The Economic Impact and Profile of Connecticut's ECE Industry

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Revision Date:
September 27, 2004

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Executive Summary

THE ECONOMIC IMPACT OF CONNECTICUT'S CHILD CARE INDUSTRY

Over the past several years, scholars and public policy researchers have been giving increased attention to early childhood investments, using benefit-cost analyses and assessing the contribution of the early care and education "industry" to the economic capacity of states and municipalities. Nobel laureate economist James Heckman[1] finds a substantial long-term return on investment resulting from the provision of high quality early care and early education (hereafter, ECE) services, based on later averted costs for welfare dependency and prison confinement. Similarly, in December 2003, Minneapolis Federal Reserve senior economists Arthur Rolnick and Rob Grunewald reported that high quality early childhood investment provides an annual long-term return of 16%, significantly greater than many other uses of public (or private) monies.[2] Surveys of parents using ECE primarily emphasize the educational benefit for their children;[3] these are the long-term benefits that these formal studies validate. Yet ECE is also an important economic sector, generating jobs, demand for goods and services, and permitting parents either to hold jobs, work longer hours, and even enhance their productivity because of the knowledge that their child is in good hands with their ECE provider. Looking at just these short-run returns, Cornell economist Mildred Warner[4] found that the service "industry" providing ECE contributes significantly to the economy of municipalities and states, generating jobs, purchases of goods and services, and tax revenue. The study we present here is in this vein: it evaluates the immediate economic significance of the ECE sector for the economy of the state of Connecticut.

In the spring of 2003, the Connecticut Early Care and Education Working Group[5] commissioned the Connecticut Center for Economic Analysis (CCEA) to assess the current economic impact of the state's ECE industry. Connecticut Voices for Children[6] supported this research, through grants from the National Center for Children in Poverty[7] and the Smith Richardson Foundation,[8] as did the Child Health and Development Institute of Connecticut.[9]

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[1] Heckman, James J. (2000). "Policies to Foster Human Capital," *Research in Economics*, vol. 54, no. 1, 3-56.

[2] Rolnick, Art and Rob Grunewald (2003). "Early Childhood Development: Economic Development with a High Public Return," Fedgazette, March.

[3] Warner, Mildred, "Changing the Terms of the Debate," http://government.cce.cornell.edu/doc/reports/childcare/.

[4] Investing in the Child Care Industry: An Economic Development Strategy for Kansas, http://www.marc.org/mccc/kseconimpactreportfinal.pdf, March 2003.

[5] See http://www.readysetgrowctkids.org/ece.html for more information.

[6] See www.ctkidslink.org for more information.

[7] See www.nccp.org for more information.

[8] See www.srf.org for more information.

[9] See www.chdi.org for more information.

Connecticut's ECE industry increases the labor force participation rate by increasing the number of available workers, increasing the number of hours parents are able to work, and improving their ability to acquire additional training or schooling. Overall, access to ECE programs increases the quantity and quality of human capital that is the basis for Connecticut's labor supply. As such, Connecticut's ECE industry serves as social infrastructure supporting workers and their employers. For 2002, the study estimates that there were 12,586 services, such as early head start centers, infant and toddler centers, and school age family child care group homes in 5,510 venues. Estimated licensed and exempt capacity was 125,303 spaces; there were 12,036 vacancies, an intended enrollment (actual enrollment plus vacancies) of 123,034, and an unintended enrollment (capacity less intended enrollment) of 2,269.[10]

CCEA estimates the formal ECE sector provided services for 261,414 Connecticut children younger than 12 during 2002 (including part day, part year as well as full day, full year). Given the population of children in the relevant age range, CCEA estimated that there were 306,274 children who did not use formal ECE. Some of these children were in informal arrangements, and some received home care. Appendix III provides an estimate of the size of the informal sector in terms of the number of children in informal arrangements (between 172,000 and 258,000), the revenue that flows into that sector (between $100 million and $500 million), and the employment in the informal sector (about 28,000 workers). However, in this study, CCEA projects *only* the impacts of the formal sector.

The economic value of Connecticut's formal early care and early education industry is driven by three factors: (a) labor force participation rates for 160,000 parents using formal ECE services (about 10% of Connecticut's workforce), (b) ECE industry revenues (about $789.4 million), and (c) the value added of the formal ECE sector (about $329.5 million).

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[10] Enrollment is absent from the latest Infoline database CCEA processed. We infer intended enrollment using the intended enrollment to capacity ratio calculated from the fall 2002 online tables. Infoline determines enrollment in the spring of each year and reports it in its fall online tables.

CCEA Findings

CCEA estimates that Connecticut's formal ECE industry is a significant driver of the state's economy. Its (2002) direct employment of about 15,000 workers (who earned $321.4 million) in the state's regulated ECE sector made it a larger employer than, for example, Connecticut's pharmaceutical industry. CCEA determined that the total employment impact through multiplier effects of the ECE industry is more than 29,000 full-time equivalent jobs.

The total value added impact (i.e., change in Gross State Product) due to the formal ECE industry is $920 million, including $329.5 million contributed in value directly added by the regulated ECE sector and formal sector itself and $590.5 million from the indirect and induced value added of the industry.

In addition, the regulated ECE sector purchases about $460 million in goods and services from other Connecticut businesses, further stimulating the state's economy; this does not include purchases by the unlicensed, informal care sector.

By far the greatest current impact of this industry lies in the opportunities that it creates for Connecticut parents to work or to receive additional education and training.[11] CCEA estimates that almost 10% of the total state workforce utilizes regulated ECE services, enabling some 160,000 adult parents or caregivers either to work outside the home or to be more productive employees.

In The Long Run—The Best Investment a State Can Make

Scholars have extensively researched and policy researchers have documented the long-run effects of high quality care and early childhood education have been (University of Chicago Nobel laureate economist James J. Heckman has an excellent overview[12]). Studies show that high quality care correlates with children and young adults who are better prepared for school and are more likely to perform at a higher level throughout their school years. These individuals are less likely to commit crimes, become pregnant in their teen years, and, in general, are better socially adjusted. They are more likely as adults to find higher paying jobs and their children are more likely to have better social outcomes (i.e., higher participation rates

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[11] This study looks at the current impact of the ECE industry; it does not incorporate any consideration of the long-term benefits that high quality early childcare and education provide.

[12] See footnote 1.

in civic and cultural life) than children are in corresponding cohorts who did have high quality child care.

These positive outcomes lead to 'averted costs' in the long run, that is, lower future costs of law enforcement, welfare expenditures, health care, financial mismanagement, and so on. Although researchers have made a convincing case concerning the long-term benefits of ECE investment, there are few reliable estimates of the magnitude of these savings. Minneapolis Federal Reserve economists Rolnick and Grunewald make a convincing case concerning the long-term benefits of child care investment.[13] They declare:

> These disadvantaged children are not only shut out from Minnesota's famed high quality of life, but they also impose social costs on the rest of society. And that's where the budget and economic development come into play. Research has shown that investment in early childhood development programs brings a real (that is, inflation adjusted) public return of 12 percent and a real total return, public and private, of 16 percent. *We are unaware of any other economic development effort that has such a public return, and yet early childhood development is rarely viewed in economic development terms.*

National data on ECE's long run return *additively* complements CCEA's analysis of the *current* economic contribution of Connecticut's ECE "industry" and its documented role as an essential workforce support, and argues for attention to this industry as core to Connecticut's continued economic competitiveness and success.

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[13] See footnote 3.

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Part 1: The Economic Impact of Connecticut's ECE Industry on the Connecticut Economy

Introduction

Connecticut Voices for Children and the Connecticut Child Health Development Institute of Connecticut and partner organizations commissioned the Center for Economic Analysis (CCEA) at the University of Connecticut to assess the economic impact of Connecticut's early ECE and education (hereafter, ECE) industry on its economy. Part 1 describes the methodology for measuring these economic impacts as well as the aggregate results. Part 2 provides a description of the ECE industry, reporting its revenue, employment, and the number and location of establishments, together with their capacities and enrollments. Further, CCEA estimates the demand for ECE by geographic area and compares the supply or availability of ECE facilities and services to the demand. This analysis serves as well to estimate unmet needs for ECE in Connecticut. Our analysis benefits from numerous prior studies on this subject, particularly the studies by M.Cubed[14] of the national impact of the ECE industry and by Mildred Warner, et al. of Cornell University's Department of City and Regional Planning on the statewide impact of ECE in Kansas.[15]

A principle benefit of the ECE industry is that it enables parents and/or primary caregivers to work, to work more hours, to be more productive at work, and/or to engage in training and education programs. In these ways, the existence of Connecticut's ECE industry increases the labor force participation rate by increasing the number of available workers, and/or the number of hours they are able to work. Specifically, parents may be able to work full-time instead of part-time. Parents are less likely to have to stay home with their children when care is stable and consistent, thus lowering absenteeism. Workers are more productive on the job if they feel less anxiety. Workers are able to pursue further education and professional development. Overall, ECE therefore increases the quantity and quality of human capital immediately available, and thus it plays an important role in shaping Connecticut's labor

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[14] M. Cubed (Fall 2002). The National Economic Impacts of the ECE Sector.
[15] Investing in the ECE Industry: An Economic Development Strategy for Kansas, http://www.marc.org/mccc/kseconimpactreportfinal.pdf, March 2003.

supply. As such, Connecticut's ECE industry serves as social infrastructure supporting workers and their employers.

ECE as an Economic Enterprise

As an economic enterprise, the ECE industry employs teachers, assistant teachers, directors, administrators, specialists, kitchen staff and custodians, among others. These workers spend their wages to buy goods and services from other sectors of the economy. ECE facilities purchase goods and services from the local economy and pay taxes and rent. Each of these purchases represents a sale for another sector of the economy. Furthermore, the increase in labor supply and productivity of parents whose children ECE serves supports production in other sectors of the economy. Purchases by one industry from another are termed 'intermediate goods and services' and are used in the production of new goods and services. State and local governments use taxes paid by workers and businesses to purchase goods and services and to provide important social and educational services to state residents. The increase in labor productivity that ECE affords multiplies economic activity across all sectors of the Connecticut economy. These 'multiplier effects' have relatively short run consequences.

Scholars and public policy researchers have extensively researched and documented the long-run effects of high quality care and early childhood education (University of Chicago Nobel laureate James J. Heckman has an excellent overview[16]). Studies show that high quality care correlates with children and young adults who are better prepared for school and are more likely to perform at a higher level throughout their school years. These individuals are in the future less likely to commit crimes, become pregnant in their teen years and are, in general, better socially adjusted. They are more likely to find higher paying jobs, and their own children are more likely to have better social outcomes (i.e., higher participation rates in civic and cultural life) than children in corresponding cohorts whose parents have not had access to or have not utilitized high quality ECE. These positive long-term outcomes translate into, for example, lower future costs of law enforcement, welfare expenditures, health care, financial mismanagement, and so on. Although researchers have made a convincing qualitative case concerning the long-term benefits of ECE investment, there are few reliable estimates of the magnitude of these savings. Minneapolis Federal Reserve economists Rolnick and Grunewald

make a convincing case concerning the long-term benefits of ECE investment.[17] For those children who do not participate in ECE, they conclude: "….These disadvantaged children are not only shut out from Minnesota's famed high quality of life, but they also impose social costs on the rest of society. And that's where the budget and economic development come into play. Research has shown that investment in early childhood development programs brings a real (that is, inflation adjusted) public return of 12 percent and a real total return, public and private, of 16 percent. ***We are unaware of any other economic development effort that has such a public return, and yet early childhood development is rarely viewed in economic development terms.***"[18] We acknowledge the existence of these considerable benefits but in this study do not estimate the economic impact of these long run effects of ECE. The focus here is on the immediate or current impacts of ECE as an economic sector in the Connecticut economy.

The Formal and Informal Sectors

There are many venues in which ECE takes place: in homes, churches, profit and non-profit centers, schools of all types, as well as camps and businesses. We divide these venues into two categories: formal or informal. Formal establishments themselves fall into two categories: state licensed or legal and license-exempt. Licensed providers may operate in any of the above venues; license-exempt providers typically occupy a school facility regulated through public and private schools. They consequently do not need a license, but do require Connecticut Department of Public Health recognition of their exemption. These two provider types, comprising the 'formal' ECE sector are known, because of the licensing or registration requirements. The informal sector (generally publicly invisible and functioning without any regulatory supervision) includes providers who are relatives of the children and care for them in their own home, or persons who work in the homes of the children for whom they provide care. There are in addition providers, who are usually friends or neighbors of the family or families they serve. Taken together, we commonly refer to this informal ECE sector as "kith and kin" or "family, friends and neighbor (FFN)" care (see Part 2). Taken together, the formal and informal sectors represent the entire non-parental ECE industry in the state.

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[16]Heckman, James J. (2000). "Policies to Foster Human Capital," *Research in Economics*, vol. 54, no. 1, 3-56.
[17] Rolnick, Art and Rob Grunewald (2003). "Early Childhood Development: Economic Development with a High Public Return," Fedgazette, March.
[18] Emphasis added.

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ECE Users

ECE users are parents, grandparents, foster parents, and legal guardians who need or want to work or to pursue training or education away from home, or who want respite for other purposes. In some cases, stay-at-home parents access ECE solely to give their children additional education and social development opportunities, although this is a small proportion of ECE demand. There are stay-at-home parents who do not use ECE and parents who juggle their schedules to avoid the need for paid care. We refer to ECE users in this study as parents in a general sense and we focus on the birth to twelve cohort (children of ages zero to 132 months).

Funding ECE

Parents meet the cost of ECE in variety of ways, depending on both their household income and the nature of the ECE provider they utilize. For lower income parents, many ECE establishments have ways to reduce fees charged for their services, such as a sliding fee scale based on family income or the number of siblings in care. State and local governments subsidize the cost of care for some lower income families. Subsidies are either portable (follow the user with vouchers, e.g., Care4Kids) or are available through the provider via grant funding. Funders include federal, state, and local agencies, foundations, corporations, and community philanthropy (e.g., United Way). The principal federal funds come from the ECE Development Fund (CCDF), Temporary Assistance to Needy Families (TANF), and Head Start.

The diagram below conceptualizes the foregoing discussion.

ECE Conceptual Framework
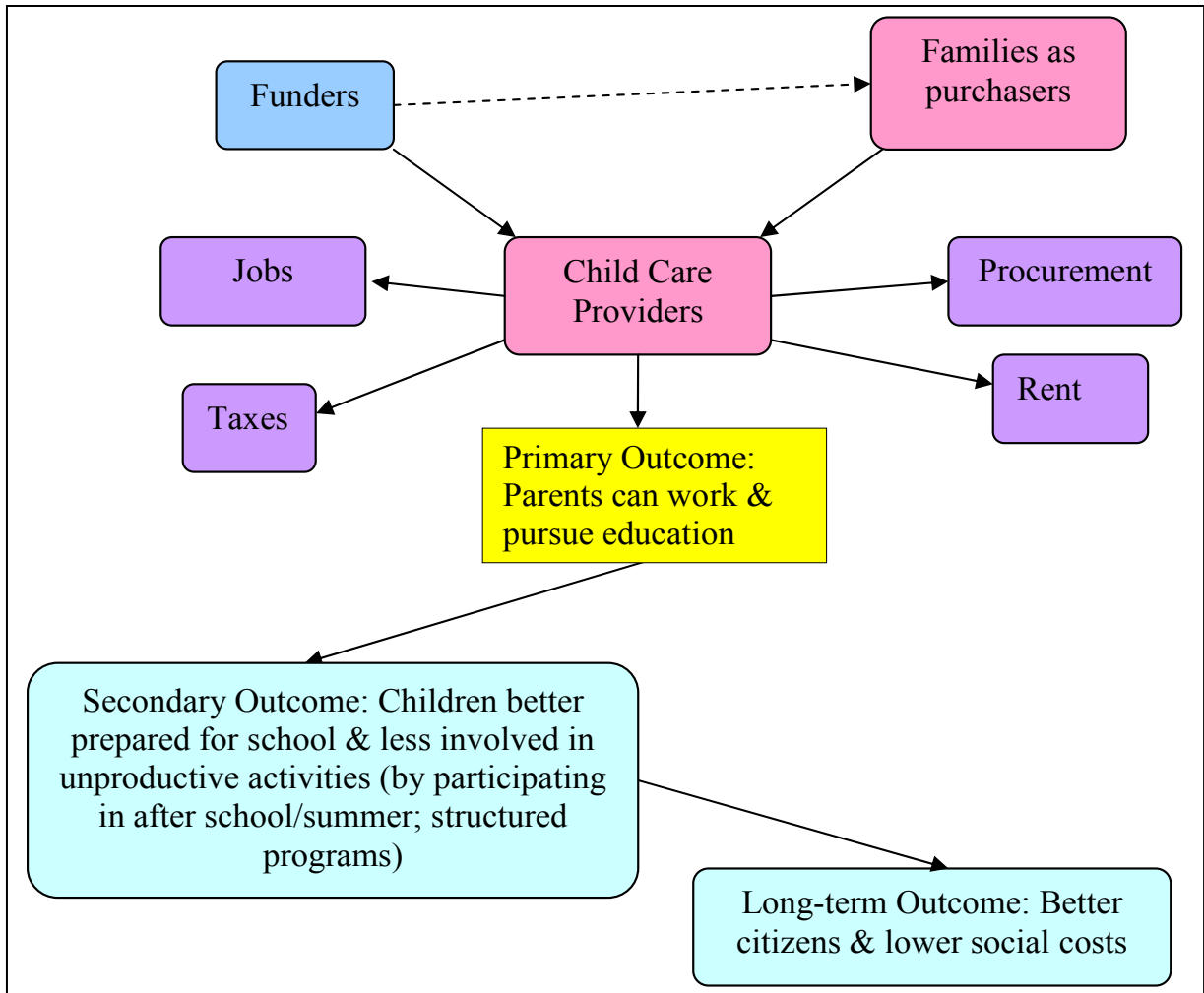
The Economic Impact of Connecticut's ECE Industry

A. General Approach

The labor force participation rates for parents using formal ECE, the industry revenue of ECE, and the value added[19] of the formal sector determine the economic value of Connecticut's ECE industry. We explain how we estimate these factors below.

We take a sales or revenue approach and let funds received from fees, grants and subsidies flow from ECE establishments through the Connecticut economy. The revenue

approach stands in contrast to the expenditure approach, in which detailed industry expenditure information is available for ECE facilities' wages and salaries, procurement, rent, and taxes. Lacking such expenditure detail, we use the former approach that estimates ECE industry revenue.

We estimate the economic impact counterfactually, that is, we remove the formal and informal ECE sectors and their associated revenues and 'productivity' increases expressed as labor force participation rates (by age and gender cohort, and associated only with the formal sector) from the Connecticut economy and then measure the economic losses due to the absence of the ECE industry. These losses represent a conservative estimate of the current economic contribution of the entire ECE industry to Connecticut. We recognize that, in reality, were the formal ECE industry in Connecticut to disappear, alternative arrangements would emerge over time because people have to work. In fact, this is a dynamic in the current environment when acceptable ECE is not available: parents figure out how to "make do" because they must. Our approach conceptually captures the instantaneous economic impact of the ECE industry on the state's economy. Our labor force participation estimates are necessarily conservative because we cannot identify all informal (paid and unpaid) providers and the number of children or families actually served by the informal sector.

This study's methodology stands in contrast to other studies that estimate wages earned by parents using ECE. Changing parental wages simulates (in economic impact analysis models such as IMPLAN, RIMS II or REMI) a demand side effect *as if firms* changed wages by changing their demand for labor (that is, the quantity of labor—e.g., number of workers or hours per week—firms are willing to hire at every wage) with the supply of labor unchanged. Further, some studies that estimate parental wages do not apply multipliers to obtain the total effect of a changed wage bill (the product of the number of parents using ECE and their average wage). We instead estimate the increased labor force participation afforded by the availability of ECE. We assume that the fundamental (short-term) effect of the ECE industry is its influence on labor supply (that is, the quantity of labor—e.g., hours per week—households and individuals are willing to deliver at every wage). That is, parents work or study more or less depending on the availability of ECE services, a fact many studies acknowledge. Prior studies

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[19] Value added is gross receipts less intermediate goods and services purchases, and indirect business taxes, or, equivalently, payments to labor, capital and land (rent).

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thus essentially try to analyze the impact of ECE from the demand side; however, they do not, in our opinion, correctly represent the economic 'productivity' phenomenon that the ECE industry creates, that is, a supply side effect. In our approach, we keep the demand for labor unchanged and reduce the supply of labor, an approach that would drive up the wage rate and attracts economic migrants to the state. Static economic impact models such as IMPLAN and RIMS have no capability to model labor supply effects or migration; relying on those models precludes taking our supply-side approach in which we use the Connecticut economic model, REMI (see Appendix I for a description).

B. Estimating the Quantity of Parental Labor Using Formal ECE

The economic impact of the ECE industry derives from sales (revenues) of the industry and the additional labor supplied to the Connecticut economy due to ECE availability as described above. This section provides an overview of our methodology to estimate labor force participation rates for males and females, by one-year age cohorts, by county, who have children younger than 12 and use *formal* ECE arrangements. We make explicit in context our assumptions permitting us to make these estimates. Appendix II contains details.

The labor force participation rate is the proportion of the total non-institutionalized civilian population 16 years of age and over that is in the civilian labor force (employed workers plus unemployed workers actively seeking employment). This ratio indicates the proportion of the available "working age" population that is willing and able to work and is either employed or actively seeking employment.

The existence of the ECE industry influences the labor force participation rate. Using the Connecticut economic model, REMI, we are able to estimate the performance of the Connecticut economy after (counterfactually) subtracting the fraction of the labor force using *formal* ECE. However, the labor force participation rate due to *formal* ECE is not readily available. The following summarizes our approach to creating a reasonable estimate of that rate, based on Connecticut household and population data at the county level from Census 2000.

There were 451,411 households with children younger than 18 in Connecticut in 2000 (line 12 in Table 1.1 below). We estimate separately the number of male and female parents using ECE between the ages of 16 and 80 to obtain labor force participation rates by age and gender

in each Connecticut county.

Table 1.1

Line	Source	Estimate of Parents with Children Younger than 12 in Formal Child Care	Fairfield County	Hartford County	Litchfield County	Middlesex County	New Haven County	New London County	Tolland County	Windham County	State of Connecticut
1	Census 2000	Total households:	324,232	335,098	71,551	61,341	319,040	99,835	49,431	41,142	1,301,670
2	Census 2000	Family households with children<18:	118,678	112,381	24,115	19,601	107,000	34,170	17,073	14,691	447,709
3	Census 2000	Married-couple family	90,190	75,306	18,913	15,206	72,113	24,339	13,530	10,095	319,692
4	Census 2000	Other family:	28,488	37,075	5,202	4,395	34,887	9,831	3,543	4,596	128,017
5	Census 2000	Male householder, no wife present	5,237	6,320	1,388	999	6,163	2,245	899	1,159	24,410
6	Census 2000	Female householder, no husband present	23,251	30,755	3,814	3,396	28,724	7,586	2,644	3,437	103,607
7	Census 2000	Nonfamily households (couple) with children<18:	666	937	231	171	881	451	160	205	3,702
8	Census 2000	Male householder	468	664	195	129	625	353	127	175	2,736
9	Census 2000	Female householder	198	273	36	42	256	98	33	30	966
10	Census 2000	Total Male Parents with Children < 18	96,093	82,563	20,532	16,376	79,157	27,035	14,589	11,459	347,804
11	Census 2000	Total Female Parents with Children < 18	114,107	106,998	22,958	18,773	101,718	32,376	16,334	13,737	427,001
12	Equation 1	Households with one or more children under 18 years:	119,344	113,318	24,346	19,772	107,881	34,621	17,233	14,896	451,411
13	Equations 2 & 3	Parents & Households with one or more children under 12 years	85,077	80,781	17,356	14,095	76,906	24,680	12,285	10,619	321,799
14	Equation 4	Average number of children per HH with children under 12 years	1.85	1.74	1.68	1.72	1.76	1.71	1.69	1.67	1.76
15	Equation 5	Number of children under 12 in formal child care	73,106	64,667	13,271	11,166	62,192	19,388	9,539	8,085	261,414
16	Census 2000	Number of children under 12	157,798	140,721	29,225	24,190	135,083	42,218	20,745	17,708	567,688
17	Census 2000 - Eqn. 5	Number of children under 12 NOT in formal child care	84,692	76,054	15,954	13,024	72,891	22,830	11,206	9,623	306,274
18	Equation 6	HHs with children under 12 in formal child care	39,416	37,122	7,881	6,506	35,407	11,334	5,649	4,848	148,163
19	Equation 7	Percent of HHs with children under 12 in formal child care	46.33%	45.95%	45.41%	46.16%	46.04%	45.92%	45.98%	45.66%	46.04%
20	Equation 8	Male parents with children under 12 in formal child care	31,736	27,047	6,646	5,389	25,980	8,851	4,782	3,730	114,161
21	Equation 8	Female parents with children under 12 in formal child care	37,686	35,052	7,432	6,177	33,385	10,599	5,354	4,471	140,156
22	Census 2000	Households with no children under 18 years:	204,888	221,780	47,205	41,569	211,159	65,214	32,198	26,246	850,259
23	Census 2000	Family households:	109,721	109,975	25,483	20,979	103,687	33,023	17,061	13,532	433,461
24	Census 2000	Married-couple family	89,610	89,490	22,012	18,140	82,892	28,088	15,129	11,414	356,775
25	Census 2000	Other family:	20,111	20,485	3,471	2,839	20,795	4,935	1,932	2,118	76,686
26	Census 2000	Male householder, no wife present	5,963	5,836	1,119	850	6,206	1,586	643	679	22,882
27	Census 2000	Female householder, no husband present	14,148	14,649	2,352	1,989	14,589	3,349	1,289	1,439	53,804
28	Census 2000	Nonfamily households:	95,167	111,805	21,722	20,590	107,472	32,191	15,137	12,714	416,798
29	Census 2000	Male householder	40,310	47,844	9,666	9,114	46,507	15,219	7,163	5,899	181,722
30	Census 2000	Female householder	54,857	63,961	12,056	11,476	60,965	16,972	7,974	6,815	235,076

Because we do not have separate data for Connecticut for the number of households with children until 12, we use the U.S. fraction of households with children younger than 12 to obtain the number of Connecticut households with children younger than 12. Using this approach we project that there were 321,799 such households in Connecticut in 2000. We assume that each Connecticut county has the same ratio of households with children younger than 12 to households with children younger than 18. Further, we assume the fraction of the parent population (males and females) in households with children younger than 12 to the population in households with children younger than 18 is the same as the fraction of households with children younger than 12 to households with children younger than 18.

The above procedure gives the *maximum* demand of parents (males and females) for ECE. We next need to find the male and female parent population *actually* using formal ECE. To do

this, we convert the ratio of children in formal ECE to the ratio of parents using formal ECE by first assuming the same ratio of households with children younger than 12 to households with children younger than 18 for each county. This approach shows that there were 567,688 children younger than 12 (ages 0 through 132 months) in Connecticut in 2000.

Using national data for children in formal ECE for different age groups,[20] we obtain the number of children younger than 12 in formal ECE. We estimate there were 261,414 children younger than 12 in formal ECE in Connecticut in 2000 (and 302,274 children younger than 12 were NOT in formal ECE). Given this, we estimate there were 148,163 households in 2000 in Connecticut with children younger than 12 in formal ECE. The fraction of households with children younger than 12 using formal ECE is the number of households with children younger than 12 using ECE divided by the number of households with children younger than 12. Assuming this same fraction can be applied to the parent population as for households implies that, for Connecticut in 2000, there were 114,161 male parents using formal ECE and 140,156 female parents using formal ECE services.

We need now to estimate the labor force using formal ECE by age and gender cohort by county. We assume that parents with children younger than 12 have the same labor force participation rate as the general population. REMI, as part of its large database of regional information, provides the Connecticut labor force participation rate by age and gender cohort. We then arrive at the labor force using ECE. Census 2000 provides population data in one-year age and gender cohorts at the county level for Connecticut. We obtain the *change* in the labor force participation rate as a fraction of each age and gender cohort due to the formal ECE industry by taking the ratio of the labor force using formal ECE to the population in each cohort.

We assume that were it not for ECE services, some parents and guardians would withdraw from the labor force. We estimate Connecticut's labor force participation rates as described above for 65 age cohorts (16-80 year olds) for male and female parents *as a fraction of their respective age cohort* in each Connecticut county *because there is significant county variation in the magnitude of the rates even though the county participation rate statistical*

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[20] See ECE Expenses of America's Families, Urban Institute 1997; also see The Economic Impact of Vermont's ECE Industry.

distributions are similar (see Appendix II). We calculate detailed cohort participation rates because there are differential economic impacts associated with each age and gender cohort. Appendix II describes the age distributional properties of these participation rates by gender and county. Visual inspection of this data suggests that 8% is a frequently occurring rate that varies from a few tenths of a percent for septuagenarian parents to 10% for parents in their twenties and thirties.

C. ECE Industry Revenue and Value Added

Industry sales (revenues) flow through establishments to wages and salaries, rents, taxes and purchases of goods and services (such as insurances) used in providing ECE services. We estimate year 2000 revenues (sales) of the formal ECE industry (that is, firms) in Connecticut answering the Bureau of Economic Analysis (BEA) employer survey to be $551 million (reported by the IMPLAN software). ***This represents a portion of the formal ECE industry; not represented are self-employed persons and informal care providers.*** BEA value added of this portion of the formal sector is $230 million. GSP is the value of all goods and services produced in the economy and captures payments to labor, capital (interest payments) and rent. Equivalently, value added is sales less intermediate goods and services purchases and taxes. For reference, in 2000, Connecticut's GSP was $156.322 billion. Using the CCEA-processed Infoline[21] database, CCEA estimates revenues of the formal sector to be $739 million (see methodology sidebar in Part 2). To this, we add $45.5 million in federal funds and $4.9 million in state funds for Head Start and Early Head Start programs for total 2001 formal ECE industry revenue of $789.4 million. The $40 million in state funds for school readiness programs and $25 million in state funds for state-funded ECE centers contributed in FY 2001-2002 is already included in the aggregate formal sector revenue estimate as is the Care4Kids portable subsidy paid through vouchers in the formal sector. We estimate informal sector revenue in Part 2.

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[21] Infoline created in 1976 as a public/private partnership of United Way and the State of Connecticut is an integrated system of help via telephone - a single information source about community services, referrals to human services, and crisis intervention. It is accessed toll-free anywhere in Connecticut by dialing 211, 24 hours a day, 365 days a year. See www.infoline.org. The database is not equivalent to the information available on the Internet. Infoline added additional providers, especially exempt providers in this version. CCEA reorganized this database to be amenable to query.

We assume that the informal sector does not disappear in our counterfactual analysis despite some public funds flowing to it. In fact, we remove only $80 million of the Care4Kids subsidy assuming that the remainder ($76 million) continues to flow into the informal sector. The $80 million in the counterfactual represents money returned to taxpayers offset by reduced (productive, that is, quality-of-life enhancing) government spending. Therefore, we remove formal ECE sector sales (revenues) of $789.4 million and value added (representing an amenity or quality of life value) of $329.5 million from the Connecticut economy apportioned on a population basis to each county. The $329.5 million in value added derives from the BEA sales to value added ratio implied above. This is about half of the value added of the services created in both the elementary and secondary education sectors.[22] Unlike the (public) education sector, however, the ECE sector generates approximately $6.4 million in indirect business tax revenue each year.

In addition to labor, ECE operations purchase food, business services, paper and craft products, entertainment and media, travel and lodging, toys and games, sundries, and pay for maintenance for their grounds and buildings. ECE has close ties to other service sectors, such as social services and non-profit agencies. Table 1.2 indicates formal ECE operations' *representative* purchases of other goods and services as reported in the BEA employer survey. This table omits self-employed and other ECE programs (denoted 'non-firm' above).

Table 1.2: ECE Industry Purchases of Goods & Services from Other Connecticut Industries

Goods and Services	Purchases * (millions of dollars)
Maintenance of Grounds and Buildings	$26.01
Food	19.03
Business Services	119.51
Paper and Craft Products	11.3
Travel and Lodging	12.33
Entertainment and Media	19.3
Toys and games	18.97
Sundries	14.25
Social Services	79.23
Other Services	1.48
Total	**$321.24**

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[22] Elementary and secondary education produces $542 million worth of services in Connecticut.

Connecticut produces roughly two-thirds of the goods and services ECE facilities purchased in 2001, based on estimates of regional purchase coefficients. Thus, formal ECE 'firms' responding to the BEA survey purchased $321 million in goods from other sectors, of which $214 million is produced within Connecticut's borders. Using the purchases to revenue ratio implied here, we estimate $460 million in purchases by the entire formal sector.[23]

Parental labor force participation rates by age and gender cohort (for parents using the formal sector only), ECE industry revenue and reduced productive state spending (forgone subsidies) offset by tax refunds, are the direct effects that determine the economic value of the industry to Connecticut.

D. Modeling Strategy and the Response of the Connecticut Economy

CCEA uses the Connecticut Economic Model (REMI) from Regional Economic Models, Inc. REMI is a detailed, dynamic, economic impact model of Connecticut and its eight counties (see Appendix I). REMI measures total economic changes (direct + indirect + induced) over time from a baseline forecast or no action alternative due to a change in direct variables (called the shock) such as industry employment or sales. CCEA's impact analysis measures the total (direct + indirect + induced) change (impact) in the Connecticut economy due to the economic activities that flow from the ECE industry as characterized above. As we estimate the direct impact (revenue and employment in the ECE industry), we infer the sum of indirect and induced impacts (additional rounds of spending that ECE industry purchases of intermediate goods and ECE workers' wages stimulate) as a residual. We assume that the economic impact of the ECE industry in Connecticut derives from the sales and value added of the industry and the increased productivity (labor force participation) of the state's workforce.

We model the impact of the industry as a counterfactual, that is, if the formal ECE industry were not in Connecticut, what would be the effect on the state's economy. We assume all structures and capital such as computers and laundry equipment remain; all ECE workers walk away from the facilities in which they work, or in the case of home care, cease providing ECE services. We assume there are no alternative uses of the facilities, as we are not seeking an opportunity cost analysis.

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[23] That is, $321/551 = x/789.4$, where x is the implied purchases of the entire formal sector.

The economy responds dynamically. Counterfactually, formal ECE users (parents) cease to work in the short run as they seek informal care arrangements. Real wages are bid up as the quantity of labor supplied at every wage decreases, that is, the Connecticut labor supply schedule shifts to the left, driving up real wages. Businesses substitute capital (such as computers and machines) for labor, as it is relatively cheaper. Production costs rise; output (sales or gross receipts) falls as Connecticut firms become less competitive relative to those in other states. Some workers commute from neighboring states to take jobs vacated by parents needing ECE and some Connecticut unemployed or underemployed childless workers take vacated jobs. In addition, workers migrate to Connecticut to take higher paying jobs vacated by resident parents who need ECE. Immigration is mitigated however because we reduce the amenity (quality of life or attractiveness) value of living in Connecticut by assuming the reduction in government spending is productive spending, that is, such spending decreases Connecticut's quality of life. In sum, Connecticut becomes a less desirable place to work despite higher wages due to the disappearance of the formal ECE industry. We remove $70 million in direct state subsidies to facilities and about $80 million of the Care4Kids subsidy, assuming that the remainder (about $76 million) continues to flow to informal care providers through vouchers. These eliminated subsidies amount to a reduction in productive state spending that returns to Connecticut taxpayers' wallets. The $45.5 million in federal money disappears.

Employment and gross regional product decline in each county with respect to their baseline forecasts for about 22 years until in-migration restores employment and GSP to their levels at the time the hypothetical shock was applied (that is, when the formal ECE industry was hypothetically removed). Figure 1.1 depicts the statewide dynamic impact of jobs and gross state product.

Figure 1.1

CT Child Care Impact: Jobs and GSP
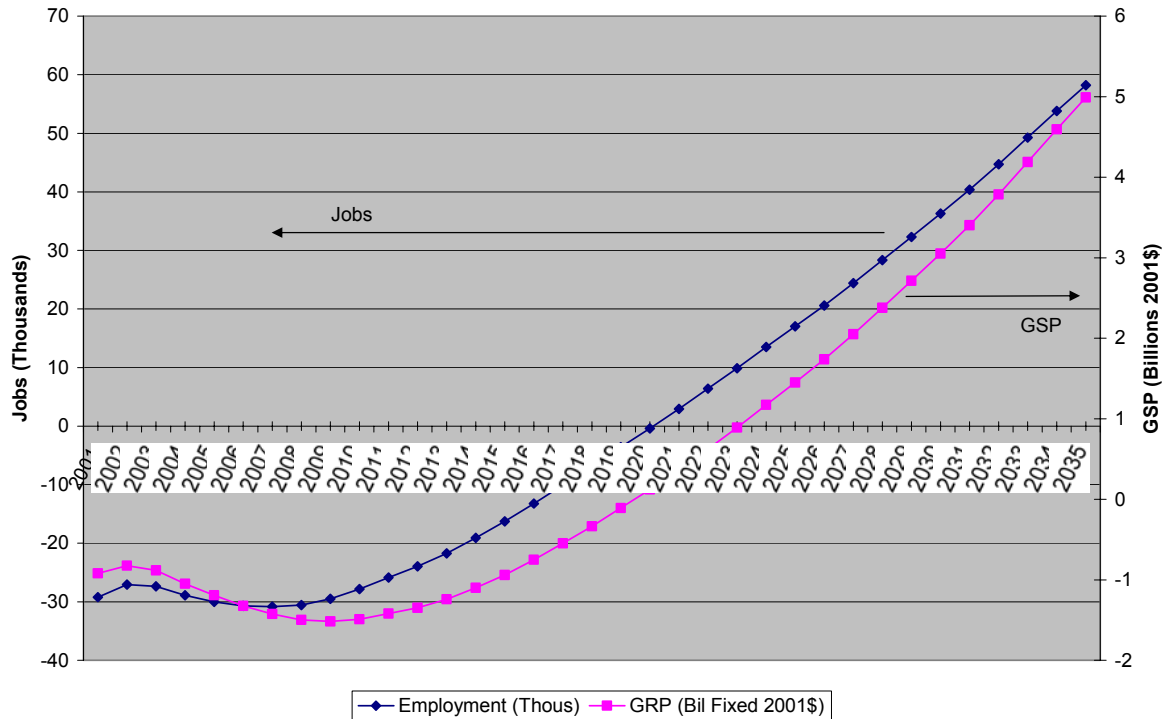
The increasing supply of labor due to immigration ultimately drives down the real wage rate and production costs making Connecticut firms once more competitive. Our two measures of the value (economic benefit) of the ECE industry are the net present value (using a discount rate of 5%) of its value added (GSP) through multiplier effects over the period of negative values (2001 through 2022 for several variables) and the average number of jobs lost in any given year during this period. Table 1.3 displays these summary results.

Table 1.3: Summary of Counterfactual Impact Results

Region	NPV GSP (2001 billion$)	NPV Sales (2001 billion$)	Average Jobs Lost	Average Labor Force Change
Connecticut	-$12.71	-$39.23	17,992	-62,880
Fairfield County	-$5.32	-$13.95	7,174	-19,669
New Haven County	-$2.28	-$6.65	4,785	-15,984
New London County	-$0.43	-$1.72	1,143	-5,584
Middlesex County	-$0.66	-$1.94	1,028	-3,310
Tolland County	-$0.06	-$0.46	926	-3,044
Windham County	-$0.13	-$0.69	532	-2,282
Litchfield County	-$0.63	-$1.69	1,073	-3,855
Hartford County	-$3.97	-$12.56	6,055	-16,386

In the first year after the hypothetical disappearance of the formal ECE industry, Connecticut's labor force declines by more than 160,000 people (about 10% of Connecticut's 2001 workforce), while employment (the number of Connecticut jobs) declines by only 29,200 jobs (the unemployment rate drops). This difference is due to several factors: the loss of ECE induces parents to leave the labor force because formal ECE is not available at any price. Thus, there is a shortage of workers and people seeking work will accept only a higher wage than before. The suddenly scarce labor supply generates competition by employers in the short run and drives wages up. Economic migrants (workers resettling in Connecticut), cross-border commuters and previously unemployed Connecticut residents find work. Over time, the labor force is restored.

Connecticut's average job loss in any given year is more than 1% of its 2001 total employment during the period 2001 through 2022. The net present value of Connecticut's lost value added ($13 billion in 2001$) amounts to almost 10% of its 2001 GSP. The net present value of its lost sales ($39 billion in 2001$) amounts to more than 23% of its 2001 total output (value of shipments). *These lost sales are never made up; they are lost forever to Connecticut. Other states benefit from our losses.* Despite the reductions in employment and the labor force, personal income (the aggregate compensation of all workers) increases because the increased wages paid to fewer people more than offset the loss of workers at their original lower compensation.

E. Conclusion

We conclude that Connecticut's formal ECE industry is a significant driver of its economy. Its direct employment is about 15,000 workers in the formal sector and is larger than Connecticut's pharmaceutical industry employment. The total employment impact in the first year (before in-migration offsets withdrawing parents) of the industry's counterfactual disappearance is 29,200 jobs, implying that the indirect and induced employment effect is 14,200 jobs. The total value added impact (change in GSP) in the first year of the industry's counterfactual disappearance is $920 million (in 2001$) relative to $329.5 million (in 2001$) in direct ECE industry value added, implying that $590.5 million (in 2001$) is the indirect and induced value added effect due to Connecticut's formal ECE industry operations.

In addition, we estimate the formal sector of the ECE industry purchases $460 million in goods and services from other Connecticut and regional businesses, further stimulating their economies. This implies an average annual salary for ECE workers of $21,960.[24] By far the largest portion of its impact lies in the opportunities it creates for Connecticut parents to work or receive additional education. Our estimates show that almost 10% of Connecticut's workforce depends on formal ECE to enable to it be productive outside the home. The impact estimated in this report does not account for the long run effects of high quality ECE and thus underestimates a truer value of the formal ECE industry to Connecticut in terms of past investments that are now paying dividends in the form of better performing adults.

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[24] From the total revenue received by the industry ($789.4 million), subtract $460 million and divide by 15,000 workers. This neglects taxes and rent paid out of revenues.

Part 2: Connecticut's ECE Industry: A Quantitative Characterization

Part 2 is organized as follows: we first describe quantitatively and geographically the supply and demand sides of the ECE industry. That is, we list the formal sector's enrollment, capacity and vacancies by town for all providers known to us (via 211/ECE Infoline's[25] survey of licensed and exempt providers). In Appendix III, we estimate the size of the informal sector.

Supply of ECE in Connecticut

To more clearly understand the economic value of Connecticut's ECE industry, we profile its employment, revenues (sales) and basic economic linkages to other sectors of the economy. We use the most recent state level inter-industry data available from the Bureau of Economic Analysis for the year 2000 as a first approximation. We access this data from the Connecticut IMPLAN Economic Model and Database.[26]

ECE Industry Profile: Formal Sector Facilities and Services

According to Infoline's fall 2002 online tables,[27] for Connecticut statewide, there were 13,000 licensed and exempt ECE venues that had a total capacity of 147,971 spaces (licensed capacity), a total enrollment of 105,577, total vacancies numbering 16,238, total intended enrollment of 120,840[28] and, total unintended enrollment of 25,753.[29] From these tables at the Infoline website, we calculate the statewide, intended enrollment to capacity ratio. These capacities and other statistics reported in Infoline's fall 2002 tables differ from the more recent (July 2003) CCEA-processed Infoline database (not available online) which reports 12,586 services, delivered in 5,510 venues such as early head start centers, infant and toddler centers, school age family child care group homes. In this latter database, there are 125,303 spaces, 12,036 vacancies, an intended enrollment of 122,856, and unintended enrollment of 2,447.[30]

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[25] See footnote 8.
[26] IMPLAN is a static, economic impact analysis for U.S. counties. See www.implanpro.com for more information.
[27] www.childcareinfoline.org/Professionals/Capacity.asp
[28] Total intended enrollment is enrollment plus vacancies.
[29] Total unintended enrollment is capacity less intended enrollment.
[30] Enrollment is absent from the latest Infoline database CCEA processed. We infer intended enrollment using the intended enrollment to capacity ratio calculated from the fall 2002 online tables. Infoline determines enrollment in the spring of each year and reports it in its fall online tables.

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The CCEA-processed database incorporates additional exempt sites based on a CCEA survey. Even so, there are missing and inaccurate data (some exempt sites as well as some church-sponsored and employer programs are omitted). These databases (including Census 2000) are snapshots in time and do not reflect today's statistics.

There were about 568,000 children younger than 12 (aged 0 through 132 months) in Connecticut in 2000 according to Census 2000 who could potentially use ECE services. Tables 2.1 and 2.2 report county level facility and service counts and intended enrollment for three facility types and 16 service types as reported in the CCEA-processed Infoline database. Tables 2.3 and 2.4 report similar information at the Labor Market Area (LMA) level. LMAs represent town clusters in which people live and work, and ostensibly in which one can compare the supply of and demand for ECE services.

Demand for ECE in Connecticut

The Census 2000 county level distribution of Connecticut's population of children younger than 12 years old is as follows:

	0 through 2 years	3 through 5 yrs	6 through 11 years	Total
Connecticut	130,813	139,374	297,501	567,688
Fairfield County	37,497	39,667	80,634	157,798
Hartford County	32,085	34,213	84,423	150,721
Litchfield County	6,174	6,918	16,133	29,225
Middlesex County	5,691	5,977	12,522	24,190
New Haven County	31,276	32,773	71,034	135,083
New London County	9,527	10,384	22,307	42,218
Tolland County	4,601	5,241	10,903	20,745
Windham County	3,962	4,201	9,545	17,708

These numbers show that Fairfield, Hartford and New Haven counties have a large potential demand for ECE services, while Windham and Tolland counties' potential demand is not nearly as large. Tables 2.1 through 2.4 report facility counts, facility capacities and services' intended enrollments by county and labor market area without normalizing the latter by the population of the cohorts that ***could possibly*** use ECE in those regions. To do so and for purposes of this analysis, we aggregate the intended enrollment for the relevant services for each cohort. For example, children ages 0 through 24 months use Early Head Start and infant and toddler services; children ages 25 through 60 months use Head Start, nursery and preschool services;

and, children ages 61 through 132 months use school age services. The supply-demand ratios for each county are the quotients of intended enrollment aggregated by service age group and the population of that age group. Table 2.5 depicts the supply-demand ratios suggested above for Connecticut counties.

Table 2.5

Service Intended Enrollment by Connecticut County Per Child by Age Group				
County	Age 0-2	Age 3-5	Age 6-11	Age 0-11
Fairfield	0.1237	0.5397	0.1052	0.2188
Tolland	0.1531	0.5433	0.1094	0.2287
Windham	0.1116	0.3797	0.0853	0.1610
Middlesex	0.1749	0.5610	0.1645	0.2649
New Haven	0.1466	0.4566	0.0945	0.1944
Hartford	0.1852	0.5411	0.1323	0.2437
Litchfield	0.1557	0.4259	0.1157	0.1976
New London	0.1713	0.3897	0.1035	0.1892
Connecticut	0.1522	0.4999	0.1119	0.2164

These ratios suggest, for example in Fairfield County in 2001, Early Head Start, nursery, infant and toddler services could accommodate 12.37% of children aged 0 through 24 months represented by intended enrollment on the supply side. In the entire state, less than 16% of children aged 0 through 24 months (represented by intended enrollment on the supply side) could be accommodated in these services in 2001, while less than 22% of children younger than 12 could be accommodated in all formal services in Connecticut. *This stands in stark contrast to the estimates on page 9 we employ to arrive at a ECE parental participation rate. Part of the difference is due to the paucity of data for exempt programs and part is due to incomplete data for licensed programs. There should clearly be an exhaustive survey of licensed and exempt providers at all facilities in Connecticut.*

Connecticut's Future Population of Children

The projection of Connecticut's future population is an important consideration in assessing the demand for ECE. According to Census projections, Connecticut may have a population of 3.7 million people in 2025; in 1995, it was 3.3 million people. A 1996 study

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projected that Connecticut will gain 337,000 people through international migration into the state, but this occurred before September 11, 2001 and may not materialize. The number of births estimated for the period 1995 to 2025 is 1.4 million. Although in all states, the proportion of youth under 20 is expected to decline, Connecticut in 1995 was ranked 45th in the largest proportion of youth under 20, but by 2025 it is projected to rank 29th in the country in its proportion of youth under 20.[31] Therefore, ECE will be a relatively large issue in Connecticut's future.

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[31] Source: STATE POPULATION RANKINGS SUMMARY SOURCE OF DATA: U.S. Bureau of the Census, Population Division, Population Paper Listing #47, Population Electronic Product #45, CT 1996.
Source: Figures are from Series A (the Preferred Series) as reported in Campbell, Paul R., 1996, "Population Projections for States, by Age, Sex, Race and Hispanic Origin: 1995 to 2025," Report PPL-47, U.S. Bureau of the Census, Population Division. Most of these data are available in files from the Population Projections section of the Census Bureau Home Page (http://www.census.gov).

Table 2.1

Facility and Service Counts by Connecticut County

County	Family Day Care Home	Center	Group Home	Facility Totals	Early Head Start Centers	Infant & Toddler Centers	Infant & Toddler FCC Group Homes	Infant & Toddler FCC Homes	Head Start Centers	Nursery School Centers	Nursery School FCC Group Homes	Preschool Centers	Preschool FCC Group Homes	Preschool FCC Homes	School Age Centers	School Age FCC Group Homes	School Age FCC Homes	Service Totals
Fairfield	607	523	18	1,148	4	133	12	556	33	230	6	214	0	599	172	2	452	2,413
Hartford	1,009	545	12	1,566	1	164	10	924	28	209	1	235	0	988	241	5	858	3,664
Litchfield	129	124	5	258	1	42	4	115	7	67	0	56	0	127	61	4	114	598
Middlesex	202	109	1	312	1	32	0	186	3	53	1	47	0	200	59	0	182	764
New Haven	777	472	18	1,267	1	146	15	713	30	193	2	216	0	767	170	3	652	2,908
New London	258	161	6	425	0	49	4	226	8	69	2	78	0	252	61	2	221	972
Tolland	237	85	2	324	0	19	1	209	1	49	0	29	0	230	34	1	199	772
Windham	136	72	2	210	2	18	1	120	3	25	1	33	0	136	35	0	121	495
State Totals	3,355	2,091	64	5,510	10	603	47	3,049	113	895	13	908	0	3,299	833	17	2,799	12,586

Table 2.2

Facility Capacity and Service Intended Enrollment by Connecticut County

County	Facility Capacity Totals	Early Head Start Centers	Infant & Toddler Centers	Infant & Toddler FCC Group Homes	Infant & Toddler FCC Homes	Head Start Centers	Nursery School Centers	Nursery School FCC Group Homes	Preschool Centers	Preschool FCC Group Homes	Preschool FCC Homes	School Age Centers	School Age FCC Group Homes	School Age FCC Homes	Service Totals
Fairfield	35,495	54	3,624	106	856	1,278	9,329	111	8,851	26	1,843	7,426	9	1,047	34,560
Hartford	34,846	33	4,473	60	1,377	1,093	5,366	0	8,993	45	3,061	7,775	11	2,060	34,345
Litchfield	5,834	72	697	25	168	167	1,197	0	1,195	15	391	1,592	10	265	5,793
Middlesex	6,367	9	707	0	280	164	1,211	9	1,348	0	621	1,632	0	428	6,408
New Haven	26,749	15	3,405	94	1,072	1,364	4,514	36	6,654	55	2,396	5,171	18	1,522	26,315
New London	8,363	0	1,272	21	340	191	901	30	2,134	16	791	1,770	5	534	8,005
Tolland	4,592	0	394	11	299	53	1,202	0	866	7	726	698	4	491	4,751
Windham	3,057	36	226	4	176	104	128	18	911	7	435	539	0	276	2,859
State Totals	125,303	219	14,797	319	4,568	4,415	23,847	204	30,951	172	10,263	26,602	55	6,623	123,034

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Table 2.3

Facility and Service Counts by Connecticut LMA

LMA	Family Day Care Home	Center	Group Home	Facility Totals	Early Head Start Centers	Infant & Toddler Centers	Infant & Toddler FCC Group Homes	Infant & Toddler FCC Homes	Head Start Centers	Nursery School Centers	Nursery School FCC Group Homes	Preschool Centers	Preschool FCC Group Homes	Preschool FCC Homes	School Age Centers	School Age FCC Group Homes	School Age FCC Homes	Service Totals
Bridgeport	441	255	8	704	2	60	6	407	14	102	2	110	0	438	98	1	345	1,585
Danbury	152	138	2	292	0	42	1	134	8	60	1	56	0	149	69	0	128	648
Danielson	78	45	2	125	1	13	1	71	2	16	1	22	0	78	21	0	65	291
Hartford	1,498	761	16	2,275	3	219	12	1,360	34	318	2	320	0	1,465	347	7	1,285	5,372
Lower River	20	19	0	39	0	5	0	19	0	11	0	9	0	20	11	0	19	94
New Haven	508	320	14	842	0	104	11	471	22	130	2	148	0	501	110	1	436	1,936
New London	255	161	5	421	0	50	3	223	8	68	2	79	0	251	58	1	219	962
Stamford	174	220	10	404	2	51	7	160	15	109	3	79	0	172	47	1	105	751
Torrington	47	44	4	95	1	15	3	41	4	25	0	20	0	46	20	4	43	222
Waterbury	182	128	3	313	1	44	3	163	6	56	0	65	0	179	52	2	154	725
State Totals	3,355	2,091	64	5,510	10	603	47	3,049	113	895	13	908	0	3,299	833	17	2,799	12,586

Table 2.4

Facility Capacity and Service Intended Enrollment by Connecticut LMA

LMA	Facility Capacity Totals	Early Head Start Centers	Infant & Toddler Centers	Infant & Toddler FCC Group Homes	Infant & Toddler FCC Homes	Head Start Centers	Nursery School Centers	Nursery School FCC Group Homes	Preschool Centers	Preschool FCC Group Homes	Preschool FCC Homes	School Age Centers	School Age FCC Group Homes	School Age FCC Homes	Service Totals
Bridgeport	17,633	24	1,548	44	617	698	3,285	27	4,249	14	1,368	4,653	5	793	17,325
Danbury	8,900	0	1,002	7	201	236	2,077	36	2,139	0	454	2,486	0	302	8,940
Danielson	1,959	12	162	4	106	43	53	18	608	7	249	388	0	149	1,798
Hartford	46,572	66	5,579	74	2,016	1,393	7,766	9	11,374	56	4,554	10,227	17	3,097	46,228
Lower River	872	0	128	0	28	0	102	0	260	0	63	238	0	43	863
New Haven	18,340	0	2,346	77	711	929	3,517	36	4,612	37	1,560	3,472	11	1,021	18,329
New London	8,379	0	1,292	18	335	191	862	30	2,191	11	790	1,733	3	521	7,977
Stamford	14,197	30	1,593	69	252	506	4,946	48	3,432	16	527	1,797	4	237	13,456
Torrington	1,880	72	199	18	60	108	365	0	380	15	144	375	10	102	1,847
Waterbury	6,571	15	949	10	240	312	876	0	1,705	15	554	1,232	7	358	6,273
State Totals	125,303	219	14,797	319	4,568	4,415	23,847	204	30,951	172	10,263	26,602	55	6,623	123,034

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Connecticut's ECE Labor Force Profile

ECE services play the dual role of providing adult supervision for children as well as providing opportunities for their intellectual and social development. A critical component of this experience is the ECE workforce. Previous research has suggested that children who have caregivers with more formal education and more specialized training improve cognitive development in children.[32] Even so, workers' wages in the ECE sector are relatively low.

CCEA obtained estimates of the formal ECE labor force and their wages in the child day care services sector (SIC 8351) from the Connecticut Department of Labor for ECE firms reporting unemployment insurance information. According to the Bureau of Economic Analysis (BEA) employer survey for the year 2000, Connecticut's ECE industry (the formal sector not including entities above) employed 11,965 people[33] and paid an average wage of $17,200.[34] This data omits Head Start programs, school-based (usually exempt) programs, reporting and non-reporting self-employed providers, and church-sponsored and employer-sponsored programs. Using the CCEA-processed Infoline database, we estimate (see methodological sidebar) an additional 2,845 jobs in the formal sector and 28,585 jobs in the informal sector (see discussion of informal care in Appendix III) for a total estimated ECE industry employment of 43,706 people. Workers in the formal ECE sector earned $321.4 million relative the state's total year 2000 personal income of $92.795 billion. Workers in the informal ECE sector collected almost $90 million in 2000, most of which was likely unreported due to cash payments or payments in kind (see discussion of informal care below).

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[32] Parisky Group (2002) 'ECE Workforce in Connecticut' working paper – draft, Connecticut: Child Health and Development Institute of Connecticut.

[33] Obtained from Connecticut DoL. Data on certain types of employees is suppressed for confidentiality reasons. 11,000 represent a minimum estimate of the current number of employees in the state. See Appendix I for occupational details.

[34] Employer Survey Data from ES202 reporting for 2002, Connecticut Department of Labor.

Estimating Revenue and Employment in Connecticut's Formal ECE Industry

We make the following assumptions to calculate industry revenue and employment.

1. Early Head Start and Head Start programs are government-funded, free services for parents, and are included in industry revenue estimation.

2. The CCEA-processed Infoline database does not provide "service enrollment," rather, it reports "service capacity" and "service vacancy." We infer intended enrollment using the intended enrollment to capacity ratio calculated from the fall 2002 online tables. Infoline determines enrollment in the spring of each year and reports it in its fall online tables.

3. The service cost is missing for some ECE providers. We substitute the average cost across all providers within a given service for missing values.

4. Our working definition of full time/part time services is that only infants', toddlers' and preschool services have full-time programs, while nursery school, school age and Head Start programs are part-time. Following this rule, we use reported full-time costs for infants', toddlers' and preschool services, and part-time costs for nursery school and school age programs. We assume that part-time services involve 20 hours of work per week.

5. We calculate formal ECE industry revenue ($739,082,104) as the product of intended service enrollment and service cost per child for all services in all facilities. The intended to unintended enrollment ratio from Infoline data multiplies each service's total revenue.

6. To estimate full-time, formal ECE industry employment (14,810), we use statistics from related research (Connecticut's ECE Workforce: A Report on Findings from the ECE Market and Workforce Study, June 2003, by Early Childhood DataCONNections) that estimate the child/adult ratio in infants' and toddlers' centers and Early Head Start programs to be 1/4, and in preschool and school age centers to be 1/10. Nursery school centers' C/A ratio is 1/20 to estimate FTEs. Programs in family day care homes have at least one adult per establishment and 11% have a part-time assistant. We use the number of such programs multiplied by 1.055 to account for assistants. Group homes have at least two adults per establishment. ***The number of children used as the basis is estimated intended enrollment because we assume staffing must exist to handle intended enrollment.***

7. The occupational distribution for the ECE industry from BLS consists of ECE firms that respond to the employer survey (firms that file unemployment insurance and workers' compensation forms). The Infoline database includes both ECE firms and non-firms (self-employed and exempt, school-based programs). Our estimate for employment in the formal ECE industry is therefore greater than the BLS number. We assume for purposes of this analysis that workers in non-firm ECE facilities are either ECE workers or teacher assistants (as occupational categories). Adding estimated wages for workers in non-firm ECE provider settings to the statistics from BLS, we obtain total wages ($321.4 million) for the formal ECE industry including Head Start programs.

8. The discrepancy between estimated revenue, purchases and wages is due to inaccuracies in the data sources; CCEA regards the formal sector revenue estimate as conservative.

As in other segments of the economy, the formal ECE industry employs a variety of workers. Management includes general managers, coordinators and administrators. Social workers and health professionals such as registered nurses and speech pathologists provide important ancillary services to the ECE industry. Skilled preschool and kindergarten teachers, as well as their teacher assistants and other ECE workers directly provide ECE. Some ECE centers employ administrative staff that includes secretaries, office clerks and bookkeepers. Bus drivers, cafeteria workers, janitors and their supervisors compose the final category of other support personnel. Table 2.6 below provides a summary of the BLS occupational distribution; Appendix V provides greater detail.

Table 2.6: Employment and Wages in the ECE Sector (2001)

Occupational Title	Number of Employees	Average Wage		Wage Range	
		Hourly	Annual	Min[b]	Max[b]
Managers	400[a]	$22.01	$45,772.00	$11.74	$51.70
Medical and Mental Health Professionals	200	$24.49	$50,936.14	$8.79	$57.68
Teachers	5,580[a]	$10.31[a]	$37,336.00	$7.38[a]	$14.35[a]
ECE Workers and Assistants	4,440[a]	$9.65[a]	$20,480.33	$6.76[a]	$17.10[a]
Administrative Staff	200	$13.49	$28,057.50	$7.16	$25.40
Other Support Personnel	180[a]	$11.11	$23,110.20	$6.71	$19.90

[a] Some data not available in these categories. See Appendix I for detailed data.

[b] These wages represent the lowest/highest wage paid to an individual in each category.

Source: Connecticut Department of Labor (ES202 Survey)

The (simple, unweighted) average annual income across all worker categories is $35,230 per year. The average hourly wage ranges from a low of $6.71 paid to cafeteria workers and a high of $57.68 per hour paid to speech pathologists who work in this sector.

Of most interest are the workers who directly provide care to Connecticut's children. These workers include teachers and ECE workers. In the employer survey of formal ECE providers, preschool teachers are the largest component of teachers (5,470 out of 5,580 employees) and they receive an average annual salary of $21,452. This implies an average

hourly wage of $9.71.[35] The starting hourly wage for a preschool teacher in Connecticut is $7.76. By comparison, this wage is slightly below the average starting wage for janitors in the same industry who receive $8.20 per hour. Approximately 110 kindergarten teachers work in formal ECE 'firms' and earn an average annual salary of $35,147.

ECE workers and assistants are another important source of care. The average hourly wage for these workers is $9.65 with a range from $6.76 per hour for the lowest paid ECE workers to $17.10 per hour for the highest paid recreation workers. The formal ECE sector employs approximately 3,000 teacher assistants and 1,440 ECE workers.[36] The average annual wage for a teacher assistant is $21,335 per year; for an ECE worker it is $17,861; and for a recreation worker it is $22,245.

ECE workers receive low wages even by their own industry standards. The current entry-level wage for an ECE worker is $7.19 per hour[37] that ranges from $6.76 to $10.99 per hour. By comparison, cafeteria workers who are the lowest paid workers overall in the ECE industry receive between $6.71 and $11.17 per hour. This data provides an overview of the types of labor employed in the ECE industry and their remuneration. Currently, information is not directly available on the average benefits provided to workers or other important issues like turnover and working conditions. Notwithstanding, this data provides a broad profile of the ECE labor force. First, these statistics show the variety of types of workers whose jobs depend on the ECE industry – which includes more than just those who work directly with children. Additionally, wages paid to those charged directly with ECE are low relative to other types of workers in the industry itself. Finally, the data allows us to understand the overall magnitude of the ECE industry in Connecticut. Employing about 15,000 workers, the formal ECE industry has an estimated total annual wage bill of $321.4 million dollars.[38] The formal ECE industry, thus, represents a significant portion of Connecticut's economic activity.

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[35] By comparison, the average wage for a preschool teacher in the U.S. was $9.66 per hour in 2000 (data cited Parisky Group (2002) 'ECE Workforce in Connecticut', working paper – draft, Connecticut: Child Health and Development Institute of Connecticut).

[36] The number of recreation workers is not available.

[37] By comparison, the average wage for a ECE worker in the U.S. was $7.86 per hour in 2000 (data cited Parisky Group (2002) 'ECE Workforce in Connecticut' working paper – draft, Connecticut: Child Health and Development Institute of Connecticut).

[38] $321.4 million is a conservative estimate because it omits ECE occupations for which BLS suppressed employment data.

Table 2.7 shows that the formal ECE industry employed more workers than Connecticut's pharmaceutical industry in 2002.

Table 2.7: Relative Employment in ECE Services in Connecticut (2002)

Sector	Workers
Ship Building and Repairing	6,822
Farming	9,838
Pharmaceuticals	11,789
U.S. Postal Service	12,779
Hotels and Lodging	13,146
Insurance Agents and Brokers	18,950
Public and Private Elementary and Primary Education	20,526

ECE Subsidies in Connecticut

A significant factor that affects the ECE industry is parents' and/or guardians' ability to afford ECE. According to Census 2000, the number of families in Connecticut is 881,170, while the number of households is 1,301,670. The state poverty rate for people with children is 7.9%. The number of families in poverty in the state is 49,983 and the number of working poor families with children is 39,015. This is significant because these poor families need to work to sustain a decent living standard and 75% need ECE. The number of families headed by single mothers is 91,114 and the number of working poor families with single mothers is 26,802. The number of single parent headed households is 112,159. All single parents need ECE in order to work. The number of poor individuals with children under 18 is 82,866. These are important indicators in assessing ECE needs in Connecticut. Appendix IV shows this demographic data by town.

The cost of ECE is a major issue for parents and guardians of school-aged children (5-12 year olds). In Connecticut, according to 2000-2001 Infoline data:[39]

Service	Average Cost
Infant/Toddler Center	$183.32/Week
Infant/Toddler Home	$143.68/Week
Preschool Center	$147.86/Week
Preschool Home	$136.69/Week
School Age Center	$84.59/Week
School Age Home	$66.57/Week

This is expensive, especially for single parents and families with low income. To help, there are subsidies to which parents may have access.

In FY 2001-2002, Head Start programs received $45.5 million in federal funds and $4.9 million in state funds. Connecticut provided $40 million in school readiness funding and $25 million for state-funded ECE centers. The portable Care4Kids subsidy amounted to $156 million and offset parental expenses for ECE at sites that accept Care4Kids vouchers. These funds directly augment the fees ECE businesses receive and permit many more parents to place their children in non-parental care facilities in order to work and/or to obtain education.

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[39] 2-1-1 Infoline A Social Barometer for Connecticut. Winter 2002 Data analysis and report compiled by Georgine Burke, Ph.D. and Sandra Hale, Child Health Data Center, Connecticut Children's Medical Center. http://www.childcareinfoline.org/socialbar3.pdf (6/26/03).

Appendix I: The REMI Model

The REMI Model

The Connecticut REMI model is a dynamic, multi-sector, regional model developed and maintained for the Connecticut Center for Economic Analysis by Regional Economic Models, Inc. of Amherst, Massachusetts. This model provides detail on all eight counties in the State of Connecticut and any combination of these counties. The REMI model includes all of the major inter-industry linkages among 466 private industries, aggregated into 49 major industrial sectors. With the addition of farming and three public sectors (state and local government, civilian federal government, and military), there are 53 sectors represented in the model for the eight counties.

The REMI model is based on a nationwide *input-output* (I/O) model that the U.S. Department of Commerce (DoC) developed and continues to maintain. Modern input-output models are largely the result of groundbreaking research by Nobel laureate Wassily Leontief. Such models focus on the inter-relationships between industries and provide information about how changes in specific variables—whether economic variable such as employment or prices in a certain industry or other variables like population affect factor markets, intermediate goods production, and final goods production and consumption.

The REMI Connecticut model scales the U.S. I/O "table" according to traditional regional relationships and current conditions, allowing the relationships to adapt at reasonable rates to changing conditions. Listed below are some salient structural characteristics of the REMI model:

- REMI determines consumption on an industry-by-industry basis, and models real disposable income in Keynesian fashion, i.e., with prices fixed in the short run and GDP (Gross Domestic Product) determined solely by aggregate demand.

- The demand for labor, capital, fuel, and intermediate inputs per unit of output depends on relative prices of inputs. Changes in relative prices cause producers to substitute cheaper inputs for relatively more expensive inputs.

- Supply and demand for labor in a sector determine the wage level, and these characteristics are factored by regional differences. The supply of labor depends on the size of the population and the size of the workforce.

- Migration—that affects population size—depends on real after-tax wages as well as employment opportunities and amenity value in a region relative to other areas.

- Wages and other measures of prices and productivity determine the cost of doing business. Changes in the cost of doing business will affect profits and/or prices in a given industry. When the change in the cost of doing business is specific to a region, the share of local and U.S. market supplied by local firms will also be affected. Market share and demand determine local output.

- "Imports" and "exports between states are related to relative prices and relative production costs.

- Property income depends only on population and its distribution adjusted for traditional regional differences, *not* on market conditions or building rates relative to business activity.

- Estimates of transfer payments depend on unemployment details of the previous period, and total government expenditures are proportional to population size.

- Federal military and civilian employment is exogenous and maintained at a *fixed* share of the corresponding total U.S. values, unless specifically altered in the analysis.

Because the variables in the REMI model are all related, a change in any one variable affects many others. For example, if wages in a certain sector rise, the relative prices of inputs change and may cause the producer to substitute capital for labor. This changes demand for inputs, which affects employment, wages, and other variables in those industries. Changes in employment and wages affect migration and the population level that in turn affect other employment variables. Such chain-reactions continue in time across all sectors in the model.

Depending on the analysis performed, the nature of the chain of events cascading through the model economy can be as informative for the policymaker as the final aggregate results. Because REMI generates extensive sectoral detail, it is possible for experienced economists in this field to discern the dominant causal linkages involved in the results.

Appendix II: Labor Force Participation Rate Estimation Procedure

1. Labor force related to ECE usage

a. Parent Population In Households With Children Under 12

The U.S. Census Bureau provides data for households with children under 18, including married-couple households, male/female householders (no wife/husband present) and nonfamily households. According to the Census definition, a male/female householder, no wife/husband present is a family with no spouse of the householder present, while a nonfamily household is one with a householder living alone or with nonrelatives. For our purposes, nonfamily households with children younger than 18 include households with at least two adults and children younger than 18.[40] We assume there are (at least) one male adult, one female adult and one child younger than 18 in nonfamily households. Because nonfamily households with children younger than 18 are a small portion of total households with children younger than 18 compared to other categories, this assumption does not affect our estimation greatly. Married households consist of a male and a female parent.

Therefore, we obtain the number of male parents with children younger than 18 by adding up the number of married-couple households, the number of male households and the number of nonfamily households. The same approach obtains the number of female parents with children younger than 18. We estimate the numbers of male and female parents between the ages of 16 and 80 using ECE separately to obtain labor force participation rates by age and gender. That is,

male & female parents with children < 18 = parents in married households with children < 18 + male & female householders with children < 18 + parents in nonfamily households with children < 18   (1)

However, in this report, we consider ECE for children younger than 12, so we need to convert the above results into households with children younger than 12. We estimate the number of households with children younger than 12 in Connecticut to be 321,799. In the U.S. as a whole, 24.722% (CPS 2000) of all households have children 12 and younger. We apply this ratio to all Connecticut households (there are 1,301,670 households). The number of Connecticut households with children younger than 18 is 451,411. The ratio of Connecticut households with children younger than 12 to households with children younger than 18 is

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[40] Those households with only one adult and children younger than 18 are already included in the male/female householder categories.

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321,799/451,411= 71.3 %. We assume that each county has the same ratio of households with children younger than 12 to households with children younger than 18. Further, we assume the fraction of the parent population (males and females) in households with children younger than 12 to the population in households with children younger than 18 is the same as the fraction of households with children younger than 12 to households with children younger than 18, that is,

male & female parents with children < 12 = male & female parents with children < 18 × 71.3 % (2)

b. Population In Households Using Formal ECE

The above shows the procedure to obtain the **maximum** demand for parents (males and females) using ECE by one-year age cohort. We need to find the male and female parent population **actually** using formal ECE. Estimates of the number of parents using formal ECE are not readily available. However, we convert the ratio of children in formal ECE to the ratio of parents using formal ECE as follows:

i) Assuming the same ratio of households with children younger than 12 to households with children younger than 18 for each county, we estimate the number of households with children younger than 12 for each county, that is,

households with children < 12 = households with children < 18 × 71.3 %   (3)

ii) From Census 2000 data, we obtain the number of children younger than 12 by adding up male and female children in each one-year age group. Then, we have

average number of children <12 per household with children < 12 = total children < 12 / households with children < 12   (4)

iii) Using U.S. data for children in formal ECE for different age groups,[41] we have the number of children in formal ECE:

children < 12 in formal ECE = children < 5 × 60 % + children 5 to 12 × 37 %   (5)

iv) Given this, we estimate the number of households with children younger than 12 in formal ECE using the average number of children per household:

households with children < 12 using formal ECE = children < 12 in formal ECE / average number of

children < 12 per household with children < 12   (6)

v) The fraction of households using formal ECE is:

 fraction of households with children < 12 using formal ECE = households with children < 12 using formal ECE / households with children < 12   (7)

vi) Assuming the same fraction can be applied to the parent population as in households, we have:

male & female parents with children < 12 using formal ECE = male & female parents with children < 12 × fraction of households with children < 12 using formal ECE   (8)

c. Fraction of the Labor Force Using Formal ECE

The next step is to estimate the labor force using formal ECE by age and gender cohort by county. We assume that the population with children younger than 12 has the same labor force participation rate as the general population. REMI, as part of its large database of regional information, provides the general Connecticut labor force participation rate for each age and gender cohort. We then arrive at the labor force using ECE:

male & female labor force with children < 12 using ECE = general male & female labor force participation rate × male & female parents using ECE   (9)

2. Labor force participation rate change due to ECE

Census 2000 provides the data for population in one-year age and gender cohorts at the county level for Connecticut. We obtain the labor force participation rate (change due to ECE usage) as a fraction of each age and gender cohort due to the formal ECE industry by taking the ratio of the labor force using formal ECE to the population in each cohort.

Table II.A shows the estimation procedure (bolded items) in numeric terms by county.

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[41] See ECE Expenses of America's Families, Urban Institute 1997; also see The Economic Impact of Vermont's ECE Industry.

Table II.A

Source	Estimate of Parents with Children Younger than 12 in Formal Child Care	Fairfield County	Hartford County	Litchfield County	Middlesex County	New Haven County	New London County	Tolland County	Windham County	State of Connecticut
Census 2000	Total households:	324,232	335,098	71,551	61,341	319,040	99,835	49,431	41,142	1,301,670
Census 2000	Family households with children<18:	118,678	112,381	24,115	19,601	107,000	34,170	17,073	14,691	447,709
Census 2000	Married-couple family	90,190	75,306	18,913	15,206	72,113	24,339	13,530	10,095	319,692
Census 2000	Other family:	28,488	37,075	5,202	4,395	34,887	9,831	3,543	4,596	128,017
Census 2000	Male householder, no wife present	5,237	6,320	1,388	999	6,163	2,245	899	1,159	24,410
Census 2000	Female householder, no husband present	23,251	30,755	3,814	3,396	28,724	7,586	2,644	3,437	103,607
Census 2000	Nonfamily households (couple) with children<18:	666	937	231	171	881	451	160	205	3,702
Census 2000	Male householder	468	664	195	129	625	353	127	175	2,736
Census 2000	Female householder	198	273	36	42	256	98	33	30	966
Census 2000	Total Male Parents with Children < 18	96,093	82,563	20,532	16,376	79,157	27,035	14,589	11,459	347,804
Census 2000	Total Female Parents with Children < 18	114,107	106,998	22,958	18,773	101,718	32,376	16,334	13,737	427,001
Equation 1	Households with one or more children under 18 years:	119,344	113,318	24,346	19,772	107,881	34,621	17,233	14,896	451,411
Equations 2 & 3	**Parents & Households with one or more children under 12 years**	85,077	80,781	17,356	14,095	76,906	24,680	12,285	10,619	321,799
Equation 4	**Average number of children per HH with children under 12 years**	1.85	1.74	1.68	1.72	1.76	1.71	1.69	1.67	1.76
Equation 5	**Number of children under 12 in formal child care**	73,106	64,667	13,271	11,166	62,192	19,388	9,539	8,085	261,414
Census 2000	Number of children under 12	157,798	140,721	29,225	24,190	135,083	42,218	20,745	17,708	567,688
Census 2000 - Eqn. 5	**Number of children under 12 NOT in formal child care**	84,692	76,054	15,954	13,024	72,891	22,830	11,206	9,623	306,274
Equation 6	**HHs with children under 12 in formal child care**	39,416	37,122	7,881	6,506	35,407	11,334	5,649	4,848	148,163
Equation 7	**Percent of HHs with children under 12 in formal child care**	46.33%	45.95%	45.41%	46.16%	46.04%	45.92%	45.98%	45.66%	46.04%
Equation 8	**Male parents with children under 12 in formal child care**	31,736	27,047	6,646	5,389	25,980	8,851	4,782	3,730	114,161
Equation 8	**Female parents with children under 12 in formal child care**	37,686	35,052	7,432	6,177	33,385	10,599	5,354	4,471	140,156
Census 2000	Households with no children under 18 years:	204,888	221,780	47,205	41,569	211,159	65,214	32,198	26,246	850,259
Census 2000	Family households:	109,721	109,975	25,483	20,979	103,687	33,023	17,061	13,532	433,461
Census 2000	Married-couple family	89,610	89,490	22,012	18,140	82,892	28,088	15,129	11,414	356,775
Census 2000	Other family:	20,111	20,485	3,471	2,839	20,795	4,935	1,932	2,118	76,686
Census 2000	Male householder, no wife present	5,963	5,836	1,119	850	6,206	1,586	643	679	22,882
Census 2000	Female householder, no husband present	14,148	14,649	2,352	1,989	14,589	3,349	1,289	1,439	53,804
Census 2000	Nonfamily households:	95,167	111,805	21,722	20,590	107,472	32,191	15,137	12,714	416,798
Census 2000	Male householder	40,310	47,844	9,666	9,114	46,507	15,219	7,163	5,899	181,722
Census 2000	Female householder	54,857	63,961	12,056	11,476	60,965	16,972	7,974	6,815	235,076

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Table II.B shows the properties of the age distribution of male/female labor force participation rates (LFPR) for each county for parents of children ages birth to twelve who use formal ECE services. The county age distributions of male and female LFPR are similar to each other; they are each skewed to the left with a long tail to the right as workers age. Female age distributions are usually bimodal while male distributions are typically unimodal reflecting more older women in the labor force than men. The observed modal tendency (most frequently occurring participation rate) is about 8% as a fraction of the age cohort. For example, in Fairfield County, the average male parent LFPR who uses formal ECE is 7.25%, while the median male LFPR is 9.12%. The standard deviation is the square root of the variance that measures the dispersion of the distribution about the mean, that is, a measure of the 'wideness' of the peak of the distribution. Positive skewness implies a long right tail of the distribution (as in these cases). Kurtosis reflects the flatness or peakedness of the distribution: if it is less than 3, the distribution is flatter than the normal, symmetric bell-shaped curve.

Table II.B: Distributional Properties of Connecticut's Labor Force Participation Rate of Formal ECE Users By County and Gender

	Fairfield Male LFPR	Fairfield Female LFPR	Hartford Male LFPR	Hartford Female LFPR	Litchfield Male LFPR	Litchfield Female LFPR	Middlesex Male LFPR	Middlesex Female LFPR	New Haven Male LFPR	New Haven Female LFPR	New London Male LFPR	New London Female LFPR	Tolland Male LFPR	Tolland Female LFPR	Windham Male LFPR	Windham Female LFPR
Mean	-7.25	-6.17	-5.73	-5.96	-7.05	-6.13	-6.28	-6.03	-5.76	-5.93	-6.34	-5.99	-5.66	-6.88	-5.98	-6.07
Median	-9.12	-7.79	-7.13	-7.92	-8.33	-7.24	-7.61	-7.37	-6.87	-7.76	-7.64	-7.61	-7.15	-7.71	-7.16	-7.46
Standard Deviation	2.85	2.84	2.60	3.06	2.77	2.93	2.66	3.04	2.54	2.90	2.82	2.97	2.56	2.73	2.66	2.98
Sample Variance	8.14	8.09	6.74	9.34	7.65	8.56	7.09	9.26	6.45	8.41	7.94	8.83	6.54	7.43	7.07	8.90
Kurtosis	-0.51	-0.62	-0.76	-0.96	-0.21	-0.62	-0.55	-0.84	-0.69	-0.73	-0.60	-0.82	-0.55	-0.18	-0.76	-0.70
Skewness	1.00	1.02	0.93	0.87	1.12	0.96	0.97	0.90	0.93	0.96	1.00	0.92	1.00	1.05	0.91	1.00
Range	8.22	8.12	7.23	8.36	8.15	8.51	7.74	8.41	7.20	8.07	8.01	8.43	7.60	8.53	7.65	8.34
Minimum	-9.60	-8.62	-7.95	-8.69	-9.29	-8.91	-8.64	-8.73	-7.91	-8.38	-8.76	-8.78	-8.07	-9.48	-8.45	-8.67
Maximum	-1.37	-0.51	-0.72	-0.33	-1.13	-0.40	-0.89	-0.32	-0.71	-0.31	-0.75	-0.35	-0.48	-0.95	-0.80	-0.33

Appendix III: Estimates of the Informal ECE Sector in Connecticut

Informal ECE in Connecticut

One of the principal unknowns in trying to characterize the ECE industry in a region is the amount of informal ECE. Informal ECE is most easily defined by what it is not. It is not parental care or care provided in licensed or exempt centers. In Connecticut, all ECE providers that are not immediate family and that care for one or more children on a regular basis must be licensed (Morgan, et al., 2001). Public venues like schools, churches, and the like can provide ECE and be exempt from licensing regulations if approved by the Connecticut Department of Public Health. Informal ECE, then, includes care by friends, family, neighbors (FFN), as well as nannies and babysitters that is not subject to either of these regulatory standards. To the extent that informal care providers accept subsidies, they are known to the Department of Social Services, but not to the public.

The Size of the Informal ECE Sector

The Census Bureau collects some national ECE information on children aged 0-14 in the Survey of Income and Program Participation Survey [SIPP] (see Table III.A). This data, however, does not provide distinct categories for informal or formal care. Rather, the SIPP defines two major categories of ECE: relative care, and non-relative care. The informal sector includes portions of both of these. Care by non-relatives is more often informal rather than formal but not always. The SIPP reports that 45.1% of U.S. children, aged 0 to 14, receive at least some care by relatives. Grandparents provide care to 21.6% of children making them the largest single group of relative care providers.

The second category, non-relative care includes care in organized facilities and other non-relative care. Care in organized facilities includes formal care only and 29.9% of U.S. children receive this type of care. Other types of non-relative care include both formal and informal care. Care in the child's home (9.1% of U.S. children) is likely informal while care in the provider's home (21%) may be formal or informal. Informal ECE, then, is all non-relative care provided in the child's home, and some portion of relative care and non-relative care in the provider's home. Consequently, based on these national statistics, it is difficult to determine how large the informal ECE sector is nationally or in Connecticut.

Table III.A: U.S. ECE Arrangements

Arrangement Type[1]	Total No.[2]	Percent	Average Hours In Type of Care Children <5	Average Hours in Type of Care Children 5-14
Children 0-14	57509	NA	27.9	43
Relative Care	25926	45.1%	23.4	15.7
Designated Parent	2286	4.0%	18.9	14.6
Other Parent	9622	16.7%	17.3	13.1
Sibling	3855	6.7%	10.5	9.1
Grandparent	12415	21.6%	18.25	11.7
Other Relative	7150	12.4%	13.7	10.7
Nonrelative Care	15756	27.4%	39	15.1
Organized Facility	7102	12.3%	32.6	22.7
Other Nonrelative Care	10957	19.1%	27.1	12.3
In child's home	3624	6.3%	18.4	10.9
In provider's home	7730	13.4%	25.2	10.8

Source: U.S. Census Bureau, Survey of Income and Program Participation, 1993 Panel Wave 9.
[1]Children may participate in more than one type of ECE arrangement.
[2]Total number of children in survey.

The Quality of Informal ECE

Another concern not addressed by these national numbers is the extent to which informal ECE is quality ECE or babysitting. ECE involves activities designed to enhance social skills and cognitive development, while babysitting is primarily adult supervision. Child development studies suggest that spending as little as 10 hours a week in ECE can affect social and cognitive development either positively or negatively depending on the quality of care. Specifically, long-term studies have shown that high quality ECE can lead to reduced crime, lower welfare roles, and reduced special education expenditures in the future. The 25-year Perry Preschool study estimated that for every dollar spent on high quality ECE, the public saved more than $7 in future expenditures (cited in Windham ECE Association and the Peace and Justice Center, 2002). As a result, informal care has received additional scrutiny because informal ECE givers are perceived to lack sufficient training to provide an appropriate high quality care environment.

Brandon, et al. (2002) addressed the question of whether informal ECE is 'babysitting' or quality ECE in a comprehensive survey of informal ECE providers and parents in the state of Washington. Providers looking after children ages 0-5 were asked whether they engaged in a variety of developmental activities. The number of providers engaging in each activity ranged from a high of 94% working on language development to a low of 51% engaging in block

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building activity. Researchers concluded that, while some child development activities were common, more complex educational opportunities were less common.

Child Development Activities	Informal Providers Performing these Activities
Working on language development	94%
Helping child take care of toys or materials	83%
Reading to child	83%
Helping child get along with others	83%
Playing outdoors	82%
Helping child to join in activities with others	81%
Performing art and music activities	80%
Watching TV or videos	80%
Washing hands, brushing teeth, or combing hair	79%
Climbing, running, jumping, or hopping	72%
Building things with blocks	51%

Source: Brandon, Richard, et al, 2002, p. 93.

Bromer and Henly (2002) suggest that the deeper attachment between the provider and the children in the informal sector offsets this educational gap. Formal ECE facilities have a high rate of employee turnover resulting in inconsistent relationships with caregivers. Informal caregivers are likely to remain important figures in children's lives for many years. In addition, informal care has a low child-to-adult ratio that changes the nature of the connection (Brandon, et al., 2002). These features, not only provide stability for the child, but also result in greater investment by caregivers in their responsibilities (Bromer and Henly, 2002).

Who Uses Informal ECE?

Informal ECE is chosen more frequently by some demographic groups than by others. In some cases, parents opt for informal caregivers because they believe this care is better for their children. In other cases, families are constrained by the high cost or lack of available formal care. Most of the information available on these issues comes from surveys performed in other states.

Researchers in the State of Washington confirmed that lower income and less-educated families were more likely to select informal care rather than formal care (Brandon, et al., 2002). They found that single parents were more likely to use more of all types of care including informal care. Informal care was popular among employed and unemployed mothers. They

found that 48% of employed mothers used some informal care and 40% of non-employed mothers used some informal care (Brandon, et al., 2002). Employed mothers, however, were more likely to use informal care for longer periods of time (Brandon, et al., 2002). This result suggests that unemployed mothers are more likely to use informal care for babysitting rather than ECE purposes.

Parents prefer informal care for children between the ages of 0 and 2; and day care centers for children from 3-4 (Brandon, et al., 2002) reflecting the different developmental needs of children in these age groups. Infants and toddlers may do better in a home environment, while children ages 3-4 engage in school readiness programs (Capizzano, et al., 2000).

Some important features of informal care that appeal to parents include flexible hours, flexible payment arrangements, lower cost, close proximity to home or work, and cultural similitude (Bromer and Henly, 2002, and Jacobson, 2000). Some parents also cite the lack of availability of slots in licensed ECE centers and their high cost as being an important reason they opt for informal care (Jacobson, 2000). In a survey of Massachusetts parents, Albeda and Consenza (1999) report that 27% of parents either lost or quit jobs because of difficulties finding adequate ECE.

Informal ECE can be either a default option or a preferred option depending the circumstances. The results discussed above have been confirmed in a number of studies and represent hypotheses that could be explored in future surveys in Connecticut. These results suggest that the informal ECE sector is unlikely to be fully replaced by the formal sector in the near future.

Estimating Informal ECE in Connecticut

Connecticut has 567,688 children younger than 12 (Census, 2000). Many of these children receive some kind of ECE aside from parental care. Data is limited on the nature of this care. The Infoline survey periodically tracks the number of licensed and exempt ECE slots in Connecticut. CCEA estimates that Connecticut had 210,747 spaces in licensed and exempt facilities (in 5,510 venues). This number does not include informal ECE programs. In this section, we examine the available information on informal ECE and studies from other states to estimate the size of the informal ECE sector in Connecticut.

Officially, the state collects information on informal ECE providers that participate in state subsidy programs and are not licensed providers. These caregivers include relatives, friends and neighbors (FFN) who receive Care4Kids vouchers as (supplemental) payment for their services, but are not licensed or exempt providers in the state. Connecticut has 7,400 such informal ECE providers (NACCRRA, 2003). Based on studies in other states, we can impute that these 7,400 providers represent ECE for as many as 9,620 children.[42]

Other studies have suggested that as many as 78% of providers are unpaid and that many more do not participate in subsidy programs. For these reasons, 9,620 is a significant underestimate informal care provided in Connecticut.

Because there is little in the way of formal reporting in this sector, directly surveying providers and parents is the best way to estimate the size of this sector. While such a survey has not been conducted in Connecticut, we can use the results of other state analyses to impute the size of Connecticut's informal ECE sector.

There are 321,799 households in Connecticut with children younger than 12. In approximately 258,382 of these households, there is no parent who stays home to look after the children. That is, in male- and female-headed family households, the parent present is in the labor force; and in two parent families, both parents are in the labor force. We estimate (see methodology sidebar) there are 381,127 children younger than 12 in this type of household. Further, we assume that if the parents are working, these children must use some form of ECE.[43] This represents the potential demand for ECE in Connecticut. Of these, roughly 233,156

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[42] Brandon, et al. (2002) estimate a child-to-adult ratio of 1.3 to 1 for FFN care in Washington state. This estimate is the total number of providers x 1.3 children per provider.

[43] This may overestimate the total number of children in need of ECE as parents may trade-off working hours with each other to cover ECE or the children may provide self-care.

children younger than 12 receive informal care, exempt care or self-care.

Estimates from other states suggest that the informal care sector provides from 35% in Vermont (Windham ECE Association and the Peace and Justice Center, 2002) to as much as 57.6% of ECE for 5-12 year olds in Massachusetts (Albeda and Cosenza, 1999).[44] Brandon, et al., (2002) provide a moderate estimate for Washington that suggests 45% of all children in ECE receive informal care. The estimate from Washington is perhaps the most reliable as it is based on a comprehensive survey of informal care.[45] These estimates can be applied to Connecticut to the extent that ECE choices are not significantly different in our state relative to these others (see methodology sidebar for details). This translates into a range of 133,405 to 193,613 children younger than 12 receiving at least some informal care. The moderate estimate is 171,507 children notwithstanding our estimate of 258,000 children in informal arrangements determined in the sidebar below. Assuming parents pay $10 per week per child implies that $89,183,640 per year in revenue flows to the informal sector. We believe these estimates to be extremely conservative. Assuming a one to six adult/child ratio implies that the informal sector employs 28,585 people. Clearly, the level of economic activity generated by the informal sector is significant. Studies suggest that its magnitude may be as large as the formal ECE sector. As such, its contribution to the economy may be as much again, particularly as it may increase labor supply. We do not know to what extent informal child provides comparable quality of care as the formal sector, nor is it clear that one form of ECE is always preferable to the other. This information is key to formulating future policies. The informal ECE sector makes an important contribution to the health of our economy as well as filling the gaps in the formal system.

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[44] Albeda and Cosenza (1999) estimate 44% of children aged 0-4 receive informal care. We take the average of these two, 50.8% to estimate the number of Connecticut children under 12 who receive informal care.
[45] The Vermont study bases its estimate on anecdotal evidence and imputed ratios (Windham ECE Association and the Peace and Justice Center, 2002), while the Massachusetts study is based on a smaller sample that over samples lower income houses without adjusting for this population difference (Albeda and Cosenza, 1999).

Methodology to Estimate Potential Demand for Informal ECE in Connecticut

- Number of children in Connecticut aged 0 – 132 months: 567,688 (Census 2000).
- Number of households in Connecticut: 1,301,670 (Census, 2000).
- National percentage of households with children under 12 is 24.722% (CPS 2000).
- The number of households with children under 12 in Connecticut is 1,301,670 x 24.722% = 321,799. *(compare to 451,411 households with children under 18)*
- As there are 567,688 children under 12 in Connecticut, the average number of children under 12 per household with children under the age of 12 is 567,688 / 321,799 = 1.76.
- The total number of families with children under 6 in Connecticut is 258,382 including single-parent male-headed families, single-parent female-headed families and two parent families.
- The total number of families in which all parents work is 159,876 for households with children under 6.
- The percent of households in which no parent stays home to look after the children in families with children under 6 is 159,876 / 258,382 x 100% = 61.879%. This is the *full household labor force participation rate* for households with children under 6. *(Compare to the total labor participation rate in Connecticut which is 66.558%).*
- The number of households with children under 12 in which no parent remains at home with the children is 321,799 x 0.61879 = 199,126 assuming the same rate of labor force participation.
- The number of children under 12 for whom no parent is available to provide ECE is 1.914 x 199,126 = 381,127 children.
- The total number of licensed & exempt intended enrollment in Connecticut is 123,034 (CCEA/Infoline, 2003). We estimate 381,127 – 123,034 = 258,093 children under 12 receive ECE through informal care, exempt providers or self-care.

Appendix IV: Connecticut Child Population by Town (2000)

	< 5 years	5 to 9 yrs	10 to 14 yrs
Connecticut	223,344	244,144	241,587
Andover town, Tolland County	231	242	227
Ansonia town, New Haven County	1,281	1,298	1,215
Ashford town, Windham County	250	292	328
Avon town, Hartford County	1,018	1,295	1,184
Barkhamsted town, Litchfield County	190	263	258
Beacon Falls town, New Haven County	343	356	390
Berlin town, Hartford County	1,022	1,267	1,402
Bethany town, New Haven County	323	409	417
Bethel town, Fairfield County	1,254	1,416	1,418
Bethlehem town, Litchfield County	171	253	267
Bloomfield town, Hartford County	1,012	1,151	1,326
Bolton town, Tolland County	306	354	446
Bozrah town, New London County	128	160	168
Branford town, New Haven County	1,561	1,647	1,764
Bridgeport town, Fairfield County	11,397	11,489	10,696
Bridgewater town, Litchfield County	76	106	140
Bristol town, Hartford County	3,761	3,931	3,988
Brookfield town, Fairfield County	1,023	1,335	1,271
Brooklyn town, Windham County	375	490	530
Burlington town, Hartford County	605	669	677
Canaan town, Litchfield County	58	62	70
Canterbury town, Windham County	250	314	392
Canton town, Hartford County	576	670	644
Chaplin town, Windham County	151	161	159
Cheshire town, New Haven County	1,648	2,028	2,137
Chester town, Middlesex County	237	220	241
Clinton town, Middlesex County	847	959	928
Colchester town, New London County	1,242	1,317	1,190
Colebrook town, Litchfield County	91	104	120
Columbia town, Tolland County	327	398	385
Cornwall town, Litchfield County	69	102	123
Coventry town, Tolland County	823	840	946
Cromwell town, Middlesex County	697	739	840
Danbury town, Fairfield County	4,900	4,540	4,281
Darien town, Fairfield County	2,028	2,059	1,578
Deep River town, Middlesex County	242	330	333
Derby town, New Haven County	758	795	727
Durham town, Middlesex County	454	548	591
East Granby town, Hartford County	325	349	383
East Haddam town, Middlesex County	580	613	588
East Hampton town, Middlesex County	701	824	812
East Hartford town, Hartford County	3,223	3,460	3,367
East Haven town, New Haven County	1,639	1,722	1,910

East Lyme town, New London County	887	1,137	1,270
East Windsor town, Hartford County	559	591	689
Eastford town, Windham County	96	131	118
Easton town, Fairfield County	560	630	609
Ellington town, Tolland County	827	932	977
Enfield town, Hartford County	2,529	2,927	3,071
Essex town, Middlesex County	423	414	374
Fairfield town, Fairfield County	4,101	3,979	3,676
Farmington town, Hartford County	1,348	1,661	1,796
Franklin town, New London County	99	119	132
Glastonbury town, Hartford County	2,248	2,603	2,393
Goshen town, Litchfield County	140	164	192
Granby town, Hartford County,	718	854	797
Greenwich town, Fairfield County,	4,294	4,956	4,278
Griswold town, New London County,	625	814	845
Groton town, New London County,	3,220	2,959	2,497
Guilford town, New Haven County,	1,287	1,514	1,628
Haddam town, Middlesex County,	412	529	511
Hamden town, New Haven County,	3,038	3,396	3,428
Hampton town, Windham County,	104	129	143
Hartford town, Hartford County,	10,116	10,746	9,959
Hartland town, Hartford County,	110	150	181
Harwinton town, Litchfield County,	303	360	427
Hebron town, Tolland County,	782	693	746
Kent town, Litchfield County,	180	203	186
Killingly town, Windham County,	1,016	1,186	1,315
Killingworth town, Middlesex County,	454	507	437
Lebanon town, New London County,	447	527	560
Ledyard town, New London County,	916	1,182	1,292
Lisbon town, New London County,	253	300	315
Litchfield town, Litchfield County,	414	619	662
Lyme town, New London County,	106	101	133
Madison town, New Haven County,	1,193	1,569	1,473
Manchester town, Hartford County,	3,452	3,492	3,542
Mansfield town, Tolland County,	600	786	858
Marlborough town, Hartford County,	380	455	480
Meriden town, New Haven County,	4,143	4,338	4,182
Middlebury town, New Haven County,	347	452	490
Middlefield town, Middlesex County,	236	307	344
Middletown town, Middlesex County,	2,811	2,647	2,450
Milford town, New Haven County,	3,130	3,210	3,422
Monroe town, Fairfield County,	1,440	1,677	1,652
Montville town, New London County,	1,016	1,261	1,334
Morris town, Litchfield County,	129	148	184
Naugatuck town, New Haven County,	2,144	2,323	2,465
New Britain town, Hartford County,	4,754	5,051	4,816
New Canaan town, Fairfield County,	1,552	1,959	1,689
New Fairfield town, Fairfield County,	1,088	1,245	1,213
New Hartford town, Litchfield County,	409	489	515
New Haven town, New Haven County,	8,749	9,051	8,792
New London town, New London County,	1,709	1,682	1,624

New Milford town, Litchfield County,	1,932	2,194	2,204
Newington town, Hartford County,	1,530	1,760	1,790
Newtown town, Fairfield County,	2,022	2,151	2,104
Norfolk town, Litchfield County,	105	120	113
North Branford town, New Haven County,	904	1,044	1,037
North Canaan town, Litchfield County,	169	221	232
North Haven town, New Haven County,	1,261	1,459	1,589
North Stonington town, New London County,	287	330	376
Norwalk town, Fairfield County,	5,689	5,373	4,724
Norwich town, New London County	2,317	2,461	2,497
Old Lyme town, New London County	424	544	547
Old Saybrook town, Middlesex County	589	690	624
Orange town, New Haven County	728	944	1,026
Oxford town, New Haven County	650	762	807
Plainfield town, Windham County	951	1,151	1,142
Plainville town, Hartford County	852	1,077	1,138
Plymouth town, Litchfield County	710	820	954
Pomfret town, Windham County	224	289	324
Portland town, Middlesex County	608	700	588
Preston town, New London County	213	292	328
Prospect town, New Haven County	561	593	675
Putnam town, Windham County	527	554	642
Redding town, Fairfield County	582	702	763
Ridgefield town, Fairfield County	1,913	2,260	2,074
Rocky Hill town, Hartford County	917	971	1,085
Roxbury town, Litchfield County	107	119	171
Salem town, New London County	256	357	355
Salisbury town, Litchfield County	145	239	340
Scotland town, Windham County	113	111	149
Seymour town, New Haven County	902	1,054	1,089
Sharon town, Litchfield County	117	183	208
Shelton town, Fairfield County	2,347	2,509	2,657
Sherman town, Fairfield County	247	305	309
Simsbury town, Hartford County	1,666	2,027	2,069
Somers town, Tolland County	448	613	714
South Windsor town, Hartford County	1,540	2,022	2,034
Southbury town, New Haven County	980	1,255	1,351
Southington town, Hartford County	2,399	2,599	2,855
Sprague town, New London County	147	256	245
Stafford town, Tolland County	721	792	850
Stamford town, Fairfield County	8,108	7,452	6,704
Sterling town, Windham County	224	265	252
Stonington town, New London County	993	1,100	1,151
Stratford town, Fairfield County	2,983	3,321	3,410
Suffield town, Hartford County	712	860	916
Thomaston town, Litchfield County	435	575	571
Thompson town, Windham County	513	620	674
Tolland town, Tolland County	992	1,059	1,097
Torrington town, Litchfield County	2,107	2,280	2,381
Trumbull town, Fairfield County	2,366	2,601	2,606
Union town, Tolland County	48	41	37

Vernon town, Tolland County	1,713	1,776	1,744	
Voluntown town, New London County	156	212	189	
Wallingford town, New Haven County	2,612	2,998	3,012	
Warren town, Litchfield County	69	89	78	
Washington town, Litchfield County	152	246	317	
Waterbury town, New Haven County	8,176	8,415	7,681	
Waterford town, New London County	938	1,221	1,291	
Watertown town, Litchfield County	1,257	1,542	1,644	
West Hartford town, Hartford County	3,621	3,942	4,070	
West Haven town, New Haven County	3,270	3,425	3,502	
Westbrook town, Middlesex County	341	394	413	
Weston town, Fairfield County	801	1,128	963	
Westport town, Fairfield County	1,920	2,372	1,954	
Wethersfield town, Hartford County	1,388	1,512	1,553	
Willington town, Tolland County	285	315	404	
Wilton town, Fairfield County	1,390	1,748	1,653	
Winchester town, Litchfield County	610	688	763	
Windham town, Windham County	1,474	1,505	1,433	
Windsor Locks town, Hartford County	710	802	863	
Windsor town, Hartford County	1,692	1,925	2,095	
Wolcott town, New Haven County	958	1,164	1,233	
Woodbridge town, New Haven County	508	732	828	
Woodbury town, Litchfield County	539	653	696	
Woodstock town, Windham County	396	531	611	
Totals	223,344	244,144	241,587	709,075

Appendix V: ECE Labor Force Occupational Profile

Table V.1: Connecticut's ECE Worker Profile

Occupational Title	Employment	Mid-Wage	Average Hourly	Annual	Entry Level	Wage Range	
General and Operations Managers	N/A	26.23	28.99	60,303	18.55	16.17	51.70
Administrative Services Managers	20	14.00	14.57	30,307	10.07	9.61	21.14
Education Administrators, Preschool and ECE Center/Program	390	16.45	18.29	38,034	12.00	11.74	27.91
Medical and Health Services Managers	10	27.58	27.71	57,637	22.45	20.53	36.15
Social and Community Service Managers	20	22.87	26.77	55,677	19.78	18.78	46.49
Mental Health Counselors		11.22	12.28	25,539	10.05	9.42	17.19
Child, Family, and School Social Workers	20	16.87	16.98	35,319	12.95	10.98	22.12
Social and Human Service Assistants	80	12.75	13.61	28,304	10.78	10.11	19.83
Preschool Teachers, Except Special Education	5470	9.71	10.31	21,452	7.76	7.38	14.35
Kindergarten Teachers, Except Special Education	110	N/A	N/A	35,147	N/A	N/A	N/A
Special Education Teachers, Preschool, Kindergarten, and Elementary School	N/A	N/A	N/A	55,409	N/A	N/A	N/A
Instructional Coordinators	10	18.15	18.74	38,979	14.73	13.68	24.78
Teacher Assistants	3000	N/A	N/A	21,335	N/A	N/A	N/A
Registered Nurses	60	26.89	27.65	57,513	15.89	8.79	48.96

Speech-Language Pathologists	10	46.19	46.42	96,564	42.27	39.60	57.68
Cooks, Institution and Cafeteria	80	10.40	10.65	22,149	9.17	8.48	13.39
Food Preparation Workers	20	9.51	9.13	18,989	6.84	6.71	11.17
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	50	10.75	10.76	22,385	8.20	7.12	14.22
First-Line Supervisors/Managers of Personal Service Workers	N/A	15.03	15.17	31,557	12.31	11.79	19.90
ECE Workers	1440	8.25	8.59	17,861	7.19	6.76	10.99
Recreation Workers	N/A	8.72	10.70	22,245	8.02	7.44	17.10
First-Line Supervisors/Managers of Office and Administrative Support Workers	20	14.48	16.18	33,651	12.08	11.31	25.40
Bookkeeping, Accounting, and Auditing Clerks	40	12.81	14.09	29,302	10.28	9.76	21.69
Executive Secretaries and Administrative Assistants	30	13.58	14.90	31,003	12.90	11.98	17.76
Secretaries, Except Legal, Medical, and Executive	40	12.44	12.29	25,561	10.49	9.85	14.48
Office Clerks, General	50	8.79	8.91	18,521	7.69	7.16	10.98
Bus Drivers, School	30	9.88	9.84	20,471	8.38	7.94	11.69

N/A – data suppressed to maintain confidentiality

Source: Connecticut Department of Labor

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