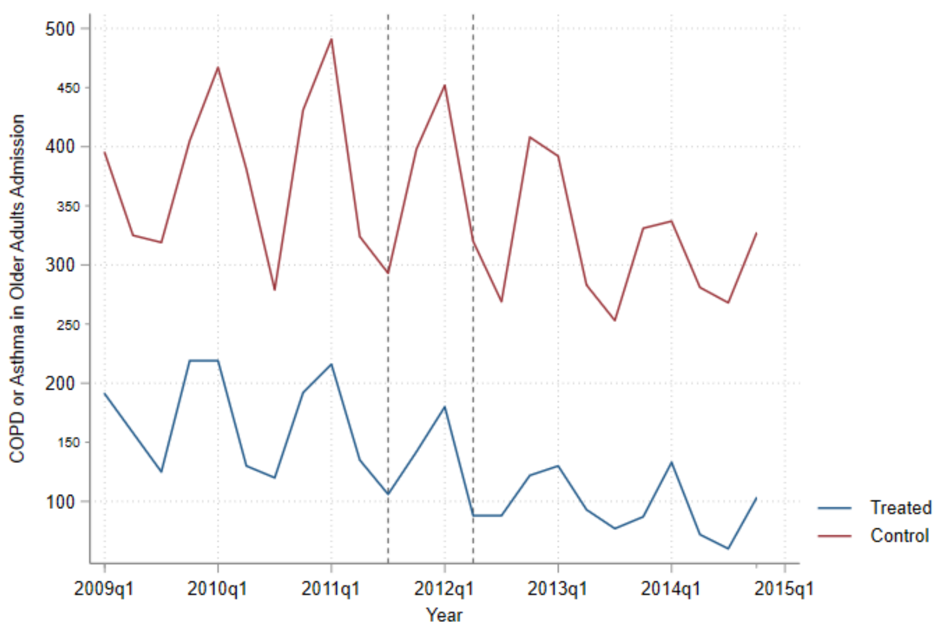

Figure 4-6: Count of COPD or Asthma Discharges for ages 18-64

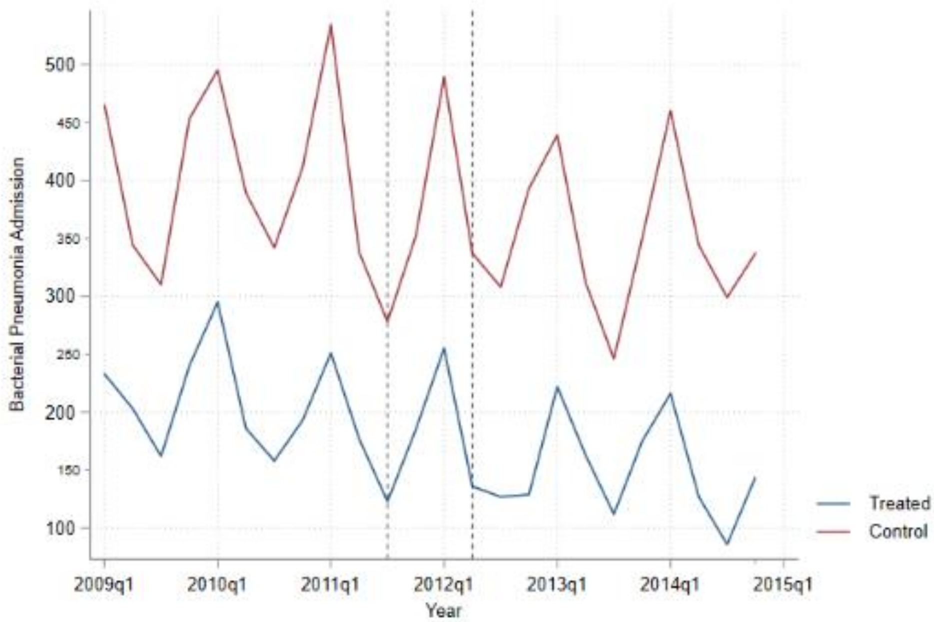

Figure 4-7: Count of all Bacterial Pneumonia Discharges for ages 18-64

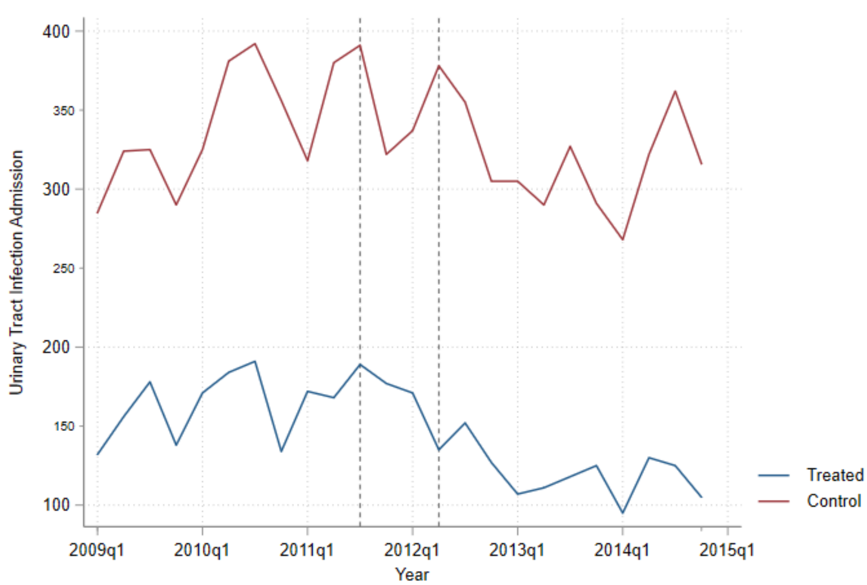

Figure 4-8: Count of Urinary Tract Infection Discharges for ages 18-64

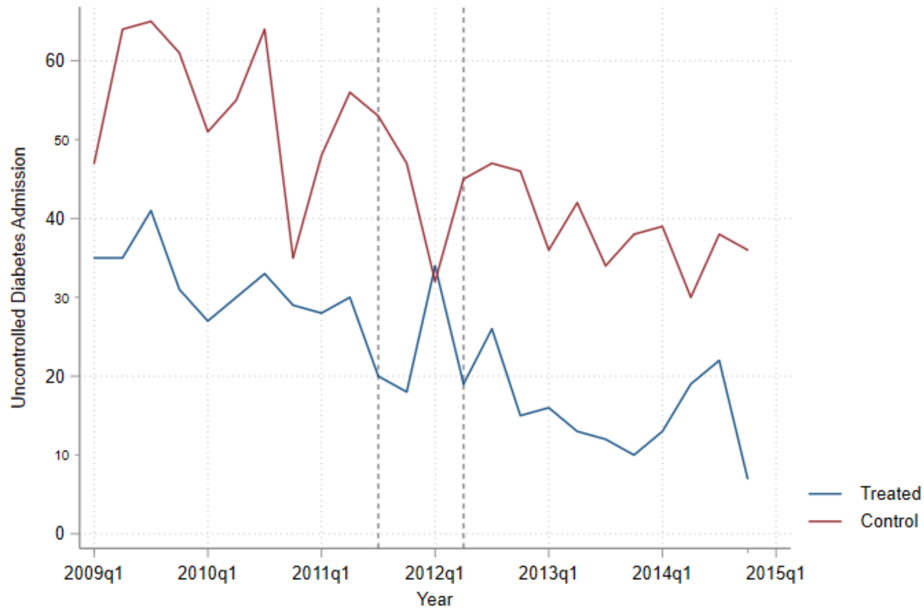

Figure 4-9: Count of all Uncontrolled Diabetes Discharges for ages 18-64

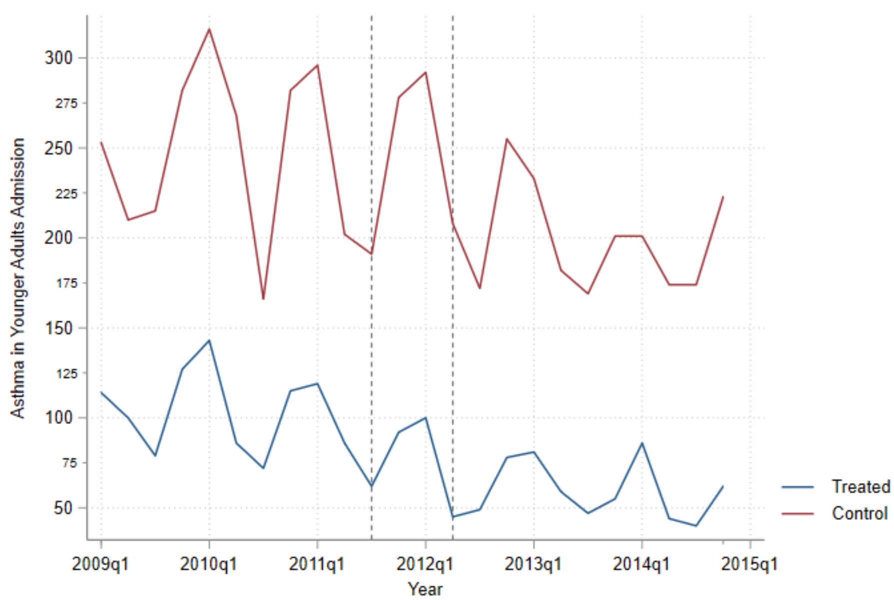

Figure 4-10: Count of Asthma in Younger Adults Discharges for ages 18-64 years

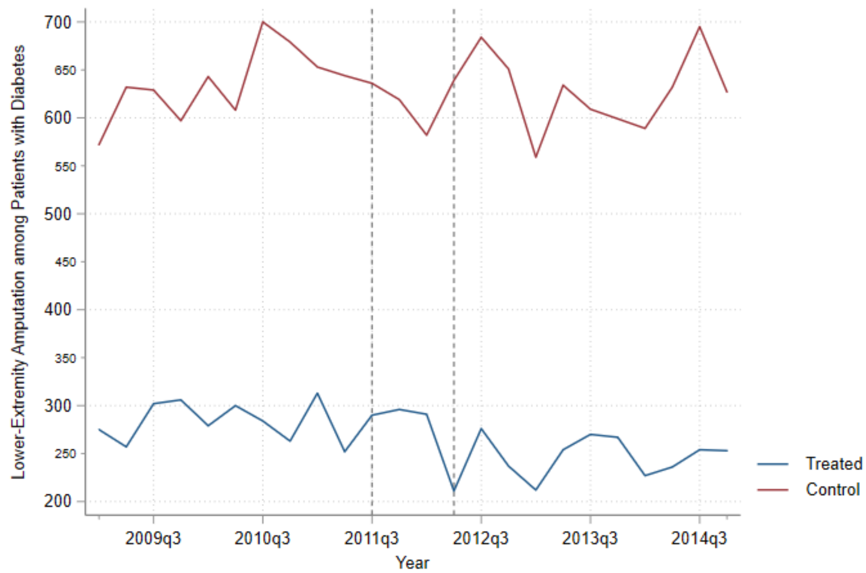

Figure 4-11: Count of all Lower-Extremity Amputation Discharges among Patients with Diabetes Discharge for ages 18-64

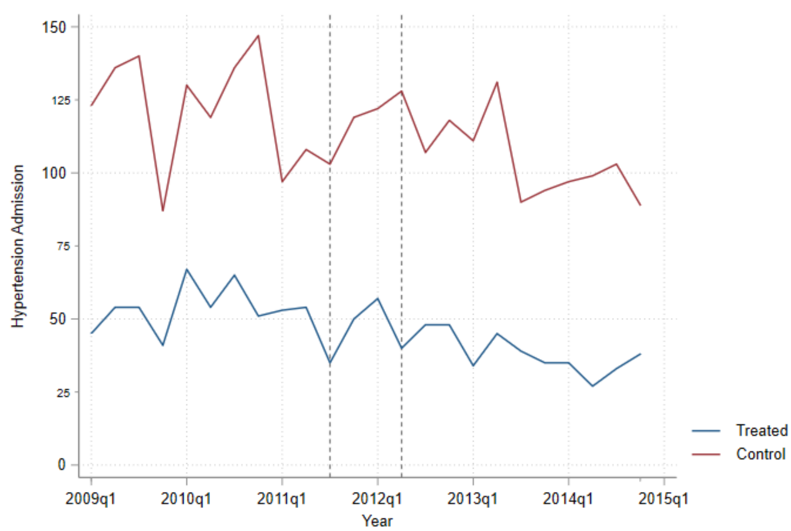

Figure 4-12: Count of Hypertension Discharges for ages 18-64

Figure 4-13 exhibits the trend of C-Section in both treated and comparison counties.

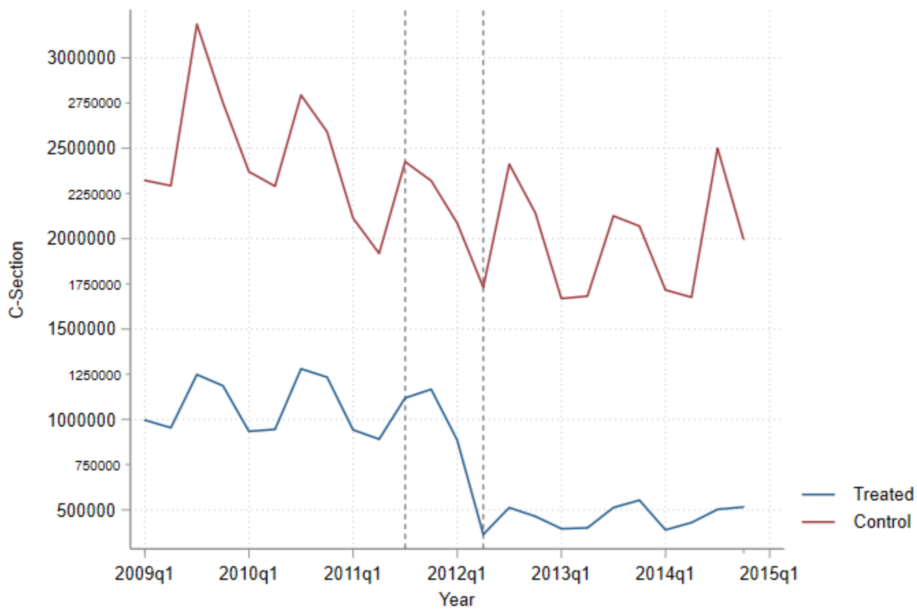

Figure 4-13: Count of C-section for women ages 18-64

Table 4-4 displays the result of regression for women who delivered by C-section; and there were no significant differences in their discharge rate after expansion of Managed care.

Table 4-4: Regression Results for the C-Section Delivery

	Coefficients
STAR*Post	0.044 (0.057)
County Fixed Effects	Yes
Year Fixed Effects	Yes
Number of counties	76

*** p<0.01, ** p<0.05, * p<0.1

Table 4-5 displays the result of regression estimation for ACSCs. The findings show that discharges for diabetes long-term complications admission been have been reduced by the impact of STAR expansion. Adjusted by the average Medicaid population, the findings suggest a reduction of on average 235 persons for all treated counties in a year.

Table 4-5: Regression Results for the Potentially Preventable Admissions

ACS conditions	
Diabetes Short-Term Complications Admission	0.085 (0.153)
Diabetes Long-term Complications Admission	-0.303* (0.155)
COPD or Asthma in Older Adults Admission	0.017 (0.217)
Heart Failure Admission	-0.296 (0.194)
Bacterial Pneumonia Admission	-0.053 (0.166)
Urinary Tract Infection Admission	-0.029 (0.127)
Uncontrolled Diabetes Admission	-0.018 (0.042)
Asthma in Younger Adults Admission	0.046 (0.118)
Lower-Extremity Amputation among Patients with Diabetes	-0.239 (0.291)
Hypertension Admission	-0.050 (0.052)

*** p<0.01, ** p<0.05, * p<0.1

4.5. Discussion

The aim of this study was to test whether the expansion of Texas MMC plan influence hospitalization. I examined changes in hospitalization for all discharges, and ACSCs discharges. I find that expansion of MMC was associated with a reduction of all Medicaid discharges. Further findings showed that managed care has not changed the rate of discharges for those with C-section delivery.

I followed prior studies and examined the ACSCs. ACSCs are considered as potentially preventable admissions and are used as important measure of access to care and the quality of primary care that a person receives (Ansari, Laditka, & Laditka 2006; Toseef, 2019; Billings et al 1993; AHRQ, 2018; Bindman et al, 2005). The results relating to ACSCs show that expansion of STAR overall had no significant impact on the hospitalization for ACSCs. The only exception was hospitalization for diabetes long-term complications admission, which has reduced with the expansion of STAR. For the diabetes, it corresponds to the findings of recent research that showed continuity of care was associated with lower rates of diabetes-related hospitalization (Van Loenen et.al, 2016). It is also consistent with the previous research which have argued diabetes is a condition that can often be managed with timely and effective treatment in an outpatient setting, thereby the hospitalizations due to diabetes can be prevented (Bindman et al., 2005).

The data come with several limitations. The data are a snapshot in time. Hospitals must submit data no later than 60 days after the close of a calendar quarter. Depending on hospitals' collection and billing cycles, not all discharges may have been billed or reported. This can affect the accuracy of source of payment data, particularly self-pay and charity that may later qualify for Medicaid or other payment sources. Additionally, I was not able to determine if Medicaid discharges were for MMC or FFS enrollees.

4.6. References

Agency for Healthcare Research and Quality (AHRQ). (2018). Prevention Quality Indicators Overview. Retrieved from

https://www.qualityindicators.ahrq.gov/modules/pqi_overview.aspx, last accessed June 2nd 2019

AHRQ Quality Indicators—Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality, 2001. AHRQ Pub. No. 02-R0203

Ansari, Z., J. N. Laditka, and S. B. Laditka. 2006. “Access to Health Care and Hospital-ization for Ambulatory Care Sensitive Conditions.”Medical Care Research andReview63 (6): 719–41

Basu, J., Friedman, B., & Burstin, H. (2002). Primary care, HMO enrollment, and hospitalization for ambulatory care sensitive conditions: a new approach. Medical care, 1260-1269.

Bindman, A. B., Chattopadhyay, A., Osmond, D. H., Huen, W., & Bacchetti, P. (2005). The impact of Medicaid managed care on hospitalizations for ambulatory care sensitive conditions. Health services research, 40(1), 19-38.

Brown, R., Wooldridge, J., Hoag, S., & Moreno, L. (2001). *Reforming Medicaid: The experiences of five pioneering states with mandatory managed care and eligibility expansions* (No. 5a44c5daf2fd4f67b77f5a1cb900c796). Mathematica Policy Research.

Centers For Medicare and Medicaid Services Special Terms and Conditions (STCs) (2016). Texas Healthcare Transformation and Quality Improvement Program, Number 11-W-00278/6. Texas Health and Human Services Commission.

Duggan, M., & Hayford, T. (2013). Has the shift to managed care reduced Medicaid expenditures? Evidence from state and local-level mandates. *Journal of Policy Analysis and Management*, *32*(3), 505-535.

Freund DA, Rossiter LF, Fox PD, Meyer JA, Hurley RE, Carey TS, Paul JE. "Evaluation of the Medicaid Competition Demonstrations." Health Care Financing Review, vol. 11, no. 2, 1989

Friedberg, M. W., P. S. Hussey, and E. C. Schneider. 2010. "Primary Care: A CriticalReview of the Evidence on Quality and Costs of Health Care."Health Affairs29 (5): 766–72.

Garrett B, Zuckerman S. "National Estimates of the Effects of Mandatory Medicaid Managed Care Programs on Health Care Access and Use, 1997–1999." Medical Care, vol. 43, no. 7, 2005.

Holahan, J., S. Zuckerman, A. Evans, and S. Rangarajan. 1998. "Medicaid ManagedCare in Thirteen States."Health Affairs17 (3): 43–63.

Howell EM, Dubay L, Kenney G, Sommers AS. "The Impact of Medicaid Managed Care on Pregnant Women in Ohio: A Cohort Analysis." Health Services Research, vol. 39, no. 4 (part 1), 2004.

Hu, T., & Mortensen, K. (2018). Mandatory statewide Medicaid managed care in Florida and hospitalizations for ambulatory care sensitive conditions. Health services research, 53(1), 293-311.

Koroukian, S. M., Bush, D., & Rimm, A. A. (2001). Comparison of cesarean section rates in fee-for-service versus managed care patients in the Ohio Medicaid population, 1992-1997. American Journal of Managed Care, 7(2), 134-144.

Levinson A, Ullman F. "Medicaid Managed Care and Infant Health." Journal of Health Economics, vol. 17, no. 3, 1998.

Park, J., and K.-H. Lee. 2014. "The Association between Managed Care Enrollments and Potentially Preventable Hospitalization among Adult Medicaid Recipients in Florida."BMC Health Services Research 14(1):247.

Park, J. (2019). Medicaid managed care enrollments and potentially preventable admissions: An analysis of adult Medicaid recipients in Florida. International Journal of Healthcare Management, 1-10.

Porell, F. W. 2001. "A Comparison of Ambulatory Care-Sensitive Hospital Discharge Rates for Medicaid HMO Enrollees and Nonenrollees." Medical Care Researchand Review58 (4): 404–9

Purdy, S., T. Griffin, C. Salisbury, and D. Sharp. 2009. "Ambulatory Care Sensitive Conditions: Terminology and Disease Coding Need to Be More Specific to Aid Policy Makers and Clinicians." Public Health 123 (2): 169–73.

Ricketts, T. C., Randolph, R., Howard, H. A., Pathman, D., & Carey, T. (2001). Hospitalization rates as indicators of access to primary care. *Health & place*, *7*(1), 27-38.

Saha, S., Solotaroff, R., Oster, A., & Bindman, A. B. (2007). Are preventable hospitalizations sensitive to changes in access to primary care? The case of the Oregon Health Plan. Medical care, 712-719.

Sisk JE, Gorman SA, Reisinger AL, Glied SA, DuMouchel WH, Hynes MM. "Evaluation of Medicaid Managed Care." Journal of the American Medical Association, vol. 276, no. 1, 1996.

Sparer, M. (2012). Medicaid managed care: Costs, access, and quality of care. POLICY, 1(6).

The Lewin Group. Projected Impacts of Adopting a Pharmacy Carve-In Approach Within Medicaid Capitation Programs. January 2011.

The Lewin Group. An Evaluation of Medicaid Savings from Pennsylvania's HealthChoices Program. May 2011.

Toseef, M. U. (2019). Medicaid Managed Care and Its Impact on Potentially Preventable Hospital Utilization (inpatient And Emergency Room Visits).

Van Parys, J. (2015). How do managed care plans reduce healthcare costs? Job market paper, Columbia University.

Van Loenen, T., Faber, M. J., Westert, G. P., & Van den Berg, M. J. (2016). The impact of primary care organization on avoidable hospital admissions for diabetes in 23 countries. *Scandinavian journal of primary health care*, *34*(1), 5-12.

Wilkinson, E. S. (2019). Essays in Health Economics (Doctoral dissertation, Temple University. Libraries).

5. CONCLUSIONS

This dissertation presents evaluations of recent coverage expansion policies in Texas.

In the first chapter, I conduct a descriptive analysis examining the hospitalization for all age group 18-64 in Texas. I measure what percentage of discharges in each age, gender, sex, race, and type of admission has been covered by either of self-pay or charity (i.e. uninsured), private insurance, or Medicaid. I graph the trends of estimated percentage by quarter over years 2009 through 2018. I also compare the mean of estimated percentages for year 2013 versus 2014. I compute the percentage change between 2013 and 2014 and use t-test to measure if the change in 2014 was statistically different from 2013. I also provide trends of changes in provider supply over the years 2011 through 2018. I further estimate the mean supply of providers (PCPs, MDs, Nurse) per 10,000 population Pre and Post-ACA. I find consistent decline in uninsured discharges and increase in privately insured discharges for all outcomes of interest. Additional findings show there was low supply of primary care physician within several counties after the enactment of the ACA. Yet, the findings show there was no considerable changes in the count of health profession per 10,000 population statewide.

In the second chapter, I use a difference-in-difference strategy to estimate average effects of coverage expansion on the uninsured inpatient discharge rate over the 2014-2018 time period. I find the Marketplace decreased the proportion of uninsured discharge rate by 1.6 percentage points over the five-year period of 2014-2018 for 225

Texas acute care hospitals. I perform event study as a sensitivity analysis. I find that reductions in the uninsured discharge rate for years 2014-2018 was led by the creation of ACA Marketplaces. In a robustness check, I perform analysis on several sub-samples. First, I estimate the effect for hospitals with more than 500 average annual admission which at least in one quarter were self-identified as acute care. This suggest that for 268 selected hospitals, at the average pre-ACA uninsured discharge rate (12.8%), the ACA-Marketplace is predicted to decrease uninsured discharge rate by 1.0 percentage points. Second, I estimate the effect for hospitals restricted to those which in all quarters were self-identified as an acute care. As displayed in the third column, the finding suggests that for the selection of 247 acute care hospitals, at the average pre-ACA uninsured discharge rate (13.8%), the ACA-Marketplace is predicted to decrease uninsured discharge rate by 1.3 percentage points. Overall, I find strong evidence that ACA Marketplaces have led to reduction of uninsured inpatient discharge rate for acute care hospitals in Texas.

In the third chapter, I use difference-in-difference to examine the impact of MMC expansion on inpatient utilization, I compare differential changes in outcomes in counties that implemented MMC in 2011 and 2012 relative to changes in counties that had already implemented MMC prior to 2011. I examine the impact for all Medicaid hospitalization and for those potentially preventable conditions. I find that expansion of MMC was associated with a reduction of all Medicaid discharges. However, lot of this reduction can be accounted for because of pregnancy-related discharges that are a huge portion of discharges. Therefore, the estimated effect is imprecise. The results relating to

ACSCs show that expansion of MMC overall had no significant impact on the hospitalization for ACSCs. With the only exception of hospitalization for diabetes long-term complications admission, which was declined after the expansion of MMC.