KENAN INSTITUTE
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UNC KENAN-FLAGLER BUSINESS SCHOOL

Igniting Growth:

Measuring Business Formation's Positive Role Across the North Carolina Economy

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Executive Summary

Data on new business starts from the North Carolina Secretary of State's Office (SOS) helps to better predict local economic activity. Research shows a generally positive relationship between business formation and county GDP growth (the broadest measure of economic activity) as well as job creation, though the degree varies by the size of the county and the employment sector.

Key Findings:

1. How Business Formation Impacts GDP Growth:
   - **The impact of business starts is larger in highly populated counties,** with each additional 10 percentage points in the growth rate of new businesses in a larger county resulting in an additional 0.11 percentage points in GDP growth in the same year. For a county with an expected 2% GDP growth, this would raise growth to 2.11%, a 5.5% increase in the growth rate.

   - **In less populated counties, the effect of business starts is smaller and more complex.** A 10 percentage point increase in both statewide and county-level new business growth rates results in a 0.07 percentage point increase in GDP growth, a meaningful boost given the slower growth many of these counties have experienced in recent years.

2. How Business Formation Impacts Employment Growth:
   - **Goods-producing sector (e.g., manufacturing, construction, etc.):** New businesses lead to more jobs, but with a lag. It takes about three-quarters of the year to see the effect of an increase in new business starts in the employment data. A 10 percentage point increase in the growth rate of new businesses results in a 0.02 percentage point increase in the growth rate of jobs in the goods-producing sector.

   - **Service sector (e.g., information technology, healthcare, etc.):** The impact is quicker and slightly larger. A 10 percentage point increase in the growth rate of new businesses results in a 0.03 percentage point increase in the growth rate of jobs by the next quarter..

Overall, trends in new business starts help predict short-term job changes and broader economic growth across different counties in North Carolina. Understanding the relationship between new business starts on state economic growth is crucial because it helps policymakers make better-informed decisions that foster economic development and job creation.

This research was done in partnership with the North Carolina Collaboratory and the North Carolina Secretary of State to explore the development of the North Carolina Center for Advanced Economic Forecasting (NCCAEF). The center aims to forecast economic growth across all 100 counties in North Carolina and identify the key factors driving this growth. Access to this data allowed the Kenan Institute to produce innovative findings on the drivers of local economic activity.

Introduction

In this report, we examine how business formation influences economic growth across North Carolina's 100 counties. This research was done in partnership with the North Carolina Collaboratory to explore the development of the North Carolina Center for Advanced Economic Forecasting (NCCAEF). The center aims to forecast economic growth across all 100 counties in North Carolina and identify the key factors driving this growth. By partnering with the North Carolina Secretary of State's Office, we gained access to the state's business-start data (e.g., new business applications), enhancing our NCCAEF models of GDP and employment growth.

GDP, a key indicator of economic activity, is closely linked to the standard of living. Accurate GDP modeling helps institutions and governments understand economic growth drivers and use tools to boost growth. One of the challenges with current GDP data is its nearly two-year lag. This delay means policymakers lack recent data to inform their decisions, making reliable nowcasts and forecasts even more crucial. Employment growth is another key metric of economic health. Moreover, modeling employment helps to provide insights into industry movements within the economy.

> **"Access to the business-starts data enabled the Kenan Institute to uncover innovative insights into the drivers of local economic activity, particularly the role of business formation.**

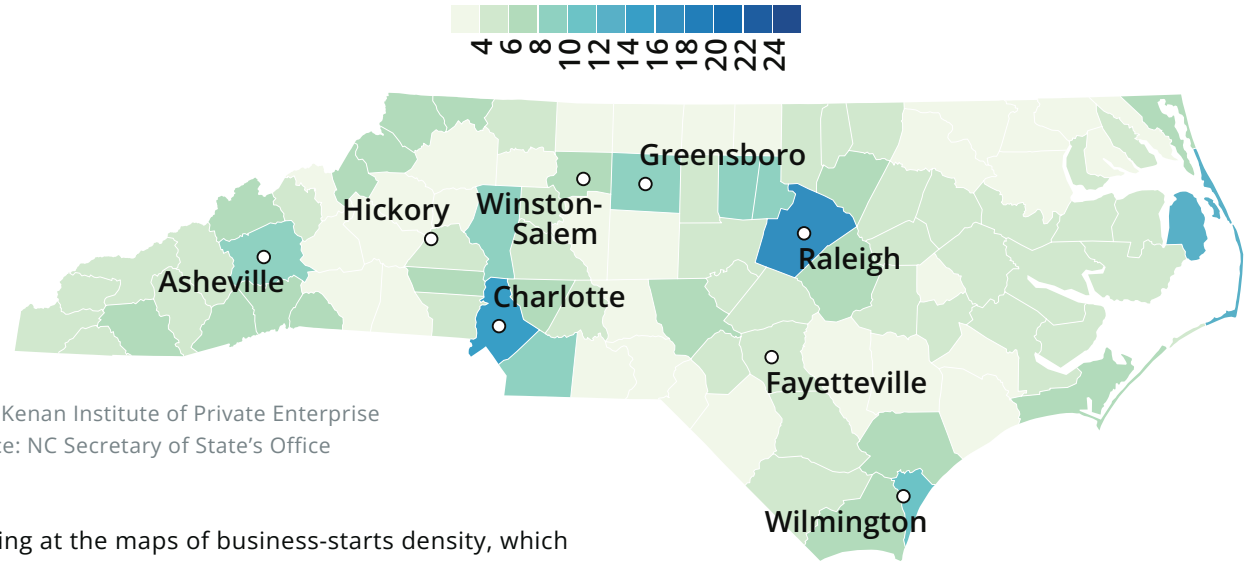
More data improves our models' accuracy and predictive power. Next, we detail our methodology and findings.

North Carolina Business-Starts Data

The business-starts data consists of information from the individual business applications received by the North Carolina Secretary of State's Office. This data includes the title of the business, a brief description of the business, the address of the business and the date of application. In this analysis, we use only the location and date of the application. After matching the individual business applications to their counties, we created county-level measures of the growth rate and density of new business starts. This analysis focuses on the growth of business starts, but the density of business starts can be seen in Figures 1 and 2, which follow.

Figure 1: **Business-Starts Density by County, 2019**

Business Starts per 1,000 Residents

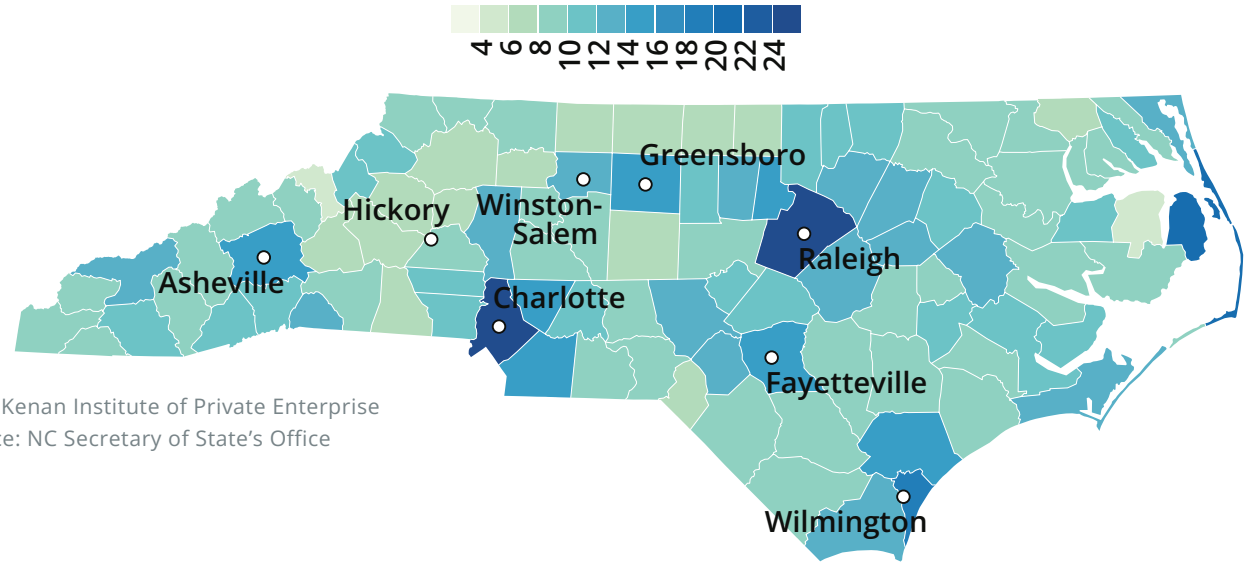


Map: Kenan Institute of Private Enterprise
Source: NC Secretary of State's Office

Looking at the maps of business-starts density, which measures the number of business starts per 1,000 residents, we can see how business formation activity varies across the state of North Carolina. Comparing Figure 2 with Figure 1, we see business formation activity after the COVID-19 pandemic has increased in all counties in North Carolina. The pattern observed across counties in North Carolina is consistent with national trends.

Figure 2: **Business-Starts Density by County, 2022**

Business Starts per 1,000 Residents

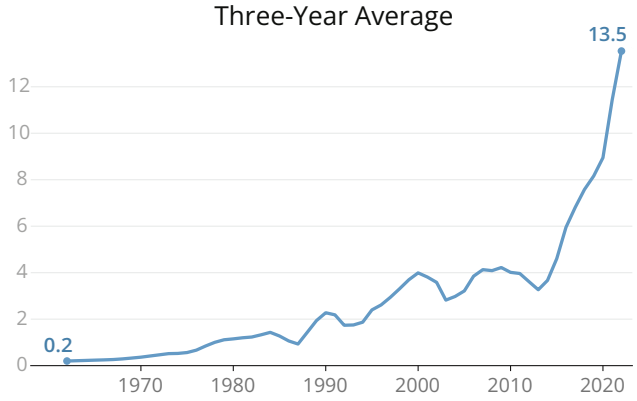


Map: Kenan Institute of Private Enterprise
Source: NC Secretary of State's Office

Across the US, the number of new business applications jumped in 2020 and 2021 and has remained at this elevated level since. There are business applications data available at the county level from the Census Bureau, but what makes the SOS data unique and more useful for modeling is that the data covers a longer period and is produced with a shorter lag. The SOS data begins much earlier than the Census Bureau data, which starts in 2005. In Figure 3, we can see that the SOS business-starts activity in North Carolina goes back to 1960.

Figure 3: **North Carolina Business-Starts Density Since 1960**

Business Starts per 1000 Residents



Modeling Real GDP Growth

Learnings from the American Growth Project – Economic Forecasting for the Largest 150 US Metro Areas

In our efforts to model NC county real GDP growth using the NC Secretary of State's Office (SOS) business-starts data, we started with our existing GDP model from the American Growth Project. In the American Growth Project, we model and forecast real GDP growth for 150 regional economies across the United States. This model in the initial testing for the NC county-level data performed the best compared with the others tested. All data is aggregated to the annual level because the dependent variable, real GDP growth, is annual. Moreover, county-level GDP is released with long lags. The independent variables in the model include a one-year lag of real GDP growth, US real GDP growth, employment growth, a one-year lag of housing permit growth, and a 2020 dummy variable. The specific type of model used is a fixed-effect panel model. This model accounts for the individual characteristics of each regional economy that affect real GDP growth but are either slow to change or are permanent differences. Examples of characteristics that would be lumped into fixed effects include the region's geographic location, the areas infrastructure, agglomeration effects from industry concentration, and long-term demographics trends.

North Carolina County GDP Growth Models

Minor changes to the GDP growth model were made when adapting it for the NC county data. Instead of US GDP growth, we include a NC GDP growth term that

Table 1: **Large North Carolina Counties' Descriptive Statistics***

	MEAN	STAND. DEV.	MINIMUM	MAXIMUM
GDP	$14.6 billion	$2.92 billion	$1.53 billion	$171 billion
Employed	89,700	122,500	19,600	643,300
Unemployment Rate	3.53 %	0.56 %	2.71 %	4.97 %
Population (total)	190,900	229,500	54,600	1,203,400
Prime Working Age Population	74,700	100,400	15,700	522,400
Average Age	40.3	3.1	32.7	49.8
Growth of Business Starts, SOS	11.8%	4.0%	6.2%	26.7%
Total Observations	**50**			

** Counties with populations of 52,000 or more in 2022*

we call "NC leave-out GDP growth." This measures the state's GDP growth from the 99 other counties in the state. For example, when looking at Guilford County's 2022 observation, the state's real GDP growth value excludes Guilford County's contribution to the state in that year. This method is applied to each of the 100 counties. This leave-out GDP variable is especially important for our two largest counties, Wake and Mecklenburg, which make up 15% and 22% of NC GDP, respectively. Data from 2002 to 2018 is used to train the models, and then out-of-sample testing is performed for 2019 to 2022.

In the American Growth Project, we separate the regional economies into two groups based on population, the largest 50 and the midsize 100, and model them separately, as we find the large and midsize microeconomies have different growth drivers. We do this with the North Carolina counties as well. We split the 100 counties in half by population. The two groups are called "large counties" and "small counties." This was done using the median population in NC counties in 2022, the latest year of population estimates when we started this modeling project. The differences between the large and small counties are significant, as can be seen in the descriptive statistics in Tables 1 and 2. This difference is reflected in the results from the GDP models as well.

Results

In this project, we are modeling real (inflation-adjusted) GDP growth rates, so when including the business-starts data, we calculated the growth rates of the number of business starts from year to year. There are two measures of business-starts growth used in testing the models, the county-level growth of business starts and the aggregated statewide growth. In the results for the large-county models (Table 3), the

Table 2: **Small North Carolina Counties' Descriptive Statistics***

	MEAN	STAND. DEV.	MINIMUM	MAXIMUM
GDP	$1.2 billion	$0.78 billion	$0.14 billion	$3.12 billion
Employed	11,300	6,200	1,300	24,700
Unemployment Rate	3.91 %	0.85 %	2.89 %	6.31 %
Population (total)	26,700	13,900	3,500	50,100
Prime Working Age Population	9,200	4,900	1,200	18,300
Average Age	43.8	2.6	40.0	49.4
Growth of Business Starts, SOS	9.4%	2.5%	5.5%	21.7%
Total Observations	**50**			

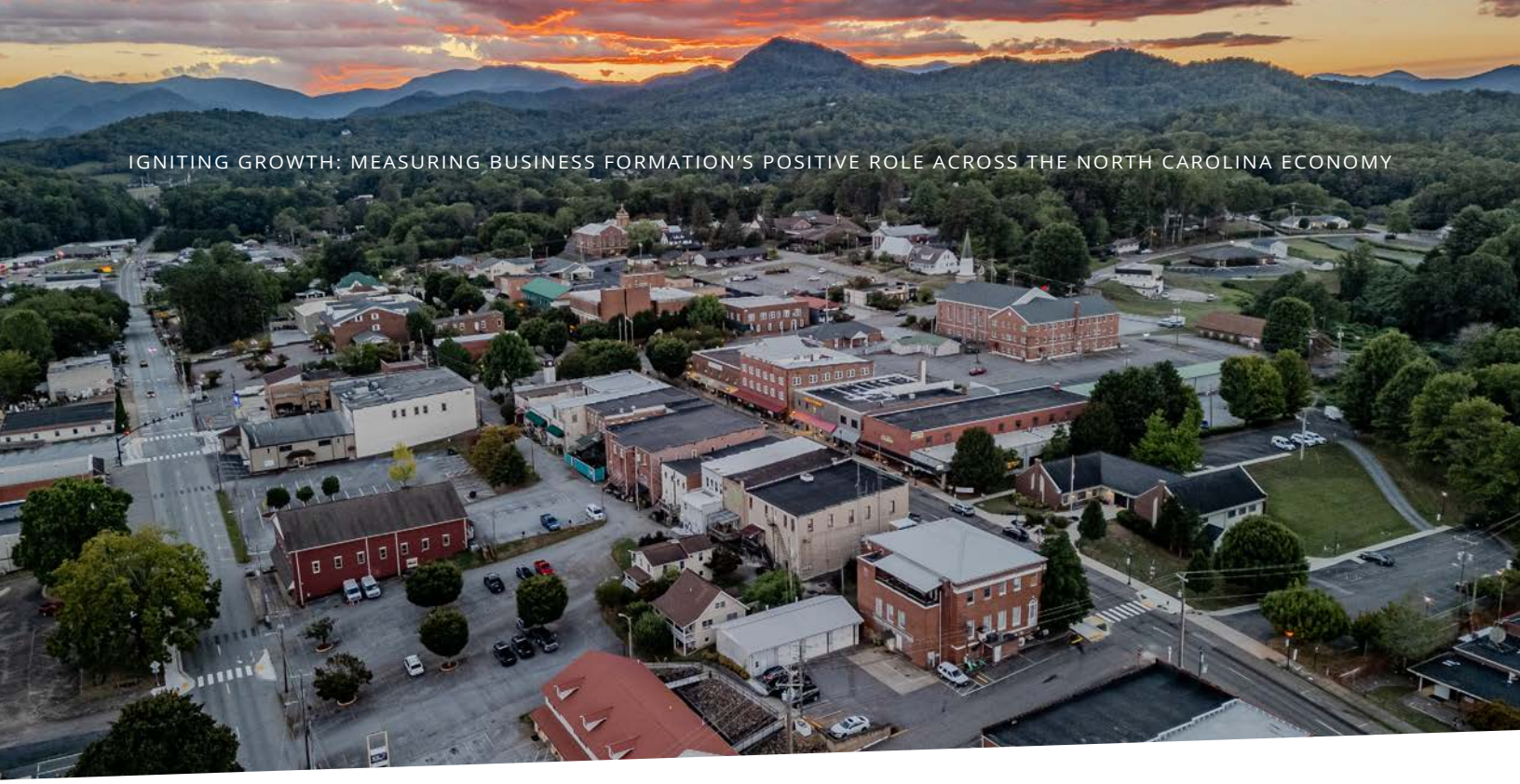
** Counties with populations of less than 52,000 in 2022*

county-level and statewide contemporaneous business-starts growth rates are statistically significant and have meaningfully large coefficients. The county-level coefficient is 0.011, meaning for every 10 additional percentage points of growth in the county's business starts, we expect, on average, the county's GDP growth to increase by 0.11 percentage points. This is a meaningful increase, as the mean growth in large-county GDP was 3.4% in 2023, or 2.1% if we exclude Mecklenburg and Wake counties.

Table 3: Large-County GDP Growth Fixed-Effect Panel Model Results

VARIABLES	(1) COUNTY GDP GROWTH	(2) COUNTY GDP GROWTH	(3) COUNTY GDP GROWTH	(4) COUNTY GDP GROWTH
County RGDP Growth 1-Year Lag	0.102***	0.093***	0.103***	0.093***
	(0.035)	(0.035)	(0.035)	(0.035)
Employment Growth	0.306***	0.322***	0.305***	0.322***
	(0.082)	(0.082)	(0.082)	(0.082)
NC GDP Growth †	0.436***	0.410***	0.443***	0.412***
	(0.099)	(0.099)	(0.099)	(0.099)
Housing Permit Growth 1-Year Lag	0.008	0.007	0.008	0.007
	(0.005)	(0.005)	(0.005)	(0.005)
County Business-Starts Growth		0.011**		
		(0.006)		
County Business-Starts Growth 1-Year Lag			-0.001	
			(0.006)	
State Business-Starts Growth				0.012**
				(0.006)
Constant	0.001	0.000	0.001	0.000
	(0.003)	(0.003)	(0.003)	(0.003)
Observations	800	800	800	800
Number of Counties	50	50	50	50
County FE	Yes	Yes	Yes	Yes
Sample	2002-2018	2002-2018	2002-2018	2002-2018
R2	0.109	0.114	0.109	0.114

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 † Leave-Out NC RGDP Growth



The relationship between statewide business starts and county GDP growth is slightly stronger, with a coefficient of 0.012. This coefficient means for every 10 additional percentage points of growth in the state's business starts, we expect, on average, the county's GDP growth to increase by an additional 0.12 percentage points in the same year. We included one-year lags of both the county and state business-starts growth individually and found no statistically significant relationship. Including both the state and county business-starts growth in the same model results in both measures being insignificant statistically. This means that the GDP impact occurs within the year the business was started. Across all four out-of-sample testing years 2019-2022 (Appendix), Model 4, which includes business formations, had the lowest root mean squared error (RMSE), which is a measure of testing out-of-sample success of a model. A lower RMSE means a more accurate forecast, implying that including starts improves our predictions of GDP.

We do not find the same relationship in the small-county model results (Table 4). Neither the county nor the state business-start measures are statistically significant when included alone. However, when both the county and the state level measures are included, Model 4, the coefficients are larger, the state measure is statistically significant and the county measure is nearly significant. In this model, the county business starts have a negative coefficient at -0.014, meaning for every 10 additional percentage points of business-starts growth in the county, we expect, on average, 0.14 percentage points less in GDP growth in the county. But, the state measure has a coefficient of 0.021, meaning for every 10 additional percentage points in business-starts growth, we expect county GDP to grow by an additional 0.21 percentage points. Thus, on net, a 10 percentage point increase in business starts leads to a 0.07 percentage point increase in GDP. This boost to growth is meaningful since the average growth in small-county GDP was actually -0.66 percentage points in 2023.

Table 4: Small-County GDP Growth Fixed-Effect Panel Model Results

VARIABLES	(1) COUNTY GDP GROWTH	(2) COUNTY GDP GROWTH	(3) COUNTY GDP GROWTH	(4) COUNTY GDP GROWTH
County RGDP Growth 1-Year Lag	-0.074**	-0.074**	-0.075**	-0.074**
	(0.036)	(0.036)	(0.036)	(0.036)
Employment Growth	1.040***	1.040***	1.035***	1.026***
	(0.218)	(0.219)	(0.218)	(0.218)
Unemployment Rate	-0.031	-0.027	0.002	-0.008
	(0.123)	(0.126)	(0.126)	(0.126)
Employment Growth x Unemployment Rate	-9.423***	-9.425***	-9.370***	-9.257***
	(1.980)	(1.982)	(1.980)	(1.979)
NC RGDP Growth †	0.368**	0.369**	0.371**	0.362**
	(0.151)	(0.151)	(0.151)	(0.151)
Housing Permit Growth 1-Year Lag	-0.009*	-0.009*	-0.009*	-0.009*
	(0.005)	(0.005)	(0.005)	(0.005)
County Business-Starts Growth		0.001		-0.014
		(0.006)		(0.009)
State Business-Starts Growth			0.008	0.021**
			(0.006)	(0.010)
Constant	-0.003	-0.004	-0.007	-0.006
	(0.012)	(0.012)	(0.012)	(0.012)
Observations	800	800	800	800
Number of Counties	50	50	50	50
County FE	Yes	Yes	Yes	Yes
Sample	2002-2018	2002-2018	2002-2018	2002-2018
R2	0.0480	0.0481	0.0504	0.0535

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 † Leave-Out NC RGDP Growth

Modeling Employment Growth

Applying the American Growth Project Employment Growth Models to NC Counties

For modeling the employment growth of North Carolina counties, we again borrow from our American Growth Project. It models each Supersector of the economies[1] (i.e., manufacturing, finance, etc.) employment individually and then uses the individual forecasts to build an employment growth prediction for the entire regional economy. Because we lack more granular sector data for some NC counties, we use the two broad parts of the employment market, the goods-producing and the service-providing sectors. We hope to access confidential granular industry-level employment data from the NC Department of Commerce, which would facilitate deeper analysis.

NC County Employment Growth Models

Since we have higher-frequency (quarterly) data, we use quarterly fixed-effect panel models for modeling the sector employment growth. Like the GDP models from above, this model accounts for the individual fixed effects of the counties, but it also accounts for seasonal effects occurring in the different quarters through the year. The models are trained on data from Q1 1998 to Q4 2018, and then out-of-sample testing is done for 2019 to 2023 (Appendix). The year-over-year (Y/Y) employment growth is modeled for both the goods-producing and service-providing sectors. The base model's independent variables are similar between the two sets of models and include: US employment growth in the respective sector, a one-quarter lag of county-level employment growth in the sector, US real GDP growth and NC real GDP growth. With the business-starts data, we calculated the growth from the same quarter last year, or Y/Y growth, for both the county and state levels.

Results

In the goods-producing models, there was success in using the county-level Y/Y business-starts growth to model Y/Y growth in the sector's employment. The three-quarter lag indicator for county-level business starts was significant, with a coefficient of 0.002. This means that if business starts grow by an additional 10 percentage points compared with the same quarter the year before, then we would expect goods sector employment to grow by an additional .02 percentage points three quarters later. The statewide term of Y/Y business-starts growth is not statistically significant when we include them in the model. (For an example, see Model 3 in Table 5, which follows.) The base model (Column 1, Table 5) performs the best for every year in the RMSEs from out-of-sample testing (Appendix).

[1] The *Bureau of Labor Statistics*, for the purpose of analysis, has aggregated NAICS sectors into groups called Supersectors: Manufacturing, Government, Information, Professional and Business Services, Education and Health Services, Construction, Natural Resources and Mining, Financial Activities, Trade/Transportation/Utilities, Leisure and Hospitality, and Other Services.

Table 5: Goods-Producing Sector Employment Growth Fixed-Effect Panel Model Results

VARIABLES	(1) GOODS EMP Y/Y GR	(2) GOODS EMP Y/Y GR	(3) GOODS EMP Y/Y GR	(4) GOODS EMP Y/Y GR
US Goods Emp Growth	1.346***	1.350***	1.349***	1.348***
	(0.095)	(0.095)	(0.095)	(0.095)
County Goods Emp Y/Y Gr Qtr Lag	0.674***	0.672***	0.672***	0.685***
	(0.008)	(0.008)	(0.008)	(0.008)
US GDP Growth	0.049	0.049	0.049	0.059
	(0.040)	(0.041)	(0.041)	(0.041)
NC GDP Growth	-0.022	-0.032	-0.031	-0.074*
	(0.044)	(0.044)	(0.044)	(0.044)
County Business-Starts Y/Y Growth 3-Qtr Lag		0.002*		0.002
		(0.001)		(0.001)
State Business-Starts Y/Y Growth 3-Qtr Lag			0.002	-0.000
			(0.001)	(0.002)
Constant	-0.216	-0.250	-0.239	-0.210
	(0.210)	(0.210)	(0.210)	(0.209)
Observations	8,269	8,032	8,032	7,842
Number of Counties	100	100	100	100
County FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Sample	1998q1-2018q4	1998q1-2018q4	1998q1-2018q4	1998q1-2018q4
R2	0.525	0.529	0.528	0.546

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

In the service-providing employment models, we see a similar relationship between business-starts growth and the sector's employment to that of the goods sector. Table 6 shows the Y/Y modeling results for the service sector. County-level measures are significant and have positive relationships with employment growth in the sector. The service sector coefficient for same-quarter county Y/Y business-starts growth is 0.002, meaning for every additional 10 percentage points in county Y/Y growth in business starts, we expect an additional 0.02 percentage points in service sector growth that quarter. The one-quarter lag of business starts' coefficient is 0.001. On net, a 10 percentage point growth in business starts in one quarter will result in a total effect of 0.03 percentage point growth in service sector employment. The statewide measure's coefficient is larger at 0.004 for the one-quarter lag indicator.

Table 6: Service-Providing Sector Employment Growth Fixed-Effect Panel Model Results

VARIABLES	(1) SERVICES EMP Y/Y GR	(2) SERVICES EMP Y/Y GR	(3) SERVICES EMP Y/Y GR	(4) SERVICES EMP Y/Y GR
US Services Emp Growth	1.127***	1.093***	1.007***	1.033***
	(0.205)	(0.205)	(0.209)	(0.208)
County Services Emp Y/Y Gr Qtr Lag	0.601***	0.599***	0.605***	0.604***
	(0.009)	(0.009)	(0.009)	(0.009)
US GDP Growth	0.120***	0.118***	0.128***	0.121***
	(0.026)	(0.026)	(0.026)	(0.026)
NC GDP Growth	0.134***	0.125***	0.135***	0.121***
	(0.028)	(0.028)	(0.028)	(0.028)
County Business-Starts Y/Y Growth		0.002***		0.002***
		(0.001)		(0.001)
County Business-Starts Y/Y Growth 1-Qtr Lag		0.001*		
		(0.001)		
State Business-Starts Y/Y Growth 1-Qtr Lag			0.004***	0.003***
			(0.001)	(0.001)
Constant	-0.246**	-0.288***	-0.247**	-0.296***
	(0.112)	(0.112)	(0.112)	(0.112)
Observations	8,266	8,196	8,095	8,066
Number of Counties	100	100	100	100
County FE	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Sample	1998q1-2018q4	1998q1-2018q4	1998q1-2018q4	1998q1-2018q4
R2	0.422	0.421	0.426	0.426

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The service sector indicators have a shorter lead time (with same-quarter and one-quarter lag effects) between the business-starts growth and service sector employment growth than do the goods sector, which has a three-quarter lag. This may be the result of the longer ramp-up time needed to start a manufacturing or construction business. The service sector models that included business starts performed better in the out-of-sample testing than the base model without starts in most years.

Summary

Our analysis finds a generally positive and statistically significant relationship between the growth rates in new business starts and in county-level GDP and employment. In general, the relationship is stronger for the largest counties in North Carolina and in service-producing industries. This may not be particularly surprising given the lower variation in growth in larger counties and in service sector employment. We also find that business starts have a shorter lead time in services versus manufacturing employment (same-quarter and one-quarter ahead versus three-quarters). These findings contribute innovatively to the existing literature, which has primarily focused on national trends. Incorporating new data series, such as the business-starts data from the North Carolina Secretary of State's Office, is crucial for our work at NCCAEF. With access to additional data, including detailed industry-level data, we aim to better understand these relationships and the factors influencing lead times.

Appendix

Variable Glossary

GDP Models

County GDP Growth	This is county real gross domestic product growth. This measures the growth in economic activity in a county from one year to the next, accounting for inflation.
Employment Growth	Measures the growth in employment in a county from one year to the next.
Unemployment Rate	The share or percentage of a county's labor force that does not have a job but wants one.
Employment Growth x Unemployment Rate	This allows the model to account for how the interaction between employment growth and the unemployment rate affects GDP growth separate from their individual effects. This is important for small counties in the GDP model.
NC GDP Growth	Measures the growth in inflation-adjusted economic activity in North Carolina from one year to the next. In this project, we incorporate a leave-out measure of North Carolina real GDP. This means for a particular county, the NC GDP growth does not include that county and is measuring the economic activity in the other 99 counties in the state.
Housing Permit Growth	Measures the growth in the number of housing permits approved in each county from one year to the next.
County Business-Starts Growth	Measures the growth in the number of business applications completed in a county from one year to the next.
State Business-Starts Growth	Measures the growth in the number of business applications completed in North Carolina from one year to the next.

Employment Models

US Goods/Service Emp. Growth	Measures the growth in employment in the goods or services sector in the United States in that quarter.
County Goods/Service Emp. Y/Y Gr.	Measures the growth in employment in the goods or services sector in a county compared with the same quarter the year before.
US GDP Growth	Measures the growth in inflation-adjusted economic activity in the current quarter in the United States.
NC GDP Growth	Measures the growth in inflation-adjusted economic activity in the current quarter in North Carolina.
County Business-Starts Y/Y Growth	Measures the growth in business starts in a county compared with the same quarter the year before.
State Business-Starts Y/Y Growth	Measures the growth in business starts in North Carolina compared with the same quarter the year before.

GDP Out-of-Sample Testing: Root Mean Squared Errors

LARGE-COUNTY GDP MODELS ROOT MEAN SQUARED ERRORS				
Year	Model 1	Model 2	Model 3	Model 4
2019	0.0066007	0.0065533	0.0065982	0.0065198
2020	0.0099836	0.0099711	0.0099977	0.0099617
2021	0.0075197	0.007316	0.0075069	0.0071521
2022	0.0067427	0.0066966	0.0067087	0.0066461

SMALL-COUNTY GDP MODELS ROOT MEAN SQUARED ERRORS				
Year	Model 1	Model 2	Model 3	Model 4
2019	0.01465	0.014668	0.014679	0.014734
2020	0.010706	0.010716	0.010713	0.010752
2021	0.017864	0.01781	0.017932	0.018194
2022	0.013511	0.013497	0.013844	0.013241

Employment Out-of-Sample Testing: Root Mean Squared Errors

GOODS-PRODUCING EMPLOYMENT MODELS ROOT MEAN SQUARED ERRORS				
Year	Model 1	Model 2	Model 3	Model 4
2019	1.067562	1.081931	1.0816	1.118846
2020	0.905517	0.908004	0.908192	0.90772
2021	0.942374	0.960768	0.960127	0.995935
2022	0.775095	0.782426	0.782655	0.800943
2023	1.049018	1.067913	1.068225	1.100016

SERVICE-PROVIDING EMPLOYMENT MODELS ROOT MEAN SQUARED ERRORS				
Year	Model 1	Model 2	Model 3	Model 4
2019	0.881098	0.875204	0.891157	0.882586
2020	0.841459	0.822119	0.824722	0.82045
2021	0.810292	0.819587	0.800363	0.824759
2022	0.812323	0.813234	0.818486	0.818465
2023	0.875953	0.87643	0.885802	0.885337

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