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Economic Losses from Inadequate Child Care for Working Families in Tennessee

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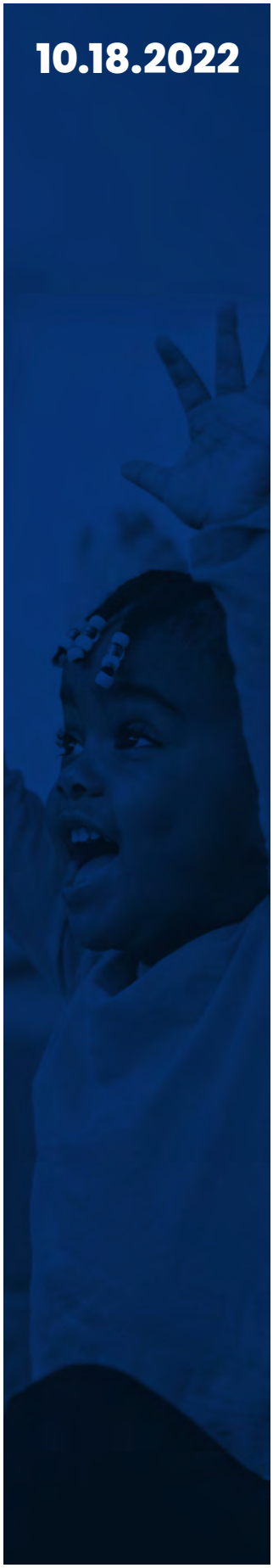

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TQEE

Summary

Child care is essential for ensuring families can participate in the labor market and become economically secure. But too many working families across Tennessee struggle to find and afford child care that meets their needs.

Using a new survey of 2,507 Tennessee parents with young children, conducted in summer 2022, this report examines the links between child care and work, and the adverse economic impact of inadequate child care in the state.

Our analytical sample for this report includes 1,297 parents of children under age 6 actively working or looking for work. Among the findings:

- Most families face significant challenges in finding child care that supports their work. Affordability and quality are significant concerns. But the most basic and widespread concern is simple accessibility – being able to find available slots that meet their families' needs – with more than two-thirds of parents saying access is a challenge.

- To fund their child care needs, families are mostly on their own. A small number have access to subsidized public programs like Head Start and Voluntary Pre-K. Eight percent report receiving some help through Tennessee's child care payment assistance program for low-income families. Many used the expanded federal child tax credit to help pay for child care, though that program was temporary. Employer support of child care is limited, with very few parents reporting child care services or financial support for child care from the companies they work for.

- Most families are patching together a mix of parental care, center-based care and informal care for their young children.

Inadequate child care plays an important role in workers' earnings and their productivity.

- Many working parents report economic disruptions from inadequate child care. One in six report voluntarily quitting a job; One in five have left the workforce; and one in seven report being let go from their jobs.

- Many parents cannot work their preferred hours, being unable to work full-time or advance in their careers (with promotions or new jobs).

Separately, it's worth nothing that while not part of our analytical sample for this report, stay-at-home parents are in part choosing not to work because of lack of access to child care. Of 483 survey respondents identifying as stay-at-home parents of children under age 6, over one-third report having left the workforce because of child care problems.

The economic consequences of inadequate child care are felt by parents, businesses and Tennessee taxpayers. These consequences can be modeled and calculated using survey and state-specific data. Each year, as a result of inadequate child care:

- Working parents lose on average $5,480 in job terminations, lost earnings, reduced productivity at work, and in more time looking for a good job.

- Businesses lose on average $1,650 per working parent in reduced revenue and in extra recruitment costs.

- Taxpayers lose on average $1,370 per working parent in reduced tax revenues.

In total, over the course of their children's early childhood through age 8:

- Working parents lose on average $20,970 in lost earnings, reduced participation in the labor market, and in lower returns to experience.

- Businesses lose on average $3,100 per worker in reduced revenue and in extra recruitment costs.

- Taxpayers lose on average $5,110 per working parent in federal and state/local tax.

In the aggregate, those annual losses roll up to $1.652 million in parental income, $497 million in business revenue, and $413 million in tax revenue. The total burden of inadequate child care is therefore $2.6 billion. Over the long-term, the economic losses are even larger.

This analysis was also performed for TQEE's Bright Start Tennessee Network regions across the state. The results for these regions vary in two key dimensions: how much child care opportunities were adversely affected; and the economic consequences of that adversity.

For Tennesseans, inadequate child care has substantial and long-lasting economic consequences.

Contents

Introduction

There is substantial research evidence on how quality early childhood care and education promotes child development. It leads to learning gains and improvements across a range of outcomes. Gains are greater for children who enroll in higher quality programs; and gains are especially strong for disadvantaged children. Quality early care and education is good for families.[1]

Research studies also show how child care quality and availability strongly affect parents' labor market outcomes. Early care and education programs allow parents to participate more fully in the workforce. With accessible and affordable child care options, families can: job search more easily; become more productive at work; and invest in skills that have labor market value. By enhancing their immediate work options and their long run career prospects, child care is important for working parents.[2] Without it, their work and career opportunities are impaired. Household income falls and workplace productivity goes down. Businesses produce less and tax revenues fall. In many ways, inadequate child care imposes an economy-wide burden on workers, businesses and taxpayers. Using an economic model of the relationship between child care and work, this burden can be quantified.[3]

Here, we investigate the economic consequences of inadequate child care for Tennessee. Child care and early education is a multi-tiered system that for children under age 6 includes a range of providers and programs. From analysis of a survey of Tennessee families, we show how this overall system influences the employment and incomes of working families and so affects the Tennessee economy.

Survey of Working Parents in TN

Our analysis is based on a new survey of 2,507 parents of young children in Tennessee. This large survey has a sampling frame that covers all parents with young children across the state. (Appendix 1 describes the survey design.) The survey was administered in July 2022.

The analytical sample of respondents in this survey reflects the population of working parents with children aged 0 to 5 in Tennessee, and the sample size for these respondents is 1,297. Our focus is on parents who are participating in the labor market – either employed or looking for work.

Separately, it's worth nothing that while not part of our analytical sample for this report, stay-at-home parents are in part choosing not to work because of lack of access to child care. Of 483 survey respondents identifying as stay-at-home parents of children under age 6, over one-third report having left the workforce because of child care problems.

The characteristics of the survey respondents correspond closely to state-wide characteristics. (See Appendix Table 1.) Overall, 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. Racial groups match and, as expected, the ages of the respondents are slightly lower. On average, the education levels of the sample are modestly above the state population. Geographically, the sample includes urban, suburban and rural proportions that are close to the state averages. Notably, the sample is predominantly female and is mostly composed of primary caregivers. This oversampling allows us to obtain more precise estimates of the burden of inadequate child care, as this burden falls disproportionately on mothers.

The work status of the survey respondents matches that of the Tennessee workforce – adjusting for the adverse shock of the pandemic. The employment rates and hours worked are modestly lower. Again, these reflect the younger ages of the sample in relation to the state labor force. The sample respondents do report slightly lower weekly earnings –$806 versus $986 state–wide (adjusted for gender). Looking at average household income in 2022, the sample and the Tennessee workforce are close at $50,000-$55,000. In terms of the marginal value of time, earnings per hour are very similar between the sample and the state-wide average.

Separately, a resampling of the population was undertaken for specific regions. This re-sampling uses the same research protocols as the main survey and yields a larger sample size for each region.

Early Care and Education in TN

Enrollment Patterns

Early care and education in Tennessee is not adequately meeting the needs of working parents. Public programs including Voluntary Pre-K and Head Start are not accessible for most children. Average state spending is low. Relative to nationwide benchmarks, Tennessee ranks just below the middle of all 50 states.[4] Also, public preschool does not typically cover the full working day (or allow enrollment during the full working year). Most working families therefore need substantial extra coverage to meet the demands of their jobs. Finally, few families are enrolled in Tennessee's child care payment assistance program, and few receive employer-based funding for child care. Many families in Tennessee have a hard time finding any child care.

Based on the new survey data, patterns of early care and education as of summer 2022 are shown in Table 1. Formal center-based care is at 26 percent of children aged 0- 5. Nearly two-thirds of children are in informal home-based child care, and 11 percent in multiple arrangements.

TABLE 1:
Early Care and Education–Arrangements

Current Arrangements (%):	
Center-based care	26
Non-relative care in parent's own home	18
Non-relative care in their home	12
Relative care in their home	34
Multiple arrangements	11

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. N=1,297.

Paying for Early Care and Education

Early care and education is financed in various ways. Most parents pay directly out-of-pocket. Public programs including Voluntary Pre-K and Head Start are subsidized to allow access for low-income families. Other government supports work through the tax system as tax credits to offset child care expenditures, although the federal expanded child tax credit program was limited to the 2021 tax year. The state of Tennessee uses federal TANF and Child Care and Development Fund to provide payment assistance to some low-income families. Finally, child care funds may be linked to employment. However, while the trend is growing, most employers still do not offer child care financing as a benefit to employees.

Table 2 shows the reliance on external financial supports to help families pay for child care. Approximately two-in-five families relied on the federal Child Care Tax Credit, which was significantly expanded via the American Rescue Plan of 2021, though only temporarily. Nearly a third said they use the Earned Income Tax Credit to help pay for child care. Also, 8 percent of families report reliance on Tennessee's child care payment assistance programs.

TABLE 2:
Early Care and Education – Financial Supports

Funding from (%):	
Federal Child Care Tax Credit	39
Federal Earned Income Tax Credit	32
TN child care payment assistance programs	8
Employer provided financial support	8

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. N=1,297.

Employer financial support for child care is limited with only 8 percent of parents surveyed reporting receiving financial assistance for child care from their employers. Though 60 percent report their employer having family-friendly policies of flexible scheduling, and 28 percent report work from home options.

Overall, working families have scant resources available to them to help pay for child care, and most shoulder the financial burden on their own.

Child Care and Work Opportunities

Working parents clearly recognize the relationship between their employment opportunities and their child care options. This relationship can be summarized into three domains: parents need child care that is affordable, high quality and accessible.

Table 3 shows the challenges faced by parents in finding child care that supports their work. Most parents report significant challenges in each domain. Fifty-eight percent say affordability is a challenge, and 50% say high quality is a challenge. Most emphatically, 70% say that finding child care that is accessible is a significant

challenge. Accessibility has many dimensions. Parents face challenges with respect to: location convenience; open slots; matches with work schedules and changing shifts; emergency needs; and special education needs.

Table 4 shows how parents rate the child care options that might support their work. Labor market mobility is strongly affected by child care options. Almost half of all parents describe child care on site or financial assistance for child care as being very important in the decision to accept a new job offer. Other employer benefits and family-friendly policies are likewise very motivating to prospective employees, including flexible work days (74%) and work hours (70%), and a work from home option (50%).

TABLE 3:
Child Care–Major Challenges

Significant challenges in finding child care that supports your work (%):	
Affordable	58
High quality	50
Accessible (combined)	70
Accessible (detail):	
Is at a convenient location	39
Has open slots (not filled up)	38
Matches a work schedule outside Mon-Fri daytime	35
Can be flexible to accommodate changing work shifts	30
Has emergency/backup/sick child basis	31
Is for a special needs child	9

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. N=1,297.

TABLE 4:
Labor Market – Factors Influencing Job Offer Acceptance

Very important as motivation to accept a new job offer (%)	
Flexible working days	74
Flexible working hours	70
Work from home option	50
Financial assistance for child care	46
Child care center at worksite	41

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. N=1,297.

How Inadequate Child Care Affects Workers

Families need child care to support their work participation and productivity. When that care is inadequate, workers are disadvantaged in terms of time spent at work, work productivity and effort and career opportunities. These adversities translate to significant economic penalties including wage penalties, reduced hours, and diminished career options.

Table 5 shows how problems with child care cause labor market disruptions for working families. Three features are emphasized. The disruptions are various across many aspects of working; and the disruptions are economically quite meaningful.

TABLE 5:
Early Education – Labor Market Outcomes

Over the past 6 months, have you had work-related issues due to problems with child care (%):

Voluntarily quit a job	17
Been involuntarily let go from a job	15
Left the workforce	20
Went part-time (from being at work full-time)	22
Could not work full-time	17
Could not accept a job offer	27
Declined a promotion or raise	13
In combination:	
Voluntarily quit job / was let go	26
Went PT from FT / could not work FT	30
Declined promotion / could not accept offer	32
Left the workforce	20

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. N=1,297.

Job loss – the ultimate labor market penalty – is reported at 17 percent for voluntary quits and 15 percent for involuntary quits. (An omnibus measure – leaving the workforce – is 20 percent.) This involuntary quit rate is very high. In aggregation, quits/fires were experienced by 26 percent of working parents. Given the different sources of this evidence, there is reasonable confidence that inadequate child care contributes to job losses for as many as one-in-four working parents.

Working parents are also constrained in their hours of work because of inadequate child care. Even if they keep their jobs, these parents are not free to work the hours they want. As shown in Table 5, one-fifth report down-scaling from full to part-time work, and one-sixth report being unable to go full-time from part-time.

Inadequate child care also impedes career progression and job search. Table 5 shows significant penalties with respect to: being unable to accept a new job offer (at 26%), and declining a promotion or raise (at 13%). Thus, career opportunities are clearly diminished when child care is inadequate.

Inadequate child care imposes economic penalties that are substantial, multi-faceted and long-lasting; it adversely impacts workers' ability to work today as well as their future career opportunities. These influences are especially evident in job terminations. Moreover, when the effects are aggregated, the survey data shows that most working parents face some disruptions or adversities.

These survey findings for Tennessee are consistent with prior evidence for Tennessee. They are also consistent with evidence from other states across the U.S.[5] Child care challenges in Tennessee are similar to those facing other states.

The above analysis – consistent with other studies – focuses only on parents in the workforce. Stay-at-home parents are excluded. The stay-at-home group, however, almost certainly includes some parents who have exited the labor market because of child care problems. These parents faced child care barriers and challenges that they could not overcome and so had no option but to stay at home.

The survey includes 483 stay-at-home parents, and these parents experienced significant economic dislocation. Over one-third (35%) reported that they had left the workforce in part because of child care problems. Significant numbers also reported being let go from work or quitting. In effect, by focusing on working parents and not all parents, the child care barriers in this report are under-counted. The actual scale of child care penalties may therefore be approximately one-third larger than is reported herein.

Impacts on the TN Economy

Inadequate child care clearly affects workers' labor market outcomes and prospects. There are also burdens across the economy for local businesses and taxpayers across Tennessee.[6] 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

- Lower employment and labor market attachment
- 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 spending/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 (as shown in the previous section). Job loss is the largest economic impact, but there are several others. Earnings are lower, along with losses from spending time searching for work to match child care arrangements. With less training and less experience, working parents also face diminished career prospects and thus lower future earnings when their children are school age.

For firms and businesses, having a workforce with impaired productivity, less flexibility and shorter tenure reduces profitability. A workforce that has child care challenges 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 churns. They will also incur extra managerial costs and training costs for new workers. These output losses and extra costs are immediate when workers are having child care challenges. 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 because 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. Tennessee has no state-level income tax but tax revenues are based on economic activity statewide. (See Appendix 2 for details on how the state tax code is modeled.) In addition, federal income taxes are affected. The marginal federal tax rate is 10-15 percent (depending on income levels.)[7] For each year of reduced income, there is a corresponding loss in tax revenue. Lost revenue to businesses also means lower tax revenues.

A multi-period economic model is applied to calculate the economy-wide impacts of inadequate child care. Separate calculations are made for each of the three groups – workers, firms and taxpayers.[8] These calculations are based on evidence from the survey on the extent of disruptions. Economic data on earnings, business activity, and tax rates in Tennessee are also applied. Parameter values are derived separately by parental gender (as employment penalties are larger – but incomes are lower–for mothers), then aggregated. The model is run for families seeking child care as of July 2022. (The full methods for calculating these impacts are reported in detail in Appendix 2.)

Amounts are reported per working parent both annually and as accumulated totals over the early years of childhood.[9] Also, there are 301,480 working parents across Tennessee whose labor market contributions are constrained by inadequate child care.[10] Therefore, we report aggregate burdens for all these working parents across Tennessee.

Annual Burdens from Inadequate Child Care

Annual burdens are estimated for each year when a child is aged 0 through 5 (after which 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). Average burdens are reported, although some parents – those who have lost or quit their jobs – incur a much larger burden than other parents. The annual losses are shown in the boxes below.

TABLE 6:
Annual Economic Loss from Inadequate Child Care

	Annual Loss per Working Parent (of child aged 0-5)
Working Parents:	
Lost earnings	$4,450
Extra cost of job search	$930
Total	***$5,480***
Businesses:	
Lost revenue	$390
Hiring/staff costs	$1,150
Total	***$1,650***
Taxpayers:	
Lost federal tax	$820
Lost state tax	$550
Total	***$1,370***

Losses to working parents amount to $5,480 per year. These apply for each year when a child is aged under 6. The two largest components of that loss are: lower earnings whilst in work (applied across all working parents); and temporary job termination (applied to 25 percent of parents). There are also direct expenses for parents in searching for work (by convention, human resources agents calculate these expenses are a fraction of expected earnings, see Appendix 2).

Losses to business amount to $1,650 annually per working parent 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.[11]

Taxpayer revenues are reduced by $1,370 per working parent per year. Lower earnings lead directly to lower consumption taxes paid. Federal losses are caused by lower earnings only. State/local losses arise primarily from lower consumption of taxed goods.

Based on the survey responses, inadequate child care imposes significant penalties in terms of job loss, work opportunities and earnings. Businesses and taxpayers face significant burdens, but working parents bear the brunt of the losses.

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 enter schools. 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 over time of $20,970 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.

TABLE 7:
Annual Economic Loss from Inadequate Child Care

	Burden over Childhood per Working Parent (of child aged 0-5)
Working Parents:	
Ages 0-5	$17,200
Ages 6-8	$3,770
Total	***$20,970***
Businesses:	
Ages 0-5	$2,810
Ages 6-8	$290
Total	***$3,100***
Taxpayers:	
Ages 0-5	$4,320
Ages 6-8	$790
Total	***$5,110***

Businesses experience a total economic loss of $3,100. 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 $5,110 per working parent from inadequate child care. Both federal government revenues and local government revenues are impacted over the years of young childhood.

Long-term estimates (extrapolating the annual results over multiple years of childhood) are less precise because of unknowns such as whether the Covid-19 pandemic will re-surge. Nevertheless, these long-term losses are predicted to be substantial.

Aggregate Losses from Inadequate Child Care

There are 301,480 working parents with children aged under 6 in Tennessee. Given the many adverse consequences of inadequate child care, the aggregate impact on the state is likely to be substantial.

The above chart shows the aggregate losses from inadequate child care across Tennessee. These amounts are across the labor force per annual cohort of working parents. Each year, $1.652 million is lost from lower earnings, lower productivity and increased job displacement. In addition, businesses lose $497 million; and tax revenues across Tennessee are lower by $413 million.

The total burden across Tennessee is therefore $2.56 billion. As context, state GDP is approximately $420 billion. Thus, as a result of inadequate child care, state GDP is lower by approximately 0.6% percent each year. Tennessee government spending in the state is $46 billion annually (including federal funds).[12] Inadequate child care reduces (federal and state?) tax revenues equivalent to 0.9% of the state budget.

Robustness

The model calculations are based on representative survey evidence and state-specific data for Tennessee. They represent best estimates of the economic burdens from inadequate child care during this late-pandemic time period.[13]

As noted above, the model estimates are conservative: they do not account for the stay-at-home parents who are doing so because they are unable to secure any child care that would make working feasible. Over one-third of stay-at-home parents reported that they had left the workforce because of child care problems. If these parents' losses are included, the economic burden of inadequate child care would rise dramatically. However, modeling these parents' labor force decisions – to account for all factors – is complex and so is not attempted here. Nevertheless, the economic burden of inadequate child care would certainly be much higher.[14]

TABLE 7:
Aggregate Loss from Inadequate Child Care

	Aggregate Loss across Tennessee (Per Annual Cohort of 301,480 Working Parents)
Working Parents	$1.652 billion
Businesses	$497 million
Taxpayers	$413 million

Regional Results

Child care disruptions have different consequences across regions of Tennessee. Using re- sampled data, we derive economic burdens for the six Bright Start regions across Tennessee: Davidson, Shelby, Hamilton and Knox counties; and two multi-county regions of East Tennessee and West Tennessee. The resampled data (from July and August 2022) follows the same protocols as the main survey; the resampling yielded increased samples and therefore increased precision for each of the Bright Start regions.

The calculation of economic burdens per state follows the same method as for the main analysis (see Appendix 2). State-level data is replaced with region-specific data for: child care disruptions (based on the survey data); and economic parameters (from disaggregated Census and Bureau of Labor Statistics data).[15]

Table 8 shows the child care challenges and labor market disruptions by region. Working parents in every region report significant challenges in finding child care that helps them work. The challenges – affordability, quality and especially access – appear especially onerous in Hamilton, Shelby county and the West Tennessee region. The bottom panel of Table 8 shows the labor market penalties caused by child care problems. Again, there are labor market penalties across all regions, with Davidson county, Shelby county and West Tennessee residents reporting the largest disruptions (especially job terminations).

TABLE 8:
Early Education – Labor Market Outcomes by Bright Start Region

	(Working parents in TN)					
	Davidson	**Hamilton**	**Knox**	**Shelby**	**NE TN**	**West TN**
Significant challenges in finding child care that supports your work (%):						
Affordable	51	72	55	59	49	56
High quality	41	57	44	51	44	53
Accessible	75	76	60	74	63	69
Over the past 6 months, have you had work-related issues due to problems with child care (%):						
Voluntarily quit a job	19	13	10	25	18	16
Been involuntarily let go from a job	10	13	10	18	12	22
Went part-time (from being full-time)	29	21	18	25	17	22
Could not work full-time	23	15	14	21	16	26
Declined a promotion/raise	20	13	10	13	14	9
Could not accept job offer	32	21	25	31	28	25
Left the workforce	26	8	16	23	19	27
In combination (%):						
Voluntarily quit job / was let go	22	21	18	34	26	31
Went PT from FT / could not work FT	38	26	24	37	28	35
Declined promotion / could not accept offer	41	25	27	34	32	27
Left the workforce	26	8	16	23	19	27
N	133	53	135	244	155	68

Source: TQEE Survey, July 2022. Notes: Parents in labor force with children aged 0-5. NE TN: Carter, Cocke, Greene, Hamblen, Hancock, Hawkins, Johnson, Sullivan, Unicoi and Washington counties. West TN: Decatur, Dyer, Hardeman, Haywood, Hardin, Lake, Madison, McNairy and Weakley counties.

Evidence of these labor market disruptions, along with region-specific data on household incomes and labor market conditions, is applied to derive the economic burdens per working family. These economic burdens are shown in Table 9, both per working parent and aggregated across all working parents in the region. There are significant burdens in each region. However, two regions stand out: Shelby and West Tennessee (because child care penalties are hardest in those regions). For these two regions, the child care burden exceeds $10,000 per year per working parent.

TABLE 9: Economic Burdens from Inadequate Child Care by Bright Start Region

	(Working parents in TN)					
	Davidson	**Hamilton**	**Knox**	**Shelby**	**NE TN**	**West TN**
Annual loss per working parent:						
Working parent	$7,410	$5,070	$4,580	$7,930	$4,760	$5,130
Business	$2,360	$1,560	$1,420	$2,480	$1,480	$1,570
Taxpayer	$1,850	$1,270	$1,150	$1,980	$1,190	$1,280
Total	***$11,620***	***$7,900***	***$7,150***	***$12,390***	***$7,430***	***$7,980***
Aggregate loss per region cohort ($m)						
Working parents	$175.6	$60.6	$69.2	$270.4	$40.5	$95.9
Business	$55.9	$18.6	$21.5	$84.6	$12.6	$29.4
Taxpayer	$43.8	$15.2	$17.4	$67.5	$10.1	$23.9
Total	***$275.4***	***$94.4***	***$108.0***	***$422.5***	***$63.2***	***$149.2***

Source: TQEE Survey, July 2022. See Appendix Table 2 for parameter values. ACS 2020 5-year Census; fred. stlouisfed.org/series/GDPALL47065;fred.stlouisfed.org/series/MHIOH39061A052NCEN. Notes: Parents in labor force with children aged 0-5. NE TN: Carter, Cocke, Greene, Hamblen, Hancock, Hawkins, Johnson, Sullivan, Unicoi and Washington counties. West TN: Decatur, Dyer, Hardeman, Haywood, Hardin, Lake, Madison, McNairy and Weakley counties.

Conclusions

Tennessee parents need adequate and affordable child care in order to fully participate in the labor market. Substantial evidence shows that child care options affect labor market participation, job security, 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.

Working parents face a dilemma in that stable jobs are hard to find because they cannot access child care; and without job stability, parents cannot build the skills and experience that will allow them to afford high-quality child care.

Statewide and in individual regions, many parents are unable to access quality, affordable child care that meets the demands of their jobs and needs of their families. Tennessee's economy and businesses suffer significant economic losses as a result, and working families are hit hardest. Building a stronger, more affordable early care and education system in Tennessee would strengthen the economy and support hard working families to thrive economically.

Appendix 1: Sampling

Zogby Analytics was commissioned by Tennesseans for Quality Early Education to conduct an online survey of 2,507 Tennessee parents with children under the age of 9. The survey was administered from June 23, 2022 to August 1, 2022.

Using internal and trusted interactive partner resources, thousands of parents in Tennessee were randomly invited to participate in this interactive survey. Each invitation is password coded and secure so that one respondent can only access the survey one time.

Using information based on census data, voter registration figures, CIA fact books and exit polls, Zogby Analytics uses complex weighting techniques to best represent the demographics of the population being surveyed. Weighted variables may include age, race, gender, region, party, education and religion. Based on a confidence interval of 95 percent, the margin of error for 2,000 responses is +/- 2 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.)

Analysis in this report is of working parents or guardians who have at least one child aged under 6 in Tennessee. This sample restriction reduces the sample to 1,297.

Appendix Table 1 shows the descriptive frequencies for the sample and descriptive frequencies for all persons with young children (or all persons) across Tennessee. Based on comparison of the survey with the state population, the survey appears to be representative of the Tennessee population with respect to education, race, household income and employment (adjusting for age and gender of the sample).

Separately, a re-sampling by region was undertaken. This re-sampling was to ensure sample sizes were sufficient for precise estimates of the impacts by region. This re-sampled data (and not the main survey) is used for the regional analysis.

Appendix Table 1
Individual Characteristics

	Survey Sample (%)	Tennessee Population (%)
Race:		
White	71	78
Hispanic	7	7
African American	19	16
Other	3	7
Education:		
HS diploma (or below)	36	39
Some college	39	34
Bachelor's degree+	25	27
Age:		
18-24	21	14
25-29	24	25
30-34	25	28
35-39	18	21
40+	8	12
Gender:		
Male	29	50
Female	73	50
Locality:		
Urban	25	44
Suburban	33	37
Rural	42	19
Labor Market Participation:		
Employed full-time	69	55
Employed part-time	19	8
Hours worked per week (employed)	34	39
Unemployed	13	4
Earnings and Income:		
Household income	$55,600	$55,620
Earnings per week (employed)	$815	$986
Earnings per hour (employed)	$25.8	$23.7
Observations	1,297	811,290

Sources: Census (data.census.gov/cedsci/table?q=S1), American Com- munity Survey 2020; fred.stlouisfed.org. Mean annual and hourly earnings for TN (May 2021): www.bls.gov/oes/current/oes_tn.htm# 00-0000, retrieved August 1, 2022; www.census.gov/quickfacts/TN. Notes: Full survey is 2,507 respondents. Sub- sample is Tennessee par- ents/guardians who are caregivers (unpaid) of at least one child currently aged 0-5 and who are either working, in a school/training program or stay- at-home parents. Tennessee population number includes persons aged 18-65. [a] Parents with children aged 0-5.

Appendix 2: Economic Model

A static, limited-horizon economic model is used to calculate losses caused by inadequate child care in Tennessee (adapted from Belfield (2019b)).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 2019 through to age 8. These calculations are then aggregated across the state's population of working and stay-at- home parents with children aged 0-5. These dates mean that the large pandemic loss from March 2020 to March 2022 is not fully incorporated into the model. The losses in this model refer to the economic conditions after summer 2022, i.e., late-pandemic.

The model is populated using survey data and state-specific economic data from the Census and Bureau of Labor Statistics. All figures are in 2022 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 - ϵ 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 $c_i = 0.197Y_i$ (7.1% in paid leave, 3% in supplemental pay, and 9.6% in health insurance, www.bls.gov/news.release/eci.nr0.htm, April 2022).

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 which is a state-specific calculator for both federal and state/ local taxes paid. TAXSIM35 incorporates state income tax laws and federal law through 2022 including TCJA and CARES (credits via the latter Act are excluded from analysis). Taxes are per household with joint filing, single child and child care expenses of $2,800 in Tennessee. Marginal federal tax rates of 14-16% are applied. (users.nber. org/~taxsim/taxsim35/).

- State/local income tax rates in Tennessee are zero; marginal state/local sales taxes are applied at 9.5% (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 $_{cF}T$ 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 expressed as a fraction of total earnings losses Σy_i. Estimates of managerial costs attributable to low worker performance are imprecise; these manage- rial costs are therefore excluded.

Future Incomes, Output, and Income Tax Revenue:

- Future economic consequences are extrapolations proportionate to the immediate losses y, q, and $_{cF}T$. After child ages 6, impacts decay at rate τ per annum. Present value decay of impacts is ρτ .

  1. Parents experience disrupted work patterns from birth to age 8.

  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, from Carneiro et al. (2011); Guvenen et al. (2017)). 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 and Parameter		Value
y_b	Baseline individual earnings	$49,720
h	Hours deficit	0.07
ϵ	Proportion of burden incurred by worker (not firm)	0.90
m	Months lost	0.48
j	Job search costs (% of yb)	0.0720
q	Job quit/exit rate	0.0139
v	Wage penalty (%)	0.0264
z	On-costs	0.1990
d	Hiring costs	0.34
r	Federal tax rate	0.16
s_s	State sales tax rate (net exemptions)	0.095
s_y	State income tax rate	0.00
ρ	Discount rate	0.0350
g	Tax base	$(y_b - y_t) + (y_b v) + (y_b qm)$
y_t	Earnings with inadequate child care	$y_t(1 - h)$
Economic Loss Formulae:		
	Lw1	$y_b y_t \epsilon$
	Lw2	$y_b qm$
	Lw3	$y_b qj$
	Lw4	$y_b v$
	Lworker	$\Sigma L_{wk}, k = 1...4$
	Lf1	$(y_b - y_t)(1 - \epsilon)$
	Lf2	$y_b qd$
	Lf3	$(y_b - y_t)z + y_b zv$
	Lfiscal	$\Sigma L_{fk}, k = 1...3$
	Ls1	rg
	Ls2	$s_s g$
	Ls3	$s_y g$
	Lsocial	$\Sigma L_{sk,k}=1...3$

Notes

1. Studies include 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 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).
2. See Montes and Halterman (2011); Ruppanner et al. (2019). In surveys, parents clearly report the need for child care "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" (Corcoran and Steinley, 2017; Cascio, 2018).
3. Economic evidence on the relationship between early education and labor force participation nationally is vast (Powell, 2002; Cascio, 2018).
4. National Institute for Early Education Research, The State of Preschool 2021, State Preschool Yearbook, Tennessee, https://nieer.org/state-preschool-yearbooks-yearbook2021
5. 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).
6. See Workman and Jessen-Howard (2018); Belfield (2018).
7. State tax data from www.taxadmin.org/assets/docs/Research/Rates/ind_inc.pdf. On federal taxes, see Saez and Zucman (2019).
8. This 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, 2019b,a).
9. Given the similarity in the results, analysis is pooled for children aged 0-3 and 4-5.
10. 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. This estimate of 301,480 is calculated as follows. There are 407,400 children aged 0-4 in Tennessee in 2021 (census.gov). This number is adjusted as follows. It is uprated (by 1.2) to children aged 0-5 (proportionately). It is downrated (by 0.55) to homes with multiple children aged 0-5; and uprated (by 1.85) to parents in those homes (household size and formation data from www.pewresearch.org/--/1-the-american-family-today/). It is downrated (by 0.65) to working parents (fred.stlouisfed.org/series/LBSSA47). This yields 301,480 working parents with children aged 0-5 in Tennessee annually.
11. Not all workers have young children so these are not applied across an entire workforce. Also, these burdens are likely to be spread over time across a large business operation and they are not explicitly measured by firms.
12. GDP and state spending data from www.urban.org/policy-centers.
13. The relationships for Tennessee 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. See for example, Davis et al. (2017); Talbert et al. (2018); Belfield (2018).
14. Another factor that biases downward the economic dislocation is the that these estimates do not account for the significant changes in labor force participation at or before childbirth. Many parents may anticipate their child care needs and so adjust their employment and career plans prospectively. These labor force participation effects are detailed in Goldin and Mitchell (2017). A third factor, also beyond the scope of this analysis, is that parents may rely on other family members (inside or outside the household); these relatives may also experience labor market burdens.
15. Sample sizes for the regions are smaller than the full dataset, so the burdens are less precisely estimated.

References

Araujo, M. C., Carneiro, P., Cruz-Aguayo, Y., and Schady, N. (2016). Teacher Quality and Learning Outcomes in Kindergarten*. Quarterly Journal of Economics, 131(3):1415–1453.

Arteaga, I., Humpage, S., Reynolds, A. J., and Temple, J. A. (2014). One year of preschool or two: Is it important for adult outcomes? Economics of Education Review, 40:221–237.

Auger, A., Farkas, G., Burchinal, M. R., Duncan, G. J., and Vandell, D. L. (2014). Preschool Center Care Quality Effects on Academic Achievement: An Instrumental Variables Analysis. Development Psychology, 50(12):2559–2571.

Belfield, C. (2019a). The economic consequences of insufficient child care on working families across tennessee. Technical report, Tennesseans for Quality Early Education.

Belfield, C. R. (2018). The Economic Impacts of Insufficient Child Care on Working Families. Report, Council for a Strong America, at strongnation.org.

Belfield, C. R. (2019b). The Economic Impacts of Insufficient Child Care for Pennsylvania. Report, Pennsylvania Early Learning Commission.

Boushey, H. and Glynn, S. (2012). There are significant business costs to replacing employees. Re- port, American Progress, at cdn.americanprogress.org.

Campbell, F., Conti, G., Heckman, J. J., Moon, S. H., Pinto, R., Pungello, E., and Pan, Y. (2014). Early Childhood Investments Substantially Boost Adult Health. Science, 343(6178):1478–1485.

Carneiro, P., Heckman, J. J., and Vytlacil, E. J. (2011). Estimating marginal returns to education.

American Economic Review, 101(6):2754–2781.

Cascio, E. U. (2018). Why early childhood education matters and why we should pay for it. Mono- graph, milkenreview.org.

Conti, G., Heckman, J. J., and Pinto, R. (2016). The Effects of Two Influential Early Childhood Inter- ventions on Health and Healthy Behaviour. Economic Journal, 126(596):F28–F65.

Corcoran, L. and Steinley, K. (2017). Early Childhood Program Participation, from the National House- hold Education Surveys Program of 2016. National Center for Education Statistics, Institute of Edu- cation Sciences, U.S. Dept. of Education, Washington, DC.

Davis, B., Bustamente, A., Bronfin, M., and Rahim, M. C. (2017). Losing Ground: How Child Care Im- pacts Louisiana's Workforce Productivity and the State Economy. Monograph, policyinstitutela.org.

Duncan, G. J. and Magnuson, K. (2013). Investing in Preschool Programs. Journal of Economic Per- spectives, 27(2):109–131.

Goldberg, H., Cairl, T., and Cunningham, T. J. (2018). Opportunities Lost. How Child Care Challenges Affect Georgia's Workforce and Economy. Research Report, geears.org.

Goldin, C. and Mitchell, J. (2017). The new life cycle of women's employment: disappearing humps, sagging middles, expanding tops. Journal of Economic Perspectives, 31(1):161–182.

Guvenen, F., Kaplan, G., Song, J., and Weidner, J. (2017). Lifetime incomes in the United States over six decades. NBER Working Paper No. 23371.

Hill, C. J., Gormley, Jr., W. T., and Adelstein, S. (2015). Do the short-term effects of a high-quality preschool program persist? Early Childhood Research Quarterly, 32:60–79.

Karoly, L. (2012). Toward standardization of benefit-cost analysis of early childhood interventions.

Journal of Benefit-Cost Analysis, 3(1):1–45.

Lipsey, M. W., Weiland, C., Yoshikawa, H., Wilson, S. J., and Hofer, K. G. (2015). The Prekindergarten Age-Cutoff Regression-Discontinuity Design: Methodological Issues and Implications for Applica- tion. Educational Evaluation and Policy Analysis, 37(3):296–313.

Malik, R., Hamm, K., Schochet, L., Novoa, C., Workman, S., and Jessen-Howard, S. (2018). America's child care deserts. Monograph, retrieved January 2 2020, from childcaredeserts.org.

Montes, G. and Halterman, J. S. (2011). The impact of child care problems on employment: findings from a national survey of US parents. Academic Pediatrics, page 80–87.

Moore, M. A., Boardman, A. E., Vining, A. R., Weimer, D. L., and Greenberg, D. H. (2004). "Just give me a number!" - Practical values for the social discount rate. Journal of Policy Analysis and Man- agement, 23(4):789–812.

Powell, L. M. (2002). Joint labor supply and childcare choice decisions of married mothers. The Jour- nal of Human Resources, 37(1):106–128.

Reynolds, A. J., Temple, J. A., White, B. A. B., Ou, S.-R., and Robertson, D. L. (2011). Age 26 Cost-Benefit Analysis of the Child-Parent Center Early Education Program. Child Development, 82(1):379–404.

Ruppanner, L., Moller, S., and Sayer, L. (2019). Expensive childcare and short school days = Lower maternal employment and more time in childcare? Evidence from the American Time Use Survey. Socius, 5:1–14.

Saez, E. and Zucman, G. (2019). The Triumph of Injustice. W. W. Norton Company, New York, NY. Talbert, E., Bustamente, A., Thompson, L., and Williams, M. (2018). Counting our Losses: The Hidden

Cost to Marylanders of an Inadequate Child Care System. Monograph, Maryland Family Network.

van Huizen, T. and Plantenga, J. (2018). Do children benefit from universal early childhood education and care? A meta-analysis of evidence from natural experiments. Economics of Education Review, 66:206–222.

Weiland, C. (2016). Impacts of the boston prekindergarten program on the school readiness of young children with special needs. Developmental Psychology, 52(11):1763–1776.

Weiland, C. and Yoshikawa, H. (2013). Impacts of a Prekindergarten Program on Children's Math- ematics, Language, Literacy, Executive Function, and Emotional Skills. Child Development, 84(6):2112–2130.

Work Institute (2017). Retention report: Trends, reasons, and recommendations. Report retrieved July 12 2019 from info. workinstitute.com/retentionreport17.

Workman, S. and Jessen-Howard, S. (2018). Understanding the true cost of child care for infants and toddlers. Research Report, Center for American Progress, americanprogress.org.

Yoshikawa, H., Weiland, C., and Brooks-Gunn, J. (2016). When Does Preschool Matter? Future of Children, 26(2):21–35.