Using the COVID-19 Pandemic to Understand Local Sales Tax Base and the Question of 'Who Pays'

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Abstract:

Local sales tax bases are determined by factors including businesses, residential populations, and non-residential visitors. This paper capitalizes on the recession caused by the COVID-19 pandemic, sometimes referred to as the Great Lockdown, that kept the majority of Americans in their homes. Using the sudden absence of in-commuters, tourists, and college students, it estimates the contributions these non-resident populations have on the sales tax base in North Carolina's 100 counties. The findings suggest that the loss in one in-commuter for the months of March and April 2020 resulted in a loss in taxable sales of over $1,400 a month. Similarly, the loss in one night of a hotel stay results in a loss in taxable sales of $905. The impact on the presumed loss of a college student is not as clear, when examining the data, it appears that the counties with the largest residential student population have the most substantial reduction in taxable sales, however the regression results estimate an increase in taxable sales by almost $1,600 each month.

Introduction

      Local sales taxes are an increasingly important source of revenue for local governments. Currently, 37 states authorize local governments (county, municipal, and/or special districts) to levy a local sales tax and in 2017 almost 11,000 local governments did levy a local sales tax (Afonso 2017, Brunori 2020). They currently represent the second largest source of own-source revenue for local governments (Drenkard 2013). There is an increasingly robust literature that examines issues around local sales tax including cross-border shopping, the timing of adoption, and the tax rate differentials. A great deal of the literature has found that urban counties and counties that are able to import tax revenue from non-residents are more likely to be early adopters and have higher revenue raising capacity (Zhao 2005; Sjoquist et al. 2007; Burge and Rogers 2011; Burge and Piper 2012; Afonso 2018). While there are many ways in which a county may be able to import sales tax revenues, e.g. having a major highway or being a regional retail center, there has been too little attention given to the importance of the composition of taxpayers in understanding sales tax base. The research presented here aims to address this gap in the literature by estimating the impact that commuters, college students, and tourists have on the local sales tax base by using the pandemic as a natural experiment.

      The growth in the popularity and subsequent reliance on local sales taxes is often attributed to the fact that local sales taxes are one of the less visible revenue instruments available to local governments and that they may accomplish goals such as providing property tax relief, stabilizing revenue by diversifying revenue portfolios, and through exporting a portion of the tax burden to nonresidents (Advisory Commission on Intergovernmental Relations 1986, Jung 2001). This final benefit to local sales taxes is the focus of this study. Within the tax exporting literature there has been a focus on subnational, typically state or state and local

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combined, analyzing property taxes and the deductibility of state and local government taxes, often focusing on the interstate taxation of firms (Metcalf 1993, Chernick 2005, Braird 2005, Foster 2014, Prante and Navin 2016).

Understanding the composure of local sales tax bases is important for numerous reasons. First, in the majority of states where local governments are permitted to levy local sales taxes a voter referendum is required (Afonso 2017). For both voters and for elected officials the question of who pays or how much of the tax burden is exported is an important consideration. Second, and similarly, as governments are evaluating their revenue portfolio and determining their preferred tax mix, understanding the tax base is another important consideration. The literature has shown that in many instances more diverse revenue portfolios can lead to greater stability, however sales taxes are more elastic than property taxes and a sales tax base dependent on tourism is likely to be even more elastic. Third, as researchers, elected officials, planners, and others consider the fiscal impacts of developing tourism, intercounty or metro workforces, and the impact of colleges and universities it will be helpful to understand how those populations impact the sales tax base.

This analysis takes advantage of the economic shock and disruptions brought on by the COVID-19 pandemic which created high levels of unemployment, increased telework, sent college students back home, and halted tourism and business travel almost completely. By examining the change in the local sales tax revenues at the start of the pandemic, March and April 2020, in North Carolina's 100 counties the research presented here is able to estimate the impact of commuters, students, and tourist on local sales tax revenues. North Carolina is an ideal setting for this analysis because it has 1) relatively flat local sales tax rates across counties; 2) no municipal or special district local sales taxes; 3) and counties have no discretion in setting

their local sales tax base. There is also, like in most states, a great deal of diversity in tourism, commuting, the number of colleges and universities, and urbanism across the counties (Afonso 2016).

We estimate that the loss of each in-commuter results in a decrease in taxable sales by $1,415 in both March and April 2020 at the start of the pandemic. This is in addition to the benefit created by the loss of an out-commuter from a county of $508 each month. Similarly, we estimate that the loss of a night of a hotel stay results in a loss in taxable sales of $905. Counter to expectations, we estimate that the loss of a student living on campus results in a gain of $1,587 each month. This may suggest that many students did not return home and instead found places to live in the community, further supporting the local economy. However, when examining the correlation between the counties with the largest residential student populations and the change in taxable sales, the results correspond with expectations that revenues would fall. These results are conservative since we know that essential workers continued commuting, that not all tourism halted, and we cannot know where college students moved once they had to leave campus, however, they provide important insights into both the composition of local sales tax bases and the importance of different populations on the sales tax base.

This study will help researchers and policy makers to better understand the ability to import tax revenue from non-residents at the local level beyond just whether the jurisdictions are retail or regional retail centers which has been the main approach in the literature previously (Artz and Stone 2003; Rogers 2004; Zhao and Hou 2008; Burge and Rogers 2011; Burge and Piper 2012). While it does not offer the fiscal impact or the costs associated with these three populations, it does provide the first estimates, to our knowledge, of the local sales tax revenues created by each population.

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The article proceeds with a brief discussion of the relevant literature. That is followed by a discussion of our hypotheses and methodology. Next is a discussion of our results which is followed by the policy implications and our conclusions.

Literature Review

There is a robust literature examining tax exportation and the related field of cross-border shopping at the state and local level. Hettich and Winer (1999) present a model of the political economy of tax policy that is driven by political candidates supporting the tax mix that will maximize their political support. A primary way that this can be accomplished is through shifting tax burdens from residents to non-residents, since "political leaders prefer to meet constituent service demands without incurring the risk of placing the burden of paying for those services on those constituents" (Brunori 2020, 33). Within the literature a great deal of this research has examined the exportability of taxes through commerce and the deductibility of state and local taxes from federal tax burdens (Metcalf 1993, Chernick 2005, Braird 2005, Foster 2014, Prante and Navin 2016). Furthermore, the majority of this literature has focused its attention at the state level. Within this literature, there have been numerous studies that have attempted to understand and quantify tax exportation with estimates ranging from 23 percent (McLure 1967) to as high as 45 percent (Prante and Navin 2016). There are numerous taxes that can help governments shift the incidence of taxes to non-residents such as occupancy taxes, sales taxes, and taxes on non-resident property owners. Of particular relevance to this study are analyses that have considered the impact of commuters, tourists, and sales taxes.[1]

There is a growing literature that examines commuter behavior and tax exportation. Chernick (2005) finds a negative relationship between tax incidence in neighboring states and

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[1] This is in part because we were unable to identify any research on the contributions of college students to tax revenues.

attributes it, partially, to out-of-state commuters. Similarly, Braird (2005) does not model sales

tax in his tax exportation measures but notes the costs to consumers of cross-border shopping

and highlights that previous studies have included measures of commuting costs (but not

shopping trips), highlighting that commuters will have lower costs to doing their shopping in

other jurisdictions since the travel costs are already borne. Rohlin and Thompson (2018) echo

this strategy and use cross-border commuting as their measure of the potential of tax exportation

because "commuting workers are already making the trip, and it is relatively costless to react to

any incentives from a change in sales taxes" (374).[2] Similarly, Matha, Porpiglia, and

Siegelmeyer (2017) also use commuters to measures to help understand cross-border trade since

the costs, both time and of transportation, are quasi-controlled for in the case of commuters.

They find that for workers commuting into Luxembourg spend approximately 17 percent of their

gross annual income across the border. In fact, they find that these "cross-border commuter

households" spent approximately spent ~€9300 each in 2010 in Luxembourg.

      Similarly, tourism activities are important sources of revenue for national and sub-

national governments. A recent report by the UNWTO (World Tourism Organization) found

that the average visitor generated over $2,600 per stay in revenue in the United States (Haupt

2019). Only a fraction of that revenue would be sales tax revenues, but it does demonstrate the

importance of tourism to our federal, state, and local economies. Shifting to the importance of

tourism to sales taxes specifically, the literature has examined numerous relationships regarding

tourism and sales taxes. Afonso (2016) finds that counties with high levels of tourism activity

have the highest per capita local sales tax revenue, higher than even urban counties. While that

study presents evidence for the importance of tourism on local sales tax base, much of the

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[2] Though Rohlin and Thompson (2018) are examining the impact of sales tax differentials on employment.

previous literature assesses the economic impacts of tourism at the local level through similar but distinct lenses such as: the economic development component to tourism (Long, Perdue, and Allen 1990), the exportability of tourist taxes (Fujii, Haled, and Mak 1985), and the fiscal impact analysis of tourism (Stynes 1997). Findings suggest that residents support more tourism related fees and taxes as tourism development increases (Long, Perdue, and Allen 1990) and that as those taxes increase there is a negative impact on the tourism industry (Fujii, Khaled, and Mak 1985; Durbarry 2008) though there is recent evidence that the VAT does not impact tourism (Kristjánsdóttir 2020).

There is also literature on local sales taxes that this research will contribute to. For example, the ability to export the burden of local sales taxes has been shown to be a critical feature to whether a local government is an early adopter of local sales taxes (Zhao 2005; Sjoquist et al. 2007; Burge and Piper 2012; Afonso 2018). Typically, tax exportation has been controlled for by the presence of highways or whether the local government is urban. This study will provide further insights on additional ways this tax exportation may be occurring. It is also worth briefly highlighting the tangential literature around e-commerce and the (prior) ability for tax avoidance (evasion) using the internet. There is a wealth of research on the importance of e-commerce on sales tax bases and the subsequent loss of revenue for state and local governments. However, with the passage of economic nexus laws after the *South Dakota v. Wayfair, Inc.* ruling, many of those concerns have been eliminated (Afonso 2019a). However, that does not negate the impact that e-commerce is having on the local sales tax base. It is likely that as e-commerce grows that jurisdictions with smaller retail centers will export fewer sales tax dollars to neighboring jurisdictions because the sales taxes generated by their online purchases will now going to their jurisdiction of residence.

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However, there is early evidence that while the collection of sales taxes from online vendors increases revenues for all classifications of counties, that it disproportionately benefits urban jurisdictions (Afonso 2019b).[3] However, internet sales are likely still an important feature of what we observe in the impact of COVID and sales taxes. Prior to the broad use of internet, retail agglomerations were still more likely to occur in larger jurisdictions leaving consumers to seek out urban areas or regional retail centers, it is not obvious that this pattern would have changed during the pandemic. However, even if not a tax haven, the internet provided a way for consumers to purchase goods with their county of residence receiving the sales tax revenue rather than engage in cross-border shopping to take advantage of retail agglomerations. This is especially true if neighboring counties have higher local sales taxes since there is evidence of increased use of online shopping when cross-border shopping is more costly (Ballard and Lee 2007).

The North Carolina Context

North Carolina has 100 counties and they all levy at least a 2 percent local rate. This base 2 percent taxes food, none of the additional local sales tax instruments tax food. Forty-six counties levy a local rate of 2 percent, 49 levy a local tax rate of 2.25 percent, two levy a rate of 2.5 percent, and the remaining three counties levy a rate of 2.75 percent. The four counties with the highest rate have a 0.5 percent local transit sales and use tax that not all counties are permitted to adopt (NCDOR 2021). So, while there is diversity in the local sales tax rate, it is the smallest range amongst states (Sales Tax Institute 2021). For example, local sales tax rates range

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[3] An interesting additional consideration as the patterns of purchases change is whether sales and use taxes on online purchases should be origin based or destination based. In the United States, the vast majority are destination based and those that are not are typically reforming their policies (Afonso 2019a). However, there is research that examines this question from the perspective of tax base for differing sized nations, showing that origin-based taxation would benefit smaller nations (Bacache Beauvallet 2018).

from 0 to 9 percent in Alabama, from 0 to 3.25 percent in California, from 1 to 5 percent in Georgia, from 0 to 2 percent in Texas, and from 0.5 to 4 percent in Washington.

This minimizes the potential impact of traditional concerns around intra-state cross border shopping to avoid higher taxes which is a frequent finding in the literature (Leal et al. 2010). There are many studies that examine the revenue impact, causes, and the impact on sales tax rate differentials of cross-border shopping (e.g., Gordon and Nielsen 1997, Ferris 2000, Garret and Marsh 2002, Ballard and Lee 2007, Tosun and Skidmore 2007, Agrawal 2015, Rohlin and Thompson 2018). This makes North Carolina a good state for analysis. Furthermore, not only does North Carolina have little tax rate diversity, the counties do not have the option of setting their own sales tax base as they do in some states (Afonso 2019a).

Hypotheses and Methodology

In the absence of a global pandemic and without local and state stay-at-home orders in place, theory and evidence would suggest that counties have different revenue raising capacities. There are many reasons for these varying revenue capacities. For example, a great deal of literature has found that urban areas generate more revenue than their nonurban counterparts (Rogers 2004; Zhao and Hou 2008; Burge and Rogers 2011; Burge and Piper 2012) presumably in part because of their ability to import sales tax dollars from nonresidents. Another recent study examined revenue raising capacity of a broader spectrum of urban classifications, moving beyond urban and other to urban, suburban, rural, and tourism rich (Afonso 2016). Tourism rich counties were those with high volumes of tourist activity that would not otherwise have been classified as urban. Tourism rich counties were found to have the highest per capita revenue raising capacity, even though they would otherwise be considered rural. These findings suggest significant evidence for the exportation of sales tax burden to non-residents. Three common

non-resident populations that may contribute to the local sales tax base are commuters, tourists, and college students. However, to our knowledge, there has yet to be an examination of the magnitude of the contribution of these non-resident populations. Though there is some evidence that tourism may substantially reduce the median voter's tax burden (Foster and Fowles 2016).

The literature suggests that within cross border shopping the cost is lowest to those who are commuting since they are already traveling across the border (Matha, Porpiglia, and Siegelmeyer 2017; Rohlin and Thompson 2018). Therefore, we expect to see that each commuter into a county will increase the sales tax base. Similarly, as the previous literature has demonstrated the importance of tourism on local economies and on sales taxes (Long, Perdue, and Allen 1990; Afonso 2016), we expect to see that as the estimated number of tourists increase so does the size of the sales tax base. Finally, we investigate a third population of non-residents, college and university students. While they have not been analyzed in the past, we expect college students to have a positive impact on the sales tax base as well.

To measure the contributions of these three populations to the local sales tax base we capitalize on the pandemic created by COVID-19. Starting in mid-March the majority of workers shifted to virtual work, dormitories closed and college courses went virtual, and tourism was halted. Using the sudden absence of these populations from the tax base we examine the change in the sales tax base created by the removal of commuters, students, and tourists. We recognize that there remained essential workers that may be commuting and that some students who resided off campus may have stayed in the area, so what we estimate are simply conservative estimates of the impact of each of these populations.

$$\Delta TaxableSales_{cm} = \beta_0 + \beta_1 InCommuters_c + \beta_2 OutCommuters_c + \beta_3 Unemployed_{cm} + \beta_4 Enrollment_c + \beta_5 \Delta HotelRooms_{cm} + \beta_6 Month_m + \varepsilon_{cm} \qquad (1)$$

Using total taxable sales from all 100 of North Carolina's counties in March and April we model the relationships using Equation 1 and estimate the model using quantile as well as OLS regression. March and April are our months of interest because that is when the pandemic reached North Carolina and when the policy impacts of changes in response to the recession, e.g., increased unemployment benefits and stimulus checks, are least likely to impact the sales tax base. The model estimates how taxable sales were impacted by the drastic drop in the number of in-commuters, the rise in out-commuters who remained home, the loss of tourism activity, and the expected drop in the number of college students living on campus due to COVID-19. The coefficients for these primary independent variables can be interpreted as the change in the average (or median in the case of quantile regression) taxable sales associated with one fewer in-commuter traveling to the county to work, one out-commuter remaining in the county, the loss of one hotel-night stay, or one college student returning home. The model also includes the number of unemployed individuals. While we are primarily interested in understanding the relationship during the initial peak of COVID-19 in March and April prior to the numerous confounding policy responses, we also provide results for the two preceding months as a robustness test, which should not have been affected by COVID-19. Please see Table 1 for a brief timeline of the COVID-19 pandemic in North Carolina. Additionally, we include a binary variable for March (or January) as a month fixed effect and cluster the standard errors on the county.

<Table 1>

The economic impact of the pandemic on local governments has been explored in a great deal of recent literature such as symposiums in *Public Administration Review*, the *Municipal Finance Journal*, and the *Journal of Public Budgeting, Accounting, and Financial Management* as well as in work put forward by groups like the League of Municipalities. North Carolina

follows the same patterns identified elsewhere, with immediate and dramatic loss to the sales tax base.[4] Figure 1 presents the year-over-year cumulative taxable sales from across the state.[5] The figure presents a picture of drastic declines starting as early as February (once the pandemic had reached multiple states within the U.S.) and even more dramatic declines starting in March and reaching their lowest in April. Then taxable sales in North Carolina began a rapid return to pre-recession levels.

<Figure 1>

While the aggregated numbers confirm expectations and the narrative surrounding the Great Lockdown and the impact it had on sales taxes, it is important to note that not all jurisdictions were impacted the same way and to the same extent. For example, Figure 2 presents the taxable sales starting in 2017 for two counties in North Carolina, Chatham and Wake. Both of these counties are in the central Piedmont region of the state or what is occasionally referred to as the Research Triangle area. Wake is where Raleigh is located, and Chatham was once an agricultural county and is now transitioning into a commuter county. Chatham has been seeing growth in taxable sales annually since 2017 and continued to experience growth in the midst of the recession. Similarly, Wake has been experiencing growth in its taxable sales as well, but once the lockdown in North Carolina begins in March sees sharp declines in the sales tax base. We believe that a partial explanation to the different experiences of these two counties are these non-residential populations of commuters, tourists, and college students.

<Figure 2>

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[4] Not to suggest that other taxes and revenue instruments were not also impacted.
[5] The calculation of this variable is described in the data section later in the manuscript.

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In fact, when examining the patterns across the state it is clear that there is both great diversity in the impact on taxable sales and the types of jurisdictions being impacted. Figure 3 presents two maps of North Carolina. The first presents the percent change in taxable sales for March and April 2020. It is clear that the eastern part of the state was heavily impacted as was the western part of the state. These two regions represent the beaches and the mountains, respectively, and are tourism hubs as well as home to regional employment centers and universities in some cases with cities like Wilmington, NC and Asheville, NC. In the central southern region of the state is Mecklenburg County home to Charlotte, NC where there are high numbers of in-commuters, tourists, and students. Similarly, is the central region where the Research Triangle and Raleigh-Durham are where large universities like Duke University, University of North Carolina at Chapel Hill, and North Carolina State University are located. The second map, which presents the change in taxable sales presents a similar story where it is clear that many of the state's most populous counties were especially impacted.

<Figure 3>

Data

The dependent variable $\Delta TaxableSales_{cm}$ is calculated by using the revenue forecasting technique of arithmetic mean return. It uses the average growth rate in the taxable sales of each county using the average year-over-year growth between December 2019 and December 2020, and then applying the county average growth rate to year-over-year change in monthly taxable sales for the months of January to April 2020. This gives us a measure of a reasonable counterfactual of the taxable sales a county could have expected each month given their growth trajectory and the seasonality of the taxable sales if the pandemic had not taken place.[6]. Referring

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[6] This measure is taxable sales and not sales tax revenue. This was chosen because of the complicated local sales tax landscape in the state. While there is not a great deal of local sales tax rate diversity, there is some, but

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back to Figure 1, which presents the change in taxable sales as calculated using arithmetic mean return. Similarly, this is what is presented in the second map in Figure 3 to demonstrate the change in taxable sales by county for March and April of 2020.

$InCommuters_c$ is measured as the number of individuals working, but not living in the county, with $OutCommuters_c$ being the number living in the county, but working elsewhere. $Unemployed_{cm}$ is the number of workers in the county classified as unemployed during a given month. $Enrollments_c$ is the number of college students in the county living on campus and is created by interacting the percent of students living on campus with the total number of students for each college/university in the county. $\Delta HotelRooms_{cm}$ is the year-over-year change in the number of monthly hotel room stays in the county and is calculated as interaction of the county's year-over-year occupancy percent change and total number of hotel rooms to convert to a change in rooms measure, It should be interpreted as the loss in the number of hotel stays. The data is not initially at the county level and needs to be constructed from division and region level measures. The occupancy change data is available at the region level from Visit North Carolina[7], the number of hotel rooms is available at the division level from American Hotel & Lodging Association.[8] The division level hotel room data is used to create a county level measure by weighting by 2019 county level tourism revenue from Visit North Carolina. Note that due to data limitations $InCommuters_c$, $OutCommuters_c$, and $Enrollments_c$ do not vary over time.

Table 2 provides summary statistics for each of the variables included in our model. Average taxable sales rose slightly from the first two months of the year to March and April,

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furthermore, some local sales tax instruments in the state tax food while others do not. Some revenues are distributed by the state on a per capita basis. In fact, there are numerous other complications that would make using the actual revenue less clear and precise. Therefore, we chose to use taxable sales and there is no discretion on setting the sales tax base within the state.

[7] https://partners.visitnc.com/lodging-reports
[8] https://ahla.morningconsultintelligence.com/districts/nc-13/

from 113.8 to 114.6 million, but this is because sales are typically higher in March and April (for instance, observe the trends in taxable sales for prior years in Chatham and Wake counties in Figure 2). The dependent variable, the change in taxable sales ($\Delta TaxableSales_{cm}$), reflects a large drop in March and April of 25.4 million compared to only 3.7 million in January and February. Median values for these two measures are included as our main specification uses median regression. The number of unemployed doubled in March and April (3,990) compared to January and February (1,979), while the drop in the number of hotel rooms skyrocketed from a change of 1,161 in January and February to 13,868 in March and April. There are roughly the same number of in-commuters (12,352) compared to out-commuters (12,337), however there is great heterogeneity across counties. And on average a county has 1,466 college students living on college campuses, although 72 of the 100 counties do not contain a university or college.

Discussion of Results

To understand the relationships between our non-residential populations and taxable sales, we first plot the relationships between each population and taxable sales. Figure 4 presents taxable sales by the ratio between in-and out-commuters. The trends are presented by quartile for ease of interpretation (using April values to determine quartile for hotel rooms and unemployment that vary at the month level). Figure 4 shows that as counties have a greater share of in-commuters than out-commuters, their taxable sales declined more over the course of COVID-19. It also demonstrates that the impact is felt especially hard for those counties with the largest ratio of in-commuters, whereas the lower quartiles are relatively flatter.

<Figure 4>

Figure 5 presents taxable sales by our tourism measure, change in hotel room occupancy. A similar story emerges, with those with the largest drop in hotel room occupancy experiencing

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the most dramatic changes in taxable sales. Figure 6 presents taxable sales by our measure of residential college enrollment. Since 72 of the 100 counties do not have a college or university, we present this data by separating out those counties with zero and then split the remaining 28 counties by the median number of college students living on-campus conditional on having any. The counties with greater college enrollment numbers also experience the most dramatic drops in taxable sales. Lastly, even though we are less interested in the impact of unemployment on taxable sales explicitly in this research, we do observe the same trends. The quartile of counties with the highest unemployment also experiences the greatest decline in taxable sales.

The regression results from estimating equation 1 are presented in Table 3 and are consistent with the graphic evidence previously discussed, with the exception of college students. The first two columns present the estimates from median regression (column 1) and OLS (2) for January and February, the two months preceding COVID-19. It is important to note that the coefficients represent the estimated impact on change in taxable sales, not change in sales tax revenue. For our variables of interest (In- and Out-Commuters and Enrollment) we find no statistically significant relationships in these two preceding months. The estimated relationships are much larger and statistically significant in the months of interest (March and April). Focusing on the median regression results in column 3, we find that an increase of one additional in-commuter reduced taxable sales by $1,415, which is the expected sign as non-essential workers were no longer able to commute into the county due to COVID-19. This is in keeping with expectations and prior research that finds that commuters are an important component to cross-border expenditures which are typically tangible items rather than services which often go untaxed (Matha, Porpiglia, and Siegelmeyer 2017). An additional out-commuter (that is no longer leaving the county due to COVID-19) increases taxable by sales by $508.

Once again, we find no relationship between $\Delta TaxableSales_{cm}$ and enrollment in the months of January and February. Oddly, we find that one additional college student living on campus actually increased taxable sales by $1,587 in March and April though. Which is the opposite sign of what we hypothesized and the visual evidence in Figure 6. Our tourism measure, hotel room change, is negative and statistically significant for the January and February regression. This is likely due to the fact that this measure and unemployment are the only two to reflect monthly changes and this suggests that there were reductions to hotel stays that reduced taxable sales in the first two months of the year, on average. In the model of interest, for March and April, taxable sales also fall by $905 for each additional day a hotel room stayed vacant, as expected. This is in keeping with previous analysis that found that tourism rich counties had greater local sales tax revenue raising capacity than urban, rural, or suburban counties (Afonso 2016).

We also find that each additional unemployed individual reduced taxable sales by $1,585. Lastly, the binary variable controlling for March shows a large negative impact suggesting that, while we observe that April is when change in taxable sales hit its lowest point, that there is a shift in behavior unrelated to these non-residential populations and unemployment impacting sales taxes. It is likely that residential populations, perhaps especially those marginally employed or fearing unemployment, reduced their expenditures to a greater extent in March.

Finally, we also ran our model using OLS regression. Those results are also presented in Table 3. While the estimated magnitudes vary between the two regressions, they are consistent with each other, with the exception of out-commuters is not estimated to have a statistically significant impact on $\Delta TaxableSales_{cm.}$ and the impact of an additional unemployed resident is estimated to have a substantially higher impact.

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Policy Implications

There have been concerns regarding the unequal revenue raising capacity of local sales taxes. In fact, in Iowa a case was made that the link between education financing and local sales tax revenues are unconstitutional (Craft 2002). This is not uncommon, six states have specific earmarks for education and numerous others have the ability to earmark for purposes of their choosing, including education (Afonso 2017). Furthermore, the inequity of revenue raising capacity has been of concern at the state level as well. Using North Carolina as an example, there have been numerous attempts to respond to the perceived inequity of revenue raising capacity created by tax exportation. For example, in the Senate Bill 369 (Sales Tax Fairness Act) introduced in 2015, it was proposed that the base 2 percent of local sales taxes (that all counties in North Carolina have in place) be allocated on a per capita basis to ameliorate the inequities created by tax exportation. An example of successful recent legislation is Section 32.19 of S.L. 2015-241, where a portion of the sales tax revenues ($84,800,000) that is generated by the base 2 percent that all counties have in place, is placed in a statewide pool, and allocated by a statutory formula. The size of the statewide pool is adjusted each year with growth. The allocations from this pool favor less affluent and less populous counties. In fact, 21 of the most urban and wealthy counties receive no money from this pool. This contrasts with some counties that received more than $3 million in the first year alone.[9] The state implemented this change "to address sales tax leakage that results from the different revenue-raising capacity of local option sales taxes in each taxing jurisdiction." G.S. 105-524(a).

This research contributes to real policy conversations. First, as discussed above, states are taking note of perceived inequities created by tax exportation of local sales taxes. The

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[9] https://canons.sog.unc.edu/wp-content/uploads/2015/10/Sales_Tax_Change_Multi_Year_FRD_091720153.pdf

research presented here helps to identify the importance of three of the potential causes and populations of tax exportation: commuters, tourists, and students. For example, the ratio between in-commuters and out-commuters is 0.7 in the 80 rural counties in North Carolina, in stark contrast to the average ratio of 1.4 for the 20 urban counties. There is a clear discrepancy in the in- and out-commuting patterns of the two designations of counties and an urban-rural divide. In terms of local equity, it is likely that tax exportation involving commuters versus tourists would be viewed and assessed differently. This research also helps identify the magnitude of those benefits. Second, as local option sales taxes continue to be considered and adopted around the United States, this research helps policymakers and voters understand the portion of the burden they are likely about to shift onto non-residents which is an important consideration. Third, it has implications for how local governments manage their growth strategies. There has been an emphasis in the literature and in practice on local tourism development, for example. This research contributes important information to that economic development strategy.

It is critical to note that while this research presents conservative estimates of the contribution of these three populations to the sales tax base, it does not mean that this is the fiscal impact. These populations will often contribute to other revenue sources including occupancy, fuel, and property taxes. Additionally, there is also a financial cost to having these non-resident populations consume services such as public safety, roads, and parks. This research will help inform future research on the fiscal impact of these populations and that work is important.

Conclusions

The results presented here informs future tax exportation research. There is a rich literature on the impact of different features on state and local tax structures, including the

federal deductibility of state and local tax burdens for firms and individuals. These estimates on

the contribution of non-residents to the sales tax base can help researchers better understand the

tax mix adopted by different jurisdictions, and the rate setting. It may also help advance related

areas of inquiry such as the revenue diversification literature regarding the stability of diversified

portfolios and the impact diversification may have on expenditures. It will also help inform

policymakers of the true cost of adopting local sales taxes and how much of the burden will fall

on residents.

It is important to note that while our estimation of the impact of tourism on the local sales

tax base is substantial to recognize that the real impact of tourism on the local economy is much

greater. There is agreement that tourism directly impacts many sectors and employment levels,

but there is evidence of even greater multipliers of the impact of tourism development on

interindustry fields (Fretchling and Horvath 1999). For example, it is estimated that for every $1

million in sales of travel foods and services, eight jobs in the industry are generated (U.S. Travel

Association 2020). This suggests that capturing the loss of revenue from visitors will not capture

the full loss of that sector in the long term because of these interindustry impacts.

In the future, it will be important to examine the impact of the exportability of tax

burdens on expenditures in the local government. The exportation of tax burden to commuters,

students, and tourism lowers the cost of government for the median voter and should increase the

demand for government services. It will be an important exercise to understand in what areas

this upward pressure is applied and to what extent. Ultimately, understanding the fiscal impact

of these populations on local economies and government would be incredibly valuable to

policymakers, as well as practitioners in economic development, budget, and planning.

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Table 1: COVID-19 Pandemic Timeline in North Carolina

Date	Event
3/3/2020	First case of COVID-19 in North Carolina
3/10/2020	Gov. Cooper declares state of emergency
3/13/2020	Chief Justice of NC Supreme Court no new eviction proceedings
3/16/2020	State orders schools to close for 2 weeks (initially)
3/17/2020	State orders restaurants and bars to end dine in service
3/17/2020	Gov. Cooper lifts unemployment restrictions
3/19/2020	NC Utilities commission orders regulated utility companies to stop disconnections
3/30/2020	NC stay at home order goes into effect
3/31/2020	Executive Order prohibits all electricity, natural gas, water and wastewater utilities from shutting off service for non-payment
4/15/2020	IRS direct deposit of stimulus check
4/24/2020	IRS paper check to those with incomes <$10k
5/1/2020	IRS paper check to those with incomes <$20k
5/8/2020	IRS paper check to those with incomes <$30k
5/8/2020	NC enters into Phase 1 of reopening
5/15/2020	IRS paper check to those with incomes <$40k*
5/22/2020	NC enters into Phase 2 of reopening
9/4/2020	Checks mailed out to those making the maximum ($194,000) in IRS stimulus
9/4/2020	NC enters into Phase 2.5 of reopening
10/2/2020	NC enters into Phase 3 of reopening

* Followed by $10k increments each week.
Sources:
EO 124: https://files.nc.gov/governor/documents/files/EO124-Utilities-Evictions-Financial-Services.pdf
https://www.washingtonpost.com/politics/irs-to-begin-issuing-1200-coronavirus-payments-april-9-but-some-americans-wont-receive-checks-until-september-agency-plan-says/2020/04/02/8e0cfc84-751e-11ea-85cb-8670579b863d_story.html

Table 2: Summary Statistics

Months:	January & February (1)	March & April (2)	Source
Taxable Sales	113,787,134	114,632,585	North Carolina Department of Revenue (2021)
	(256,861,431)	(242,785,772)	
Median	*39,655,232*	*44,942,883*	
Δ Taxable Sales	-3,699,476	-25,369,166	
	(13,176,362)	(69,525,357)	
Median	*-405,271*	*-4,128,718*	
Unemployed	1,979	3,990	Bureau of Labor Statistics Local Area Unemployment Statistics
	(3,240)	(7,993)	
Δ Hotel Rooms	1,161	13,868	Occupancy & tourism revenue: Visit North Carolina (https://partners.visitnc.com/lodging-reports)
	(2,667)	(28,218)	Hotel rooms: American Hotel & Lodging Association (https://ahla.morningconsultintelligence.com/districts/nc-13/)
In Commuters	12,352		U.S. Census, American Community Survey (ACS) 5-Year (2011-2015) Table 2: "Residence County to Workplace County Commuting Flows for the United States and Puerto Rico Sorted by Workplace Geography"
	(25,984)		
Out Commuters	12,337		
	(14,241)		
Enrollment	1,466		collegesimply.com, U.S. News and World Reports 2021 Best Colleges, and individual college websites
	(3,710)		
N	200	200	

Table 3: Change in Taxable Sales – Quantile Regression

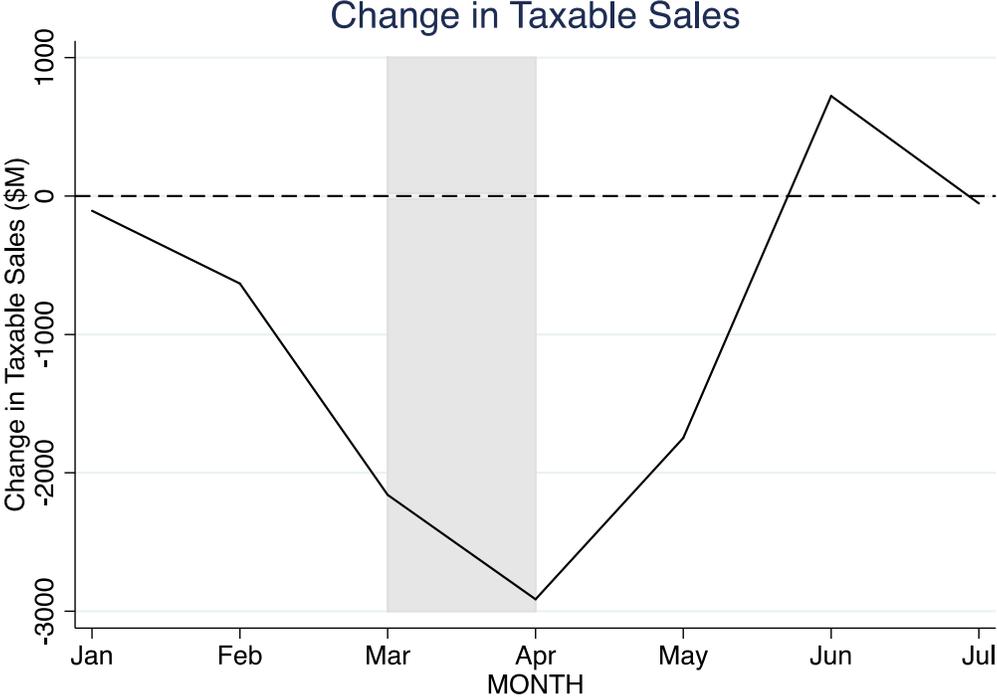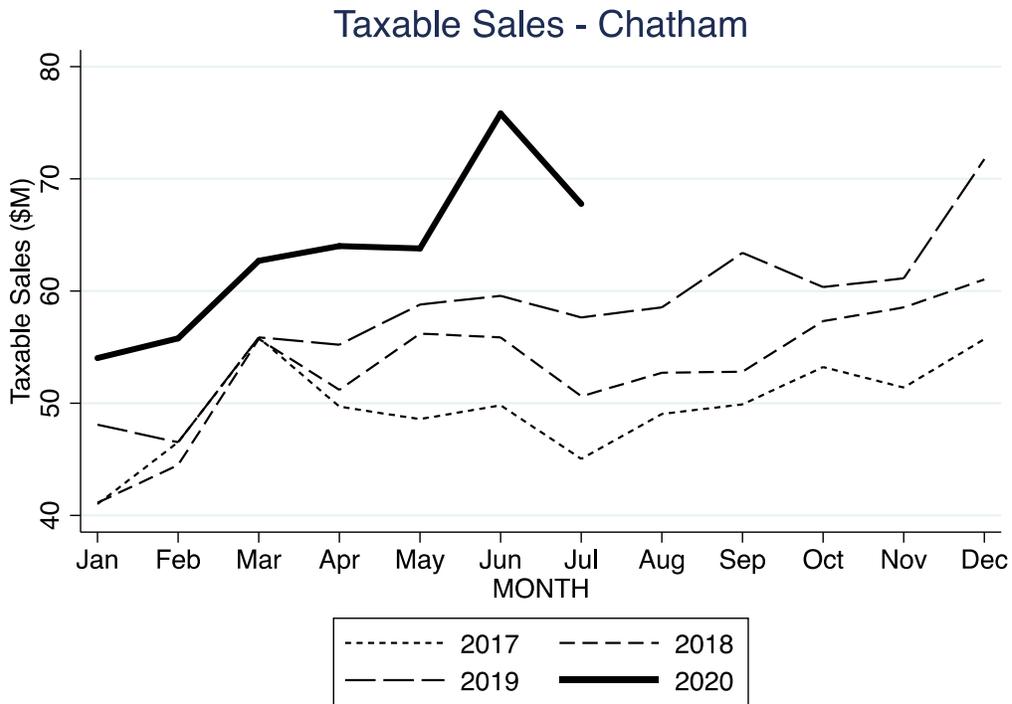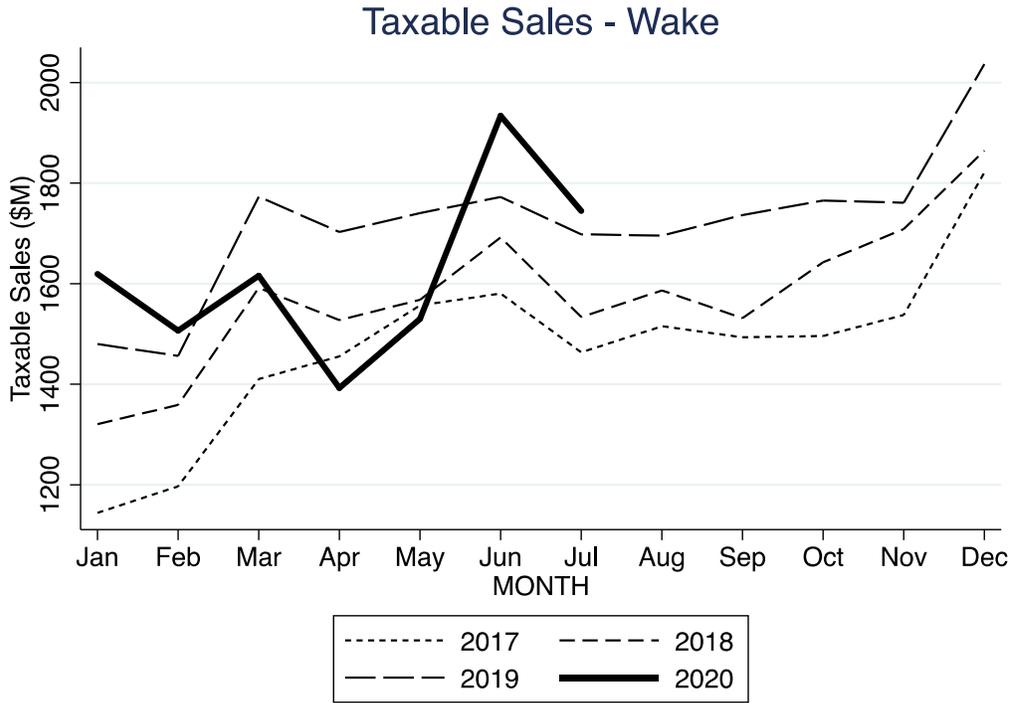| Months:	January & February		March & April	
	Median	OLS	Median	OLS
	(1)	(2)	(3)	(4)
In-Commuters	-322	-6	-1,415***	-1,132***
	(232)	(98)	(150)	(255)
Out-Commuters	46	-78	508***	286
	(188)	(129)	(192)	(372)
Enrollment	567	-931	1,587***	239
	(356)	(580)	(519)	(1,029)
Unemployed	443	-60	-1,585***	-2,561***
	(2,555)	(1,027)	(337)	(709)
Hotel Room Change	-1,228***	-1,452	-905***	-877***
	(391)	(904)	(172)	(208)
January	1,066,488	5,839,701***		
	(697,400)	(1,690,389)		
March			-3,943,368***	-7,544,825***
			(906,621)	(2,201,878)
Constant	-119,291	-2,410,934*	5,957,004***	10,894,749***
	(516,695)	(1,282,539)	(1,358,440)	(4,024,311)
N	200	200	200	200
R-squared	0.182	0.288	0.938	0.944

Sources:
See Table 2
Notes:
The table displays coefficients from median regression in columns 1 and 3 and OLS in columns 2 and 4. Models are estimated separately for January and February (the two months prior to COVID-19) in columns 1 and 2 and March and April in columns 3 and 4. The dependent variable in each model is the growth adjusted change in the county's taxable sales. Robust standard errors clustered on county are provided in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Change in Taxable Sales
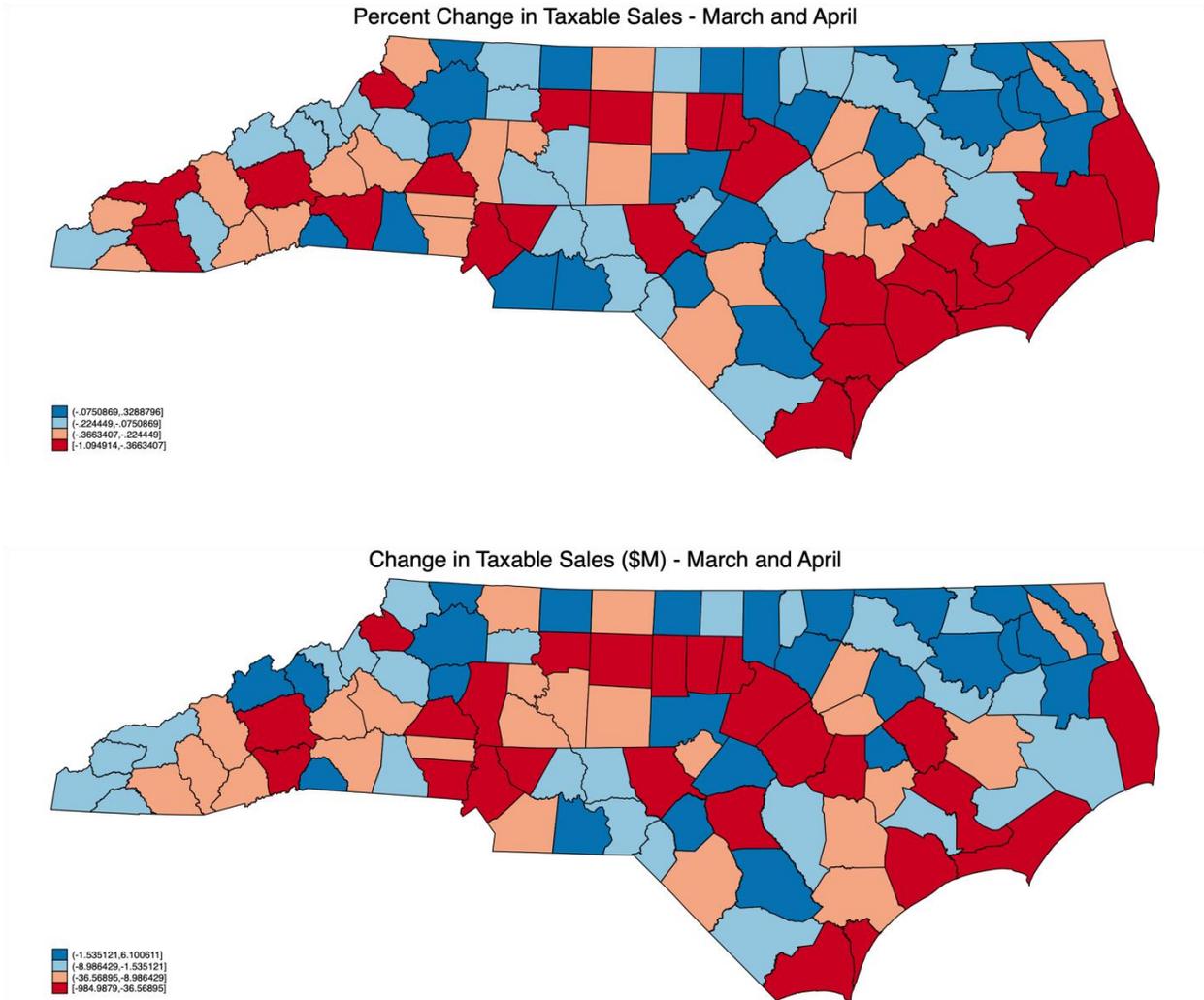

Change in Taxable Sales

Notes:
The figure displays the dependent variable (the growth adjusted change in monthly state level taxable sales) in 2020.
The gray region are the two months of interest in this study (the first two months of the COVID lockdown).

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Figure 2: Taxable Sales in Chatham and Wake County from 2017-2020

Taxable Sales - Wake

Taxable Sales - Chatham

Notes:
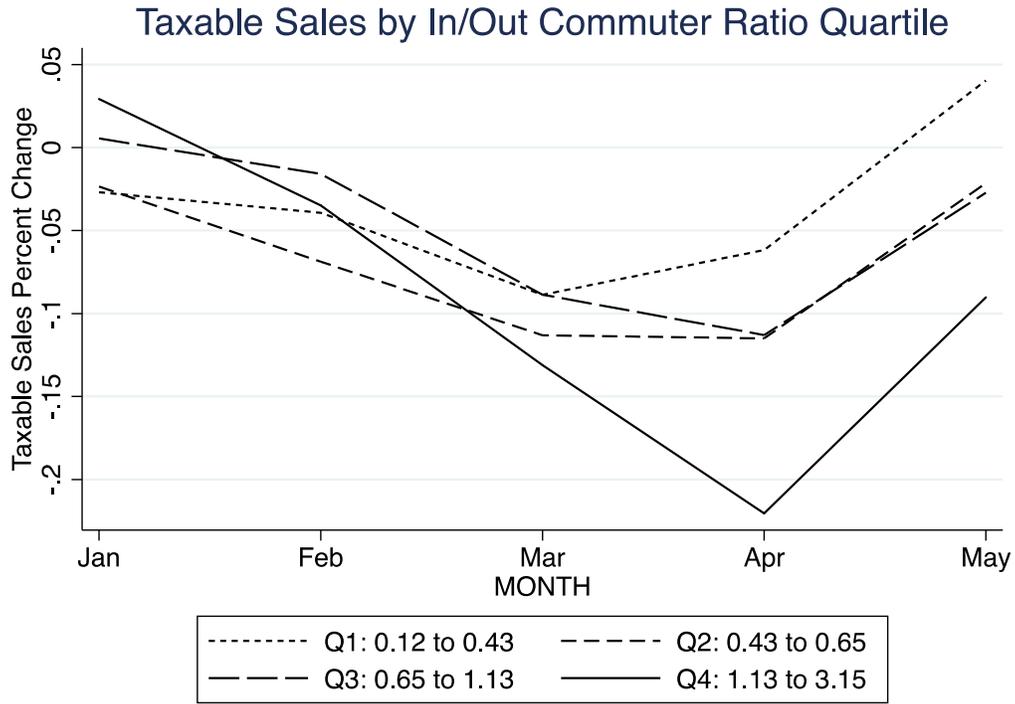The figures display monthly county level taxable sales for Wake and Chatham county.

Figure 3: Decline in Expected Taxable Sales in North Carolina Counties at the Start of the Pandemic (March and April, 2020)

Notes:
The figures display the growth adjusted change in monthly state level taxable sales for March and April, 2020 in percentage terms in the top map and in millions of dollars in the lower map. Red indicates larger negative changes, with blue less severe changes.
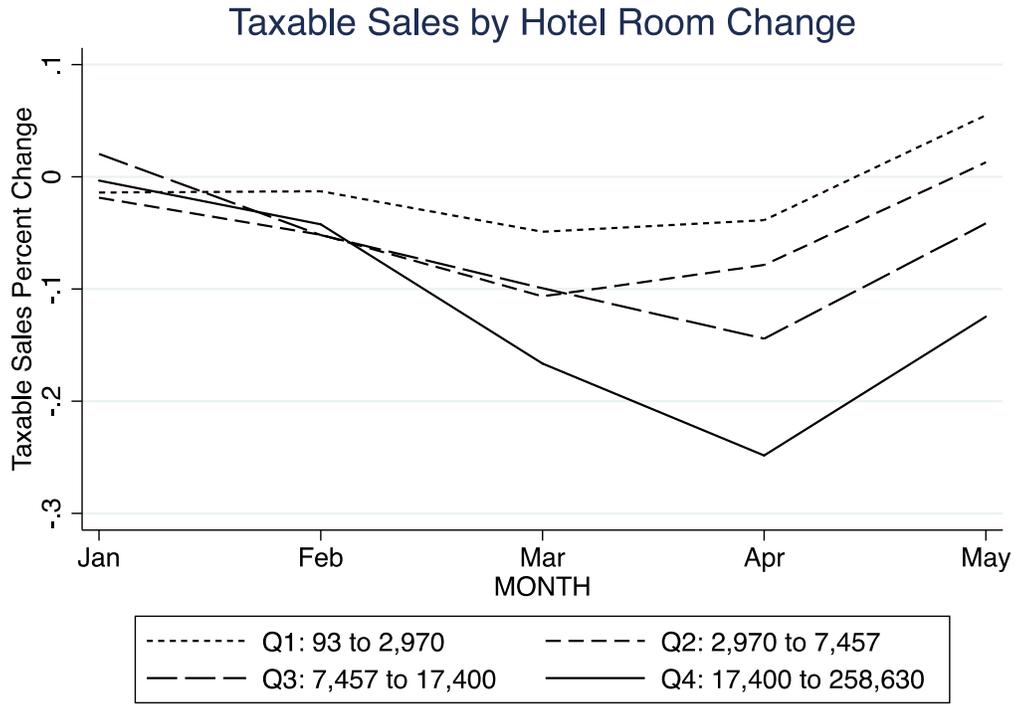
Figure 4: Changes in Taxable Sales by In/Out Commuter Ratio Quartiles

Taxable Sales by In/Out Commuter Ratio Quartile

Legend:
- Q1: 0.12 to 0.43
- Q2: 0.43 to 0.65
- Q3: 0.65 to 1.13
- Q4: 1.13 to 3.15

Notes:
The figure displays the dependent variable over the first five months of 2020 for each quantile of the ratio of in- to out-commuters. Higher quantiles indicate relatively more in-commuters to out-commuters.
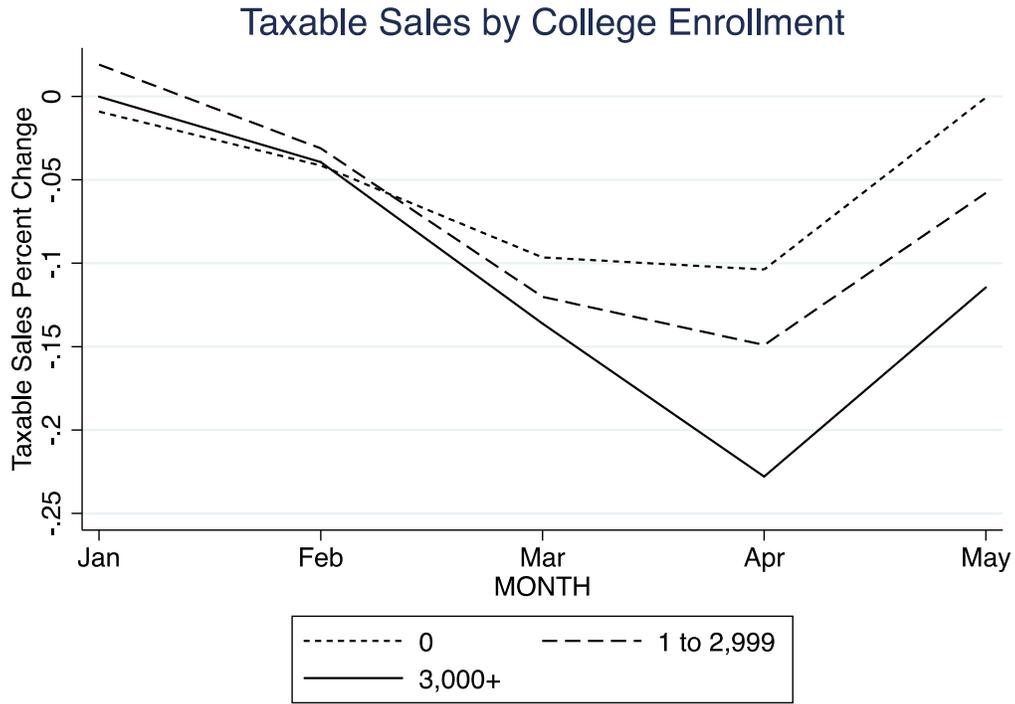
Figure 5: Changes in Taxable Sales by Change in Hotel Room Quartiles

Taxable Sales by Hotel Room Change

Legend:
- Q1: 93 to 2,970
- Q2: 2,970 to 7,457
- Q3: 7,457 to 17,400
- Q4: 17,400 to 258,630

Notes:
The figure displays the dependent variable over the first five months of 2020 for each quantile of the reduction in hotel rooms in April. Higher quantiles indicate a larger number of hotel vacancies.
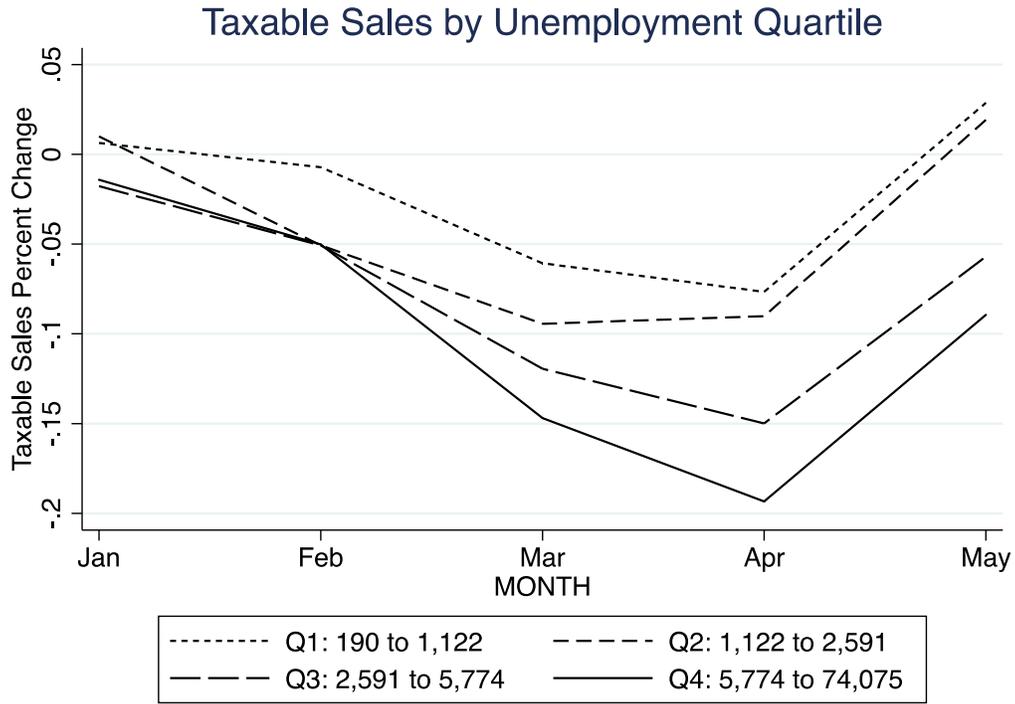
Figure 6: Changes in Taxable Sales by On Campus College Enrollment

Taxable Sales by College Enrollment

Notes:
The figure displays the dependent variable over the first five months of 2020 for the number of college students living on campus. The 0 category is for the 72 counties that have no college or university, with the other two lines designated using the median number of students conditional on having a non-zero number of students.

Figure 7: Changes in Taxable Sales by Unemployment Quartiles

Taxable Sales by Unemployment Quartile

Notes:
The figure displays the dependent variable over the first five months of 2020 for each quantile of the number of unemployed individuals in April. Higher quantiles indicate a larger number of unemployed.