

# Future Prosperity in North Carolina: The Roles of Labor, Technology, and Growth

A Background Paper for the Focus of the  
2023 Emerging Issues Forum

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## EXECUTIVE SUMMARY

The country – indeed the world – is facing the possibility of a declining labor force, caused by a reduction in the birth rate and an aging population. If this also happens in North Carolina, it could threaten the economic growth of the state.

However, using the latest population projections for the state and labor force participation rate forecasts from the federal government, the state's labor force is expected to continue rising, to 5.8 million in 2030 and 7 million in 2050. A major reason is the continuing growth of migration of individuals to North Carolina from other states. Statewide, the expected growth in the state's labor force should be sufficient to match the forecasted increase in employment.

Still, there remain two labor market challenges for North Carolina. One is differences in regional labor force forecasts, with fast growth in some metropolitan markets leading to labor force shortages, while slower economic growth in certain non-metropolitan markets will result in labor force surpluses. Hence, a regional re-allocation of the labor supply will be needed.

The second challenge is the change that continued technological developments will mean for the needed skills required from workers. Future workers will need more cognitive skills and fewer physical skills. Without appropriate skill training, there will be labor shortages for several occupations and tasks.

Hence, there is a need to re-examine state labor market policies to ensure the appropriate labor supply is available where it is geographically needed, and with the needed skills. Policies such as a new state earned income tax credit (EITC), assistance for working families with young children, skill training of incarcerated individuals, assistance with worker relocation, a more active role of the state in matching workers with jobs, reducing drug abuse, and completing the availability of reliable high-speed internet everywhere in the state are key initiatives to consider.

A skilled labor supply is essential for continued economic growth. However, there are tradeoffs, with some arguing it is economic growth that creates environmental degradation. The solution is the appropriate pricing of adverse environmental consequences that force internal recognition of environment costs, and allow those costs to be considered alongside the benefits of economic growth.

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## **1. INTRODUCTION**

In 2016, the topic of the Emerging Issues Forum was “Future Work.” An important part of the conference examined the impact of emerging labor-saving technologies on the future of human work. Just three years earlier, two British economists had stunned the world by predicting almost half of the current occupations would disappear in upcoming decades due to the expansion of tasks performed by technology.<sup>1</sup> The worry was if there would be enough jobs for people.

A mere six years later, the concern about the labor market has been completely reversed. A shortage of labor developed as the economy recovered from the Covid-19 recession. Employers in a variety of businesses had difficulty finding workers. The lack of labor caused severe supply shortages, long waits for products, and bare shelves at stores. These conditions spanned 2021 and 2022.

Many argued the labor shortage was temporary and was a result of the Covid-19 pandemic. While the virus was not yet completely controlled, some individuals remained reluctant to return to work, especially for work requiring close personal contact. With school schedules uncertain and childcare facilities not fully recovered, many mothers with young children chose to remain at home

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<sup>1</sup> Frey, Carl and Michael Osborne, “The Future of Employment: How Susceptible Are Jobs to Computerization?”, Oxford University, UK, September 2013.

caring for their children and sometimes engaged in remote education. Strong stock market gains and the trauma of the pandemic may also have accelerated retirements and curtailed the labor supply. Some research suggests significant federal financial assistance provided to households during the pandemic also reduced the labor supply.<sup>2</sup> Last, during the economic shutdown of 2020, numerous workers – especially those in lower-paying jobs – improved their skills and re-entered the labor market capable of moving to better-paying occupations, thereby creating labor reductions for lower-paying occupations. Indeed, long-run employment forecasts suggest fastest growth for occupations requiring more education and paying more.<sup>3</sup>

These explanations and reasoning imply labor constraints will gradually subside as the economy moves beyond the pandemic. While there may be labor shortages in some sectors as labor is re-allocated to faster-growing and better-paying businesses, there will still be an adequate overall level of workers.

Yet there is a contrary viewpoint arguing this optimism is misplaced. Rather than returning to a domestic economy where labor is plentiful and the greatest

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<sup>2</sup> Sumner, Scott, “Unemployment Insurance Reduces Employment,” *Econlib*, August 25, 2021; Corinth, Kevin, Bruce Meyer, Matthew Stadnicki, and Derek Wu, “The Anti-Poverty, Targeting, and Labor Supply Effects of the Proposed Child Tax Credit Expansion,” Becker-Friedman Institute, University of Chicago, Working Paper No. 2021-115, October 2021; Holzer, Harry, R. Glenn Hubbard, and Michael Strain, “Did the Pandemic Unemployment Benefits Reduce Employment? Evidence from Early State-Level Expirations in June 2021”, Working Paper 29575, Boston: National Bureau of Economic Research, February 2022.

<sup>3</sup> Lund, Susan, Anv Madgaurkar, James Manyika, Sven Smit, Kweilin Ellingrid, Mary Meaney, and Olivia Robinson, *The Future of Work After Covid-19*, New York: McKinsey Global Institute, February 2021.

threat to workers is the increasing capability of technology, the future will be one of continuing labor shortages. This condition has been labelled a “sansdemic,” meaning “without people.”<sup>4</sup>

For several years, demographers have warned of slowing population growth, particularly in developed countries.<sup>5</sup> If correct, not only will this trend have major implications for the workforce, but it will also impact institutions like higher education. It could also further polarize the political system by pitting younger tax-paying adults with dwindling numbers against older adults with expanding numbers who are on the receiving side of social programs like Social Security and Medicare.<sup>6</sup>

The fundamental source of the reduced population growth rate is a lower birth rate. Numerous factors have been cited causing the drop in the birth rate, including the high cost of children, delayed child birth due to longer periods of education, improved employment opportunities for women, a lower marriage rate, the reduced practice of religion, and increased urbanization associated with higher living costs.<sup>7</sup>

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<sup>4</sup> Hetrick, Ron, Hannah Grieser, Rob Sentz, Clare Coffey, and Gwen Burrow, “The Demographic Drought,” EMSI, May 2021.

<sup>5</sup> See, for example, Goodhart, Charles and Manoj Pradhan, *The Great Demographic Reversal*, New York: Palgrave-Macmillan, 2020.

<sup>6</sup> See, for example, Grawe, Nathan, *Demographics and the Demand for Higher Education*, Baltimore: Johns Hopkins University Press, 2018; and Kotlikoff, Lawrence and Scott Burns, *The Clash of Generations*, Cambridge, MA: The MIT Press, 2012.

<sup>7</sup> Hetrick, Ron, Hannah Grieser, Rob Sentz, Clare Coffey, and Gwen Burrow, *op. cit.*

Complementing the decline in the birth rate is a declining trend in work among many adults of prime working age (ages 25-54), particularly men. Potential reasons behind this factor include increased incarceration rates, hiring challenges for those with criminal records, low rates of pay for men with modest labor skills, the opioid epidemic and other drug use making users unemployable, the transfer of wealth from “baby boom” parents to “millennial” generation children, and the increase in video-game addictions of young men.<sup>8</sup>

This double-shot of a lower birth rate and lack of labor force participation by some components of the population paint a picture of a labor shortage that could persist well past the end of the Covid-19 pandemic. Without an adequate labor force, economic output could be curtailed and living standards may fall.

The ideas and data cited above for an emerging “sansdemic” in the labor market are from the national level. The situation at the state level, while likely similar, can possibly differ in important ways. This is especially the case for a state like North Carolina, which in recent decades has added significant population by attracting households from other states. Indeed, North Carolina has had one of the highest “net-migration rates” – which measures the net of households moving

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<sup>8</sup> *ibid.*



to the state compared to households moving out of the state – among all states in the country.<sup>9</sup>

Therefore, in order to understand the condition and future of the labor market in North Carolina, and to identify and evaluate policies that can impact the state labor market, it is important to conduct an analysis focusing only on North Carolina. This report presents such an analysis, which is presented in sections 2 through 7 following this Introduction.

The second section, “Condition and Trends in the North Carolina Labor Market,” looks at the status of the state’s labor market and the trends that have created this status. The state’s birth rate, labor force participation rate of significant population groups, net-migration rates of workers from other states, and foreign immigration of workers are examined and compared to similar national trends. The trends and conditions of key societal factors impacting these conditions, such as incarcerations, drug use, and excessive video-gaming, are also investigated.

Using the identified North Carolina labor market trends and conditions, the third section, “North Carolina Labor Market Forecasts,” develops forecasts of labor shortages or surpluses for the state and the state’s major regions for the years 2030 and 2050. These forecasts are based on population projections from the

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<sup>9</sup> Cammenga, Janelle, “Where Did Americans Move in 2020?” *The Tax Foundation*, January 13, 2021.

North Carolina State Demographer and job forecasts from the North Carolina Department of Commerce. The regional forecasts will be important in identifying geographic differences in labor shortages and surpluses.

The fourth section, “The Wildcard of Technology,” reviews the predictions for technological improvements that will impact the labor market. How extensive will be the new technology, when will the developments complement and enhance labor needs, and where will the new technology substitute for labor and thereby reduce labor needs? The answers will be used to forecast changes in the relative sizes of occupations in future decades. Large changes would imply the potential for occupational shortages and surpluses.

State policies that could be used to alter the future labor supply in the state are the focus of the fifth section, “Re-Thinking State Labor Market Policies.” Policies examined include tax credits for workers, support for parents with children, targeted work training for incarcerated individuals so more will participate in work once released, assistance for worker relocation, providing specialized and short-term task training, having the state become more active in matching individuals to jobs, reducing drug abuse among job applicants, and completing the availability of reliable, high-speed internet for the entire state. The policies will be evaluated on their ability to address possible future labor shortages in the state.

While the possibility of a labor shortage can be viewed negatively if it results in slower economic growth and limitations on worker earnings and innovation, some may have an alternative viewpoint. If the economy, workforce, and population in the state grow at lower rates, a potential benefit is a slowing of environmental degradation. The sixth section of the report, “Economic Growth and the Environmental Stewardship: Can We Have Both?” examines this possible trade-off and if there is a logical solution.

The seventh and final section, “Tomorrow’s North Carolina Labor Market,” summarizes the findings from the report that can set the agenda for IEI’s 2023 statewide theme.

### *Major Points*

- In the span of a decade, labor market concern has changed from too few jobs for the number of workers, to too few workers for the number of jobs.
- While numerous factors have been behind this shift, the dramatic decline in the birth rate and lower labor force participation are the leading causes.
- Even if the overall labor force participation rate returns to pre-pandemic levels, focusing on marginal and under-represented groups in the labor force – such as parolees from incarceration and individuals afflicted by

drug and similar abuses – are avenues that should be explored for increasing the future labor force.

- Much analysis has been done about this issue on the national level.

However, circumstances vary among states, so a specific study for North Carolina is needed.

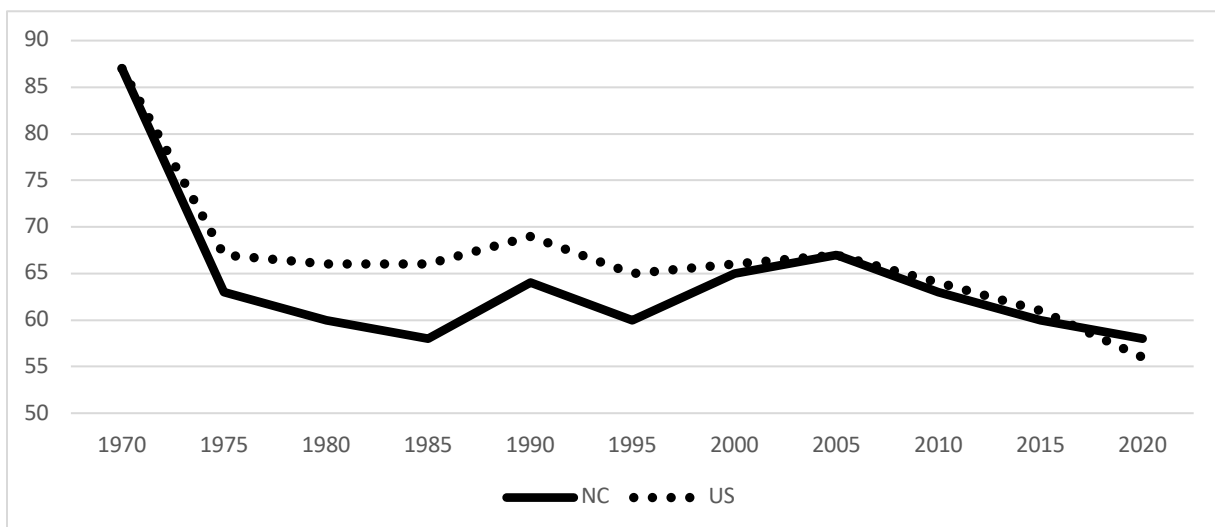
## **2. CONDITION AND TRENDS IN THE NORTH CAROLINA LABOR MARKET**

### *Birth Rate*

The market for any input is determined by the interaction of the supply of and demand for that input. Labor is a key input in the production of many products and services. This section looks at recent trends in the supply and demand of labor in North Carolina.

There are several determinants of a state's labor supply. An obvious key determinant is the birth rate. Figure 1 shows the birth rates in both the country and North Carolina have trended downward since the early 21<sup>st</sup> century. Indeed, this is a trend seen in most countries.<sup>10</sup> Analysts estimate both rates are currently

**Figure 1. Birth Rate (births per 1000 women).**



Source: Carolina Demography; U.S. Census.

<sup>10</sup> Delventhal, Matthew, Jesus Fernandez-Villaverde, and Nezih Guner, "Demographic Transitions Across Time and Space," Claremont McKenna College, University of Pennsylvania, and the University of Barcelona, November 2021.

below the “replacement rate,” which is the birth rate needed to replace deaths and keep the population constant.<sup>11</sup>

A number of reasons have been offered for today’s declining birth rate. The cost of raising children has been rising faster than incomes. From 2001 to 2015, the estimated cost of raising a child to age 18 rose 86%, compared to a 38% increase in median family income.<sup>12</sup> Simple economics suggest that when something becomes relatively more expensive, people will use less of it. Applied to children, the concept means as children become more expensive to the family, families will have fewer children.

Another recent change has been the lengthening of the period of education for young people. In earlier generations, formal education ended at high school. However, in recent decades there has been a significant rise in the percentage of high school graduates who continue their formal education in college. The percentage rose from 45% in 1960 to 60% in 1990 to 69% in 2018.<sup>13</sup> The rise has been even sharper for women, who now are the majority of students in college.<sup>14</sup> A likely result of these trends has been a delay in the average age of marriage, rising three years for men and four years for women this century.<sup>15</sup> This trend has

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<sup>11</sup> Organization of Economic Cooperation and Development, “Fertility,” OECD Factbook, 2016.

<sup>12</sup> Based on available data from the U.S. Bureau of the Census, “Medium Family Income,” and from the U.S. Dept. of Agriculture, “Expenditures on Children by Families.” The U.S. Dept. of Agriculture previously produced estimates of child-rearing costs annually, but ended the program, and the last year of data is for 2015.

<sup>13</sup> *Admissionsly*, December 4, 2021.

<sup>14</sup> *FastCompany*, September 7, 2021.

<sup>15</sup> U.S. Bureau of the Census “Median Year at First Marriage, 1890 to Present,” 2021.

obviously reduced the prime time period for females to typically give birth. These trends have occurred in both the nation and North Carolina, with North Carolina close to the national averages.<sup>16</sup>

Coincidental with their increasing educational credentials, women have continued to expand their presence in occupations previously dominated by men, including positions in leadership and the professions. These wider employment opportunities for women have made the “opportunity cost” – that is, the foregone income - of child-rearing by mothers to be more expensive. Again, applying the economic idea that less is used of something that has become more expensive, the higher opportunity cost of child-rearing would be linked to fewer births.

There may also be some sociological/psychological factors behind the trend of a lower birth rate. Fewer people – especially young people – are attending formal religious services.<sup>17</sup> Attachment to a formal religion often gives members hope for the future and a greater desire to extend the human race. Similarly, and apart from religion, recent surveys of young people show greater apprehension and despair about the future.<sup>18</sup> Logically, such feelings would also reduce desires for having children.

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<sup>16</sup> Payne, Krista, “Median Age at First Marriage: Geographic Variation,” Bowling Green University, Family Profile No. 7, 2019.

<sup>17</sup> Cox, Daniel and Amelia Thomson-DeVeaux, “Millennials Are Leaving Religion and Not Coming Back,” *FiveThirtyEight*, December 12, 2019.

<sup>18</sup> Wray, Britt, “I Have Trouble Envisioning the Future Beyond a Year,” *CNN*, October 29, 2021.

Even if the birth rate has fallen in the recent past, will it continue to contract in the future, or could there be a turnaround? While forecasting demographic trends are problematic, the current thinking is there will be no revival in the birth rate. Rather, the rate could continue to drop. Birth rates have fallen for all ages of women, so even women who delay having children will have fewer than their counterparts in the past.<sup>19</sup> Researchers who have modeled past birth rates and used their results to predict future birth rates forecast the rate could continue to drop through mid-century.<sup>20</sup>

### *Labor Force Participation*

An equally important concept in determining the future labor supply is the labor force participation rate (LFPR). The LFPR measures the percentage of available individuals of working age who are in the labor force, where “in the labor force” means an individual has a job or is actively looking for a job. The U.S. Bureau of Labor Statistics operationalizes “available individuals” as those over age 16 who are *not* active members of the U.S. armed forces, not incarcerated in prisons, jails, or other correctional institutions or detention centers, and not in residential care facilities such as skilled nursing centers.<sup>21</sup>

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<sup>19</sup> Kearney, Melissa and Phillip Levine, “Will Birth in the US Rebound? Probably Not,” *Brookings*, May 24, 2021.

<sup>20</sup> Delventhal, Matthew, Jesus Fernandez-Villaverde, and Nezh Guner, *op. cit.* While this is a national forecast, since North Carolina’s birth rate trend has tracked the national trend, similar reduction could be assumed for the state.

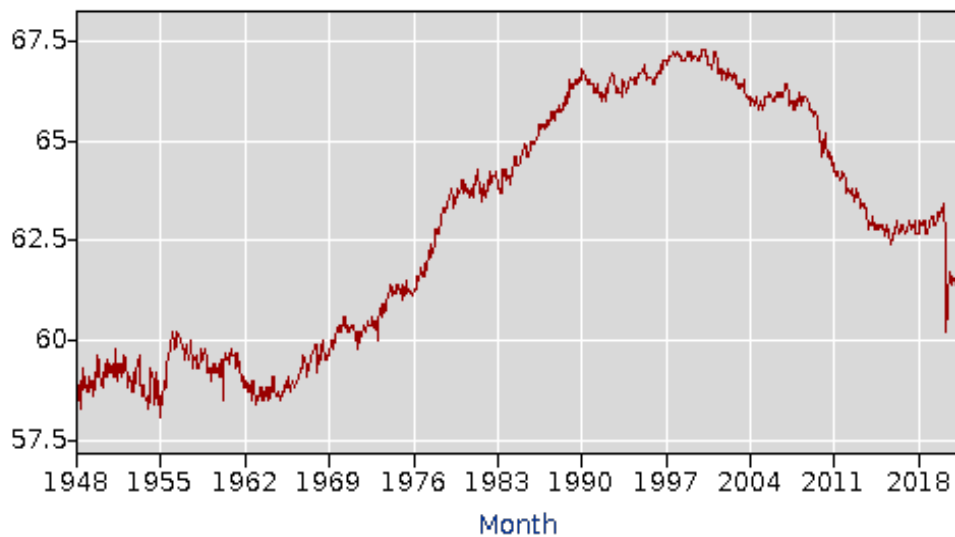
<sup>21</sup> US Bureau of Labor Statistics, “Labor Force Statistics from the Current Population Survey.”



Changes in the LFPR can complement or counter declines in the birth rate. A decline in the LFPR combined with a decline in the birth rate will result in an even larger drop in the labor force. Conversely, an increase in the LFPR combined with a decline in the birth rate will moderate the impact of the birth rate's change on the labor force.

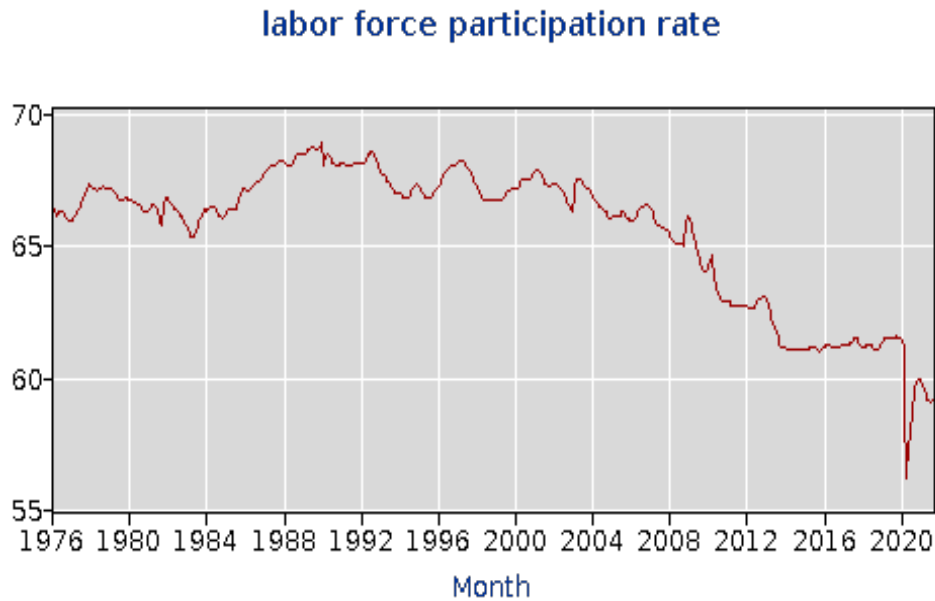
Figure 2 shows trends in the national LFPR since 1948.<sup>22</sup> The increase in the LFPR from the 1960s to the late 1990s reflects the movement of large numbers

**Figure 2. Labor Force Participation, US, 1948-2021 (%).**



<sup>22</sup> Chart is from the U.S. Bureau of Labor Statistics.

**Figure 3. Labor Force Participation Rate, NC, 1976-2021 (%).**



of women, including mothers, into the paid labor force. Numerous factors were behind this move, including a shift in paid work away from tasks requiring strength (which typically favored men), the development and application of more appliances and machinery to housework – thereby reducing the time needed to accomplish these tasks – and the confidence women had gained during World War II in replacing men in a variety of tasks.<sup>23</sup>

However, by the beginning of the 21<sup>st</sup> century, the LFPR began to decline, both in the nation and in North Carolina (Figure 3).<sup>24</sup> Between 1997 and 2019 the

<sup>23</sup> Goldin, Claudia, *Career and Family*, Princeton, NJ: Princeton University Press, 2021.

<sup>24</sup> Chart is from the U.S. Bureau of Labor Statistics.

national LFPR dropped 4.1 percentage points, and the North Carolina LFPR fell 6.5 percentage points.<sup>25</sup> There were further reductions in the LFPR in 2020 as a result of the Covid-19 pandemic. There was some rebound in LFPR in 2021, but at end of the year the LFPR was still at one of its lowest levels in over four decades.

Analysis of individual groups of workers show that the reduction in LFPR has been widespread with one exception - older workers over age 55. The decline has been larger for males than for females, and in terms of age, LFPR is down the most for individuals – both male and female – aged 16 to 24, likely as a result of more youths going on to college after finishing high school. Among racial groups, LFPR has dropped most among Whites, followed by Blacks, and then by Hispanic-Origin individuals who have had the smallest reduction.<sup>26</sup>

### *Net-Migration and Immigration*

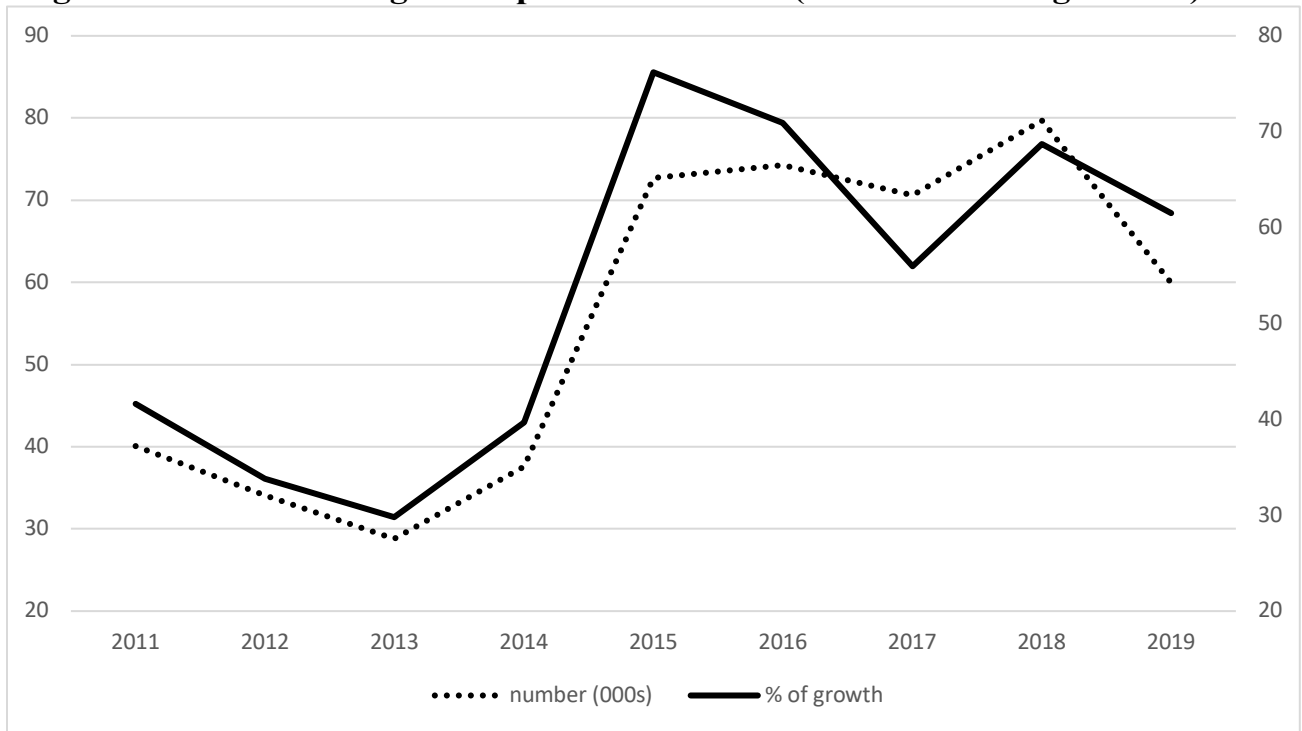
In-migration measures the number of people moving to a state from other states. Out-migration measures the number of people leaving a state to live in another state. Net-migration is the difference between in-migration and out-migration. Net-migration is positive if the number of people moving to a state is greater than the number of people moving out of a state. Positive net-migration

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<sup>25</sup> Measured from July of each year.

<sup>26</sup> U.S. Bureau of Labor Statistics, "Civilian Labor Force Participation Rate by Age, Sex, and Ethnicity," December 2021.

**Figure 4. North Carolina Net-Migration (dotted line and left scale) and Net-Migration as a Percentage of Population Growth (solid line and right scale).**



Source: U.S. Census and author's calculations.

adds to a state's population, while negative net-migration reduces a state's population.

In recent decades North Carolina has experienced positive net-migration.<sup>27</sup> Figure 4 shows both the number of net migrants as well as the percentage those migrants contributed to population growth in the state for years since 2011.<sup>28</sup> The impact of net-migration to state population growth has been substantial. Since 2015, annual net-migration to North Carolina has been between 60,000 and 80,000

<sup>27</sup> Walden, Michael L. *North Carolina Beyond the Connected Age: The Tar Heel State in 2050*, Chapel Hill: The University of North Carolina Press, 2017.

<sup>28</sup> 2019 is the latest year available.

annually. During the same time period, the contribution net-migration made to the state's annual population growth was between 50% and 80%.

Immigration refers to individuals moving to an area – like North Carolina – from a foreign country. Immigration to North Carolina has grown significantly since the late 20<sup>th</sup> century. Between 1990 and 2000 over 315,000 foreign nationals moved to North Carolina. Between 2000 and 2019 another 455,000 foreign nationals relocated to North Carolina.<sup>29</sup>

Figure 5 shows the contribution of each of the components of population change – the difference between births and deaths, net-migration, and immigration - on the state's population growth in the most recent four decades. The key take-away is the dominance of net-migration. From the 1990s to the 2010s, the share from net-migration has trended upward, while the shares from births minus deaths and immigration have fallen.

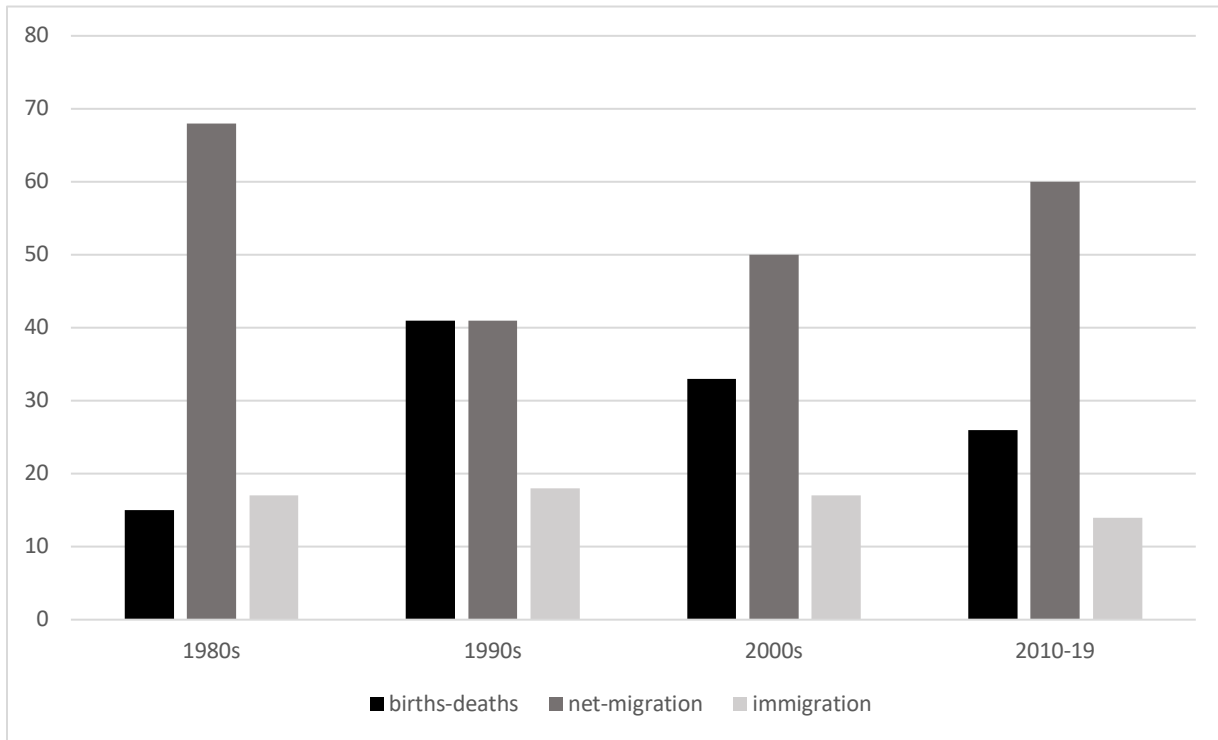
#### *Limits on the Labor Force: Incarnations, Drug-Use, Video-Gaming, Retirements*

The labor force can also be adversely impacted by institutional, medical, behavioral, and life-stage factors that preclude people from working. Four such factors are incarcerations that remove individuals from freely participating in society, excessive drug use that results in deaths, an inability to function, or

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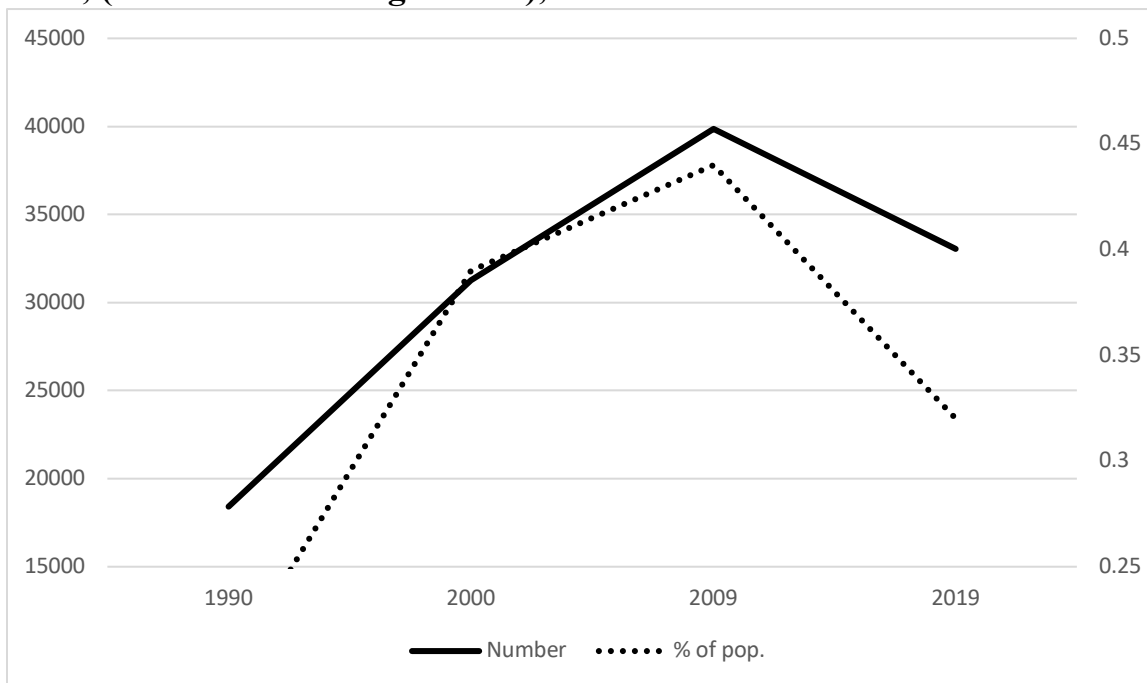
<sup>29</sup> Immigration Policy Institute, State Immigration Data Profiles.

**Figure 5. Contributions to North Carolina’s Population Growth (%).**



Sources: Walden, *North Carolina Beyond the Connected Age*; Figure 4.

**Figure 6. Incarcerated Population (solid line and left scale) and Incarcerated Rate, (dotted line and right scale), North Carolina.**



Source: U.S. Census and author’s calculations.

denial of jobs, excessive video-gaming leading to an addiction and eliminating proper participation in the labor force, and retirements.

Figure 6 shows trends in the number of incarcerated individuals and the incarceration rate (incarcerated individuals as a percent of the population) since 1990 in North Carolina. Both the number and rate of incarcerations rose from 1990 to 2009, reaching a peak of 40,000 and a rate of 0.44% in 2009. But since 2009, both the number and rate have fallen. In 2019, 33,000 individuals were incarcerated and the rate of incarceration was 0.32%. Still, if the 33,000 prisoners were added to the labor force in 2019, the state's labor force would have increased by 0.6%.

Also, it is estimated that at any point in time, 5.1% of the state's population will be in prison or will have been previously incarcerated.<sup>30</sup> This means that in 2020, the current and previous prison population in the state was near 530,000. Studies show that prison parolees have unemployment rates over five times higher than the general population.<sup>31</sup> This implies that employment in the state could increase by 110,000 if previously imprisoned individuals had the same jobless rate as non-parolees.<sup>32</sup>

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<sup>30</sup> Bonczar, Thomas and Allen Beck, "Lifetime Likelihood of Going to State or Federal Prison," U.S. Department of Justice, March 1997.

<sup>31</sup> Couloute, Lucius and David Kopf, "Out of Prison and Out of Work: Unemployment Among Formerly Incarcerated Persons," *Prison Policy Initiative*, July 2018.

<sup>32</sup> Based on an overall unemployment rate of 5%.

The abuse of drugs (including alcohol) have three adverse impacts on the labor force. First, deaths from excessive drug use remove individuals who could be potentially working. Second, drug abusers who survive may be incapable of working or, if they do work, often work less productively. Third, drug abusers may simply be denied or overlooked for work by company policies.

Using the latest available data for 2019, it is estimated that 23% of the 96,000 deaths in the state was due to drug abuse.<sup>33</sup> Using the average labor force participation rate, this means almost 60,000 could have been added to the labor force that year. Research also shows individuals abusing drugs have an unemployment rate 3.5 times higher than the general population. Applying this higher unemployment rate to data for the number of North Carolinians abusing drugs suggests 15,000 individuals in North Carolina are unemployed due to drug abuse.<sup>34</sup>

The development of video-gaming has presented the possibility of a new kind of addiction. Video-gaming usage has gradually trended upward, with average daily usage now over 1 hour. An estimated 150 million Americans play video games.<sup>35</sup> While the impacts on education and employment are only

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<sup>33</sup> Blanchard Institute, *North Carolina Drug and Alcohol Abuse Statistics*; North Carolina State Center for Health Statistics, *Vital Statistics*.

<sup>34</sup> The Blanchard Institute, *op. cit.*; Badel, Alejandro and Brian Greaney, "Exploring the Link between Drug Use and Job Status in the U.S.," Federal Reserve Bank of St. Louis, July 2013. A base unemployment rate of 5% is used in the calculation.

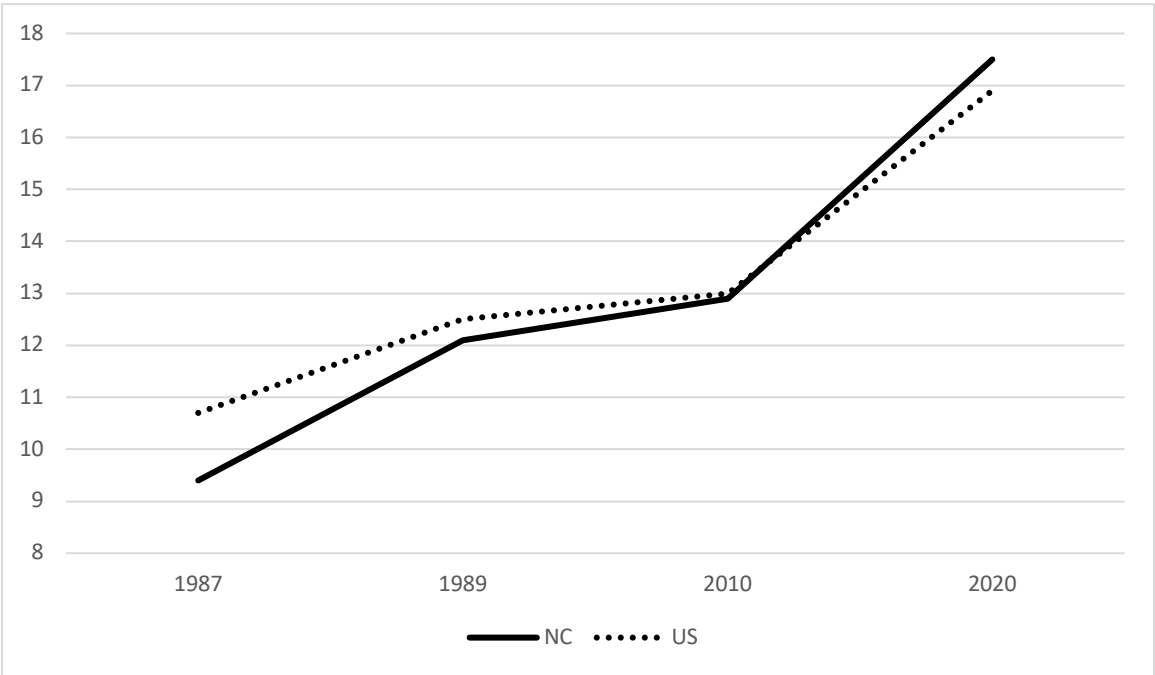
<sup>35</sup> The Recovery Village, "Video Game Addiction Statistics."



beginning to be understood, clearly excessive video-gaming presents another challenge for the labor force.

With aging of the population, labor force participation of the elderly – defined as those age 65 and over – becomes more important. Figure 7 shows this realization can be even more significant in North Carolina as the share of the elderly population has grown faster in the state than in the nation. While traditionally the share of the elderly population was smaller in North Carolina than in the country, the reverse is now the case – in 2020 North Carolina’s elderly were 17.3% of the state’s population compared to 16.9% at the national level. The shift

**Figure 7. Elderly Population Share in North Carolina and the US, (%).**



Source: U.S. Census.

is likely due to the improved mobility of the elderly and the increased attractiveness of North Carolina as a location for retirees.

The labor force participation (LFPR) of the elderly has also become more important to the economy. While LFPR of the total workforce has been falling (see Figures 2 and 3), LFPR has been rising for the 65 and older group. The LFPR of those aged 65 to 74 rose from 17.5% in 1996 to 23.6% in 2006 to 26.8% in 2016, with a projection of 30.2% in 2026. Similarly, the LFPR of those 75 and older increased from 4.7% in 1996 to 6.4% in 2006 to 8.4% in 2016, with a forecast of 10.8% in 2026.<sup>36</sup> Interestingly, in the 21<sup>st</sup> century, the majority of elderly workers have chosen full-time work over part-time work.<sup>37</sup>

### *Major Points*

- A lower birth rate has made North Carolina more dependent on net-migration from other states, as well as immigration of foreign nationals to the state, in order to grow the future workforce.
- With experts forecasting no turnaround in the birth rate – and, indeed, possibly additional reductions in the rate – the future of the state’s

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<sup>36</sup> U.S. Department of Labor, TED: The Daily Economist, “Labor Force Participation Rate for Workers Age 75 and Over Projected to be 10% by 2026,” May, 2019.

<sup>37</sup> Leonosio, Michael, Benjamin Bridges, Robert Gesumaria, and Linda Del Benes, “The Increasing Labor Force Participation of Older Workers and Its Effect on the Income of the Elderly,” *Social Security Bulletin*, Vol. 72, No. 1, 2012.

workforce will increasingly depend on decisions of workers outside the state to move to North Carolina.

- The labor force participation rate has been declining in the 21<sup>st</sup> century. The reduction in working has been widespread across all groups with one notable exception – elderly persons. Hence, even if North Carolina gains in the population of work-eligible individuals, there's no assurance those individuals will add to the workforce.
- On top of these challenges are additional workforce issues related to incarcerations and the capabilities of individuals who abuse drugs or video games to engage in work. If individuals in these categories could be employed at the same rate as the general population, the North Carolina workforce would increase by 185,000, equivalent to a 4% increase in the workforce in 2022.
- Hence, projecting the future size of the North Carolina workforce is not simply a matter of counting individuals who are of working age. It involves numerous other factors that can be impacted by public policy.

### **3. NORTH CAROLINA LABOR MARKET FORECASTS**

#### *State Population Projections*

Official population forecasts for North Carolina through 2050 are available from the State Demographer. The State Demographer makes the forecasts based on a number of factors and trends. Projections are initially made for each county, with the state total being the sum of the individual county populations. This process means existing population trends within the state – such as population growth in urban counties and population decline in many rural counties – are generally forecasted to continue.<sup>38</sup>

Table 1 gives the official total population forecasts as well as forecasts by age group and gender through 2050. Figure 8 shows these total (both genders combined) in a graph, and Figure 9 shows the age group forecasts in terms of their share of the total population.

Table 1 and Figure 8 show North Carolina’s total population is forecasted to grow from 10.5 million in 2020 to 13.8 million in 2050, a 31% increase. Also, all age components are projected to increase in numbers. The biggest numerical and percentage gain is for the oldest group aged 65 and over, which is expected to add 1.3 million individuals from 2020 to 2050, a 76% increase. Closely following

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<sup>38</sup> Demographic and Economic Analysis Section, North Carolina Office of State Budget and Management, “Projected Population of the State of North Carolina and North Carolina Counties for July 1, 2020 through July 1, 2050,” released February 2022.

**Table 1. North Carolina Population and Forecasts.**

	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>
<b>Total</b>	10,456,593	11,527,150	12,669,133	13,824,955
<b>Female</b>	5,381,754	5,948,244	6,551,406	7,160,226
<b>Male</b>	5,074,839	5,578,906	6,117,727	6,664,729
<b>Ages 0-15</b>	1,992,214	2,039,064	2,245,900	2,392,958
<b>Female</b>	976,693	997,125	1,099,837	1,173,264
<b>Male</b>	1,015,521	1,041,939	1,146,063	1,219,694
<b>Ages 16-24</b>	1,297,866	1,348,619	1,357,162	1,508,966
<b>Female</b>	631,171	656,090	658,802	735,547
<b>Male</b>	666,695	692,529	698,360	773,419
<b>Ages 25-54</b>	4,096,459	4,473,941	4,928,096	5,289,312
<b>Female</b>	2,098,790	2,290,063	2,508,356	2,688,321
<b>Male</b>	1,997,669	2,183,878	2,419,740	2,600,991
<b>Ages 55-64</b>	1,332,635	1,369,277	1,468,239	1,658,679
<b>Female</b>	697,816	716,803	782,877	879,066
<b>Male</b>	634,819	652,474	685,362	779,613
<b>Ages 65 &amp; +</b>	1,737,419	2,296,249	2,669,736	2,975,040
<b>Female</b>	977,284	1,288,163	1,501,534	1,684,028
<b>Male</b>	760,135	1,008,086	1,168,202	1,291,012

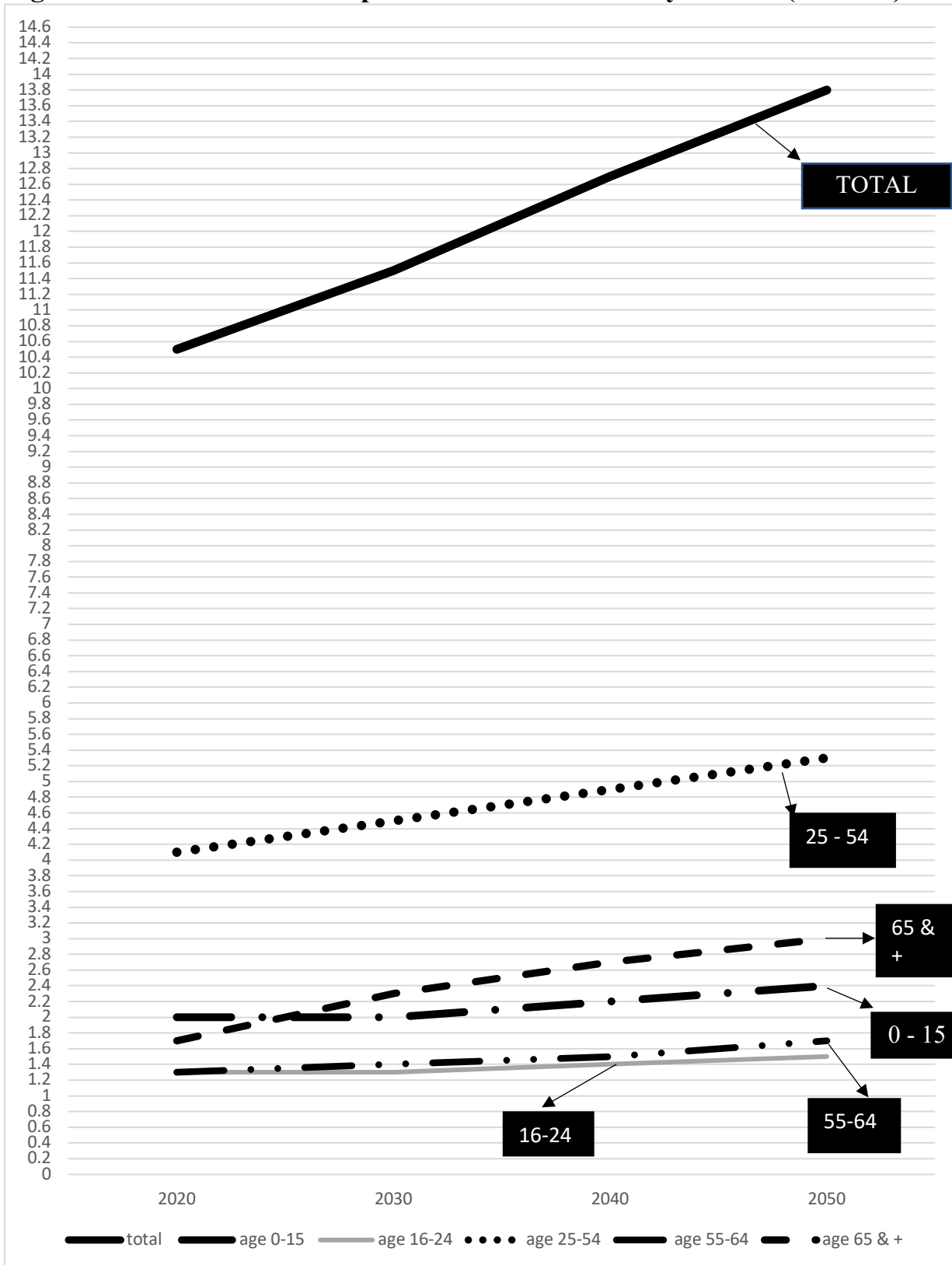
Source: Demographic and Economic Analysis Section, North Carolina Office of State Budget and Management.

are the 25-54 age group, adding 1.2 million individuals and growing 29% between 2020 and 2050. Importantly this is the prime working age group. Those nearing elderly status (age 55-64) will add 400,000 people, a 31% increase. The youngest age groups, ages 0-15 and 16-24, will have small numerical increases and the lowest percentage gains, reflecting the declining birth rate forecasted for the state.

The same data are shown in a different way in Figure 9. Here the sizes of the age groups are presented as a percentage of the total population. There are three major conclusions. First, the prime working age group – individuals aged 25-54 – will decline slightly as a percentage of the population, from 39.2% in 2020 to 38.3% in 2050. Second, the oldest age group, those age 65 and older, will significantly increase their share of the population from 16.6% in 2020 to 21.5% in 2050. Third, the other two age groups, ages 16-24 and 55-64, are expected to have modest reductions in their portions of the total population. In short, North Carolina's population will age between 2020 and 2050.

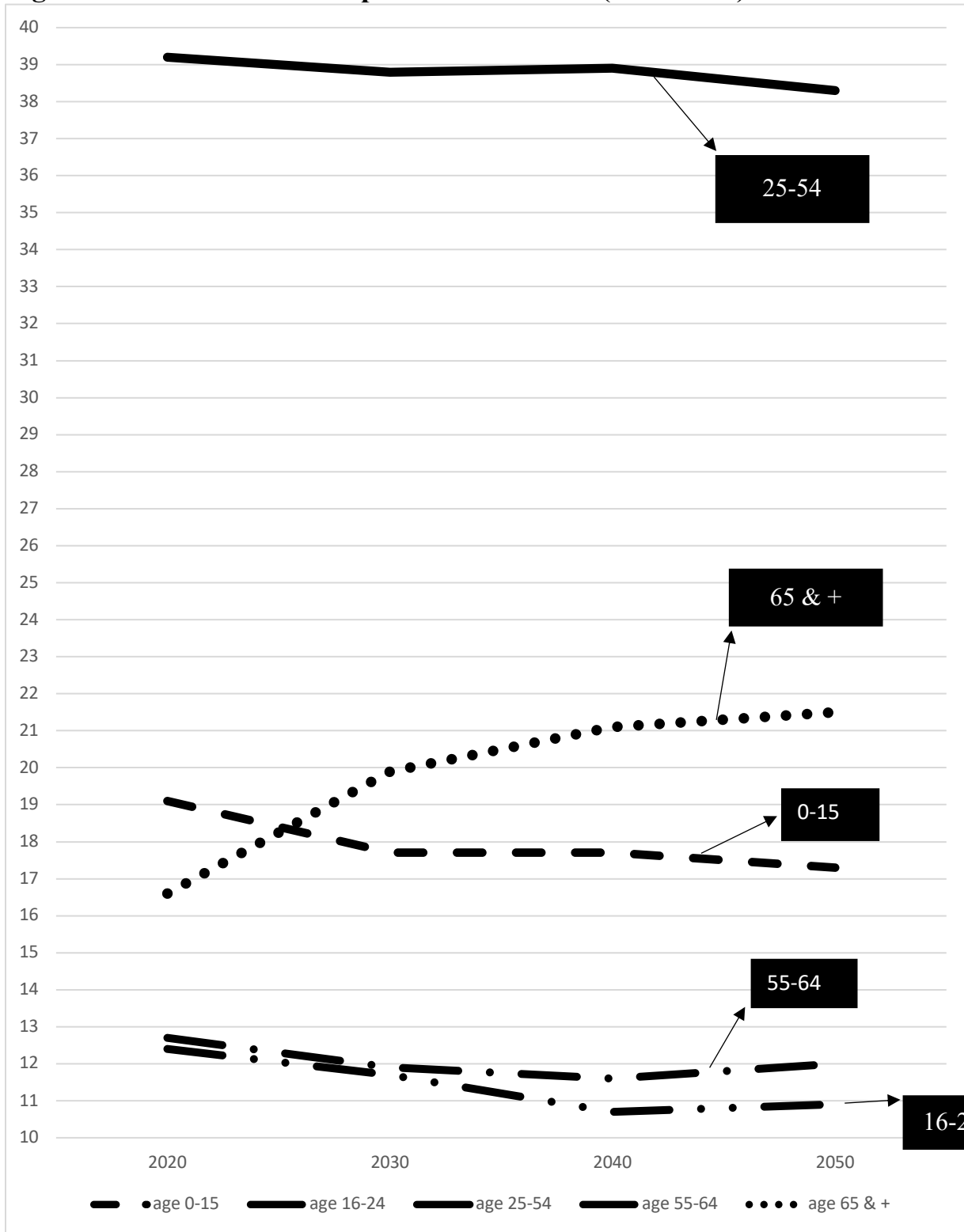
There will also be significant differences in population growth by racial/ethnicity groups, which will be reflected in each group's share of the total population. From 2020 to 2050, Non-Hispanic Whites' share of the population will drop from 61% to 52%, Non-Hispanic Non-Whites' share will increase from 28% to 34%, Hispanic Non-Whites' percentage will double from 2% to 4%, and

**Figure 8. North Carolina Population and Forecasts by Decade (millions).**



Source: Demographic and Economic Analysis Section, North Carolina Office of State Budget and Management.

**Figure 9. North Carolina Population Forecasts (% of total).**



Source: Demographic and Economic Analysis Section, North Carolina Office of State Budget and Management.



Hispanic Whites' share will rise from 9% to 10%. Appendix A gives details for population projections based on age, gender, ethnicity, and race.

### *State Labor Force Projections*

To move from forecasted population numbers to forecasted labor force numbers requires a projected labor force participation rate (LFPR) for each age group. The U.S. Bureau of Labor Statistics has forecasted LFPRs for age groups in 2030.<sup>39</sup> To derive LFPRs for 2050, the LFPR trends for 2010 to 2030 are applied to the 2030 rates.

Table 1 gives the actual LFPRs by age group and gender for 2019 and the forecasted rates for 2030 and 2050. The 2019 rates are from the U.S. Census' annual American Community Survey. Values for 2019 are used rather than for 2020 due to the unusual economic circumstances in 2020 as a result of the pandemic. The forecasted rates for the state in 2030 follow trends in the national rates as projected by the U.S. Bureau of Labor Statistics. The forecasted LFPRs for 2050 are developed by applying the same trends in the gender and age-specific LFPRs between 2010 and 2030 to the time period 2030 to 2050.

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<sup>39</sup> U.S. Bureau of Labor Statistics, "Civilian Labor Force Participation by Age, Sex, Race, and Ethnicity."

**Table 2. Actual (2019) and Forecasted (2030, 2050) North Carolina Labor Force Participation Rates by Age Group (%).**

	<b>2019</b>	<b>2030</b>	<b>2050</b>
<b>Ages 16-24</b>			
<b>Female</b>	57.3	48.0	45.3
<b>Male</b>	61.3	50.2	43.0
<b>Ages 25-54</b>			
<b>Female</b>	77.2	75.2	76.1
<b>Male</b>	88.9	88.0	85.3
<b>Ages 55-64</b>			
<b>Female</b>	58.4	62.4	67.5
<b>Male</b>	70.1	71.5	74.0
<b>Ages 65 &amp; +</b>			
<b>Female</b>	13.3	18.2	24.9
<b>Male</b>	22.4	32.2	39.5

Source: American Community Survey; U.S Bureau of Labor Statistics, “Civilian Labor Force Participation by Age, Sex, Race, and Ethnicity; author’s calculations.

It’s instructive to pause and examine the trends in Table 2. If the forecasts are accurate, there will be a significant decline in the LFPR for the youngest workers, age 16-24. The LFPR in 2050 will be 20% less for females and 30% less for males than their levels in 2019. Several studies have examined this trend and concluded numerous factors to be responsible for the results, including increased productivity of low-skilled jobs, the emergence of elderly and retired workers competing with younger workers, the extension of formal education beyond high

school, the greater availability of financing for college educations, and the improved financial position of households with children.<sup>40</sup>

The LFPR for the prime working age range, ages 25-54, also shows a decline, but a much more modest one. Again, assuming the accuracy of the projections, there will be a 1% decline for females and a 4% decline for males in the LFPR between 2019 and 2050. Although these changes appear minor, they apply to the largest – by far – population group.

The older two age categories are forecasted to experience an upward trend in LFPR. The population group from ages 55 to 64 is expected to have a 16% gain in the LFPR for females and a 6% gain for males between 2019 and 2050. The oldest – but smallest - population group for ages 65 and higher is projected to experience an 87% jump in LFPR for females and an 76% increase for males. Better health, the decline in traditional (defined-benefit) retirement plans, and the reduced physicality of jobs are some of the reasons thought to be behind these trends.<sup>41</sup>

The populations in Table 1 can be combined with the LFPRs of Table 2 to generate forecasts of the North Carolina labor force in both 2030 and 2050. The results are in Table 3. In 2030 the state is forecasted to have a labor force of

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<sup>40</sup> Reeves, Richard and Eleanor Krause, “Why Are Young, Educated Men Working Less?” *Brookings Institution*, February 23, 2018; Abraham, Katherine and Melissa Kearney, “Explaining the Decline in the U.S. Employment to Population Ratio: A Review of the Evidence,” National Bureau of Economic Research, Working Paper 24333, February 2018.

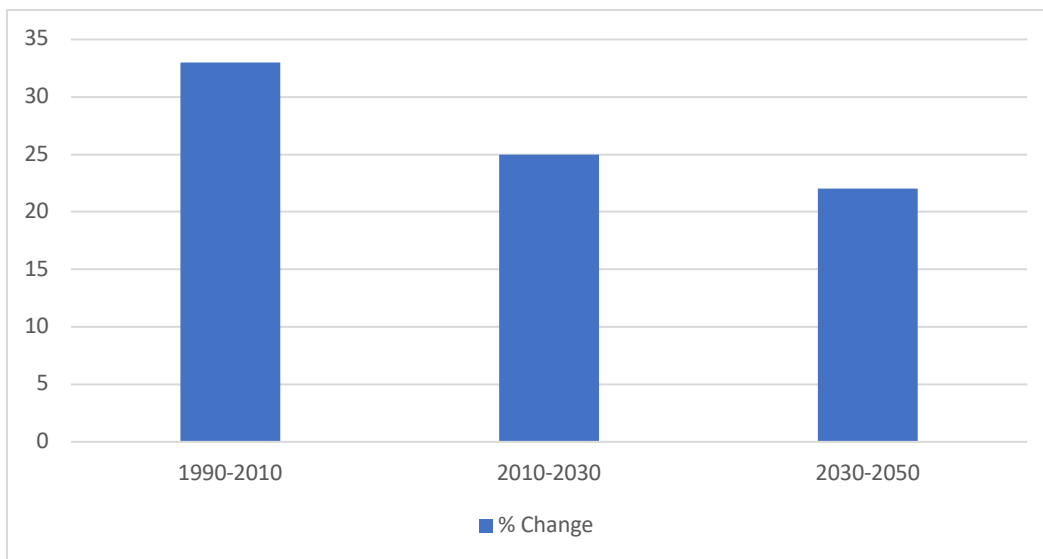
<sup>41</sup> Yoe, Jonathan, “Why Are Older People Working Longer,” U.S. Bureau of Labor Statistics, July 2019.

**Table 3. North Carolina Labor Force Forecasts, 2030, 2050.**

	<b>2030</b>	<b>2050</b>
<b>Ages 16-24</b>		
<b>Female</b>	314,923	333,203
<b>Male</b>	347,650	332,570
<b>Ages 25-54</b>		
<b>Female</b>	1,722,127	2,045,812
<b>Male</b>	1,921,813	2,218,645
<b>Ages 55-64</b>		
<b>Female</b>	447,285	593,369
<b>Male</b>	466,519	576,914
<b>Ages 65 &amp; +</b>		
<b>Female</b>	234,446	419,323
<b>Male</b>	324,604	509,950
<b>Total</b>	<b>5,779,367</b>	<b>7,029,786</b>

Source: Tables 1 and 2.

**Figure 10. Actual and Projected Growth Rates in North Carolina’s Labor Force (20-Year Percentage Change).**



Source: Table 3 and U.S. Bureau of Labor Statistics.

almost 5.8 million, and in 2050 the total labor force is projected to be near 7 million.

In 2010, the state's labor force was 4,631,078, meaning the projected labor force of 5,779,367 in 2030 represents a twenty-year gain of 25%. The forecasted labor force of 7,029,786 in 2050 is a 22% twenty-year gain over 2030. From 1990 to 2010, North Carolina's labor force increased 33%. So, the state's labor force will expand, but at a slower pace in upcoming decades (Figure 10).

### *State Job Projections*

The next step is to examine job projections for North Carolina. The state's Department of Commerce makes long-term employment forecasts, as does the federal Congressional Budget Office (CBO). The state's forecasts imply an aggregate employment total of 5,157,023 in 2030.<sup>42</sup> The CBO estimates are for the nation. CBO's national growth rate in employment is augmented with the rate by which North Carolina's job growth rate has exceeded the national rate in the 21<sup>st</sup> century to develop a growth rate for North Carolina. Applying this rate results in a total state employment of 5,086,508 in 2030. The two estimates differ by only 1.4%. An average of 5.1 million jobs in 2030 is used.

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<sup>42</sup> The state forecasts are limited to 2028. The implied annual growth rate from 2018 to 2028 is used to extend the forecast to 2030 (North Carolina Department of Commerce, "Employment Projections").

The estimate of 5.1 million jobs in North Carolina in 2030 can serve as a base to project the level of jobs in 2050. While tenuous due to the length of the projection and the unknown factors impacting the economy over the next 30 years, a baseline forecast can be derived. Applying the forecasted growth rate in jobs in North Carolina over the 2010-2030 period to the 2030-2050 period yields a forecast of 6,273,000 million aggregate jobs in the state in 2050.<sup>43</sup>

### *State Surplus or Shortage?*

While keeping in mind that forecasts can be incorrect, the projections for the labor force and the employment that the labor force will support in North Carolina appear to be encouraging. In 2030, a labor force of 5.8 million is available to support a job total of 5.1 million. Likewise, in 2050, a labor force of 7 million is forecasted to be available to support a job total of 6.3 million. In both years, it would appear there would be an ample labor force for the employment levels. In 2030, the forecasted labor force exceeds forecasted employment by 12%; in 2050, the surplus of labor force over employment is 10% (Table 4).

However, the labor force includes not only those working, but also those who are not working but are looking for work. Some of these individuals may be looking for work because they lost their previous job. Others may be voluntarily

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<sup>43</sup> The forecast uses the household survey level of employment in the state in 2010 for the beginning point of the forecast.

**Table 4. N.C. Labor Force and Employment Comparisons, 2030, 2050.**

	<b>Forecasted Labor Force</b>	<b>Forecasted Employment</b>	<b>% Surplus</b>	<b>Surplus with 7% “Slack Requirement”</b>
<b>2030</b>	5.8 million	5.1 million	12%	5%
<b>2050</b>	7.0 million	6.3 million	10%	3%

Sources: Table 3; North Carolina Department of Commerce.

not working as they look for better employment opportunities, or are relocating to a different location. This “slack” – as I term it – in the labor force is important in the reallocation of workers as the economy changes.

“Slack” is not insignificant. Using monthly data for North Carolina in the 21<sup>st</sup> century, “slack” – that is, the percentage difference between the labor force and employment – averages 7%. Incorporating “slack” as a needed component of the labor force, Table 4 shows a labor force surplus of 5% in 2030 and of 4% in 2050.

Therefore, it could be concluded that North Carolina will not face a labor shortage in upcoming decades. However, this conclusion is based on numerous long-run assumptions about population growth, net-migration, labor force participation, and employment trends. With minor variations in these assumptions and forecasts, the conclusion of a labor surplus could be significantly changed. For example, if the average forecasted labor force participation rate is 12% or more

lower in 2030, or 10% or more lower in 2050, then statewide labor market shortages would exist in both years.

Yet, even if a statewide labor surplus does occur in the future, there could still be regional shortages. That is, the geographical distribution of labor availability may not match the geographic distribution of jobs. Examining this possibility is the topic of the next section.

### *Regional Analysis*

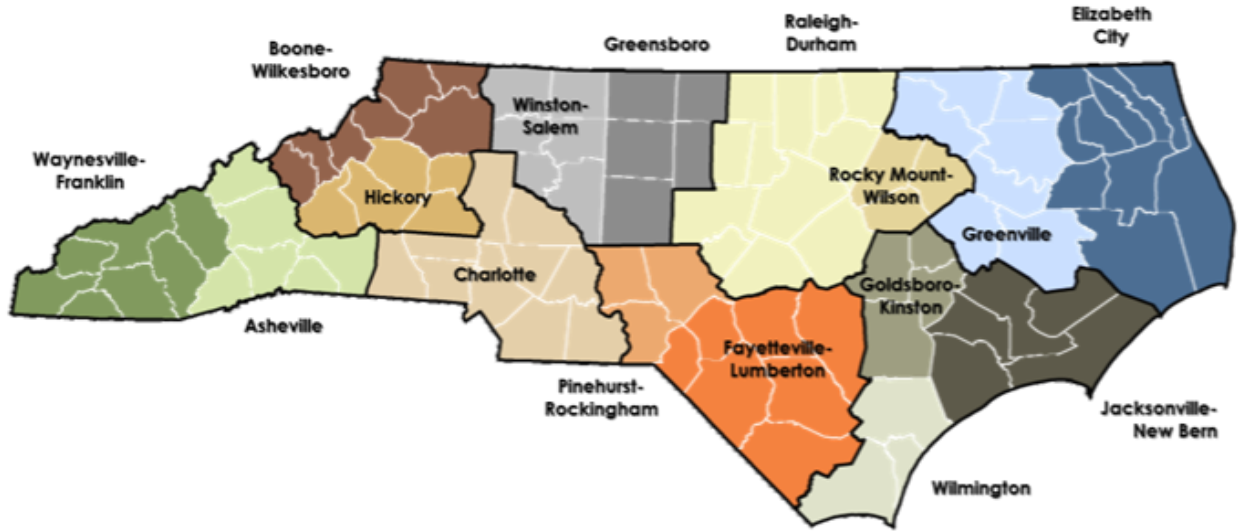
The above methodology and analysis are repeated for regions in North Carolina. While North Carolina's economy has been rapidly expanding in recent decades, the expansion has not been geographically even. Metropolitan areas and counties surrounding metropolitan counties have experienced strong growth, while most rural regions have had much slower growth. Indeed, some rural regions have had negative growth.

Therefore, labor force projections and employment projections are estimated for regions in the state. The regions are those defined by the North Carolina Department of Commerce in their employment projections and are shown in Figure 11. The member counties for each region are listed in Appendix A.

Table 5 presents the regional results. Several interesting conclusions are found. Not accounting for labor force "slack," most regions are expected to have labor supply sufficient for employment in both 2030 and 2050. However, the



**Figure 11. North Carolina Regions**



**Table 5. Labor Force and Employment for NC Regions, 2030, 2050.**

Region	2030			2050		
	Labor Force	Employment	Net	Labor Force	Employment	Net
Waynesville-Franklin	113,866	78,947	34,919	132,646	58,319	74,327
Asheville	264,978	250,927	14,051	335,429	317,197	18,232
Hickory	222,235	194,277	27,958	246,105	182,307	63,798
Boone-Wilkesboro	106,524	88,081	18,443	120,856	87,842	33,014
Charlotte	1,326,765	1,406,926	<b>-80,161</b>	1,776,274	2,008,085	<b>-231,811</b>
Winston-Salem	403,036	337,931	65,105	460,270	384,288	75,982
Greensboro	522,048	469,433	52,615	621,170	476,814	144,356
Raleigh-Durham	1,339,319	1,240,052	99,267	1,711,776	1,724,687	<b>-12,911</b>
Rocky Mount-Wilson	162,046	103,484	58,562	157,399	77,209	80,190
Pinehurst-Rockingham	108,452	79,317	29,135	125,412	81,858	43,554
Fayetteville-Lumberton	323,888	257,122	66,766	324,849	225,079	99,770
Greenville	126,863	154,772	<b>-27,909</b>	150,613	140,010	10,603
Elizabeth City	113,248	66,841	46,407	110,275	49,263	61,012
Goldsboro-Kinston	167,112	103,767	63,345	172,900	74,382	98,518
Jacksonville-New Bern	217,709	135,732	81,977	246,514	126,449	120,065
Wilmington	261,278	197,566	63,712	337,298	259,211	78,087
<b>State Total</b>	<b>5,779,367</b>	<b>5,156,175</b>	<b>614,192</b>	<b>7,029,786</b>	<b>6,273,000</b>	<b>756,786</b>

Source: calculations by author.

opposite is the case for Charlotte in both 2030 and 2050, Raleigh-Durham in 2050, and Greenville in 2030 (**bold** entries). Also, although Asheville has a surplus labor supply, the size is very small. If a 7% slack threshold is used as needed for labor market adjustments, then Asheville in both years and Greenville in 2050 also fall in the shortage category.

The implication is there will be opportunities for the transfer of labor supply between regions in North Carolina in upcoming decades. Examining the columns labelled “Net” suggests Jacksonville-New Bern, Fayetteville-Lumberton, Winston-Salem, Wilmington, and Goldsboro-Kinston have the largest numerical surpluses. The finding that the location of labor supply in the state may need to be geographically rebalanced in the future has implications for public policy, a point that will be addressed in the fifth section of the report.

Before leaving this section, it is important to emphasize how tentative and speculative the analysis is for regional employment and labor supply. The same caveats apply as was discussed for the statewide analysis, except that the caveats are stronger due to the smaller geographic areas of the regions. Specifically, we don't exactly know how technological advances might change the geographic distribution of jobs and workforce in the state. For example, if remote connections are enhanced, or even more boldly, if virtualization is perfected, then locations of work and residence will be less important. In North Carolina, such developments

could spark faster economic growth in more rural regions and slower economic growth in metropolitan areas. Also, individuals in slow-growing or declining regions may pre-emptively move and consequently reduce the labor surpluses in those regions while also reducing labor shortages in fast-growing regions.

### *Major Points*

- Using population forecasts from the North Carolina State Demographer and labor force participation rate forecasts from the U.S. Bureau of Labor Statistics, the North Carolina labor force will increase to 5.8 million in 2030 and 7 million in 2050.
- Using employment forecasts from the North Carolina Department of Commerce, these statewide labor forces will be sufficient to supply needed labor to jobs.
- However, looking at both labor force and employment forecasts for regions within North Carolina, several regions are expected to have labor shortages or small labor force surpluses in upcoming decades, while other regions will have significant labor force surpluses.
- The implication is there will be a need for large labor supply movements from labor surplus regions to labor shortage regions to supply all of North Carolina's expected future jobs.

#### **4. THE WILDCARD OF TECHNOLOGY**

##### *Importance of Worker Productivity*

The productivity of workers is an important part of the labor force, the economy, and society's standard of living. Workers with higher productivity – meaning they produce more output (products or services) – are paid more because they are more valuable to employers. Because more productive workers generate more output, they make the economy larger. Last, since more productive workers are paid more and make the economy larger, a higher societal standard of living is associated with greater productivity.

There have been significant labor productivity improvements in the country and in North Carolina in the 21<sup>st</sup> century. Table 6 shows the percentage gains in labor productivity for all national economic sectors combined (Total US Economy), all North Carolina economic sectors combined (Total NC Economy), and for individual North Carolina sectors.

Both the nation and North Carolina had economy-wide labor productivity gains over 20%. In North Carolina, all but three sectors (construction, leisure and hospitality, and personal services) experienced gains in labor productivity. Importantly, the three sectors without gains are all heavily labor intensive and are in activities that have experienced relatively little application of technology and

**Table 6. Labor Productivity Improvements in the US, North Carolina, and North Carolina Sectors, 2000-2019.**

<b>Sector</b>	<b>Percentage Change</b>
<b>Total US Economy</b>	26.9
<b>Total NC Economy</b>	23.4
<b>NC Construction</b>	-18.9
<b>NC Manufacturing</b>	78.6
<b>NC Trade, Transportation, &amp; Utilities</b>	23.2
<b>NC Information</b>	213.5
<b>NC Finance</b>	40.2
<b>NC Professional Services</b>	43.8
<b>NC Education &amp; Health</b>	11.5
<b>NC Leisure &amp; Hospitality</b>	-5.3
<b>NC Personal Services</b>	-21.3

Source: U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics.

automation.<sup>44</sup>

Improving labor productivity is one way to cope with labor shortages, as higher labor productivity means fewer workers are needed to produce each unit of output.<sup>45</sup> There are two main ways to improve labor productivity – through worker education and training resulting in better skills, and through technology which, when combined with workers, makes each worker more productive. I will address education and training in a later section of this report. The following section focuses on technology.

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<sup>44</sup>Changali, Srman, Azan Mohammad, and Mark van Nieuwland, *The Constructive Productivity Imperative*, Washington, DC, McKinsey Company, June 2015.

<sup>45</sup> Due to the difficulty of forecasting factors, such as technology, that improve labor productivity, changes in labor productivity are typically not used to determine future labor force requirements.

## *From Threat to Savior*

Recent technological improvement has been driven by the computer revolution. Mainframe computers, then desktop and laptop computers, and now smartphones, are allowing individuals to manipulate and access large amounts of data, run sophisticated analyses, and interact instantaneously with individuals, firms, and institutions worldwide. These technologies have expanded the capabilities of workers and – in many cases – allowed employers to downsize their workforce. Indeed, the worry a mere decade ago was that continued technological advancements would reduce labor needs so dramatically that the unemployment rate would rise to significantly higher levels. The question then would become, how would permanently unemployed workers be supported, and what would they do with their time?<sup>46</sup>

Whether technology helps or harms human labor depends on whether the technology is a complement to human work or a substitute to that work. Technology that is complementary to human labor makes the labor more valuable and should increase the employment of humans who are paired with the technology. An example is human-directed warehouse picking machines, which allow workers to store and retrieve products much faster than if totally done by

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<sup>46</sup> Stettner, Andrew, “How to Respond to Job Losses from Technology, Trade, and Policy Choices,” New York, The Century Foundation, October 2019.

only human power. The use of humans to operate the machines would rise as managers see productivity increase.

In contrast, technology that directly substitutes for human effort would reduce employment. Continuing the previous example, while companies will use more labor trained to operate the warehouse pickers, the same companies will likely reduce the use of labor storing and retrieving products the “old fashioned way” – through brute human power.

Research shows technology is more likely to be complementary for more educated, more skilled, and higher-paid workers, and is more likely to be a substitute for less educated, less skilled, and lower-paid workers. Hence, advances in labor market technology and automation could increase income inequality.

Still, if technology and automation expand the aggregate standard of living, then total jobs could easily expand. Hence, further developments in labor market technology and automation may not be a solution for labor shortages; indeed, such advances could exacerbate the shortages, while at the same time reallocating where jobs occur.

#### *Job Reallocation: Where and How Much?*

The best forecast for North Carolina may therefore be for continued growth in employment but with a redistribution of where those jobs occur. North Carolina

may therefore face a dual challenge: attracting enough workers in total, and attracting or developing workers to those economic sectors that are expanding.

It is extremely difficult to forecast where technology and automation will replace human workers, one reason being many of the technological improvements have yet to be developed. Nonetheless, there have been estimates of where those technological advances will be made and the degree of impact they could have on employment.

For example, Nedelkoska and Quintini have estimated the probability of automation and technology displacing workers.<sup>47</sup> Figure 12 shows those occupations where the probability of displacement is over 25%. A perusal of the figure shows a majority of the occupations are those not requiring high-level cognitive skills. For example, drivers, although needing split-second decision skills, are at risk of losing their jobs to artificial intelligence systems that drive vehicles. Likewise, legal assistants are being displaced by computer programs that can quickly do case research, and health workers that monitor patient data may be replaced – again – by artificial intelligence-guided computer programs.

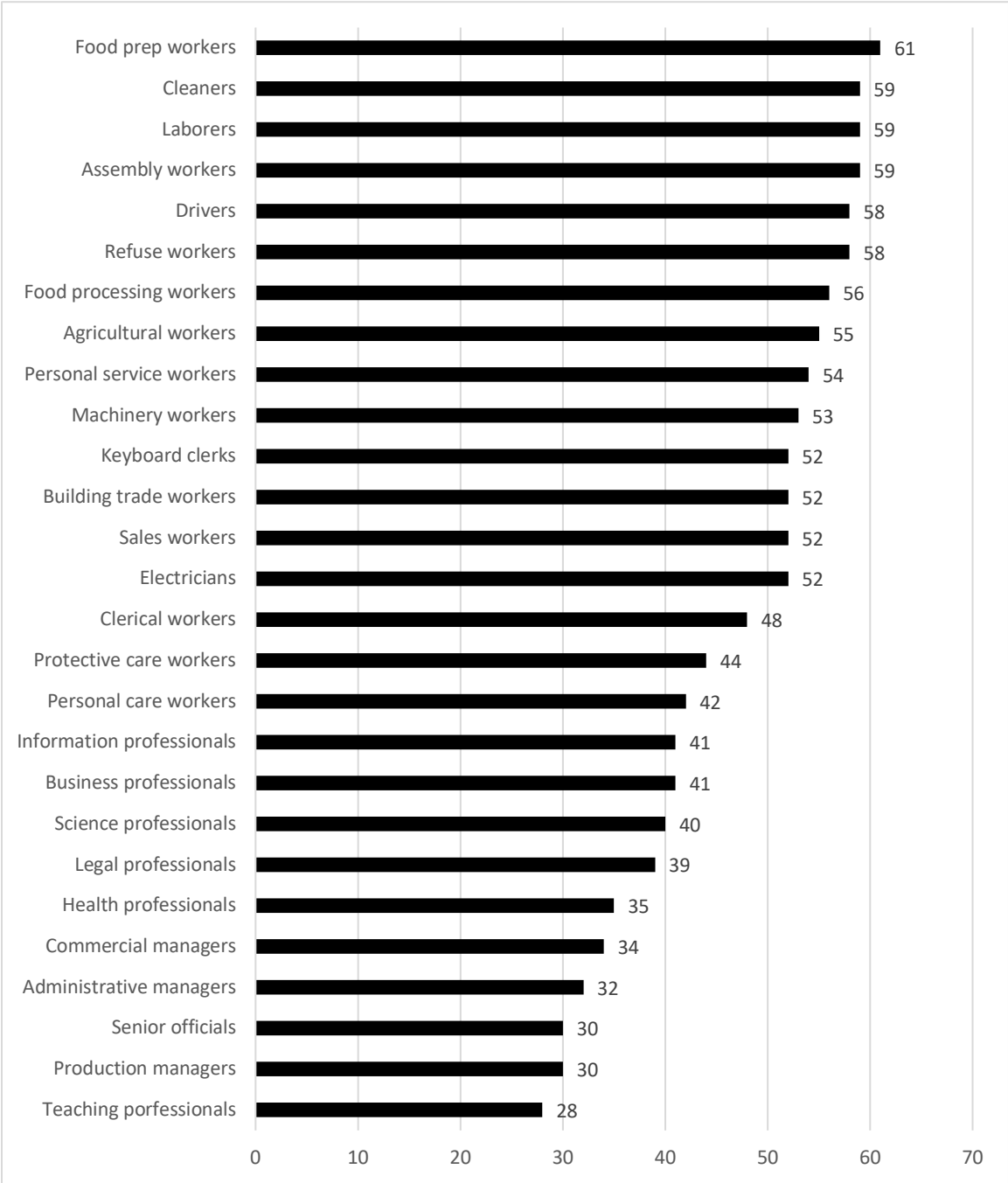
Figure 13 shows the same result by industry, this time looking at industries where there is an estimated 40% or more chance of significant job loss due to automation and technology. Agriculture, restaurants and food service, and many

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<sup>47</sup> Nedelkoska, Ljubica and Glenda Quintini, "Automation, Skills Use, and Training," Paris, OECD, March 2018.

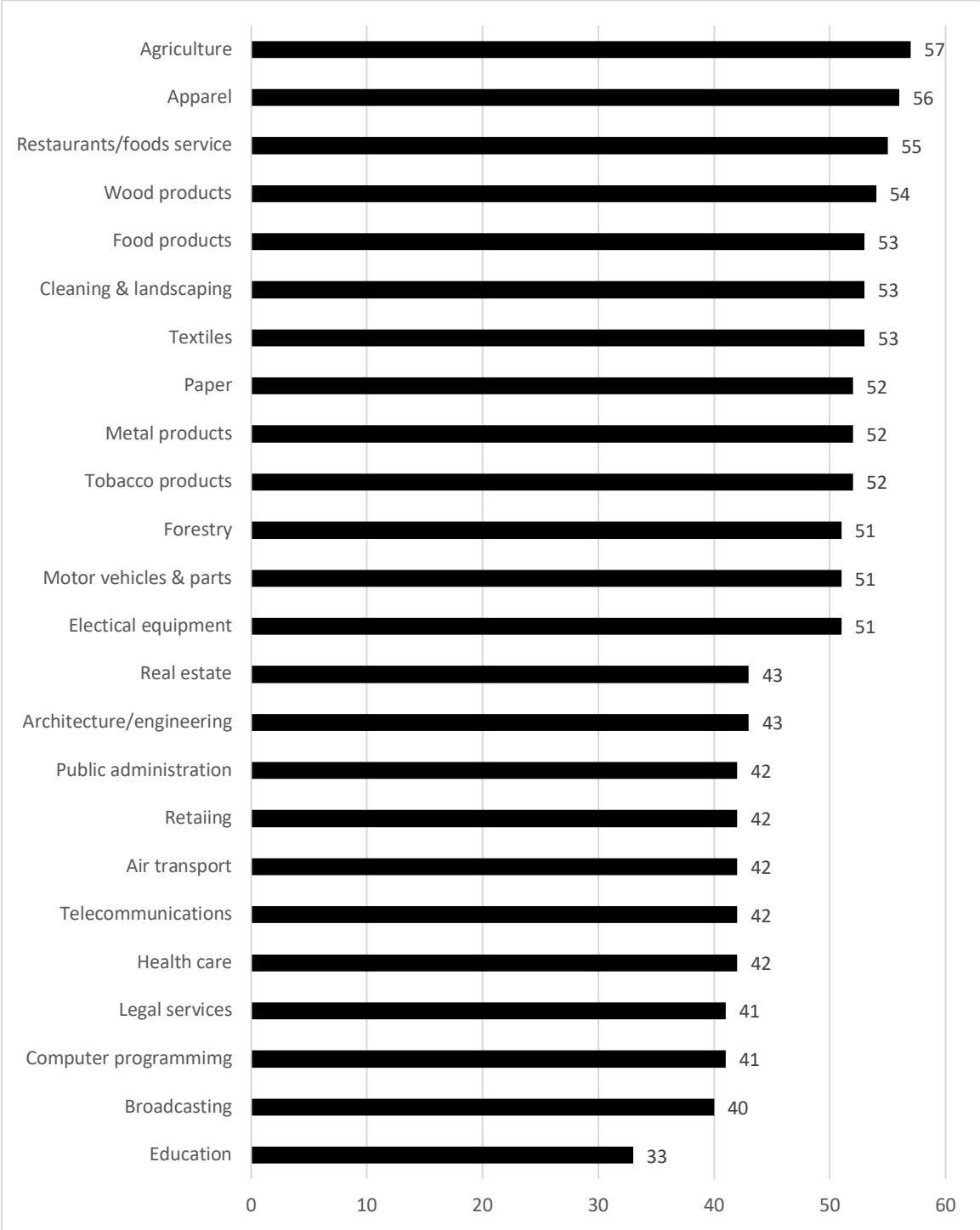


**Figure 12. Estimated Displacement of Workers in Occupations by Automation and Technology (probability in %).**



Source: Nedelkoska and Quintini.

**Figure 13. Estimated Displacement of Workers in Industries by Automation and Technology (probability in %).**



Source: Nedelkoska and Quintini.

manufacturing sectors have the highest probabilities of experiencing significant employment losses due to technology and automation.

The conclusion is technology and automation will continue to have impacts on the labor market. They will result in less demand for workers in occupations requiring physical skills as well as those needing low-level cognitive skills. At the same time, technology that is paired with workers - resulting in those workers' efficiency rising - will cause demand for the workers to increase. Additionally, if the efficiency of the aggregate economy rises as a result of these shifts, then demand for all workers will increase, meaning some of the losses for physical-skilled and low-level cognitive workers will be offset.

It cannot be emphasized enough that these changes are very, very difficult to forecast over any number of years, especially ten, twenty, or thirty years. Consequently, Table 7 shows one idea of how the shift in the composition of North Carolina's employment might change over the next thirty years. It compares the actual distribution of employment in North Carolina in 2019, using each occupation's share of total employment, to the forecasted distribution in 2050. To arrive at the 2050 estimates, the probabilities in Figure 12 were applied to North Carolina's actual occupational distribution in 2019. Share losses were redistributed to occupations with less than a 45% probability of labor replacement.

**Table 7. Actual North Carolina Occupational Distribution in 2019 and Forecasted Distribution in 2050 Based on Probabilities of Worker Replacement by Technology and Automation.**

<b>Occupation</b>	<b>Percent of Total Employment</b>	
	<b>2019</b>	<b>2050</b>
<b>Expanding Occupations</b>		
Healthcare Practitioners	6.0	13.9
Management	5.6	12.5
Education	5.6	12.5
Business & Financial	5.3	11.8
Computer & Math	3.0	7.2
Architecture & Engineering	1.4	3.2
Arts, Design, Media, & Entertainment	1.3	2.9
Social Sciences	1.7	1.9
Life & Physical Sciences	0.7	1.8
<b>Total of Expanding Occupations</b>	<b>30.6</b>	<b>67.7</b>
<b>Contracting Occupations</b>		
Clerical & Administrative Support	13.6	6.5
Sales	10.5	5.2
Production	7.4	3.5
Food Preparation	9.0	3.2
Transportation & Material Moving	7.0	2.9
Construction & Extraction	4.2	2.1
Installation, Maintenance, & Repair	4.2	2.1
Healthcare Support	3.2	1.8
Building & Landscape Maintenance	3.5	1.6
Personal Care	3.5	1.5
Protective Service	2.1	1.2
Legal Support	0.6	0.4
Farming, Forestry, & Fishing	0.6	0.3
<b>Total of Contracting Occupations</b>	<b>69.4</b>	<b>32.3</b>

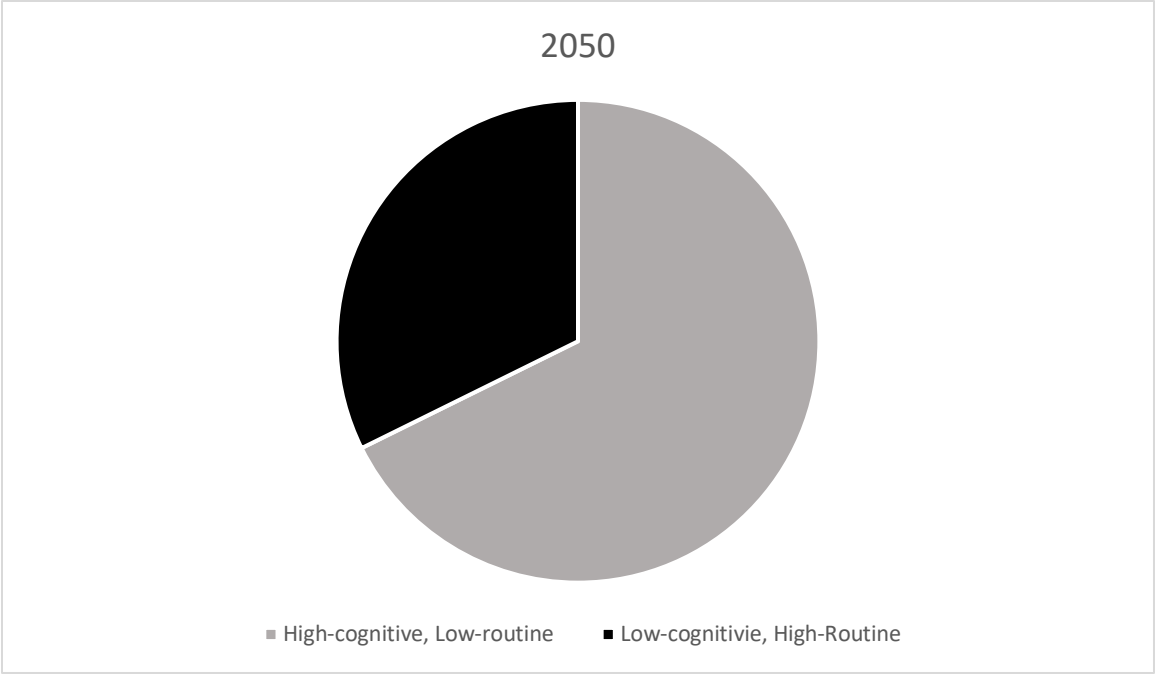
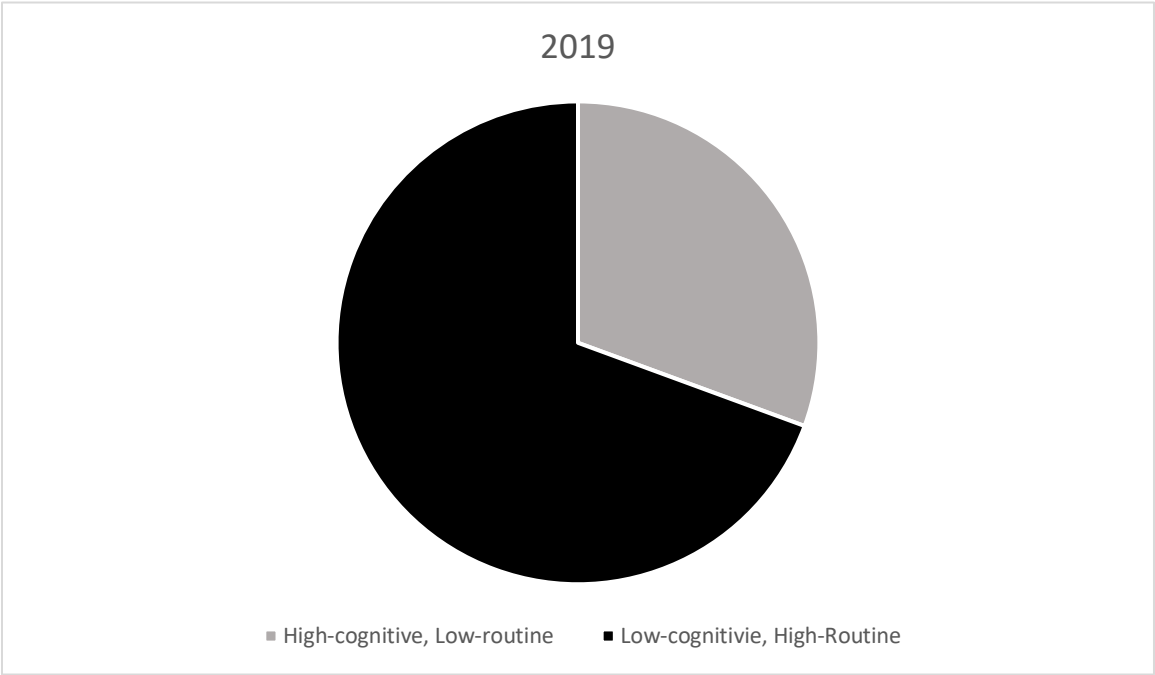
Sources: NC Department of Commerce.

The results in Table 7 are divided between those occupations expanding their employment share and those contracting their employment share. Occupations expanding their share are those using more cognitive skills applied to tasks with a high variability in conditions that preclude them from being routinized and summarized by a repeatable process. Contracting occupations have the opposite characteristics. They apply to predictable tasks with little variability that can often be replicated by machines or technology.

Figure 14 shows how dramatic the shift could be within the economy between occupations gaining share and occupations losing share. In fact, the shift is almost a complete reversal. In 2019 less than one-third of occupations were in the “high-cognitive, low-routine” category, with more than two-thirds in the “low-cognitive, high-routine” category. The forecast for 2050 shows two-thirds of occupational employment in the “high-cognitive, low-routine” category and one-third in the “low-cognitive, high-routine” category.

There’s a very important conclusion from this analysis. There may be no labor shortage in the state when comparing the expected total supply of workers to the expected total demand from jobs. But if workers – including potential workers such as incarcerated individuals - aren’t trained for the occupations that make up the labor demand, there can be shortages – indeed, severe shortages – in particular

**Figure 14. The Changing Shares of Occupations, 2019, 2050.**



Source: Table 6.

occupations, at the same time there are labor surpluses in other occupations.

Public policies to deal with such situations will then be crucial. This is one of the topics addressed in the next section.

### *Major Points*

- Improving worker productivity is the key to raising the state's standard of living.
- Pairing improved technology with workers is a way to improve worker technology and increase the need for such workers.
- However, technology that substitutes for workers will reduce the use of these workers in the economy.
- With expected large improvements in technology, North Carolina's occupational profile will substantially change in the future. Whereas in 2019 two-thirds of the state's workers were in low-cognitive, high-routine occupations, by 2050 two-thirds of workers will be employed in tasks with high-cognitive, low routine characteristics.
- Hence, without proper skill training of existing workers as well as underrepresented workers, North Carolina could have a future labor surplus at the same time it has a labor shortage for many occupations.
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## **5. RE-THINKING STATE LABOR MARKET POLICIES**

The research findings and analysis presented in the previous sections suggest North Carolina will face some important labor market issues in upcoming decades. Although the state may not realize the depth of a labor shortage experienced by other states, it could have shortages in some components of the labor market, while at the same time having surpluses occur in other parts of the labor market. Also, there will likely be a geographic component to the labor market, with shortages occurring in some fast-growing metro counties alongside surpluses in selected rural counties.

Thus, a survey of state policies impacting the labor market are vital to the state having a future labor supply of sufficient size and quality. This section presents that survey. The policies examined are (1) the earned income tax credit (EITC), (2) support for households with young children, (3) training for incarcerated inmates and reduction of work barriers once released, (4) incentives for retirees, (5) support for the relocation of labor, (6) initiatives in matching jobs to workers, (7) expanded initiatives for educational institutions, (8) reducing drug abuse, and (9) providing universal reliable high-speed internet.

### *Earned Income Tax Credit*

The earned income tax credit (EITC) is a program that refunds some or all of a worker's income taxes. In some cases, extra funds – in addition to the tax



refunds – are also sent to the worker. The EITC is targeted to lower-income workers. The program is structured in such a way that incentives are in place to always make it financially beneficial to work more hours. Research has found the EITC to be one of the most effective programs to reduce poverty and encourage work.<sup>48</sup>

There has been a federal EITC since 1975 applying to federal income taxes. North Carolina had a state EITC applying to North Carolina income taxes from 2007 to 2014, after which the program was eliminated.

A reinstatement of the state EITC should be considered by North Carolina as a way to encourage work. However, some research shows that among women, the EITC most encourages work by single women, while at the same time discouraging work by mothers with children.<sup>49</sup> Although revisiting the state EITC is advisable, all aspects of its design should be examined and evaluated from the point of view of encouraging work.

### *Support for Young Children*

Parents with young, pre-school children may be discouraged from working due to the lack of affordable childcare. This issue can easily be seen in the labor force participation rate data, where participation in paid work for mothers rises

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<sup>48</sup> Tax Policy Center, *Key Elements of the US Tax System*, “What Is the Earned Income Tax Credit?”, 2021.

<sup>49</sup> Crandall-Hollick, Margot and Joseph Hughes, “The Earned Income Tax Credit,” *Congressional Research Service*, August 2018.

significantly with the age of their children.<sup>50</sup> Interestingly, the increase in labor force participation with the child's age is very minor for college-educated women compared to mother's with other levels of education.<sup>51</sup> Also, the increase in labor force participation with a child's age is less for married mothers than for single mothers.<sup>52</sup>

Hence, policies that reduce the cost of childcare would presumably increase working by parents, particularly mothers. Indeed, research findings confirm this conclusion. For example, one study of single mothers found a 10% reduction in childcare costs was associated with between a 4% and 11% increase in labor force participation by the mother.<sup>53</sup>

It is therefore logical to suggest that public financial assistance to defray some of the costs of childcare would motivate more working, particularly by women. Indeed, since 1954 the IRS has permitted the deduction of some childcare expenses for federal income taxes.<sup>54</sup> The federal government has also offered a general child tax credit since 1997. It is not based on any particular type of

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<sup>50</sup> Bureau of the Census, *American Community Survey*, *op. cit.*

<sup>51</sup> Pilkauakas, Natasha, Jane Waldfogel, and Jeanne Brooks-Gunn, "Maternal Labor Force Participation and Differences by Education in an Urban Birth Cohort Study, 1998-2010," *Demographic Research*, vol. 34, pp. 407-420, 2016.

<sup>52</sup> U.S. Bureau of Labor Statistics, "Married Mothers Less Likely to Participate in Labor Force in 2017 than Other Moms," *TED: The Economics Daily*, April 2018.

<sup>53</sup> Connelly, Rachel and Jean Kimmel, "The Effect of Child Care Costs on the Employment and Welfare Reciprocity of Single Mothers," *Southern Economic Journal*, 2003, 69 (3), pp. 498-519.

<sup>54</sup> Internal Revenue Service, *Topic No. 602: Child and Dependent Care Credit*, Washington DC, January 21, 2022.

expenditure made by the household for the child. In 2021 it was temporarily expanded and changed to a monthly refund of the credit.<sup>55</sup>

Research is divided on whether the general child tax credit motivates or discourages work by parents. Indeed, two recent studies published during the pandemic reached the exact opposite conclusions. One from the University of Chicago found the child tax credit discouraged work.<sup>56</sup> The second, from Washington University in St. Louis and Appalachian State University, found use of the child tax credit increased work.<sup>57</sup>

Several states also have similar credits and deductions applying specifically to state income taxes. As of 2019, eighteen states provided tax credits to employers who offer childcare to their employees. Twenty-five states have a general child tax credit, and another four states allow a state tax deduction for some childcare expenses. North Carolina is not part of any of these groups.<sup>58</sup>

Hence, one option for North Carolina in expanding the labor supply would be for the state to follow numerous other states and add a tax deduction for childcare expenses. Doing so, however, raises an important issue. To what extent should public policy impact the decision of a parent to devote more time to their

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<sup>55</sup> Congressional Research Service, *The Child Tax Credit: Legislative History*, Washington, DC, December 23, 2021.

<sup>56</sup> Corinth, Kevin, Bruce Meyer, Matthew Stadnicki, and Derek Wu, "The Anti-Poverty, Targeting, and Labor Supply Effects of the Proposed Child Tax Care Expansion," University of Chicago, Becker-Friedman Institute, October 7, 2021.

<sup>57</sup> Roll, Stephen, Leah Hamilton, and Yung Chun, "Expanded Child Tax Credit Payments Have Not Reduced Employment," University of Washington in St. Louis and Appalachian State University, January 26, 2022.

<sup>58</sup> Committee for Economic Development, *Tax Credit Corner: State Tax Credits for Childcare*, 2019.

young child or more time to paid work? This is a vital question as some child experts argue the bonding of a parent with a young child is essential to the proper development of that child. Indeed, child development expert Dr. Erica Komisar asserts the first three years of a child's life spent with its mother is the key to a successful start in the child's life.<sup>59</sup> A policy of public subsidization of childcare would tilt the decision about time use of a parent toward the workforce and away from child-rearing.

An alternative to subsidizing childcare costs is to provide families with young children a regular monetary amount that the family can decide how to use, similar to the federal childcare tax credit that was converted to a monthly payment in 2021. Some may use the funds to help finance childcare. Others may use the money to compensate for lost income when a parent reduces work hours to devote more time to child-rearing. But, based on the differing results of alternative studies, there is no assurance such a program would expand work.

### *Training for Incarcerated Inmates*

Over 30,000 individuals are imprisoned in North Carolina, and almost ten times that number have been incarcerated at some time in their lives.<sup>60</sup> For those ultimately released, providing the individuals with marketable job skills has two

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<sup>59</sup> Komisar, Erica, *Being There: Why Prioritizing Motherhood in the First Three Years Matter*, New York: Tarcher-Perigee, 2019

<sup>60</sup>Bonczar, Thomas, "Prevalence of Imprisonment in the U.S. Population, 1974-2001," U.S. Dept. of Justice, August 2003.

big benefits. First, the individual can augment the labor supply and help curtail labor shortages. Second, engaging the releasees in beneficial work that pays commensurate salaries likely reduces recidivism, avoids victim costs from any future crimes, and reduces public safety costs to the state.

Research on the benefits of prisoner education, including a meta-analysis from the Rand Corporation, finds large benefits from prisoner education, with an average 43% reduction in the recidivism rate for prisoners successfully completing educational programs.<sup>61</sup>

An estimated 45% of North Carolina parolees obtain employment within a year. However, their average salaries are low, at only 20% of the average North Carolina salary.<sup>62</sup>

The North Carolina Department of Public Safety offers educational services to inmates. Some programs are offered at the incarceration site, while others are offered off-site. In 2019 the RAND Corporation released a detailed analysis of North Carolina's "Pathways from Prison to Postsecondary Education Program."<sup>63</sup> While lauding the program, RAND did offer several suggestions for improvement for both securing employment for parolees and well as improving their salaries.

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<sup>61</sup> Davis, Lois, Robert Bozick, Jennifer Steele, Jessica Saunders, and Jeremy Miles, *Evaluating the Effectiveness of Correctional Education*, Santa Monica, CA: The RAND Corporation, 2013.

<sup>62</sup> Berger-Gross, Andrew, "The State of Reentry: An Update on Former Offenders' in North Carolina's Labor Market," North Carolina Dept. of Commerce, October 29, 2019.

<sup>63</sup> Davis, Lois and Michelle Tolbert, *Evaluation of North Carolina's Pathways from Prison to Post-Secondary Education Program*, Santa Monica, CA: The RAND Corporation, 2019.

Included among the suggestions are widening the range of concentrations (majors) for students, devoting more resources to administration of the program, and expanding follow-through and mentoring of graduates of the program as they make the transition from incarceration to work.

### *Work Incentives for Retirees*

With older individuals increasing as a share of the population, retirees will become a major source for expanding the labor force. Also, with many jobs becoming physically less demanding, retirees will likely be capable of performing more jobs.

The federal government taxes income earned by retirees. This is understandable. However, the federal government can – in some circumstances – also reduce a retiree’s Social Security benefits if the recipient has earned income. The circumstance is if the individual is receiving Social Security benefits before the age of “full retirement,” which is age 67 for people born on January 2, 1960 or after. In this case, Social Security benefits are reduced \$1 for every \$2 of earnings above \$19,560.<sup>64</sup>

The reduction in Social Security benefits when earnings exceed \$19,560 for those who retire prior to age 67 is obviously a disincentive to working. Changes to

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<sup>64</sup> Social Security Administration, “How Work Affects Your Benefits,” 2022. The \$19,560 value changes each year based on the past year’s inflation rate.

Social Security rules – such as increasing the \$19,560 level or raising the \$2 of earnings - are in the domain of the federal government. North Carolinians can only influence such changes to Social Security through their elected federal representatives.

As is the case for the federal income tax, earnings by retirees are taxed by the North Carolina income tax. But Social Security benefits are not taxed by North Carolina. However, North Carolina is not alone. A total of thirty-seven states do not tax Social Security benefits.<sup>65</sup>

While a special reduction in North Carolina income taxes could be proposed for retirees who enter the labor force, such a reduction would likely face strong opposition from those who view such a proposal as special treatment for one demographic group. As an alternative, North Carolina could look at reducing the state income taxation of pension payments to retired state workers who re-enter the labor market and have earnings. Such a proposal might be less politically challenging.

### *Relocation Support*

While technology, such as provision of reliable high-speed internet to all regions of North Carolina, may spread economic growth more broadly throughout the state, there is a likelihood there may still be geographic mismatches between

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<sup>65</sup> Maranjian, Selena, “37 States That Don’t Tax Social Security Benefits,” *The Motley Fool*, January 22, 2022.

the availability of jobs and the availability of labor. This was seen in the regional labor force and job projections in an earlier section. To address this imbalance, labor would need to move to the job locations.

Although there are numerous public and private programs assisting workers, such as job training and unemployment compensation, few if any of these programs provide assistance for relocating workers to where matching jobs exist. For lower-income workers, especially, the cost of relocation may inhibit such moves. Adding to the issue is the fact that other public assistance programs, such as Food Stamps (SNAP), health programs like Medicaid, and even housing aid, can be available to unemployed and indigent individuals. This assistance, perhaps ironically, may discourage relocation to jobs.

For a household moving 250 miles – a distance that would cover most residential moves in North Carolina – North Carolina could consider establishing a “Worker Mobility Fund” to assist unemployed workers with previous incomes below a certain level – such as 150% of the poverty level – in their move to a new job outside their current location. In addition to an income limit, workers would need to have a job already offered to them in the new location, or be accepted at a re-training program leading to a new job.

#### *Initiatives in Matching Jobs with Workers*

If the anticipated turnover in occupations described in an earlier section



indeed occurs, then new methods of developing workers with skills needed for emerging jobs may be the most important initiative North Carolina can use for dealing with a future labor shortage. A key part of achieving this goal would be “targeted task training,” or TTT. The objectives of TTT are for North Carolina to (1) rapidly identify both expanding and contracting occupations, (2) encourage the development of training programs for expanding occupations, and (3) to facilitate the movement of workers in contracting occupations to occupations with vacancies.

North Carolina already has the infrastructure of the TTT in the form of the NC Works Centers.<sup>66</sup> There are 94 NC Works Centers across the state. The centers serve as a clearinghouse for job openings and job candidates in specific geographic regions. Individuals looking for work can post resumes, and firms needing workers can post job openings. However, the state leaves it to individuals or firms to use the postings to form matches.

TTT would take the information imbedded in NC Works to new levels in several ways. First, job postings can provide information on the kinds of tasks and skills employers need. Such information could be used to inform training programs, such as those at the state’s community colleges, about trends in occupational needs. Likewise, information from job candidates’ resumes – of

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<sup>66</sup> North Carolina Department of Commerce, “NC Work Career Centers.”

course, keeping individual information confidential - can be examined to develop data about the occupations that individuals had left. This information also would have implications for educational training programs. Both data analyses can assist the state spot expanding occupations and contracting occupations.

As good as NC Works is, the data it collects rely on initiatives from firms needing individuals to hire and individuals needing to work. To develop more comprehensive information will require the state to be proactive in tracking job hires and job losses. Each of the 94 NC Works Centers should use various means – social media, newspaper postings, chamber of commerce information, calls to firms, and analyzing information from individuals filing unemployment compensation claims – to supplement what is now collected. Merging both sets of information should give a clearer on-going picture of North Carolina’s labor market.

Also, with the consent of firms posting job openings and individuals posting resumes, the state could establish algorithms to match firms needing workers to specific individuals needing jobs. The state could then inform both the matched firm and matched individual and offer to facilitate an interview. Such a service funded by the state would be particularly attractive to lower-income workers who cannot afford private job search alternatives.

Lastly, North Carolina could consider establishing a “Rapid Work Response Unit,” or RWRU. Such a unit would be dispatched to areas experiencing major business contractions or closures eliminating significant numbers of jobs, regardless of the reason.<sup>67</sup> The RWRU would expedite the provision of public assistance to displaced workers and their families. The RWRU would also assess the training needs of displaced workers to qualify for other jobs in the area or in the state and help those workers obtain the needed skills.

#### *Expanded Initiatives for Educational Institutions*

There are currently three major components of North Carolina’s education and job training – K-12, community colleges, and four-year colleges and universities. While, in their present roles, each of the components will play a vital role in ensuring a strong labor market in the state, some modifications and new initiatives should be considered.

At the high school level, greater efforts should be used to expose students to occupations that don’t require a four-year college degree. North Carolina already has the Career and College Promise (CCP) program. CCP allows qualified high school students to enroll in community college or university courses and thereby reduce the time required for achieving a higher education degree.<sup>68</sup> For

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<sup>67</sup> Hence, the RWRU would be broader than similar programs, such as the federal Trade Adjustment Assistance programs for workers displaced by international trade.

<sup>68</sup> North Carolina Department of Public Instruction, “Career and College Promise.”

community college programs, CCP could be expanded so that participants could achieve a degree in one year after high school graduation. A complementary idea for consideration would be the establishment of stand-alone vocational high schools that would expedite the entry of high school age students to the labor force.

Another initiative is “rapid task training.” Here, individuals are trained to perform one or two specific tasks, such as coding, warehouse management, or - thinking of the future – operating delivery drones. Due to the focus on a limited number of tasks, the training could often be accomplished quickly, perhaps in months. Training can be done by public institutions, private firms, or even by the hiring firm through on-the-job training. Recently North Carolina expanded its financial support to both firms and students for its Apprenticeship NC program, which aims to encourage firms to hire and train workers for high-demand fields.<sup>69</sup>

Lastly, with the labor force aging, and with the reduction in physical work allowing older individuals to work longer, higher education institutions may want to consider training and degree programs targeted to post-age 55 people. While older individuals are currently free to enter college and university degree programs, they may prefer to take courses with other students closer to their age. If there are enough older individuals to make targeted programs to them financially worthwhile for colleges and universities, then such programs could help older

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<sup>69</sup> Business North Carolina Daily Digest, “Today’s Number: \$12 Million,” February 23, 2022.

individuals who want new careers or post-retirement careers achieve these objectives. If successful, the programs would help the state meet its labor force needs.

### *Reducing Drug Abuse for Job Applicants*

The latest data show 4.5% of job applicants fail a drug test. This is the highest rate in over a decade. Also, almost one-fourth (23%) of businesses report the drug failure rate is over 5%.<sup>70</sup> These numbers show the drug failure rate among job applicants is not a trivial matter. In early 2022, 5% of the North Carolina labor force is over 250,000 individuals who could be working.

It is beyond the scope of this report to evaluate the myriad of programs that have been used or are being used to reduce drug abuse. An excellent summary and analysis of scores of programs is presented by Prendergast, *et. al.*<sup>71</sup>

### *Providing Universal Reliable High-Speed Internet*

In the post-pandemic world, reliable high-speed internet (RHSI) has become a necessity, just as electricity was in the 20<sup>th</sup> century. Today's businesses, institutions, and even households need access to RHSI to properly function. The availability of RHSI can also facilitate the expansion of fast-growing tech-related

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<sup>70</sup> Express Employment Professionals, "New Survey: How Many Job Applicants Fail Drug Tests?" June 2017; Blonquist, Ashley, "Consequences of a Failed Drug Test: Options for Employers," *Goodhire*, March 2021.

<sup>71</sup> Prendergast, Michael, Deborah Podus, Eunice Chang, and Darren Urada, "The Effectiveness of Drug Abuse Treatment: A Meta-Analysis of Comparison Group Studies," *Drug and Alcohol Dependency*, Vol. 67: pp. 53-72, June 2002

jobs to beyond metropolitan areas in rural regions and small towns.<sup>72</sup> To accomplish North Carolina’s job goals through mid-century, RHSI will have to be universal across the state.

Importantly, the process seems to be underway, both through public and private funding. The federal and North Carolina state governments are providing funding for the expansion of RHSI. Yet there’s also exciting developments in the private sector. One is the idea of using low earth-orbiting satellites to provide internet signals. The entrepreneur Elon Musk is the leader in this idea with his SpaceLink program. The advantage of SpaceLink is it avoids the cost and time-consuming process of laying cable or stringing cable to poles to push RHSI into unserved areas. Besides possibly being a funder, government’s role in the process is to ensure the proper regulatory and legal elements are in place to facilitate the expansion of RHSI, however it is done.

### *Major Points*

- Re-establishing an Earned Income Tax Credit in North Carolina would be a powerful incentive for increased labor force participation by users.
- Subsidizing childcare expenses for households would motivate increased labor force participation by mothers, particularly single mothers.

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<sup>72</sup> See Ro Khanna, *Dignity in a Digital Age*, New York: Simon and Schuster, 2022; and Michael L. Walden, *Re-Launch: How Families Can Be Renewed and the American Dream Revived in the New Independent Lifestyle of the Post-Pandemic Economy*, Conroe, Texas: Defiance Press, 2022.

However, the state must consider its appropriate role in the important decision of parents in choosing between work and devoting more time to their children, especially young children. State provided cash support to parents with young children with no conditions on usage is an option to evaluate.

- Providing incarcerated individuals with education and job skills has been shown to reduce recidivism and increase labor force participation. Changing policies to encourage firms to consider appropriately trained individuals with criminal records would also facilitate their incorporation into the labor force.
- Reducing the state income tax on pensions of retired state workers who re-enter the workforce is an option to increase their labor force participation.
- Establishing state funded financial assistance for relocation expenses to individuals moving for a job would help align the geographic availability of jobs and the availability of workers.
- The state should consider the more active use of the information available at the NC Work Centers to match workers to available jobs and to identify expanding and contracting occupations and skills.

Establishing a Rapid Work Response Unit would provide valuable and timely help to communities and workers experiencing major job shifts.

- To make greater use of the elderly population, instituting course and degree programs targeted at older (post-age 55) students would facilitate extending their work careers in needed occupations.
- Almost 5% of job applicants fail a drug test that disqualifies them for work. This translates to 250,000 individuals. Reviewing programs to reduce drug abuse is recommended for finding ways to reduce this failure rate.
- Universal reliable high-speed internet service has become a necessity in the modern economy, especially for job recruitment and job search. New investments and new ways of providing the service have created optimism that the goal of universal internet availability will become a reality. Still, many households may require financial assistance to access the service.



## **6. ECONOMIC GROWTH AND ENVIRONMENT STEWARDSHIP: CAN WE HAVE BOTH?**

*Why?*

Before moving to the concluding section, it is important to take a step back and address an important issue regarding economic growth. The material here addresses whether there are any downsides from promoting pro-labor supply and pro-growth policies. Furthermore, if there are major downsides, should we question our focus on labor supply and growth? Or, are there ways to balance the benefits and costs of economic growth?

*Benefits of Economic Growth*

Why are we concerned about the size of the labor force? We are concerned because labor is – and likely will continue to be – essential for a functioning economy. So, if we want the economy to grow, then we need sufficient numbers of workers to facilitate that growth.

Yet some question whether continual economic growth is necessary.<sup>73</sup> In particular, they worry about degradation to the environment – including pollution, climate change, and eliminating forests, open spaces, and habitats for animal and plant life - when economic growth requires production of more goods and services.

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<sup>73</sup> See, for example, Cassidy, John, “Can We Have Prosperity Without Growth?” *The New Yorker*, February 2, 2020.

However, there are two major concerns with limiting economic growth. One is the potential impact on inventions and innovations. There is an argument that inventions and innovations that improve our lives are spurred by economic growth.<sup>74</sup> A growing economy presents more opportunities for those who develop new techniques, products, and procedures (inventors) and those who apply those techniques, products, and procedures to real situations (innovators).

A second concern is based on economic mobility. An expanding economy also creates additional job opportunities for workers. As the economy grows, new occupations are often generated, thereby allowing individuals to consider different types of employment, pursuits, and life plans. The economy of the last twenty years – the digital age of computers, smart phones, and instant information and connectivity – is a good example.

### *Paying for the Costs of Growth*

Can economic growth with the positive changes it creates and protection of the environment and nature co-exist? The key is ensuring that actions that generate adverse environmental costs have those costs incorporated into the price of the product, service, or actions responsible for the negative effects. A pollution fee on fossil fuel use is an excellent example. Fees on development using large tracts of

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<sup>74</sup> Prahhan, R.P., M.B. Arvin, J.H. Hall, and M. Nair, "Innovation, Financial Development, and Economic Growth in Eurozone Countries," *Applied Economic Letters*, 23(16), pp. 1141-1144.

land to fund public land preservation purchases is another example.<sup>75</sup>

Lastly, there's the practical matter of limiting economic growth, particularly at the state level. It is unlikely state governments could prohibit new households and firms from moving to their states from other areas, particularly since the federal government regulates interstate commerce.

Thus, the preferred approach to the issue of economic growth and environmental harm is to allow economic growth, but make sure the growth pays for any negative consequences.

### *Major Points*

- Economic growth has both benefits and costs.
- Economic growth spurs inventions and innovations, as well as making it easier for individuals to pursue new opportunities and occupations.
- There can be downsides from economic growth, such as harm to the climate and natural environment, which usually are not recognized by those participating in the growth.
- The straightforward solution to making economic growth and environmental stewardship compatible is to price the cost of growth and have the firms or consumers pay that price when they engage in an

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<sup>75</sup> Walden, Michael, *Real Solutions: Common Sense Ideas for Solving Our Most Pressing Problems*, Wisdom House Books, 2020.

action or purchase a product or service with adverse environmental consequences.

## **7. TOMORROW'S NORTH CAROLINA LABOR MARKET**

North Carolina has always had a dynamic economy. When the economy was dominated by agriculture, most individuals worked on small farms raising crops and livestock. In the 19<sup>th</sup> century the state's labor supply shifted to manufacturing, led by growth in the production of textiles, apparel, furniture, and tobacco products. In the late 20<sup>th</sup> century international trade and automation in manufacturing created another major shift to new sectors such as technology, pharmaceuticals, and services.<sup>76</sup> Labor supply followed, but with one major downside – the new economy became structured as an hour-glass, with the largest concentration of jobs in the highest-paying and lowest-paying sectors and the smallest concentration in middle-paying sectors.<sup>77</sup>

Many think we are now on the verge of another major transformation in the economy, based on emerging technologies such as cloud computing, virtual reality, and – with remote working – the emergence of stronger national and international labor markets as a result of the “death of distance.”<sup>78</sup> If accurate, North Carolina

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<sup>76</sup> See Walden, Michael L. *North Carolina in the Connected Age*, Chapel Hill: The University of North Carolina Press, 2008.

<sup>77</sup> Walden, Michael L. “Economic Growth and Income Distribution in North Carolina and Introduction of the NC-Growth and NC-Share Indices.” Department of Agricultural and Resource Economics, North Carolina State University, November 2021.

<sup>78</sup> Mills, Mark, *The Cloud Revolution: How the Convergence of New Technologies Will Unleash the Next Economic Boom*, New York: Encounter Books, 2021.

is facing another transformation to its economy and disruptions to the labor market, but likely at a much faster pace than in the past.

We can speculate about what the future North Carolina economy will look like, but most predictions won't capture all the changes because many of the inventions, innovations, and applications have yet to emerge. The reality is, we won't know the future until it is here.

Still, this does not mean we are helpless to deal with the future. What we can do is have plans and policies in place that can facilitate the transformations once they are here. Policies regarding the state's labor supply, including matching labor skills to the needs of future companies, making sure labor is located where it is needed, and having institutions ready to re-train and reinforce the labor force, are important to develop and implement now.

Compared to many other states, it can be argued North Carolina is in an enviable position. People and companies are moving to the state, and the labor supply is expected to grow and – based on current forecasts – exceed the growth in jobs. The challenges will be making sure workers have the required skills for the available jobs and are in the locations where jobs are available.

Even in our technological age, labor is necessary to make the economy operate. Among all the challenges facing our society in the future, making sure we

have the quantity and quality of labor needed to make the future economy prosperous for all is high on the list.

The good news is, North Carolina has successfully faced many challenges in the past. Now North Carolina will be called on to do the same with the emerging challenges of the future labor supply.

**APPENDIX A: NORTH CAROLINA POPULATION PROJECTIONS BY AGE,  
GENDER, ETHNICITY, AND RACE**

Categories by the State Demographer of North Carolina

AIAN (American Indian and Alaskan Native)

	2020	2050	% Change
Ages 0 -15			
Female	18,416	24,472	32.9
Male	18,529	27,203	46.8
Ages 16-19			
Female	5,191	7,351	41.6
Male	6,076	8,702	43.2
Ages 20-24			
Female	6,723	9,436	40.4
Male	7,333	11,207	52.8
Ages 25-34			
Female	12,390	19,958	61.1
Male	12,317	21,919	78.0
Ages 35-54			
Female	24,154	44,233	83.1
Male	24,986	46,663	86.8
Ages 55-64			
Female	8,728	19,105	118.9
Male	9,505	19,462	104.8
Ages 65 & +			
Female	10,192	34,913	242.6
Male	9,578	35,664	272.4
Total			
Female	85,794	159,468	85.9
Male	88,324	170,820	93.4

Source: North Carolina State Demographer, "Population Projections to 2050," February 2022.



Asian

	2020	2050	% Change
Ages 0 -15			
Female	40,821	107,059	162.3
Male	40,860	108,482	165.5
Ages 16-19			
Female	10,360	26,174	152.6
Male	9,903	26,051	163.1
Ages 20-24			
Female	12,356	32,070	159.6
Male	12,077	32,037	165.3
Ages 25-34			
Female	28,756	76,973	167.7
Male	25,467	68,890	170.5
Ages 35-54			
Female	64,985	178,466	174.6
Male	57,102	153,009	168.0
Ages 55-64			
Female	18,277	67,600	269.9
Male	15,446	56,573	266.3
Ages 65 & +			
Female	19,026	111,900	488.1
Male	14,082	87,662	522.5
Total			
Female	194,581	600,242	208.5
Male	174,937	532,704	204.5

Source: North Carolina State Demographer, "Population Projections to 2050," February 2022.

Black

	2020	2050	% Change
Ages 0 -15			
Female	234,063	239,487	2.3
Male	240,424	245,310	2.0
Ages 16-19			
Female	64,366	66,953	4.0
Male	66,722	67,488	1.1
Ages 20-24			
Female	85,186	86,788	1.9
Male	88,013	87,624	-0.4
Ages 25-34			
Female	164,070	161,274	-1.7
Male	151,393	156,555	3.4
Ages 35-54			
Female	305,048	327,453	7.3
Male	251,729	305,495	21.4
Ages 55-64			
Female	148,953	165,648	11.2
Male	122,546	138,160	12.7
Ages 65 & +			
Female	172,493	286,728	66.2
Male	115,544	179,072	55.0
Total			
Female	1,174,179	1,334,331	13.6
Male	1,036,371	1,179,704	13.8

Source: North Carolina State Demographer, "Population Projections to 2050," February 2022.

Other

	2020	2050	% Change
Ages 0 -15			
Female	54,634	108,659	98.9
Male	56,638	113,554	100.5
Ages 16-19			
Female	16,780	30,277	80.4
Male	17,812	32,297	81.3
Ages 20-24			
Female	18,033	35,591	97.4
Male	18,780	39,024	107.8
Ages 25-34			
Female	31,167	70,464	126.1
Male	27,672	71,543	158.5
Ages 35-54			
Female	47,112	183,435	289.4
Male	41,077	173,875	323.3
Ages 55-64			
Female	16,492	79,246	380.5
Male	14,123	69,146	389.6
Ages 65 & +			
Female	18,613	133,820	619.0
Male	15,457	105,176	580.4
Total			
Female	202,831	641,492	216.3
Male	191,559	604,615	215.6

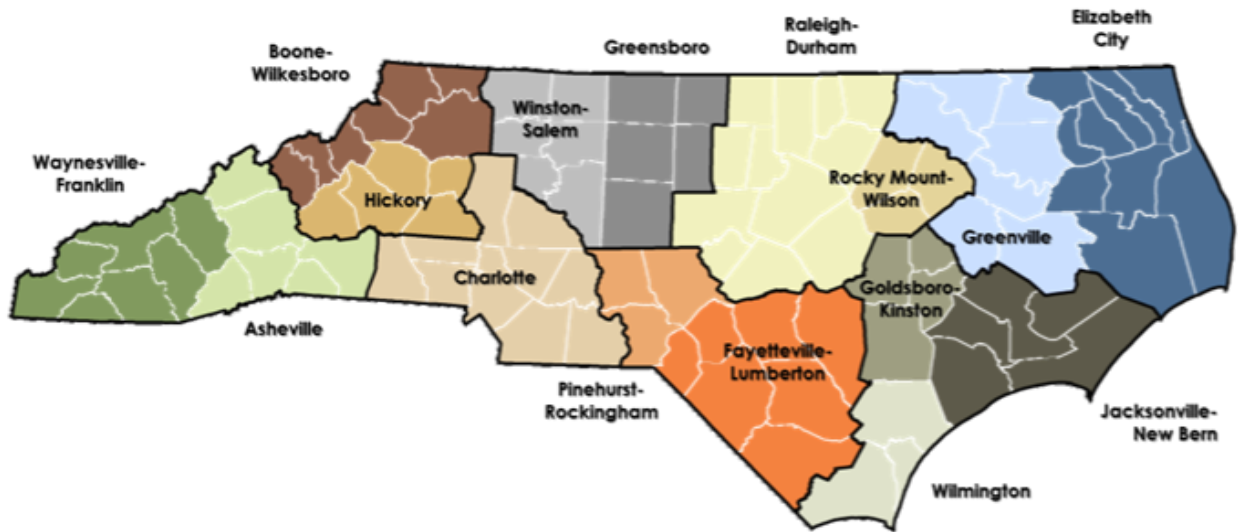
Source: North Carolina State Demographer, "Population Projections to 2050," February 2022.

White

	2020	2050	% Change
Ages 0 -15			
Female	628,759	693,587	10.3
Male	658,070	725,145	10.2
Ages 16-19			
Female	181,983	192,496	5.8
Male	188,746	198,064	4.9
Ages 20-24			
Female	230,184	248,411	7.9
Male	251,233	269,925	7.4
Ages 25-34			
Female	448,228	488,970	9.1
Male	455,625	503,553	10.5
Ages 35-54			
Female	960,302	1,137,095	18.4
Male	939,454	1,099,489	17.0
Ages 55-64			
Female	505,366	547,467	8.3
Male	473,199	496,272	4.9
Ages 65 & +			
Female	769,538	1,116,667	45.1
Male	616,321	883,438	43.3
Total			
Female	3,724,360	4,424,693	18.8
Male	3,582,648	4,175,886	16.6

Source: North Carolina State Demographer, "Population Projections to 2050," February 2022.

## APPENDIX B: NORTH CAROLINA REGIONS



### Waynesville-Franklin

Cherokee  
Clay  
Graham  
Haywood  
Jackson  
Macon  
Swain

### Asheville

Buncombe  
Henderson  
Madison  
Polk  
Rutherford  
Transylvania  
Yancey

### Charlotte

Cabarrus  
Cleveland  
Gaston  
Iredell  
Lincoln  
Mecklenburg  
Rowan  
Stanly  
Union

### Winston-Salem

Davidson  
Davie  
Forsyth  
Stokes  
Surry  
Yadkin

Hickory  
Alexander  
Burke  
Caldwell  
Catawba  
McDowell

Boone-Wilkesboro

Alleghany  
Ashe  
Avery  
Mitchell  
Watauga  
Wilkes

Greenville

Beaufort  
Pitt

Raleigh-Durham

Chatham  
Durham  
Franklin  
Granville  
Harnett  
Johnston  
Lee  
Orange  
Person  
Vance  
Wake  
Warren

Rocky Mount-Wilson

Edgecombe  
Halifax  
Martin  
Nash  
Northampton  
Wilson

Greensboro

Alamance  
Caswell  
Guiford  
Randolph  
Rockingham

Fayetteville-Lumberton

Bladen  
Columbus  
Cumberland  
Hoke  
Robeson  
Scotland

Elizabeth City

Bertie  
Camden  
Chowan  
Currituck  
Dare  
Gates  
Hertford  
Hyde  
Pasquotank  
Perquimans  
Tyrrell  
Washington

Jacksonville-New Bern

Carteret  
Craven  
Jones  
Onslow  
Pamlico

Pinehurst-Rockingham

Anson

Montgomery

Moore

Richmond

Goldsboro-Kinston

Duplin

Greene

Lenoir

Sampson

Wayne

Wilmington

Brunswick

New Hanover

Pender

## About the Author

Michael Walden, Ph.D., is a William Neal Reynolds Distinguished Professor Emeritus at North Carolina State University and President of Walden Economic Consulting, LLC. During his 43 years on the faculty at NC State, Walden became recognized as an expert on the state economy and public policy. He is the author of twelve books and over 300 articles and reports, and he has made 3000 personal appearances. Walden is also a frequent contributor to the national and state media, and continues to write a biweekly newspaper column. He has won numerous awards, including two Champion-Tuck Awards for Excellence in Broadcasting, the UNC Board of Governors Award for Excellence in Public Service, the Holladay Medal for Excellence from North Carolina State University, and the Order of the Long Leaf Pine. His newest books are *Real Solutions* and *Disunionia: A Political Thriller*. His upcoming book, *Re-Launch: How Families Can Be Renewed and the American Dream Revived in the New Independent Lifestyle of the Post-Pandemic Economy* will be published in March, 2022. Walden is a member of the North Carolina Economic Development Association, and he resides in Raleigh with his wife, Mary.