A Benefit-Cost Analysis of Child Care Subsidy Expansions: The New York State Case[*]

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Abstract

Proposals to expand child care assistance have widespread support at the national and state levels. This paper uses a novel approach to estimate the benefits and costs of providing child care subsidies to families up to three times the federal poverty line while supplementing child care worker compensation—a reform recently proposed in New York State. We estimate a net present value of $12.4 billion in yearly social benefits relative to a yearly cost of $1.6 billion. Further, we examine alternative program designs including more generous income eligibility and child care worker wage supports, along with other sensitivity analyses.

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I. INTRODUCTION

The lack of affordable quality child care strains the budgets of low- and middle-income families, keeps some mothers from working, and stunts the future wage growth of mothers who are deterred from working because of the high costs of care. As a consequence, expanding child care subsidies to low- and middle-income parents has remained on the national and state agenda for the past half century. In 1971, the Congress passed the Comprehensive Child Development Act, which called for funding child care centers across the nation, but President Nixon vetoed the bill. In 1990, the Child Care and Development Block Grant Act created a federal block grant program to fund states' child care programs; reauthorized in 2014, it remains the main structure for child care assistance across all states. However, child care support has remained a patchwork of funding and programs that became more centralized through the Child Care Development Fund (CCDF) as a part of the 1996 Welfare Reform Act.[1] Further, in response to the COVID-19 pandemic, the American Rescue Plan made almost $24 billion available in Child Care Stabilization Grants for state programs. Recent proposals have sought to expand child care assistance: the Child Care for Working Families Act or the Universal Child Care and Early Learning Act in the pre-pandemic era, for example, or the Build Back Better Act post-pandemic. In this study, we estimate the long-run benefits and costs of a 2022 child care expansion in New York State as an illustrative case for evaluating policy impacts and potential variations.

Child care assistance programs are designed to provide low-income parents with access to services in support of work and educational opportunities while ensuring quality care for young children. Under CCDF policy, families with incomes below twice the federal poverty

[1] In addition, child care funding is available through the Social Services Block Grant as well as state discretion over Temporary Assistance for Needy Families block grants to supplement CCDF via transfer funds or to directly fund child care via so-called 'non-assistance' work supports.

level (FPL) and a child below age 13 are eligible for benefits. New York child care subsidy funds are distributed to 58 county departments of social services.[2] Child care providers must have a contract with their local department in order to receive CCDF funding. As of fiscal year 2019, about 720,000 children in New York State were eligible for CCDF subsidies according to federal rules, and around 440,000 under state rules (Chien, 2022). Approximately 1 out of 4 eligible New York children receive subsidized care, which partly reflects state implementation choices, availability of services, and parent take-up when accessible. About 70 percent of children receiving subsidies were in center-based care or group family child care, 25 percent received care in license-exempt groups or homes, and 5 percent received care in their own home (New York State Office of Children and Family Services, 2021).[3] Child care reform has the potential to better serve eligible children, expand eligibility to more families, and make center-based care more affordable.

The New York State Child Care Expansion (NYSCCE), enacted in Spring 2022 as part of the State's budget bill, was designed to make child care more accessible and affordable, and to ensure that child care workers are better paid and trained. Prior to NYSCCE, the NYS child care subsidy program provided child care subsidies for families with a child under age 13 and with incomes below 200 percent the federal poverty level (FPL). Families with incomes below the FPL have no copayment, those with incomes above the FPL have copayments set at 10 percent of the family income amounts exceeding the FPL, and those with incomes above 200 percent of the FPL are ineligible for subsidies. The NYSCCE expands eligibility for subsidies from 200 to 300 percent of the FPL, where the copayment continues to be determined by 10 percent of the

[2] See https://ocfs.ny.gov/programs/childcare/stateplan/assets/2022-plan/FFY2022-2024-CCDF-Plan.pdf.
[3] For the latest summary of subsidized child care in New York State, see https://ocfs.ny.gov/programs/childcare/assets/docs/factsheets/2021-DCCS-Fact-Sheet.pdf; and for market rate survey of child care costs, see https://ocfs.ny.gov/main/reports/2022-Child-Care-Market-Rate-Survey.pdf.

difference between family income and the FPL, now for all families with incomes between 100 and 300 percent of the FPL. Additionally, $257.3 million of NYSCCE is dedicated to supplement salaries of child care workers, establish retirement accounts, and create one-time employee bonuses. Finally, $50 million is devoted to enhancing child care supply via capital improvement (New York Governor's Press Office, 2022).

Understanding the benefits and costs of expanding child care assistance presents special issues to explore relative to the program evaluation literature on income interventions in childhood as well as evaluations of early childhood interventions such as the Perry Preschool Project or Abecedarian Project. For example, Garfinkel et al. (2022) find that a child allowance would imply net present value of social benefits that are approximately 9.5 times the cost on a yearly basis. However, child care subsidies only increase net income for families who were paying out of pocket, so the main mechanism for increasing household income for families with children is by supporting parental employment. Further, child care subsidies directly affect non-monetary investments in child development through changes in care arrangements. Others have studied long-run returns to experimental investments in early childhood learning (see Campbell et al., 2014; Heckman et al., 2010), yet these interventions may not be directly applicable to current reform proposals to child care assistance. The literature has established the work-enhancing role of child care supports (see Morrissey, 2017), which distinguishes the role of child care for children below age 13 relative to family policy designs that target income directly to children or alternatively protect family leave for those employed with very young children.

In the following sections, we analyze the benefits and costs of a state-level child care policy expansion given the case of New York, and we explore key policy variations under consideration for future reforms in New York State that may also be relevant for understanding

potential reforms more generally. Section II presents a conceptual basis for the benefits and costs expected when expanding child care assistance. Section III discusses the data and methodology used for the benefit-cost analysis, providing details on how we estimate household income effects, describing our microsimulation framework, and discussing the challenges of estimating child care quality effects. Section IV presents baseline results on aggregate benefits and costs of NYSCCE. Section V presents sensitivity analyses, and section VI examines two extensions now being considered by the New York State Legislature. We conclude with section VII.

II. EXPECTED BENEFITS AND COSTS

Table 1 illustrates the expected direction of monetary impacts of subsidized child care to beneficiaries, taxpayers, and society. Non-monetary benefits and costs are presented in Table A1 of the appendix. The objective of a benefit-cost analysis is to attach monetary values to each of the benefits and costs in Table 1, which we subsequently present in Table 3 in Section IV. In Table 1, a plus sign indicates a benefit, a minus sign a cost, a zero no net change, and a question mark some conceptual uncertainty. Row A indicates that, conceptually, a child care subsidy is a benefit to recipients [+] but a cost to taxpayers [-], and that for society, whether the subsidy is a net benefit or a cost remains uncertain [?]. The next two sub-rows explain this ambiguity by dividing the subsidy into two portions: the portion that offsets existing childcare payments (sub-row A.i) and the portion that does not offset existing payments but instead represents new, increased spending by society on childcare (sub-row A.ii). While parents value the former at its full value—since parents are already spending this amount on child care—parents may not do so for the latter if their lack of spending indicates they do not value it fully at that cost. On the other hand, parents are not likely to place zero value on this additional child care; if they did, they could always choose not to use a subsidy. We treat this uncertainty by assuming in our baseline

estimates that parents value this additional child care at half of its cost, and later we test the sensitivity of this assumption by allowing parents' value to range between zero and the full dollar amount of subsidies not offsetting existing payments.[4] Sub-row A.iii is the increased wage rate of child care workers. The increase in earnings for child care workers is a benefit to those workers and a cost to taxpayers, which offset each other and result in a zero effect to society as a whole. Other child care supply investments, such as capital improvement, is summarized by sub-row A.iv, which we treat as uncertain in terms of direct beneficiaries though we expect any impact to be non-negative.

[4] It is also possible that some parents value additional childcare at more than its price but have been unable to purchase it due to credit constraints; by ignoring this possibility for the purposes of our analysis, our estimates of the maximum benefits may be understated.

Table 1. Conceptual Table of the Monetary Benefits and Costs of Subsidized Child Care

	Direct beneficiaries +	Indirect taxpayers =	Total society
A. Subsidized child care and care provider wages	+	−	?
i. Portion of subsidy that supplants out-of-pocket care expenses	+	−	0
ii. Portion of subsidy for additional/new child care consumption	+	−	?
iii. Changes in child care worker wages	+	−	0
iv. Investments in child care supply	+/0?	−	?
B. Changes in earnings of parent recipients	+	0	+
i. Increased earnings from hours worked	+	0	+
ii. Increased total cost of work	−	0	−
iii. Increased wage rates over time from returns to work experience	+	0	+
C. Increased tax payments by parent recipients	−	+	0
D. Reduced other cash or near-cash transfers	−	+	0
Outcomes due to increased household income			
E. Increased future earnings of child recipients	+	0	+
F. Increased future tax payments by child recipients	−	+	0
G. Decreased future transfer payments to child recipients	−	+	0
H. Increased children's health and longevity	+	0	+
I. Avoided expenditures on children's health care costs	+	+	+
J. Avoided expenditures on crime	0	+	+
K. Decreased victimization costs of crime	0	+	+
L. Avoided expenditures on foster care	0	+	+
M. Increased parent's health and longevity	+	0	+
N. Avoided expenditures on parent's health care costs	+	+	+
O. Increased payments due to increased children's longevity	+	−	0
P. Increased payments due to increased parents' longevity	+	−	0
Q. Increased expenditures from greater child educational attainment	0	−	−
R. Outcomes due to changes in child care quality	?	?	?
S. Administrative costs	0	−	−
T. Excess burden for taxpayers	0	?	?

Notes: Benefits are denoted by +, costs by −, completely offsetting benefits and costs or no effect by 0, and conceptual uncertainty by ?. Direct beneficiaries and indirect taxpayers are not mutually exclusive in the population.

Row B indicates that a child care subsidy is expected to lead to increases in the earnings of parent recipients (see Morrissey, 2017). In addition to earnings increases from more hours worked (sub-row B.i), increases in hours worked also imply increases in the cost of working (sub-row B.ii) such as transactional costs like transportation as well as the disutility cost of labor, which partially lessen benefits to recipients and to society as a whole. The transactional costs of working are generally small relative to the benefit from earnings, thus the costs considered here

may predominantly be considered attributable to the disutility of labor. Families may also benefit from the discounted value of future increases in wage rates (sub-row B.iii) due to reduced labor market interruptions and consequent returns to increased work experience (see Spivey, 2005). The increased earnings of recipients leads to a benefit for taxpayers through increased taxes paid—row C—and reduced needs for transfers—row D.

The rows discussed above can lead to both increases and decreases in household income. If there is a net increase in household income, the increase is expected to lead to long-term positive outcomes for children and parents—rows E through Q. For more detailed descriptions of these outcomes, see Garfinkel et al. (2022). Increased household income will increase the future earnings of children when they become working-aged adults (row E), which creates more future tax payments (row F) and less need for future transfer payments (row G). Increased household income is also expected to improve children's and parents' health and longevity (rows H and M respectively), which in turn reduces health care expenditures (rows I and N) but requires higher Social Security and health insurance payments as they live longer (rows O and P, respectively). Following the improvement of children's development outcomes due to higher household income, there will be a reduction in criminal justice and victimization costs (rows J and K), a reduction in child protection costs (row L), and an increase in education expenditures as children complete more schooling (row Q).

Future impacts for children may be generated not only by increases in household income but also by changes in the quality of child care provision as a result of the subsidy program (row R). The extent to which the quality of provision increases (or decreases) will depend upon many factors, which we discuss at the last subsection of Section III. Finally, the program has

administrative costs (row S) and what economists call excess burden (row T) that arise from the taxation required to finance the program.[5]

III. MEASURING IMPACTS: STUDY DATA AND METHODS

Estimation of Household Income Effects

As discussed above, the child care subsidy will lead to increases in household incomes and generate long-term benefits for children and parents. To estimate these benefits, we turn to Garfinkel et al. (2022), who collected and standardized rigorous evidence on these effects through a systematic review of quasi-experimental and experimental studies. For details on the studies and the standardization, see Garfinkel et al. (2022). Table 2 presents standardized mean estimates of the present discounted value of the benefits and costs for one-child, one-parent, low-income households per $1,000 increase in household cash income.[6] The long-term benefits to child beneficiaries are substantial. The biggest improvements are in children's health and longevity, representing over twice the initial increase in household cash income. This is followed by an increase of $1,222 in children's future earnings. The long-term benefits in health and longevity for a single parent are $378. Increases in education incur direct and opportunity costs for children that total $302.

[5] All taxes distort incentives. Taxes on earnings reduce the incentive to earn more. Deadweight loss measures the loss in efficiency.

[6] We update Garfinkel et al. (2022)'s calculation of increased children's future earnings. While Garfinkel et al. (2022) assume children start making earnings at age 22, we assume children start making earnings at age 19 while accounting for the proportion expected to have positive earnings. Note that estimates on reduced crime and victimization costs may also be subject to updating, though we currently follow estimates as shown in Garfinkel et al. (2022).

Table 2. Present Discounted Value of Monetary Benefits and Costs for One-Child, Single-Parent, Low-Income Families per $1,000 Increase in Household Cash Income: Based on Mean Impacts

	Direct beneficiaries	+	Indirect taxpayers	=	Total society
Increase in household income	1,000		-1,000		0
Increased future earnings of children[a]	1,222		0		1,222
Increased future tax payments by children	-342		342		0
Decreased future transfer payments to children	-22		22		0
Increased children's health and longevity	2,250		0		2,250
Avoided expenditures on children's health care costs[b]	8		67		76
Avoided expenditures on crime	0		506		506
Decreased victimization costs of crime	0		1,240		1,240
Avoided expenditures on child protection	0		21		21
Increased parents' health and longevity	378		0		378
Avoided expenditures on parents' health care costs[b]	0.3		2.3		2.6
Increased payment due to increased children's longevity	229		-229		0
Increased payment due to increased parents' longevity	77		-77		0
Increased costs of children's education	-302		-72		-374

[a] Future earnings are valued at 75 percent of the face value ($1,629). This is because some increases in earnings come from increased hours, and our upper bound estimate (to be conservative) is 25 percent. Conservatively, we assume the recipient gets no surplus from increased earnings that come through additional hours.

[b] Reductions in health care expenditures reduce both out-of-pocket costs to beneficiaries and public and private insurance costs to taxpayers. Out-of-pocket medical expenditures are about 11 percent of national health expenditures in 2019 (Centers for Medicare and Medicaid Services, 2019). We allocate 11 percent of the reduced health care costs to beneficiaries and 89 percent of the costs to taxpayers at large in the form of reduced taxes and insurance premiums.

Benefits for taxpayers are much smaller in magnitude. The biggest benefit comes from reductions in criminal justice expenditures and the victim costs of crime, 71 percent of which is attributable to reductions in victim costs rather than reductions in taxes. Increased future earnings of children lead to increases in taxes they pay and decreases in other transfers they receive that are worth $342 and $22 to taxpayers, respectively. Health care costs decrease by $8 for children, $0.29 for parents, and by $69 for taxpayers. Child welfare spending declines as well, saving taxpayers $21. Taxpayers also see increases in certain costs. Increased schooling of children imposes a cost on taxpayers of $72. Increased longevity of both the child and parent increase Social Security and Medicare transfers that nearly offset the increase in taxes paid from increased earnings.

To convert these estimates into aggregate benefits and costs of the NYSCCE, we take account of the number of children in the families that receive child care benefits as well as the number of children in families of child care providers that received increases in their wages or benefits. This is because the increase in family income benefits all the children in the family, not just those children who receive child care. Although we do not count benefits to all adults in the families in our baseline estimates—because the majority of evidence on parental outcomes is on mothers—we test the sensitivity of our results to taking account of benefits to all adults in these families in our sensitivity analysis section. Finally, we also account for some families whose incomes are above our definition of low-income. As described in Garfinkel et al. (2022), families with incomes below $50,000 are categorized as low-income and receive the full future stream of benefits resulting from additional income, while families with incomes above $100,000 are considered high-income families who derive no future stream of benefits from the increases in family incomes. Families with incomes between $50,000 and $100,000 receive an average of about half of the full stream of benefits. We test the sensitivity of our results to alternative definitions of low-income in the sensitivity analysis section.

Microsimulation Estimates of Changes in Household Income

To estimate the increase in household income generated by the NYSCCE, we use the Annual Social and Economic Supplement of the Current Population Survey, 2015-2019 (for income data observed in 2014-2018). Any reform that reduces out-of-pocket child care expenses for families would lead to an increase in economic resources for those who are currently paying for care. In addition, parents may also increase work/child care hours or change modes of child care arrangement. Behavioral responses to child care reform comprise the largest effect in terms of net income gains, poverty reduction, and long-term saving ability. Lastly, changes in earnings

imply changes in taxes and transfers, as well. The following steps describe the microsimulation methods used to estimate the changes in family income resulting from the NYSCCE:

1) Estimate changes in hours of work, earnings, and net cost of child care.

For families with incomes below 300 percent of the FPL and children under age 13, we model expected behavioral responses in hours of work and earnings following Hartley et al. (2022). We assume that any behavioral response to a child care reform would be taken by either a single parent or the secondary earner if there are two parents present. First, because many families are not paying for child care and/or not working, we estimate the potential cost of yearly child care for each family based on their family structure assuming a distribution of work hours proportional to those of parents with older children. Then, we calculate the percent change in that potential cost after the proposed reform. For parents already working and paying for formal care, we use estimates of elasticities from the available literature (for a summary, see Morrissey, 2017) to model how lower child care costs would affect work hours. Given the percent change in potential child care prices, the elasticity estimates indicate the relative size of the labor response. We follow the labor elasticity assumptions used by Hartley et al. (2022). For responses in the employment decision, we assume no changes for those with incomes above 150 percent of the state median income (SMI), we use elasticities of -0.225 and -0.075 for single parents and married/cohabiting parents, respectively, with incomes between 75 and 150 percent of SMI, and -0.450 and -0.150 for single parents and married/cohabiting parents with incomes below 75 percent of SMI. For the predicted probability of entering employment given by the employment elasticities multiplied by percent changes in child care prices, we assign those with probabilities greater than a uniform random variate to be employed post-reform. We use a matching algorithm that imputes new hours of work, earnings, and childcare expenses by family characteristics. For

responses in hours worked among those already working, we use elasticities that vary by age of youngest child and income status. For families with incomes between 75 and 150 percent of SMI, we use elasticities of -0.0068, -0.0100, and -0.0136 when the youngest child is aged 6-12, 3-5, and 0-2, respectively; for those with incomes below 75 percent of SMI, we instead use -0.0340, -0.0500, and -0.0680. The expected percent change in work hours is the elasticity multiplied by the percent change in child care cost. We assume that no one would increase labor supply beyond 2,080 hours per year. Further, we assume a post-reform setting in which the child care market has fully adapted, and quality child care supply is market-clearing.

2) Estimate changes in wages for child care workers.

We additionally model proposed increased wages for child care workers. Under the NYSCCE, $257.3 billion would be dedicated to the child care workforce (to increase salaries, to establish retirement accounts, and to create one-time employee bonuses). We treat all of the $257.3 million as increase in workers' income as a simplifying assumption. We distribute the $257.3 million evenly across childcare workers making less than $25 per hour.

3) Estimate changes taxes and transfers.

We further estimate changes in taxes and transfers among households with increased earned income from the reform. Changes in tax liabilities are estimated pre- and post-reform using Tax-Calculator v.3.2.1 (an open-source microsimulation model calibrated to the National Bureau of Economic Research's TAXSIM). Changes in transfers from Temporary Assistance for Needy Families (TANF) and the Supplemental Nutrition Assistance Program (SNAP) are estimated based on changes in family earnings, where TANF is reduced dollar for dollar with additional earnings and SNAP is reduced at a rate of 30 percent of additional earnings.

4) Estimate wage profile increases over time from greater job experience.

Parents who increase their work hours because of child care subsidies can expect to see increases in their wage profiles over time given greater job experience and reduced career interruptions. These wage profile increases also benefit children. We first use a synthetic cohort technique for simulating changes in lifetime earnings based on Hartley et al. (2021). This approach constructs a lifetime earnings profile along with changes corresponding to responses to a child care subsidy reform, and then simulates the return to additional years of work in terms of higher wages over time. (For estimates of the returns to reducing career interruptions, see Madowitz et al., 2016; Spivey, 2005). The approach not only produces an estimate of the aggregate earnings gains that result from increased wage rates as a consequence of the increased labor supply stimulated by the NYSCCE, but also an average ratio between lifetime changes in earnings from increased hours worked relative to increased wage rates over time. We apply this ratio to the changes in earnings from hours worked estimated through a cross-section to get the wage profile increases in the cross-section. We use results based on the cross-section because it represents a one-year estimate of the lifetime changes in earnings (given that a cross-section represents parents across the observed age distribution who benefit from the child care program). We then discount the increase in wage profile to the ages when parents first start experiencing wage profile increases, using the ratio between the discounted and undiscounted values produced by the synthetic cohort approach.

The Importance and Challenge of Measuring Changes in Child Care Quality

In this section we begin by briefly summarizing what the literature says about the effects of child care on child development (especially the effects of child care quality), focusing on the implications for estimating the benefits and costs of the child care reform. Then we explain why the small set of quasi-experimental and experimental evaluations of actual child care programs

do not provide appropriate estimates for quantifying the benefits and costs of changes in child care quality under the NYSCCE.

First, scholars agree that the quality of child care affects child outcomes. Most also agree that center-based, regulated child care centers provide higher quality child care than informal, unregulated care or care by relatives (Chaudry et al., 2017), which is especially true for lower-income single mothers (see Bernal and Keane, 2005). However, accounting for potential changes in the quality of care in New York State and incorporating the changes into a benefit-cost analysis is challenging. In response to a child care policy reform, families may: (a) increase the time their child spends in the care of others; (b) substitute one child care arrangement for another; or (c) both. Families may also generally increase the number of child care arrangements by supplementing unpaid care with subsidized care, or may consolidate into fewer, more expensive arrangements. The net result of these choices on the quality of care thus depends on a number of factors. Put another way, measuring changes in the quality of care involves shifts from parental to non-parental care as well as shifts between lower and higher quality non-parental care, potential increases in hours of care, and potential changes in the number of child care arrangements.

Second, the positive effects of child care on child development are largest for children from the lowest-income families and smallest for children from the highest-income families.[7] This complicates the estimation of the effects of changes in the quality of child care on both benefits and costs.

[7] See Appendix Tables A2 and A3, including the following studies with more positive outcomes for lower-income children: Herbst, 2017; Havnes and Mogstad, 2011, 2015; Berger et al., 2021; Felfe and Lalive, 2018; Kottelenberg and Lehrer, 2014, 2017; Haeck et al., 2018; Weiland and Yoshikawa, 2013; Pion and Lipsey, 2021; Cornelissen et al., 2018; Felfe et al., 2015; Datta Gupta and Simonsen, 2010; Magnuson et al., 2007; Berlinski et al., 2008; Berlinski et al., 2009.

Third, age also matters. For children ages 3 to 4, there is strong evidence that high-quality pre-k/child care is good for children and parents. At the other extreme, for children in the first six months of life, there is strong evidence that paid parental leave is good for children and parents (see Rossin-Slater, 2021), suggesting that at typical levels of quality, non-parental child care in the first six months of life, on average, may be inferior to parental care.[8] For children ages 1 and 2, the evidence is more mixed; two quasi-experimental causal studies of the effects of child care on children of this age in France (Berger et al., 2021) and Germany (Felfe and Lalive, 2018) both find positive cognitive effects but conflicting evidence on child behavior. A very high-quality study of the effects of child care in the United States (Vandell et al., 2010) finds positive cognitive effects and negative effects on child behavior, which they report as a central finding based on a comprehensive review of the literature. The net effect on long-term child outcomes for this age group is unclear. Finally, for children of school age, child care is generally after-school care, on the effects of which research is limited and weak (Kremer et al. 2015).

In view of the daunting challenge of incorporating changes in the quality of child care into a benefit-cost analysis, and the likelihood that most of the benefits in this policy will derive from changes in household incomes, we conclude that based on current knowledge, the most illuminating estimates we can derive will be limited to the household income effects of the child care subsidy. We acknowledge from the outset that assuming zero effects of changes in the quality of child care constitutes an imperfect estimate of the benefits and costs of child care. But given the state of the evidence, abstracting away from net quality effects has the virtue of providing a clear starting point. With this as our starting point, we can proceed to test the

[8] Rossin-Slater also finds that even unpaid short leaves have positive effects for children and mothers and that extending paid leaves beyond one year has no positive effects on children and negative effects on wages, employment, and career advancement for mothers.

sensitivity of our main estimates to a range of assumptions about how good (or bad) changes in the quality of child care would need to be to achieve a return on investment of various magnitudes.

IV. AGGREGATE BENEFITS AND COSTS OF NYSCCE

Rows A–D of Table 3 present microsimulation results on the cost and various components of increases in household incomes under the NYSCCE. The taxpayer column of row A shows that the fiscal cost of NYSCCE is $1.61 billion per year. Of this $1.61 billion in spending, $0.41 billion are subsidies that offset existing child care expenditures and would increase households' cash incomes by the same amount. Subsidies that represent new rather than offsetting expenditures amount to $0.91 billion, but as discussed above we assume that beneficiaries value these at 50 percent of their total, or $0.45 billion. Child care workers receive an earnings increase of $0.24 billion. Increases in earnings from parental increases in hours worked and higher wage rates over time are $0.81 billion and $0.24 billion, respectively. Increases in hours worked also pose a cost of working that we conservatively assume to be 50 percent of the increase in earnings—$0.41 billion ($0.81 × 0.5).[9] We conduct a sensitivity analysis in Section V by

[9] In the analysis of a child allowance, Garfinkel et al. (2022) assumed even more conservatively in the baseline estimate that increases in income from increases in hours worked were fully offset by work-related expenses and utility losses. Rätzel (2012), however, using data from the German Socio-Economic Panel, finds that utility—measured by a life satisfaction scale—increases as hours worked per day increase up to 7-8 hours per day for men and 4-5 hours for women and then decreases for more hours of work. This finding suggests that for our low-income sample of New York State families, where underemployment is generally more common than overemployment, there should be no discount for utility loss, but only a discount for the costs of working other than child care and taxes, which we already count. According to calculations by the U.S. Census Bureau (2017), median weekly work-related expenses (excluding child care) were $56 in 2015 dollars, the equivalent of $60 in 2019 dollars. According to the Bureau of Labor Statistics, in 2015, the median weekly earnings of full-time workers were $801, the equivalent of $860 in 2019 dollars. This means that work-related costs for someone making half the median weekly wage are around only 14 percent of earnings (i.e. $60/($860/2)). The 50 percent figure we use here is thus very conservative.

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assuming the cost of working ranges from 0 to 100 percent of the value of increased earnings from increased hours of work, which we also do for the percent of newly subsidized care valued as a benefit. Increases in tax payments are worth $0.27 billion and savings in cash or near-cash transfers are worth $0.02 billion, both benefits for taxpayers. In sum, the net increase in household incomes of child care providers and subsidy recipients equals the sum of subsidies that supplant existing child care payments ($0.41b), plus earnings increases to both providers ($0.24b) and recipients ($0.81b from increased hours of worked and $0.24b from increased wage profiles), net of the cost of working (-$0.41b), increased taxes paid (-$0.27b), and loss of means-tested transfer payments (-$0.02b). Thus, the net increase in household income is $1 billion. Remaining subsidies that increase the quantity of care used ($0.45b for beneficiaries) are valued by parents, but they do not contribute to future outcomes because they do not generate cash to invest in child development or family health.

Table 3. Estimated Yearly Benefits and Costs of the NYSCCE (in billions of dollars)

	Direct beneficiaries	+ Indirect taxpayers	= Total society
A. Subsidized child care and care provider wages	1.11	-1.61	-0.50
i. Portion of subsidy that supplants out-of-pocket care expenses	0.41	-0.41	0
ii. Portion of subsidy for additional/new child care consumption	0.45	-0.91	-0.45
iii. Changes in child care worker wages	0.24	-0.24	0
iv. Investments in child care supply	0	-0.05	-0.05
B. Changes in earnings of parent recipients	0.65	0	0.65
i. Increased earnings from hours worked	0.81	0	0.81
ii. Increased total cost of work[a]	-0.41	0	-0.41
iii. Increased wage rates over time from returns to work experience	0.24	0	0.24
C. Increased tax payments by recipients	-0.27	0.27	0
D. Reduced other cash or near-cash transfers	-0.02	0.02	0
Outcomes due to increased household income			
E. Increased future earnings of child recipients	2.95	0	2.95
F. Increased future tax payments by child recipients	-0.83	0.83	0
G. Decreased future transfer payments to child recipients	-0.05	0.05	0
H. Increased children's health and longevity	5.43	0	5.43
I. Avoided expenditures on children's health care costs[b]	0.02	0.16	0.18
J. Avoided expenditures on crime	0	1.22	1.22
K. Decreased victimization costs of crime	0	3.00	3.00
L. Avoided expenditures on foster care	0	0.05	0.05
M. Increased parent's health and longevity	0.40	0	0.40
N. Avoided expenditures on parent's health care costs[b]	0.0003	0.0025	0.0028
O. Increased payments due to increased children's longevity	0.55	-0.55	0
P. Increased payments due to increased parents' longevity	0.08	-0.08	0
Q. Increased expenditures from greater child educational attainment	-0.73	-0.17	-0.90
R. Outcomes due to changes in child care quality	0	0	0
S. Administrative costs[c]	0	-0.08	-0.08
T. Excess burden for taxpayers[d]	0	0.02	0.02
U. Total[e]	9.30	3.12	12.42

[a] Increases in hours worked also pose a disutility cost of working that we assume to be 50 percent of its value.
[b] Reductions in health care expenditures reduce both out-of-pocket costs to beneficiaries and public and private insurance costs to taxpayers. Out-of-pocket medical expenditures are about 11 percent of national health expenditures in 2019 (Centers for Medicare and Medicaid Services, 2019). We allocate 11 percent of the reduced health care costs to beneficiaries and 89 percent of the costs to taxpayers at large in the form of reduced taxes and insurance premiums.
[c] We assume that administrative cost is 5 percent of initial fiscal cost.
[d] Excess burden is assumed to be equal to 40 percent of the net increase or decrease in the present discounted value of taxes. Neither decreases in victim costs nor reductions in health insurance premiums (71 percent and 33 percent respectively of total taxpayer benefits) are counted in the calculation of excess burden.
[e] The total may not be exactly the sum of numbers in the column due to rounding.

To translate our estimated increases in household cash incomes into estimates of future benefits and costs for children, parents, and taxpayers, we combine household income increases in Table 3 with the standardized mean estimates developed by Garfinkel et al. (2022) of the

benefits and costs per $1,000 increase in household income for one-child, single-parent, low-income households (presented in Table 2). These standardized mean estimates are based on a systematic review of studies documenting the effects of cash and near-cash income transfer programs on child and parent outcomes. Given that the average family today has two children, and the benefits of a $1,000 increase in household income to children and parents in high-income families are likely to be lower than they are for low-income families, we adjust the standardized estimates by the number of children in each household of our dataset, and by the income levels of the households in our dataset. (The adjustment for higher-income families is small because only families below 3 times the poverty level are eligible for benefits.) For parent benefits, because nearly all evidence on adult benefits from the literature is based on mothers, we follow Garfinkel et al. (2022) in limiting benefits to one adult per household. We test the sensitivity of our results to this conservative assumption in Section V.

Rows E–U of Table 3 present the present discounted value of future aggregate benefits and costs of the NYSCCE, based solely on effects from increased household income while assuming no change in quality of child care. Children's future earnings increase by $2.95 billion. Increases in children's health and longevity yield the biggest benefit, at $5.43 billion, far exceeding the total costs of child care subsidies. All told, beneficiaries, including both subsidy recipients and child care workers, derive $9.30 billion worth of benefits, more than 5 times the initial fiscal outlay.

Taxpayers enjoy some indirect benefits but also incur extra costs in addition to the initial fiscal cost. The high value of reduced expenditures in criminal justice and victimization costs, $3.22 billion ($1.22 + $3.00), is the biggest savings to taxpayers. Note that 71 percent, or $3.00 billion, of the value of reduced crime to taxpayers is due to the reduction in their costs as victims,

while $1.22 billion is due to reduction in fiscal costs to taxpayers. (Only the latter affects the calculation of deadweight loss to taxpayers.) Savings to taxpayers from increased taxes paid by children in the future are also large, amounting to $0.83 billion. Due to the increased longevity of parents and children, $0.63 billion ($0.55 + $0.08) of extra social insurance and health insurance payments are required of taxpayers. The bottom line for taxpayers is that net costs are completely offset and an additional $3.12 billion worth of benefits are generated. For society as a whole, net benefits equal $12.42 billion.

V. SENSITIVITY ANALYSES

Our main results rely on a set of assumptions regarding beneficiary valuation of additional earnings or subsidized child care, a series of benefit-cost parameter choices, a survey of relevant estimates from the literature, and the net change in child care quality. In this section, we explore the sensitivity of our main results to variability across these assumptions. The sensitivity results are summarized in Table 4, which we discuss in turn in the following subsections on ranges of alternative assumptions, child care quality, and a Monte Carlo exercise exploring estimate variability.

Alternative Assumptions and Parameter Values

Table 4 panel A presents the results of this sensitivity analysis focusing on the impact of one assumption at a time, with estimates ordered by the range from lower to upper net social benefit. Several of the assumptions we consider, depending on a reasonable set of alternative values, imply only small effects on the aggregate social benefit, mostly falling between the central estimate of $12.42 billion plus or minus $0.5 billion. In the main results, the excess burden of tax distortions is assumed to be 40 percent of the net changes in the present discounted values of taxes, which generates little variation in aggregate social benefit when excess burden ranges

from alternative values of 30 to 50 percent. Because most of the literature focuses on outcomes for mothers, our main estimates assume only one parent benefits, yet allowing the possibility that a second parent benefits when present also leads to only small increases in net social benefit. The following parameter choices also have subtle implications for the net social benefit. We allow the health expenditure elasticity to range between 0.19 and 1.48 (given estimates in the literature). We compare ranges of income status with expected long-run benefits from household income increases, where the main results assume families with incomes below $50,000 benefit fully in the long run, those between $50,000 and $100,000 benefit partially, and those above $100,000 experience no change in long-run outcomes. The sensitivity results compare incomes with lower long-run benefit thresholds of $37,500 to $75,000, or higher thresholds of $67,500 to $125,000. Further, we test the sensitivity of assuming additional earnings from increased hours worked have disutility costs of 50 percent of the earnings value, where alternatively we consider disutility costs that completely offset earnings as well as zero disutility or other work costs. Lastly, we relax the assumption that additional child care subsidies for those not already paying out of pocket are valued at 50 percent, and instead we compare values from 0 to 100 percent. Again, each of these options listed above suggest no more than a $0.5 billion difference in either direction, or a percent difference no more than 4 percent.

Table 4. Sensitivity Analysis on Net Social Benefits to Society from the NYSCCE (in billions of dollars)

A. One-at-a-time variations	Lower	Upper
Excess burden proportion {0.5, 0.3}	12.42	12.43
Share of benefits/costs to co-parents {0[a], 1}	12.42[a]	12.56
Health expenditure elasticity {0.19, 1.48}	12.26	12.58
Declining long-run benefit range {$37.5-$75k, $62.5-125k}	12.03	12.55
Share of parents' increased earnings counted as benefit {0, 1}	12.02	12.83
Share of additional child care subsidies counted as benefit {0, 1}	11.97	12.88
Share of future earnings as direct benefit {0.75[a], 1}	12.42[a]	13.41
Share of increased earnings to boost long-run outcomes {0.5, 1}	9.44	13.58
Value of a statistical life {$4.6m, $15.0m}	9.31	15.47
Percent change in child care quality {-10%, +10%}	7.12	16.76
Discount rate {0.05, 0.01}	6.83	26.66
Study estimates used by outcome {min, max}[b]	8.11	26.04
B. Simulation-based variations[b]	**5th percentile**	**95th percentile**
Baseline specifications over ranges noted above	1.86	31.01
Including only positive study estimates	5.57	36.96

[a] Denoted estimates correspond to our baseline specification as reported in Table 3.
[b] Study estimates used from the literature correspond to the minimum or maximum estimate for each outcome, where the minimum estimates exclude the one study showing negative effects of household income on long-run child outcomes.
[c] Simulation-based variations are based on 1,000,000 replications that vary by parameter choices given the ranges represented in panel A as well as the study estimates from the literature when more than one study is used for a given outcome.

The increase in children's earnings is a major benefit of the NYSCCE, so counting 100 percent instead of 75 percent of its full value generates an 8 percent increase in social benefits. If all of the increased future earnings of children came through higher wages instead of additional hours worked, then valuing those earnings at 100 percent would be more appropriate instead of assuming some disutility costs of work. In our main estimates, we assume that 86 percent of increased parental earnings are available for investments in long-run outcomes, which represents the transactional costs of working like transportation or clothing. For our sensitivity estimates, we compare a lower estimate of only 50 percent of earnings available to an upper estimate of 100 percent, with net social benefits implied between $9.44 billion and $13.58 billion. Next, using a VSL of $4.6 million or $15.0 million generates a substantial 25 percent difference in each direction from our baseline estimate. And for the most consequential assumption, discounting all future benefits and costs by 1 percent instead of 3 percent more than doubles the aggregate social

benefit; a discount rate of 5 percent instead would reduce social benefits by 45 percent. All of our main estimates rely on multiple studies, so we additionally explore the degree to which our results rely on only the smallest or largest estimates from the literature regarding each outcome. Using the minimum estimates from impact studies cuts the aggregate benefit by 35 percent, and the maximum estimates double the aggregate benefit.

Taking Account of Child Care Quality

Sensitivity estimates for child care quality are also included in Table 4 panel A, yet we discuss the difficulties and assumptions in more detail in this subsection. On one hand, the $257.3 million of NYSCEE funds dedicated to the child care workforce could contribute directly to improvement in child care quality. On the other hand, program expansion can also entail drawbacks in the quality of care if investments in market supply are insufficient to meet changes in child care utilization. For example, research on Quebec's child care program has found negative effects of its expansion on child development outcomes (see discussion in Appendix), and research on paid family leave suggests that for children in the first six months of life, parental care may result in better child outcomes than market care.

We use child care expenditures per child subsidized as a rough proxy for child care quality and changes in these expenditures as a measure of changes in quality. We account for child care spending per child using federal and state Child Care and Development Fund (CCDF) estimates along with separate child care funds via Temporary Assistance for Needy Families (TANF) and Social Services Block Grant (SSBG). According to our estimate, current child care spending per child is approximately $10,000 in New York State. The total number of eligible children pre-reform is about 550,000 children, of which only about 20 percent, or 110,000, are enrolled in subsidized care. The NYSCCE reform would be a sizable 150 percent increase in

spending, which would expand access to child care to new families and children. We predict a 40 percent increase in children using subsidized care based on parents entering employment; additional parents who were already employed may also seek child care in response to the reform. The change in public child care spending per child depends on the actual take-up response. If the 40 percent increase in children from newly employed parents were the only change—representing about 45,000 additional children—then spending per child would increase by 78 percent. Conversely, if all currently-eligible children entered subsidized care, spending per child would decrease by 48 percent. The break-even point indicating no change in spending per child would correspond to an additional 170,000 children in subsidized care, which would represent total take-up among currently-eligible children of 50 percent.

While it is difficult to expect the effects of per-child spending to increase by 78 percent or fall by 48 percent, those numbers set informal bounds around assumptions about enrollment. More likely changes in enrollment might lead to changes in per-child spending ranging from a 10 percent increase to a 10 percent decrease (an increase or decrease of $1000 per child), and for illustrative purposes we consider the implications of these two possibilities for the net benefits of the program.

To estimate the effect of child care spending per child, as a proxy for quality, we leverage school spending estimates by Jackson et al. (2016). We conclude that a 10 percent increase in spending per child per year would increase earnings in adulthood by 0.738 percent per year. (Detailed summaries and calculations are in Appendix.) According to our New York state sample, among adults aged 30-34 (approximately the mid-point of age 20-45, where Jackson et al. (2016) analyzed adult earnings) who were living in families below 300 percent of the FPL, average annual earnings were around $21,830. A 0.738 percent per year increase is thus a $161

per year increase. Assuming that children are on average 9 years old and increased earnings starting at age 19 and ending at age 64, the present discounted value of the lifetime increase in future earnings is $3,060.

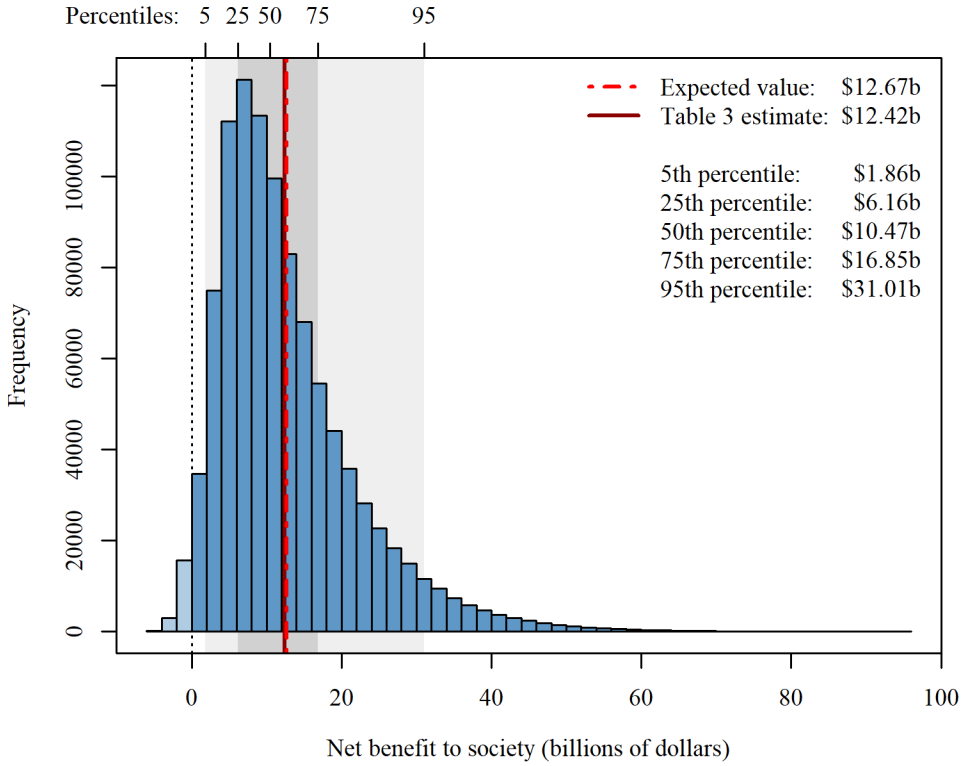
To convert the present discounted value per child above into an aggregate increase, we multiply by the number of children in subsidized child care based on different assumptions on the take up rate and spending per child. For example, a 10 percent increase in spending-per-child would imply an aggregate increase of $0.9 billion in future earnings. If 52 percent of all eligible children participated post-reform, the spending-per-child would match pre-reform levels, suggesting a break-even with no change in quality. Our main estimates implicitly assume no changes in quality of care in order to avoid overstating the net social benefit. As a more extreme assumption, we estimate that a 10 percent decrease in spending per child—based on a participation rate of 58 percent of eligible children—would imply a $1.1 billion decrease in future earnings. While it may not seem plausible that quality would decrease by this magnitude among all children on average, this thought exercise addresses the question of how much unintended quality effects might matter. Assuming that average quality decreases by 10 percent implies a reduction in the net future earnings impacts from family income of about 37 percent. Assuming all other benefits that reflect future outcomes for children also decrease by 37 percent, the net social benefit would decline by close to 37 percent because, while some of the benefits we calculate are attributable to parent's increase in employment, those benefits are very small compared to children's benefits. Given a +/- 10 percent range for quality changes, our main estimate of the net social benefit ranges between $7.1 billion and $16.8 billion.

Monte Carlo Simulation Exercise

In order to be more informative about possible interactions in the variability across these assumptions, we perform a Monte Carlo exercise where we simulate random draws from each range of alternative values in Table 4 panel A, and we summarize the results in panel B. Across 1,000,000 replications, we take parameter values from a uniform distribution over each range while also randomly selecting one study estimate for each outcome from standardized effects taken from the literature. Table 4 panel B shows the 5th and 95th percentiles of the results as a way of bounding expected estimates of the net social benefit between $1.86 billion (15 percent above the program cost) and $31.01 billion (150 percent above the aggregate benefit estimate in Table 3). When excluding the only negative estimate in the literature for household income effects on long-run child outcomes, the 5th to 95th percentile range shifts upward: $5.57 billion to $36.96 billion. Figure 1 illustrates the distribution of results from the Monte Carlo simulations. The expected value of the net social benefit is $12.67 billion, just above the main estimate in Table 3. The interquartile range of estimates spans from $6.16 billion to $16.85 billion.[10]

[10] Assuming truncated normal distributions centered on each choice set for parameters instead of uniform distributions makes negligible differences in the quantitative results except that Figure 1 would have a longer right tail. Still, the 99th percentiles are very similar, with aggregate social benefits of 47 when normally distributed versus 45 when uniform.

Figure 1. Histogram of Simulation-based Sensitivity Estimates
by Parameter Choices and Study Estimates



Notes: Estimates are based on 1,000,000 replications that vary by parameter choices given the ranges represented in Table 4 as well as the study estimates from the literature when more than one study is used for a given outcome.

Whenever possible, our main estimate choices attempt to provide informative data without overstating the potential social benefits. Figure 1 illustrates that our central estimates correspond almost exactly to the expected value over all possible combinations even though the distribution skews towards potentially high values of social benefit at the upper end of the distribution. One area that we do not address empirically in our analysis is the possibility that early childhood investments have continued impact in subsequent generations if children grow up to become better parents. Daruich (2022) considers second-generation parenting as a mechanism for longer-run general equilibrium effects and find returns around twice as large.

Even considering future discounting, investing in children—whether through child care or other family policies—is a great deal that is even better for society in the longer-term future.

VI. ALTERNATIVE PROGRAM EXPANSIONS

The specific child care expansion passed in New York State is only one example of what child care policy could mean within a benefit-cost framework. Other reforms are still under consideration in New York that may be relevant for policy planning more generally. First, family income eligibility could be more inclusive for middle-income families by extending up to 500 percent of the FPL instead of the NYSCCE reform up to 300 percent of the FPL. The copay structure remains the same, where those below the FPL pay nothing, and those above the FPL pay no more than 10 percent of the difference between family income and the FPL as long as their incomes do not exceed the 500-percent threshold. Second, reforms could focus more on strengthening child care worker wages directly. While some reforms have focused on goals such as $25 per hour, or equivalence with early education teacher salaries, we consider a wage supplement of $12,500 yearly per child care worker. Lastly, we consider an alternative policy that combines both an extended income eligibility threshold and higher child care worker wages.

Table 5. Estimated Yearly Benefits and Costs of Alternative Program Designs (in billions of dollars)

Alternative program designs	Program cost	Net social benefit
Baseline: Family income eligibility up to 300 percent of the FPL[a]	1.61	12.42
Family income eligibility up to 500 percent of the FPL	2.09	17.09
Child care work wage supplements of $12,500 per year	2.74	19.41
Combined 500% FPL eligibility and $12.5k wage supplements	3.22	25.63

[a] Denoted estimates correspond to our baseline specification as reported in Table 3.

Table 5 compares the program cost and net social benefit for our baseline NYSCCE results alongside these alternative programs. If child care reform benefits more families, raising the eligibility to 500 percent of FPL, then aggregate benefits would increase to $17.09 billion with a yearly cost of $2.09. If reform offers a higher wage to child care workers, holding the

NYSCCE eligibility at 300 percent of the FPL constant, aggregate benefits would increase even more, to $19.41 billion at a cost of $2.74 billion. And with both alternative reforms combined—a higher eligibility at 500 percent of the FPL and child care worker wages supplemented by $12,500—the net social benefit would be $25.63 billion at a cost of $3.22 billion. The relative social benefits to program cost are higher when expanding eligibility to lower- and middle-income children, especially in the alternative case with eligibility up to 500 percent of the FPL. However, child care worker wages may be a more direct input toward increasing the quality of care. Although the child care worker wage supplements considered here are substantial relative to mean salaries, for transparent comparisons and simplicity, we assume that quality increases by 10 percent following the sensitivity exercise reported in Table 4. It is possible that investing in worker wages actually pays off more in long-run social benefit if the quality impacts are larger, and the results are qualitatively similar between increased eligibility and higher worker wages with the 10 percent quality assumption as shown in Table 5.

VII. CONCLUSION

The shortage of affordable child care in New York and across the nation is a serious problem for families with children, straining family budgets, discouraging work, and stunting wage growth for mothers. In this paper, we examine whether and to what degree the social benefits of expanding affordable child care exceed the social costs. Our analysis focuses on New York State as a recent illustration of what state-level policy can accomplish while also exploring potential extensions to that model. We examine a recently enacted expansion of the State's child care system and two further extensions which are under consideration in the legislature and Governor Hochul's Administration. The pre-reform system in NYS closely mirrored the federal program. Families with children under the age of 13 and with incomes below twice the federal poverty

level were eligible for child care subsidies. Eligibility for benefits was extended to families with incomes between two and three times the poverty level. Remuneration of child care providers was also increased slightly. Our results suggest that these extensions are a good investment for New York State. The policy will cost New York State $1.6 yearly and generate a present discounted value of social benefits of $12.4 billion per year. Extending eligibility to families with incomes up to five times the poverty and bigger increases in the pay of child care workers are similarly good investments.

Our main estimates of the social benefits are based solely on the increases in household incomes that result from the increases in affordable child care and increased earnings. Because of the difficulty of estimating how the legislation will change the quality of child care, we save attempts to estimate any benefits (or costs) that would come from improvements in the quality of child care via a sensitivity exercise. This is a limitation of our analysis, especially in the case of a large increase in child care worker wages, because increases in child care worker wages very likely lead to increases in the quality of child care. Despite this limitation, simulation analysis on the variability of our modeling assumptions indicates our core findings are relatively robust. Our analysis suggests that increasing the supply of affordable child care generates social benefits for in excess of budget costs.

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APPENDIX

Non-monetary Benefits and Costs of Subsidized Child Care

Although non-monetizable benefits and costs cannot be valued in dollar terms such that they can be added or subtracted from the monetized benefits and costs, they should not be ignored. To the extent that we can estimate the magnitude or at least identify the direction of impacts of child care on these non-monetary benefits and costs, even though we cannot value the impacts in dollar terms, our benefit-cost analysis will be more complete, enabling readers to place their own values on the impacts. Table A1 summarizes select non-monetary outcomes and expected impacts.

Table A1. Conceptual Table of the Non-Monetary Benefits and Costs of Subsidized Child Care

	Direct beneficiaries	+	Indirect taxpayers	=	Total Society
An. Decreased poverty	+		+		+
Bn. Decreased inequality	+		+		+
Cn. Increased economic opportunity	+		+		+
Dn. Increased prosocial outcomes	+		+		+
En. Increased freedom (avoided incarceration)	+		+		+
Fn. Fertility and childbearing	?		?		?
Gn. Dependence on government	?		?		?
Hn. Trust	−		−		−
In. Increased work	+		+		+
Jn. Increased security	+		+		+
Kn. Savings	+		−		−
Ln. Increased gender equality	+		+		+

Notes: Benefits are denoted by +, costs by −, completely offsetting benefits and costs or no effect by 0, and conceptual uncertainty by ?. Direct beneficiaries and indirect taxpayers are not mutually exclusive in the population.

The first non-monetizable benefit in row An, the reduction in poverty, illustrates the importance of including non-monetizable benefits and costs. Poverty reduction is one of the most important objectives of subsidized childcare program. Consequently, how much a particular policy reduces poverty is of great concern to policy makers and researchers and any analysis that ignored the amount of poverty reduction achieved would be woefully incomplete. Because

poverty reduction is a widely shared value, taxpayers as well as beneficiaries derive some benefit from the achievement of this value. We are able to calculate such impact in poverty reduction through microsimulation. Similarly, taxpayers and beneficiaries both derive some value from reductions in inequality (row Bn) and increase in the opportunity to achieve equality (row Cn). This does not mean that all or even any taxpayers value the reduction in either poverty or inequality by a greater amount than the extra taxes they will pay to achieve the reduction, but rather that, other things equal, most taxpayers value less poverty and inequality (Page and Jacobs, 2009).

Prosocial outcomes (row Dn) as a result of better child development under the subsidy program is another important non-monetary benefit as child recipients would become better citizens as adults.

Freedom (row En) is another widely shared value, so reductions in incarceration benefit both subsidy recipients and taxpayers. In this case, of course, the non-monetary value of freedom is especially large for those amongst beneficiary families who would otherwise have been incarcerated.

How members of society, both beneficiaries and taxpayers, value an increase in childbearing is more difficult to assess (row Fn). On the one hand, many Western European nations have subsidized childcare in order to increase fertility. On the other hand, many in the United States oppose child benefits because of their potential pro-natal effects. We are unaware of any evidence on U.S. public opinion about this aspect of childcare, so its effect here remains uncertain.

Independence (row Gn) is another widely held value in the United States. Dependence on government benefits is viewed negatively by many Americans. This is especially true for

dependence on means-tested benefits, like Temporary Assistance for Needy Families (TANF) and even the Supplemental Nutrition Assistance Program (SNAP or Food Stamps). Since subsidized childcare is also a means-tested benefit, on the one hand, it is subject to the criticism of increasing dependence on the government. On the other hand, subsidized childcare has beneficial impacts on work (row In) and thus can increase independence. Therefore, the net effect is ambiguous. Trust is another non-monetary value that means-tested programs may undermine (row Hn). Means-tested programs can reduce trust as beneficiaries are suspected by many of cheating and many politicians fan the flames by scapegoating beneficiaries. But, as subsidized childcare can increase recipients' work, the detrimental effect on trust is likely to be small.

Work (row In) and increase in security (row Jn) are also widespread, strongly held values. As discussed above, subsidized childcare can increase work and parents' retirement security, which benefits everyone in the society. A subsidized childcare program will increase savings amongst beneficiaries (row Kn) but decrease savings by a greater amount amongst taxpayers because the rich save a greater proportion of their incomes than the poor, and therefore decrease savings for the economy as a whole.

Finally, the child care subsidy would also increase gender equality (row Ln). Since traditionally, mothers take up a bigger role in child care, the child care subsidy may ease the child care burden of mothers, allow them to better participate in the labor market and reduce the wage and wealth gap between men and women.

Summary of Child Care Literature

As noted in the text, there are a set of experimental and quasi-experimental evaluations of child care programs, which raises the question of why these cannot be used to conduct a benefit-cost analysis of the reform in New York state. Tables A2 and A3 in the appendix summarize the child care literature that is based primarily on quasi-experimental or experimental methods. Table A2 is limited to evaluations that have adult outcomes, or in the case of Quebec, near adult outcomes. Table A3 includes evaluations that report only child outcomes.

The first thing to note about the two tables is that most of the studies are limited to childhood outcomes. Our review of the literature found only 7 studies of 5 programs that measured the causal effects of child care on child participants in adulthood. Heckman et al. (2010) and Campbell et al. (2012, 2014) evaluate random assignment experiments—Perry Preschool and the Abecedarian Project—with very small sample sizes of 123 and 111 respectively. Baker et al. (2019) and Havnes and Mogstad (2011, 2015) conduct quasi-experimental evaluations of full-scale programs in Quebec and Norway respectively, and Herbst (2017) conducts a quasi-experimental evaluation of the U.S. federal child care program during World War II. The Perry and Abecedarian experimental programs and the U.S. federal program were all high-quality, center-based programs. Norway was predominantly high-quality, center-based care, but had a large non-center-based component. Quebec had lower rates of center-based care, which was not of the highest quality, and which expanded rapidly during the period of study. All of these studies except that of the Quebec program found positive effects on adult earnings. The evaluation of care in Quebec finds, for those aged 12 to 20 years old, poorer health and higher rates of criminal activities.

It is possible to construct estimates of the benefits and costs of each of the programs. Indeed, the Heckman et al. (2010) provides a partial benefit-cost analysis based on increases in earnings and education and decreases in crime and means-tested transfers. No account is taken of health benefits, which Garfinkel et al. (2022) find to be the biggest single benefit of increases in household income from a related policy, a child allowance. None of the three pure center-based child care programs in Table A2 represent a good measure of the expected benefits and costs of the child care subsidy expansions in New York State because less than half of subsidized care arrangements in the state are licensed center-based care (New York State Office of Children and Family Services, 2021). The earlier center-based care interventions also represent different counterfactuals for child care quality than would be relevant for current reforms. Both the Norwegian and Quebec programs are closer to the New York State program, but estimates from another country may not be generalizable, and they find conflicting results.

The more numerous quasi-experimental studies of the impacts of child care programs on childhood outcomes that are summarized in Table A3 could also each be used to estimate the benefits and costs of the NYSCCE. But all the limitations of applicability to New York State and strong assumptions needed for studies that include adult outcomes would be needed for these studies, plus the additional strong assumption that we had a good method for translating positive childhood cognitive test scores and negative behavioral health measures into health and earnings outcomes in adulthood. Positive cognitive test scores combined with negative behavioral outcomes of center-based care is the most common finding in Table A3. Unfortunately, we do not have a reliable method for translating this combination into long-term adult outcomes.[11]

[11] Chetty (2011) examines the effects of both test scores and behavioral measures on adult earnings among the STAR experiment treatment and control groups, but the evaluation from which he starts found positive effects on both child outcomes.

Because of these challenges, we assume in our baseline estimate that the reform has a net zero effect on future child outcomes with respect to child care quality. We conduct a sensitivity analysis that takes into account potential child care quality changes resulting from the subsidies.

Table A2. Summary of child care literature with adult outcomes (ages 18 and over)

Study	Methodology	Data	Adult outcomes
Baker et al. (2019) *American Economic Journal: Economic Policy*	DD: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2009), SYC, SAIP, PCAP, PISA, CCHS, & UCRS	Worse health and more crime age 12-20
Herbst. (2017) *Journal of Labor Economics*	DD: U.S. children exposed to the policy age 0-12 vs those born after the policy ends, children born in high vs low-spending states	Decennial U.S. Census (1970, 1980, 1990)	Age 24-59: Higher earnings, lower welfare use, better health, higher chance of high school and college graduation
Havnes & Mogstad (2011, 2015) *American Economic Journal: Economic Policy, Journal of Public Economics*	DD: Children age 3-6 in regions with larger vs smaller expansion in child care, 4 years before–after	Administrative data, Norway	Age 30-42: More education, lower welfare use, higher earnings for low-income children, lower earnings for middle- and high-income children
Heckman et al. (2010) *Journal of Public Economics*	Benefit-cost analysis based on experiment (EXP): treatment in Perry Preschool lasts age 3-5	Longitudinal data on treatment & control group	Annual return of 7-10% due to positive impact on earnings, welfare use, and crime
Campbell et al. (2012, 2014) *Developmental Psychology, Science*	Small sample inferences based on EXP: treatment in Abecedarian Project lasts age 0-4	Longitudinal data on treatment & control group	Age 30: more education, higher income, lower welfare use, better physical health

Table A3. Summary of child care literature with child outcomes (ages 0-18)

Study	Methodology	Data	Child outcomes
Panel A. Treatment age under 3 years old			
Berger et al. (2021) *Demography*	IV and OLS: treated children attend center-based care age 1. Instruments are born in Spring and local child care supply	Elfe (national longitudinal study in France)	Cognitive: Better language and motor skill age 2 Behavioral/other: Worse behavior age 2
Felfe and Lalive (2018) *Journal of Public Economics*	Marginal treatment effect (MTE): treatment attend child care age 2 and control do not	Child assessment & survey from Germany	Cognitive: More gains in motor skill age 6 for high-income children Behavioral/other: More gains in socio-emotional skill age 6 for low-income children
Panel B. Treatment age 0 to 6 years old			
B.1. Studies on universal child care subsidies in Quebec, Canada			
Baker et al. (2008) *Journal of Political Economy*	DD: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2003) (national longitudinal survey in Canada)	Cognitive: Worse social-motor skill age 0-3, especially for those exposed age 0-2 Behavioral/other: Worse behavior age 0-4, especially for those exposed age 0-2. Worse health age 0-4
Baker et al. (2019) *American Economic Journal: Economic Policy*	DD: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2009), SYC, SAIP, PCAP, PISA, CCHS, & UCRS	Cognitive: Worse cognitive skill age 4-5. Better cognitive skill age 15 if measured by PISA, worse if by Canadian local test Behavioral/other: Worse behavior age 2-9.
Kottelenberg & Lehrer (2013) *Canadian Public Policy*	DD: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2007)	Cognitive: Worse social-motor skill age 0-3 Behavioral/other: Worse behavior age 2-3. Worse health age 0-4
Kottelenberg & Lehrer (2014) *CESifo Economic Studies*	DD & Change-in-change: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2007)	Cognitive: Worse social-motor skill for those exposed age 0-2, especially age 0. Worse cognitive skill for those exposed age 4. Better social-motor skill for disadvantaged children exposed age 3 Behavioral/other: Worse behavior for those exposed ages 2-3, especially age 2. Worse health for those exposed ages 0-4, especially those age 0

Kottelenberg & Lehrer (2017) *Journal of Labor Economics*	Change-in-change: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2009)	Cognitive: Better social-motor skill for children age 0-3 of single parents
Haeck et al. (2018) *Journal of Human Capital*	DD: Quebec children age 0-4 vs rest of Canada, 4 year before–after	NLSCY (1994-2008) and CCHS (2001-2014)	Cognitive: Worse social-motor skill age 0-5 Behavioral/other: Worse behavior age 2-5. Worse emotional disorder and anxiety age 5-9. Worse health 0-5. Less likely to smoke age 12-18
B.2. Other studies			
Vandell et al. (2010) *Child Development*	Structural equation modeling. Sample received routine non-relative care age 0-4.5	NICHD (national and longitudinal)	Cognitive: Better cognitive skill age 15 from higher quantity and quality Behavioral/other: Worse behavior age 15 from higher quantity. Better behavior age 15 from higher quality
Panel C. Treatment age 3 years old and over			
C.1. Pre-K studies: Tulsa, OK, Tennessee, and Boston, MA			
Gormley et al. (2005) *Developmental Psychology*	RDD: treated children pass the age cutoff for program eligibility and attend pre-k for 1 year	Admin and test score data in Tulsa	Cognitive: (+) Better cognitive skill age 4-5 Behavioral/other: NA
Gormley et al. (2011) *Child Development*	Propensity score matching (PSM) & teacher fixed-effect regression	Admin and test score data in Tulsa	Cognitive: NA Behavioral/other: Better socio-emotional skill age 4
Gormley et al. (2018) *Journal of Policy Analysis and Management*	PSM & OLS/Logistic	Admin and test score data in Tulsa	Cognitive: Higher standardized math score & honor class enrollment. Lower grade retention. Behavioral/other: NA
Weiland & Yoshikawa (2013) *Child Development*	RDD: Treated children pass the age cutoff for program eligibility and attend pre-k for 1 year	Admin and test score data in Boston	Cognitive: Better cognitive & executive functioning skill age 4-5 Behavioral/other: Better socio-emotional skill age 4-5
Pion & Lipsey (2021) *AERA Open*	RDD: Treated children pass the age cutoff for program eligibility and attend pre-k for 1 year	Child assessment across Tennessee	Cognitive: Better cognitive skill Behavioral/other: NA
C.2. Other studies			
Black et al. (2014) *Review of Economics and Statistics*	RDD: Treated children are below the cutoff for higher child care prices at age 5.	Admin data (Norway)	Cognitive: Higher GPA ages 13-16

Cornelissen et al. (2018) *Journal of Political Economy*	IV and MTE: treatment defined as attending child care age 3-6. Instrument is local child care coverage rate 3 years before school entry	Admin data (Germany)	Cognitive: NA Behavioral/other: Lower school readiness age 6 for high-income children. Higher school readiness age 6 for low-income children
Felfe et al. (2015) *Journal of Population Economics*	DD: Children age 3 in regions with larger vs smaller expansion in child care, 2 years before–after.	Admin data (Spain), PISA & Spanish Labor Force Survey	Cognitive: Higher cognitive skill age 15 Behavioral/other: Lower grade retention in elementary school
Datta Gupta & Simonsen. (2010) *Journal of Public Economics*	OLS and IV: studies the impact of preschool vs family day care vs home care at age 3. For local average treatment effect of preschool, instrument is guaranteed access to preschool	DALSC (National longitudinal data in Denmark)	Cognitive: NA Behavioral/other: Worse behavior age 7 from receiving preschool/ family day care
Magnuson et al. (2007) *Economics of Education Review*	OLS, IV, & PSM: Treatment defined as attending pre-k than center-based care, Head Start or non-parental care. Instruments are state spending on pre-k and portion of young children in pre-k	ECLS-K	Cognitive: Higher cognitive skill by the fall of kindergarten Behavioral/other: Worse behavior by the fall of kindergarten and the spring of first grade
Berlinski et al. (2008) *Journal of Public Economics*	IV & OLS: Treatment defined as attending preschool for >=1 year. Instrument is local preschool attendance	ECH (National longitudinal data in Uruguay)	Cognitive: More education by age 15 Behavioral/other:
Berlinski et al. (2009) *Journal of Public Economics*	OLS: Treatment defined as attending preschool for 1 year	Child assessment data (Argentina)	Cognitive: Higher math and language score by third grade Behavioral/other: Better behaviors by third grade

Summary of Study of the Impacts of Additional Spending per Child

Jackson et al. (2016) found that among low-income children in K-12, exposure to an increase of school spending per child of 1 percent for 13 years increases wages in adulthood (between ages 20-45) by 0.9598 (s.e. 0.3003) or 0.9598 percent, increases family income in adulthood (ages 20-45) by 1.7146 (s.e. 0.3585) or 1.7146 percent, and reduces annual incidence of adult poverty by 0.6132 (s.e. 0.1242) or 0.6132 percentage points. Apart from adult economic outcomes, the authors also found an increase of schooling of 4.5899 (s.e. 1.2072) or 0.045899 years and an increase of probability of high school graduation of 0.9878 (s.e.0.2744) or 0.9878 percentage points following a 1 percent increase of school spending. The authors linked school-spending data and school-financial-reform data to national, longitudinal data on individuals in PSID. Final sample included 15,353 individuals, 9,035 of whom were from low-income families. Authors exploited exogenous changes in K-12 spending following court-mandated school financial reforms. Children of K-12 age (ages 5-17) during the passage of reforms were considered as treated. Regressions were conducted using a 2SLS difference-in-differences model, comparing children within the same district who were exposed to the reforms for different years, across districts with different levels of spending changes.

Based on the long-run wage effect summarized above, we calculate the increase of adult earnings relative to a 1 percent increase in K-12 spending per child, per year. Since a 1 percent increase in school spending for 13 years increases adult wages by 0.9598 percent, we assume that a 1 percent increase in child care spending per child would increase adult wages by 0.0738 percent (0.9598/13).