Child Care and Working Families: A Post-Pandemic Economic Analysis for the U.S.

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Summary

Child care — as well as fostering child development — helps families participate in the labor market and become economically secure. However, many working families across the U.S. do not have adequate child care; millions of parents of young children struggle to find child care that helps them work at the jobs they need. This problem is longstanding but the pandemic has made it worse.

This Report examines the economic consequences of this child care deficit for the U.S. economy. Applying an economic model with data from a new nationwide survey of 806 working parents with children 0-3, this Report calculates the financial burden of inadequate child care for parents, for businesses, and for the taxpayer.

Most working parents do not have child care that meets their needs. They rely on a mixture of formal and informal care options, including family care at home; non-family care at home; and center-based care. Public funding for child care and support from employers is limited. Consequently, almost three-quarters of working parents report that access to child care is a challenge. And more than half say it is a significant challenge to find child care that is either affordable or high quality.

As a result of inadequate child care, most parents report that their participation in the labor market is undermined. Inadequate child care has adverse effects across four work domains:

- **Effort at work:** Most working parents report that child care problems have caused them to be distracted, late, or missed commitments at work.
- Hours of work: Almost half of all working parents report that the hours they can work are compromised. Inadequate child care has caused these parents to voluntarily reduce their hours, to have their hours cut at work, or to go part-time.
- **Terminations:** One-fifth of working parents say that they had to exit the labor market (either voluntarily or involuntarily) because of child care challenges.
- Career opportunities: More than one-third of working families report that inadequate child care restricts their career options in terms of turning down job offers, further education or work-related training.

These labor market adversities are substantial and have broad economic consequences for parents, businesses, and taxpayers. These consequences can be calculated using an economic model of labor supply, business output and the tax code.

Each year, as a result of inadequate child care, per working parent with children 0-3:

- Working parents lose \$5,520 from lower earnings, reduced productivity at work, and from job search expenses.
- Businesses lose \$1,640 in reduced revenue and in extra recruitment costs.
- Taxpayers lose \$1,470 in lower federal and state/local taxes.

Losses are even greater across the early childhood years from birth to kindergarten:

- Working parents lose \$19,610 in lost earnings, reduced participation in the labor market, and in lower returns to experience.
- Businesses lose \$3,280 per worker in reduced revenue and in extra recruitment costs.
- Taxpayers lose \$5,170 per working parent in federal and state/local tax.

In the aggregate across all working parents in the U.S., there are annual losses of \$78 billion in parental income, \$23 billion in business output, and \$21 billion in tax revenue. With no substantial or permanent public investments in child care and with the pandemic ongoing, the long-term aggregate economic losses are even larger for each new birth cohort.

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1 Introduction

A lot of high quality research evidence shows how early education and high quality child care boost child development, especially for children from low-income families.¹

Importantly, a growing body of evidence now shows how access to child care can help working parents.² Parents rely on child care so they can participate in the labor market. Child care frees up parents' time so they can work and it can help them become fully productive and build successful careers.³ However, many parents across the U.S. do not have access to affordable and adequate child care.⁴ As a result, many working families across the U.S. struggle with child care and therefore struggle to be economically secure.

When families do not have access to child care supports there are widespread economic consequences. Productivity goes down and aggregate economic activity is lower. Businesses produce less and local tax revenues are lower. Thus, inadequate or limited child care acts as an immediate drag on workers, businesses and taxpayers. Looked at in the aggregate, this economic burden is substantial.

In this Report, we calculate the economic consequences of inadequate child care across the U.S. We use a new nationwide survey on the experiences of working families with children aged 0-3; the survey evidence is then linked to a model of family labor supply and economic and fiscal impacts. We begin by reporting on the child care "system" for working families, including the many types of care and the patchwork of care options relied on by working parents. Using an economic framework, we show how this "system" adversely affects the employment and incomes of working families. Next, we model how these adversities impact on government revenues and economic growth. We provide dollar estimates of the economic burden nationwide, both per family and in the aggregate for the U.S. economy. These calculations are up-to-date for 2023: they are based on survey evidence and modeling from December 2022 (and so include the extra challenges created by the COVID-19 pandemic and by recent changes to the labor market).

2 Survey of Working Parents across the U.S.

Our analysis is based on a new survey of 806 working parents across the U.S. The sampling frame is all working parents with young children aged under 3 nationwide. (Appendix 1 describes the survey design). The survey was administered in December 2022. It therefore reflects the experiences of working families after the major wave of the pandemic but during the time when community-level contagion is still high. Also, almost all these young children were born during the pandemic.⁵

The sample of respondents in this survey reflects the population of working parents with children 0-3 across the U.S. 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. Given these characteristics, the survey respondents correspond closely to the national picture; evidence is given in Appendix Table 1A. Racial groups match the national profile and so do the ages of the respondents. Geographically, the sample includes urban, suburban and rural proportions and regional proportions that are very close to the national average. The sample is disproportionately female (although not substantially). The education levels of the sample are above the national population (with 48% of the sample having at least a Bachelor's degree; across the U.S. working families the rate is 15%). The sample is close to the national profile in terms of single parents but includes higher rates of married households.

The work status of the survey respondents resembles those across the U.S. workforce – adjusting for the adverse shock of the pandemic and the ages of parents. (Appendix Table 1B compares the labor market characteristics of the sample to the state population). The full-time and part-time employment rates match, as do the hours worked per week. The sample respondents report slightly lower weekly earnings (\$967 versus \$1,090 nation-wide) and somewhat higher annual household incomes (\$69,570 versus \$58,260 nation-wide). These gaps are partially explained by differences in experience and household composition (with two-parent households being more common). Census data shows that full-time female [male] workers with children aged under 6 have average weekly earnings of \$894 [\$1,161]; these figures are very close to the \$967 figure (in Appendix Table 1B).

Overall, the individual characteristics and labor market attributes of the survey sample correspond to population-wide data.

3 Child Care across the U.S.

Patterns of Child Care

Before the pandemic, child care for working families was a patchwork of different arrangements. As well as parental care in the home, families relied on informal care and on center-based care (often privately funded) to cover their child care needs. Nevertheless, more than half of all families lived in child care "deserts", i.e. areas with too few licensed slots for the number of children who need care.⁸ Even in areas where child care was available, it did not cover the full working week or the hours necessarily for parents to hold full-time jobs.

Child care options deteriorated dramatically during the first two years of the pandemic (from March 2020). The supply of available places for young children fell sharply. As well, when child care centers did re-open they had significantly higher costs: this reduced supply even further and made child care less affordable. On the demand side, some parents had lost their jobs or lost income – making early education unaffordable; and some parents were reluctant to commit to childcare centers – in case of infection. With home-based work, child care became a "juggling act for working parents". ¹⁰

As the pandemic endures at a lower intensity through 2022, the child care system remains in flux. The top panel of Table 1 shows the various types of care families with children aged 0-3 rely on as of December 2022. Families do not rely on just one child care type. Just under half of families take care of their children at home and or rely on home care by a non-family member. Almost one-third use some form of center-based facility (almost all of which is paid for privately). Also, one-quarter report that their child care arrangements are "informal" or "multiple". Thus, families do not have reliable access to child care; few can afford center-based care and most rely on several unstructured types of care.

Table 1: Child Care Participation

	Working Parents
Type of care used (%):	
Family child care at home	48
Home care by non-family	45
Center-based facility	29
Informal care	23
Multiple arrangements	18
No regular arrangements	5
Employer support for child care (%):	
Program on-site	24
Financial support	24
Arrangements with off-site care	18
Informational support	14

Source: Ready Nation Survey, December 2022. Notes: N=806.

For type of care, respondents gave multiple responses.

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. The bottom panel of Table 1 shows how employers support child care: approximately one-quarter of working parents report child care at the workplace or financial aid for child care; and one-in-six report either off-site arrangements or informational support. Across the U.S., most working parents receive only limited child care support from their employers.

Enrollment Constraints

In searching for child care parents consistently emphasize three desirable features: affordability, quality, and accessibility. However, most families face challenges in obtaining child care that has some or all of these features.

Table 2: Child Care Challenges

	Working Parents (%)
Parents who report significant challenges	
in accessing child care that supports their work:	
Affordable	57
High quality	51
Accessible ^a	74
Convenient location	41
Matches work-week schedule	37
Flexible to work shifts	35
Open slots	31

 $\it Notes: \ ^a$ Accessible includes any affirmative responses to location, matches schedule, flexible, or open slots.

Table 2 shows the challenges that families face: 57% report that affordability is an issue; and 51% report that finding high quality child care is a challenge. Notably, almost three-quarters (74%) of families report that access to child care is a challenge. Access is compromised for various reasons. These include situations where child care options: are not in convenient locations; do not match work schedules; do not offer flexible hours; or simply do not have open slots. 12

4 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 many ways. These are grouped into four domains: work productivity and effort; hours of work; job terminations; and career opportunities. These adversities were present before the pandemic; and they have persisted as the pandemic has ebbed.

Inadequate child care has diverse and chronic effects across many working families with children aged 0-3. These penalties are shown in Table 3. These effects are consistent with (and in some respects more severe than) those found in recent studies for individuals states and in prior national studies.¹³

More than half of parents report "being distracted to the point of being unproductive at work" over the last three months. As well, almost two-thirds recognize how child care problems cut into their work time (making them either late, or leave early, or miss a work day/shift). Looking over the prior two years, working parents report high and significant disruptions from inadequate child care; these are shown in the bottom panel of Table 3. In terms of hours at work, more than one-third of parents report fewer hours, lower pay or a

formal change from full-time to part-time work. Critically, one-quarter of parents report job terminations – either losing or quitting a job; other parents identified employment penalties (either reprimands or demotions). Finally, more than one-third of parents report adverse career impacts such as turning down a job offer, a training opportunity, or a promotion.

Many working parents experience at least one of these labor market penalties. At least one effort penalty (e.g., lateness or absence) was reported by 85% of parents. Looking at hours, 57% of parents reported one of the three penalties. One type of termination penalty was reported by 49% of parents. Finally, 62% of working parents reported at least one career-related penalty.

These disruptions are greater than those reported in national survey data from before the pandemic. 14 In each domain – productivity, hours, terminations, and careers – rates of disruption are significantly above pre-pandemic levels. 15

Table 3: Child Care Work-Related Issues

Work-related issues because of problems with child care	Working Parents (%)
Over past 3 months:	
Productivity:	
Distracted to the point of being unproductive at work	53
Effort:	
Been late for work	64
Left work earlier than normal	64
Missed a full-day of work	58
Missed work shift	44
Since child was born/adopted:	
Hours:	
Reduced your regular work hours	44
Had pay or hours reduced	37
Changed from full-time to part-time work	33
Termination:	
Reprimanded by supervisor	30
Quit a job	26
Been let go or fired	23
Demoted	17
Career:	
Turned down a new job offer	41
Turned down an opportunity to pursue further education	36
Had problems participating in work-related training	33
Turned down a promotion or reassignment	28

Source: Pritzker Children's Initiative Survey, December 2022. Notes: N=806. Past three months refers to period October–December 2022.

Clearly, the adverse impact of inadequate child care is substantial, multi-faceted and persistent. It jeopardizes workers' time and effort commitments to their jobs, their ability to be productive when at work, and their future career opportunities. When the effects are aggregated, the survey shows that most working parents face some disruptions or adversities.

5 Modeling the Economic Impacts of Child Care

Inadequate child care strongly impairs workers' time, productivity and careers. It also causes economy-wide burdens for businesses and taxpayers across the $\rm U.S.^{16}$ These burdens are modeled and calculated based on the survey data and national economic data. The Boxes below show the main burdens of inadequate child care for working parents, businesses, and taxpayers.

Working Parents

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

Businesses

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

Taxpavers

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

For working families the economic consequences from inadequate child care are clear and immediate (as per Table 3). Labor force attachment is weaker, 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 output and revenue (and potentially affects 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 operational and managerial costs. These output losses and extra costs are immediate when workers have young children. But the effects extend into the long-term because each firm's workers are not optimally trained and have less experience.

For taxpayers, lower economic output means fiscal revenues are lower: the tax base is smaller (both directly per individual and indirectly per business). Federal income tax revenues are affected. The marginal federal tax rate is 10-15% (depending on income levels). At the state/local level, there are losses in tax revenues, primarily through income and sales taxes. Each year of reduced economic activity leads to a corresponding loss in tax revenue.

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. ¹⁸ These calculations rely on: evidence from the survey on the extent of disruptions; national economic data on earnings and business activity; and average and marginal tax rates. All figures are reported in 2023 present value dollars. 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 birth. Model estimates are calculated per working parent – not per parent who is adversely impacted. There are approximately 11.4 million children aged under 3; accounting for labor force participation and household demographics, this child count corresponds to 14.1 million working parents across the country whose labor market contributions may be constrained by inadequate child care. For annual burdens, we report aggregate losses for all 14.1 million working parents across the U.S. For the childhood burdens, we report burdens for each annual cohort of 3.7 million births; this corresponds to 4.7 million working parents.

6 Economic Burdens from Inadequate Child Care

Annual Burdens

Annual burdens from inadequate child care are estimated for each working parent with a child aged 0-3. These burdens can be added up over time (as the child ages) until preschool or kindergarten options are available.

These annual losses are shown in Box 1. Losses per working parent amount to \$5,520 per year. These losses directly apply for each year when a child is aged under 3. 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 \$1,640 per year for each year when a worker has a child aged under 3. This burden comes from: reduced revenue; lower productivity that is not offset by lower wages; and extra hiring costs. 20

Table 4: Annual Loss from Inadequate Child Care

	Annual Loss per Working Parent (of child aged 0-3)
Working Parents:	
Lost earnings	\$4,540
Extra cost of job search	\$980
Total	\$5,520
Businesses:	
Hiring/staff costs	\$1,160
Lost revenue	\$480
Total	\$1,640
Taxpayers:	
Lost federal tax	\$830
Lost state tax	\$640
Total	\$1,470

Taxpayer revenues are reduced by \$1,470 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 size of each burden depends mainly on two factors: the income potential of working parents; and the inadequacy of child care. Other factors are also influential, including the available public funds, the tax code, and the structure of work. On the last of these, the pandemic may have ameliorated the child care penalty: if parents can work from home, they may be better able to manage any child care deficiencies. However, the extent to which parents can do this (given their job contracts and home environments) is unclear.

Lifetime Losses per Working Parent

Parents experience these direct economic losses for each year their child is aged under 3 and faces challenges finding child care. After that age, more pre-school (and then kindergarten) options become available. However, many parents face challenges accessing early education; many of the challenges of child care continue after age 0-3. In addition, because of lower experience and lower skill development, parents experience small (but non-trivial) economic losses after the child enters school. From the year of birth each parent experiences annual child care burdens and lagged burdens before their child enters school. These total losses can be expressed as present values from the time the child is born until school age entry.

Working parents face a total economic loss of \$19,610 from inadequate child care. This career burden includes the annual burdens as well as a lower trajectory of earnings over the years up to the child reaching school age. Most of the burden is when the child is aged under 3, but there are persistent effects afterward.

Table 5: Childhood Loss from Inadequate Child Care

Loss per Working Parent ^a (Childhood from birth to K)

Working Parents \$19,610

Businesses \$3,280

Taxpayers \$5,170

Notes: a Present values at birth.

Businesses experience a total economic loss of \$3,280. This lump sum captures the period when the child is under school-age plus future losses in productivity, as well as additional hiring costs. 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 \$5,170 from inadequate child care. Both federal government revenues and local government revenues – most of which come from income taxes – are impacted over the full period of young childhood.

Aggregate Losses from Inadequate Child Care

There are over 14.1 million working parents with children aged under 3 in the U.S. Many of them will experience adverse consequences of inadequate child care; the aggregate impact across the U.S. economy is therefore substantial.

Table 6 shows the aggregate economy-wide losses from inadequate child care. The first column shows the amount each year for all the 14.1 million working parents of children aged 0-3. For parents this annual burden amounts to \$77.8 billion. In addition, businesses lose \$23.1 billion; and tax revenues are lower by \$20.7 billion. As context, U.S. GDP is approximately \$25 trillion. Thus, as a result of inadequate child care, national GDP is lower by approximately 0.25% percent each year. Similarly, inadequate child care reduces tax revenues equivalent to almost 0.33% of federal budgets. These are annual amounts for each year when child care is sub-optimal.

Table 6: Aggregate Loss from Inadequate Child Care

	Annual Loss 14.1m Working Parents Ages 0-3	Childhood Loss ^a 4.7m Working Parents From birth to K
Working Parents	\$77.8 bn	\$92.2 bn
Businesses	\$23.1 bn	\$15.4 bn
Taxpayers	\$20.7 bn	\$24.3 bn

Notes: ^a Present values at birth. Aggregate loss across the U.S. population.

Table 6 (second column) shows the aggregate loss per child who experiences inadequate child care up to school-age entry. These losses are incurred across 4.7 million working parents each year. In total, the predicted burden for all working parents is 92.2 billion. There are also large aggregated losses to businesses of 15.4 billion. Aggregate taxpayer burdens are even larger at 24.3 billion. These are the future expected losses for each child born in 2023 and beyond.

7 Robustness and Sensitivity Testing

Model estimates are calculated from representative survey evidence and national datasets. These estimates are therefore the expected economic burdens from inadequate child care. However, each variable in the model may be subject to bias and imprecision. We consider these two factors here.

The model estimates are conservative (biased downward) in several respects. Primarily, the survey asks working parents about their child care experiences; parents who are not working are not part of the survey. This latter group includes parents for whom child care options were so inadequate that they were unable to participate in the labor market; the burdens for these parents are even greater than the burdens reported here. As well, the model estimates do not include prior – endogenous – decisions to reduce work commitments. If parents expect their future work opportunities to be constrained, they may invest less in career-building skills. Also, only direct burdens on parents are included in the model: relatives and informal carers (including other children) may incur economic burdens when child care is inadequate. Finally, any managerial and operational costs associated with lost productivity are not available and are therefore not included. If these factors were included in the model, the burdens per parent would be significantly larger.

For future working parents, there are some uncertainties; these may affect the estimates. Trends in the labor market, such as more flexible-hours contracting, may make child care easier (if working parents can secure these jobs); for other trends, such as work-from-home practices, it is not clear if they help working parents. Demographic changes (such as household composition or cohort size) may also be influential but it is similarly unclear how these changes will benefit working parents. Finally, policies to increase the supply of or funding for child care would affect the predictions from the model.

Table 7: Economic Loss: Monte Carlo Simulations

	Loss per Working Parent			
	Mean	SD	Min.	Max.
Annual Loss (child aged 0-3):				
Working Parents	\$5,520	\$1,160	\$1,920	\$12,080
Businesses	\$1,680	\$370	\$580	\$4,130
Taxpayers	\$1,480	\$310	\$500	\$3,200
Total Loss (over childhood):				
Working Parents	\$19,610	\$1,560	\$13,540	\$28,130
Businesses	\$3,280	\$430	\$2,050	\$6,110
Taxpayers	\$5,170	\$420	\$3,560	\$7,440

Notes: Monte Carlo simulation with 10,000 iterations. Distributions for earnings, quit rate, hours penalty, and wage penalty as per Appendix Table A2.

The precision (and possible range) of the estimates is modeled using sensitivity testing. Specifically, 10,000 Monte Carlo simulations are run based on the distributions of key variables (reported in Appendix Table A2). These key variables are individual earnings, the job/quit rate, and months unemployed.

The sensitivity testing results are reported in Table 7. (The mean values are as per Tables 4 and 5.) For annual losses, the standard deviation is \$1,160; the minimum value is \$1,920 and an upper bound penalty per working parent is \$12,060. Looking at the total loss over childhood, the the standard deviation of the estimated loss is \$1,560; the range is between \$13,540 and \$28,130. Similar boundaries are evident for business and taxpayer losses. Overall, the simulation shows that the results can be bounded +/-10% around the mean estimates from Tables 4 and 5. Notably, even on very conservative assumptions, there are substantial economic losses to families, businesses and taxpayers.

8 Conclusions

Parents need access to adequate and affordable child care. Without this access, they are hampered in their ability to fully participate in the labor market. Specifically, parents have

a harder time finding work, being at their workplace, and being maximally productive when they are at work. Their career opportunities are diminished. In combination, parents face many adversities that are economically significant. And as a consequence, the U.S. economy experiences economic disruptions.

Working families faced adversities before the pandemic started. These adversities have persisted and – even as working from home has become more prevalent – they have not abated. Many parents still cannot access child care: so they cannot find work and cannot build careers that would allow them to afford high quality child care. With the costs of COVID-safe high quality child care going up, parents are finding access even harder.

These adversities are experienced nation-wide. There are regional variations in child care options and labor market opportunities for working families. But no region has an efficient child care sector in the sense of maximizing incomes for parents and economic growth for communities. Significant additional investments in child care would be efficiency-enhancing nation-wide.

9 Appendix 1: Sampling

The survey is representative of employed adults in the U.S. who have at least one child aged 0-3. The survey was performed by Zogby Analytics on December 2-5 2022. The final sample was 806 persons.

Zogby Analytics used internal and trusted interactive partner resources to randomly invite thousands of adults were 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 used complex weighting techniques to best represent the demographics of the U.S. population.

Based on a confidence interval of 95%, the margin of error for a sample size of 806 persons 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 the United States. Based on comparison of the survey with the state population, the survey appears to be generally representative of the U.S. population with respect to race, location, and individual/family income (accounting for age and gender).

Appendix Table 1A Individual Characteristics

	Survey Sample	U.S. Population
	(%)	(%)
Race:		
White	59	59
Hispanic	17	19
African American	16	13
Asian	6	6
Other	3	2
Education:		
HS diploma (or below)	25	36
Some college	17	25
Associate degree	10	24
Bachelor's degree+	48	15
$Age:^a$		
18-24	13	19
25-29	18	20
30-34	28	22
35-39	23	21
40+	18	18
Gender:		
Male	45	49
Female	55	51
Family status:		
Single parent	14	12
Married	62	76
Locality:		
Urban	62	60
Suburban	24	22
Rural	14	18
Region:		
East	18	17
South	33	38
Central	27	21
West	22	24
Observations	806	12 million

Sources: Census data.census.gov/cedsci/table?q=S1, March Current Population Survey 2022 census.gov/data/tables/2021/demo/families/cps-2021.html; and fred.stlouisfed.org.

Notes: Sample is U.S. parents/guardians who are caregivers (unpaid) of at least one child currently aged 0-3 and who are either working or in a school/training program. Census data is parents with co-resident children under age 6 (or 18).

Appendix Table 1B Labor Market Involvement

	Survey Sample	U.S. Workforce
Employment status (%):		
Working full-time	76	74
Working part-time-time	16	16
Hours worked per week	35 (11)	39 (8)
Income:		
Individual usual weekly earnings	\$967 (571)	\$1,090 (220)
Average household income	\$69,570 (39710)	\$58,260 (32090)
Observations	806	143 million

Sources: Census, March Current Population Survey 2022; Bureau of Labor Statistics; fred.stlouisfed.org; Semega and Kollar (2022). Notes: Standard deviations in brackets. All survey respondents included (regardless of work status).

10 Appendix 2: Economic Model

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

Calculations are expressed per working parent (not per affected working parent). Amounts are calculated per year. Immediate consequences are annual amounts when a child is 0-3 (expected value 1.5). These calculations are then aggregated across the national population of working parents with children aged 0-3. Childhood estimates are modeled per birth cohort (e.g., children born in 2023) up to age 5 (kindergarten entry). These estimates are aggregated per birth cohort families.

The model is populated using survey data and national economic data from the Census and Bureau of Labor Statistics. All figures are in 2023 present value dollars with a discount rate ρ =3.5%. Appendix Table 2 provides full information. Model variables and parameter values (including derived variables) are described in the top panel. The formulae for economic loss per worker, business and fiscal agency are given in the bottom panel. Data sources for these variables are listed in the Table Notes.

Earnings and Output Losses:

- For i individuals, baseline income y_b is adjusted to y_c with a set of parameters capturing labor market distortion caused by child care problems β . These distortions are: job quit/exit rates q; and months unemployed m (weighted across all parents and regression-adjusted for age, experience (linear and quadratic), education, and gender). These yield a wage penalty v. Individuals incur a proportion $\epsilon = 0.92$ of these lost hours and lost earnings; 1ϵ is incurred by firms.
- Workers incur job search costs as a % of y_b , adjusted for the job quit/exit rate.
- Output losses are the sum of: the proportion $(1-\epsilon=0.08)$ of lost hours and lost earnings borne by the employer $(1-\epsilon)hw$; and direct employment on-costs z and hiring costs d payable by the firm per worker. These costs are a function of the quit/exit rate and the months unemployed. (No reliable estimate of managerial costs attributable to low worker performance are available; to be conservative, these managerial costs are therefore excluded.)

Federal Income Tax Revenue and State/Local Tax Revenue:

- Losses in federal income tax are derived from values for y_c multiplied by marginal federal tax rates of 15%.
- State/local income and non-income (consumption/sales and property tax rates) are averaged from rates across all states (weighted for population). Marginal state/local income taxes are rated at 3.85%. Marginal state/local non-income taxes are applied

at 6.9% (adjusted for 30% tax-exempt consumption).

Future Incomes, Output, and Income Tax Revenue:

- Future economic consequences are extrapolations proportionate to the immediate losses to individuals, businesses and taxpayers. (Immediate child care losses are modeled for each year a child is aged 0-3.) Future losses are model up to age 5 (i.e., they are assumed to be fully alleviated as children enter kindergarten. However, for child ages 3-5, impacts decay at rate τ per annum. Present value decay of impacts is $\rho\tau$.
- 1. Each working parent experiences on average 5 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. These annuities are lost for workers who experience child care problems and are assumed to decay to zero after five years.

Appendix Table 2 Model Variables and Parameters

$\begin{array}{llllllllllllllllllllllllllllllllllll$	Variable/parameter		Value
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
Months unemployed p.a. 0.21 j Job search costs (% of y_b) 0.0690 v Wage penalty (% of y_b) 0.0190 q_b Annual growth rate earnings 0.015 ϵ Proportion of earnings loss incurred by worker 0.92 z On-costs 0.1990 d Hiring costs (% of y_b) 0.28 r Federal tax rate 0.15 s_y State/local income tax rate 0.15 s_y State/local income tax rate (net exemptions) 0.069 0.069 0.069 0.0190	y_b	Baseline individual earnings p.a. (full/part-time adj.)	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	q	- ,	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	m	Months unemployed p.a.	0.21
η_t Annual growth rate earnings 0.015 ϵ Proportion of earnings loss incurred by worker 0.92 z On-costs 0.1990 d Hiring costs (% of y_b) 0.28 s_y State/local income tax rate a 0.0385 s_s State/local non-income tax rate (net exemptions) a 0.069 ρ Discount rate 0.0350 g_t Earnings with inadequate child care p.a. g_t	j	Job search costs (% of y_b)	0.0690
The proportion of earnings loss incurred by worker 0.92 to 0 -costs 0.1990 to 0.28 to 0.1990 to	v	Wage penalty (% of y_b)	0.0190
z On-costs 0.1990 d Hiring costs (% of y_b) 0.28 r Federal tax rate 0.15 s_y State/local income tax rate a 0.0385 s_s State/local non-income tax rate (net exemptions) a 0.069 p Discount rate 0.0350 p_e Earnings with inadequate child care p.a. $p_b(1-v-qm/12)$ p	η_t	Annual growth rate earnings	0.015
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	ϵ	Proportion of earnings loss incurred by worker	0.92
x Federal tax rate x State/local income tax rate x	z	On-costs	0.1990
s_y State/local income tax rate a 0.0385 s_s State/local non-income tax rate (net exemptions) a 0.069 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 $y_$	d	Hiring costs (% of y_b)	0.28
s_s State/local non-income tax rate (net exemptions) a 0.069 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: $L_{w1} \qquad \qquad (y_b-y_e)\epsilon$ $qmy_b/12$ $L_{w2} \qquad qmy_b/12$ $L_{w3} \qquad qjy_b$ $L_{w4} \qquad vy_b$ $L_{worker} \qquad \Sigma L_{w}, k=14$ $L_{f1} \qquad (y_b-y_e)(1-\epsilon)$ $L_{f2} \qquad qdy_b$ $L_{f3} \qquad (y_b-y_e)2+zvy_b$ $L_{firm} \qquad \Sigma L_{firm} \qquad \Sigma L_{firm} \qquad \Sigma L_{fk}, k=13$ rg $L_{s2} \qquad s_{sg}$ $L_{s3} \qquad s_{yg}$	r	Federal tax rate	0.15
$ ho$ Discount rate 0.0350 g_e Earnings with inadequate child care p.a. g Tax base g Discount rate g Discount	s_y	State/local income tax rate a	0.0385
y_e Earnings with inadequate child care p.a. $y_b(1-v-qm/12)$ y_b-y_e	s_s	State/local non-income tax rate (net exemptions) a	0.069
$egin{array}{lll} & & & & & & & & & & & & & & & & & &$	ρ	Discount rate	0.0350
$egin{align*} Economic \ Loss \ Formulae: & (y_b - y_e) \epsilon \ L_{w2} & qmy_b/12 \ L_{w3} & qjy_b \ L_{w4} & vy_b \ L_{worker} & \Sigma \ L_{wk}, k = 14 \ L_{f1} & (y_b - y_e)(1 - \epsilon) \ L_{f2} & qdy_b \ L_{f3} & (y_b - y_e)z + zvy_b \ L_{firm} & \Sigma L_{fk}, k = 13 \ L_{s1} & rg \ L_{s2} & s_{s}g \ L_{s3} & syg \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	y_e	Earnings with inadequate child care p.a.	$y_b(1-v-qm/12)$
$egin{array}{cccccccccccccccccccccccccccccccccccc$	g	Tax base	$y_b - y_e$
$egin{array}{cccccccccccccccccccccccccccccccccccc$	Ecc	momic Loss Formulae:	
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{w1}	$(y_b - y_e)\epsilon$
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{w2}	$qmy_b/12$
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{w3}	qjy_b
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{w4}	vy_b
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{worker}	$\Sigma L_{wk}, k = 14$
$egin{array}{cccccccccccccccccccccccccccccccccccc$		L_{f1}	$(y_b - y_e)(1 - \epsilon)$
L_{f3} $(y_b - y_e)z + zvy_b$ L_{firm} $\Sigma L_{fk}, k = 13$ rg L_{s2} s_sg L_{s3} s_yg		•	
L_{firm} $\Sigma L_{fk}, k = 13$ L_{s1} rg L_{s2} s_{sg} L_{s3} s_{yg}			$(y_b - y_e)z + zvy_b$
$egin{array}{cccc} L_{s1} & & rg \ L_{s2} & & s_sg \ L_{s3} & & s_yg \ \end{array}$		•	
$egin{array}{c} L_{s2} & s_s g \ L_{s3} & s_y g \end{array}$			
L_{s3} $s_y g$			<u> </u>
			_

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/eccc.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]. a Tax rate per state population-weighted from taxfoundation.org/publications/state-local-tax-burden-rankings/#burdens. ρ – Moore et al. (2004).

Notes

- 1. See studies by 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 Yoshikawa et al. (2016); Araujo et al. (2016). Benefit-cost analyses include Barnett and Masse (2007); Heckman and LaFontaine (2010); Reynolds et al. (2011).
- 2. See Montes and Halterman (2011); Belfield (2018, 2019); Borowsky et al. (2022). For calibrated economic models and labor supply studies, see Ho and Pavoni (2020); Moschini (2023).
- 3. In surveys, households give "to provide care when a parent is at work" as the primary reason for child care; and almost 90% of households say it is "very important" that their child care allows them to meet work commitments. See Cascio (2018); Ruppanner et al. (2019).
- 4. Public funding is extremely low: across the 38 OECD countries, average public spending per child is \$14,400; in the U.S. it is \$500 (data from New York Times, Oct. 6 2021, retrieved 12/12/22 from www.nytimes.com/2021/10/06/upshot/child-care-biden.html). Working families can take up the Dependent Care Tax Credit; and low income families can access the Child Care and Development Fund. Use of these subsidies is discussed in detail in Ho and Pavoni (2020). Public subsidies were temporarily increased after the passage of the American Rescue Plan of 2021.
- 5. The survey asks about children aged under 3 in December 2022. The oldest children were therefore born at most two months before the start of the pandemic (March 2020).
- Across 95% of the 806 respondents, at least one family member within each household is working or looking for work. All analyses are performed on the full sample of 806 observations, unless otherwise indicated.
- 7. Data for 2020 from www.bls.gov/opub/reports/womens-earnings/2020/.
- 8. Data from www.americanprogress.org/series/child-care-deserts/; see also National Institution for Early Education Research, *Yearbook 2019*.
- 9. On the fall in places, see Barnett et al. (2020). Higher costs arose because of cleaning costs and the need for physical distancing.
- 10. See Heggeness (2020). On shifting back to the family unit to meet child care needs, see Alon et al. (2020).
- 11. National Household Education Survey estimates are similar, although these pre-date the pandemic (Corcoran and Steinley, 2017).
- 12. These results are similar to other state-wide and national studies (Montes and Halterman, 2011; Belfield, 2018, 2019).
- 13. Recent state studies include North Carolina, Pennsylvania, and Tennessee. See Montes and Halterman (2011); Davis et al. (2017); Talbert et al. (2018); Belfield (2019).
- 14. See Belfield (2018). Question wording was somewhat different in the 2018 survey. However, question wording was more expansive in 2018 such that more disruptions would have been reported.
- 15. For example, rates of leaving work early in 2022 are 64% (versus 56% in 2018). Hours reductions in 2022 are 37% (versus 13% in 2018). And, the rate at which working parents turned down further education in 2022 is 36% (versus 25% in 2018).

- 16. See Workman and Jessen-Howard (2018).
- 17. State tax data from www.taxadmin.org/assets/docs/Research/Rates/ind_inc.pdf. On federal taxes, see Saez and Zucman (2019). Corporate taxes are not included.
- 18. 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).
- 19. 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 11.4 million children 0-3 is weighted from population aged 0-4 from http://www2.census.gov/programs-surveys/cps/techdocs/cpsmar21.pdf. Source: U.S. Census Bureau, Current Population Survey, 2021 Annual Social and Economic Supplement at www.census.gov/quickfacts/fact/table/US/PST045222 (release date: November 2021). Adjusting for household composition (twins, siblings, non-parent families) and labor force participation, there are 12.1 million full-time working parents and 2.0 part-time working parents.
- 20. 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.
- 21. GDP is from U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; //fred.stlouisfed.org/series/GDP, January 1, 2023.
- 22. Over time, fiscal effects become larger than business burdens because of the tax code. The fiscal consequences become even greater.
- 23. These labor force participation effects are detailed in Goldin and Mitchell (2017).

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