Early Education in the Time of COVID-19: An Economic Analysis for North Carolina

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Summary

Early education and child care – as well as boosting child development – helps families participate in the labor market and become financially secure. However, too many working families across North Carolina cannot access adequate child care – and the COVID-19 pandemic has it worse. Each year over 400,000 parents of children aged under 6 struggle to find child care that helps them work at the jobs they need.

Using a new survey of 802 working parents with young children in North Carolina, conducted in October 2020, this Report examines the links between child care and work before and during the COVID-19 pandemic.

- Pre-pandemic, only half of all parents were able to access any type of center-based or formal care. Six months into the pandemic this rate fell to less than one-in-three. The decline in enrollment was caused by families exiting the formal sector completely.
- Only half of all working parents receive any child care supports from their employer. Most of the available supports were opportunities for leave from work; fewer than one-in-ten receive subsidized child care from their employer.
- Emphatically, parents say that child care is too expensive or low quality; also, many child care arrangements are not work-friendly, convenient or flexible.
- The pandemic has made child care unaffordable for many families; many other parents are not working and so no longer "need" child care. As the pandemic continues, parents expect these trends to worsen.
- Households of color face more early education challenges: the care they rely on is lower quality, with fewer employer supports; and the pandemic has disproportionately impaired their access to child care.
- Rural families have much lower access to ECE than families in cities and the suburbs.

The pandemic has directly affected the incomes of working families with young children. Families have been furloughed, had their pay reduced, lost their jobs, and had their work hours cut. Overall, more than half of all households report these economic adversities. Three-in-ten families report major or extreme financial problems.

- Before the pandemic, many parents were forced to quit jobs, move to part-time work, or reduce their work hours as a result of child care problems. Many parents also reported diminished career prospects, with less training and fewer promotions.

- With the pandemic, work participation and career prospects for parents became more pressured. As a result of inadequate child care, many parents reported less time at work, lower productivity when at work, and problems finding work; and they were less able to develop job-related skills.
- As the pandemic continues, to meet their child care needs parents are being forced to work more flexibly – outside normal business hours, alternating work hours with their partners – and to take paid or unpaid leave.
- Families of color are making bigger mid-pandemic adjustments to their work and child care. Relative to state-wide averages their time at work is falling faster and their career prospects are more impaired. Their opportunities to adjust their jobs are fewer too, further upsetting the balance between work and child care.
- Rural families have both cut back on child care and experienced significant work disruptions. Families in cities have had similar experiences, but they had more choices pre-pandemic. Suburban families have cut back on child care but have experienced relatively milder work disruptions.

The economic consequences of inadequate child care are felt by parents, businesses, and North Carolina taxpayers. These consequences can be measured in money terms. Each year, as a result of inadequate child care:

- Working parents lose $3,870 in lost earnings, in reduced productivity at work, and in more time looking for a good job.
- Businesses lose $1,270 per working parent in reduced revenue and in extra recruitment costs.
- Taxpayers lose $1,040 per working parent in lower taxes.

In total over early childhood and up to age 8:

- Working parents lose $19,960 in lost earnings, reduced participation in the labor market, and in lower returns to experience.
- Businesses lose $6,540 per worker in reduced revenue and in extra recruitment costs.
- Taxpayers lose $5,330 per working parent in federal and state/local tax.

COVID-19 has exacerbated each of these adversities; mid-pandemic losses are even greater.

In the aggregate across all working parents in North Carolina, there are annual losses of $1,548 million in parental income, $507 million in business revenue, and $414 million in tax revenue. Over the long-term – and with the pandemic ongoing – the aggregate economic losses are even larger.

For North Carolinians, inadequate child care has substantial and long-lasting consequences;

its effects are felt by parents, businesses, and the state's taxpayers. This was true and important before the pandemic; it is worsening as the pandemic continues.

Contents

1 Introduction

In this Report, we investigate the economic consequences of early childhood education in North Carolina. Early education and child care systems encompass a range of providers and programs for children from birth up to kindergarten entry.[1] We show how this system influences the employment and incomes of working families. Critically, we analyze how the coronavirus (COVID-19) pandemic has affected early education and in turn work opportunities for parents across North Carolina. Our analysis draws on a new survey – conducted state-wide in the Fall of 2020 – on over 800 working families.

Early Education is Effective and Efficient for Children

Lots of high quality research shows how early education and high quality child care boosts child development, especially for children who are disadvantaged or from low-income families.[2] Specifically, early childhood education leads to learning gains, with higher academic achievement in elementary and secondary school, as well as reduced special educational placement and grade retention. High quality care and programs in formal settings also convey long-term behavioral advantages, including: improved health status and lower criminal activity, as well as increased economic well-being from higher earnings and financial independence. Gains are greater for children who enroll for longer or in higher quality programs. ECE is effective for children.

There is direct evidence on the positive impacts of early childhood education in North Carolina. Long-term study of the Abecedarian Program, an intensive pre-school program delivered to a small sample of children in North Carolina in the 1970s, shows gains decades later.[3] Also, research on the *More at Four* program (now *NC Pre-K*), along with *Smart Start*, the early child care program, identifies substantial academic gains for participating children.[4] Several studies have undertaken benefit-cost analysis, comparing the costs of providing early education with the monetized benefits for the children, their families, and the broader society over the children's early lifetimes.These benefits include savings to the school system, higher earnings, and lower government expenditures on, e.g. crime, welfare (Levin et al., 2018). See also Barnett and Masse (2007); Heckman et al. (2010); Reynolds et al. (2011). These studies find that the economic benefits of investments in early education easily exceed the program costs. Early education is an efficient investment.

Early Education Supports Working Families

Early education helps families. Working parents rely on child care so they can participate in the labor market. Not only does early education free up parents' time so they can work, but – when that child care is high quality, accessible, and reliable – it helps them become fully productive and build successful careers.[5]

For most families, decisions about child care and decisions about work are made together. Nationally, households give the primary reason for child care as "to provide care

when a parent is at work"; and almost 90% of households emphasize that reliability – child care that allows them to meet work commitments – is "very important". The quality of the child care options families have strongly affects the work options they have.[6]

When families do not have access to early education programs, their work and career prospects suffer. Household income falls, productivity goes down and across the economy aggregate economic activity is lower. Businesses produce less and local tax revenues are lower. Inadequate or limited child care acts as an immediate drag on workers, businesses and taxpayers. The size of this economic burden can be quantified by modeling how early education affects working families.

Early Education and the 2020 Pandemic

Before the pandemic, North Carolina's child care and early education system was far from comprehensive in terms of access for children in need. Of young children aged 0-3, 250,000 are in Child Care Centers (or Family Child Care homes); this is approximately two-thirds of all children; and only one-fifth of these receive public subsidies.[7] For children just under kindergarten age, public programs are also far from comprehensive. The *NC Pre-K* program for at-risk, low-income families enrolled almost one-quarter of all four-year olds in public pre-school.[8] But it does not serve any three-year olds. The program is intended to be targeted to disadvantaged children, including those with developmental delay, health conditions and limited English proficiency. But this group is approximately 40% of all children; so many targeted families still lack access. Finally, pre-school only covers 6 hours per day and 36 weeks per year; working families therefore need substantial extra coverage to meet the demands of their jobs.

Many families of young children in North Carolina had a hard time finding any child care. Mapped against licensed child care slots across the state, 44% of families were classed as living in a "child care desert" (with less than one slot for every three children aged 0-5). Thus, many parents – even those living in urban or suburban areas – experienced "some or a lot of difficulty" in finding early education.[9]

The 2020 pandemic has created new and intense pressures on early childhood education across North Carolina. The supply of available places for young children has fallen dramatically. In a survey in May-June 2020, Barnett et al. (2020) estimate that almost three-quarters of pre-school centers (for children aged 3-5) had closed temporarily. Even as centers struggle to remain open or re-open, most now have significantly higher costs – reducing supply even further.[10] As well, demand for places has fallen sharply and changed form. Some parents have lost their jobs or seen their incomes fall – these families are now unable to afford pre-school – and many parents are reluctant to send their children to child-care centers or preschools in case of infection. Demand has also changed: many parents now need ECE that is more flexible either to match their new work schedules or to allow them to job search maximally.

The pandemic has also created new demands on parental time. Now intermittently back in the household, children require educational supervision (as described by Barnett et al., 2020). This supervision takes time; it may also require the acquisition of new skills by parents. Using national data on school-aged children, Heggeness (2020) describes a "juggling act for working parents." Families have had to immediately respond to the need for more time on home care and many did so by sacrificing work time.[11]

As the pandemic continues, patterns of early education remain flux. Yet, there has been almost no data on how pandemic-related changes in early education are affecting family's work options, especially in contexts where there was already a shortage of available places for children. This investigation is, to our knowledge, the first direct survey of how families are combining early education and work in the time of COVID-19.

2 Survey of Working Parents in North Carolina

Our analysis is based on a new survey of 802 working parents of children aged up to 5 in North Carolina. This large survey has a sampling frame that covers all working parents with young children across the state. (Appendix 1 describes the survey design). The survey was administered in October 2020 and therefore relates to families experiencing high rates of community infection from the coronavirus.

The sample of respondents in this survey broadly reflects the population of working parents with children aged 0-5 in North Carolina. Across 96% of the 802 respondents, at least one family member within each household is working or looking for work.[12] Overall, working parents with young children are distinct from the general working population in terms of age and education: they are younger than the working population; and have higher education levels.

The characteristics of the survey respondents correspond closely to state-wide characteristics. (Appendix Table 1A compares the personal characteristics of the sample to the state population). Racial groups match and, as expected, the ages of the respondents are slightly lower. Notably, the sample is predominantly female and is mostly composed of primary care-givers. On average, the education levels of the sample are above the state population (37% of the sample have at least a Bachelor's degree; across North Carolina's working families the rate is 31%) . The sample is close to the state profile in terms of single parents and married households. Geographically, the sample includes urban, suburban and rural proportions that are very close to the state averages.

The work status of the survey respondents resembles those across the North Carolina workforce – adjusting for the adverse shock of the pandemic. (Appendix Table 1B compares the labor market characteristics of the sample to the state population). The employment rates match, as do the unemployment and furlough rates. The labor market participation of the respondents is very close to that of the state population

The sample respondents do report slightly lower weekly earnings $850 versus $1,230 state-wide. (This different reflects discrepancies in in time frames and question phrasing). Looking at average household income in 2019, the sample and the North Carolina workforce match almost exactly at $52,000. Finally, the sectors the respondents work in match those of the state's workforce.

Overall, and adjusting for the pandemic, the survey responses match the characteristics and circumstances of families with young children across all of North Carolina.

3 Early Childhood Education in North Carolina

Enrollment Patterns

Child care and early education opportunities for children aged 0-5 in North Carolina – both pre-pandemic and mid-pandemic – are shown in Table 1.

Before the pandemic, half of all families enrolled their children in center-based or formal early childhood education. These families were relying on a mix of formal care options – private programs, public programs, and Head Start – as well as informal care by relatives.[13] Thus, most families were not able to access child care options to cover a full-time work commitment.

Table 1: **Child Care – Enrollments**

	Working Parents in NC	
	Pre-pandemic	**Mid-pandemic**
Any center-based or formal care (%)	51	32
Type of care used (%):		
Private, center-based program	26	15
Public school pre-K	14	6
Head Start	10	4
Family child care home	12	7
Informal child care at home	20	11
Weekly hours by users:		
Private, center-based program	24	23
Public school pre-K	18	15
Head Start	20	16
Family child care home	17	17
Informal child care at home	19	21

Notes: N=802. Question: "In a typical week, [currently/before the coronavirus (COVID-19) pandemic], which types of paid or unpaid child care did you or another parent/caregiver in your household use for your child(ren) in the age range 0-5?"

Mid-pandemic, the proportion of families enrolled in center-based care has fallen to 32%. The mix of formal care options remains similar to that pre-pandemic, but reliance on these formal care options has fallen by approximately one-half. The effect of the pandemic has been to reduce formal early childhood education for families by 40-50%. This reduction includes subsidized programs such as public school pre-K and Head Start. Many more families are now providing child care within the home and without public financial support.

Data on weekly hours of child care enrollments are given in the bottom panel of Table 1. The hours are averages only for those who rely on each child care option. Working parents only enroll their children on average 15-24 hours per week; this is far below the typical work week of 35+ hours. By a significant margin, these child care options do not span the

hours of a full-time worker.

For families accessing child care, hours of child care have broadly remained stable between pre-pandemic and mid-pandemic dates. On average, reliance is 1-2 hours lower mid-pandemic than prior to the pandemic. Therefore, the decline in child care reliance is predominantly caused by families completely exiting the formal child care system (not by each family downscaling by a few hours).

Supports by Employers

Increasingly, employers recognize that supporting child care helps working families. However, not all workplaces can or do invest in child care; and few offer comprehensive supports.

Table 2: **Child Care – Employer Benefits**

	Working Parents in NC (%)
Employer offers at least one benefit	49
Paid sick leave	20
Flexible working hours	20
Flexible spending account	19
Paid family leave	17
Emergency leave	14
On-site child care	11
Child care referral service	10
Subsidy to the cost of child care	7

Table 2 shows the pattern of employer benefits in North Carolina as of October 2020. Almost exactly half of all families obtain employer-supported benefits. As well, many of the most common supports – paid sick/emergency leave of flexible work hours – are limited or indirectly related to child care needs. Only one-in-ten working families has access to on-site child care; fewer than one-in-ten receives an employer subsidy to cover child care costs.

Working families do value child care benefits from their employers. Families ranked employer benefits that would be most valuable as: flexible working hours (41%); on-site child care (40%); subsidized child care (35%); flexible spending accounts (27%); and child care referral services (27%). Thus, there is a strong preference for a variety of child care supports; and some of these supports – such as flexible working hours – may not require employers to provide additional funding for child care.

Enrollment Constraints

There are many reasons why families are currently unable to access quality child care in formal settings. Table 3 shows the main reasons why families are unable to access center-based care. Although many families do not need formal center-based care, over one-quarter

of families either could not afford childcare or did not consider the available providers were adequate.

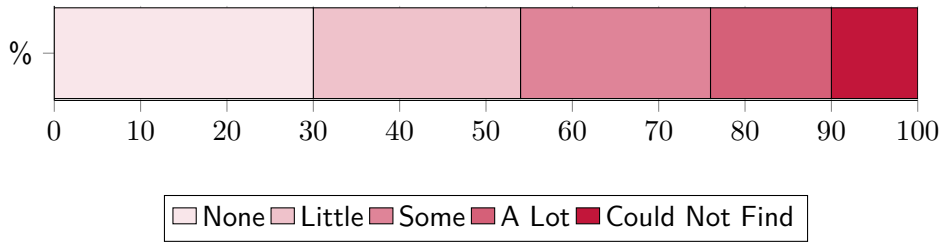
Table 3: **Child Care – Constrained Choices**

	Working Parents in NC (%)
Why not used any center-based or formal care?	
Did not need help with childcare	53
Not comfortable with available providers	27
Could not afford childcare	26
Could not find childcare to accommodate my needs	14
To support your work, current or future significant challenges are finding child care that is:	
Affordable	54
High quality	46
At a convenient location	35
Not filled up (has open slots)	33
Matched to a non-standard work schedule	32
Flexible to accommodate changing work shifts	29
Available as emergency/backup	26
For a special needs child	8

Parents in the survey emphasized that the difficulties in finding center-based child care were its "cost" and "quality". More than half of all parents identified both these difficulties. Other concerns were over the location of the center and the restrictive hours/schedule available. In line with national data on child care deserts, 38% of working families in North Carolina reported that the biggest difficulty was that no openings were available.

Working families appreciate that constrained child care options adversely affect their work. As shown in Table 3, affordability and quality are the key features that would help parents in the workplace. Other features – location, availability, and flexibility – are also important.

Difficulty Finding Current Child Care Arrangement



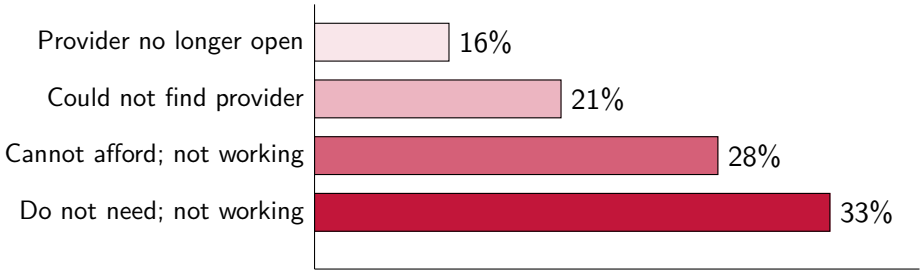
Given their current circumstances and taking account of available options, most parents report how difficult it is for them to find the child care arrangement they rely on. The degree of difficulty is shown in the bar line (for parents who rely on care from outside the

home). One-in-three parents do report "no difficulty." However, more than one-third report "some" or "a lot" of difficulty and one-in-ten report that they could not find a satisfactory child care arrangement. The difficulty in finding any child care appears high, not least because many of these child care arrangements are less-than-ideal in terms of affordability, quality and convenience. Indeed, when asked directly, many more parents would prefer to be able to access center-based care or public pre-K.[14]

COVID-19 Pandemic Factors

As noted above, formal child care availability has fallen by approximately half since the pandemic. Both supply and demand factors are playing an important role in the new mid-pandemic patterns of child care. These are listed in Chart 1.

1. Reasons not currently using any child care (other than parent/guardian):



Some families have lost child care because their provider has closed; others because they could not find a provider during the pandemic. Significantly, three-in-ten families no longer rely on child care because they cannot afford it; and one-third are not working and therefore have substituted in home care over formal center-based care. It remains to be determined if this last group of parents will be able to find work again if they have no obvious access to child care.

Looking Ahead

As the pandemic continues, many families might be unable to sustain even the limited child care they currently have. In survey responses, many working parents do report their current child care arrangements as "very manageable" (although some of these have exited the formal system entirely). However, a significant proportion – approximately 20% – are concerned about how long they can continue their current arrangements.

Table 4 itemizes the likely factors influencing child care arrangements if the pandemic continues another 6-12 months (from October 2020). Four main factors are highly salient for families, making it highly likely that child care options will deteriorate even further as the pandemic continues. One-quarter of working parents predict that their child care will disappear; and three-in-ten predict that it will not be affordable or be compatible with their

work commitments. Many families are also concerned that their child care arrangements may become a greater hazard in terms of COVID-19 infections.

Table 4: **Child Care – Future Challenges**

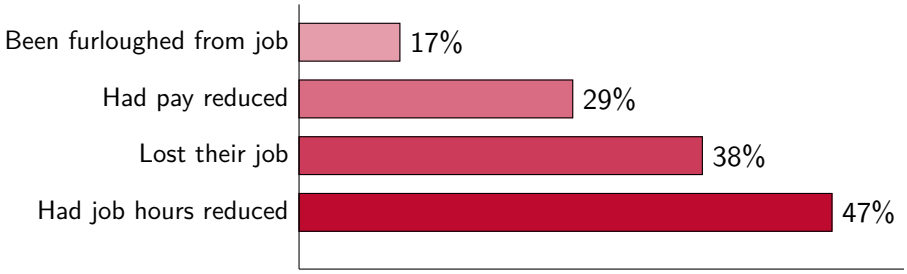
	Working Parents in NC (%)
If pandemic continues 6-12 months, likely factors influencing previous child care arrangement:	
It won't be available	24
It won't be affordable for my family	28
It won't be compatible with our work hours or schedule	28
It will be more likely our child/family will be exposed to COVID-19	30

Unless there are significant reductions in virus transmission or an economic boom, future child care arrangements for working families will deteriorate even more.

4 Economic Consequences of the Pandemic

The COVID-19 pandemic has sharply reduced economic well-being. This is true for all groups; but it is especially clear for working families. As reported in the survey, there is a clear and very large direct economic impact: 55% of households report that at least one adult has experienced job loss, furlough, or reduction of pay or hours because of the COVID-19 pandemic. This economic adversity has several dimensions, as shown in Chart 2. Across households, almost half are experiencing reduced hours and four-in-ten lost their job; in addition, one-in-three had reduced pay and one-in-six were furloughed.

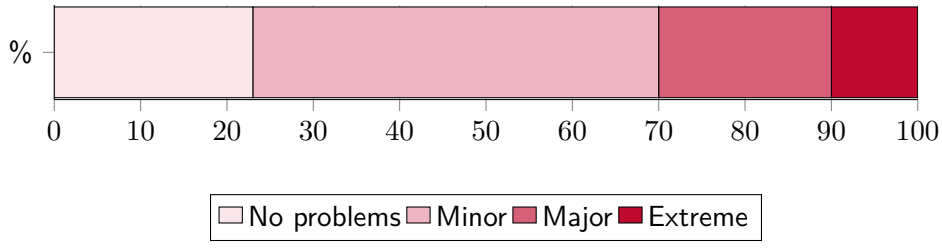
2. As a result of the pandemic, has a household member:



The job loss rate from this survey mirrors the state-wide unemployment data from the Census. As of October 2020, the U.S. Census Household Pulse Survey estimated that 46% of North Carolina families with children experienced loss of employment income since March 2020 (for self or household member). This loss of employment income averages approximately 20%, an amount far in excess of what families pay for child care.[15]

For those with jobs, the COVID-19 pandemic has changed conditions at work. Predicting through to the end of 2020, the division is almost equal between workers expecting to be working from home versus working at a specific job site (42% versus 47%); and one-in-ten workers are unsure where they will be working by the end of the year.

As of October 2020, your family's financial problems are:



Together, these pressures are economically damaging. As of October 2020, three-quarters of families were reporting financial problems, with one-in-ten describing these as extreme.

5 Households of Color and Urban/Rural Differences

There are significant disruptions to early education for all working families across North Carolina. Here, we take advantage of the large sample size to examine patterns for specific families – households of color – and to compare the patterns between urban and rural households. First, we describe on key differences in ECE patterns – both pre-pandemic and mid-pandemic. Next, we report how ECE and economic circumstances have affected these groups.

Households of Color: ECE Patterns

The patterns of child care and early education are distinct for households of color in North Carolina. (These findings are based on the sample of 232 non-white respondents within households).

Enrollment rates for this group are similar to the state-wide average. About half accessed center-based or formal care before the pandemic and one-third afterward (as per Table 1). However, this group has lower incomes than the state-wide average; these families should be accessing subsidized child care at relatively higher rates.

The child care available to households of color comes with fewer employer supports on average. For each of the possible benefits – leave, flexible working hours, direct child care services – availability is 2-4 percentage points lower than the rate state-wide. (These families are more likely to work in occupations that rely on in-person interaction. With COVID-19, these occupations are dwindling.)

Households of color also face more constraints on their use of child care. Again at elevated rates compared to state-wide, these families report they do not use child care because they are not comfortable with available providers, they cannot afford child care, or they cannot find child care that meets their needs.

The pandemic has hit this group especially hard. Relative to state-wide rates, they are now more likely to opt out of formal center-based care or early education. Since the pandemic started, households of color more frequently report that: their provider is no longer open; they cannot find an alternative; and they cannot afford one because of reduced income.

Broadly, these figures show that households of color require more, better quality child care and early education. This requirement arises in part because their options are inferior to the average for working parents. The need is heightened by deteriorating child care options over the course of the pandemic.

Households of Color: Economic Impacts

The economic consequences of the pandemic are similar for households of color as they are across North Carolina. That is, 55% report that at least one member of the household has experienced labor market dislocation. Similarly, the quit rate attributable to inadequate child care (before the pandemic) is 24%; a very high rate but one that is almost identical to the state-wide average. Thus, it appears that the pandemic has been equally destructive to the labor market participation of households of color.

The disadvantages for households of color are more subtle than job loss. Before the pandemic, inadequate child care had a relatively big effect on the time these parents could spend at work. Both cutting back on work hours and the decision to move to part-time were especially sensitive to child care problems. Households of color also experienced child care problems disproportionately in their career opportunities. They were more likely to turn down promotions, training, and job offers. These rejections accumulate into a long-term disadvantage in the labor market. These relative disadvantages existed before the pandemic and are remaining over the course of the pandemic.[16]

Finally, households of color were less able to adjust their work arrangements so as to provide child care during the pandemic. Relative to the state-wide average, these households took less paid leave, were unable to adjust their hours of work, or alternate work time with other household members. Therefore, child care options are less flexible in themselves; and workers in households of color have less flexibility in their workplaces.

Overall, households of color are facing income losses rather than job losses from inadequate child care mid-pandemic. These losses go together with child care that is insufficiently responsive to job conditions.[17]

Regional Variation in ECE

There are differences in patterns of early education across North Carolina. The data allows us to compare families living in large, medium, and small cities with families in suburbs and families in rural areas. (By large city, we refer to Charlotte and Raleigh; medium cities are Cary, Durham, Fayetteville, Greensboro, and Winston-Salem.)[18]

Significantly, rural areas relied on ECE less before the pandemic. Whereas the majority (54-62%) of families in cities relied on formal ECE, less than half (44%) of families in rural areas did so. Notably, this difference was not because of preferences by rural families. When asked if they had good choices for ECE locally, more than half (51%) of rural families said "no". Good choices increased with population density: only 32% of families living in large cities said they had "no good choices".

In terms of access to ECE, the pandemic hit families across North Carolina. But it hit rural families especially hard. ECE enrollment declined by approximately 40% statewide, but

it declined by more than 50% in rural areas. By mid-pandemic, only 15% of rural families were accessing formal ECE.

Relative to other localities, fewer rural families were enrolling in ECE before the pandemic and even more dropped out during the pandemic. The gaps in ECE between families in rural areas and cities has increased with the pandemic.

Regional Economic Impacts

Many families have experienced labor market disruptions – job loss, furlough, or reduced pay/hours – from COVID-19. But the patterns of disruption are not uniform across regions.

Labor market disruptions are high in cities: affecting 59% of households in large cities and 60% in medium cities. By contrast, suburban families have been relatively cushioned: 46% of families report a labor market disruption. However, rural areas have been hit as hard as cities: 57% of families reported at least one household member had experienced job loss, furlough, or reduced pay/hours.

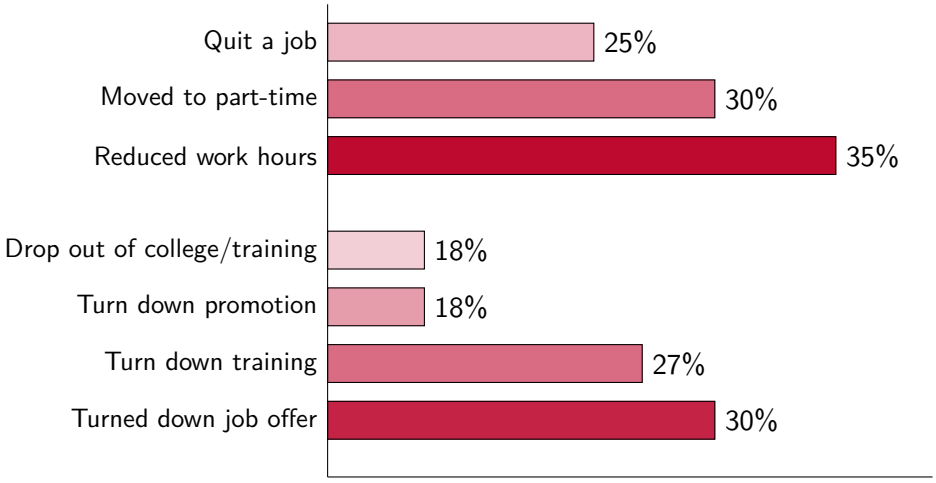
Combining the pandemic with ECE access patterns, rural areas are experiencing the sharpest impacts. Few families are in ECE and many families are facing economic difficulties. For the cities, job loss is a big problem but ECE is available; in suburban areas, job loss is less of a problem although access to ECE might be strengthened. But for rural areas, both work and ECE options have deteriorated. As discussed above, these two phenomena reinforce each other: it is hard to find work without child care; it is hard to afford child care without work.

6 How Inadequate Child Care Affects Workers

Families need early childhood care and education to help them be productive. When this education is inadequate, workers are disadvantaged in terms of: time spent at work; work productivity and effort; and career opportunities. These adversities were present before the pandemic; and they have intensified during the pandemic.

Inadequate child care has diverse effects across many working families with children aged 0-5. These are shown in Chart 3. Over the course of these childhoods, approximately one-in-three parents moved to part-time work or partially reduced their hours. One-quarter of parents quit a job because of inadequate child care. (This high quit rate has been validated in a number of other studies).[19] These are the immediate effects when child care is insufficient.

3. Before the pandemic – as a result of child care care problems, had a household parent:

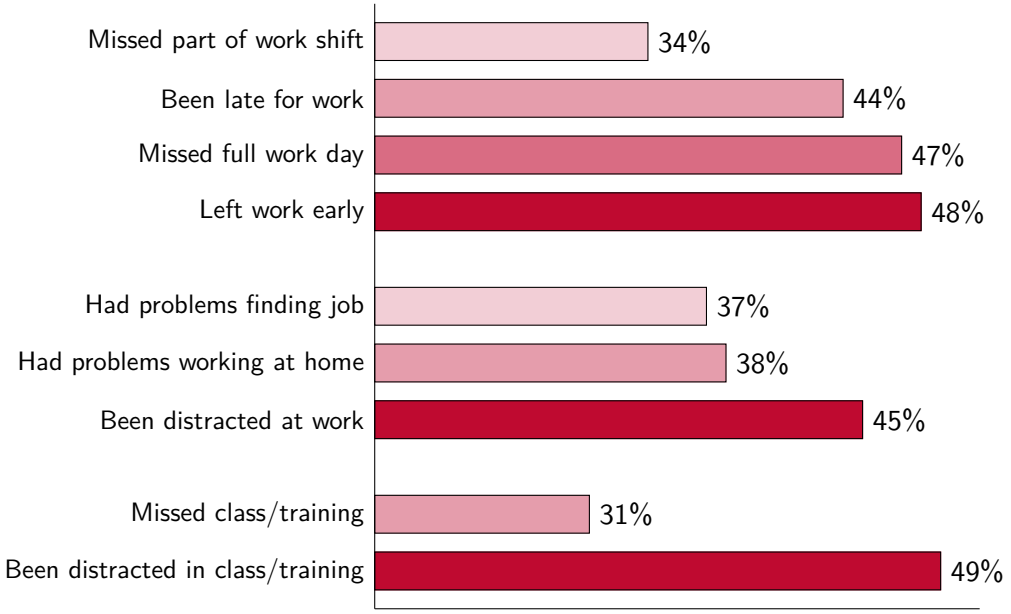


There are also long-term work-related consequences of inadequate child care. One-fifth of parents reported dropping out of college or training; another one-fifth turned down promotion or job reassignment. Parents also report declining training and job offers. These missed opportunities impair the ability of working families to make economic progress either through skill development or career advancement.

Work-related distortions have grown since the start of the pandemic. These distortions are shown in Chart 4. First, when child care is inadequate, time at work is significantly impaired: between one-third and one-half of parents report missing part of a shift, being late, missing work days, and leaving early. Second, attachment to the labor market is lower: almost four-in-ten parents report problems in finding a job because of child care concerns. Third, productivity is lower: almost half of all parents report working at home is difficult and that they are distracted when working. Finally, inadequate child care impairs the development of skills: many parents report missing classes or training sessions; almost half report

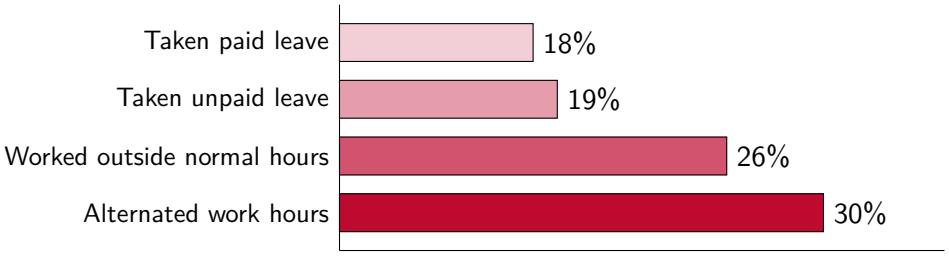
being distracted when in training. Together, these distortions put working families at a significant disadvantage.

4. Since the pandemic – as a result of child care care problems, has a household parent:



Parents are attempting to respond to the dual constraints of both early education and the pandemic. Overall, two-thirds of families have adjusted their work patterns. As shown in Chart 5, these adjustments include: taking paid or unpaid leave; working outside normal business hours; working fewer hours; and alternating work hours within the household. To the extent that families are able to make these adjustments, they can partially offset the burden of the pandemic.

5. To provide child care during the COVID-19 pandemic, have you or another parent/caregiver in your household:



The impact of inadequate child care is substantial, multi-faceted and long-lasting; it adversely impacts workers' time and effort commitments to their jobs, their ability to be productive when at work, and their future career opportunities. These influences are manifest in various ways – fewer hours of work, more distractions, fewer promotions, and even

job terminations. When the effects are aggregated, the survey shows that most working parents face some disruptions or adversities. The effects are stronger for some groups – parents who are female, minority race, and low income – but they are high across all population groups in North Carolina.[20] Child care challenges in North Carolina are similar to those facing other states.

7 Impacts on the North Carolina Economy

Inadequate child care clearly affects workers' time, productivity and careers. There are also burdens across the economy, for local businesses and taxpayers across North Carolina.[21] These burdens are modeled and estimated based on the survey data and state-specific economic data.

Modeling the Economic Impacts

The main burdens of inadequate child care for working parents, local businesses, and taxpayers are shown in the Boxes below.

Working Parents

- Lost earnings now (lower productivity/experience)
- Extra costs of job search (to match work with child care)
- Lost future career earnings (less experience, fewer skills)

Businesses

- Lost revenue now (lower output)
- Extra workforce costs (disruptions/absences, hiring)
- Lost future revenue (lower workforce capital)

Taxpayers

- Lost tax revenue now (lower incomes)
- Smaller state/local tax base
- Lost future tax revenue (weaker economic growth)

For individual workers and their families, the economic consequences from inadequate child care are clear and immediate. Earnings are lower, along with losses in time spent looking for work to match child care arrangements. With less training and less experience, working parents also face diminished career prospects and so lower future earnings when their children are school age.

For firms and businesses, having a workforce with lower productivity and shorter tenure reduces profitability. An unstable, distracted workforce can affect the entire business, including product quality and customer service. (Firms may reduce workers' pay, but the adjustment is not complete: wages do not instantaneously and perfectly adjust; and firms would prefer workers to not be constrained by child care). Directly, firms must pay for recruitment and hiring as their workforce turns over; they will also incur extra managerial costs. These output losses and extra costs are immediate when workers have young children. But the

effects extend into the long-term because the firm's workers are not optimally trained and have less experience.

For taxpayers, tax revenues are lower: the economic impacts of inadequate child care on individuals and firms reduce the tax base. At the state level, there are losses in tax revenues, primarily through income and sales taxes: North Carolina has a single income tax bracket at 5.25% and a 6.9% state/local sales tax (with exemptions). In addition, federal income taxes are affected. The marginal federal tax rate is 10-15% (depending on income levels).[22] For each year of reduced income, there is a corresponding loss in tax revenue. Lost revenue to businesses also means lower tax revenues.

To calculate the economy-wide impacts of inadequate child care for these three groups – workers, firms, and taxpayers - we use a multi-period economic model.[23] These calculations rely on evidence from the survey on the extent of disruptions; economic data on earnings, business activity, and tax rates in North Carolina are also applied. The model is run for both pre-pandemic and mid-pandemic scenarios; the mid-pandemic scenario accounts for the adverse supply and demand shocks as of October 2020. (The full methods for calculating these impacts are reported in detail in Appendix 2).

We report amounts per working parent both as annual amounts and over the early years of childhood from 0-5. There are approximately 610,000 children aged under 6; this corresponds to 400,000 working parents across the state whose labor market contributions are constrained by inadequate child care.[24] Therefore, we report aggregate burdens for all these 0.4 million working parents across North Carolina.

Annual Burdens from Inadequate Child Care

Annual burdens are estimated for each year when a child is aged 0 through 5 (at which age most children are eligible for publicly-funded kindergarten). These burdens – caused by inadequate child care – are reported as annual amounts, although they vary for each child-year (with infants requiring the most child care at home). The annual losses are shown in the boxes below.

Losses per working parent amount to $3,870 per year. These apply for each year when a child is aged under 6. The largest component of that loss is due to lower earnings whilst in work; there are also significant losses because of time unemployed and time and expenses in searching for work.

Losses to business amount to $1,270 per year for each year when a worker has a child aged under 6. This burden comes from: reduced revenue; lower productivity that is not offset by lower wages; and extra hiring costs.[25]

Annual Economic Loss from Inadequate Child Care

	Annual Loss per Working Parent (of child aged 0-5)	
	Pre-pandemic	**Mid-pandemic**
Working Parents:		
Lost earnings	$3,060	$3,880
Extra cost of job search	$810	$890
Total	*$3,870*	*$4,670*
Businesses:		
Lost revenue	$340	$340
Hiring/staff costs	$930	$1,090
Total	*$1,270*	*$1,430*
Taxpayers:		
Lost federal tax	$620	$730
Lost state tax	$420	$490
Total	*$1,040*	*$1,220*

Taxpayer revenues are reduced by $1,040 per year. These reductions arise because lower incomes lead directly to lower income tax contributions and indirectly to lower consumption taxes paid. Federal losses are caused by lower earnings only; state/local losses arise from lower earnings and lower consumption of taxed goods.

The pandemic has exacerbated these economic losses. Based on the survey responses, inadequate child care imposes greater penalties in terms of work opportunities and earnings. Mid-pandemic, working parents are incurring economic losses of $4,670, approximately 20% greater than before the pandemic. Correspondingly, businesses and taxpayers are also facing greater burdens mid-pandemic. However, the pandemic has shifted (in relative terms) the losses toward working parents.

There are offsetting factors that mute the effect of the pandemic on the child care burden. First, because all incomes are lower mid-pandemic, the absolute sizes of the penalties are partially narrowed. Second, fewer parents are working, which makes their child care difficulties less salient. Third, as shown above, parents are adjusting their work times and patterns to accommodate their reduced child care options. However, even as the child care burden is lower, these factors are not desirable in themselves.

Total Losses from Inadequate Child Care per Working Parent

Parents experience economic losses for each year their child is aged under 6. In addition, because of lower experience and lower skill development, parents experience some small (but non-trivial) economic losses after the child enters school. So, in total, each parent experiences annual burdens before the child enters school, as well as future burdens when the child is older but the parents' lost experience and skills still matter.

Total losses for working parents are substantial. These totals are calculated up to age 8 for the child; they are expressed as present values from the year when the child is born. Thus, they represent the economic consequences per working parent who is facing a significant duration without adequate child care.

Working parents face a total economic loss of $19,960 from inadequate child care. This career burden includes the annual burdens as well as a lower trajectory of earnings over the years up to reaching age 8. Most of the burden is when the child is aged under 6, but there are persistent effects afterward.

Childhood Economic Loss from Inadequate Child Care

	Burden over Childhood per Working Parent (of child aged 0-5)	
	Pre-pandemic	**Mid-pandemic**
Working Parents:		
Ages 0-5	$19,300	$22,250
Ages 6-8	$660	$740
Total	*$19,960*	*$22,990*
Businesses:		
Ages 0-5	$6,320	$7,130
Ages 6-8	$220	$230
Total	*$6,540*	*$7,360*
Taxpayers:		
Ages 0-5	$5,160	$6,060
Ages 6-8	$180	$200
Total	*$5,330*	*$6,260*

Businesses experience a total economic loss of $6,540. This lump sum captures the period when the child is under school-age plus future losses in productivity, as well as additional hiring costs over the next five years. However, these amounts include only minimal pay distortions beyond the first two years: firms are assumed to adjust wages and work allocations over time to match workers' productivity.

Total losses in taxes are $5,330 from inadequate child care. Both federal government revenues and local government revenues are impacted over the full period of young childhood.

These long-term losses are substantial and they are higher as a result of the pandemic. However, long-term estimates for the mid-pandemic scenario are speculative because it is unknown how long the pandemic will last.

Aggregate Losses from Inadequate Child Care

There are over 400,000 working parents with children aged under 6 in North Carolina. Many of them will experience adverse consequences of inadequate child care; the aggregate impact on the state is therefore substantial.

Annual Aggregate Loss from Inadequate Child Care

	Aggregate Loss across North Carolina (0.4 Million Working Parents) [Dollars in Millions]	
	Pre-pandemic	**Mid-pandemic**
Working Parents	$1,548	$1,796
Businesses	$507	$579
Taxpayers	$414	$472

The above Chart shows the aggregate losses from inadequate child care across North Carolina. These are annual amounts across the labor force of working parents. Each year, $1,548 million is lost from lower earnings, lower productivity, and increased job displacement. In addition, businesses lose $507 million; and tax revenues across North Carolina are lower by $414 million. As context, state GDP is approximately $590 billion. Thus, as a result of inadequate child care, state GDP is lower by approximately 0.3% percent each year. North Carolina government spending in the state is $51 billion annually (including federal funds).[26] Inadequate child care reduces tax revenues equivalent to almost 1% of the state budget. The tax revenue loss is greater than the total of public spending (of approximately $160 million) on ECE in North Carolina. With the pandemic, these aggregate losses are even greater.

Robustness

The model calculations are based on representative survey evidence and state-specific data for North Carolina. They represent best estimates of the economic burdens from inadequate child care.

Most likely, the model estimates are conservative. First, the survey is of working parents, not all parents: some families are unable to secure adequate child care and so may not be working or looking for work; these parents likely experience larger burdens than working

parents. Second, these estimates do not account for the significant changes in labor force participation at or before childbirth – parents adjust their employment in anticipation of inadequate or expensive child care.[27] Third, when parents rely on other family members (inside or outside the household), these relatives may also experience labor market burdens.

Finally, the pre-pandemic relationships for North Carolina align with those reported in national studies and state-level analyses. These recent studies find substantial labor market distortions – especially in terms of job losses – from inadequate child care.[28] As this study is the first to examine the impact of the pandemic, external evidence from mid-pandemic is not available. However, trends in economic burdens depend on many economic and social factors. As the pandemic continues, the availability of child care is likely to fall, as is the quality and reliability of that child care; more centers will close (absent a fiscal stimulus). Simultaneously, the job market and the nature of work for working parents may change. The evidence here indicates that families in North Carolina face substantial immediate and future economic burdens from inadequate child care.

8 Conclusions

North Carolina parents need adequate and affordable child care in order to fully participate in the labor market. There is now substantial evidence that child care options affect time at work, productivity when working, and career opportunities. The impacts are various, long-lasting and economically significant. In turn, businesses are affected and so are tax revenues across the state.

These relationships were evident before the pandemic; but the pandemic has intensified them. Working parents are in a "double-bind": they cannot find jobs because they cannot access child care; and without jobs, they cannot build the skills and experience that will allow them to afford high quality child care. At the same time, with rising costs of providing COVID-safe child care, parents are further pushed out of the formal child care market. These patterns are especially salient for minority females with children.

State-wide, many parents are unable to access child care that meets the demands of their jobs. If these parents had access to affordable, high-quality and flexible child care, the North Carolina economy would be stronger.

9 Appendix 1: Sampling

The survey is representative of persons in North Carolina who are in the workforce and have a child aged 0-5. The survey was performed by Zogby Analytics in October 2020.

For this interactive survey, thousands of adults were randomly invited to participate. Each invitation was password coded and secure so that one respondent could only access the survey one time.

Based on a confidence interval of 95%, the margin of error for 802 is +/- 3.5 percentage points. This means that all other things being equal, the identical survey repeated will have results within the margin of error 95 times out of 100. Subsets of the data have a larger margin of error than the whole data set. (Additional factors may create error, such as question wording and question order).

Appendix Tables 1A and 1B show the descriptive frequencies for the sample and descriptive frequencies for all employed population with young children across North Carolina. Based on comparison of the survey with the state population, the survey appears to be generally representative of the North Carolina population with respect to location, age, race, household income, and sector of employment.

Appendix Table 1A
Individual Characteristics

	Survey Sample (%)	North Carolina Population (%)
Race:		
White	63	65
Hispanic	12	10
African American	20	18
Other	15	7
Education:		
HS diploma (or below)	26	36
Some college	37	34
Bachelor's degree+	37	31
Age: [a]		
18-29	41	38
30-39	44	40
40+	15	22
Gender:		
Male	26	50
Female	74	50
Family status:		
Single parent	26	34
Married	55	47
Locality:		
Urban	55	48
Suburban	19	24
Rural	24	26
Observations	*802*	*6,503,000*

Sources: Census (data.census.gov/cedsci/table?q=S1), March Current Population Survey 2020; fred.stlouisfed.org.

Notes: Sample is North Carolina parents/guardians who are caregivers (unpaid) of at least one child currently aged 0-5 and who are either working or in a school/training program. North Carolina population number includes persons aged 18-65. [a] Population of child-age households under 60.

Appendix Table 1B
Labor Market Involvement

	Survey Sample	North Carolina Workforce
Employment status (%):		
Working	57	58
Unemployed	10	7
Furloughed	6	6
Not in labor force	26	28
Individual usual weekly earnings	$850	$1,230
Average household income in 2019	$52,500	$52,600
Sector of work (%): [a]		
Finance, Technology, IT	13	11
Healthcare	9	12
Prof., Business, Personal	8	9
Manuf., Construction	8	9
Education	7	9
Retail	6	10
Government, Non-profit	5	6
Food, Agriculture	5	1
Trans., Logistics, Dist., Auto.	4	5
Hospitality	4	5
Not currently employed	31	31
Government support:		
Child care subsidy/payment from state of NC	13	n.a.
Any other public/employment benefits [b]	43	n.a.
Observations	*802*	*6,503,000*

Sources: Census, March Current Population Survey 2020; Bureau of Labor Statistics; fred.stlouisfed.org. NC Department of Commerce *Annual Economic Report, 2018*.
Notes: North Carolina parents or guardians who are the caregiver (not paid) of at least one child currently aged 0-5, and who has either worked or been in school/training program during the past year. North Carolina workforce population includes all persons aged 18-65. CPS sample: weighted frequencies for employed persons aged 16+ with children under age 6. [a] State-sector figures adjusted to equate employment rates. [b] Benefits include Medicaid, Food Stamps, TANF. *n.a.*, not applicable. Furloughed includes those workers "marginally attached to work force."

10 Appendix 2: Economic Model

A static, limited-horizon economic model is used to calculate losses caused by inadequate child care in North Carolina. The model estimates the economic consequences of inadequate child care for three agents: families, businesses, and taxpayers.

Calculations are expressed per working parent. Amounts are calculated per year. Immediate consequences are annual amounts when a child is 0-5 (expected value 3); future consequences are modeled for the "typical" parent of a child who is born in 2020 through to age 8. These calculations are then aggregated across the state's population of working parents with children aged 0-5.

The model is populated using survey data and state-specific economic data from the Census and Bureau of Labor Statistics. All figures are in 2020 present value dollars with a discount rate ρ=3.5% (Moore et al., 2004). Model variables and parameter values are summarized in Appendix Table 2.

Earnings and Output Losses:

- For i individuals, income losses y_i are expressed as a proportion α of total earnings Y_i; α is a parameter capturing labor market distortion caused by child care problems β. Estimation of β is from direct responses on child care problems; estimation of α is from a regression equation $\alpha = f(\beta, X)$, where X is a vector of family characteristics. We use the survey estimates of hours of work h lost per wage rate w to calculate the labor market burden. We use the survey estimates of work disruptions and the returns from skill accumulation to derive a small immediate wage penalty of $0.04w$. Individuals incur a proportion ϵ=0.9 of these lost hours and lost earnings; $1-\epsilon$ is incurred by firms.
- Output losses q are the sum of: the proportion (1-ϵ=0.1) of lost hours and lost earnings borne by the employer $(1-\epsilon)hw$; and direct employment on-costs c_i payable by the firm per worker. For these on-costs $c_i = 0.192Y_i$ (7.1% in paid leave, 3% in supplemental pay, and 8.8% in health insurance, `www.bls.gov/-news.release/ecec.nr0.htm`).

Federal Income Tax Revenue and State/Local Tax Revenue:

- Losses in federal income tax (FT) are derived from values for Y_i applied through the NBER tax calculator TAXSIM version 32 (updated July 2019). Taxes are per household with joint filing, single child and child care expenses of $3,000 in North Carolina. Marginal federal tax rates of 15% are applied.
- State/local income and consumption/sales tax rates in North Carolina: state income tax rates of 5.25% are applied (dividend income tax is not included; no exemptions are considered); marginal state/local sales taxes are applied at 6.9% (adjusted for 30% tax-exempt consumption). Source: `taxpolicycenter.org`.

Firm Turnover and Management Costs:

- Firms pay for turnover in reduced worker morale leading to lower productivity. For this model, the firm turnover cost $c_F T$ is estimated at tvr=19% of annual salary per affected worker (Y). This turnover rate estimate (tvr) is derived from summaries of evidence across two reviews and is the lower bound of reported estimates (Boushey and Glynn, 2012; Work Institute, 2017).
- Managerial costs are estimated as a fraction of total earnings losses Σy_i. No reliable estimate of managerial costs attributable to low worker performance are available; to be conservative, these managerial costs are therefore excluded.

Future Incomes, Output, and Income Tax Revenue:

- Future economic consequences are extrapolations proportionate to the immediate losses y, q, and $c_F T$. After child ages 6, impacts decay at rate τ per annum. Present value decay of impacts is $\rho\tau$.

1. Each working parent experiences on average 8 years of disrupted work patterns from birth.
2. Each working parent has lower skills and less experience and these are proportionate annuities based on published estimates of the returns to experience and the returns to education/training (1.5% and 2.2%, respectively, Carneiro et al., 2011). These annuities are lost for workers who experience child care problems and are assumed to decay to zero after five additional years.

Appendix Table 2
Model Variables and Parameters

Variable/parameter		Value
y_b	Baseline individual earnings p.a.	\$42,500
q	Job quit/exit rate p.a.	0.0074
m	Months unemployed p.a.	0.23
j	Job search costs (% of y_b)	0.0640
v	Wage penalty (% of y_b)	0.0170
η_t	Annual growth rate earnings	0.02
ϵ	Proportion of burden incurred by worker (not firm)	0.90
z	On-costs	0.1990
d	Hiring costs (% of y_b)	0.25
r	Federal tax rate	0.15
s_s	State sales tax rate (net exemptions)	0.0483
s_y	State income tax rate	0.0525
ρ	Discount rate	0.0350
y_e	Earnings with inadequate child care p.a.	$y_b(1 - v - qm/12)$
g	Tax base	$y_b - y_e$
Economic Loss Formulae:		
	L_{w1}	$(y_b - y_e)\epsilon$
	L_{w2}	$qmy_b/12$
	L_{w3}	qjy_b
	L_{w4}	vy_b
	L_{worker}	Σ L$_{wk}, k = 1...4$
	L_{f1}	$(y_b - y_e)(1 - \epsilon)$
	L_{f2}	qdy_b
	L_{f3}	$(y_b - y_e)z + zvy_b$
	L_{fiscal}	$\Sigma L_{fk}, k = 1...3$
	L_{s1}	rg
	L_{s2}	$s_s g$
	L_{s3}	$s_y g$
	L_{social}	$\Sigma L_{sk}, k = 1...3$

Notes/Sources: y_b, q – survey data, working parents. m – [`www.bls.gov`]. v – survey data, regression coefficients. η_t – Carneiro et al. (2011). ϵ – by assumption. z – includes paid leave (7.1%), in paid leave, supplemental pay (3%), health insurance (8.8%) [`www.bls.gov/-news.release/ecec.nr0.htm`]. d – Boushey and Glynn (2012); Work Institute (2017). r – Saez and Zucman (2019). s_i – for income tax, no dividend tax or exemptions; state/local sales taxes adjusted for 30% tax-exempt consumption [`taxpolicycenter.org`]. ρ – Moore et al. (2004).

Notes

1. The child care system includes (for younger children) child care centers and family child care homes and (for older children) *NC Pre-K*; a snapshot of the system is at `https://ncchildcare.ncdhhs.gov`.
2. See studies by Temple et al. (2010); Magnuson and Shager (2010); Reynolds et al. (2011); Lipsey et al. (2015); van Huizen and Plantenga (2018). On achievement gains, see Weiland and Yoshikawa (2013); Duncan and Magnuson (2013). On changes in special education placement, see Karoly (2012); Weiland (2016); on health, see Campbell et al. (2014); Conti et al. (2016); on crime, see Hill et al. (2015). For gains over duration in pre-school, see Arteaga et al. (2014); on returns to quality, see Auger et al. (2014); Yoshikawa et al. (2016); Araujo et al. (2016).
3. The children were followed up to age 30. Overall, the Abecedarian Program generated significant gains in educational attainment (an additional 1.2 years over the control group); economic and socio-behavioral gains were mixed (Campbell et al., 2012).
4. Exploiting differences in funding across localities, Dodge et al. (2017) identified substantial academic gains: the cumulative months gained by fifth grade for a child participating in the combination of *Smart Start* and *More at Four* was 6.2 in reading and 3.3 in math. There were also significant reductions in grade retention and special educational placement from pre-school: *More at Four* reduced special educational placement by up to 48% by fifth grade (Ladd et al., 2014; Muschkin et al., 2015).
5. Ruppanner et al. (2019).
6. Corcoran and Steinley (2017); Cascio (2018).
7. Data from `https://ncchildcare.ncdhhs.gov/County/Child-Care-Snapshot`.
8. National Institution for Early Education Research, *Yearbook 2019*.
9. See Malik et al. (2018); data from `cdn.americanprogress.org`.
10. Higher costs arise because of cleaning costs and the need for physical distancing (?).
11. Alon et al. (2020) investigate how flexible are the responses by fathers and by employers to this shift of child care back to the family unit; their analysis emphasizes the relative flexibility for occupations that permit working remotely.
12. All analyses are performed on the full sample of 802 observations, unless otherwise indicated.
13. One-quarter of state families rely on formal center-based care. This rate is close to National Household Education Survey estimates; see Corcoran and Steinley (2017).
14. Parents were asked: "Regardless of what you think your childcare arrangements will look like if the pandemic continues another 6 months or a year, what would be your preferred method of care if it were available and affordable?" 41% responded in favor of center-based care or public pre-K.
15. Source: `www.census.gov/programs-surveys/household-pulse-survey/datasets.html` (Week 16). Data includes all households with children under 18.
16. In each case, the rates were 2-7 percentage points higher than in Charts 3 and 4.
17. There are other groups facing disproportionate economic adversities. The economic burden is also higher for working families that are: younger; not college-educated; and in living in rural areas. Economic sectors matter too, with workers in the retail sector are especially hard-hit.
18. It is not possible to match respondents to specific counties within North Carolina.
19. For example, see Belfield (2018).

20. These survey findings for North Carolina are consistent with national and state-level evidence from before the pandemic. The high quit rate was identified in a 2016 National Survey of Children's Health; it has also been reported in a national survey of working parents. These other studies include: Montes and Halterman (2011); Davis et al. (2017); Talbert et al. (2018); Belfield (2018).

21. See Workman and Jessen-Howard (2018); Belfield (2018).

22. State tax data from `www.taxadmin.org/assets/docs/Research/Rates/ind_inc.pdf`. On federal taxes, see Saez and Zucman (2019).

23. Our approach is similar to that used in prior studies of inadequate child care (Davis et al., 2017; Talbert et al., 2018; Goldberg et al., 2018; Belfield, 2018, 2019).

24. The population of working parents depends on number of children in the family, number of parents in the family, and labor force participation rates. These parameters fluctuate over time depending on demographics and labor market conditions.

25. These are not burdens per worker because not all workers have young children. These burdens may be hard to see if they are spread over time across a large business operation and if they are not explicitly measured by firms.

26. GDP and state spending data from `www.urban.org/policy-centers`.

27. These labor force participation effects are detailed in Goldin and Mitchell (2017).

28. See for example, Davis et al. (2017); Talbert et al. (2018); Belfield (2018).

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