



The Partnership for America's
Economic Success



The Economic Value of The U.S. Early Childhood Sector

By:

Elaine Weiss, Manager, The Pew Center on the States and
Richard Brandon, Director, Human Services Policy Center, and Senior Research Fellow, Evans
School of Public Policy, University of Washington, Seattle

July 2010



Partnership for America's Economic Success



The Partnership for America's Economic Success is a coalition of economists, policy experts and advocates mobilizing business leaders to improve tomorrow's economy through smart policy investments in young children today. The Partnership is managed by The Pew Charitable Trusts, and has been funded in the past by the Buffett Early Childhood Fund, Robert Dugger, the George Gund Foundation, the Horace Hagedorn Foundation, Paul Tudor Jones, the Ohio Children's Foundation, the Peppercorn Foundation, PNC Financial Services Group, Scholastic, Inc., the Schott Foundation for Public Education, The John D. and

Catherine T. MacArthur Foundation, and
The Pew Charitable Trusts.

For more information:
Sara Watson, Director:
info@partnershipforsuccess.org
Partnership for America's Economic
Success
901 E Street NW, 10th Floor
Washington, DC 20004
(202) 552-2000

Authors

Introduction and Conclusion

Elaine Weiss, Manager, Pew Center on the States
Richard Brandon, Director, Human Services Policy Center and Senior Research Fellow, Evans School of Public Affairs

Chapter 1

Richard N. Brandon, T.J. Stutman, Michelle Maroto. Human Services Policy Center, University of Washington

Chapters 2 and 3

Elaine Weiss, Pew Center on the States

Appendix 1

Richard N. Brandon, T.J. Stutman, Michelle Maroto. Human Services Policy Center, University of Washington

Published July, 2010

Acknowledgements

The authors gratefully acknowledge the tremendous contributions of Marci Whitebook of the UC Berkeley Institute for Research on Labor and Employment, T.J. Stutman of the Human Services Policy Center, and Stephen Rhody of ASR Analytics. They also appreciate valuable work conducted by several research assistants: Michelle Maroto (ECE), Brandon Brockmyer (Health Care), and Trevor Higgins (Family Expenditures).

The paper has been strengthened by the comments and suggestions of several peer reviewers: Timothy Bartik of the W.E. Upjohn Institute; Janet Currie of Columbia University; Dick Wertheimer of Child Trends; and Steven Rhody of ASR Analytics. Any omissions or misstatements are solely the responsibility of the authors.

Contents

Introduction	5
Chapter One	19
Approach to Measuring Economic Value of ECE	21
Estimated Economic Value of ECE	28
Summary of Findings	40
Appendix 1.A	41
Chapter Two	42
Estimated Economic Value of Early Childhood Health Care	49
Conclusion	55
References	56
Chapter Three	59
Analysis/Discussion	67
References	70
Conclusion	71
Appendix One	79
Estimating Hours of ECE Utilization	81
Specifying Types of Care	82

Calculation Methods	83
Description of Methodology: Estimation of Foregone Wages	96
Data Set: ATUS Multi-Year	97
Descriptive Analysis of ATUS Data	107
Wage Estimates and Regression Analysis	117
Description of Methodology: Estimation of Economic Value	134
Price-based Estimation of Economic Value of ECE	135
Wage-based Estimate of Economic Value of ECE	138
Sensitivity Analysis	142
References	145
Appendix Two	147
References	155
Appendix Three	156
References	162
Endnotes	163

Introduction

Why an Early Childhood Sector Analysis

The societal benefits of certain investments in young children – programs to support their early care and education, support for parents to help them effectively nurture children, and health care, among others – are increasingly clear. The foundations laid in the first five years of a child’s life can have lasting impacts, setting children on track for later success as students, citizens, parents and contributors to the economy. Conversely, traumas, illnesses and deprivations experienced during these years can also cause long-term damage, derailing children and planting the seeds for later problems with personal and societal costs.

Much less clear, however, is the direct cumulative impact that *all* expenditures on behalf of children have now on the nation’s economy. Most prior analyses of the economic benefits of children’s programs emphasize the “outcome” benefits of investments in them – better test scores and graduation rates, lower crime. These are critical to developing the nation’s future workforce development and to its long-term fiscal stability but take many years to attain. However, it is also the case that investments in raising young children, like those devoted to manufacturing televisions, building bridges, and supporting hospital construction, keep the economy running. Understanding the magnitude of these expenditures allows for a new kind of assessment of the economic impact of children’s programs and supports.

In addition, because young children’s programs are “siloes” among different agencies at both federal and state levels – with early care and education under a different set of laws and regulations from health care, and those two distinct from family supports that address issues of nutrition, housing, and other needs – the overall size of these programs’ contribution to the nation’s economy may not always be viewed in a holistic manner. Indeed, a common complaint of early childhood advocates is that making a case based on economic returns is difficult because each agency only sees one “piece” of the collective “pie.”

This combined lack of information – the immediate impact of early childhood programs on state and federal economies, as well as the scope of the “sector” devoted to raising children – may contribute to the neglect of effective early childhood programs in federal and state budgets. In good times, their needs are overshadowed by less effective economic policies, and in difficult economic times, their programs may be among the first to sit on the cutting block. Until decision makers have clear metrics – level of total investment, its capacity to meet basic needs, and its efficient allocation – they will be hard-pressed to make decisions that yield economically and socially optimal results.

Other economic sectors – manufacturing, construction, banking and finance – provide information about their contributions to GDP through sector analyses. Such estimates may be produced by the industry itself, and/or by interested government agencies, such as the Bureau of Economic Analysis.¹

No national analysis of the early childhood sector currently exists. The estimates presented here thus represent the first comprehensive calculation of dollar and share-of-GDP expenditures on behalf of children birth-to-5. This rigorous analysis of the early childhood economic sector (ECS) allows for a true understanding of both its absolute and its relative importance – its contribution can be compared to that of other sectors that have been deemed sufficiently large and/or important to receive regular and appropriate policy maker attention. Indeed, a major goal of this analysis is to enhance the understanding of child rearing by looking at its larger economic role.

Describing the contours, components, and limits of this sector illuminates not just its size, but its breadth, including not only early care and education workers, but doctors, nurses, and factory workers who manufacture baby formula, diapers, and swing sets.

Finally, the analysis is supplemented with information on latent demand for early childhood programs, as well as the available supply. This structure invites an assessment of unmet needs and inefficiencies in current societal early childhood investments, which can help guide future spending as states and the federal government face difficult budget decisions.

How This Sector Analysis is Structured

This study estimates the total economic resources devoted to nurturing young children. Quantifying the current level of investment allows policy makers and others who make decisions related to spending on behalf of families to address two essential questions:

- 1) Is our spending sufficient to meet the immediate needs of children?
- 2) Do the available data suggest that it is allocated in a cost-effective manner?

Many benefits of investments in young children can be readily measured and expressed in terms of economic value. Others, such as improved self-esteem, are more difficult to capture. Given the need for concrete data to respond to the above questions, this research uses input measures of immediate economic value – dollars spent on behalf of children – rather than often broader “outcome” measures. It employs the concepts of economic value used to measure national Gross Domestic Product. The term “Early Childhood Sector” includes three age groupings of children ages birth-to-5 comprising this share of the economy: infants, toddlers, and preschoolers.

It is helpful to see where this approach to estimating economic value fits within the four types of value often discussed for early childhood. The first two help provide a context for assessing the adequacy and efficiency of investment in the early childhood sector: how well do current investments meet society’s long-term needs? The latter two are employed in this economic analysis.

- ***Societal value:*** This set of outcome measures includes the broad range of benefits derived from children’s successful development. It includes both long- and short-term economic benefits of children’s health, cognitive and social development.

- **Cost-effectiveness:** This related concept refers to the specific amount of economic value returned for a given investment. It is a useful tool for comparing investments in early childhood to alternative uses of public and private resources.
- **Amount of investment (share of GDP):** This is the concept of economic value used in this report. It includes the total amount of direct expenditures on goods and services that nurture young children, both direct payments and in-kind services provided by relatives and public agencies. This is consistent with the methods used in calculating Gross Domestic Product. The official GDP only includes market transactions that involve wages and prices. However, economists agree that there is real economic value to many activities not counted in the GDP. This work therefore includes income foregone by parents and relatives who care for young children at home during hours they could be engaged in paid employment.
- **Human resource investment:** In addition to the dollar value of investment in young children, it is also important to consider the amount of adult time devoted to young children, including the paid workforce providing goods and services, parental time caring for children, and the time spent by family, friend or neighbor (FFN) caregivers and by volunteers. This type of investment is captured in the ECE chapter of the analysis.

Gross Domestic Product (GDP)

The Gross Domestic Product of a country is the sum total of all goods and services produced in a nation.

Total income and total products each equal GDP.

- Income includes individuals' income from wages, rents or interest and business income.
- Products include durable goods, non-durable goods and services.

U.S. GDP equaled \$14.1 trillion in 2007

Three Components of Spending on Young Children

Estimating the economic value of total US investment (including, where possible, the human resources expended) in raising children from birth to age 5 as a share of GDP requires capturing all aspects of child-rearing. The research therefore focuses on three types of investments: Early Care and Education (ECE); Health Care; and Family Expenditures for remaining goods and services. The share of the nation's economic resources devoted to these three components of the EC sector provides a clear measure of its commitment to meeting children's, and society's, needs.

As demonstrated by decades of robust research, effective investment in each of these three components has major positive impacts. Programs that support children's appropriate cognitive, behavioral, social, and physical and mental health development in the first years of life represent the building blocks upon which all later progress takes place. Early investments can also play a significant role in workforce development, as well as reducing the need for costly interventions later. These various kinds of stimulation and support that children receive work together and interact with one another. Quality pre-k, healthy adult-child interaction and parental nurturing function in tandem with good nutrition, safety, security and proper health care, to set children on a strong life course.

Analytic Methods and Data Sources¹

Estimating the total U.S. economic resources allocated to these three components of the early childhood sector in terms equivalent to the Gross Domestic Product represents a complex undertaking; it requires the use of multiple data sources and concepts and their careful and coherent arrangement. One specific challenge is consistency across the three components of the sector; given the impossibility of using a single data source to calculate investments across them, it was important to employ sources that provided comparable information. Survey data based on consumer (usually parental) reports of expenditures were available in most cases, enabling such consistency. The data, supplemented with non-survey information as needed, thus represent:

- *Early Care and Education*: the amount of time young children are cared for in each type of ECE and how much that time costs (the latter is not provided by parent reports);
- *Health Care*: the amount of funds spent to improve and maintain young children’s health, their type of health insurance and health status; and
- *Family Expenditures*: the amount of family investments for all other goods and services on behalf of young children.²

Estimating the value of early care and education (ECE) required several separate pieces of information: estimates of the number of adults caring for young children, of the prices and wages of paid caregivers, and of the total amount of wages foregone by parents and relatives caring for young children.³ It was also necessary to account for public ECE programs provided outside the market structure in which fees are paid for a service. Calculating health care investments involved adjusting parent reports of health care expenditures to account for health care costs not covered in personal expenditure and insurance coverage reports. For family expenditures, statistical methodologies were applied to estimate the differential amount of expenditures related to the presence of young children in a family.⁴ In particular, an established U.S. Department of Agriculture (USDA) methodology was employed that uses different adjustments to allocate family spending in various categories – housing, transportation, clothing, and food – to young children in particular.

The complexity of this research also presented challenges, of course, with respect to both data and methodology. Regarding the research on ECE expenditures, it was necessary to combine many different data sources reflecting prices, wages and program budgets. Estimates of how many hours children spend in each type of ECE were developed from a national household survey. Prices for market-based ECE were applied to those hours. Advanced statistical techniques were used to estimate the wages foregone by parents and FFN caregivers based on their education and other characteristics, as reported in a second federal survey. This survey also allowed estimation of the degree to which child care staff is underpaid compared to women with

¹ References to all data and methodology, as well as other relevant points, are fully cited in the chapters below.

² In some cases, supplemental data are needed to fill in “holes” in the information provided by parents, but the bulk of the investment figures come from those parent responses.

³ As noted above, even though these foregone wages are not direct expenditures, they have economic value, since they are a productive activity of adults who could be spending additional time in the paid labor force.

⁴ The various analytic methods and data sources are described in detail in a series of Methodological Appendices for each chapter, available online and as an attachment to this paper.

similar qualifications working in other occupations; since there is no standard accounting of public support for ECE, estimates of public appropriations and tax credits were compiled from several sources.

While the data on health care expenditures were fairly straightforward and allowed for clear allocation to ECS children versus others, they omitted entire categories of data that pertain to spending on young children. This made it necessary to employ an existing means of adjusting for those omissions in order to arrive at reasonable, but conservative, estimates. Family expenditures presented their own difficulties: first, regressions were employed to understand how spending patterns varied across families of different ages and among those with no children and with children of differing numbers and ages. To accurately estimate the ECS share of the majority of expenditures that cut across multiple members of the family, as set out above, methods developed by the USDA and well accepted by economists were used to apportion spending in those areas to B-5 children versus others. The chapters below and three appendices set out in detail the datasets and methodologies employed and the resolutions to the challenges noted here.

Major Findings: The Size and Scope of the Early Childhood Economic Sector

Total National Investment in Young Children

Total economic resources devoted to young children in the United States are estimated to be equivalent to 2.9 percent of GDP. This is larger than several other economically important sectors that have recently benefitted from substantial federal and state policy attention, including agriculture (which NAICS calculates at 1.2 percent of U.S. GDP), utilities (2.0 percent), and insurance (2.4 percent). Moreover, most of this sector is, by its nature, difficult to outsource – child care employees and health providers remain local, as do many of the retailers who support family consumption.

Early Care and Education

The first component of investment addressed in this analysis is the Early Care and Education (ECE) of young children on a regular basis. ECE services are provided in a variety of arrangements and settings, including: center-based ECE (this includes Head Start, Early Head Start, and state, community and private pre-k); family child care (in home other than child's, provided for a fee; usually licensed or registered); family, friend or neighbor care (in home of child, relative or neighbor; 80 percent unpaid; majority evening and weekends); and parental care (up to 40 hours/week when child is not in another form of ECE). ECE is financed primarily by direct parent payments, with significant assistance from income-related vouchers and public funding for Head Start and state pre-kindergarten. Some families also receive federal income tax offsets, through the child and dependent care tax credit (CCDTC) and the Dependent Care Assistance Program (DCAP).

Importance of ECE

The quality of interaction between adult caregivers and young children has been demonstrated to affect those children's social, emotional, cognitive and self-regulatory development. Simply put, children in high quality ECE get along better with other children, and with their teachers (a

critical “soft skill”), learn more in reading, math and other areas, and are better prepared to participate in a more structured environment when they reach school age. Substantial disparities in children’s learning appear as early as the first eighteen months of life and have been related to the quality of children’s caregiving. These early disparities grow into the elementary and secondary school “achievement gaps” that teachers, administrators, education experts, and state and federal policy makers have, for decades, spent huge sums to narrow, with little success.

The effects of quality early learning show up immediately and have been demonstrated to last into the adult years. At-risk children in higher quality ECE make better progress in school, have higher rates of high school and college graduation, and earn more as adults.

Economic Value

About \$157 billion a year - equivalent to 1.1 percent of GDP - is devoted to early care and education. Of that sum, \$61 billion is for non-parental ECE, and \$96 billion is the value of wages parents forego to care for their young children.

The economic value of paid center- and home-based ECE is equivalent to 8.4 percent of public investment in elementary and secondary (K-12) education; that value increases to 11 percent when paid care by family, friends, or neighbors is included. This supports a paid workforce of 2.2 million individuals. These employees represent 3.5 percent of the total U.S. female workforce (most ECE workers are female) and 30 percent of the total U.S. education workforce.

Roughly 17 percent of all investment in ECE is public in nature, including both expenditures and tax credits. At \$96 billion in economic value, foregone wages of parents staying home with young children alone (just one part of the 83 percent of all ECE spending that is private) are nearly four times as large an investment as total public spending in this area. In other words, while K-12 education is recognized as a fundamental part of the American social and economic fabric, requiring public support, this is not yet true of the first stage of the educational process.

As a point of reference, the birth-to-5 population is roughly half the size of the 6-to-18 population. Based on estimates finding that the average annual per-student cost of high-quality ECE is roughly equal to that of public K-12 education, the country would have to spend four times the amount currently devoted to ECE in order to invest in young children’s education as it does in that of older children.

Table I.1: Estimated Economic Value of ECE in the United States in \$2007 Billions

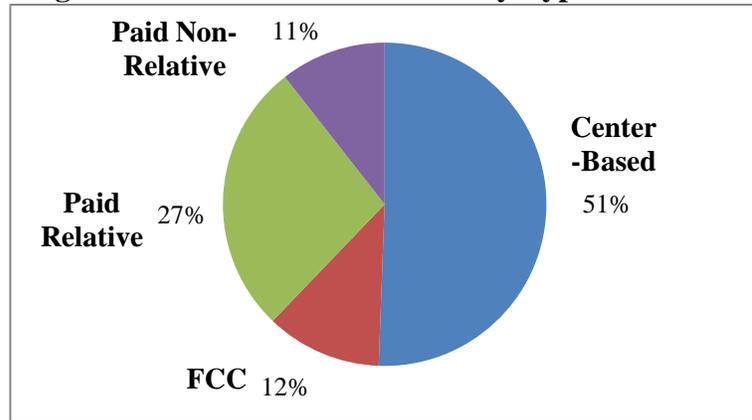
	Infants (0-18 mos.)	Toddlers (19-36 mos.)	Pre-Schoolers (3-5 yrs.)	Total Children Birth-5
Center-based ECE (Price-based Estimate)	\$4.8	\$7.9	\$13.6	\$26.3
Head Start, Early Head Start (Program-based Budget Amt)	-	-	\$7.6	\$7.6
Family Child Care (Price-based estimate)	\$2.7	\$3.2	\$2.9	\$8.8
Family, Friend or Neighbor Care (Wage-based Estimate)	\$4.3	\$4.3	\$6.1	\$14.7
Public Pre-Kindergarten (Program-based Budget Amount)	-	-	\$3.2	\$3.2
Military Child Care (Budget Amount)	-	-	\$0.6	\$0.6
Parent-Care Hours (Wage-based Estimate)	\$29.4	\$29.4	\$37.3	\$96.1
Total Value: Non-Parental Early Care and Education	\$11.7	\$15.5	\$33.9	\$61.1
Total Value: Including Parental ECE	\$41.1	\$44.9	\$71.2	\$157.2
Total ECE Economic Value as Percent of U.S. GDP	0.29%	0.32%	0.51%	1.12%

Just over one half of the paid ECE workforce is employed in center-based settings and one eighth in formal Family Child Care facilities that are operated as businesses. The remaining 38 percent are relatives or neighbors who are paid to care for young children on a regular basis.

Center-based ECE costs, by this analysis, an average of \$3 per hour for preschoolers, \$3.35 for toddlers, and \$3.90 for infants. Hourly prices for formal Family Child Care are quite a bit lower: roughly \$2.50, \$2.65, and \$2.85, respectively, for those age groups. Prices are relevant to two critical aspects of this study. First, they are applied to children's hours in market-based ECE to estimate its economic value. Second, from a policy perspective, it is important to understand prices to ascertain the impact of quality standards affecting cost on parents' ability to afford ECE. The prices reported here reflect current low wages and higher-than-desired child to adult ratios in most states, representing low standards of quality.

On average, paid child care staff have relatively low educational qualifications and low wages. However, taking their qualifications into account, child care workers still earn \$2.20 per hour — a substantial 31 percent -- less than other women with similar qualifications.

Figure I.1: Paid ECE Workforce by Type of ECE



In 2006, child care workers earned an average \$9.45 per hour, and preschool teachers averaged \$12.45. This compared to foregone wages of about \$16.50 for FFN and just under \$20 for parental caregivers. Some, but not all, of this large gap can be attributed to the average lower education levels of most child care workers noted above. If child care staff wages were commensurate to their qualifications, it would add 22 percent to costs, or about \$13 billion to the economic value of early care and education. If higher-quality ECE were to be promoted by setting higher standards of qualification and performance for ECE staff, the increase in their earnings would be substantially greater. Since wages are the major driver of ECE prices, which are the measure of economic value for market-based ECE, this would add even more to the economic value of the ECE component of the sector.

Unmet needs

National investments in young children’s early care and education, while substantial in their contribution to the economy, appear to be insufficient to meet the needs of many children and their parents. Most of the early care and education (ECE) provided in the United States is of insufficient quality to fully stimulate early learning and to generate the outcomes and economic returns that could potentially be achieved with high-quality programs. Moreover, the most at-risk children, those from low-income and non-white families, have a much greater likelihood of spending their days in poor quality settings. High-quality programs, of course, require skilled staff and thus cost more than the current average; paying the salaries needed to recruit and retain high-quality early learning staff would require an additional investment equivalent to about 0.3 percent GDP.

It should also be noted that, while the birth-to-5 population is nearly half the size of the population age 6-18, and high-quality early learning opportunities cost roughly the same amount per child as K-12 education, total ECE expenditures are only about 11 percent as large as those for public K-12 schools.

Health Care

The second component of ECS investment is health care – services and the goods that accompany them – for young children. As with ECE, it is provided in a variety of settings – pediatric and dental offices, community clinics, hospitals, homes, and special facilities. It is also

financed in a variety of ways – private insurance, public insurance based on low-income status (Medicaid, SCHIP), TRICARE for children of military personnel, and out-of-pocket payments by families.

In addition to direct doctor-patient and hospital-based health care services, young children receive health care services within the public health and social services realms. As set out in Chapter 3, these are substantially harder to calculate than direct medical services, for a number of reasons. These less direct health-related goods and services are therefore omitted from the estimate, which contributes to its conservative nature. (A table of relevant services is included in the Methodology Appendix to the chapter.) The exception is the federal Women, Infants, and Children (WIC) program, which can be attributed entirely to the B-5 population and thus have data that are viable to include.

Importance of Early Childhood Health Care

The amount and quality of health care provided to young children, as well as the timing of that care, have both immediate and lasting effects on their health, with impacts potentially through the school years and affecting their adult health. Well-child checkups, immunizations, screenings, preventive dental care, strong nutrition, and timely treatment of both mild and acute childhood diseases yield better health at every stage of life. Moreover, with respect to several of the most common early childhood health problems – poor birth outcomes, developmental delays, asthma, and injuries – effective preventive measures can greatly reduce rates among higher-risk populations and avoid the later costs of hospital visits and other remedial care.

Averting or managing poor early childhood health provides savings that go far beyond hospitals. Many childhood health conditions form the basis for adult health problems that affect not only medical expenses but educational attainment, employment and earnings, and overall quality of life.

Economic Value

About \$54 billion – equivalent to 0.4 percent of GDP - is devoted to expenditures on health care for young children in the U.S. As set out above, this total is comprised of care provided in a variety of settings by many different kinds of medical and social services practitioners. Table 1.2 provides calculations of the total dollar and GDP-equivalent value of that care, as well as a breakdown of goods and services provided in different contexts.

Table I.2: Estimated Economic Value of Early Childhood Health Care in the United States, \$2007 Billions

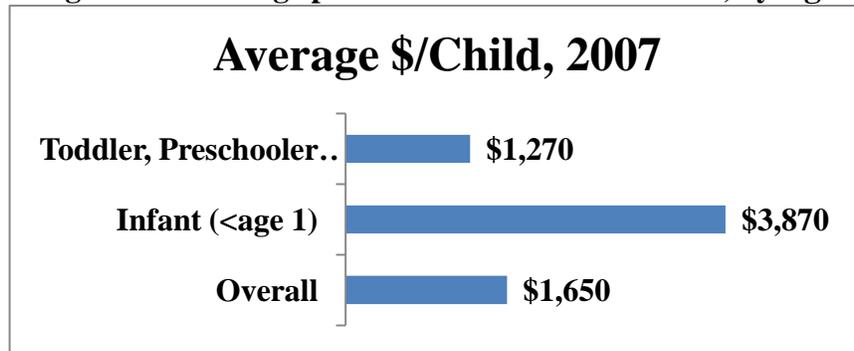
	<i>Total Health Care Expenditures (in billions)</i>	<i>Total Health Care Expenditures as a Percentage of GDP</i>
<i>Total/All</i>	\$54.4	0.385%
<i>Source of Care</i>	<i>Estimated breakdown</i>	<i>As % of total</i>
<i>In-patient</i>	\$22.6	46%
<i>Doctors' visits</i>	\$13	26%
<i>Out-patient</i>	\$3.9	8%
<i>Prescriptions</i>	\$3.1	6%
<i>Emergency room</i>	\$2.9	6%
<i>Home health</i>	\$1.8	4%
<i>Dental</i>	\$1.7	3%
<i>WIC</i>	\$5.4	10%

Although the data used in this analysis do not allow us to distinguish between remedial and preventative care, other research has shown the benefits of providing children with sufficient care at the right time. As shown above, nearly half of all health expenditures for young children are attributable to in-patient hospital visits. Some of these represent costs that could have been reduced through preventive measures. With respect to asthma, early diagnosis, appropriate medication, and monitoring can avert most hospital visits. Evidence-based nurse home visiting programs can substantially reduce the rate of accidental injuries among at-risk young children.

As expected, the cost of health care services is negatively associated with parents' reports of children in good health. While the data do not support an inference of causality, the pattern makes medical sense; children with health problems, whether asthma, obesity, injuries, or rare conditions such as cancers, require more intensive, and often more frequent health care, driving up costs. Among the sampled children, 45 percent were reported to be in "excellent" health and another 32 percent in "very good" health. Only tiny minorities were in "fair" and "poor" health, so while their average costs were high, their small numbers limited their overall contribution to ECS health expenditures.

With respect to relative expenditures by age of child, services for infants average almost \$3,900 a year, over three times the \$1,270 in services for toddlers and preschoolers. In all, infants constitute about one sixth of the birth-to-5 population but account for over a third of health costs. All births are costly – most occur in hospitals – and well-child care in the first year of life is more intensive than later. However, these age-based differences are attributable partly to high rates of preterm and low birthweight births in the United States. Each such birth raises the cost from roughly \$1,500 in immediate medical expenses to between \$9,000 and \$40,000.

Figure I.2: Average per-Child Cost of Health Care, by Age



Differences are also evident across insurance types. Children with private insurance receive on average 50 percent more per year in health care services (as measured by payments) -- \$1,500 – than their publicly-insured peers (\$1,000). More spending on doctors’ visits for the former group accounts for much of this difference, and a similar pattern is found for dental services. Expenditures on behalf of children of all ages who are uninsured are substantially lower than for their insured peers. Infants who lack insurance receive \$2,100 in annual care versus \$2,800 for privately-insured infants. Differences among children ages 1-5 are larger: \$443 in service value for uninsured children versus \$1,000 for those publicly-insured and nearly \$1,500 for their privately-insured peers.

Unmet needs

As is true with respect to ECE, many children receive excellent care, and public supports have filled much of the gap that exists in the private sector. Moreover, young children’s health care needs are, for the most part, quite modest relative to those of adults in general and retirees in particular. Still, this work presents evidence that some substantial unmet needs persist.

The data show that few uninsured children receive an amount of health care expenditures comparable to that of their privately- and publicly-insured peers. And this is not a small problem: a substantial share of children lack health insurance – 9.1 percent, on average, and 16.6 percent of low-income children. While health care reform will largely address this issue, public insurance may not close all the gaps. For example, while 58 percent of all American children see a dentist, only 36 percent of low-income children who are covered by Medicaid do so. These investment gaps contribute to higher costs later in life when these often preventable early childhood health problems go unaddressed and worsen.

Family Expenditures

The third component of investment in young children encompasses all of the products and services purchased by families on behalf of infants, toddlers, and preschoolers, as well as federal expenditures that support the B-5 population with respect to food, housing, and other basic necessities. The data employed include all expenditures (except those for ECE or health care) on behalf of children birth-to-age-5. These include not only child-specific items, such as diapers, formula, car seats, strollers, and swing sets, but all housing, transportation, food items, toys and recreational spending, etc.

Of course, those items that fall into the latter categories are not neatly divided among members of a household. For example, a car is used to take the entire family to the grocery store, or on vacation – so appropriate methods are employed with respect to each of these categories to derive the proportion that should be attributed to the household’s children under the age of 6. Assessing differential spending patterns among families with and without children birth to 5 provides initial information, and a USDA report provides an accepted means of calculating per-ECS-child figures for each spending category.

Importance of Family Expenditures

Families have the ultimate responsibility for meeting children’s needs, from the basics of food and shelter to such enriching activities as recreational sports, music and art lessons and family travel. Families are also responsible for much of the costs of early education and health care. Expenditures in this area thus overlap with those in the two other EC sector components. And like those components, spending on children’s basic daily needs has both immediate and long-term impacts that affect the child and his or her family, the community and larger society.

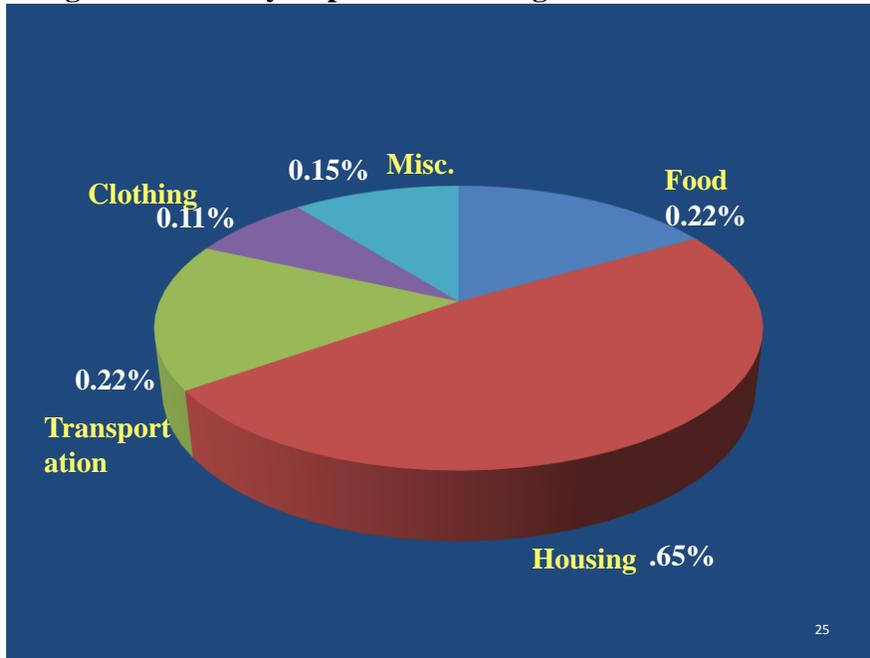
Studies have shown that poverty in the youngest years of life has the greatest negative impact on later child outcomes of health, education and social adjustment – and that the harm is greatest if poverty is both early and persistent. Insufficient family income and unemployment generate stresses in families that can cause psychological damage to children, with negative effects on their health, educational performance, and their tendency toward violent or risky behavior. Lacking sufficient food, or being unable to purchase food that gives children the nutrition that they need, stunts children’s healthy growth and development. Living in unhealthy or unstable housing can deter academic attainment, both immediately and long-term.

Economic Value

Family expenditures, exclusive of ECE and health care, amount to roughly \$191 billion – equivalent to 1.4 percent of 2007 GDP. Expenditures on behalf of young children are often conceived as consisting largely of child-specific items, but, as the above table shows, it is also consumption of the larger daily needs that pertain to the entire household that comprise the bulk of family spending. When spending is translated into equivalent dollars-per-child age B-5, the average household spends a total of \$7,800 total each year, broken down into: housing (\$3,800); food (\$1,300); transportation (\$1,300); miscellaneous items (\$850); and clothing (\$600).

The size of this contribution to the sector, the largest of the three, illustrates the importance of a full economic analysis that describes not just the sector’s overall size, but its scope. One useful way to view this total is to see it broken down into the contributions of the various categories of family spending to GDP, as presented in Figure 3.

Figure I.3. Family Expenditure Categories as Share of GDP



Families at different income levels, and single- versus-dual-parent households, appear quite similar with respect to the *percentage* of total expenditures devoted to each category of goods and services. This makes sense; except for very wealthy families, Americans tend to spend almost all of their net income on these basic expenses, and it is difficult to cut back much on some necessities. As demonstrated in Table 1.3, below, however, *absolute* spending – actual dollars spent – vary substantially, as would be expected given differences in available resources.

Table I.3: Average Expenditure per ECS Child, by Household Structure, \$2007 and Percentage of Total Spending⁵

Household structure	Avg. Income (% for ECS)	Housing	Food	Transportation	Total
Lower-income*					
2 parents/1 child	\$35,000 (9.9%)	\$3,465 (35%)	\$1,280 (13%)	\$1,268 (13%)	\$9,976
1 parent/2 children	\$24,000 (10.7%)	\$2,609 (37%)	\$1,176 (16%)	\$676 (10%)	\$7,156
Higher-income*					
2 parents/1 child	\$74,000 (6.2%)	\$4,545 (33%)	\$1,527 (11%)	\$1,811 (13%)	\$13,604
1 parent/2 children	\$99,000 (5.4%)	\$5,401 (36%)	\$1,762 (12%)	\$1,736 (12%)	\$15,099

Source: Authors' tabulation of GDP-Adjusted CEX, employing USDA methodology

* The USDA methodology divides households into income brackets that do not correspond to Federal Poverty Level

While it may be counter-intuitive that the percentage of total family expenditures devoted to each consumption category changes relatively little across different family structures, it is expected that lower-income households, especially those with just one parent, have much less money to invest in the care of their children. The recession means more children are now in this category.

⁵ It should be noted that 1 parent/2ITP children appear have higher overall expenditures because the small number of families in that sample made it necessary to condense data on higher- and very high-income families.

Unmet needs

In 2007, 41 percent of young children lived in families who lack sufficient resources to meet their basic needs without economic assistance, and nearly one in five lived in families at or below the federal poverty line. These numbers have since increased due to the current economic crisis and increasing unemployment rate, meaning that both “deep poverty” – living at or below 50 percent of the poverty level – and areas with pockets of higher unemployment and greater unmet needs are continuing to increase.

Indeed, recently-released 2008 figures on food insecurity and hunger find that nearly one quarter of U.S. children were food insecure that year, up substantially from 17 percent in 2007. Even more disturbing, 17 million children experienced not just food insecurity, but actual hunger, up 4 million from just one year before. The housing and foreclosure crises mean that children who are displaced, who move frequently, and who sleep in shelters are on the rise as well, as figures from cities across the country continue to demonstrate. The consequences of those early deprivations can have life-long economic ripple effects for children and for society as a whole.

Allocation of Societal Resources and Investment Efficiency

Investing in young children is one of many compelling societal needs competing for adequate resources. There is no definitive way to determine whether the estimated 2.9 percent of GDP currently devoted to raising young children from birth to age 5 is the “right” amount, too much or too little. However, our analysis of the three components of this sector strongly suggests that we are under-investing in young children across all of these areas, both relative to their share of the population and relative to their needs. In addition,, it is likely in some instances that specific under-investments represent missed opportunities to benefit society, either by reducing costs, increasing revenue or both.

Of the total U.S. population, 8.2 percent of citizens are below the age of 6. The 2.9 percent of our economic resources currently devoted to young children is thus just over a third of their share of the population. While it’s not possible to count every dollar spent on behalf of any group, these figures seem out of balance. If the needs of young children were less than the needs of others, or if they were clearly being met, this might not be a concern. However, compelling evidence across the ECS sector components finds that young children’s needs are, in fact, not being adequately addressed.

Organization of the Report

The next three chapters discuss in more detail the estimates of economic value for the three components of the ECS sector and how they were derived. They also present information about the elements and distribution of investment within each component. The concluding chapter discusses the public policy implications of these findings.

Chapter 1: The Economic Value of Early Care and Education for Young Children⁶

Background: What constitutes economic value for early care and education

The first circle of investment is the economic value of the time adults spend caring for and educating young children. We define early care and education (ECE) as time children age birth through five and not in kindergarten spend in the care of adults, either their parents or others. The core concept of this chapter is that an economic value can be assigned to every hour of ECE, though the economic value varies considerably by the ECE arrangement.

The care of children too young to care for themselves is a necessity for both society and the economy, since they will grow into the workers, consumers and investors of the future economy. The higher the quality of that early care and education, the greater the economic value, since higher quality ECE is associated with later success in school, workforce participation and earnings.ⁱⁱ

For parents to participate in the paid workforce, they must have a reliable source of care for their child. This may take the form of a paid child care facility, an arrangement with a family member or neighbor, parents arranging their work hours to share caregiving responsibilities, or one parent foregoing all or part of their potential earning to stay home and care for a child full or part time.

As noted in the Introduction, there are broader concepts of societal value to which high quality ECE contributes. However, the purpose of this paper is to focus on a somewhat narrower concept of economic value consistent with the calculation of Gross Domestic Product (GDP). Payments to child care facilities, either center-based or home-based, are normally counted in the GDP. Similarly, the costs of public programs like Head Start are counted in GDP, in the form of wages and benefits to program staff and purchases of goods and services ranging from the facility where the program is located to the food purchased for meals and snacks. Other arrangements – the value of time spent by parents, family or friends – have equivalent value but are not normally accounted for in GDP.

Early Care and Education Arrangements

Center-based : a non-residential setting, usually licensed, in which paid caregivers provide care for young children in full-day and/or part-day programs. Includes Head Start, public pre-Kindergarten.

Family Child Care (FCC): a residential setting in which a paid caregiver offers child care, typically in her/his own home; caregivers include the proprietor and often an assistant. The degree to which such arrangements are licensed varies by state.

Family, Friend or Neighbor Care (FFN): provided by a relative or neighbor in either the parent's home or the provider's home, either paid or not. Usually exempt from state licensing.

Auspices of Centers:

Private: for profit, not-for-profit. May be free-standing or part of a larger entity.

Public: operated directly or under contract to public agency. May be center-based or home-based -- Head Start, pre-k, military.

Subsidies for ECE in a private setting are treated as a source of funding, not a separate type of ECE arrangement.

⁶ Richard N. Brandon, T.J. Stutman, Michelle Maroto. Human Services Policy Center, University of Washington.

A major effort of this chapter, therefore, is to estimate the economic value of both categories. Since the intensity of labor that is required to care effectively for children of different age groups within the ITP population varies considerably, we have estimated economic value separately for infants, toddlers and preschoolers.

Approach to Measuring Economic Value of ECE: Combine Price and Wage Information

Our approach is to derive economic value from a combination of price and wage information, augmented by public program expenditures. Economic value is normally measured by the price paid for a good or service; the compensation paid for producing the good or service is usually reflected as a component of that price. For services that do not involve a market transaction of buying or selling – such as public education or military service – the compensation paid to employees and the associated non-personnel costs are counted as part of the GDP. For public programs, the cost is often reflected in a budget that encompasses personnel and other costs but is not easily broken down into those components. A market price or value is not attached to those services. For this chapter, therefore, the major components of economic value of ECE will be prices paid at facilities operating in the marketplace, estimated number of paid child care staff and their wages, wages (actual or foregone) for parental or FFN caregivers, and budgets for major public programs (e.g., Head Start, public pre-kindergarten, military child care). Parents make payments on a variety of time schedules – daily, weekly, monthly or hourly. To allow calculation flexibility, we have standardized our estimates of the amount of service and payments for service to an hourly basis, then converted hours to annual rates of utilization and expenditure.

Foregone wages are the estimated amount of earnings that parents or relatives could be earning during the time they are caring for young children.

To estimate the size and components of the paid child care workforce, we have combined four major factors for each age group: the percentage of children utilizing each type of setting; hours spent in each setting; ratio of children to adults in each setting; and average weekly hours of workers. Applying each of these major components to derive a workforce estimate has required a variety of estimating techniques.

The most commonly used measure of ECE experiences are parent reports of the number of hours their children spend in various parental and non-parental arrangements, and such an estimate lies at the heart of our analysis. A critical analytic decision was to estimate parental care as the share of a 40-hour work week that is not spent in a non-parental arrangement. Thus, if a child spent 20 hours a week in various forms of non-parental ECE, they were considered to be in parental care for the remaining 20 hours. If a parent used no non-parental care, they would be attributed 40 hours a week of parental care. It could be argued that all children's waking hours are potentially attributable to parental care, but this would expand the concept of economic value beyond the concept of foregoing wages in the normal workforce. We have also found that for parents caring for young children, total caregiving occupies about eight hours a day, but only a few hours a day is in active caregiving. The remainder is in other household activities or activities that could be generating income, such as telecommuting or operating a home-based business. Moreover, only about 20-25 percent of children are in non-parental care at least 40 hours a week, so we are estimating a considerable parental care value for most children, even if they spend a substantial amount of time in paid ECE. Finally, U.S. employees average about 34 hours per week of paid employment and most cannot draw earnings for substantially more hours. We therefore believe that including the parental portion of ECE for children spending less than 40 hours a week in

non-parental arrangements, but not counting more than 40 hours per week in foregone wages, provides a reasonable estimate of the economic value of ECE.

The paid ECE workforce estimates were derived by considering the number of hours worked each week by child care workers and FCC providers, as well as the ratio of children to adults in those settings for each age group of children. We also considered the share of center-based staff that were directors, lead teachers or assistants, since they have different hours of work and ratios of children to adults. These factors allowed us to estimate the number of adults that would be required to provide the number of hours of ECE in each arrangement as reported by parents.

Estimating foregone wages

For employed individuals: reported average hourly wages at non-child-care employment.

For non-employed individuals: wages estimated from a statistical equation reflecting such characteristics as age, education, gender and area of residence.

Reported hours in parental or FFN care adjusted by percent of such care that is primary.

We were then able to apply average wage levels and non-personnel costs to estimate the wage-based economic value of each type of ECE arrangement. For center-based staff and pre-kindergarten teachers, average wages are reported by the U.S. Department of Labor’s Bureau of Labor Statistics and we used these estimates for those settings.

To estimate the foregone wages of parental and FFN caregivers, we conducted several estimations. First, we divided the caregivers represented in the American Time Use Survey (ATUS) by gender and by whether they were employed or not. For employed persons, we used the median wage reported on the survey (after purging outliers). We then conducted a regression analysis, utilizing factors shown in previous research to be predictive of wages. The most important factors were age of respondent, education level, number of children in care, working full or part time, race-ethnic and immigrant status and part of the US in which they reside. We then applied the resulting regression equations to estimate the wages for non-employed female and male parents and FFN caregivers. We applied a two-step Heckman correction to offset the potential effect of unobserved variables related to the nature of non-employed individuals, which reduced the estimated wages somewhat. Since a much higher percentage of caregiving was by females, we developed a weighted average hourly wage reflecting both gender and minutes per day of caregiving. The weighted average wages for parents and for FFN caregivers were then applied to the total hours children spent in parental or FFN care.

A central issue is the differentiation between primary caregiving, when the parent or relative is actively engaged with the child (as in play or reading) and secondary caregiving, when the adult may be doing another task (such as cooking or cleaning), while still being responsible for the child. On the one hand, it could be argued that parents or FFNs forego paid employment for all hours they are doing either primary or secondary caregiving, and so both should be counted. On the other hand, it could be argued that the activities caregivers are engaged in while doing secondary care have their own economic value and should not be attributed to ECE. At the extreme, a parent or FFN caregiver may be running a home-based business and conduct it while not actively engaged with the child in her care. For the purpose of this analysis, we have taken the conservative option of focusing on primary care only by parents and adjusted the hours in parental care downward to reflect that. The comparative amounts of primary and secondary

caregiving are discussed in Appendix 1-B. Since approximately 25 percent of parental and 22 percent of FFN caregiving is primary, using total caregiving hours would approximately triple their component of the estimate economic value of ECE.

Methodology for estimating economic value (detailed methodology in Appendix)

Broadly stated, our approach to estimating economic value of ECE was to estimate the total number of hours per year that young children spend in each of the major arrangements, estimate the hourly value of those arrangements, and multiply the two to derive total economic value. We applied and compared two approaches: estimating the number of paid child care workers for each arrangement and applying the wage value for those caregivers; and applying the market price of each type of arrangement to the number of hours in each arrangement. For each segment, we took account of the ratio of adults to children to estimate either the number of staff in licensed ECE, or to estimate the share of parent or FFN hours attributable to each child. We also considered for parents and FFN caregivers the share of caregiving that was the primary vs. secondary activity, since we only attributed economic value to the share that is primary.

We conducted a sensitivity analysis, comparing the two estimates and considering which entailed the greatest levels of uncertainty. Conducting this sensitivity analysis, it became clear that the price-based component was preferable – conceptually and empirically – for licensed child care, and that the wage-based approach was preferable for parental and FFN care. *Our final estimate is therefore a composite of wage and price-based approaches.*

The price-based approach is conceptually preferable for licensed care, since prices reflect the actual value placed by parents purchasing ECE after taking account of competing demands on their budget. It also implicitly accounts for competition among different providers of service and between different types of ECE. It is empirically preferable because, while we have good national data on wages, we do not have recent, nationally representative data on the non-wage components of ECE costs or the tradeoffs between personnel and non-personnel components. These are implicitly accounted for in prices that must cover both those components.

The wage-based approach is conceptually preferable for valuing parental and FFN caregiving since these are non-market activities for which there is no real-world price. Empirically, the higher caregiver education levels and lower child to adult ratios for parental and FFN care than for licensed ECE make it clear that these are qualitatively different services. Valuing parental or FFN care by the price of ECE available in the market would underestimate their value, since it would be based on a lower-quality service.

We therefore followed a hybrid approach for our final estimation of economic value of ECE. This approach combines:

- The price-based method for hours in center-based and FCC.
- Estimated foregone wages for hours in parental and FFN care.
- Program budgets for Head Start, public preschool and Military Child Care.

The steps for estimating and comparing economic value in these different approaches are summarized in the flow chart on the following page.

Data sources applied in this chapter

We have combined data from several different sources. Three sources are major national surveys conducted by the federal government on a regular basis, for which there are large samples and a high degree of reliability. For one component -- prices -- the only available data are from market surveys conducted by individual states. The data sources are as follows:

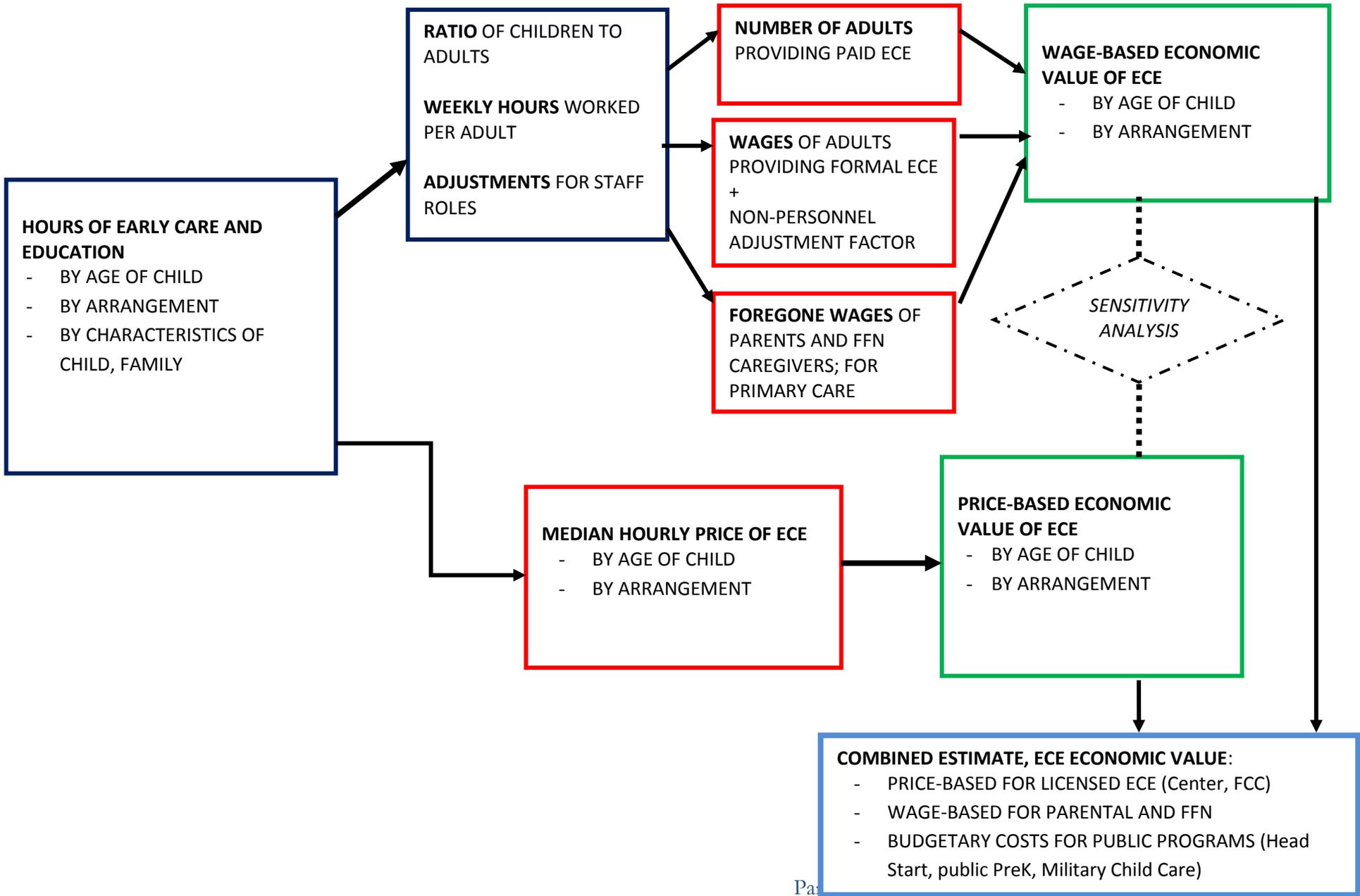
1. *Hours of ECE.* We have derived these from the 2005 version of the National Household Education Survey (NHES), Early Childhood Supplement. We examined several national surveys of ECE utilization and found that the NHES has the best combination of categories that match those commonly used in the field, and related variables. This is a random telephone survey of the general population, with 7,198 household respondents with children B-5. Along with many other data, the NHES includes hours in each type of arrangement (including multiple arrangements for a single child), age of child, parent-reported child to adult ratio, characteristics of the child (e.g., whether they have a special need) and parents (e.g., their employment status and race-ethnic and language background). Using this data base allows us to break hours of ECE into many useful categories. These data also allow us to distinguish hours in public programs, such as Head Start, so that we can subtract these and use program budgets to estimate economic value for the hours children spend in these programs.
2. *Ratio of adults to children.* This is essential for deriving workforce estimates. While the NHES includes parent reports of ratios, there is reason to believe these are not fully accurate, since parents only observe the setting at one or two times during the day. We have found another national survey (Early Childhood Longitudinal Survey, ECLS) that includes external observation of child to adult ratio at several times through the course of a day for children who are two and four years old. We have used these observations to adjust the parent-reported ratios from the NHES to produce workforce estimates.
3. *Average weekly hours worked.* These are available for center-based staff from the U.S. Department of Labor's Current Employment Survey, which surveys employers on a monthly basis.
4. *Price of formal child care.* The Human Services Policy Center has compiled recent market price surveys from 46 states. These are random samples of licensed providers, either center-based or Family Child Care, who report the prices charged to parents for children of the three relevant age groups -- infants, toddlers and preschoolers. These are often reported on a weekly basis and we have converted the results to hourly prices. Some states have reported 50th percentile (median) prices, others the 75th percentile, which is often used as a guideline for state reimbursements. We have found that where states report both, the ratio between 50th and 75th percentile prices is highly stable, so we have been able to estimate median prices where only 75th percentile is reported. The median price is used for estimating economic value. While federal regulations require such state market price surveys to be conducted regularly, there are no guidelines regarding methodology and the level of consistency and reliability varies across states.ⁱⁱⁱ However, many of these differences are

minimized by using a weighted national average, and the results are consistent with other estimates of child care prices. There is also a potential that reported prices under- or over-estimate the value of ECE. There is some amount of donated and volunteer time, plus parental fundraising, that contributes to the conduct of formal ECE, which is not reflected in the price. This can cause price to be an underestimate. It is also possible that providers discount prices for some individuals who have difficulty paying, or provide sibling discounts. It is conventional wisdom that many low-income parents do not pay providers the co-payment amounts, and that providers absorb this cost. The impact of public subsidies on prices is also unknown. To the extent that public subsidy reimbursement rates reflect market prices, they may reinforce “stickiness” in prices, with providers reluctant to charge middle- or moderate-income families more than the public rate. On the other hand, where states reimburse at or near the 75th percentile price (which is the federal guideline), they may be effectively driving up the prices for providers who would otherwise be charging a price equivalent to a lower percentile. Our price-based estimate is therefore probably a lower-bound estimate for that component of ECE economic value.

5. *Wages of paid child care workers and preschool teachers.* These are reported annually by the U.S. Department of Labor, Bureau of Labor Statistics as part of the Occupational Employment Statistics (BLS/OES) series. These include the number of workers in each of these categories and the mean and median wages paid for the nation and for each state. While the BLS/OES data do not incorporate all categories of paid child care workers, we believe they are a reasonably accurate measure of the market value of wages for the sector.
6. *Foregone wages of parents and family, friend or neighbor caregivers.* The ATUS conducted by the US Census for the Department of Labor, Bureau of Labor Statistics, reports annually for a representative sample of about 13,000 Americans about their activities on a typical day and contains considerable data on their demographic and employment characteristics and earnings. We have been able to identify sub-samples of adults who care for their own children and for other people’s children, but who do not list this as their occupation. From the earnings and demographic data reported for these two groups of caregivers, we are able to estimate foregone wages. Since the sample size is relatively small for some sub-groups of interest, we have used a combined sample from the surveys conducted in 2005, 2006 and 2007, with a combined sample size of 38,229. The ATUS distinguishes minutes of primary from secondary care by both parents and other caregivers and we have used that data to adjust parent-reported hours in parental or FFN care (NHES) to reflect only primary caregiving hours.
7. *Public budget and administrative data.* The total cost of the federal Head Start and Early Head Start programs are available as part of the federal budget. The Program Information Reports (PIR) provide annual counts of the number of Head Start staff, which we have incorporated in our workforce estimates. The National Institute for Early Education Research (NIEER) publishes an annual estimate of the amount of public pre-kindergarten and the associated state expenditures, and we have included those estimates. There is not an easily identified budget allocation for military child care across the different services. We have included the best documented estimate from a reliable source.^{iv} There is some uncertainty with regard to a small share of this budget being allocated to payments to support

privately operated child care off base; we have therefore rounded the estimate down somewhat to reflect this potential overlap. It is also possible that there are some in-kind contributions of goods or services to such programs that are not reflected in their budgets, ranging from free rent for Head Start in public schools to unpaid time contributed by parents or volunteers, or from fundraising. This unknown amount of “hidden subsidy (see Helburn et.al. 1995)” should be added to complete the economic value of these programs.

Estimation of Economic Value for Early Care and Education
Human Services Policy Center, University of Washington



The Estimated Economic Value of Early Care and Education

In this section, we present our findings of economic value for the ECE circle of investment, and show the major components from which it is derived. The detailed estimation methodology and backup data tables are presented in Appendices 1-A, 1-B and 1-C.

Table 1.1 shows our overall estimate of economic value for ECE of children age birth through five in the United States, using the hybrid model valuing hours in ECE by prices, wages and program budgets. We have applied price-based estimates for the formal, market-based forms of ECE – center-based and FCC – and wage-based estimates for parental and FFN care. For public programs – Head Start, public school pre-kindergarten and military child care – we have added estimated budget levels. The total economic value is \$61 billion per year for non-parental ECE; it rises to \$157 billion a year if the value of parental care is included (\$2007). About 26 percent of the economic value is for care of infants, about 29 percent for toddlers and about 45 percent for preschool age children.

The ECE sector is equivalent to about 1.12 percent of the U.S. GDP. Another interesting metric is to compare our societal investment in ECE with our investment in elementary and secondary education. The total value of non-parental ECE is equivalent to about 11 percent of the \$555 billion total revenues allocated to public schools in 2007. If we leave out the share of economic value attributable to FFN caregiving, the public and private investment in ECE is about 8.4 percent as large as the annual public investment in elementary and secondary education.

HSPC has found in a series of studies that the annual cost per child of reasonably high quality ECE is at least as large as the cost of elementary-secondary education. The population age birth through five is about 47 percent as large as the population age 6-18. If the U.S. were investing equally in early education, the economic value of ECE would therefore be about 47 percent as large as for elementary and secondary education.

**Table 2.1: Estimated Economic Value of ECE in the United States
Hybrid Wage-Price-Budget Estimate, \$2007 Billions**

	Infants (0-18 mos.)	Toddlers (19-36 mos.)	Pre-Schoolers (3-5 yrs.)	Total Children Birth-5
Center (Price-based Estimate)	\$4.8	\$7.9	\$13.6	\$26.3
Head Start (Program-based Budget Amount)			7.6	7.6
FCC (Price-based Estimate)	\$2.7	\$3.2	2.9	\$8.8
FFN (Wage-based Estimate)	\$4.3	\$4.3	\$6.1	\$14.7
Public Pre-K (Program-based Budget Amount)			3.2	\$3.2
Military Child Care (Budget Amount)			\$0.6	\$0.6
Parent-Care Hours (Wage- based Estimate)	\$29.4	\$29.4	\$37.3	\$96.1
Total Value: Non-Parental	\$11.7	\$15.5	\$33.9	\$61.1
Total Value: Including Parental	\$41.1	\$44.9	\$71.2	\$157.2
Total ECE Economic Value as Percent US GDP (2007)^y	0.29%	0.32%	0.51%	1.12%

Factors Contributing to Economic Value: Utilization, Wages and Prices of ECE

Utilization of Early Care and Education by US Children Age Birth through Five

The essential building block for our analysis is the number of hours the children spend in various ECE arrangements, as derived from the NHES (2005).

Table 2.2 shows the percent of hours children spend in parental care only or a mixture of parental and non-parental. We see that while a majority of infants and almost half of toddlers are only in parental care, only about a quarter of preschoolers spend no time in non-parental ECE. About a quarter of infants, a third of toddlers and almost half of preschoolers split their time between parental and non-parental ECE in a typical week. Less than a quarter of all children age birth through five spend a full 40 hours a week in non-parental ECE.

Table 2.2: Share of ECE In Parental and Non-Parental ECE

	Parental Care Only	Uses Some Non-Parental Care & Some Parental Care	All Children Using At Least Some Parental Care	Using No Parental Care (i.e. at least 40 hours of non-parental care)
Infants	56%	25%	81%	19%
Toddlers	46%	31%	77%	23%
Preschoolers	27%	49%	76%	24%

Table 2.3 shows the percent of non-parental care hours by age of child and arrangement that we have derived from the National Household Educational Survey of 2005. The FFN share is the sum of paid and unpaid relative and non-relative ECE.

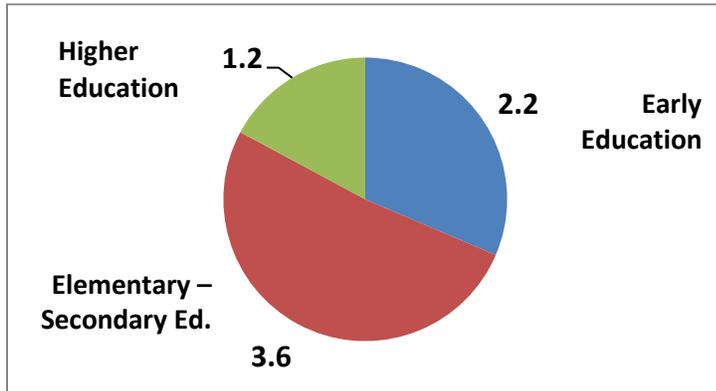
Table 2.3: Share of Non-Parental ECE Hours by Arrangement

Percent Total Non-Parental Hours	Center-based	Head Start	Family Child Care (FCC)	Total Family, Friend, Neighbor (FFN)	(FFN-Paid)	(FFN-Unpaid)
<i>All Ages Birth - Five</i>	41%	7%	17%	35%	(12%)	(24%)
Infants (0-18mos)	29%	1%	22%	48%	(16%)	(32%)
Toddlers (19-36mos)	40%	4%	21%	35%	(10%)	(25%)
Pre-Schoolers (3-5yrs)	47%	11%	12%	30%	(11%)	(20%)

1) Estimated Size of the ECE Workforce

As described above, we have converted the estimated hours spent in ECE into a demand-based estimate of the ECE workforce, taking into account the ratio of children to adults, the average number of hours worked and other factors (see Appendix 1 for methodology). The ECE workforce is substantial – 2.2 million paid workers plus 3.2 million unpaid caregivers in a typical week. The paid ECE workforce is equivalent to 1.6 percent of the total U.S. civilian workforce, and 3.5 percent of the nation’s female workforce.

**Chart 1-A. U.S. Educational Workforce, 2005
Millions of Instructional Staff**



The 2.2 million ECE staff compares to 3.6 million public and private K-12 teachers¹ and 1.2 million higher education instructors¹. ECE therefore accounts for about 30 percent of the total paid U.S. educational workforce.

Chart 1-B. Paid ECE Workforce by Age of Child

Looking at Chart 1-B, we see that almost half the paid ECE workforce is engaged with preschool age children, about a third with toddlers and about a fifth with infants.

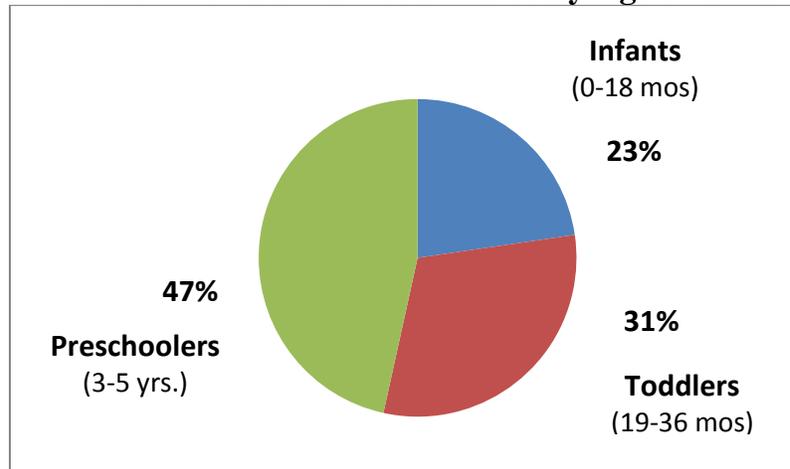
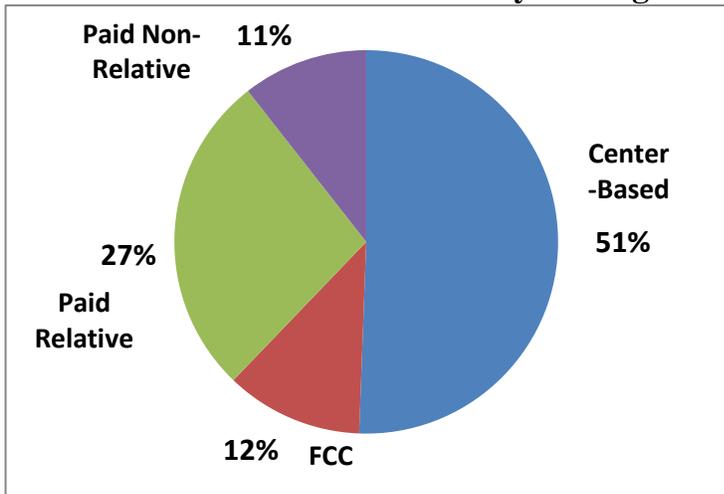


Chart 1-C. Paid ECE Workforce by Arrangement



Considering the settings where staff work, as shown in Chart 1-C, we find that about half the ECE workforce is employed in center-based ECE and 12 percent in licensed family child care (FCC). The remaining 38 percent are paid Family, Friend and Neighbor caregivers (FFN's).

Table 2.4A gives a more detailed picture, displaying the number of paid child care workers in a typical week, broken down by the age of child in their care and by type of arrangement. This is the standard method of counting the workforce, and the one we used in our wage-based estimation of economic value.

However, since there is relatively high turnover in ECE occupations, this does not fully reflect the total number of individuals who are employed to provide ECE through the course of a given year. Table 2.4B shows parallel estimates of the number of individuals employed in ECE through the course of a year, taking into account occupational turnover. This latter estimate is important for such endeavors as estimating the number of individuals requiring professional development or support through the course of a year.

Table 2.4A: Number of Paid ECE Workers in the US in a Typical Week

	Total Paid	Center Care	FCC Providers	Paid Relatives	Paid Non-Relatives
Infants (0-18 mos.)	490,000	223,000	78,000	111,000	78,000
Toddlers (19-36 mos.)	654,000	309,000	92,000	166,000	87,000
Early Head Start	12,000	12,000			
Pre-Schoolers (3-5 yrs.)					
PRIVATE	826,000	371,000	80,000	312,000	63,000
Pre-Schoolers (3-5 yrs.)					
PUBLIC	79,000	79,000			
Head Start	101,000	101,000			
All 0-5 Year Olds	2,163,000	1,094,000	250,000	589,000	229,000

Table 2.4B: Number of Paid ECE Workers in the U.S. in a Year

	Total Paid	Center Care	FCC Providers	Paid Relatives	Paid Non-Relatives
Infants (0-18 mos.)	546,000	265,000	91,000	111,000	78,000
Toddlers (19-36 mos.)	728,000	367,000	107,000	166,000	87,000
Early Head Start	14,000	14,000			
Pre-Schoolers (3-5 yrs.)					
PRIVATE	910,000	441,000	93,000	312,000	63,000
Pre-Schoolers (3-5 yrs.)					
PUBLIC	94,000	94,000			
Head Start	122,000	122,000			
All 0-5 Year Olds	2,412,000	1,302,000	292,000	589,000	229,000

Table 2.5 shows our estimate of the number of unpaid members of the caregiving population, also by age of child and type of arrangement. Adding the paid and unpaid caregiver estimates yields a total of 5.2 million individuals engaged in ECE in a typical week, and 5.6 million through the course of a year.

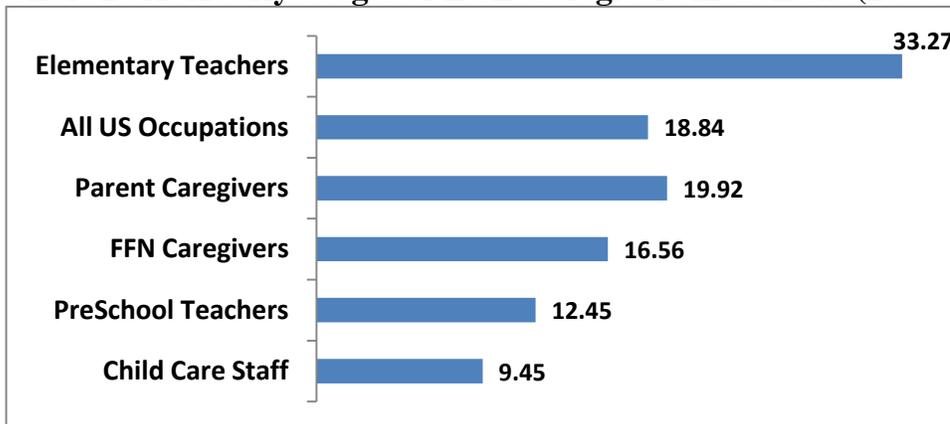
Table 2.5: Number of Unpaid ECE Caregivers in the U.S.

	Total Unpaid Caregivers	Unpaid Caregivers		
		Center Care Volunteers	Unpaid Relatives	Unpaid Non-Relatives
Infants (0-18 mos)	879,000	17,000	834,000	28,000
Toddlers (19-36 mos)	1,070,000	23,000	1,017,000	30,000
Pre-Schoolers (3-5 yrs) PRIVATE	1,276,000	28,000	1,209,000	39,000
Pre-Schoolers (3-5 yrs) PUBLIC	6,000	6,000		
All 0-5 Year Olds	3,231,000	74,000	3,060,000	97,000

2) Average Wages of ECE Staff; Foregone Wages of Parental and FFN Caregivers

One route to estimating the economic value of ECE is to apply the wages of different categories of caregivers to the amount of time children spend in each type of ECE. Chart 1.6A summarizes our estimates of the equivalent hourly wages of parental and FFN caregivers used in our economic value estimation, and compares them to the overall average wage and the amount paid to elementary school teachers. In general, we see that parents staying home have wage levels close to the overall national average, and FFN caregivers slightly less.

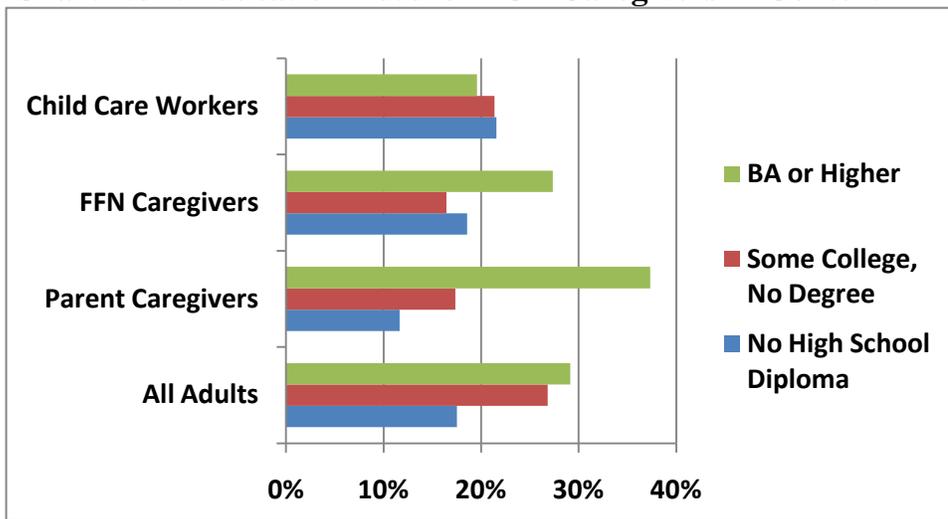
Chart 1.6A. Hourly Wages of ECE Caregivers in Context (2006 Values)



As revealed by our analysis of ATUS data, compared to parents and to the general adult population, child care staff have lower than average levels of education, are less likely to be married, and are more likely to be non-white; these are all predictors of lower wages.^{vi} For example, as shown in Table 1.6B, 22 percent of child care workers lack a high school degree, compared to 18 percent of the general adult population and 12 percent of parental caregivers. Conversely, 20 percent of child care workers have a BA or higher degree, less than the 29 percent of the general population and 37 percent of parental caregivers. About a fifth of child care staff have taken some college courses but not completed a degree, a higher share than for parental or FFN caregivers.

However, even taking all these factors into account, we found that child care workers earn about \$2.20 an hour or 31 percent less than the average of female workers with comparable characteristics.^{vii} Thus, as a society, we pay elementary school teachers considerably more than the average wage, reflecting their education and skills, but we pay preschool teachers and child care staff considerably less.

Chart 1.6B. Education Level of ECE Caregivers in Context



The child care staff and preschool teacher wages used in our estimate of economic value were derived from the BLS/OES wage data. A factor for benefits and non-personnel costs was applied to wages to derive a total cost of ECE service. This factor is based on HSPC analysis of the relationship of wages to total costs and consistent with other studies. Costs were annualized at 1,586 hours per year, based on the average hours worked per child care staff. This is consistent with the average of 30.5 hours worked used in estimation of individuals in the ECE workforce, which reflects a combination of full- and part-time staff and was derived from the Current Employment Survey.

A new contribution of this effort has been estimating the wages foregone by parents caring for their own children, and for family, friend and neighbor caregivers. As discussed above, we have derived these estimates from the ATUS. While the ATUS specifications of caregiving and relationships are not adequate for determining the hours in each type of ECE, they are close enough to provide reasonable estimations of the wages earned by individuals who care for their own or other people’s children but are not child care employees.

As shown in Table 2.7, individuals in these caregiving categories vary considerably in their employment status (full, part-time, not employed) and their wages vary accordingly. While we show these different wage levels to aid in understanding the range of caregivers’ economic value, we applied a weighted average wage value to the hours in parental and FFN forms of ECE. As noted above, the estimates for non-employed parental and FFN caregivers were each estimated by developing a regression model to estimate wages of employed individuals based on demographic characteristics, then applying the coefficients from those models to the non-

employed caregivers. We applied a two-step Heckman correction to offset the potential effect of unobserved variables related to the nature of non-employed individuals, which reduced the estimated wages somewhat. We also estimated foregone wages separately for males and females, since they were found to have both different levels (higher wages for males) and somewhat different relationships to the characteristics predicting wages. As expected, we found that while average wages for males were higher, a much higher percentage of caregiving was by females. We therefore developed a weighted average wage reflecting both gender and minutes per day of caregiving. The wage estimation was done separately for parents and FFN caregivers, since their distribution of caregiving hours, average wages and demographic characteristics varied considerably. The weighted average wages for parents and for FFN caregivers were then applied to the total hours children spent in parental or FFN care.

Several findings from Table 2.7 are striking:

- As expected from most research, wages for males (\$25.43/hour) are higher than for females (\$19.23/hour).
- Wages of parental caregivers (\$20.86/hour) are considerably higher than wages of FFN caregivers (\$17.42/hour). That is to be expected, since a variety of studies have shown that more affluent parents are more likely to stay home with their children.
- There is wide variation in the earnings capacity of parental caregivers. At the high end, in households with one spouse working full time and another part time, earnings average over \$24/hour. At the low end, single parents working part time earn only about \$12/hour.
- Full-time workers earn more per hour than part time; this exemplifies the economic cost to parents of working part time to provide care and education to their young children.
- Wages of both parental and FFN caregivers are on average considerably higher than the \$10-12 per hour earned by child care workers and preschool teachers. This reflects the fact that ECE provided outside the licensed ECE sector is by individuals with greater education and employment opportunities than those paid to care for children.

Table 2.7: Estimated Wages of Parental and FFN Caregivers

	Mean Hourly Wage		All Respondents Weighted by Gender and Average Minutes/Day of Caregiving
	Mean for Males	Mean for Females	
Parent Caregivers of Children in the Household	25.43	19.23	20.86
<i>All Households with Partner Present</i>	<i>25.87</i>	<i>20.83</i>	<i>22.36</i>
Both Parents Work Full Time	23.86	22.48	22.98
Respondent Works Part Time, Partner Works Full Time	17.62	22.79	22.62
Respondent Does Not Work, Partner Works Full Time	24.93	19.90	20.14
Respondent Works Full Time, Partner Works Part Time	24.94	21.50	24.41
Both Parents Work Part Time	22.20	16.83	19.04
Respondent Does Not Work, Partner Works Part Time	20.95	16.93	17.63
Respondent Works Full Time, Partner Does Not Work	29.57	22.50	28.71
Respondent Works Part Time, Partner Does Not Work	31.20	16.92	23.55
Both Parents Do Not Work	19.70	16.07	17.29
<i>Households with No Partner Present</i>	<i>15.85</i>	<i>13.27</i>	<i>13.45</i>
Respondent Works Full Time	17.07	13.56	13.85
Respondent Works Part Time	19.26	11.78	12.07
Respondent Does Not Work	13.47	12.86	12.89
Caregivers of Non-Household Children (FFN)	20.94	15.92	17.42
Respondents with Some Employment	22.30	17.20	19.09
Respondents with No Employment	17.09	14.43	14.95

Source: HSPC Analysis of ATUS Multi-year Sample, 2005, 2006, 2007

3) Median ECE Prices By Age of Child and Arrangement

The prices of ECE used in our price-based estimate of economic value are displayed below. The prices for centers and FCC facilities are derived from the HSPC compilation of state market price surveys, and reflect the median price paid for each type of arrangement for each age group of children. The U.S. average is weighted to reflect the share of the population age B-5 in each state. For FFN care, there is no market price. We have therefore used an estimated FFN price equal to 70 percent of the FCC price. This is derived from two sources. A major study of FCC prices indicates that the business-related costs of FCC are about 30 percent of the total, so that the share of prices that would be applicable for FFN providers is about 70 percent of FCC. It is also common practice for states to reimburse relative care at about 75 percent of FCC prices for subsidy programs.

For parental care, we have set the price equivalent for our economic value estimate at what parents would have to pay in the market if they did not provide care themselves, which we estimate as the weighted average prices of center-based and FCC care. This implicitly assumes that if parental caregivers were to use licensed ECE, they would use it in the same pattern as other parents. It is striking that the price that parents would have to pay in the market is only about 15 percent of the wages they forego to care for their own children. Part of this difference is that prices are per child per hour, and most parents are only caring for one or two children, while average market prices reflect child to adult ratios that range from as low as 4:1 for infants in states with high standards, to 18:1 for preschoolers in states with less rigorous standards. But as noted, parents caring for their own children have, on average, higher levels of education and earning power than child care workers. These data suggest that parents caring for their children at home are purchasing with their foregone wages a higher quality service than what they would receive in the formal ECE market, in terms of two key factors – child to adult ratio and education of the caregiver.

Table 2.8. Average Hourly Prices for ECE in the U.S.

	Weighted Average Median Price per Hour			
	Center	FCC	FFN*	Parent-Care Hours**
Infants (0-18 mos)	3.89	2.83	1.98	3.42
Toddlers (19-36 mos)	3.35	2.65	1.86	3.11
Pre-Schoolers (3-5 yrs)	2.98	2.52	1.76	2.89
*FFN care priced at 70% of FCC prices; **Parental care priced at weighted average of Center and FCC				

4) *Share of ECE Workforce Responsible for Children of Special Interest*

An interesting question that we have been able to explore in this analysis is the share of ECE utilization that is by children with characteristics that make them of particular interest to policy makers. Adults caring for children with special physical or emotional needs require more specialized training and skills to successfully nurture these children and support for dealing with the stresses of this task. Similarly, providing appropriate care for children whose parents do not speak English, who are usually recent immigrants, also requires appropriate training and support. It is valuable to know what share of the ECE workforce is serving such children for purposes of planning workforce training. And the extra skills required by these teachers commands extra value in the paid workforce.

Our primary data source, the NHES, identifies children in each of these categories,^{viii} so we have applied our workforce estimation methodology to the hours of non-parental ECE reported for each of these groups. A major challenge is that we do not have data on the degree to which children with special needs or limited English ability are concentrated in a limited number of classrooms or FCC homes, or the degree to which they are dispersed. If, for example, most special needs children were served in special programs, where all children have special needs, then many fewer teachers would be exposed to such children than if they were dispersed among

regular “inclusion” classrooms or FFC homes. We have therefore estimated minimum and maximum numbers of paid adults based on levels of concentration and calculated a mid-point that we report. In Table 2.9, we display the percent of the total ECE workforce likely to be serving special needs or Dual Language Learner children based on the mid-point estimates (the actual numbers of workers, by age of child and setting, are shown in Appendix 1). The finding that approximately a third of ECE staff are likely to be responsible for children with special physical or emotional needs, and that a fifth are responsible for children where English is not the home language, indicates the substantial need for training and support of staff. These numbers could become even greater if the trend of early identification of special needs and the growth of immigrant populations continue.

Table 2.9. Percent of ECE Workforce Serving Children With Special Needs or English Language Learners (Midpoint Estimate)

	Special Needs	Dual Language Learners
Infants (0-18 mos)	10%	13%
Toddlers (19-36 mos)	20%	14%
Pre-Schoolers (3-5 yrs)	48%	25%
All 0-5 Year Olds	33%	21%

5) Current resources compared to the cost of high quality ECE

The estimates of economic value of ECE presented above are based on the current price of licensed ECE. These prices are constrained by the ability of middle-income parents to afford ECE for their children, since there is not universal financing of ECE for all children as there is for elementary and secondary education. We have already noted that child care staff wages are about \$2.20 an hour or 31 percent lower than average female U.S. workers with similar education and experience. This is due largely to the affordability constraint. If current workers were to be paid comparably to their qualifications, the price of ECE would be 22 percent higher. This would add about \$13 billion to the economic value of ECE.

HSPC has conducted cost simulations of appropriate standards for high quality ECE, working with policy teams in numerous states and counties. We have found that, on average, requiring a modest increase in educational qualifications, providing ongoing professional development, and paying the wages necessary to recruit and retain qualified staff would increase hourly ECE costs by at least 25 percent.^{ix} Another consistent finding across states is that such high-quality ECE would cost about 25 percent of the average family’s take home pay for each child. Since about 30 percent of children age B-5 have a sibling in the same age group, the cost would be about 50 percent of take home pay for almost a third of families. Just as most families could not afford public school at \$9,700 (2007) a year per student,^x or college at even higher costs, they cannot afford high quality ECE without help. Supporting the qualifications and compensation that would allow high quality ECE would therefore require increased financial assistance to families.

6) *Public investment as a share of ECE spending*

There is no readily available accounting of all the public expenditures on behalf of ECE in the U.S. as there is for other elements of the educational enterprise. However, we can derive a close estimate by examining major elements of public federal and state spending. We know this is a minimum estimate, since it excludes local government funding and the value of state child care tax credits, for which data are not readily available. Table 1.10 shows federal and state direct expenditures and federal tax expenditures.

Table 2.10: Major Federal and State Expenditures on ECE

Category	\$ Billions 2007
<i>Direct Expenditures (Federal, State):</i>	
Child Care and Development Fund (CCDF) Subsidies	10.2
Head Start	6.9
Public Pre-K	3.7
<i>Tax Expenditures (Federal):</i>	
Child and Dependent Care Tax Credit (CDCTC)	1.8
Total	22.6

We see from Table 2.10 that public ECE expenditures were on the order of \$23 billion in 2007.^{xi} That represents about 14 percent of the estimated \$157 billion total investment in ECE that year. The public investment averages \$1,100 per child in the population age B-5. Even if we only consider the 60 percent of children in non-parental ECE, public investment averages about \$1,800. These figures contrast strongly with the \$9,700 per enrolled public school student in 2007. About a billion dollars a year will be added to this total from the economic stimulus package, but that may be offset by reductions in CCDF spending as increasing cash assistance rolls make it less possible for states to transfer funds from Temporary Assistance to Needy Families to child care.

Summary of Findings Regarding the Economic Value of ECE

- The total economic value of early care and education in the U.S. is about \$157 billion a year, equivalent to about 1.12 percent of GDP. About \$61 billion is for non-parental ECE, and about \$96 billion is the value of wages parents forego to care for their young children.
- About 14 percent of the economic value of ECE is composed of public spending, including tax credits.
- The economic value of non-parental ECE is equivalent to 11 percent of public investment in elementary and secondary (K-12) education. If we exclude the value of family, friend and neighbor ECE, non-parental ECE is equivalent to 8.4 percent of K-12 investment. As a point of reference, the population age B-5 is 47 percent as large as the population age 6-18.
- The paid, non-parental ECE workforce is quite large, about 2.2 million paid workers, plus 3.2 million unpaid caregivers. The 2.2 million paid workers represent 30 percent of the total US educational workforce, which includes 3.6 million K-12 teachers and 1.6 million higher education instructors. It was equivalent to about 1.6 percent of total US civilian employment in 2005 and about 3.5 percent of US female employment.
- Almost half (47 percent) of the paid ECE workforce is responsible for children age 3-5 years, a third (31 percent) for toddlers, and a quarter (23 percent) for infants.
- About one-third of ECE workers are responsible for children with special physical or emotional needs and about one-fifth for children whose first language is not English; both of these require special skills, training and support.
- About half (51 percent) of the paid ECE workforce are employed in center-based settings, including Head Start and pre-kindergarten programs; more than a third (38 percent) are family, friends and neighbors providing home-based ECE; one-eighth (12 percent) are formal family child care providers, operating businesses in their homes.
- Child care worker wages averaged \$9.05 per hour and preschool teachers averaged \$12.45 (2006). This compares to average foregone wages of \$20.86 for parental caregivers and \$17.42 for FFN caregivers in that time period.
- To some extent, lower ECE wages reflects lower education levels of child care workers. However, child care staff earn about \$2.20 an hour (31 percent) less than female workers in other occupations who have similar education and other characteristics.
- If child care staff were paid wages equivalent to their qualifications, it would add about 22 percent to costs, or about \$13 billion to the economic value of early care and education.

Appendix 1.A. Detailed Estimates of ECE Workforce Providing ECE to SPED or ELL Children

In Tables 2.11 and 2.12, we show the midpoint estimates of the numbers of the paid ECE workforce that is exposed to children with special needs or to English Language Learners.

Table 2.11. ECE Workforce Serving Children with Special Needs

Child Care Workforce Exposed to Special Physical, Emotional Needs (Midpoint)					
	Total Paid	Center Care	FCC	Paid Relatives	Paid Non-Relatives
Infants (0-18mo)	50,364	10,395	2,974	31,082	5,913
Toddlers (19-36mo)	128,870	86,890	19,260	11,627	11,093
Pre-Schoolers (3-5y/o)	479,779	334,149	45,030	61,772	38,828
All 0-5 Year Olds	659,012	431,434	67,264	104,481	55,833

Table 2.12. ECE Workforce Serving English Language Learners

Child Care Workforce Exposed to English Language Learners (Midpoint)					
	Total Paid	Center Care	FCC	Paid Relatives	Paid Non-Relatives
Infants (0-18mo)	63,238	17,641	4,669	25,609	15,320
Toddlers (19-36mo)	91,527	53,875	10,116	27,536	0
Pre-Schoolers (3-5y/o)	254,620	183,356	16,861	49,258	5,144
All 0-5 Year Olds	409,386	254,871	31,647	102,403	20,465

Chapter 2: Health Care Goods and Services⁷

Economic Impacts of Early Childhood Health Care

Having estimated the size and scope of the early childhood sector component devoted to early childhood education (ECE), this chapter explores investments on behalf of young children with respect to health care services. Young children's health care and well-being are central to societal well-being in ways that may not always be obvious to policy makers; healthier children increase the capacity of cities, states, and the country to function now and into the future. Early childhood health can help set children on a path to be eager, prepared students, productive workers, and healthy adults. Conversely, inadequate or poorly allocated investments in health can result in students who are not ready to learn, and thus a future workforce that is not as skilled or productive as needed. This chapter therefore represents an important new contribution to understanding the societal value of such investments, both immediately and longer-term.

Children's early health lays the foundation for, and contributes to, a host of subsequent outcomes. These include not only teen and adult health status, but academic attainment, behavioral and mental health well-being and, ultimately, workforce skills and earnings. Birth outcomes, for example, are known to have continuing impacts on children's academic and health status into adulthood. Low birthweight and preterm births reduce average school attainment and earnings and substantially reduce life expectancy, so reducing low birthweight and preterm births can substantially improve children's odds of life success. (*see, e.g., Currie 2008 and Johnson 2007*).

Other areas of child health, including proper nutrition and healthy weight, injury prevention and mental health, also strongly influence school readiness, students' capacity to learn and later health and earnings potential (*see, e.g., Guyer 2008 and Currie 2009*). Asthma, a largely controllable health problem that manifests itself early in most cases, can, if not diagnosed, treated, and monitored, cause children to lose school days and results in costly emergency room and hospital visits. Parents of children with uncontrolled asthma miss work days, and adult acute attacks cost substantial workforce productivity losses (*Fertig and Corso 2009*). Lead poisoning, while greatly reduced in recent decades due to abatement campaigns and new laws and regulation, remains a threat for small pockets of children. That threat includes reduced IQ and cognitive function, increased odds of criminal activity, reduced academic attainment and later worker productivity, as well as direct medical costs (*Gould 2009*).

In all of these instances, poor early health and/or lack of appropriate childhood health care has economic consequences. Direct medical costs to treat asthma, injuries, obesity and mental health problems are substantial and, especially in the case of obesity, increasing in recent years (*Guyer 2008*). Longer term, failure to provide children with a healthy start contributes to school costs in higher rates of grade repetition and of special education services, and reduced odds of high school graduation (*see, e.g., Murphy et al 2008 and Currie et al 2009*). This means reduced odds of college attendance, obtaining critical workforce skills, and thus of earning a living wage and

⁷ Elaine Weiss, Project Manager, Partnership for America's Economic Success, Pew Center on the States. Note that this chapter was written before the 2010 health reform was passed and thus does not reflect those changes.

paying taxes. In sum, societal costs accrue at various points in time and on an ongoing basis when critical early childhood health problems are not prevented or appropriately addressed.

More immediately, early childhood health care services contribute to current economic output, but perhaps not as efficiently and effectively as they could. As the debate on health care reform highlights, health care represents an increasingly large portion of Gross Domestic Product (GDP). Americans pay more for their health care but are less healthy than their peers in other countries. One key reason for that increase is spending to treat adult diseases like cardiac and respiratory problems, obesity, and diabetes, which often have their genesis in unaddressed childhood health problems (see, *e.g.*, Johnson and Schoeni 2007(b)). In some cases, then, increased investments in and/or reallocation of early childhood health care could save substantial sums in the future.

Children’s healthy development thus represents an investment in our collective future, so although the portion of health GDP devoted to young children is not as large as that devoted to other populations, it must be part of the discussion around allocation of scarce health care dollars. This chapter uses solid data to estimate the economic contribution of B-5 health care goods and services to GDP, as well as seeking to determine the extent to which that contribution is both sufficient and efficiently allocated.^{xii}

What Constitutes Economic Value in this Component

As discussed above, the primary definition of economic value of the size of this component of the early childhood sector is the total amount of health care goods and services consumed by young children, which is presented as equivalent to a percentage of GDP. As discussed in the Introduction, the use of the term “economic value” in this work does not reflect the societal outcome benefits of these expenditures. The \$25 co-pay and additional \$50 in insurance company compensation that might be paid for a well-child visit is likely substantially lower than the ultimate societal benefit of the vaccination and screenings that take place during that visit. At the same time, parents with private insurance coverage may “over-invest” in unnecessary or ultimately unproductive sick child visits because they see only the \$25 price tag.

It is thus not possible to estimate the ultimate value in outcome benefits of those payments, nor is that the focus of this work. For the purposes of this paper, the term “economic value” is defined as the total sums spent by families, insurance companies, and taxpayers (through various government methods of payment for health care) on health care goods and services for children birth to age five.

Approach to Measuring Health Care Goods and Services

Based on that definition, the economic value of this care can be divided into two major pieces:

- ***Direct medical services***, which include well-child and sick-child care by doctors,^{xiii} hospital services (whether in- or out-patient or emergency room), dental care, mental health care, prescription medications, and any home health care; and

- **Other health-related services**, such as public health programs, parenting education programs to improve children’s well-being, home visits from nurses and social worker visits, and public nutritional supports.

Maternal Health Care: Relevant but Omitted

Mothers’ health, especially during pregnancy, is inherently a part of, and attributable to, the health of young children. Pregnant women pass on good (or poor) health to their infants through a variety of mechanisms: poor oral health can translate into early caries for babies; nutritional deficiencies increase children’s risk of immune deficiencies, anemia, and obesity; stress and psychological problems are increasingly found to shape babies’, children’s and even adult behavior; and others. After birth, mothers pass along nutrition through breastfeeding, while maternal depression can cause substantial trauma and affect children’s development, both cognitive and behavioral.

For all these reasons, including maternal health care in this estimate would make sense; it directly and indirectly affects young children and is part of their health care as well. However, the data available do not lend themselves to such inclusion; there is no viable method for identifying those portions of Medical Expenditure Panel Survey costs for mothers that should be attributed to children’s health care services. Moreover, because this estimate is intended to be as consistent as possible across all three portions of the sector, it is omitted, with the exceptions of actual birth costs and spending on WIC. Again, we note the conservative bias that this omission adds to the overall estimate.

Direct medical services, which represent the vast majority of the economic value of this component, are relatively easy to measure using national surveys. The value of other supports is more difficult to calculate; such programs are not included in national surveys, many are provided at the state or local level, and federal and state data do not indicate allocation by age. Therefore, with the exception of the Women’s, Infants, and Children (WIC) program, for which all federal expenditures are for children birth-to-5, this paper computes only direct medical services.^{xiv}

Sources of Health Care Payments

Society pays for children’s health care costs through a variety of mechanisms. For a majority of children, parents’ private employer-provided health insurance (supplemented with out-of-pocket expenses including co-pays, deductibles, non-prescription medicines and other non-covered costs) pays for their health care services.^{xv} Other children are insured through Medicaid and/or the Children’s Health Insurance Program (CHIP), a state-run program for low-income children who are in need of coverage but whose family income renders them ineligible for Medicaid. Less common sources of payment include health insurance provided through the Veterans Administration for military employees and other public insurance. Finally, a minority of children have no health insurance at all.^{xvi} For uninsured children, payments are made out-of-pocket or, for emergency room visits and other limited health services, paid for by a combination of “subsidies” on the part of tax payers, health care providers, private insurance providers and self-payers.

Categories of Health Care Coverage

Employer-provided insurance: Health insurance provided by parent/adult employer. Adult may pay some, all, or none of the insurance cost, which is subsidized through the federal tax code.

Private insurance, other: A minority of families pay out of their own income for insurance, which may range in coverage from only “catastrophic” to the equivalent of employer-issued.

CHIP: The State Children’s Health Insurance Program, initiated in 1997, provides health insurance for low-income children whose family incomes are too high for Medicaid, with levels of eligibility (185% to 400% of the federal poverty level) determined by each state.

Medicaid: The federal- and state-funded health insurance program is administered by states for low-income individuals and families. Young children living at 133% of the federal poverty level or below are eligible in every state (states have individual eligibility requirements as well).

Veterans/other public: A small percentage of health care services is provided directly, rather than through insurance. Sites include veterans’ facilities (not relevant to children B-5) and community clinics (especially for low-income and minority children). It also includes TRICARE (formerly CHAMPUS), which provides supplemental health services for Uniformed Services beneficiaries.

Uninsured: Children who do not qualify for SCHIP or other subsidized care, but whose families cannot or do not insure them, pay for specific services or use emergency rooms or public clinics.

In addition to these direct medical services, a range of public health and other initiatives support children’s early health. These include home visits for parents, the portion of family-related programs attributable to young children, and supports like the federal Women, Infants, and Children (WIC) program.^{xvii} WIC is administered at the national and regional levels through the U.S. Department of Agriculture Food and Nutrition Service and implemented at the state and local levels through various agencies and other venues. It provides nutritious food, counseling on nutrition, and referrals to other related services. WIC targets low-income and nutritionally at-risk pregnant women and post-birth new mothers; infants; toddlers; and preschoolers up to age 5.

Clearly, young children receive health care goods and services through a variety of delivery mechanisms. The calculations below take into account direct medical services as well as WIC expenditures to estimate the total value of those services. The chapter then breaks down that estimate of current spending on health care in order to explore the potential impacts of those patterns on children’s health and societal well-being. Health care costs are presented both as totals and by relevant segments, all of which serve to enrich the understanding of this sector:

- Age of child;
- Type/site of care;
- Source of payment; and
- Health status.

Data for measuring the economic value of health care goods and services

Data on payment for services is the best available basis for estimating the economic value of child health services, as workforce or wage data specific to young children are not available.^{xviii} In order to estimate total annual health care spending for children birth to age five, the research draws upon the two foremost sources for national health care data: the Medical Expenditure Panel Survey (MEPS), which is sponsored by the Agency for Health Care Research and Quality (AHRQ), and the National Health Expenditure Accounts (NHEA) data collected by the Center for Medicare and Medicaid Services (CMS).

The 2002 MEPS data come from survey information collected on over 34,000 non-institutionalized civilians, of which 3,455 were children from birth to age five. MEPS health care expenditure data for each person include respondent reports of “the total direct payments from all sources to hospitals, physicians, other health care providers (including dental care), and pharmacies.”^{xix} The dataset also includes detailed information on health insurance coverage and health status, as well as a wide variety of social, demographic, and economic characteristics. Because only respondent costs are included, however, it does not capture administrative costs. By contrast, NHEA estimates, which are based on health care provider-based and government-based data sources, include administrative and other costs, as well as personal health expenses. Differences between the two datasets in population, type of cost, and source of data result in NHEA estimates that are substantially larger than MEPS figures. For the young children who are the subject of this work, however, under-reporting, in particular, seems to be the major factor accounting for this discrepancy (Selden and Sing 2008).^{xx}

While the range of items covered by NHEA is arguably superior to that of MEPS-HC, in that it provides a fuller estimate closer to actual overall spending, and thus value, in this component, CMS has been unable to produce NHEA spending estimates limited to children birth to age five.^{xxi} This leaves MEPS-HC as the only viable alternative for assembling such an estimate. While reliable, MEPS omissions result in substantial under-estimates in some areas, so this study corrects for those discrepancies to produce an adjusted MEPS value.^{xxii} The adjustment methodology is set out in more detail in Appendix 2.

Methods for Applying Data to Calculate National Estimate

MEPS presents data as the cost of health services, so there was no need to “convert” them from workforce or price estimates. It was necessary only to translate the sample data to national estimates and to convert that dollar value to percentage of GDP. As with each of the other

components, all dollars are adjusted using GDP-based measures and presented as 2007 value, so that they are current and consistent across the entire sector.^{xxiii}

In order to allow researchers and other users to obtain representative national estimates from the MEPS-HC sample, AHRQ has developed an online MEPS query system, MEPSnet, from which our annual health care expense estimate for children birth to age five were obtained. The MEPSnet tool takes into account sampling and response rate concerns and weights the survey responses to arrive at a national estimate that is representative of the entire population, including children.

MEPSnet provides cost estimates for 2002, which were then converted to 2007 GDP and then to 2007 dollars.^{xxiv} In addition to cost estimates, MEPSnet was used to obtain maximums and means for a given health care category. These numbers permit us to look not only at national totals, but to estimate what average and expensive children birth-to-5 “cost.” In order to address the latter – determining which children are “expensive” and assessing the policy implications of those divisions – we also used MEPSnet to break down young children’s receipt of health care services in several different ways.

Subgroup Assessment

1. Sample children were placed into one of two **age groups**: 1) infants less than one year old; and 2) children ages one to five. This allows for the estimation of differences in value attributable to the two groups’ different health care needs.
2. Different patterns of spending among families are also assessed with respect to **insurance coverage status** (*i.e.*, private insurance; public insurance including SCHIP, Medicaid, military-related and other; and no insurance coverage). The dollar value of medical care tends to vary substantially, depending on how it is paid for and by whom.
3. A third subgroup division was **health service type**, meaning how and where the health care was delivered. For some children, most health care services are delivered in doctors’ offices. These consist of preventive care, such as immunizations and well-child visits, and also of a range of remedial services for sick children.^{xxv} For others, hospital visits – neonatal intensive care units (NICU), in- and out-patient visits for surgeries, emergency room – account for the bulk of services received.^{xxvi} For disabled children and others who require rehabilitation or frequent nursing support, home health may be a big factor.
4. Finally, the data are divided based on the parent’s report of his or her **child’s health status**. Parental assessments of what constitutes poor, good, or excellent health may be inconsistent across families, so this category is assessed with caution. However, the survey includes some specific questions that guide that ultimate category placement. Moreover, health status is a key indicator of how expensive a person’s health care is likely to be, so ignoring these data weakens the assessment of drivers of health care costs, and, again, the policy implications of spending patterns.^{xxvii}

While health status represents a definitional driver of health care service cost, the other three breakdowns – age, insurance status, and health service delivery type – allow us to better assess the “shape” of this component – which groups of children account for the largest portions of the cost or value of health care. They also help assess the extent to which certain groups of children have unmet needs for health care services, and thus have implications regarding efficient service allocation. Data showing that specific subgroups of children do not visit doctors’ offices as often

as others suggest that they may lack access to appropriate preventive care. In addition, while many hospital visits would take place irrespective of prior preventive measures, a good number are the result of failure to provide such early care. Combined with other research information, these data raise policy implications with respect to private versus public insurance, overall access to care, and allocation of resources. These issues are discussed in detail below.^{xxviii}

Economic value of federal social services

As set out above, WIC figures are included in the calculation of this component of the early childhood sector because, unlike other social services programs, they are entirely federal in nature, meaning that no state or local data must be collected, and also because the portion of their funding dedicated to young children is clear. For the purpose of this research, all WIC expenditures can be allocated to the birth to age five population since the program is targeted to pregnant women, infants, and young children.

The Estimated Economic Value of Early Childhood Health Care

Direct Health Care Goods and Services

This section presents the findings of economic value for the second component of Birth-to-5 investment and breaks out some major cost differences. For totals, two estimates are presented: one based on MEPS data only, and a second adjusted for the cost components that NHEA captures and are not captured by MEPS. In all subsequent tables, only “adjusted” values are presented, as they are more accurate estimates of health care spending. Moreover, adjusted numbers allow for only the presentation of totals, and do not allow for expenditures to be accurately broken down into age categories (infants versus toddlers and preschoolers) or source of care, as do MEPS data. As such, the tables below that present data by subgroups should be viewed in terms of their relative proportions, rather than absolute values. (In order to avoid confusion, WIC values are calculated separately, below, and added to that total to present the full component value.)

Under the more conservative MEPS-only estimate, total sector economic value is \$38 billion (in 2007 dollars), with in-patient hospital visits accounting for the largest proportion, at \$17.7 billion, and doctors’ visits next at \$10 billion. As set out in Table 3.2 below, all other cost categories are much smaller: out-patient visits account for just under \$3 billion; prescriptions \$2.4 billion; emergency room visits \$2.2 billion; home health care \$1.4 billion; and dental care \$1.3 billion. In all, health care services for children birth through age 5 represent the equivalent of just over one quarter of a percent of GDP, 0.27%. Adjusting for expenses not accounted for in MEPS, the total rises to just over \$49 billion, with in-patient services valued at \$22.6 billion and doctors visits at \$12.8 billion. The value as a percentage of GDP increases slightly, to 0.35%.

WIC

Since its enactment in 1974, WIC appropriations and participation have grown steadily with a few exceptions. In 2007, 8.2 million participants received \$5.4 billion in WIC goods and services, at an average monthly food cost per person of just \$39.^{xxix} When added to the adjusted value of \$49 billion in 2007 health care goods and services, the total rises to \$54.4 billion. This figure represents 0.385% of GDP, or 0.39% rounded.

Table 3.1. Health costs (all ages and young children), total and as a percentage of GDP using alternative calculation methods, 2007

All Ages		Ages birth to 5 years	
Total Health GDP	Total Health Expenditures, billions of dollars	Health and Social Services Expenditures (2007)	Health Expenditures as Share of GDP (2007)
10.4%	\$1,470 billion	\$38 billion (MEPS health) \$5.4 billion (WIC spending) \$49 billion (adjusted health) \$54.4 billion (total)	0.3% (“basic” health) 0.35% (“adjusted” health) 0.39% (adjusted total)

SOURCES: AUTHORS’ CALCULATIONS BASED ON MEPS DATA AND FEDERAL WIC EXPENDITURES

While the health care component of the early childhood sector does not, by itself, represent a large proportion of the economy, it is not insignificant. When the value of the second component is added to the 1.12% of GDP represented by the first component of daily care and education, the total comes to 1.51% of total GDP.^{xxx} These two pieces of the sector alone provide as much economic value as other entire sectors that have attracted policy attention, such as the oil and gas extraction sector (1.2%) and the publishing and software industry (just over 1%).

Value of Children’s Health Care: Relevant Sub-groups

This section uses MEPSnet breakdowns, based on the pertinent subgroup categories set out above, to discuss subgroup costs for healthcare goods and services. As noted above, these breakdowns represent averages obtained through MEPSnet, and do not control for other factors that influence health care costs. (For example, having an infant in very poor health may induce parents to use up assets and switch to public insurance, which may partly explain the higher cost for that group, in addition to other factors.) As such, causality should not be inferred. The discussion below explores how the data might reflect links between value of health care goods and services and factors such as age group, insurance status, and source of care, as well as assessing potential policy implications.

Table 3.2 below presents total 2007 values of early childhood health services, both “basic” and NHEA-adjusted, broken down by site of care: doctors visits, in-, out-patient, and emergency room hospital visits, dental visits, and home health care. Each of those totals and broken down numbers is represented both in 2007 dollars and as shares of 2007 GDP.

Table 3.2: Total B-5 Direct Health Care Services Value (Basic and Adjusted)^{xxxi} and Health Care Value as a Percentage of GDP, 2007 Values

<i>Source of care</i>	<i>Total Health Care Costs (in billions)</i>		<i>Total Health Care Costs as a Percentage of GDP</i>	
	<i>Basic*</i>	<i>Adjusted**</i>	<i>Basic</i>	<i>Adjusted</i>
Total/All	\$38	\$49.1	0.27%	0.35%
			<i>As % of total</i>	
<i>In-patient</i>	\$17.7		46%	
<i>Doctors visits</i>	\$10		26%	
<i>Out-patient</i>	\$3		8%	
<i>Prescriptions</i>	\$2.4		6%	
<i>Emergency room</i>	\$2.2		6%	
<i>Home health</i>	\$1.4		4%	
<i>Dental</i>	\$1.3		3%	

* in billions of dollars **MEPS-adjusted in billions of dollars

SOURCE: AUTHORS’ TABULATIONS OF MEPS AND NHEA-ADJUSTED MEPS

Table 3.3 depicts the breakdown of health expenses by age. Though they constitute only about one sixth of the total birth to age five population, infants birth to age one year receive health care goods and services that are valued, on average per child, at over three times those of children ages one to five. In total, they account for over one third of 2007 health care costs, double their share of the Birth-to-5 population.

Table 3.3: Average and Total Health Care Value, by Age, Unadjusted 2007 Dollars^{xxxii}

	Overall	Birth-1	Age 1-5
<i>Mean</i>	\$1,647	\$3,872	\$1,271
<i>Number in sample</i>	3,455	487	2,968
<i>National Total</i>	\$38 billion	\$25 billion	\$13 billion

SOURCE: AUTHORS' TABULATIONS OF MEPS DATA

Table 3.4 presents the breakdown of average health care costs for young children by insurance type. On average, among all children birth-to-5, health care services are valued at \$1,647 per year. Average costs are slightly higher for children covered by public insurance (\$1,849) than for children covered by private insurance (\$1,608) and substantially lower for children with no insurance (\$971). Indeed, children who are not covered receive roughly half the value of health care of children who are privately insured.^{xxxiii}

Top-level data imply that the value of health care services is nearly identical among privately- and publicly-insured children. However, breaking down the data by both age and insurance type (see Table 3.4, below) reveals a more complex pattern: among infants, public insurance is associated with a substantially higher value of care, but among children ages one to five, those who have private insurance receive nearly 50% more in health care services than publicly-insured young children, who in turn receive over twice the care (in dollar value) of their uninsured peers.

Table 3.4: Average Health Care Value, by Insurance Type and Age, 2007 Dollars

Age	Overall	Private	Public	None
All	\$1,647	\$1,608	\$1,849	\$971
Birth-1	\$3,872	\$2,811	\$5,661	\$2,095
Ages 1-5	\$1,271	\$1,464	\$1,002	\$443

SOURCE: AUTHORS' TABULATIONS OF MEPS DATA

Table 3.5 presents health care services value by health status for all children birth to age five. As expected, the cost of health care services is negatively associated with parents' report of child good health. While, again, this link may not be causal, it is logical; children with health problems, whether asthma, obesity, injuries, or rare conditions like cancer, require more intensive, and often more frequent, health care, driving up costs.

Of a sample of just under 3,500 children, very few parents reported their children to be in poor health (17 total), so while average cost for these children is reported in the text below, it is not included in the table. It is too small to be generalized to the nation as a whole. Indeed, only 86 children -- considered to be in the low range of sample size acceptable for use in calculations -- were reported to be in "fair" health.

Among the 3,455 children birth to age five in the sample of households surveyed, 45% were reported by their parents to be in "excellent" health, another 32% in "very good" health, 20% in "good" health, and tiny minorities -- 2% and 1/2 of a percent, respectively -- in "fair" and "poor" health. So while unhealthy children are, as expected, much more costly on average, their small number limits their overall contribution to young children's health care costs, and thus to its proportion of national GDP. This stands in contrast to the large number of preterm and low birthweight infants, whose added expenses contribute substantial sums to the total value of early childhood health care.

Table 3.5: 2007 Average Health Care Services Value, by Health Status

	Overall	Excellent	Very Good	Good	Fair
Mean	\$1,647	\$875	\$1,169	\$2,943	\$6,260
Total Number ^{xxxiv}	23,291,759	11,627,467	7,322,058	3,804,157	423,402
Total Value	\$38 billion	\$10 billion	\$9 billion	\$11 billion	\$3 billion

SOURCE: AUTHORS' TABULATIONS OF MEPS DATA

Another point must be emphasized: children's health status and insurance type may not be independent. Children with very poor health may prompt their parents to obtain eligibility for Medicaid or CHIP, for example, by making it difficult for one parent to work, which would reduce family income. In the same way, they might cause the family to lose employer-sponsored health insurance, irrespective of eligibility for public coverage.^{xxxv}

Discussion: Sub-group Breakdowns and Policy Implications

Age

Young children are the least expensive members of the population with respect to health care services. They are particularly inexpensive when compared to the most expensive group – retirees. This is not surprising; young children tend not to suffer from the chronic and costly illnesses – diabetes, heart, pulmonary, cardiovascular disease and cancer – that present in middle age and among the elderly.^{xxxvi} Table 3.6 shows 2002 values for comparison purposes.

Table 3.6: Average Annual Value of Health Care Services, Children versus Elderly, 2002\$

	Sample	Projected Nat'l	Mean	Projected Sum
Under 1 yr	468	4,075,635	\$ 3,167.24	\$ 12,908,515,511.00
1-5 yrs	2,635	20,366,124	\$ 1,079.98	\$ 21,995,063,812.00
Total 0-5	3,103	24,441,759	\$ 1,428.03	\$ 34,903,579,323.00
65 & Up	3,917	37,980,277	\$ 8,776.14	\$ 333,320,234,753.00

SOURCE: AUTHORS' CALCULATIONS BASED ON 2002 MEPS FIGURES

As stated earlier, however, there is a substantial difference between the cost of health care services provided to infants in their first year of life and toddlers and preschoolers, from age one through age five, with infants costing about three times as much, on average, per child. Much of this cost reflects the reality that the vast majority of U.S. births take place in hospitals. They are thus innately costly compared to health care services for other children, many of which are delivered in doctors' offices and through other less intensive means. However, a substantial portion represents the added medical products and procedures and longer hospital stays that are attributable to preterm and low birthweight births.^{xxxvii} The United States has the highest rate of such births among Western nations. In 2005, 8.2% of U.S. births were low birthweight and 12.7% preterm,^{xxxviii} with rates much higher among low-income women (11% low birthweight) and African Americans (14%).^{xxxix} Associated total annual medical costs are estimated at between \$7 billion and \$9.3 billion for low birthweight births and \$14.4 billion for preterm births.^{xl}

While birth-related problems are by no means entirely preventable, evidence suggests that some specific programs can reduce the rate. For example, programs to improve the health of the most at-risk women might help to prevent some of the health problems that can spur preterm births. Several states have enacted pilot programs to insure women who have already had a preterm birth and are thus at very high risk.^{xli} Improving access to prenatal care can increase, in particular, low-income women’s receipt of early counseling on proper nutrition, smoking, and other health-related factors that are known to negatively impact babies’ health at birth. In 2006, at least 3.6 percent of U.S. births occurred to women who received late or no prenatal care.^{xlii}

Finally, two large-scale social service programs have been shown to be quite effective at reducing the rate of low birthweight births among low-income, at-risk women. Studies of the federal WIC program have found that, on average, participation increases birth weight by 7.5% and that every dollar spent returns between \$1.50 and \$3.00 in the first two months of babies’ lives, mostly due to savings in better birth outcomes (Kowaleski-Jones 2002). Enrolling at-risk pregnant women and ensuring their access to healthy diets could thus help deliver more healthy babies and also save public dollars. The Nurse-Family Partnership, a health, education, and safety program for first-time teen mothers and their babies, has similarly reduced poor birth outcomes (McGroder and Hyra 2009). This improvement is likely due to the combination of connecting women with prenatal care providers and advice on nutrition and health during pregnancy.

Insurance by age and delivery source type

As described earlier, the average annual cost of health care for children birth to age five varies little between children with private versus public insurance.^{xliii} However, when cost is broken down by age, the two groups look quite different. The pattern seen among infants – for whom public insurance is associated with more care – is reversed for children ages one to five: privately-insured toddlers and preschoolers receive medical care valued in dollars at nearly 50% more than that of their publicly-insured peers, who, in turn, receive more than twice the dollar value of care of uninsured children. Figure 3.7, below, presents the data for all children and by insurance, age, and source.

Table 3.7: Per-Child Health Care Value, by Insurance and Delivery Source Types, 2007\$

<u>Insurance Type</u>	<u>All</u>	<u>Birth – 1 year</u>	<u>Age 1-5</u>	<u>Site/Source</u>	<u>Doctors’ office</u>	<u>Dental Visits</u>
Private	\$1849	\$2,811	\$1,464		\$482	\$75
Public	\$1,609	\$5,661	\$1,002		\$368	\$34
None	\$971	\$2,095	\$443		\$258	\$12

SOURCE: AUTHORS’ TABULATIONS OF MEPS DATA

A second breakdown of the data reveals underlying patterns: expenditures in doctors’ and dentists’ offices, the sources of most preventive care, for publicly-insured children are nearly 25% less than for their privately-insured peers. Expenditures for doctors’ visits for uninsured children, in turn, average 25% less in than for those who are publicly insured.^{xliv} The gap for dental care is more striking, albeit at a much lower level: children covered privately receive over twice as much in value of services as their publicly-insured peers, who, in turn, have almost three times the value of care of their uninsured counterparts.^{xlv}

There are many possible explanations for these discrepancies, and the data do not shed light on one versus the other (or on the likelihood of a combination of multiple factors). However, prior research sheds some light on unmet needs of young children, particularly those in poor and low-income families. Across the United States, 9 percent of all children and 16.6 percent of low-income children lacked health insurance in 2008, and trends show those numbers to be rising. In most states, children are eligible for SCHIP if their families live at 200% of the poverty level or lower.^{xlvi} Even so, in 2008, eight million children lacked health insurance. Of these, two-thirds were eligible for public coverage but not enrolled.^{xlvii}

The percentage of children who lack health insurance varies substantially from state to state and across regions. Indeed, in several Southern states, half or more than half of all children living at or below the poverty level are uninsured: Georgia (50%); Alabama (62%); and Mississippi (64%).^{xlviii} And in several others, children account for a substantial percentage of the total uninsured population: Florida (23%); Mississippi (24%); Nevada (25%); Texas (27%); and Utah (29%).^{xliv}

Other data show holes in access to basic care. For example, in 2005-2006, more than four in ten of children lacked a “medical home”, which is defined by the American Academy of Pediatrics as care that is accessible, continuous, comprehensive, family-centered, coordinated and compassionate;¹ and of the 25 percent of U.S. children who were at risk for developmental or behavioral problems or for social delays, fewer than one in five received the screening that was recommended. Such screenings are considered among the most cost-effective preventive medical services that young children can receive.

With respect to dental health care, young children are at high risk: 28 percent of children ages two to five have cavities, and, of these, 72 percent are in need of treatment.^{li} Among children overall, low-income children have more decay: middle-class children (whose families live at 300% of the federal poverty line or above) have an average of 0.3 teeth that are decayed or filled, and those living between 201% and 300% have about 0.6. Low-income children have many more: children between the poverty line and 200% have more than twice as many, an average of 1.4 bad teeth, and those living at or below poverty average 1.5.^{lii} Compounding this problem is a lack of basic preventive dental care for the very children who most need it. While nine million children lack health insurance, the number who do not have dental insurance is more than double that, twenty million, and of those enrolled in Medicaid, only 34 percent receive any dental service in a given year. This means that nearly two-thirds of young children most likely to have dental problems – cavities, caries, and associated health conditions and pain – go without the care they need.^{liii} Expanding dental care through a variety of strategies, including improving public health insurance programs, spreading school-based sealant programs, exploring dental workforce innovations, enlisting medical professionals to provide basic preventive dental services, and bringing fluoridation to communities that currently lack it, can help narrow, if not close, these critical gaps.

Conclusion

As set out above, proper early care, nurturing, and health services can help lead to healthier, less costly children and eventually to healthier, less costly, and more productive adults. Many of the unmet needs discussed above therefore represent a need for further investment. Among suggestions for policy makers to consider with respect to the size and allocation of this piece of the early childhood sector, several in particular stand out:

- Enhanced health care coverage for women of childbearing age who have already had a preterm birth, which could save substantial sums in avoiding future preterm births.
- Enhanced access to prenatal care so that pregnant women see doctors early and regularly.
- Expanded Medicaid and CHIP programs to ensure that all eligible children are covered, especially as the unemployment rate, and thus the rate of children who lack private insurance, increases during the economic downturn. This should include additional outreach as needed to increase participation among eligible children who are not currently enrolled.
- Increased appropriations for WIC and proven voluntary home visiting programs as necessary for the same reason. Studies of both programs demonstrate their cost-effectiveness and net benefits.^{liv}
- Attention not only to insurance coverage, but to *access* to basic preventive physical, mental, and dental health care services for low-income children.

The next chapter fills in this picture by describing the economic contribution to the economy of family expenditures on behalf of young children. The resulting full-sector analysis enables a comparison of the early childhood sector to other economic sectors.

References

- Centers for Medicaid and Medicaid Services, 2007 Medicaid Early & Periodic Screening & Diagnostic Treatment Benefit.
http://www.cms.hhs.gov/MedicaidEarlyPeriodicScren/03_StateAgencyResponsibilities.aspx.
- Child Poverty Prevention Council for Louisiana, Implementation Plan, February 2009, Submitted for Approval to the Louisiana Legislature Joint Committee on Health and Welfare.
- Currie, Janet, “Child Health and the Intergenerational Transmission of Human Capital,” VOX, July 19, 2008, accessed at <http://www.voxeu.org/index.php?q=node/1422>.
- Currie, Janet, Mark Stabile, Phongsack Manivong, and Leslie Roos, “Child Health and Young Adult Outcomes,” March 2009, Partnership for America’s Economic Success, accessed at: http://www.partnershipforsuccess.org/docs/researchproject_currie_200903_paper.pdf.
- Dye BA, Tan S *et al*, “Trends in oral health status: United States, 1988-1994 and 1999-2004.” National Center for Health Statistics, Vital Health Stat 11, 2007.
- Fertig, Angela and Phaedra Corso, “Why Business Leaders Should Care About Asthma,” June 2009, Partnership for America’s Economic Success.
- Fertig, Angela and Phaedra Corso, “Delivering Healthy Babies and Economic Returns,” Nov 2009, Partnership for America’s Economic Success, www.partnershipforsuccess.org.
- Gehshan, Shelly, “Meeting the Oral Health Needs of Children,” Presentation, Pew Center on the States, February 2, 2009.
- Gould, Elise 2009. Childhood lead poisoning: Conservative estimates of the social and economic benefits of lead hazard control. *Env Health Perspect*. doi: 10.1289/ehp.0800408, accessed at <http://dx.doi.org>.
- Guyer, Bernard, Sai Ma, Holly Grason, Kevin Frick, Deborah Perry, Alyssa Wigton and Jennifer McIntosh, “Investments to Promote Children's Health: A Systematic Literature Review and Economic Analysis of Interventions in the Preschool Period,” January 2008, Partnership for America’s Economic Success, accessed at: http://www.partnershipforsuccess.org/index.php?id=7&tag_item=999.
- Johnson, Rucker and Robert Schoeni, “The Influence of Early Life Events on Human Capital, Health Status, and Labor Market Outcomes over the Life Course,” National Poverty Center Working Paper, January 2007, accessed at: <http://www.psc.isr.umich.edu/pubs/pdf/rr07-616.pdf>

Johnson, Rucker and Robert Schoeni, “Early-Life Origins of Adult Disease: The Significance of Poor Infant Health and Childhood Poverty,” Working paper, accessed at: http://socrates.berkeley.edu/~ruckerj/johnson_schoeni.EarlylifeOriginsAdultDisease_9-07.pdf.

Kaiser Family Foundation, Health Reform website, <http://healthreform.kff.org>.

Kashihara, D. & Carper, K., “National Health Care Expenses in the U.S. Civilian Noninstitutionalized Populations 2006.” Statistical Brief #229, December 2008. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/st229/stat229.pdf

Kowaleski-Jones, L. et. al. (2002). Effects of Participation in the WIC Program on Birthweight: Evidence from the National Longitudinal Survey of Youth. *American Journal of Public Health* 92(5):799-804.

Martin, Joyce A., Brady E. Hamilton, Paul D. Sutton , Stephanie J. Ventura, Fay Menacker, Sharon Kirmeyer, and Martha L. Munson, “Births: Final Data for 2005.” National Vital Statistics Reports vol. 56 no 6. December 2007, National Center for Health Statistics.

Martin, J.A. et al, “Births: Final Data for 2006,” National Vital Statistics Reports vol.57 no7, 2009, National Center for Health Statistics.

McCarthy, Douglas, Sabrina K.H. How, Cathy Schoen, Joel C. Cantor, and Dina Belloff, “Aiming Higher: Results From a State Scorecard on Health System Performance, 2009,” October 2009, The Commonwealth Fund.

McGroder, Sharon, and Allison Hyra. “Developmental and Economic Effects of Parenting Programs for Expectant Parents and Parents of Preschool-age Children.” Partnership for America’s Economic Success, March 2009. http://www.partnershipforsuccess.org/docs/researchproject_mcgroder_200903_paper.pdf

Murphy, Carolyn, Stephanie Ettinger de Cuba, John Cook, Rachel Cooper and James Weill, “Reading, Writing and Hungry; The Consequences of Food Insecurity on Children, and on our Nation’s Economic Success,” Partnership for America’s Economic Success, November 2008.

Health Resources and Services Administration’s Maternal and Child Health Bureau, “The Health and Well-Being of Children: A Portrait of States and the Nation 2007,” 2009, Washington, D.C., available at www.childrenhealthdata.org.

Rosenbaum, Sara, Michelle Proser, and Colleen Sonosky, “Health Policy and Early Child Development: An Overview,” July 2001, The Commonwealth Fund.

Selden, Thomas M. and Merrile Sing, “Aligning the Medical Expenditure Panel Survey to Aggregate U.S. Benchmarks,” July 2008, Agency for Healthcare Research and Quality Working Paper No. 08006, <http://gold.ahrq.gov>.

Shea, Katherine K., Karen Davis, and Edward L. Schor, “U.S. Variations in Child Health System Performance: A State Scorecard,” May 2008, The Commonwealth Fund. Accessed at: http://www.commonwealthfund.org/~media/Files/Publications/Fund%20Report/2008/May/U%20S%20%20Variations%20in%20Child%20Health%20System%20Performance%20%20A%20State%20Scorecard/Shea_Child_Health_rev_6%206%2008_optimized%20pdf.pdf.

Chapter 3: The Value of Household Expenditures for Young Children⁸

Economic Impacts of Early Childhood Consumption of Goods and Services

The third piece of investment in young children encompasses all of the products and services purchased by families on behalf of infants, toddlers, and preschoolers, as well as federal expenditures that support the Birth-to-5 population. While not often discussed in prior analyses of the benefits of programs and policies that provide support for young children – which have tended to focus on early care and/or education, sometimes with the addition of children’s health care – such items are an integral part of the early childhood economic sector. Like expenditures on children in components one and two, these “other consumption” items are a critical part of raising children from birth to age five, and the quantity and quality of consumption items available have both social and economic impacts. Indeed, food, shelter, and clothing are the most basic and essential of items; without them, young children would literally not be able to live.

Like the other components, this one contributes value to society in employment at several levels and helps to stimulate the economy. Also like early care and education and health care goods and services, some childhood consumption of goods and services provides not only familial, but societal benefits. While we tend to focus, when we think of consumption by young children, on child-specific items – diapers, carseats, formula, board books, bunk beds and even swing sets – it is the larger-ticket items that children share with other members of their families that comprise the lion’s share of this “piece” of the sector, and that carry most of those economic implications.

The first of these is food. Children who are well fed and properly nourished are not only happier and healthier, they bring about benefits to society, both immediately and in the long term. Such children have fewer emergency room visits as infants and toddlers compared to their hungry or undernourished peers, they develop stronger immune systems, they are less often sick, and, perhaps most fundamental of all, these children develop the strong early minds and bodies that form the basis for the learning, play, and social engagement that set the stage for the rest of their lives (Murphy et al 2008). The importance of good nutrition begins before children are born; pregnant women who eat well give birth to babies who are, on average, of healthier weights and are less likely to develop obesity early in life (Bergner 1970, Black 2005, and Dubois 2006). And school-age children who are not hungry and eat regular nourishing meals learn better (including better test scores) and behave better (they get into fewer fights) (Jyoti 2005, Murphy 1998). So ensuring that young children eat well and regularly saves money – in hospital and other medical costs as well as for schools.

To the extent that children who eat regularly, enough, and well are less likely to be obese and learn more in school, those short-term cost savings can translate into substantial ones over their lives. Children who are not overweight are less likely to become obese adults, and thus to develop diabetes, high blood pressure, and a range of other health conditions that limit their job

⁸ Elaine Weiss, Project Manager, Partnership for America’s Economic Success, Pew Center on the States

and life prospects and cost them, their insurers, and taxpayers large sums in health care costs. If the added school attainment translates into high school graduation or college attendance or completion (versus not at any of those points), it can mean substantially higher odds of obtaining a good and reliable job and of earning a living wage. Early nutrition, in other words, can set a child on the path to a healthy, successful life or, conversely, put in place obstacles that can add up in individual and societal costs.

Housing also plays a major role in setting children on the right path. Unhealthy housing – homes that are pest-infested or contain asthma triggers – can cause health problems ranging from relatively benign sniffles to dangerous rat bites and acute asthma attacks.^{lv} Such conditions are disproportionately prevalent in public and other low-income housing,^{lvi} where lead paint can also pose a danger. While the sorts of quality problems that plagued low-income families in prior decades (lack of plumbing, insufficient electricity, etc.) are very rare outside of isolated rural areas, pests and other asthma triggers are again on the rise in some urban neighborhoods.^{lvii}

More prevalent, however, and also more costly to children, and society, are the impacts of unaffordable housing for a large and growing number of children. Having to struggle to afford the monthly rent payment leads to a variety of problems that can have long-term consequences for young children in particular. These include the family's inability to pay for other basics, including food, clothing, and health care. One study found, for example, that lower-income families who spent half or more of their income on housing had only \$536 left to cover all their remaining expenses. This meant that they spent: 30 percent less on food; 50 percent less on clothing; and 70 percent less on health care than families with housing expenses of 30 percent or less of their income.^{lviii}

When families struggle to pay for housing, they are also more likely to move and to move more frequently, which turns out to also have serious consequences for children. In the immediate term, switching homes and care providers can hamper young children's healthy play development, an indicator of later school readiness. Down the road, too many early moves can substantially reduce a child's later odds of graduating high school; one study found that high school graduation was reduced by 19 percent among children who had moved three or more times between the ages of four and seven, compared to their non-moving peers (Haveman and Wolfe 1991). Low-income children are more likely to move, and to move more frequently, with consequences exacerbated by the fact that, according to research, frequent moves are particularly damaging for children who are otherwise vulnerable. In general, children can be quite resilient in the face of adversity. At the same time, children with multiple risk factors have less of a cushion – financial, psychological, physical, and emotional – to help them survive frequent moves without incurring cognitive and social delays.

Transportation is even less likely to be considered of economic consequence to young children, but there are many ways for it to influence family, and thus child, well-being. When a family cannot afford a car, it can create obstacles to parents' obtaining reliable jobs and/or cause frequent delays in arriving at work that can cause worker penalties, especially in low-wage contexts. Similarly, lack of accessible, reliable modes of transportation can make child care, preschool, and other early childhood services substantially more time-consuming and difficult.

In sum, while it is intuitively clear that providing for children’s basic needs is important, the societal impacts of doing so well or less well have not been so obvious. Research shows that providing children with these fundamental goods and services at sufficient quality and quantity, especially food and housing, can have real economic benefits, both immediately and for years afterwards. It is therefore critical to understand not only the size of the third component of early childhood sector investment, but how that size measures up against children’s needs. In addition, this analysis seeks, as it does in the prior two chapters, to set forth the shape of the sector, in order to make clear how resources within that “size” are allocated, and where unmet needs appear to be most pressing.

What Constitutes Economic Value in this Component

As in the two pieces of the ITP sector calculated and discussed above, economic value for the third component is measured based on expenditures on the goods and services included. These encompass a range of items that are not included in either the ECE or health care analyses.^{lix} In some cases, this spending is straightforward and easy to measure. For example, the purchase of baby food, infant clothing, or strollers is clearly attributable in total to young children. Similarly, spending on alcohol or tobacco is not at all attributable to young children. In other cases, purchases such as swing sets are likely associated with children, but not necessarily only with children under age six. Clothing purchased for a first child may later be “consumed” by younger siblings as well.

Even more broadly, there are many purchases that a family makes that are not designated for consumption by a young child, but which were precipitated by the arrival of one or more children, most notably the purchase of a new home.^{lx} Food that is not specific to infants or toddlers must likewise be assumed to be partly, but not entirely, attributable to the population of interest. Any partial value of such consumption that is attributable to young children is thus also included in this third piece of the economic sector.^{lxi}

While purchases of child-specific items might seem the most likely driver of spending on infants, toddlers, and preschoolers, that category contributes little in total value. For example, while the average expenditure on toys among families that have a young child is nearly twice that of families that only have children older than six (\$294 versus \$155 annually), in the larger analysis, such differences are insubstantial. (Spending on toys among both groups was less than half a percent of after-tax income, on average.) It is also worth noting that, broken down into the major categories of family consumption (with ECE and health care accounted for separately), relative allocation of family resources among households with young children is, in aggregate, fairly similar to that of most others: housing (48 percent), food (17 percent), transportation (16 percent), and clothing (8 percent), as well as the miscellaneous other items needed for everyday life (11 percent). (The definitions and specific composition of these categories are discussed below.)

How Economic Value is Measured

The total dollar amount of this investment reflects the economic value of a range of actions – innovation, production, and commerce – that are engendered by infants, toddlers, and

preschoolers. Such activity employs a large labor force, but, as is true of the second component, not one that is singly devoted to the EC sector. While limited private sector data exist to estimate roughly the FTEs devoted to the production of specific products, that information would not allow for an estimate of anything close to the many goods and services produced on behalf of young children. It would thus be impractical to estimate the share of the national labor force that belongs to this component of the sector. The economic value of this labor, however, is represented in the total value of sector consumption, which is well captured by consumer survey data. Employing this dataset also allows the paper to consistently base its estimates across all three components on consumption data, albeit, of course, from very different sources.^{lxii}

Data

The data used to measure economic value are from the Consumer Expenditure Survey (CE), an annual survey conducted by the Bureau of Labor Statistics (BLS). Much like MEPS' collection of data to calculate national spending on health, this survey is used to produce national estimates of total household expenditures (including spending on health and education – early and other). The data, which are collected at the “individual consumer unit” (similar to a household) are matched to each unit's demographic characteristics, including members' age and the number of people in the unit.^{lxiii} Survey information is collected on a broad range of consumption goods, including, as noted above, items related to housing, food, transportation, and clothing, as well as medical care and education, entertainment, and a variety of other categories.^{lxiv}

While the data provide a comprehensive picture of spending on a wide range of items, they do not attach to particular children, nor does household spending on non-baby or toddler-specific categories break down by child. It was therefore necessary to determine which portion of spending on non-child-specific items, and categories, should be attributed to the children ages zero-to-five who are the subject of this sector analysis. The basic aspects of this methodology are described below, and a more detailed description, with backup tables, is provided in Appendix 3.

Methodology

The CE is comprised of two elements: a quarterly interview and a two-week diary. Two sample groups of consumer units are surveyed, with the first providing detail over the course of a year in three-month increments, and a separate sample reporting spending, based on daily diaries kept for survey purposes, over two consecutive weeks.^{lxv} The latest full year of spending data to be published, which are employed in this research, were collected in 2006 and 2007.

As noted above, some expenditures collected in the survey were very clearly relevant (or irrelevant) to our population of interest. The former include infant's apparel and baby food, and the latter include, among other things, alcohol, tobacco, and college tuition. Most expenses, however, are attributable, but only partially, to the ITP sector. For example, children's apparel is its own expense category, but is defined for survey purposes as apparel for children between the ages of two and fifteen. If children of other ages reside in the consumer unit, it is not possible to determine, based only on the data, how much was spent on ITP children.

In order to sort through which expenditures should be attributed to which members of the consumer unit, and particularly to children birth-to-five, we used estimates prepared by the U.S. Department of Agriculture (USDA) of the partial relevance to children of the expenditures in the Consumer Expenditure Survey.^{lxvi} Their methodology excludes families without children and any children who happen to be living with parents who are under the age of 18. From this subsample, the USDA Report groups household expenditures into seven categories, whose components are described below.

Prior to using the USDA estimates, differential patterns of spending were explored across families of various ages and sizes who did and did not have children ages birth to 5. These explorations helped assess, for example, how food, clothing, and transportation budgets were expended among families with ITP children versus those without them. As expected, the presence of a young child shifted spending from adult dress clothing to onesies. With respect to consumption of food, similar amounts of money tended to shift from prepared foods and meals in restaurants to larger quantities of groceries and milk as the family grew to include children.

Figure 4.1: Categories of Household Expenditures

Housing: shelter (rent; mortgage; maintenance and repairs; and insurance); utilities; furnishings and equipment (small and large appliances, furniture, floor coverings)

Food: food and non-alcoholic beverages purchased at grocery, convenience, and specialty stores, including purchases using Food Stamps/SNAP, and restaurant and school meals

Transportation: down payments and monthly payments on vehicles; gasoline and oil, maintenance and repairs, and public transportation (including airline fares). Only family transportation, and not parents' work-related transport, is included.

Clothing: children's apparel, including socks, shoes, etc. and alterations/repair

Healthcare: medical and dental services and prescription drugs and medical supplies not covered by insurance; health insurance premiums; physical and mental health services*

Child Care and Education: day care tuition and supplies; babysitting; elementary and high school tuition, books, fees, and supplies*

Miscellaneous: personal care items, entertainment, and reading materials

Source: USDA Report, page 2 *Excluded from this chapter/estimate

These categories represent all of the spending that the CE-Interview captures.^{lxvii} However, including household expenditures on Early Care and Education and on Health in this estimate of the third component would have led to double counting certain expenditures, so this estimate focuses on five categories only: Housing, Food, Transportation, Clothing, and the "Miscellaneous" items, such as toiletries, that do not fall into any of the specific categories.^{lxviii} After estimating household expenditures in each category, the USDA analysis allocated them to children. Because, as set out above, some categories lend themselves more easily than do others to distinguishing young children from other household members, USDA employed a variety of methods to tease out those numbers.^{lxix}

While details are provided in the Appendix, a few core features of the use of the data are set out here. First, in order to be consistent across all three components of the early childhood sector, dollar values in the USDA report are deflated to 2007 dollars, using the category-specific values of the GDP where possible. For each of the 48 “types” of child reported by USDA, the Current Population Survey (CPS) was used to estimate the relevant current U.S. population of children under six.^{1xx} Each average expenditure was then multiplied by the corresponding population number, producing a national estimate of the total value of this third component.

The Size of the Third Component – Family Consumption on Behalf of B-5 Children

Table 4.1 expresses the economic value of the ITP sector’s third component in billions of 2007 dollars and as a percentage of 2007 GDP. The national estimate of economic value of this third component is \$191 billion, which translates to 1.35 percent of 2007 GDP. The size of this contribution to the sector – which is the largest of the three, but is frequently overlooked when assessing young children’s economic contribution to society – illustrates the importance of a full analysis. One useful way to view this total is to see it broken down into the various components of family spending, as presented here:

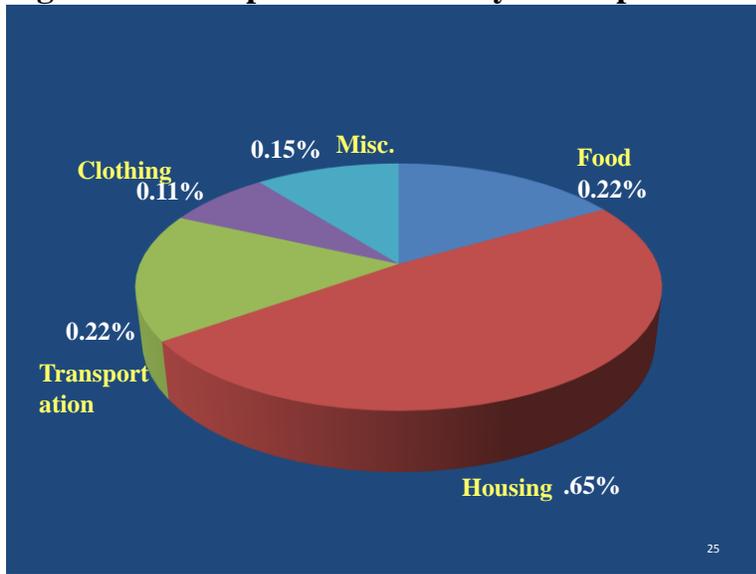
Table 4.1: Dollar Value of U.S. Family Expenditures on Behalf of Children Birth-to-5 and Major Components, 2007

	<i>Housing</i>	<i>Food</i>	<i>Transport</i>	<i>Misc.</i>	<i>Clothing</i>	<i>Total</i>
<i>2007USD, billions</i>	92.0	31.6	31.3	20.6	15.1	190.7
<i>ITP \$, Share of component</i>	\$3,800 48%	\$1,300 17%	\$1,300 16%	\$850 11%	\$600 8%	\$7,800 100%

Source: Tabulated by authors based on GDP-Adjusted CEX, using USDA methodology

It is also informative to see all family expenditures on behalf of young children broken down as shares of the component’s contribution to the national economy; housing for these children alone represents over half of one percent of U.S. GDP.

Figure 4.2: Components of Family EC Expenditures as Share of GDP



It is not possible to produce “benchmark” numbers that compare spending in families with and without B-5 children, as households spend most of their income irrespective of family structure; such children just shift the family’s specific needs.^{lxxi} Indeed, comparisons of mean expenditures across families of different structures provide some illustrative examples. For example, it is common for a childless couple to spend \$1,500 per month on the rental of a mid-town studio apartment and, anticipating or just after the birth of a baby, move to a suburb of that city, where they pay the same \$1,500 per month on a mortgage for a 3-bedroom starter house. Similar patterns are seen with respect to food – pricey ingredients and take-out change into larger numbers of less expensive meals at home when children are present – and clothing – less is spent on cocktail dresses and more on onesies and Stride Rite shoes.

Expenditures by Sub-Group: Lower-Income and Single-Parent Households

While the USDA report does not break down data by income level in a way that allowed for the comparison of poor versus non-poor and/or middle-income families, it did allow for the examination of differences in spending patterns between the two income categories it employs. It also provides such patterns for single- versus dual-parent homes. In the sample, lower-income household units earn a maximum of \$55,000 (2007\$), well above the 200 percent of the federal poverty line that would allow families to provide for the basics, but, as discussed below, single-parent households earn, on average, far less than that. As Table 4.2 below demonstrates, backed by extensive research, young children living in single-parent households receive fewer resources than their peers who live with both parents and are thus more likely to go without the “basics.”

Table 4.2: Average Expenditure per Child, \$2007 and Percentage of 3rd-Component Spending

<i>Household structure</i>	<i>Avg. Income (% for ITP)</i>	<i>Housing</i>	<i>Food</i>	<i>Transportation</i>	<i>Total</i>
Low-income*					
2 parents/1 ITP	\$35,000 (9.9%)	\$3,465 (35%)	\$1,280 (13%)	\$1,268 (13%)	\$9,976
1 parent/2 ITP	\$24,000 (10.7%)	\$2,609 (37%)	\$1,176 (16%)	\$676 (10%)	\$7156
Higher-income**					
2 parents/1 ITP	\$74,000 (6.2%)	\$4,545 (33%)	\$1,527 (11%)	\$1,811 (13%)	\$13,604
1 parent/2 ITP	\$99,000 (5.4%)	\$5,401 (36%)	\$1,762 (12%)	\$1,736 (12%)	\$15,099

Source: Authors' tabulation of GDP-Adjusted CEX * (\$56,000/yr) max ** (\$56,870 and above)

The percentage of total expenditures devoted to each category of necessities remains much the same across families at different income levels, and single-parent versus dual-parent households. Given that the vast majority of American families save very little of their earnings – meaning that they spend virtually all of their income – for many, this means allocating most of those earnings across the above categories. Actual dollars spent, however, vary substantially, based on differences in resources available.

Among lower-income households, single-parent families spend 25 percent less each year on housing than do their dual-parent peers.

This is true both overall – in terms of total dollars devoted to ITP children – and in each spending category. Across all four categories, the proportion of total (non-ECE and health care) housing expenditures range only between 33 percent and 37 percent among the four types of households: low-income single- and dual-parent units and both kinds of higher-income units. Dollars spent on housing per ITP child, however, vary from just over \$2,600 for lower-end single parents with two children to over double that, \$5,400, for a higher-income parent with two young children.

Absolute expenditures in each consumption category do not vary as much between lower-income single- and dual-parent households, as these households have fewer overall resources to invest in their young children. This is likely due to two factors. First, as Table 4.2 figures above demonstrate, within the lower-income group, earnings of single-parent families are substantially lower than those of households with two parents.^{lxxii} In addition, single-parent households need, on average, more child care, as there are fewer parental resources to fill in that need. Moreover, recent data from state records and other sources regarding the degree to which children's basic needs are met (and, in an increasing number of cases, not being met) also shed light on the implications of these spending patterns.

Analysis/Discussion

As set out above, the third component of the early childhood sector is the largest of the three, representing 1.35 percent of GDP. As is also true of the other two, there are indications, based on these data and on information from states across the country, that substantial unmet needs exist in at least two fundamental areas of child consumption that are assessed here. In particular, in spite of federal and state programs to meet the needs of low-income families with respect to these two basics, large numbers of children still lack food and/or housing that is of sufficient quantity and quality to meet their needs and promote their healthy development. Moreover, as mentioned above, these two areas of spending are closely intertwined; families spending too much of their income on housing find themselves unable, as a result, to feed their children three nutritious meals a day. In this section, we discuss evidence of such unmet needs and suggest potential options for addressing them.

Unmet Needs

Across the nation, family consumption on children outside the areas of early care and education and health care amounts to \$191 billion in 2007 dollars. It is difficult to say, based only on that figure, whether this expenditure for young children is sufficient, since the available data provide information on how much is spent, but not how that amount compares to what ITP children need.

However, other available data do shed light on the degree to which young children's needs are being met to a degree that supports their healthy development. Income and expenditure levels of roughly twice the federal poverty level (FPL) are increasingly accepted as those that are required to meet basic needs. The 2007 FPL was \$22,100 for a family of four with two children, meaning that, at about \$44,000, on average, parents should be able to provide food, shelter, and clothing without having to make trade-offs among those basic items. However, Census data show that 40 percent of young children live in families with incomes below 200 percent of the FPL, and the most recent data show one in five children live in families that earn below the poverty level itself.

Many poor and low-income children B-5 receive federal benefits that supplement family income, so their expenditures may be adequate to meet specific basic needs. Indeed, recognizing that below this income level families can work full-time, but still be unable to meet their needs for basic necessities, many federal programs – such as the Earned Income Tax Credit, CHIP, and free- and reduced-price school breakfast and lunch – assist families who fall below it. CHIP, for example, was enacted in part in response to the recognition that Medicaid's coverage of children at 100 percent of the poverty line left a very large number of children without basic health care. And while 200 percent of the FPL tops eligibility in most states, over a dozen states have established higher cut-offs of 250 percent or even higher, again, recognizing unmet needs.

Food

Recently-released numbers show that, in 2008, nearly one in four U.S. children met the federal criteria for “food insecurity” – lacking “enough food for an active, healthy life for all household members.”^{xxiii} In plain English, this means that fully 25 percent of American children lacked basic meals – an increase of 32 percent from the 17 percent who were food insecure in 2007 –

and this does not address the nutritional level of the meals that they do receive. Nor does it account for the reality that very young children tend to have higher rates of food insecurity and other poverty-related deficits than do children (zero-to-eighteen) as a whole. Not all food insecure children actually go hungry, but those same new numbers find that 17 million children did experience hunger at some point. Again, this number represents a substantial increase of 25 percent from the already large number of 13 million children who went hungry in 2007.

While Congress has responded to growing child poverty and hunger numbers through increases in SNAP allocations and expenditures,^{lxxiv} a combination of unmet demand and some eligible but still-unenrolled children may merit policymaker attention. The USDA reports, for example, that only 67 percent of those currently eligible for SNAP benefits currently receive them, so a first step may be more outreach to eligible families.^{lxxv}

With more family budgets stretched thin and other resources unavailable, SNAP is likely to play an increasingly important role in filling this gap. Indeed, a recent study finds that, over the course of their lifetimes, half of all American children will, at one time or another, live in a household that receives SNAP/food stamps benefits. And one in five children relies on SNAP for extended periods, often several years. The study's author states that "the period of childhood, rather than a period of safety and security, is really a time, for a lot of kids, of economic turmoil and risk."^{lxxvi}

Housing

Another direct measure of meeting children's needs comes from statistics on children's housing needs and circumstances. As discussed above, low-income children are particularly vulnerable because their families are more likely to rent, rather than own, their homes. While home ownership is no guarantee of stability, as the current housing crisis has made abundantly clear, rentals by families with limited resources can expose children to frequent moves when rent is raised. As of 2005, prior to the current housing crisis, low-income families in nearly every state were already having trouble paying for housing and other basic needs:^{lxxvii}

- In 44 states, more than half of low-income families were spending 30 percent or more of their income on housing. As discussed above, housing burdens above 30 percent may put households at risk of having to make difficult trade-offs among other basic needs;
- In ten states, at least two-thirds of low-income families were housing burdened; and
- In four states, including California, three quarters or more of such families were burdened.

Even more troubling, the percentage of families with young children paying half or more of their income on rent – those considered "severely housing burdened" and making substantial cuts to other basic needs – ranged recently from 10 percent in Nebraska to nearly 25 percent, or one in every four, in New York. For an infant, toddler, or preschooler who relies on not just regular meals, but milk, fresh produce, and other more expensive foods to build a healthy body and immune system, such reductions can have serious consequences, both short- and long-term.

Not being able to pay the rent also increases frequent moves, which negatively affect not only individual children, but also schools themselves, from the classroom to the entire school district. Evidence that states feel the burden can be seen in the Michigan Department of Human Services'

2004 enactment of a pilot rent subsidy program. Turnover-heavy Flint decided to help families of school-age children stay in their homes in an attempt to stabilize schools. The first iteration of the pilot resulted in rapid reductions in the number of moves by participating families and test score increases among their third grade children.^{lxxviii}

At the extreme, children whose families cannot pay mortgage or rent, who have lost their homes, or who have exhausted other options become homeless. Not surprisingly, being without a home has numerous negative consequences for those children, physically, emotionally, and cognitively. While we tend to think of homeless single men, young children are a large and growing segment of the homeless population; of all children living in families that were homeless in 2008, 42 percent were under the age of six.^{lxxix}

Overall, then, this third component of the estimate of the early childhood economic sector demonstrates two key points: 1) the early childhood sector represents a substantial contribution to national economic value (just under 3 percent), as measured by GDP; and 2) like the other two components, this one shows unmet needs in areas critical to young children's healthy development.

References

- Bergner, L. and M.W. Susser (1970). Low birth weight and prenatal nutrition: an interpretative review. *Pediatrics* 46:946-966.
- Black, S., et. al. (2005). From the Cradle to the Labor Market? The effect of birth weight on adult outcomes. *National Bureau of Economic Research*, Working Paper 11796.
- Brunekreef, Bert, D. W. Dockery, F.E. Speizer, J.H. Ware, J.D. Spengler, and B.G. Ferris. 1989. Home dampness and respiratory morbidity in children. *American Review of Respiratory Diseases* 140(5):1363-67.
- Dubois, L. et. al. (2006). Family food insufficiency is related to overweight among preschoolers. *Social Science and Medicine* 63:1503-1516.
- Eckholm, Erik, "To Avoid Student Turnover, Parents Get Help with the Rent," *New York Times*, June 24, 2008.
- Fernandez, Manny. "Albany Panel to assess health risks of mold." *New York Times*. December 3, 2007.
- Haveman, Robert, Barbara Wolfe, and James Spaulding. "Childhood events and circumstance influencing high school completion," *Demography* 28(1):133–157, 1991.
- Joint Center for Housing Studies of Harvard University, *The State of the Nation's Housing* 2003. Accessed at: <http://www.jchs.harvard.edu/publications/markets/son2003.pdf>.
- Jyoti, D. et. al. (2005). Food insecurity affects school children's academic performance, weight gain, and social skills. *J. Nutr.* 135:2831-2839.
- Murphy, J.M. et. al. (1998). Relationship between hunger and psychosocial functioning in low-income American children. *Journal of the American Academy of Child and Adolescent Psychiatry* 37(2):163-170.
- Murphy et al 2008, "Reading, Writing, and Hungry: The Consequences of Food Insecurity on Children, and on our Nation's Economic Success," November 2008, Partnership for America's Economic Success, http://www.partnershipforsuccess.org/uploads/20090107_FoodReport.pdf.
- National Center on Family Homelessness, "The Characteristics and Needs of Families Experiencing Homelessness," April 2008.
- Roy, Joydeep, "The Hidden Costs of the Housing Crisis: The Impact of Housing on Young Children's Odds of Success," July 2008, Partnership for America's Economic Success, www.partnershipforsuccess.org.
- Szabo, Liz, "Study: Half of U.S. kids will receive food stamps," November 5, 2009, *USA Today*.

Conclusion: Investing Adequately and Wisely in Young Children

Children's earliest years of life start them on a trajectory of experiences, opportunities and risks that can affect their odds of success – at home, in school, and as adults in the workforce -- and therefore shape the nation's overall level of economic growth and productivity. Expenditures on behalf of young children that promote the positive effects of early childhood experiences and opportunities constitute an investment in our economic future.

This research was conducted to determine the total economic value of those national resources. This set of expenditures is referred to as the Early Childhood Sector (ECS) of the economy, parallel to resources devoted to building bridges or sustaining the insurance industry. The sector analysis addresses three key questions:

- How much is invested in children birth-to-five, expressed as equivalent to a share of Gross Domestic Product (GDP)?
- Is this level of investment adequate to meet the needs of young children?
- Are funds allocated to effectively meet the needs not only of children, but of society?

This report addresses these questions both for the overall sector and for each of its three components – Early Care and Education (ECE); Health Care; and Family Expenditures.

Total National Investment in Young Children

Overall national investment on behalf of young children is equivalent to 2.9 percent of GDP, slightly more than one third the 8.2 percent share of the U.S. population that is in that age group^{lxxx}. This does not necessarily indicate that the investment is inadequate. It may be less expensive to meet the needs of young children than it is to support teens or adults. The analysis of each of the three components is therefore critical in determining whether the current investment level in each area meets the needs of and promotes the full economic potential of young children.

Based on the findings of those component analyses, current national investments in young children appear to be inadequate. Too many young children are in low-quality ECE, which means lower levels of early learning and social development. In spite of federal efforts to boost insurance rates and access to basic care, nearly one child in ten lacks health insurance, and even among those who are insured, some lack full and timely medical and dental care. Finally, a large and increasing number of young children live in families that cannot afford to meet their basic needs; these children suffer from hunger so that their families can pay fixed monthly housing costs, and they and their families may lack adequate heat, clothing, and transportation. These deficiencies generate economic inefficiencies and social disparities, with negative short- and long-term consequences for society as a whole.

Early Care and Education

The investment in the ECE of young children is equivalent to roughly 1.1 percent of GDP, or \$157 billion in 2007. This includes the prices paid for market-based ECE in centers or family child care homes (FCC) operated as a business (0.25 percent), public pre-kindergarten programs,

including Head Start (0.03 percent), and the wages foregone by parents caring for their own children (0.68 percent) and by family, friend or neighbor (FFN) caregivers (0.10 percent).

National measures of ECE service quality, overall and differentiated by social and economic groups, combined with disparate outcomes for young children in those groups, provides substantial evidence that this level of spending is inadequate. The majority of ECE currently provided in the United States has been demonstrated to be of low-to-mediocre quality, and low-income and non-white children disproportionately are served in such settings. Partly as a result of this, disadvantaged young children have significantly lower average levels of early cognitive, social-emotional and self-regulatory development. The inadequacies and disparities evidenced in these early years persist through school as achievement gaps, and through adult life in the form of reduced earnings and economic productivity.

It has been estimated that achieving high-quality early learning opportunities would increase the current average cost of ECE by about 25 percent. While this represents a substantial increase over current investments, it is cost-effective in long-term economic and societal benefits.

A second indicator of inadequate investment is the relative imbalance of expenditure between early education and K-12 schooling. The birth-to-five population is almost half the size of the school-age population, but total ECE spending is only about 11 percent as large as that spent on public elementary and secondary education. Since the annual cost per child of high-quality ECE is approximately the same as the per-student cost of public school, the relative investment should be close to 50 percent. Only about 17 percent of national investment in ECE is through public funding and tax incentives, with parents and relatives making up most of the difference through fees or their own foregone wages. This is much lower than elementary, secondary and higher education, where the vast majority of funding is from public sources.

An important result of this under-investment is the lack of a skilled and educated ECE workforce. The low qualifications and compensation of the people who are paid to care for, nurture, and educate young children are a major factor in the low levels of quality and investment. While the ECE workforce is large— 2.2 million individuals, accounting for 31 percent of the total U.S. instructional workforce – those workers have low average educational qualifications and wages. Moreover, even accounting for their low qualifications, ECE staff are currently paid an average of 31 percent less than female workers with similar qualifications who work in other occupations. Eliminating this wage differential would increase the economic value of ECE by 22 percent.

Increasing educational qualifications to require a college degree plus certification would generate substantial increases in the price and economic value of non-parental ECE, but there is evidence that it could contribute to children's developmental gains.

Unfortunately, an increase in staff qualifications and compensation of this scale would make the cost of pre-k programs unaffordable for most families, just as the \$9,700 annual cost of public K-12 education would be unaffordable without public financing. Thus, an increase in financial support to families would be required to support the costs of achieving the quality of ECE that would fulfill young children's learning potential.

In particular, three types of policy change would improve the efficacy and efficiency of ECE investments overall.

- *Increase performance standards and compensation of ECE staff, including through significant investments in professional development.*

It is neither feasible nor desirable to rapidly replace a workforce of 2.2 million mostly low-skilled individuals with a new set of more highly qualified workers. The initial focus must therefore be on upgrading the knowledge and skills of the current workforce, while at the same time recruiting better qualified individuals to fill future job openings. Professional development of the current ECE workforce is also required to maintain the current cultural diversity of the ECE workforce while improving its qualifications. If higher staffing standards were to be achieved by requiring ECE workers to obtain higher pre-service educational qualifications, such as BA degrees, this could result in the lack of diversity among instructional staff faced by many public K-12 schools. This is a particular problem in settings with high percentages of non-white students. Head Start has used the approach of supporting in-service professional development and managed to increase the share of teachers with college degrees while maintaining cultural diversity.^{lxxxix}

- *Link financial investments directly to quality at both the program and individual staff levels; provide venture capital to support quality improvement.*

The majority of ECE payments are not linked to demonstrated quality, and the system contains insufficient financial incentives for improvement. Head Start has in place performance standards, but most payments to contractors are not linked to how well those standards are met.

However, models exist to improve circumstances in this area. A number of states have moved to link their ECE payment levels to quality by implementing Quality Rating and Improvement Systems. Agencies then provide differential rates of subsidy reimbursement to providers, based on the level of quality standard they achieve.

Several states have linked parental and provider tax credits to quality rankings. These quality levels are mostly based on such structural characteristics as child to adult ratios and teacher education levels, which may not be monitored or consistently enforced. Only two states – Tennessee and North Carolina – require an annual external observation and rating of all licensed facilities.

A major challenge occurs when programs or facilities are asked to pay for costly improvements, such as reduced child to adult ratios, in anticipation of higher private fees or public reimbursement. ECE providers may not have the resources to make the changes or may be averse to the risk of not recouping their funds. Venture capital in the form of loans or grants to support the transition to higher quality is therefore a necessary component of an effective strategy.

- *Increase public support to assure low-, moderate- and middle-income families have access to high-quality ECE.*

High-quality ECE with moderately improved teacher compensation has been estimated to cost about 25 percent of average net take-home pay - per child – for the average family. For low- and moderate-income families, it would take a much greater share. For the 30 percent of such families with two or more children younger than age five, for example, obtaining high-quality early education would require spending at least half of take-home pay.

Given current budget constraints, it would be more cost-effective to focus investments on communities or populations that can benefit the most. However, as compelling research shows, all children benefit from and need high-quality early education environments. It is therefore important to tailor financing policies to assure that children from families of all income groups – including the middle class - have affordable access to high quality early learning opportunities.

. An effective financing approach would target the bulk of public resources to the most vulnerable children, while promoting economically integrated early learning opportunities to the extent possible. Serving low-income children in socioeconomically integrated facilities has been shown to enhance their developmental gains.

Health Care

Total national investment in health care for infants, toddlers and preschoolers is estimated at \$49 billion in 2007, equivalent to 0.4 percent of GDP. This is about two-tenths of one percent of the 16.2 percent of GDP currently spent on health care for all Americans.

As a group, young children are quite inexpensive with respect to health care goods and services. Much of this is because they are, on the whole, healthy – few have yet developed the chronic and serious ailments, such as diabetes, heart conditions or cancer, that cost large sums to treat and can require intensive medical services. Part of the low economic value of health care services, however, as this sector analysis reveals, is attributable to the failure to spend sufficiently to meet the needs of all young children. Improving efficiency would partly offset the necessary increase in investment, so total economic value would increase.

Preventive health care for young children, such as immunizations, screenings, and well-child checkups, can be provided at very low cost. Many of these are cost-effective; they reduce the need for later, more expensive remedial services. Children’s other health care needs, such as emergency room visits to address acute asthma attacks, in-patient hospital admissions to treat several accidental injuries, and extended stays in neonatal intensive care units for babies born preterm or low birthweight, are expensive. In many cases, these higher costs are avoidable or, at the least, could have been limited or reduced through appropriate earlier preventive measures.

Some children fail to obtain such preventive care due to lack of access to a doctor, with lack of health insurance one reason. In 2008, about nine percent of all children – eight million – and seventeen percent of low-income children lacked health insurance, resulting in barriers to needed care. The data employed in this analysis find that uninsured children receive an average of under \$450 annually in expenditures on health care services, compared to \$1,000 for children with public insurance and nearly \$1,500 for privately-insured children. It is not clear, however, how much of these differences in economic value should be attributed to differences in quantity, quality or price of service.

While problems are most acute for at-risk children who lack insurance coverage, unmet needs exist for children in every state and at many income levels:

- Overall, roughly four in ten U.S. children lack the “medical home” that pediatricians see as critical in providing prompt, consistent, responsive care.
- Of the 25 percent of U.S. children who were at risk for developmental or behavioral problems or for social delays, fewer than one in five received the screening that was recommended.
- With respect to oral health care, 28 percent of children ages two to five have cavities, with poor children five times as likely as middle-class children to have them. Of these, 72 percent lack the needed treatment.

While more research is needed to determine the most cost-effective use of limited health care dollars, and a full analysis is beyond the scope of this paper, policy makers looking to invest appropriately and efficiently in young children have several policy options to consider.^{lxxxii}

- *Explore ways to provide more children with access to basic health care.* This likely entails a combination of outreach to enroll the millions of SCHIP-eligible children who are not currently enrolled and other means of connecting needy children with services. Federal and state governments have made great strides in recent years to cover most children by expanding Medicaid and enacting SCHIP. However, these expansions have recently stalled or been cut back as state governments face fiscal pressure. The rate of coverage also varies greatly among states.
 - *This should include investments in appropriate preventive oral health measures.* In particular, improving public health insurance programs, spreading school-based sealant programs, exploring dental workforce innovations, enlisting medical professionals to provide basic preventive dental services, and bringing fluoridation to communities that currently lack it, can help narrow, if not close, critical gaps in children’s early oral health.
- *Invest in programs proven effective in reducing costs associated with childhood health problems.* Evidence-based voluntary home visiting programs, such as the Nurse-Family Partnership, have been demonstrated to produce lower rates of both low birthweight births and infant and toddler hospitalizations among the at-risk mothers who participate. Similarly, WIC has been found to produce net societal benefits through reduced rates of adverse birth outcomes. Careful monitoring and readily available medications can eliminate much of the medical costs of childhood asthma. These reductions in early childhood health problems can substantially reduce later costs.
- *Explore measures to improve the health of pregnant women, both during and before their pregnancies.* Early prenatal care, including, especially, information on proper nutrition and smoking cessation, has been found to be effective in improving birth outcomes by enhancing mothers’ health. Moreover, babies born to healthier, well-nourished mothers have better oral health, lower odds of becoming obese, and other childhood health

advantages. Ensuring access to prenatal care from the start of the pregnancy can aid in this. For the most high-risk women--those who have already experienced at least one preterm birth--programs to improve their health before they become pregnant again can substantially reduce the risk of subsequent adverse births.

Family Expenditures

The greatest share of our national investment on behalf of young children comes from direct spending by families. This component of the EC sector is equivalent to 1.4 percent of GDP, or \$191 billion a year. Some of this expenditure is, in turn, supported by public assistance in the form of cash or such substitutes as food stamps or housing allowances. However, the vast majority comes from families' own resources.

The major family expenditures on behalf of young children beyond the health and ECE expenses described above are divided among: housing (with 48 percent of families' non-ECE and health consumption going to this category of expenses), food (17 percent), transportation (16 percent) and clothing (8 percent). For the average family, these constitute roughly \$7,800 per year in additional spending per child birth to age five in the household.

Unfortunately, many children (41 percent of all U.S. children in 2008) live in families that cannot afford to meet their basic needs. The fact that, below this level of income (200% of the Federal Poverty Level), families require assistance has been recognized in such federal programs as the Earned Income Tax Credit (EITC), Medicaid and the school meals program. However, federal and state guidelines for such other social assistance programs as Temporary Assistance for Needy Families (TANF), food stamps (SNAP), child care subsidies, and housing assistance are based on lower (and varied) income standards. The result is that, despite being employed, many parents in low-wage jobs face a significant gap between their financial resources and what is required to meet their children's basic needs for food, shelter and clothing.

This problem is exacerbated in times of economic distress, as reflected in recent increases in child poverty and associated unmet needs. Last year, one quarter of American children faced "food insecurity," meaning that their parents cannot consistently provide them with healthy food of sufficient quantity. A substantial number live in families that are "severely food insecure," which means that they experience hunger; this number was 13 million in 2007 and climbed to 17 million in 2008, reflecting the recession's toll on children.

Lack of proper nutrition has been demonstrated to inhibit both health and education. Poverty that starts and persists for extended periods in early childhood has been found to be the single greatest predictor of poor outcomes in later life, from low educational attainment, to harmful adolescent involvement with drugs and alcohol, violence and risky sex. These in turn result in lower levels of adult job skills and economic productivity. It has been estimated that the cost of poverty to the U.S. economy is \$500 billion a year, or 3.8 percent of GDP.^{lxxxiii}

Substantially reducing poverty and its impact on young children would require a combination of short- and long-term strategies encompassing a variety of policy areas. These are beyond the scope of this paper, but some strategies to explore include:

- *Ensure that cost-effective programs are accessible to eligible families.* Two large federal programs that provide children with needed nutritional support, WIC and SNAP, have been found to be cost-effective in the immediate term, and provide continuing economic benefits to society. Particularly in an economic downturn, when both family and public budgets are stretched, outreach to ensure that families with young children can get the benefits for which they are eligible may be a smart strategy.
- *Explore the potential of income- and asset-boosting programs, such as the Earned Income Tax Credit and Individual Development Accounts.* Many low-income families find themselves unable to substantially improve their economic circumstances, especially when unemployment rates are high and trying to save income for future needs is at its most difficult. Making work pay is one politically accepted and effective way of doing this. A growing body of evidence also suggests that asset-boosting measures, particularly matched accounts with particular “rules” attached, can improve poor households’ odds of life success, in terms of access to job training and higher education, home ownership, and being able to survive a health or other financial crisis.

Summary

This research makes clear that, while the Early Childhood Sector of the U.S. economy constitutes a substantial and important contribution to GDP, the overall level of resources devoted is insufficient to meet the needs of young children, and more investment is needed if their economic potential is to be realized. While some of this gap could be reduced through more efficient reallocation of resources in the ECE and health sectors, those shifts are unlikely to make up for the overall inadequacy of investment. This combination of inefficient allocation and insufficient investment produces a drag on the economy, limiting its current productivity and reducing future growth.

As stated above, it is beyond the scope of this work to explore fully and make specific recommendations about all the policy improvements that would be required to produce an optimally resourced and efficient early childhood sector. However, the policies suggested for exploration would constitute an excellent start at better meeting the needs of young children and setting them, and the country, on a track that is fiscally wise and promotes future economic success.

Appendix 1: Methodology for Estimating the Economic Value of Early Care and Education⁹ (Chapter 1)

Richard N. Brandon, T.J. Stutman & Michelle Maroto

Human Services Policy Center, University of Washington

January 7, 2010

In this Appendix, we discuss in more detail the methods used to develop the estimates of economic value of the early care and education (ECE) component of the ITP sector, which were presented in Chapter 1. We also present backup tables with more detailed data used for those estimates. The Appendix is designed to be read in conjunction with the chapter and does not repeat all the information presented there.

On the following page we reproduce the flow chart which shows how the major parts of our analysis were combined to produce estimates of economic value. We then discuss in detail three sections of the analysis:

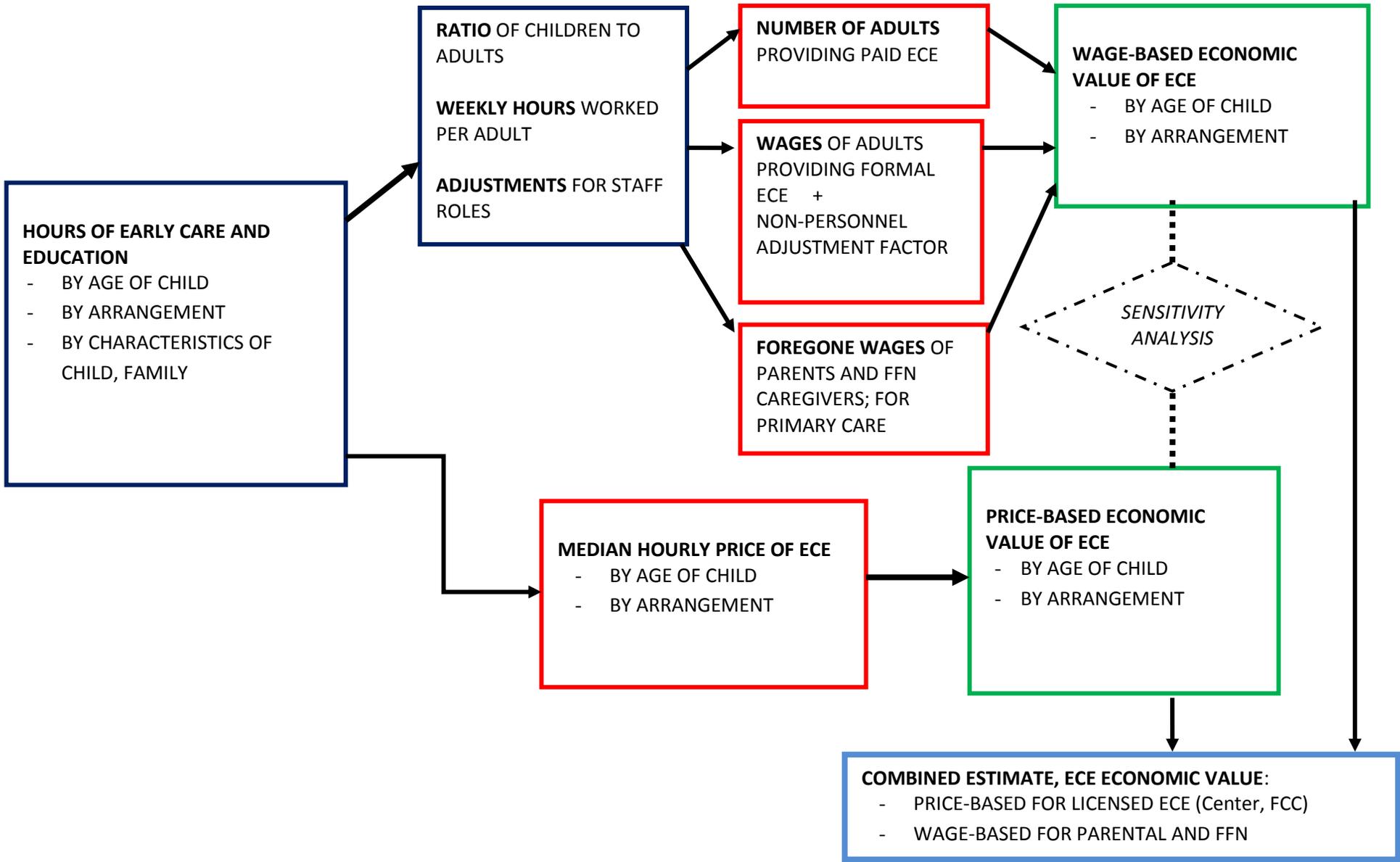
- 1-A. Estimating the number of hours young children spend in each ECE arrangement, and deriving from the estimated hours an estimate of the size of the paid ECE workforce and the unpaid caregiving population. This section includes our estimate of the number of paid and unpaid workers caring for young children.

- 1-B. Estimating the foregone wages of parental caregivers and family, friend or neighbor (FFN) caregivers. This section provides relevant characteristics of parents, FFN caregivers and paid child care workers and reports the regressions used to estimate foregone wages. It also describes our analysis of the wage differential between child care and other occupations, an interesting analysis that is ancillary to the primary purposes of this paper.

- 1-C. Estimating economic value of ECE by applying either wages and related costs, or prices, to hours in ECE by infants, toddlers and preschoolers. This section compares the wage-based and price-based approaches to estimating economic value and concludes with a hybrid approach.

⁹ The authors acknowledge an extremely helpful review and comments on this section by Dr. Marcy Whitebook, University of California, Berkeley. Any errors are our responsibility, not hers.

Estimation of Economic Value for Early Care and Education
Human Services Policy Center, University of Washington



Appendix 1-A. Estimating Hours of ECE Utilization

The Human Services Policy Center’s approaches to estimating the economic value of the early care and education (ECE) component of the ITP Sector involve estimating both the number of hours that young children are in various types of parental and non-parental care, and the number of individuals paid to provide that care. Both these estimates are derived from our analysis of the 2005 National Household Education Survey, Early Childhood Supplement (NHES). This is a large-scale, nationally representative survey that asks respondents questions about the hours spent in a variety of care arrangements in a typical week. The NHES is a random-digit-dial telephone survey of the general population, with 7,198 household respondents with children age birth-through-5. In this section of the Appendix, we discuss how we categorize the hours of care and how we use them as the basis for estimates of the paid child care workforce.

The ratio of adults to children is essential for estimating the number of workers required to provide a given number of hours of ECE, and that ratio varies considerably by the three age subgroups within B-5. It also varies considerably by setting. Further, wages and prices for ECE vary considerably by setting, with substantially higher prices for center-based than for home-based ECE. We therefore estimate hours separately for each age group (infant, toddler, preschooler) and each type of care setting. One reason for selecting the NHES as our core data base is that it allows these differentiations.

Our estimates of the size and components of the U.S. child care workforce and caregiving population are updates of our earlier estimates reported in “Estimating the Size and Components of the U.S. Child Care Workforce and Caregiving Population: Key Findings from the Child Care Workforce Estimate” (CCW & HSPC, May 2002). These estimates utilize a demand-based approach to arrive at an approximate workforce size, including paid FTEs and volunteers in formal care, paid caregivers in informal care, and unpaid caregivers providing informal care. The workforce estimates developed for this new study rely on the same basic methodology as detailed in the 2002 report, but use an updated version of the National Household Education Survey’s (NHES) Early Childhood Program Participation component and some refined adjustment factors. The 2002 report relied upon NHES data collected in 1999, whereas the updated estimates use NHES/ECPP data collected in 2005.

Specifying Types of Care

The NHES identifies three distinct types of care: center-care, relative-care, and non-relative care. The survey also asks parents to report whether a fee was paid for each type of care, and, for informal (non-center) care, whether the care took place within or outside of the child's home. HSPC uses this information to construct four different types of child-care. These definitions are consistent between the 2002 report and the current estimates:

Center Care is care reported as taking place within a formal child care center, excluding Head Start or Early Head Start arrangements. It includes public pre-school programs, which may be located either in schools or in community-based centers.

Head Start Care is reported as taking place within a formal child-care center, with the care identified by the parent as Head Start or Early Head Start.

Family Child Care is defined as paid, non-relative-care that takes place outside of the child's home. We recognize that some paid, non-relative care may be by friends or neighbors, and less "formal" than a Family Child Care home that is operated as a business and often required to be licensed. However, parents do not report whether this care arrangement is licensed, and licensing requirements vary greatly among the states, making a category based on licensing status untenable. We therefore focus on payment, lack of family connection and in whose home care occurs as the best available proxies for a more formal arrangement.

Family, Friend or Neighbor, or Informal Care is comprised of four sub-categories: paid relative care, unpaid relative care, paid non-relative care within the child's home, and unpaid non-relative care. Paid non-relative care outside the child's home is considered to be family child care.

Parental Care is defined for this analysis as the portion of a 40-hour work week that children are not in one of the prior non-parental arrangements. It is thus a residual, rather than a specific attribution. While it could be reasonable to define greater hours of parental caregiving, up to the maximum of 168 hours a week, we have decided to focus on the hours during which parents could likely be earning income from employment in other activities. Since the average hours worked per week for all U.S. workers is about 33.5, basing our estimate on 40 hours/week seems reasonable.

Calculation Methods

Our demand-based calculation of workforce estimates can be divided into two phases: (a) an initial phase for calculation of point-in-time estimates of the total weekly child care workforce, and (b) a second phase that adjusts the initial total workforce estimate to derive a distribution of personnel by position and estimated total annualized workforce. The first phase relies upon the NHES-derived estimates of participation in care, hours, and child to staff ratios, while the second phase incorporates several adjustments as derived from related studies of the early care workforce.

Initial Estimates of Weekly Adult ECE Workers

The initial estimates of hours and workforce for formal care (Center, Head Start, and Family Child Care) are calculated by the following formulas:

$$\frac{\text{Total ECE Hours}}{\text{(By age, type)}} = \frac{\text{Participation}}{\text{(\% children by age in each type)}} \times \frac{\text{Population}}{\text{(\# U.S, Children of each age)}} \times \frac{\text{Average Hours of ECE}}{\text{(By age, type)}}$$

$$\frac{\text{Total ECE Hours}}{\text{(By age, type)}} \div \frac{\text{Child:Adult Ratio}}{\text{(By age, type)}} = \frac{\text{Aggregate ECE Hours per Adult}}{\text{(By age, type)}}$$

$$\frac{\text{Aggregate ECE Hours per Adult}}{\text{(By age, type)}} \div \frac{\text{Weekly Work Hours per Adult}}{\text{(By age, type)}} = \frac{\text{Number Adult Workers}}{\text{(By age, type)}}$$

The components of these calculations are described in more detail below:

- **Participation:** Parents report whether their children participate in center care, relative care, or non-relative care. Participation rates in each type of care (including those children without non-parental care arrangements) are then constructed for the seven care-types as detailed above. It should be noted that about 11% to 17% of children are in more than one type of care, and thus participation figures in each type of care are not mutually exclusive.¹⁰ Our focus is on capturing all hours in each type of care and the NHES methodology allows us to do this.
- **Population:** The total number of children in each age group (infant, toddler, preschooler) are calculated from the weighted NHES estimates. These reflect population data as of the time of the data collection, in early 2005. *The product is then the total number of children participating in each type of care.*

¹⁰ Our calculations from the NHES indicate that approximately 11% of children participate in multiple types of child care. Census Bureau estimates from the SIPP data (2004) place this figure at 17%, but also include additional types of care, such as ‘other-parent’ and ‘self-care’.

- Average hours in ECE:** The NHES data contains parent-reported information on the number of hours each week that the child participates in a given type of care. HSPC calculates the average hours for each age group within each of the seven care types. As noted above, participation in each type of care is not mutually exclusive, but the hours in each type of care are limited to that particular care arrangement. Thus, while the participation figures cannot be summed or they would yield an overestimate of total participation, the hours in care are correct because they sum the actual number of hours that children with multiple arrangements spend in each type of care. *The product of number of children in care times the average hours in care (by age and type of care) yields the estimated total number of hours spent in care.*
- Average child to adult ratios:** The NHES data contains parent-reported information on both the number of adults present in each care arrangement, as well as the number of children in each arrangement. HSPC then calculates the mean child to staff ratio for each child's care-type. Parent-reported ratios are adjusted by HSPC in two ways: first, by using a weighted average for multiple arrangements within individual care-types; second, by a factor derived from the ECLS-B child to staff observed ratios for Center Care (see detailed explanation in section (e) below; observed and parent-reported mean and median ratios, by age and type of care, are shown in Annex A).
- ECE hours per adult per week:** For formal center-based ECE (Centers, Head Start, and preschool), each adult is assumed to represent 30.5 hours per week of ECE. This estimate is drawn from the Current Employment Survey's estimates of the average hours worked in the Child Day Care industry (NAICS 6624). It should be noted that this is an average of hours worked by full- and part-time workers, and produces the estimated number of individuals in the workforce, which is greater than the number of Full Time Equivalent (FTE) positions. This produces the number of adults per care type, serving each age group. For formal family child care (FCC), we assume an average of 50 working hours per week, since these home-based enterprises are usually open longer than the normal working day to accommodate parents with different work or school schedules.

The calculations for FFN care are similar, but remove the calculation which assumes a standard definition of an average work week. Informal care is different from formal care in that caregivers are not necessarily assumed to be working a set number of hours per week. The average work week concept is not applicable when caregivers might only be working for a few hours per week, and for a limited number of children. This method implicitly assumes that each child is only in the care of one FFN caregiver. In some cases, this may be an underestimate, since some children may split their time between more than one relative or neighbor each week. There may also be one than one adult present, and when a child is with two grandparents. Lacking a reliable method to estimate the number of informal caregivers, we have opted for a conservative estimate of the number of FFN caregivers.

The estimated number of individual informal caregivers is calculated by using the first two steps in the formal care calculation, multiplying participation rates by population counts, and then dividing by the child to staff ratio. This results in the approximate number of caregivers in a given week, for each informal-care type serving each age group.

Adjustments to Estimate Staff Distribution and Annual Workforce

The initial phase of calculations produces aggregate hours of care, which are then converted to workforce estimates by age group, by care type. These figures do not make any distinction between the different staff positions within each type of care. They also provide the number of workers at one point in time, a week. A point in time estimate is important because that is the standard used in labor force statistics and is comparable to other occupations. This is the estimate that will be used for calculating economic value from wages times FTEs, since the wage value is assigned to a given amount of work, regardless of how many individuals may fill that slot over the course of the year.

However, for other purposes, such as planning the number of professional development opportunities to offer, it is important to know the number of individuals who work in child care over the span of a year. This is particularly important because child care is a relatively high turnover occupation. The second phase of calculations therefore incorporate adjustments for turnover and distribution of the workforce among positions based on related research.

There are three components of these adjustments. It should be noted that the data used for these adjustments are relatively old, introducing a measure of uncertainty in the estimates.

- **Workforce Distribution by Staff Position:** The total number of workers, produced from the initial calculation, are divided to reflect the expected staffing patterns found in the child-care workforce. Center-based care and Head Start are expected to employ Directors, Teachers, and Assistants, along with unpaid volunteers¹¹. Family Child Care is expected to employ Providers/Teachers and Assistants.¹²
- **Adjustment to Number of Workers for Positions.** Once the FTE counts have been distributed among staff positions, the next step is to take into account the respective hours worked. Since directors are expected to work more hours than assistants, a calculation of actual personnel will result in personnel figures for directors that are smaller than the average number of workers, as well as personnel figures for assistants that are larger than the average number of workers, so as to arrive at a more precise estimate of the actual number of workers in each category.¹³

¹¹ Center Care FTEs are divided into Teachers (62.5%), and Assistants (37.5%) (Cost, Quality, Outcomes 1993). Directors are assumed to not be represented in the parent-reported ratios, and are estimated as 10% of total FTEs in addition to Teachers & Assistants (Wilder, 2001). Volunteers are included in the FTE count for toddlers and preschoolers as approximately 27% of staff in 28% of centers (7.6% overall; Willer 1991).

¹² Family Child Care FTEs are divided into Providers (80%) and Assistants (20%), based on the averaged staffing patterns between the background sources (Wilder 2001; Burton, Sakai, & Whitebook 1999). Volunteers are not included in the FTE or personnel counts.

¹³ The 2002 study made the FTE to Personnel adjustments based on how hours varied around a full-time work-week of 35 hours/week, with Directors estimated as working 40 hours/week and assistants working 28 hours/week (Helburn 1995), and teachers working at the then-current FTE definition of 35 hours/week (Whitebook, Sakai, Gerber & Howes 2001). For these estimates, the effective ratios used in the 2002 study were retained, in the absence of updated information on how staffing patterns vary by position.

- **Annual Turnover:** The NHES data provides ‘point in time’ estimates that represent child care characteristics in an average week. In order to extrapolate these estimates to an annual basis, it is necessary to take into account the expected annual turnover for each staff position. The annual figures thus include an estimate of the additional personnel needed to replace departing child care workers.¹⁴ Turnover for center staff is derived from Whitebook et.al, 2001. The rates are 15% for teachers, 25% for assistants. It should be noted that for workforce estimates, we are using occupational turnover rates, not job turnover. Turnover for FCC providers is estimated at 16.5%, which is derived from Kontos et.al. 1992. It should be noted that both of these data sources are now relatively old, and not fully representative nationally; however, they are the best currently available.

Public School Pre-K and Head Start Estimates

An interesting challenge was estimating the economic value of public pre-K programs. The NHES data includes parents’ responses to the location of center and Head Start care. Child care worker wages tend to diverge depending on whether care takes place in private centers versus public schools, with public school pre-kindergarten teachers often earning a substantial premium. In order to have reliable estimates of economic value it is necessary to separate out those hours for Center and Head Start care that take place in public schools so that appropriate wages can be applied for both public and private care.

Unfortunately, there is not any federal data source on employment or financing of these programs. We explored several approaches to developing a specific pre-K employment estimate. However, none of these yielded a reliable source of public pre-K employment. For estimating the number of hours of ECE and overall workforce, we therefore left these hours within the center-based care hours and estimated the number of workers using our general methodology. However, when we estimated economic value, we recognized that there are different pay scales for child care and public preschool. We therefore subtracted the aggregate number of public pre-K hours from the total of center-based for the purpose of estimating economic value. Rather than multiplying the subtracted hours by wages or prices, we then added an estimate of public pre-K spending by the National Institute for Early Education Research (NIEER) which we consider the best estimate of payments for this component. Similarly, for Head Start, we subtracted the parent-reported Head Start hours from the aggregate total before applying wage and price estimates, and then added in the total budget for the program as its share of economic value. In the following section we describe our efforts to develop specific preschool and Head Start employment estimates.

We considered but rejected two alternative methods of distinguishing public pre-K and Head Start hours. The National Institute for Early Education Research (NIEER) publishes an annual state preschool yearbook, which includes data on enrollment and program operations. These figures can be used to estimate the total number of hours in state-funded preschool, which can then be subtracted from the total hours estimated from the NHES. These hours would be

¹⁴ Center & Head Start teachers and directors are expected to incur an annual turnover rate of 15%, while assistant teachers incur a higher annual turnover rate of 25% (Whitebook, Sakai, Gerber & Howes, 2001). Annual turnover for providers and assistants in Family Child Care is estimated at 16.5% (Kontos, Howes, Shinn & Galinsky, 1992).

represented in the NHES as Center Care only, excluding Head Start Centers. However, the NIEER report gives only state regulations regarding hours per day of pre-K, often stated as a minimum, and in many states this is left to local discretion. While our attempted estimation based on this report yielded hours in the same order of magnitude as the NHES estimate, we believe the uncertainties would be much greater using this extension of the NIEER data than relying on the parent reports in the NHES.

It was not necessary to apply our demand-based estimation approach for the Head Start workforce, since the responsible federal agency, Administration for Children and Families (ACF), collects direct workforce information. All 2005 staffing figures for Head Start & Early Head Start care were drawn from the ACF's Program Information Reports. These reports are submitted by all Head Start grantees, and include point-in-time estimates of child development staff positions, including both teachers and assistant teachers. These do not report total hours in care, but do report total enrollment, operations, and staffing. These figures, along with imputed personnel estimates for program directors, were used in lieu of the NHES FTE & personnel estimates for Head Start programs.

We also considered whether the share of Head Start care in public school settings could potentially be estimated from the Program Information Reports, to potentially allow a differentiation in wage levels between public school and community-based programs. However, we found that the PIR does not distinguish public school-based settings from other centers, so this was not a viable option.

Workforce Responsible for Children with Learning Challenges

We are interested in knowing how much of the ECE workforce is responsible for children who have special learning challenges, either because they and their families are not native English speakers, or because they have special physical or emotional needs. Adults responsible for these children would benefit from extra training and support, and it would be useful to public agencies to understand the extent of this need. The NHES data include parent reports of a range of demographic characteristics of children, including whether children are English Language Learners (ELL), and whether the child has special physical or emotional needs.¹⁵ Caregivers for these children are considered to be nested within the total workforce estimates calculated for all children, as detailed above. Caregivers working with ELL and special-needs children can be estimated by separating the participation, hours of care, and child to adult ratios reported for those children and applying the same methodology as for all caregivers. However, we are limited to estimating ranges of caregivers, rather than single-point estimates, since the NHES does not report the number of ELL or special-needs children within each classroom. For the low end of the range, we assume that ELL and special-needs children are concentrated in separate classrooms, rather than mainstreamed with other students as is often the case. For the upper end of the range, we assume that each ELL and special-needs child represented in the NHES is the

¹⁵ English Language Learners are considered those with parents who did not learn English as children, and who speak a language other than English at home. Children reported as having any of the following conditions are included in the special-needs definition: Learning Disability, Mental Retardation, Speech Impairment, Emotional Disturbance, Deafness, Blindness, Orthopedic Impairment, Autism, Attention Deficit Disorder, Pervasive Development Disorder, and Severe Development Disability.

sole representative within a mainstreamed classroom. Finally, we present the midpoint between these estimates, reflecting an implicit assumption that half the aggregate hours are spent each in highly dispersed and concentrated classrooms.

Adjustment of NHES Parent-Reported Child to Adult Ratios by ECLS Observational Data

It was found by Willer et.al. (1991) in the 1990 National Household Child Care Survey and Profile of Child Care Settings that parent reports of child to adult ratios differed significantly from center directors reports, and we used that difference as an adjustment factor in our previous estimate of the size of the child care workforce (Burton et.al. 2002). However, that data is now almost 20 years old. It is also questionable whether director reports are accurate, particularly since ratios vary across the day (Li et.al, 2005). We have therefore developed a new set of adjustment factors utilizing data from the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), a large scale nationally representative study (Mulligan & Flanagan, 2006).

The ECLS data has two advantages. First, it is collected by trained observers who are in the classroom and is thus likely to be more accurate than either parent-reported or director-reported ratios. Second, the ECLS observations occur at six times across the course of the day, and are more likely to capture fluctuations, such as pick up and drop off times. We found the expected pattern, with more children in the middle of the day and fewer at the beginning and end of the day. We therefore applied a weighted average across the observations, with the observed ratios weighted by the number of children in care for that period. Not taking the lower ratios at the early and late hours of the day into account would yield an under-estimate of the workforce. Overall, we found that observed ratios for non-Head Start centers were 9% higher than parent-reported for preschoolers and 2% higher for 2-year olds. The differences were much greater for Head Start centers, with observed ratios exceeding parent reports by 30% for preschoolers and 20% for 2-year olds. Differences were small for FCC and FFN care.

A particular complication is the difference in age specifications between the NHES and the ECLS-B. A major reason we are using NHES for estimating hours in care by age group is that NHES samples all children and reports their birth dates, so that we can develop aggregate groupings for infants, toddlers and preschoolers. ECLS-B only observes classrooms and ratios for children aged approximately 2 and 4 years, resulting in age groupings that are not strictly comparable to our definitions of toddlers (19-36 months) and preschoolers (37-60 months). ECLS-B collects data so that cohort observations are representative of the 2-year and 4-year intervals, rather than requiring that children be exactly 24 or 48 months in order for data to be recorded. In the 2-year sample, 99% of observations are between 22 and 27 months of age. In the 4-year sample, 91% of observations are between <48 months and 57 months of age. The 4-year sample may require the exclusion of some observations that fall outside of the age-range used in the NHES sample (i.e. >60 months). However, since we can extract comparable age 2 and age 4 parent-reported ratios from the NHES, we could calculate a factor comparing average parent-reported and observed ratios for comparable age groups and settings. We then applied these factors to the broader age groupings derived from the NHES. The specific calculation was performed as follows:

1. Calculate adult to child ratios for ECLS-B and NHES for comparable age groups and care-types. The ECLS birth-cohort reflects data collection at the 2-year and 4-year points

and were compared to NHES data for comparable age groups, using the month-in-ages to create comparable groupings across both data sets.

2. Determine “adjustment factor” by calculating the relationship between average ECLS ratios and NHES ratios for 2-year old and 4-year olds, for each type of care (Center, Relative, Non-Relative).
3. Apply adjustment factor to NHES parent-reported ratios for toddlers (19-36 months) and preschoolers (37-60 months), resulting in final ratios for new age-groups for each care-type.
4. We did not apply and adjustment factor for infant ratios, since the adjustment factors were substantially different across age groups. However, since we did not adjust for relative care, which predominates for infants, this does not create a significant discrepancy in our analysis.

Table A-1. ECE Workforce By Arrangement and Age of Child

Estimated Number of ECE Workers in the U.S.

Number of Paid ECE Workers in the U.S. in a Typical Week

	Total Paid	Center Care	FCC Providers	Paid Relatives	Paid Non-Relatives
Infants (0-18 mos)	490,492	222,838	78,120	111,085	78,450
Toddlers (19-36 mos)	653,968	308,793	92,037	166,362	86,776
Early Head Start	11,536	11,536			
Pre-Schoolers (3-5 yrs) PRIVATE	826,461	370,706	80,247	312,047	63,461
Pre-Schoolers (3-5 yrs) PUBLIC	78,802	78,802			
Head Start	101,471	101,471			
All 0-5 Year Olds	2,162,731	1,094,146	250,404	589,494	228,686

Number of Paid ECE Workers in the U.S. in a Year

	Total Paid	Center Care	FCC Providers	Paid Relatives	Paid Non-Relatives
Infants (0-18 mos)	545,586	265,042	91,009	111,085	78,450
Toddlers (19-36 mos)	727,604	367,243	107,223	166,362	86,776
Early Head Start	13,605	13,605			
Pre-Schoolers (3-5 yrs) PRIVATE	909,871	440,875	93,488	312,047	63,461
Pre-Schoolers (3-5 yrs) PUBLIC	93,718	93,718			
Head Start	121,857	121,857			
All 0-5 Year Olds	2,412,241	1,302,339	291,721	589,494	228,686

Unpaid Caregivers

	Total Unpaid	Center Care Volunteers	Unpaid Relatives	Unpaid Non-Relatives
Infants (0-18mo)	879,445	16,847	834,167	28,432
Toddlers (19-36mo)	1,069,584	23,345	1,016,561	29,678
Early Head Start	----	----	----	----
Pre-Schoolers (3-5y/o) PRIVATE	1,275,865	28,025	1,208,773	39,067
Pre-Schoolers (3-5y/o) PUBLIC	5,957	5,957	----	----
Head Start Centers	----	----	----	----
All 0-5 Year Olds	3,230,852	74,174	3,059,501	97,177

Workforce by Position

The following table presents our estimates of the distribution of the paid child care workforce by position within center-based and Family Child Care.

Table A-2. ECE Workforce By Position and Age of Child

	Center Directors	Center Teachers	Center Assistants	Center Total
Infants	18,024	117,037	87,778	222,838
Toddlers	26,591	160,893	121,308	308,793
Preschool (Private)	31,923	193,152	145,631	370,706
Total	76,538	471,083	354,717	902,337

	FCC Providers	FCC Assistants	FCC Total
Infants	47,219	30,901	300,958
Toddlers	55,631	36,406	400,830
Preschool (Private)	48,505	31,742	450,953
Total	151,355	99,049	1,152,741

Comparison of Demand-Based Workforce Estimates with Department of Labor Data

To compare the NHES-derived workforce estimates to the figures from the BLS’s Current Employment Statistics survey, we limit the estimates to only paid, private-sector employment. The table below presents the final personnel estimates for private centers and paid Family Child Care, excluding public pre-K programs, unpaid care, and paid care within a child’s own home. The final estimate of 1,262,493 personnel is approximately 75% larger than the 723,000 comparable occupations within the Child Day Care Services industry (NAICS 6244).

The following tables summarize our findings. The first shows weekly point-in-time estimates of paid child care FTEs in 2005; the second table shows the estimated number of individuals providing paid child care over the course of the year.

We then present the weekly estimates for unpaid caregivers. There is probably some turnover in unpaid caregivers as well, resulting in a greater number of individuals over the course of a year. However, it is not reasonable to assume the turnover is the same as for paid care, and we have no way of developing a reliable estimate. We therefore do not present a separate estimate of annualized individual unpaid caregivers.

There are several explanations for why the demand-based workforce estimates exceed the BLS estimates:

- *Center-based ECE.* The NHES survey uses a more inclusive definition of center-based care than the BLS. The 723,000 comparable BLS workers are solely within private establishments covered in the Child Day Care Services NAICS classification. This would exclude child development staff who work in similar occupations but in establishments outside of this industry, such as employer-based care, place-of-worship care, or private school care. These other settings are included in the NHES specifications.
- *Family Child Care,* as calculated from the NHES, consists of paid, non-relative care that takes place outside of the child's own home. This could result in FCC personnel estimates that include some employment that would not be expected to appear in the CES estimates, including unlicensed care and self-employed providers.
- *Age of Children.* The demand-based workforce estimates exceed the BLS estimates by a greater degree than immediately apparent, because the BLS is for all child care workers, including those serving school-aged children. The demand-based estimates are only for children below school age.

The occupational distribution within the NAICS Child Day Care Services classification largely matches the personnel distribution-by-age from the NHES estimates.¹⁶ The table below displays the distribution of positions within NAICS 6244, with the 'Employment, Training, and Library Occupations' category including preschool teachers and assistants, and the 'Personal Care & Service Occupations' category including non-preschool Child Care Workers. According to OES data, approximately 51% of occupations within Child Day Care Services were in Education, Training, and Library occupations, with most of these staff working with preschool children.

The demand-based figures estimate that approximately 38.5% of all workers (including directors, teachers, and assistants) in centers and FCCs are with preschool-age children.

OES also estimates management and administrative positions as approximately 8.5% of total employment within the industry. HSPC's calculations assume that directors represent 10% of the

¹⁶ OES data is available for the most recent data-collection in May 2008. Therefore, the total employment for NAICS 6244 is greater than that given in the 2005 CES data. We assume that the occupational distribution has remained constant across these years.

workforce. The OES figure would be slightly larger if we were to exclude the non-comparable occupations from the total, bringing the figure closer to the 10% estimate that we derived from the literature on personnel distribution (Wilder, 2001).

The OES estimates are not directly comparable to the NHES estimates, mostly because the OES data does not segment occupations by children’s age-group, and because the OES occupational categories are more granular than the NHES categories of “director, teacher, assistant”. Assuming that the OES categories of ‘Education, Training, and Library’ and ‘Personal Care & Service’ are suitable proxies for ‘Preschool’ and ‘Infant/Toddler’ allows us to make some broad comparisons across the two data sets.

Table A-3. Paid Child Care Workforce by Occupation (U.S. Census)

Paid Child Care Workforce, Occupational Distribution, 2008		
Total, all Occupations	100.00%	807,330
Education, Training, and Library Occupations	51.36%	414,670
Personal Care and Service Occupations	31.49%	254,260
Management Occupations	5.09%	41,060
Office and Administrative Support Occupations	3.57%	28,850
Non-Comparable Positions	8.48%	68,490
<i>Source: Occupational Employment Statistics, BLS 2008</i>		

Table A-4: Summary of Weekly Hours in ECE Derived from Analysis of NHES-2005

		Center	HS	FCC		Public Pre-K*	Parent-Care Hours
					<i>FFN Total Hours</i>		
Total # of care hours in a typical week	Infants (0-18mo)	21,121,278	884,736	16,548,448	<i>35,378,610</i>		151,015,821
	Toddlers (19-36mo)	40,914,691	4,274,100	21,164,458	<i>35,858,013</i>		150,870,619
	Pre-Schoolers (3-5y/o)	78,613,629	18,660,128	19,609,498	<i>50,807,078</i>	17,345,046	191,699,157
	Totals	140,649,598	23,818,963	57,322,403	<i>122,043,700</i>	17,345,046	493,585,598

* Imputed for each state from requirements described in NIEER 2005 PreK Handbook; aggregated to U.S. These overlap the hours in Center-based ECE derived from the NHES and were not used in later calculations.

Table A-4: Comparison of observed child:adult ratios from ECLS with parent reported ratios from NHES 2005.

**HSPC Calculation of ECLS(weighted by student counts)
Average child:adult ratio (mean),
Observed indoor counts only
(average 6 counts)**

	Center	Head Start Center	Relative	Non-Relative
2-year	5.19	5.12	1.55	3.65
Preschooler	7.5	7.22	1.6	3.51

HSPC Estimates from ECLS-B (weighted by student counts)

	Center	Head Start Center	Relative	Non-Relative
Average child:adult ratio (median), Observed indoor counts only (average 6 counts)				
2-year	4.91	4.56	1	3.34
Preschooler	7.29	7.19	1	3

HSPC Estimates from ECLS-B (weighted by student counts)

The adjustment factors for PRESCHOOLERS are as follows:

- Center (non Head Start) = 9% higher
- Head Start Center = 44% higher
- Relative = No adjustment
- Non-Relative = No adjustments

NHES Estimates

Average child: adult ratio (mean); parent-reported

	Center (not HS)	Head Start Center	FCC	Paid Relative	Unpaid Relative	Paid Non-Relative	Unpaid Non-Relative
2-year cohort	5.17	2.88	3.53	2.137	1.355	1.23	2.836
Preschool cohort	7.11	5.76	4.31	2.062	1.49	2.117	2.68

Source: National Household Education Survey, 2005

Average child: adult ratio (median); parent-reported

	Center (not HS)	Head Start Center	FCC	Paid Relative	Unpaid Relative	Paid Non-Relative	Unpaid Non-Relative
2-year cohort	5.00	3.50	3.00	1.5	1	1	3.5
Preschool cohort	6.67	5.00	5.00	1	1	2	3

Source: National Household Education Survey, 2005

The adjustment factors for the 2-year Cohort are as follows:

Center (non Head Start) = 2% lower

Head Start Center = 30% higher

Relative = No adjustment

Non-Relative = 5% lower

Appendix 1-B. Description of Methodology: *Estimation of Foregone Wages, Parents and Family, Friend and Neighbor Caregivers*

For child care worker wages, we can use BLS/OES annual wage statistics. However, for parental and FFN caregivers, we must use a different data source for estimating the value of the wages foregone while they are caring for young children. We have utilized the American Time Use Survey (ATUS) for this purpose. In this appendix, we discuss in detail the methods used to estimate those foregone wages. Where caregivers reported regular non-child care employment, we treated their mean occupational earnings as the best estimate of foregone wages. Where caregivers did not report paid employment, we used a regression analysis of the entire sample of the adult population to estimate foregone wages from other characteristics associated with earnings. We first discuss the data set selected, then the descriptive analysis, including mean earnings for employed caregivers. Next, we discuss the examination of bivariate correlations to assist in selecting among similar and collinear variables for inclusion in the regression analysis. Then we present the regression models used to estimate foregone wages for non-employed caregivers. Finally, we discuss our additional analysis of the wage differential experienced by child care workers.

Data Set: ATUS Multi-Year (Combined 2005, 2006, 2007 data)

This section provides background information about the American Time Use Survey (ATUS) data used in this project. We begin with a description of the variables selected for analysis and then review some selected ATUS descriptive statistics describing the sample.

To estimate foregone wages of parents and Family, Friend and Neighbor (FFN) caregivers, we required a data set that would include (a) whether respondents cared for children age birth-five; (b) whether providing child care was their paid occupation; (c) their paid employment status; (d) wages and income; and (e) demographic characteristics relevant to prediction of earning levels. The only data set we found that met these requirements is the American Time Use Survey (ATUS).

The ATUS is conducted by the Bureau of Labor Statistics (BLS) and administered by the U.S. Census Bureau. Surveyors randomly select individuals from a subset of households from the Current Population Survey (CPS) and interview these respondents about how they spent their time on the previous day, where they were, and whom they were with. Beginning in 2003, researchers selected 3,375 households leaving the CPS sample for the ATUS sample each month. The respective sample sizes for the 2003, 2004, 2005, 2006, and 2007 survey years are 40,500, 26,328, 13,038, 12,943, and 12,248. For our research purposes, we pooled data from the three of the most recent survey years, 2005, 2006, and 2007 for a total (N) of 38,229 respondents prior to removing missing data. The respondents are equally divided across weekdays and weekends with 19,119 weekend interviews and 19,110 weekday interviews. While we use the full sample of 38,229 respondents for the population and sample descriptive statistics, we use a slightly reduced sample for regression analyses of the data.

The ATUS imputes missing values for cases of item non-response; thus missing data are rare in this dataset. However, certain earnings and hourly employment data were considered missing in specific cases. First, ATUS interviewers did not calculate wages for 2849 self-employed respondents, nor did they record hours worked per week for an additional 311 respondents, who did not indicate separate hourly earnings. We dropped these cases from our regression analyses, resulting in an N of 35,069 respondents. Second, we considered cases outliers in hourly earnings if they were employed and made more than one hundred dollars per hour or less than one dollar per hour. We considered cases outliers in weekly hours worked if their indicated earnings or hours were three or more standard deviations above the mean for other employed respondents. We removed 338 cases that fit these criteria, resulting in a final N of 34,731 respondents for the hourly wage estimation analyses.

Descriptive Statistics for Full ATUS Sample

This section provides an overview of the characteristics of the ATUS sample, and focuses on the differences between male and female respondents. These differences indicate why it is necessary to construct separate wage estimates for males and females.

Table B-1 presents descriptive statistics for all respondents in the combined 2005, 2006, and 2007 ATUS sample (N=38,229), comparing male (N=16,412) and female (N=21,817) respondents. The characteristics of ATUS respondents vary somewhat from the overall U.S. adult population as described by Census data, due to oversampling of households with children. However, the Census Bureau supplies weights to correct for these sampling differences, which we applied to later average earnings and child care estimates.

Table B-1. ATUS Sample Characteristics

Selected ATUS Respondent Characteristics						
	Total		Males		Females	
	N	Proportion of Sample	N	Proportion of Males	N	Proportion of Females
Age						
Mean	45.86	*	44.88	*	46.6	*
Median	44	*	44	*	45	*
Standard Deviation	17.681	*	17.127	*	18.051	*
Range	15-85	*	15-85	*	15-85	*
Employment Status						
Employed	24626	0.644	11890	0.724	12736	0.584
Full-time	19512	0.792	10448	0.879	9064	0.712
Part-time	5114	0.208	1442	0.121	3672	0.288
Unemployed	1520	0.040	654	0.040	866	0.040
Out of Labor Force	12083	0.316	3868	0.236	8215	0.377
Education (Degree)						
No High School Diploma	6693	0.175	2983	0.182	3710	0.170
HS Diploma	10247	0.268	4285	0.261	5962	0.273
Some College, No Degree	6685	0.175	2722	0.166	3963	0.182
Associate's Degree	3460	0.091	1367	0.083	2093	0.096
Bachelor's Degree	7113	0.186	3137	0.191	3976	0.182
Master's, Professional, or Doctorate Degree	4031	0.105	1918	0.117	2113	0.097
Marital Status						
Married	19672	0.515	9187	0.560	10485	0.481
Never Married	9100	0.238	4319	0.263	4781	0.219
Previously Married	9457	0.247	2906	0.177	6551	0.300
Spouse/Partner Present						
No Partner Present	17763	0.465	6804	0.415	10959	0.502
Partner Present	20466	0.535	9608	0.585	10858	0.498
Number of Children						
No Children	19154	0.501	8413	0.513	10741	0.492
One Child	7748	0.203	3218	0.196	4530	0.208
Two Children	7300	0.191	3106	0.189	4194	0.192
Three or More Children	4027	0.105	1675	0.102	2352	0.108
White						
No	6822	0.178	2735	0.167	4087	0.187
Yes	31407	0.822	13677	0.833	17730	0.813
Black						
No	33410	0.874	14582	0.888	18828	0.863
Yes	4819	0.126	1830	0.112	2989	0.137
Hispanic						
No	33233	0.869	14223	0.867	19010	0.871
Yes	4996	0.131	2189	0.133	2807	0.129
Total	38229	1.000	16412	1.000	21817	1.000

Age

The sample population is slightly older than the U.S. population. According to 2005-2007 data from the Census Bureau's American Community Survey (ACS), the median age for all individuals in the population was 36.4 years. For males the median age was 35.2 years. For females the median age was 37.8 years. A comparison of the age distribution across these two surveys shows that ATUS sample participants are concentrated around that 35 to 54 age range, which reflects the oversampling of households with children in this survey. The larger proportion of women in these ATUS data also reflects this sample structure.

Table B-2. Age Distribution

Age Breakdown, Percent Distribution					
	ATUS	ACS		ATUS	ACS
15 to 19 years	7.25	7.20	50 to 54 years	8.60	6.90
20 to 24 years	4.66	7.00	55 to 59 years	7.44	6.00
25 to 29 years	7.08	6.80	60 to 64 years	5.98	4.60
30 to 34 years	9.43	6.60	65 to 69 years	4.95	3.50
35 to 39 years	10.85	7.10	70 to 74 years	4.04	2.90
40 to 44 years	11.35	7.50	75 to 79 years	3.66	2.50
45 to 49 years	10.31	7.60	80 to 84 years	2.79	1.90
			85 and older	1.62	1.70

Sources: American Time Use Survey; U.S. Census Bureau, 2005-2007 American Community Survey

In 2007, the mean age for householders with children was 42.7 years (ACS, U.S. Census Bureau), which is again lower than the mean age for householders in the sample, but much closer.

Sex, Race, and Education

As previously noted, the ATUS sample is not evenly distributed between males and females due to the oversampling of households with children. Fifty-seven percent of the sample was female, while fifty-one percent of the population was female in 2007 (ACS, U.S. Census Bureau).

The proportion of respondents in the broader racial categories described in the ATUS is similar to that of the population as a whole. Of the ATUS sample, 12.6% of respondents described themselves as "black only" and 13.1% of respondents indicated that they were of Hispanic origin. The U.S. Census estimates that approximately 12.3% of the population is black and 14.7% is Hispanic.

Respondents were almost evenly distributed across the categories of educational degrees, with slightly more only having a high school degree. More males than females in the sample completed degrees beyond college, but the proportions that obtained high school and college degrees are similar.

Family Structure

About half of all respondents were married (51.5%) and had a spouse or a partner present in the household (53.5%), with slightly more men than women indicating that they were married and had a partner present. Half of the respondents had children present in the household, even though approximately 22% of households had children present in 2007 (ACS, U.S. Census Bureau). The median age for the youngest child in sample households with children was seven years (not shown in table).

Employment and Wages

The employment rates for respondents in the sample are similar to those indicated by the Bureau of Labor Statistics (BLS). Approximately 64.4% of respondents were employed and 4.0% were unemployed at the time of their ATUS interview. According to the BLS, 66.3% of Americans age 16 or older were employed in 2007, 66% were employed in 2006, and 65.8% were employed in 2005. Of the population age 16 and above, the unemployment rate was 4.6% in 2007, 4.7% in 2006, and 5.2% in 2005. In the sample, more males (72.4%) than females (58.4%) were employed, but the groups had identical unemployment rates. The difference in employment between males and females is reflected in the higher percentage of women who are out of the labor force.

Table B-3. Wage Summary

Wage Information for All Employed Respondents				
	Mean	Median	Standard Deviation	Range
Hourly Earnings (Dollars)				
Total Sample	19.76	15.62	17.12	0 to 961.00
Males	22.00	18.00	16.66	0 to 384.60
Females	17.78	13.90	17.11	0 to 961.00
Weekly Earnings (Dollars)				
Total Sample	804.00	640.00	617.59	0 to 2885.00
Males	966.80	803.30	673.63	0 to 2885.00
Females	660.40	520.00	523.11	0 to 2885.00
Hours Worked Per Week (Hours)				
Total Sample	40.43	40.00	13.65	1 to 160
Males	44.19	40.00	13.48	1 to 160
Females	36.92	40.00	12.84	1 to 120

According to BLS data, the median hourly wage across all occupations was \$14.15 in 2005, \$14.61 in 2006, and \$15.10 in 2007. The mean hourly wage across all occupations was \$18.21 in 2005, \$18.84 in 2006, and \$19.56 in 2007. ATUS respondents have slightly higher mean and median wages than the BLS estimates for 2007; however, these individuals are slightly older than the population and earnings tend to increase with age.

As seen in the table on wage information, the median hourly earnings for employed hourly workers in the full sample were \$15.62 per hour. Women earned slightly less per hour (\$13.90) than the sample, while men made more (\$18.00), which reflects sex differences in earnings across the population. The median weekly earnings for employed workers in the full sample were \$640.00 per hour. Similar to sex differences in hourly earnings, women made less than the median weekly earnings (\$520.00), while men made more (\$803.30). Across employed men and women in the sample, the median hours worked per week were 40 hours. The mean varies slightly across men and women, with men working four hours more per week and women working four hours less.

The average hourly earnings for all privately employed workers were \$16.13 in 2005, \$16.76 in 2006, and \$17.43 in 2007. The average weekly earnings for these workers were \$544.33 in 2005, \$567.87 in 2006, and \$590.04 in 2007. The average hours worked per week by these workers were 33.8 in 2005, 33.9 in 2006, and 33.9 in 2007.

Privately employed respondents in the ATUS sample made more and worked more hours than the population average. Within the ATUS sample, individuals employed in private, for-profit firms made, on average, \$19.21 per hour or \$791.00 per week and worked 40.56 hours each week. Median hourly and weekly earnings were slightly less, \$14.96 and \$600.00 respectively.

Description of ATUS Variables

The following table provides an overview of variables from the American Time Use Survey (ATUS) that were used in describing and estimating wages of parental and family, friend, and neighbor (FFN) caregivers. We then provide a detailed description of these variables, divided into three sections: caregiving estimates, work indicators, and individual, demographic indicators. As noted in a meta-analysis of gender wage discrimination conducted by Stanley and Jarrell (1998), these variables appear across a variety of research predicting hourly wages for men and women.

Description of ATUS Variables	
Variable	Description
Any Parental Household Care	Did R spend 1 minute or more caring for own household children during activity day: 0=No; 1=Yes
Minutes of Parental Household Care	Minutes that R spent caring for own household children during activity day
Any Non-Household Care	Did R spend 1 minute or more caring for any non-household children during activity day: 0=No; 1=Yes
Minutes of Non-Household Care	Minutes that R spent caring for non-household children during activity day
Hourly wage	R's hourly wages
Weekly wage	R's weekly wages
Hours worked per week	R's usually total hours worked per week
Employment Status	R's labor force status: 0=Employed; 1=Unemployed; 2=Not in labor force
Full-time Status	R's full-time or part-time job status: 0=FT; 1=PT; 2=Not employed
Hourly Status	Is R's job paid hourly or non-hourly: 0=Not hourly; 1=Hourly; 2=Not employed
Number of Jobs	Does R hold multiple jobs: 0=No; 1=Yes; 2=No employment
Partner's Employment Status	Employment status of R's partner or spouse if present: -1=No partner/spouse present; 0=Employed; 1=Not employed
Partner's Full-time Status	Employment status of R's partner or spouse if present: -1=No partner/spouse present; 0=FT; 1=PT; 2=Not employed
Number of Children	Number of children in R's HH: 0=No children; 1=One child; 2=Two children; 3=Three or more children
Age of Youngest Child	Age of R's youngest child: -1=No children present
Marital Status	R's marital status: 0=Married; 1=Never married; 2=Previously married (separated, widowed, or divorced)
Spouse/Partner Present	Does R have a partner or spouse present in the HH: 0=No partner/spouse present; 1=Partner/spouse present
Enrollment Status	Is R currently enrolled in school: 0=No; 1=Yes
Education (Degree)	R's highest educational degree obtained: 0=No high school diploma; 1=HS diploma; 2=Some college, no degree; 3=Associate's degree; 4=Bachelor's degree; 5=Master's, Professional, or Doctorate degree
Disability	Does R have any disability: 0=No; 1=Yes
Union	Does R belong to a union or collective bargaining agreement: 0=No; 1=Yes
Government Job	Does R work in a government or public sector job: 0=No; 1=Yes
Detailed Occupation	R's detailed occupational code for main job
Detailed Industry	R's detailed industry code for main job
Age	R's age in years

Sex	R's sex: 0=Male; 1=Female
White	Does R list White Only for race: 0=No; 1=Yes
African American	Does R list African American Only for race: 0=No; 1=Yes
Hispanic	Is R Hispanic: 0=No; 1=Yes
Spanish Speaking	Is Spanish the only language spoken by all members of R's household who are 15 years and older: 0=No; 1=Yes
Citizenship Status	Is R a US citizen: 0=US Native Citizen; 1=US Naturalized Citizen; 2=Not a US Citizen
Mother's Birthplace	Was R's mother born in the United States: 0=No; 1=Yes
Father's Birthplace	Was R's father born in the United States: 0=No; 1=Yes
R's Birthplace	Was R born in the United States: 0=No; 1=Yes
Region	R's region of residence: 0=Northeast; 1=North Central; 2=South; 3=West
State	R's state of residence
Metropolitan Area	Does R reside in a metropolitan area: 0=No; 1=Yes

Source: American Time Use Survey, Multi-Year Codebook, <http://www.bls.gov/tus/atusintcodebk0307.pdf>
Note: "R" stands for respondents. "HH" stands for household

Specifying Caregivers and Caregiving: Primary vs. Secondary

The ATUS data allow us to distinguish between primary and secondary care of children. Primary caregiving refers to activities involving direct interaction with a child and are likely to fully absorb the caregiver's attention. Secondary caregiving refers to time when the adult is responsible for the child's well-being, but is not directly engaged and may be conducting other activities. For describing the characteristics of parental and FFN caregivers, we combine the time spent in both primary and secondary caregiving. However, when we estimate the economic value of parental and FFN caregiving, we adjust the hours children are in such care by the fraction that is devoted to primary care. This adjustment is based on the assumption that during secondary caregiving, adults may be engaged in other activities, which have their own economic value.

Primary Parental and FFN Child Care

We define primary parental care for household children as a compilation of time spent in more specific household child care activities recorded in the ATUS data. Thus, primary household child care is a combination of a participant's time spent in the following activities:

- Physical care for household children
- Reading to/with household children
- Playing with household children, not classified as sports
- Arts and crafts with household children
- Playing sports with household children
- Talking with/listening to household children
- Organization and planning for household children
- Looking after household children (as a primary activity)
- Attending household children's events
- Waiting for/with household children
- Picking up/dropping off household children
- Caring for and helping household children, not elsewhere classified
- Homework (household children)

- Meetings and school conferences (household children)
- Home schooling of household children
- Waiting associated with household children’s education
- Activities related to household children’s education, not elsewhere classified
- Providing medical care to household children
- Obtaining medical care for household children
- Waiting associated with household children’s health
- Activities related to household children’s health, not elsewhere classified

Secondary Parental and FFN Child Care

Respondents were also asked to provide information about time spent providing secondary child care for their own household children. Secondary child care refers to any time respondents were providing child care, but did not indicate it as a primary activity. For example, if a respondent were cleaning the house and also watching children, he or she would indicate, “house cleaning” as the primary activity and child care as a secondary activity.

Work Indicators

We include a set of variables related to the respondent’s employment, earnings, and workplace characteristics. Because all of these data were not available for non-employed respondents, we could not use them in our wage imputation equations. However, we still provide a discussion of all the available wage indicators.

Work Experience

The ATUS and available matched CPS data do not offer a specific measure of work experience. When actual work experience is not available researchers usually use potential work experience, estimated as age minus years of schooling minus six. In place of work experience some researchers include age among the predictor variables. To allow for concavity in wage profile by age, age or experience is usually included as a quadratic specification. We therefore use age, along with an age-squared term in our analyses.

Workplace and Employment Characteristics

For employed respondents we include measures of workplace and employment characteristics. These variables measure the respondent’s *occupation and industry of employment, number of jobs, part-time and full-time status, hourly status, union agreements, and government employment*. Other studies often use additional measures for a respondent’s job tenure and seniority and the size of the employer. ATUS does not include measures for these employment aspects.

For employed individuals we use both detailed and major occupation and industry codes to describe the respondent’s occupation and industry. We measure number of jobs as a binary variable indicating whether the individual holds a single job or multiple jobs. We measure part-time and full-time status with a binary variable that indicates whether or not the individual works full-time or part-time. We measure hourly status with a binary variable that indicate whether the respondent is paid by the hour or paid in some other form, such as a weekly or monthly salary. We measure union agreements and government employment using binary CPS variables.

Hourly Earnings

Hourly earnings were computed in several steps. ATUS contains information for the hourly wages of respondents who indicate that they receive an hourly pay. For all other respondents, including those who are paid hourly, ATUS contains information for their weekly earnings and number of hours worked per week. Therefore, we computed hourly earnings for those respondents with weekly earning information by dividing their reported weekly earnings by reported hours. For those respondents who did not indicate weekly earnings and hours but were employed in an hourly position, we used their hourly wage data.

Weekly Earnings

Weekly earnings were computed by the ATUS. Interviewers used information related to the respondent's employment status, hourly or non-hourly work status, hours worked per week at main job, and hours worked per week at any additional job.

Hours Worked Per Week

The variable hours worked per week describes the respondent's total hours worked per week, including overtime hours and hours worked at secondary jobs. ATUS interviewers computed each respondent's total hours worked per week by combining hours worked at main and additional jobs.

Individual, Demographic Indicators

We include a set of variables related to the respondent's education, family background, and other demographic characteristics.

Education

When measuring education most researchers use either an indicator variable based on completed educational degrees or a linear variable describing years of schooling. The ATUS does not contain data on years of schooling, thus for our analyses we use an indicator variable broken down into six categories. These categories are: respondents with no high school diploma; respondents with a high school diploma; respondents who attended some college, but received no degree; respondents with an associate's degree; respondents with a bachelor's degree; and respondents with a master's, professional, or doctorate degree.

Other demographic characteristics

Other important demographic characteristics included in studies predicting hourly wages are *marital status* and presence of pre-school and school-age *children*. Additional variables used by researchers to predict hourly wages are: *geographical area* of employment, a *government/private* employment distinction, *union/non union* status, a worker's *full time/part time* status, if main spoken language is English, and a worker's health status. Moreover, even after controlling for these characteristics, wages usually differ by *gender* and *race*.

The demographic characteristics that we control for in our analyses are *marital status*, *number of children*, *Spanish language*, *immigrant status*, *race*, and *sex*. We define marital status as currently married, never married, or formerly married. The category of formerly married includes respondents who are separated, widowed, or divorced. We measure children with two

variables, number of children and age of the youngest child. Number of children is a categorical variable indicating whether the respondent has no children, one child, two children, or three or more children. Age of the youngest child gives the age of the youngest child ranging from 0 to 17 years for all respondents with children. We measure Spanish language with a binary variable that indicates whether or not Spanish is the only language spoken by all members of the respondent's household who are 15 years and older.

We measure immigrant status with four variables. The first, citizenship status, indicates whether the respondent is a U.S. native citizen, a U.S. naturalized citizen, or a U.S. residing non-citizen. The second, respondent's birthplace, indicates whether or not the respondent was born in the United States. The third, mother's birthplace, indicates whether or not the respondent's mother was born in the United States. The fourth, father's birthplace, indicates whether or not the respondent's father was born in the United States.

While the ATUS contains information on the respondent's self-identified detailed racial category, we primarily measure race as White, African American, or Hispanic. Respondents were categorized as white if they indicated "White only" for their detailed racial category or as African American if they indicated "Black only" for their detailed racial category. The ATUS asked respondents separately if they categorize themselves as Hispanic, thus we use their binary variable to indicate if a respondent is Hispanic. We measure sex with a binary variable indicating whether the respondent is male or female.

Area of Employment

We also include variables that describe the respondent's area of employment within the country. These variables include *region*, *state*, and *metropolitan area status*. We measure metropolitan area status with a categorical variable that indicates whether or not the respondent resides in a metropolitan area. The respondent's region of residence consists of four categories, Northeast, North Central, South, and West. The Northeast category includes respondents residing in CT, MA, NH, NJ, NY, PA, RI, VT, and ME. The North Central category contains the respondents residing in IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, and WI. The South category includes the respondents residing in AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, and WV. The West category includes the respondents residing in AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, and WY.

Partition of Sample Reflecting Caregiving and Employment Status

For our analysis we create partitions of respondents based on their provision of child care outside the paid, formal sector and their employment status. As described in Table 1, we partitioned respondents providing (a) parental care and (b) family, friend, and neighbor (FFN) care into categories relevant for estimating the wage-value of the care they provide. The parental care group includes all parents with children 5 years or younger who utilize less than 40 hours of formal center or Family Child Care (FCC) child care per week. The family, friend and neighbor care group includes all adults who report caring for a child not in their household. We further divided these groups by specific family types. Parental care was broken down into (a) two parent and (b) single parent households. Family, friend, and neighbor care was broken down into (a) relative and (b) non-relative care. We then divided these groups based upon employment status.

Two parent households received six partitions: (a) one parent works full time, (b) one parent works part time, (c) one parent does not work, (d) both parents work full time, (e) both parents work part time, and (f) both parents do not work. Single parent households received three partitions: (a) works full time, (b) works part time, and (c) does not work. Finally, FFN caregivers were partitioned into two categories: (a) some employment and (b) no other employment.

Table B-4. Partition by Employment

Table 1: Informal Child Care Arrangements								
Type	Parental Care of Own Child (Includes all who utilize less than 40 hours/week of Formal Care)					Family, Friend, and Neighbor Care (Includes all adults who report caring for a child not in their household)		
Family	Two Parent Household			Single Parent Household			Relative	Non-Relative
	One Parent Care			One Parent Care				
Employment	One Parent Works Full Time	One Parent Works Part Time	One Parent Does Not Work	Works Full Time	Works Part Time	Does Not Work	Some Employment	
	Both Parents Work Full Time	Both Parents Work Part Time	Both Parents Do Not Work				No Other Employment	

Note: This is a scheme for partitioning the ATUS sample of adults caring for children, from which to estimate foregone wages by examining the characteristics of respondents who fit into these categories. The hours of care giving to which these foregone wage estimates will be applied will be derived from the NHES, 2005.

Descriptive Analysis of ATUS Data Regarding Caregiving, Caregiver Characteristics, Employment and Wages

In this section we provide descriptive statistics for selected ATUS variables salient for our analysis. We divide our review of descriptive statistics into three sections.

- The first section provides estimates of the amount of child caregiving by parents and by family, friend, and neighbor caregivers. These include parents with children age five or younger who indicated that they spent any time caring for children on their activity day (N=7,063). We then consider respondents who indicated that they spent any time caring for children who do not reside in their household (“non-household” children) on their reported activity day (N=4000). We label this group as family, friend, and neighbor (FFN) caregivers, since they are caring for someone else’s child during non-employed hours and do not list their occupation as a child care worker or pre-school teacher (see Brandon, 2005, for a discussion of the definition of FFN).
- The second section provides relevant characteristics of different groups of caregivers and compares them to the general adult population.
- Finally, we describe the characteristics of FFN caregivers who provide different amounts of care per day.

Amounts of Caregiving by Parents, FFNs

In this section we provide an overview of the amount of caregiving of young children by different types of individuals, including the amount of caregiving and characteristics of caregivers. We compare parental caregivers and family, friend, and neighbor caregivers.

Parental Child Care

The following tables summarize the distribution of amount of parental caregiving for children aged five or younger, based on the “activity day” report. Parents were asked about time spent in specific child care activities, which we coded as primary child care, and about time spent providing secondary child care.

Approximately 15.9% of respondents spent at least one minute or more per day caring for a child age five or younger and a slightly larger proportion of parents with young children (17.3%) spent a least a minute or more of their activity day providing secondary child care. Parents with young children averaged 147.1 minutes of primary care and 434.1 minutes of secondary care. Thus approximately 23% of parents’ child care time was primary care.

Table B-5. Amount of Parental Caregiving

Minutes/day of Parental Care, Children 5 Years of Younger		
	Primary Care	Secondary Care
Minimum	0	0
Maximum	1003	1245
Mean (with zeros)	23.32	75.13
Median (with zeros)	0	0
Mean (without zeros)	147.1	434.1
Median (without zeros)	113.5	440

Totaling time spent providing primary and secondary care creates higher average estimates of time, but similar proportions of parents providing care. Of all respondents, 18.5% spent some time providing child care to children age five or younger. Parents with young children averaged 532.9 minutes per day of care.

Table B-6. Distribution of Amount of Parental Caregiving

Total Household Child Care, Children 5 Years or Younger				
	Minutes/day		N	Proportion of Sample
Minimum	0	Not giving any care	31166	0.815
Maximum	1260	Giving at least 1 minute of care	7063	0.185
Mean (with zeros)	98.45	Giving at least 30 minutes of care	6944	0.182
Median (with zeros)	0	Giving at least 60 minutes of care	6807	0.178
Mean (without zeros)	532.9	Giving at least 2 hours of care	6479	0.169
Median (without zeros)	585	Giving 8 hours or more of care	4058	0.106

We also computed population estimates of the number and proportion of parents with children 5 years of age or younger who spent time caring for household children on an average day by taking the sum of a weighted average of parental caregiver respondents divided by a sum of all the sampling weights. The following table presents these estimates for total caregiving.

Table B-7. Number of Parental Caregivers

Total Parental Household Child Care, Children 5 Years or Younger						
	Population		Male Population		Female Population	
	Any Child Care	No Child Care	Any Child Care	No Child Care	Any Child Care	No Child Care
Population	34,238,298	198,980,258	14,420,826	98,518,592	21,652,955	100,461,666
Proportion	0.147	0.853	0.128	0.872	0.165	0.835
Total Pop	233,218,556		112,939,417		125,667,081	
Average Time Spent on Child Care Per Day						
	Minutes	Hours	Minutes	Hours	Minutes	Hours
	Average (No zeros)		Average (No zeros)		Average (No zeros)	
	484.71	8.08	375.82	6.26	563.95	9.40
Average (Zeros)		Average (Zeros)		Average (Zeros)		
	71.16	1.19	47.99	0.80	92.92	1.55

Overall, fewer individuals in the population spent time caring for children age five or younger than those who spent time caring for children age seventeen or younger. However, these caregivers spent more time on care than the caregivers of older children did. Of the entire population, fourteen percent of individuals spent a minute or more of time in their day caring for household children age five or younger. Caregivers averaged 8.08 hours of time on care for young household children on an average day. More women (16.5%) spent time caring for young children than men (12.8%). Female caregivers also averaged more time in their day (9.40 hours) caring for children than male caregivers (6.26 hours).

Total Friend, Family, and Neighbor Child Care

The following tables summarize the amount of non-household child care by all friend, family, and neighbor (FFN) child caregivers. Approximately 5.6% of respondents in the sample spent at least one minute or more on their interview day in an activity of primary child care for a non-household child and 7.3% spent a minute or more on secondary care. These caregivers averaged 77.15 minutes spent on primary care and 263.8 minutes spent on secondary care. Thus approximately 25% of friend, family, and neighbor child care time was primary care.

Table B-8. Amount of FFN Caregiving

	Minutes/Day of Non-Household Child Care	
	Primary Care	Secondary Care
Minimum	0	0
Maximum	818	1200
Mean (with zeros)	4.288	19.36
Median (with zeros)	0	0
Mean (without zeros)	77.15	263.8
Median (without zeros)	30	200

Of all respondents, 10.5% spent some time providing child care to non-household children on the activity day. FFN caregivers averaged 226 minutes of care on that day.

Table B-9. Distribution of Amount of FFN Caregiving

Total Non-Household Child Care				
	Minutes		N	Proportion of Sample
Minimum	0	Not giving any care	34229	0.895
Maximum	1230	Giving at least 1 minute of care	4000	0.105
Mean (with zeros)	23.65	Giving at least 30 minutes of care	3272	0.086
Median (with zeros)	0	Giving at least 60 minutes of care	2952	0.077
Mean (without zeros)	226	Giving at least 2 hours of care	2358	0.062
Median (without zeros)	150	Giving 8 hours or more of care	582	0.015

We also compute population estimates of the number and proportion of all family, friend, and neighbor non-household caregivers who spent time caring for household children on an average day by taking the sum of a weighted average of parental caregiver respondents divided by a sum of all the sampling weights. The following table presents these estimates for total caregiving.

Table B-10. Number of FFN Caregivers in US Population

Total Non-Household Child Care						
	Population		Male Population		Female Population	
	Any Child Care	No Child Care	Any Child Care	No Child Care	Any Child Care	No Child Care
Population	22,155,255	211,063,301	7,847,309	105,092,109	12,752,084	105,971,192
Proportion	0.095	0.905	0.070	0.930	0.119	0.881
Total Pop	233,218,556		112,939,417		125,667,081	
Average Time Spent on Child Care Per Day						
	Minutes	Hours	Minutes	Hours	Minutes	Hours
Average (No zeros)	216.33	3.61	204.95	3.42	222.57	3.71
Average (Zeros)	20.55	0.34	14.24	0.24	26.48	0.44

Of the U.S. population, 9.4% spent time caring for non-household children. Caregivers averaged 3.61 hours of care on an average day. More women (11.9%) than men (6.9%) spent time on non-household child care. However, female caregivers spent similar amounts of time on care giving as men did. Female FFN caregivers averaged 3.71 hours on a typical day, while male caregivers averaged 3.42 hours.

Characteristics of Caregivers: Parents, FFNs, Child Care Workers

In this section we discuss additional descriptive statistics for comparison groups of interest. The following table provides comparison descriptive statistics for the entire sample (N=38,229), parent caregivers with children five years or younger in the sample (N = 7,063), family, friend, and neighbor (FFN) caregivers in the sample (N = 4000), and child care workers in the sample (N=501). It should be noted that we could not include preschool teachers along with or in comparison to child care workers, since the ATUS uses a census bureau categorization that

combines preschool and kindergarten teachers. Since kindergarten teachers are required to have a higher level of education and are paid higher wages than most preschool teachers, including them would have distorted the current analysis. The data provided in this section therefore do not fully represent the paid early care and education (ECE) workforce, but only that segment working in community-based facilities not classified as preschools.

Table B-11. Characteristics of Parent Caregivers, FFN's and Child Care Workers

Selected ATUS Respondent Characteristics								
	Total Sample		Parental Caregivers		FFN Caregivers		Child Care Workers	
	N	Proportion of Respondents	N	Proportion of Parental Caregivers	N	Proportion of FFN Caregivers	N	Proportion of Child Care Workers
Age (Years)								
Mean	45.86	*	33.84	*	43.44	*	37.92	*
Median	44	*	34	*	43	*	35	*
Standard Deviation	17.681	*	7.875	*	16.544	*	15.54	*
Range	15-85	*	15-80	*	15-85	*	15-80	*
Employment Status								
Employed	24626	0.644	5150	0.729	2532	0.633	501	1.000
Full-time	19512	0.792	4172	0.810	1853	0.732	291	0.581
Part-time	5114	0.208	978	0.190	679	0.268	210	0.419
Unemployed	1520	0.040	323	0.046	227	0.057	0	0.000
Out of Labor Force	12083	0.316	1590	0.225	1241	0.310	0	0.000
Education (Degree)								
No High School Diploma	6693	0.175	823	0.117	742	0.186	108	0.216
HS Diploma	10247	0.268	1669	0.236	1111	0.278	135	0.269
Some College, No Degree	6685	0.175	1226	0.174	658	0.165	107	0.214
Associate's Degree	3460	0.091	708	0.100	396	0.099	53	0.106
Bachelor's Degree	7113	0.186	1743	0.247	743	0.186	88	0.176
Master's, Professional, or Doctorate Degree	4031	0.105	894	0.127	350	0.088	10	0.020
Marital Status								
Married	19672	0.515	5600	0.793	2162	0.541	242	0.483
Never Married	9100	0.238	937	0.133	897	0.224	167	0.333
Previously Married	9457	0.247	526	0.074	941	0.235	92	0.184
Spouse/Partner Present								
No Partner Present	17763	0.465	1161	0.164	1749	0.437	255	0.509
Partner Present	20466	0.535	5902	0.836	2251	0.563	246	0.491
Number of Children								
No Children	19154	0.501	0	0.000	1686	0.422	159	0.317
One Child	7748	0.203	2152	0.305	840	0.210	140	0.279
Two Children	7300	0.191	2829	0.401	934	0.234	117	0.234
Three or More Children	4027	0.105	2082	0.295	540	0.135	85	0.170
Sex								
Male	16412	0.429	2730	0.387	1295	0.324	28	0.056
Female	21817	0.571	4333	0.613	2705	0.676	473	0.944
White								
No	6822	0.178	1120	0.159	706	0.177	107	0.214
Yes	31407	0.822	5943	0.841	3294	0.824	394	0.786

Black								
No	33410	0.874	6453	0.914	3464	0.866	411	0.820
Yes	4819	0.126	610	0.086	536	0.134	90	0.180
Hispanic								
No	33233	0.869	5856	0.829	3574	0.894	420	0.838
Yes	4996	0.131	1207	0.171	426	0.107	81	0.162
Total	38229	1.000	7063	1.000	4000	1.000	501	1.000

Age

Unlike the sample population as a whole, the age of parental caregiver respondents with young children is close to that of the U.S. population (36.4 years). Parental caregivers of young children had a median age of 34 years and a mean age of 33.8 years. For male parental caregivers the median age was 35 years. Female parental caregivers were younger with a median age of 32 years.

Family, friend, and neighbor caregiver respondents were older than parental caregivers and the US population, with a median and mean age of approximately 43 years. For male FFN caregivers the median age was 42 years. For females the median age was 43 years.

Child care workers were also younger than the total sample population, but slightly older than parental caregivers. The median and mean ages for child care workers were 35 and 38 years, respectively. For male child care workers the median age was older, 42 years. For female parental caregivers the median age was 35 years.

Sex, Race, and Education

As expected, more women than men comprise the categories of parental and FFN caregivers, but the racial make-up of each of these categories is very similar. The groups also had similar levels of educational attainment. However, parental caregivers were slightly more educated than FFN caregivers, with a higher proportion obtaining bachelor and other degrees.

Child care workers were also predominantly female, with fewer years of education than parental or FFN caregivers. When compared to other caregivers, a larger proportion of child care workers did not receive high school degrees and a smaller proportion received education beyond college.

Family Structure

In regard to family structure, 79.3% of parental caregivers were married, while only 51.5% of the sample, 54.1% of FFN caregivers, and 48.3% of child care workers listed married as their status. The majority of parental caregivers with young children had a spouse or a partner present in the household (83.6%) as well, with more men than women indicating that they were married and had a partner present. Slightly more than half of FFN caregivers (56.3%) and child care workers (50.9%) had a spouse or a partner present in the household.

All of the parental caregiver respondents had one or more children present in the household; the median age for the youngest child was two years. Fifty-seven percent of FFN respondents had one or more of their own children present in the household; the median age for the youngest child was eight years. Sixty-eight percent of child care workers had one or more of their own children present in the household; the median age for the youngest child was seven years.

Employment and Wages

More of the parental caregivers were employed (72.9%) than the sample as a whole (64.4%) and the FFN caregivers (63.3%). FFN caregivers had the highest rates of unemployment (5.7%) and were more likely than parental caregivers to be out of the labor force, which reflects their age and retirement status. Of employed caregiver respondents, the majority worked full-time, with few differences across categories.

As part of the criteria for group membership, all child care workers were employed. However, a higher proportion of these respondents worked part-time (41.9%) than the total sample (20.8%).

Table B-12. Wages of Employed Caregivers

Wage Information for Employed Respondents				
	Mean	Median	Standard Deviation	Range
Hourly Earnings (Dollars)				
Total Sample	19.76	15.62	17.12	0 to 961.00
Parental Caregivers	21.21	16.83	17.04	0 to 480.00
Family, Friend, and Neighbor Caregivers	18.52	14.92	13.56	0 to 123.50
Child Care Workers	9.32	8.17	5.18	0.75 to 40.21
Weekly Earnings (Dollars)				
Total Sample	804.00	640.00	617.59	0 to 2885.00
Parental Caregivers	867.40	688.40	648.88	0 to 2885.00
Family, Friend, and Neighbor Caregivers	741.70	576.90	616.09	0 to 2885.00
Child Care Workers	290.3	247.00	254.77	11.00 to 2212.00
Hours Worked Per Week (Hours)				
Total Sample	40.43	40.00	13.65	1 to 160
Parental Caregivers	40.85	40.00	13.14	0 to 120
Family, Friend, and Neighbor Caregivers	38.78	40.00	14.31	0 to 99
Child Care Workers	34.32	40.00	17.12	1 to 85

The different rates of full-time and part-time employment are reflected in the hours worked per week by each group. Child care workers and FFN caregivers had a slightly lower mean for hours worked per week. On average child care workers worked for approximately 35 hours per week and FFN caregivers worked for 38 hours per week, while parental caregiver respondents worked 40 hours per week.

As seen in the table on wage information, parental caregivers reported higher hourly earnings than FFN caregivers. The median hourly earnings for employed parent caregiver hourly workers were \$16.83 per hour. Female parental caregivers made slightly less per hour (\$14.33 per hour) than the sample median, while males made more (\$19.97 per hour). The median hourly earnings for employed FFN caregiver hourly workers in the full sample were \$14.92 per hour. Female FFN caregivers also earned less per hour (\$13.30 per hour) than males (\$18.57 per hour).

Child care workers reported the lowest hourly and weekly earnings of the caregiver groups. However, their hourly earnings are similar to those of all child care workers in the U.S. Child care workers in the sample earned on average \$9.32 per hour, while the mean earnings for child

care workers in the U.S. in 2007 were \$9.46 per hour (Occupational Employment Statistics, BLS).

Characteristics of Family, Friend and Neighbor Caregivers by Amount of Daily Care

In order to provide a more accurate picture of FFN caregivers, we also include descriptive statistics for three subsamples of these caregivers. These subsamples include the following: (a) FFN caregivers who spent less than 60 minutes (1 hour) on care giving (N = 1200), (b) FFN caregivers who spent 61 to 180 minutes (3 hours) on care giving (N = 1040), and (c) FFN caregivers who spent 181 minutes or more on care giving (N = 1760). We chose these categories based on the distribution of FFN caregivers across minutes of care and natural cut points.

Table B-13. Characteristics of FFN's by Amount of Daily Caregiving

Selected ATUS Family, Friend, and Neighbor Caregiver Characteristics						
	FFNs with 1-60 min of care		FFNs with 61-180 min of care		FFNs with more than 180 min of care	
	N	Proportion	N	Proportion	N	Proportion
Age (Years)						
Mean	40.27	*	43.19	*	45.75	*
Median	40	*	42	*	45	*
Standard Deviation	17.39	*	16.47	*	15.61	*
Range	15-85	*	15-85	*	15-85	*
Employment Status						
Employed	738	0.615	670	0.644	1124	0.639
Full-time	498	0.675	487	0.727	868	0.772
Part-time	240	0.325	183	0.273	256	0.228
Unemployed	77	0.064	65	0.063	85	0.048
Out of Labor Force	385	0.321	305	0.293	551	0.313
Education (Degree)						
No High School Diploma	302	0.252	180	0.173	260	0.148
HS Diploma	300	0.250	256	0.246	555	0.315
Some College, No Degree	188	0.157	172	0.165	298	0.169
Associate's Degree	100	0.083	102	0.098	194	0.110
Bachelor's Degree	225	0.188	227	0.218	291	0.165
Master's, Professional, or Doctorate Degree	85	0.071	103	0.099	162	0.092
Marital Status						
Married	572	0.477	602	0.579	988	0.561
Never Married	369	0.308	215	0.207	313	0.178
Previously Married	259	0.216	223	0.214	459	0.261
Spouse/Partner Present						
No Partner Present	602	0.502	425	0.409	722	0.410
Partner Present	598	0.498	615	0.591	1038	0.590
Number of Children						
No Children	400	0.333	426	0.410	860	0.489
One Child	285	0.238	208	0.200	347	0.197
Two Children	333	0.278	251	0.241	350	0.199
Three or More Children	182	0.152	155	0.149	203	0.115
Sex						
Male	389	0.324	345	0.332	561	0.319
Female	811	0.676	695	0.668	1199	0.681

White						
No	205	0.171	172	0.165	329	0.187
Yes	995	0.829	868	0.835	1431	0.813
Black						
No	1054	0.878	912	0.877	1498	0.851
Yes	146	0.122	128	0.123	262	0.149
Hispanic						
No	1075	0.896	934	0.898	1565	0.889
Yes	125	0.104	106	0.102	195	0.111
Total	1200	1.000	1040	1.000	1760	1.000

Age

The mean and median ages of all FFN caregiver respondents were higher than that of the U.S. population and the mean age increases with more hours of care. FFN caregivers with an hour or less of care had a median and mean of approximately 40 years. FFN caregivers with one to three hours of care had a median and mean of approximately 42 years. FFN caregivers with more than three hours of care had a median and mean of approximately 45 years.

Sex, Race, and Education

Across all three groups more females than males cared for non-household children. In regard to race, the proportion of FFN caregiver respondents in the broader racial categories described in the ATUS differed slightly from the population as a whole. Of the FFN caregiver respondents with less than an hour of care, 12.2% of respondents described themselves as “black only” and 10.4% of respondents indicated that they were of Hispanic origin. Of the FFN caregiver respondents with one to three hours of care, 12.3% of respondents described themselves as “black only” and 10.2% of respondents indicated that they were of Hispanic origin. Of the FFN caregiver respondents with more than three hours of care, 14.9% of respondents described themselves as “black only” and 11.1% of respondents indicated that they were of Hispanic origin.

Slightly more FFN caregivers with an hour or less of care did not graduate from high school than FFN caregivers with more hours of care. A smaller proportion of this group also received college degrees.

Family Structure

Slightly less than half of FFN caregivers with an hour or less of care were married (47.7%) and half (49.8%) had a spouse or a partner present in the household. Approximately 57.9% of FFN caregivers with one to three hours of care were married and 59.1% had a spouse or a partner present in the household. Fifty-six percent of FFN caregivers with three hours or more of care were married (56.1%) and 59% had a spouse or a partner present in the household. Across all three groups, more females than males indicated that they were married and had a partner present in the household.

Friend, family, and neighbor caregivers with more hours of care were less likely to have children present in their households. Sixty-seven percent of FFN respondents with less than an hour of care had one or more children present in the household. Fifty-nine percent of FFN caregivers with one to three hours of care had one or more children present in the household, while 51% of

FFN respondents with more than three hours of care had one or more children present in the household.

Employment and Wages

The employment rates across friend, family, and neighbor (FFN) caregiver categories are similar. They are also close to the rates indicated by the Bureau of Labor Statistics (BLS). Approximately 62% of FFN caregivers who spent less than one hour on caregiving were employed and 6.4% were unemployed at the time of their ATUS interview. Approximately 64.4% of FFN caregivers who spent 61 to 180 minutes on care giving were employed and 6.3% were unemployed at the time of their ATUS interview. Approximately 64% of FFN caregivers who spent three hours or more on care giving were employed and 4.8% were unemployed at the time of their ATUS interview.

Table B-14. Wages of Employed FFN's

Wage Information for Employed FFN Caregiver Respondents				
	Mean	Median	Standard Deviation	Range
Hourly Earnings (Dollars)				
FFNs with 1-60 min of care	17.36	13.57	13.03	0 to 82.42
FFNs with 61-180 min of care	18.73	14.33	14.62	0 to 123.50
FFNs with more than 180 min of care	19.14	16.00	13.21	0 to 101.30
Weekly Earnings (Dollars)				
FFNs with 1-60 min of care	674.00	500.00	618.34	0 to 2885
FFNs with 61-180 min of care	740.10	576.90	613.97	0 to 2885
FFNs with more than 180 min of care	786.60	634.60	612.43	0 to 2885
Hours Worked Per Week (Hours)				
FFNs with 1-60 min of care	37.02	40.00	16.15	1 to 99
FFNs with 61-180 min of care	38.68	40.00	14.45	0 to 99
FFNs with more than 180 min of care	39.99	40.00	12.77	0 to 99

Friend, family, and neighbor caregivers with more hours of care had higher hourly and weekly wages and worked more hours than those caregivers with fewer hours of care. The median hourly earnings for employed FFN caregiver hourly workers with less than an hour of care in the full sample were \$13.57 per hour. The median hourly earnings for employed FFN caregiver hourly workers with one to three hours of care in the full sample were \$14.33 per hour. The median hourly earnings for employed FFN caregiver hourly workers with more than three hours of care in the full sample were \$16.00 per hour.

Across the groups male FFN caregivers made more than female caregivers. Female caregivers with less than an hour of care made \$12.50 per hour, while males made \$15.05 per hour. Female caregivers with one to three hours of care made \$12.55 per hour, while males made \$19.12 per hour. Female caregivers with more than three hours of care made \$14.00 per hour, while males made \$19.23 per hour.

The median hours worked per week for all groups of FFN caregivers were 40 hours. However, the mean hours were fewest for caregivers with an hour or less of care. The mean varies more across men and women, with men working more per week than women.

Wage Estimates and Regression Analysis

Foregone Wages, Parental and FFN Caregivers

For child care worker and preschool teacher wages, we were able to use BLS/OES annual wage statistics. However, as noted above, for parental and FFN caregivers, we must use a different data source to estimate the value of wages they forego while caring for young children. In this section we discuss the methods used to estimate foregone wages.

For parental caregivers, 73% were employed – 93% of males, 61% of females. For these individuals, we were able to use data from the ATUS directly to estimate foregone wages. For salaried and non-hourly workers, we divided their weekly earnings by their total hours worked per week to create an hourly wage. Combining these two types of workers we calculated hourly earnings for 21,128 employed individuals. Mean and median wages for these individuals are reported in the partition tables.

We used multiple regression analysis to estimate the foregone wages for non-employed parental and FFN caregivers. Several steps were followed for this analysis. First, we examined the distributions of all of our variables to make sure that they were relatively normal. No problems were found in that regard. Second, we compiled all the variables available in the ATUS indicated by the past research literature to be relevant to wage levels, and ran bivariate correlations among them. After examining the bivariate correlations, we selected a reduced list of variables, selecting those with the greatest conceptual linkage to wage levels and avoiding any that were conceptually duplicative or highly collinear. We then used this list of variables to run several versions of a general model of wage prediction on the full ATUS sample. These models had all the relationships in the expected directions, most of the variables were significant, and the R-square values ranged from 0.41 to 0.47. Based on these results we believe we had a reasonably well-specified model and adequate data to estimate foregone wages.

We also ran regressions varying individual variables in order to estimate the impact of different factors. For example, we ran the full model with variables indicating whether or not the individual's occupation was listed as "child care worker" to estimate the wage differential for the child care occupation, controlling for education and other relevant characteristics.

Our final model for wage estimation was specified separately for men and women in the sample, as it is likely that most variables will interact with an individual's sex. This model only included a set of variables that were also available for non-employed respondents. These predictors include caregiving, household, education, and other individual level variables. We could not include employment and workplace characteristics variables because they were not available for respondents without employment.

Caregiving is measured as minutes spent caring for household children five years of age and younger and minutes spent caring for non-household children seventeen years and younger. Household is described by the number of children, the presence of a partner or spouse in the household, and whether or not family members age fifteen and older solely speak Spanish.

Education is measured in six categories based on degrees earned. These categories are less than a high school education, high school diploma, some college, associate's degree, bachelor's degree, and master's, professional, or doctoral degree. We also include whether or not the respondent is currently enrolled in school in the regression. The other individual level characteristics that we use are the respondent's age, along with an age squared term, the respondent's sex, the respondent's race, measured in two binary variables, African American and Hispanic, whether the respondent was born in the United States, the respondent's region of residence, and whether their residence is in a metro area.

When estimating wages for non-employed persons from characteristics of employed persons, most researchers include a correction for individual selection into employment due to the assumption that employed individuals have higher wages than non-employed individuals would have if they were working. In order to correct for sample selection bias we estimated a two-stage Tobit model, which incorporated a Heckman (1976) correction. The idea behind this correction is that we can control for selectivity bias by including an additional parameter.

In the first step we estimated a Probit model predicting employment (1 = employed, 0 = not employed) for the full sample of respondents (N=34731). This equation is represented below.

$$probit(p) = \Phi^{-1}(\beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k) \quad (\text{Eq. 1})$$

Where p is the probability of employment, Φ^{-1} is the inverse cumulative density function (CDF), β_0 is the intercept term, and β_1 through β_k are the coefficients for predictor variables x_1 through x_k .

In the second step we used ordinary least squares (OLS) regression with a log transformed outcome variable to calculate hourly wages for the employed sample of respondents (N=21128). We accounted for the selection bias in the wage equation by including λ , an additional variable for each individual calculated using the results of the Probit equation. This regression is represented in equation 1 (below).

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k + \lambda + \varepsilon \quad (\text{Eq. 2})$$

Where y is the outcome variable of logged hourly wages, β_0 is the intercept term, β_1 through β_k are the coefficients for predictor variables x_1 through x_k , λ is the Inverse Mills Ratio, and ε is an error term.

Key regression findings are reproduced in the following tables.

General Model, Full ATUS Sample

The general regression model to test the adequacy of the specified variables and the data set is summarized on the following page. The different versions of the general model included or excluded the following categories of variables: providing any care of a child in the household (i.e., parental care), vs. the number of minutes of care provided; providing any non-household

care (i.e., FFN care) vs. the number of minutes of care provided; lowest education category = less than high school diploma, vs. education = high school diploma; including or excluding the square of respondents' age as well as age; and including occupational and industry categories. The four versions produced similar results, with R-squares ranging from 0.41 to 0.47 and similar coefficients.

Table B.15. Regression for Employed Workers, Predicting Log Hourly Earnings; Mean Centered Variables: N=21,128

	Model 1			Model 2			Model 3			Model 4		
	Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error	
(Intercept)	2.64000	0.01943	***	2.72500	0.01951	***	2.63438	0.01935	***	2.72000	0.01944	***
Any HH Care							0.02818	0.01029	**	0.04635	0.01019	***
Minutes of HH Care	0.00022	0.00005	***	0.00028	0.00005	***						
Any NHH Care							-0.00662	0.01139		-0.00731	0.01124	
Minutes of NHH Care	0.00004	0.00003		0.00003	0.00003							
Hours Worked Per Week	-0.00288	0.00037	***	-0.00373	0.00037	***	-0.00290	0.00037	***	-0.00375	0.00037	***
Part Time Status	-0.23710	0.01234	***	-0.19350	0.01232	***	-0.23592	0.01234	***	-0.19200	0.01232	***
Hourly Status	-0.20280	0.00814	***	-0.20000	0.00804	***	-0.20296	0.00815	***	-0.19990	0.00804	***
Multiple Jobs	-0.29520	0.01200	***	-0.28750	0.01185	***	-0.29489	0.01200	***	-0.28700	0.01185	***
One Child	0.04503	0.00951	***	0.01717	0.00946		0.04510	0.00962	***	0.01513	0.00958	
Two Children	0.06454	0.01007	***	0.02368	0.01009	*	0.06470	0.01027	***	0.02099	0.01030	*
Three or More Children	0.04000	0.01292	**	-0.00439	0.01289		0.04083	0.01317	**	-0.00725	0.01316	
Partner Present	0.08629	0.00797	***	0.05890	0.00795	***	0.08671	0.00800	***	0.05816	0.00799	***
Education (<i>Referent: Less than HS Education</i>)												
HS Diploma	0.20720	0.01338	***	0.14230	0.01349	***	0.20761	0.01340	***	0.14160	0.01351	***
Some College	0.32610	0.01404	***	0.25380	0.01420	***	0.32636	0.01407	***	0.25270	0.01423	***
Associate's Degree	0.44470	0.01576	***	0.35600	0.01601	***	0.44563	0.01578	***	0.35550	0.01604	***
Bachelor's Degree	0.62820	0.01448	***	0.54160	0.01476	***	0.62927	0.01450	***	0.54110	0.01479	***
Master's, Professional, or Doctoral Degree	0.79610	0.01644	***	0.71280	0.01661	***	0.79713	0.01647	***	0.71210	0.01665	***
Enrolled in School	-0.11360	0.01362	***	-0.05282	0.01369	***	-0.11478	0.01364	***	-0.05270	0.01372	***
Unionized Job	0.06275	0.02874	*	0.06301	0.02837	*	0.06255	0.02875	*	0.06291	0.02837	*
Age	0.00598	0.00032	***	0.04581	0.00172	***	0.00597	0.00032	***	0.04605	0.00173	***
Age Squared				-0.00046	0.00002	***				-0.00047	0.00002	***
Female	-0.17980	0.00722	***	-0.19230	0.00715	***	-0.17847	0.00723	***	-0.19130	0.00715	***
African American	-0.06115	0.01107	***	-0.07419	0.01094	***	-0.06148	0.01107	***	-0.07485	0.01094	***
Hispanic	-0.06061	0.01253	***	-0.06822	0.01237	***	-0.06145	0.01253	***	-0.06936	0.01237	***
Spanish Speaking	-0.19910	0.02235	***	-0.21200	0.02206	***	-0.19961	0.02235	***	-0.21230	0.02207	***
Respondent Born in US	0.05116	0.01143	***	0.06518	0.01130	***	0.05178	0.01144	***	0.06582	0.01130	***
Region: (<i>Referent: Northeast</i>)												
North Central	-0.07003	0.01053	***	-0.06935	0.01040	***	-0.07030	0.01053	***	-0.06972	0.01040	***
South	-0.09442	0.01005	***	-0.09141	0.00992	***	-0.09486	0.01005	***	-0.09184	0.00992	***
West	0.00042	0.01114		0.00002	0.01099		-0.00058	0.01114		-0.00096	0.01099	
Reside in Metropolitan Area	-0.16400	0.00952	***	-0.16430	0.00940	***	-0.16449	0.00952	***	-0.16480	0.00940	***
Child Care Worker	-0.33430	0.02737	***	-0.30910	0.02703	***	-0.33463	0.02738	***	-0.30960	0.02704	***
R Squared	0.4188			0.4337			0.4185			0.4335		
Residual Standard Error	0.4968			0.4904			0.4969			0.4905		
Degrees of Freedom	21099			21098			21099			21098		

Since we were estimating foregone wages for non-employed individuals, we re-ran the regressions without full-time/part-time/hourly status, occupational and industry variables. We also split the sample between males and females and estimated separate equations for each group. This reduced the overall R-squared to 0.34 for females and 0.40 for males, as shown below.

Table B.16. Regression Equations without Heckman Correction; Variables not Mean Centered

	Females: Employed Sample N=11,286						Males: Employed Sample N=9,842					
	Model 1			Model 2			Model 1			Model 2		
	Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error	
(Intercept)	1.23200	0.05105	***	1.22700	0.05133	***	1.20100	0.05325	***	1.19800	0.05329	***
Any HH Care				0.08790	0.01448	***				0.01851	0.01552	
Minutes of HH Care	0.00048	0.00007	***				0.00007	0.00009				
Any NHH Care				-0.02501	0.01482	.				0.00276	0.01898	
Minutes of NHH Care	0.00000	0.00005					0.00006	0.00005				
One Child	-0.01495	0.01338		-0.01946	0.01359		0.02296	0.01483		0.02152	0.01494	
Two Children	-0.01819	0.01445		-0.02309	0.01476		0.04164	0.01555	**	0.03929	0.01581	*
Three or More Children	-0.10770	0.01893	***	-0.11320	0.01932	***	0.04321	0.01920	*	0.04018	0.01953	*
Partner Present	0.03516	0.01075	**	0.03398	0.01079	**	0.11480	0.01332	***	0.11350	0.01340	***
Education (<i>Referent: Less than HS Education</i>)												
HS Diploma	0.15660	0.01991	***	0.15360	0.01997	***	0.16080	0.01956	***	0.16010	0.01958	***
Some College	0.29740	0.02061	***	0.29420	0.02067	***	0.24810	0.02088	***	0.24690	0.02092	***
Associate's Degree	0.42050	0.02305	***	0.41780	0.02311	***	0.32960	0.02383	***	0.32870	0.02386	***
Bachelor's Degree	0.65980	0.02119	***	0.65730	0.02126	***	0.58260	0.02083	***	0.58100	0.02088	***
Master's, Professional, or Doctoral Degree	0.86500	0.02351	***	0.86220	0.02359	***	0.76590	0.02294	***	0.76390	0.02301	***
Enrolled in School	-0.06521	0.01841	***	-0.06359	0.01845	***	-0.12490	0.02162	***	-0.12390	0.02167	***
Age	0.04901	0.00239	***	0.04948	0.00240	***	0.05899	0.00247	***	0.05916	0.00247	***
Age Squared	-0.00050	0.00003	***	-0.00051	0.00003	***	-0.00061	0.00003	***	-0.00061	0.00003	***
African American	-0.02780	0.01479	.	-0.02954	0.01479	*	-0.17460	0.01777	***	-0.17450	0.01777	***
Hispanic	-0.04908	0.01793	**	-0.05260	0.01794	**	-0.09296	0.01833	***	-0.09303	0.01832	***
Spanish Speaking	-0.17510	0.03525	***	-0.17780	0.03526	***	-0.22310	0.03002	***	-0.22300	0.03003	***
Respondent Born in US	0.04021	0.01673	*	0.04093	0.01673	*	0.08144	0.01641	***	0.08189	0.01642	***
Region: (<i>Referent: Northeast</i>)												
North Central	-0.07511	0.01497	***	-0.07598	0.01497	***	-0.07285	0.01553	***	-0.07297	0.01553	***
South	-0.08462	0.01419	***	-0.08621	0.01420	***	-0.07534	0.01489	***	-0.07512	0.01489	***
West	-0.00051	0.01592		-0.00304	0.01592		-0.01019	0.01632		-0.01018	0.01632	
Reside in Metropolitan Area	-0.16980	0.01334	***	-0.17080	0.01334	***	-0.18680	0.01423	***	-0.18670	0.01423	***
R Squared	0.3483			0.348			0.3996			0.3996		
Residual Standard Error	0.5148			0.5149			0.5011			0.5011		
Degrees of Freedom	11263			11263			9819			9819		
AIC	17064.58			17069.07			14354.53			14355.06		
BIC	17240.53			17245.02			14527.2			14527.73		

*** p<.001, ** p<.01, * p<.05, p<.1

The final wage imputation regression equations for males and females incorporate a two-stage Heckman correction for sample selection bias. The coefficients and R squared values for predicting logged hourly wage for males and females are similar to those in the previous set of models without the correction; however, we add an additional parameter, the Inverse Mills Ratio to the equation for predicting wages.

Table B.17. Wage Imputation Regression Equations with Two Stage Heckman Models; Tobit; Variables Not Mean Centered

	Females: Full Sample N=20,367, Employed Sample N=11,286					Males: Full Sample N=14,364, Employed Sample N=9,842						
	Step 1: Predicting Employment			Step 2: Predicting Logged Hourly Wage		Step 1: Predicting Employment			Step 2: Predicting Logged Hourly Wage			
	Estimate	Standard Error		Estimate	Standard Error	Estimate	Standard Error		Estimate	Standard Error		
(Intercept)	-1.20900	0.09725	***	0.92890	0.16370	***	-1.12000	0.12210	***	0.85740	0.12660	***
Any HH Care												
Minutes of HH Care	-0.00259	0.00013	***	0.00022	0.00015		-0.00093	0.00027	***	-0.00001	0.00009	
Any NHH Care												
Minutes of NHH Care	-0.00036	0.00009	***	-0.00003	0.00005		0.00009	0.00015		0.00007	0.00005	
One Child	-0.14980	0.03056	***	-0.02761	0.01487	.	0.04185	0.03975		0.02165	0.01483	
Two Children	-0.30010	0.03212	***	-0.04479	0.01987	*	0.07200	0.04431		0.03687	0.01562	*
Three or More Children	-0.51310	0.03795	***	-0.15600	0.03116	***	-0.01070	0.05363		0.03335	0.01948	.
Partner Present	-0.26870	0.02317	***	0.01292	0.01567		0.38190	0.03267	***	0.14600	0.01692	***
Education (<i>Referent: Less than HS Education</i>)												
HS Diploma	0.44130	0.03413	***	0.20350	0.03122	***	0.40070	0.04280	***	0.20020	0.02357	***
Some College	0.53040	0.03647	***	0.35250	0.03496	***	0.54260	0.04665	***	0.29970	0.02711	***
Associate's Degree	0.72200	0.04430	***	0.49080	0.04278	***	0.70390	0.06001	***	0.39180	0.03164	***
Bachelor's Degree	0.72210	0.03904	***	0.72970	0.04158	***	0.83380	0.05070	***	0.65100	0.03095	***
Master's, Professional, or Doctoral Degree	0.90180	0.04649	***	0.94880	0.04893	***	0.93790	0.05894	***	0.84240	0.03437	***
Enrolled in School	-0.30220	0.03834	***	-0.08963	0.02225	***	-0.56830	0.04988	***	-0.17250	0.02686	***
Age	0.11230	0.00401	***	0.06166	0.00691	***	0.11170	0.00506	***	0.07359	0.00547	***
Age Squared	-0.00161	0.00004	***	-0.00068	0.00010	***	-0.00165	0.00005	***	-0.00081	0.00007	***
African American	-0.09282	0.03055	**	-0.03580	0.01534	*	-0.30000	0.04003		-0.20070	0.01979	***
Hispanic	0.01042	0.03634		-0.04808	0.01793	**	0.01876	0.04689		-0.08818	0.01839	***
Spanish Speaking	-0.10660	0.06287	.	-0.18630	0.03571	***	0.26990	0.08309	**	-0.19980	0.03101	***
Respondent Born in US	0.09077	0.03401	**	0.04910	0.01733	**	-0.13420	0.04546	**	0.07235	0.01669	***
Region: (<i>Referent: Northeast</i>)												
North Central	0.02281	0.03196		-0.07296	0.01501	***	-0.01042	0.04130		-0.07350	0.01553	***
South	-0.12620	0.02964	***	-0.09550	0.01525	***	-0.00100	0.03908		-0.07523	0.01488	***

West	-0.18570	0.03292	***	-0.01682	0.01798	-0.10170	0.04263	*	-0.01649	0.01645		
Reside in Metropolitan Area	-0.00333	0.02702		-0.16990	0.01334	***	-0.07183	0.03500	*	-0.19250	0.01436	***
invMillsRatio				0.18210	0.09329	.				0.21290	0.07126	**
Sigma	0.52958						0.5159					
Rho	0.34378						0.41263					
R Squared				0.34850						0.40020		
Degrees of Freedom	20344.0			11262			14341.0			9818		
AIC	20782			17062.77			11640			14347.59		
BIC				17246.05						14527.45		

*** p<.001, ** p<.01, * p<.05, p<.1

Our wage imputations were based on a total sample of 21,128 employed respondents, 11,286 females and 9,842 males, whose hourly wages fell between one and one hundred dollars per hour. We used these equations to predict the hourly earnings of non-employed females and males in conjunction with their values on other individual-level variables. After separately estimating the wages for females and males we combined these values to create predicted hourly earnings for the full ATUS sample. We then created 95% confidence intervals around these predicted hourly earnings, so as to obtain upper and lower estimates of earnings. Mean and median estimates for each of the partition groups are summarized in the table below.

Table B.18. Respondents' Hourly Earnings

	Mean Hourly Wage			Median Hourly Wage		
	Estimate	Lower 95% CI	Upper 95% CI	Estimate	Lower 95% CI	Upper 95% CI
All Respondents	16.71	13.61	25.11	13.31	9.00	22.05
Full Time Employed Respondents	20.53					
Part Time Employed Respondents	14.70					
Non-Employed Respondents	12.47	4.58	33.94	11.32	4.15	30.82
Parent Household Caregiver Respondents	18.95	16.2	26.46	15.31	11.67	22.94
All Households with Partner Present	20.32	17.50	28.04	16.88	13.00	24.08
Both Parents Work Full Time	21.36			18.00		
Respondent Works Part Time, Partner Works Full Time	20.46			15.45		
Respondent Does Not Work, Partner Works Full Time	15.65	5.71	42.89	14.28	5.20	39.03
Respondent Works Full Time, Partner Works Part Time	23.97			21.25		
Both Parents Work Part Time	15.64			13.46		
Respondent Does Not Work, Partner Works Part Time	14.23	5.22	38.83	13.01	4.75	35.73
Respondent Works Full Time, Partner Does Not Work	24.96			21.82		
Respondent Works Part Time, Partner Does Not Work	19.14			10.12		
Both Parents Do Not Work	14.22	5.24	38.53	13.22	4.86	35.59
Households with No Partner Present	12.35	9.96	18.89	10.19	7.50	15.55
Respondent Works Full Time	14.08			11.54		
Respondent Works Part Time	11.33			8.50		
Respondent Does Not Work	10.55	3.85	28.92	9.93	3.61	27.15
Non-Household Caregiver Respondents	16.11	12.89	24.89	13.00	8.50	21.30
Respondents with Some Employment	18.56			15.00		
Respondents with No Employment	12.52	4.59	34.17	11.54	4.21	31.59

Notes: Estimates and Intervals are in dollars.

Parent Caregiver Respondents are Parent Respondents with Children 5 years of age or younger who report spending one minute or more of time caring for their children.

95% Confidence Intervals for the mean and median are included for estimates that involve imputed wages.

Across all respondents, including imputed values for those who are currently not employed, the mean hourly earnings is \$16.71 and the median is \$13.31. The mean hourly earnings of parental caregiver respondents is \$18.95 and the median is \$15.31. The mean hourly earnings of FFN caregiver respondents is \$16.11 and the median is \$13.00. Thus, we see parental caregivers making more than other respondents, but FFN caregivers making less.

Earnings also vary based on the employment status of the respondent, whether or not the respondent has a partner present in the household, and, if there is a partner present, the partner’s employment status. Within the parental caregiver group, respondents who work full-time with partners that do not work report the highest mean and median hourly earnings. Respondents who work full-time and have partners that work part-time have the second highest mean and median hourly earnings and households where both parents work full-time have the third highest. Respondent parental caregivers who live in households without a partner present make less than parental caregivers without a partner present in the household across all earnings groups. The mean and median hourly earnings for this group are \$12.35 and \$10.19, while the mean and median hourly earnings of parental caregivers who have a partner present are \$20.32 and \$16.88.

Non-household caregiver respondents make less than parental caregivers with a partner in the household, but more than parental caregivers in households with no partner present. Employed FFN caregivers also have higher mean and median hourly earnings when compared with the imputed wages for those without employment.

As noted in the earlier section on descriptive analysis, both caregiving and wage patterns vary by gender. Since males have higher average wages but provide fewer average minutes of care, applying a simple mean wage value to hours of care from a different data set that does not distinguish between male and female caregivers would overestimate the economic value. We therefore estimated mean wages weighted by hours of care. In this case, weighted averages were calculated by multiplying each respondent’s estimated hourly wages by the respondent’s minutes of caregiving, summing these numbers, and dividing by the total number of respondents. Equation 3 describes this weighting process.

$$W = \frac{\sum_{i=1}^n (x_i y_i)}{\sum_{i=1}^n (y_i)} \quad (\text{Eq. 3})$$

Where W represents the weighted mean hourly wage, x represents the respondent’s hourly wage, y represents the respondent’s minutes of care, and n represents the total number of respondents in the respective category. These earnings are summarized in the following table.

The weighted mean hourly earnings described in the table below tend to be higher than the un-weighted means in the previous table. This difference reflects the significant positive relationship between minutes of care and logged hourly earnings predicted by our regression equations. When weighting by hours of care, we predict a mean hourly earnings of \$19.92 per hour for parental caregiver respondents and \$16.56 for non-household caregiver respondents. Hourly earnings again vary based on the employment status of the respondent, whether or not the

respondent has a partner present in the household, and if there is a partner present, the partner's employment status.

Table B.19. Respondents' Weighted Hourly Earnings

	Mean Hourly Wage		
	Estimate	Lower 95% CI	Upper 95% CI
Parent Household Caregiver Respondents	19.92	15.72	31.42
<i>All Households with Partner Present</i>	21.32	16.90	33.42
Both Parents Work Full Time	22.98		
Respondent Works Part Time, Partner Works Full Time	22.62		
Respondent Does Not Work, Partner Works Full Time	17.53	6.39	48.10
Respondent Works Full Time, Partner Works Part Time	24.41		
Both Parents Work Part Time	19.04		
Respondent Does Not Work, Partner Works Part Time	15.25	5.58	41.69
Respondent Works Full Time, Partner Does Not Work	28.71		
Respondent Works Part Time, Partner Does Not Work	23.55		
Both Parents Do Not Work	14.75	5.42	40.14
<i>Households with No Partner Present</i>	12.93	9.83	21.42
Respondent Works Full Time	13.85		
Respondent Works Part Time	12.07		
Respondent Does Not Work	11.64	4.24	31.98
Non-Household Caregiver Respondents	16.56	13.28	25.51
Respondents with Some Employment	19.09		
Respondents with No Employment	12.81	4.69	35.01

Notes: Estimates and Intervals are in dollars.

Parent Caregiver Respondents are Parent Respondents with Children 5 years of age or younger who report spending one minute or more of time caring for their children.

95% Confidence Intervals for the mean and median are included for estimates that involve imputed wages.

We also present these wage estimates in tables broken down into our earlier partition groups. Table A depicts the number of respondents in each of the partition categories.

Table B-20 A: Informal Child Care Arrangements: Number of Respondents Based on ATUS Sample Data (N=34,731)

Type	Parental Care of Own Child (Includes all who utilize less than 40 hours/week of Formal Care for Children Five Years or Younger) (N=6373)						Family, Friend, and Neighbor Care (Includes all adults who report caring for a child not in their household) (N=3621)
Family	Two Parent Household (N=5275)			Single Parent Household (N=1098)			Relative Non-Relative
Employment	Both Parents Work Full Time (N=1814)	Respondent Works Part Time, Partner Works Full Time (N=475)	Respondent Does Not Work, Partner Works Full Time (N=889)	Works Full Time (N=518)	Works Part Time (N=189)	Does Not Work (N=391)	Some Employment (N=2153)
	Respondent Works Full Time, Partner Works Part Time (N=472)	Both Parents Work Part Time (N=44)	Respondent Does Not Work, Partner Works Part Time (N=59)				
	Respondent Works Full Time, Partner Does Not Work (N=1248)	Respondent Works Part Time, Partner Does Not Work (N=130)	Both Parents Do Not Work (N=144)				No Other Employment (N=1468)

Table B describes median wages based upon sample data using reported and imputed wages. These estimates also appear in the table describing Respondent’s Hourly Earnings.

B-20 B. Informal Child Care Arrangements: Median Wages Based on ATUS Sample Data (N=34,731)								
Type	Parental Care of Own Child (Includes all who utilize less than 40 hours/week of Formal Care for Children Five Years or Younger)				Family, Friend, and Neighbor Care (Includes all adults who report caring for a child not in their household)			
Family	Two Parent Household (\$16.88 per hour)			Single Parent Household (\$10.19 per hour)			Relative	Non-Relative
Respondent's Hourly Earnings	Both Parents Work Full Time (\$18.00 per hour)	Respondent Works Part Time, Partner Works Full Time (\$15.45 per hour)	Respondent Does Not Work, Partner Works Full Time (\$14.28 per hour)	Works Full Time (\$11.54 per hour)	Works Part Time (\$8.50 per hour)	Does Not Work (\$9.94 per hour)	Some Employment (\$15.00 per hour)	
	Respondent Works Full Time, Partner Works Part Time (\$21.25 per hour)	Both Parents Work Part Time (\$13.46 per hour)	Respondent Does Not Work, Partner Works Part Time (\$13.01 per hour)					
	Respondent Works Full Time, Partner Does Not Work (\$21.82 per hour)	Respondent Works Part Time, Partner Does Not Work (\$10.12 per hour)	Both Parents Do Not Work (\$13.22 per hour)				No Other Employment (\$11.54 per hour)	

Table C describes mean wages using ATUS data in combination with sampling/population weights. These estimates were obtained by using equation 4.

$$W = \frac{\sum_{i=1}^n (x_i fwt_i)}{\sum_{i=1}^n (fwt_i)} \quad (\text{Eq. 4})$$

Where W represents the weighted mean hourly wage, x represents the respondent's hourly wage, fwt represents the respondent's final sampling weight, and n represents the total number of respondents in the respective category.

Table B-20 C: Informal Child Care Arrangements: Mean Wages Using ATUS Data with Population Weights								
Type	Parental Care of Own Child (Includes all who utilize less than 40 hours/week of Formal Care for Children Five Years or Younger)				Family, Friend, and Neighbor Care (Includes all adults who report caring for a child not in their household)			
Family	Two Parent Household (\$18.75)			Single Parent Household (\$11.16 per hour)			Relative	Non-Relative
Respondent's Hourly Earnings	Both Parents Work Full Time (\$20.20 per hour)	Respondent Works Part Time, Partner Works Full Time (\$19.56 per hour)	Respondent Does Not Work, Partner Works Full Time (\$14.72 per hour)	Works Full Time (\$12.91 per hour)	Works Part Time (\$10.60 per hour)	Does Not Work (\$9.53 per hour)	Some Employment (\$16.64 per hour)	
	Respondent Works Full Time, Partner Works Part Time (\$21.72 per hour)	Both Parents Work Part Time (\$14.49 per hour)	Respondent Does Not Work, Partner Works Part Time (\$13.36 per hour)					
	Respondent Works Full Time, Partner Does Not Work (\$22.05 per hour)	Respondent Works Part Time, Partner Does Not Work (\$14.71 per hour)	Both Parents Do Not Work (\$13.13 per hour)				No Other Employment (\$11.99 per hour)	

Table D summarizes mean wages when the sample is weighted by hours of care. These estimates also appear in the table describing Respondent’s Weighted Hourly Earnings.

Table B-20 D: Informal Child Care Arrangements: Mean Wages Weighting By Minutes of Care								
Type	Parental Care of Own Child (Includes all who utilize less than 40 hours/week of Formal Care for Children Five Years or Younger) (\$19.92 per hour)						Family, Friend, and Neighbor Care (Includes all adults who report caring for a child not in their household) (\$16.56 per hour)	
Family	Two Parent Household (\$21.32 per hour)			Single Parent Household (\$12.93 per hour)			Relative	Non-Relative
Respondent's Hourly Earnings	Both Parents Work Full Time (\$22.98 per hour)	Respondent Works Part Time, Partner Works Full Time (\$22.62 per hour)	Respondent Does Not Work, Partner Works Full Time (\$17.53 per hour)	Works Full Time (\$13.85 per hour)	Works Part Time (\$12.07 per hour)	Does Not Work (\$11.64 per hour)	Some Employment (\$19.09 per hour)	
	Respondent Works Full Time, Partner Works Part Time (\$24.41 per hour)	Both Parents Work Part Time (\$19.04 per hour)	Respondent Does Not Work, Partner Works Part Time (\$15.25 per hour)				No Other Employment (\$14.95 per hour)	
	Respondent Works Full Time, Partner Does Not Work (\$28.71 per hour)	Respondent Works Part Time, Partner Does Not Work (\$23.55 per hour)	Both Parents Do Not Work (\$14.75 per hour)					

Child Care Worker Wage Differentials

Since child care worker wages are an essential component of our economic value analysis, we wanted to understand the dynamics of their wages. It is well known that child care worker wages are lower than most human services staff, and about \$6 an hour lower than average US wages. However, it has not previously been known what the wage differential is for child care workers when such critical factors as their age and education level are taken into account.

Within the ATUS sample, 343 respondents listed their industry or occupation as child care worker, affording us the opportunity to do some analysis of their characteristics and wages. The descriptive analysis in the earlier section of this Appendix indicates that compared to parents or the general population, child care workers are more likely to be single parents and to have lower levels of educational attainment.

We therefore ran four versions of the general regression model, including a variable for whether the individual had child care worker as their occupation. The four versions included or excluded the following variables: providing any care of a child in the household (i.e., parental care), vs. the number of minutes of care provided; providing any non-household care (i.e., FFN care) vs. the number of minutes of care provided; lowest education category = less than high school diploma, vs. education = high school diploma; including or excluding the square of respondents age as well as age; and including residential region being Northeast or North Central. The results were similar, with similar coefficients and R-squares in the range of 0.4185 to 0.4337. The best overall fit was model 2, which included: minutes of care provided for household or non-household children, as opposed to the binary any care provided variable; the lowest educational level as high school diploma; and including the square of respondents age as well as the age (quadratic). The four models are shown on the following page.

Across all of these models estimating logged hourly earnings for employed respondents in the sample (N=21,128), employment as a child care worker is negatively associated with earnings, controlling for individual and employment characteristics. Based on the regression analysis in model 2, we estimated the wage differential for child care workers to be \$-1.36 per hour. That is, a child care worker is paid on average \$1.36 per hour or 15% less than workers with similar characteristics in different occupations.

It is important to note that the analysis is only for individuals classified as “child care workers” using BLS categories. We were not able to conduct a comparable analysis for pre-school teachers, since they are lumped together with Kindergarten teachers, who have BA or MA degrees and are paid on public school wage scales. Since pre-school teachers range from school district employees paid at regular teacher wage scales to employees of community-based centers whose pay is only slightly above that of child care workers, this grouping is too diverse to use for a wage estimate of preschool teachers.

Table B.21. Regression for Employed Workers, Predicting Log Hourly Earnings; Mean Centered Variables: N=21,128

	Model 1			Model 2			Model 3			Model 4		
	Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error		Estimate	Standard Error	
(Intercept)	2.64000	0.01943	***	2.72500	0.01951	***	2.63438	0.01935	***	2.72000	0.01944	***
Any HH Care							0.02818	0.01029	**	0.04635	0.01019	***
Minutes of HH Care	0.00022	0.00005	***	0.00028	0.00005	***						
Any NHH Care							-0.00662	0.01139		-0.00731	0.01124	
Minutes of NHH Care	0.00004	0.00003		0.00003	0.00003							
Hours Worked Per Week	-0.00288	0.00037	***	-0.00373	0.00037	***	-0.00290	0.00037	***	-0.00375	0.00037	***
Part Time Status	-0.23710	0.01234	***	-0.19350	0.01232	***	-0.23592	0.01234	***	-0.19200	0.01232	***
Hourly Status	-0.20280	0.00814	***	-0.20000	0.00804	***	-0.20296	0.00815	***	-0.19990	0.00804	***
Multiple Jobs	-0.29520	0.01200	***	-0.28750	0.01185	***	-0.29489	0.01200	***	-0.28700	0.01185	***
One Child	0.04503	0.00951	***	0.01717	0.00946		0.04510	0.00962	***	0.01513	0.00958	
Two Children	0.06454	0.01007	***	0.02368	0.01009	*	0.06470	0.01027	***	0.02099	0.01030	*
Three or More Children	0.04000	0.01292	**	-0.00439	0.01289		0.04083	0.01317	**	-0.00725	0.01316	
Partner Present	0.08629	0.00797	***	0.05890	0.00795	***	0.08671	0.00800	***	0.05816	0.00799	***
Education (<i>Referent: Less than HS Education</i>)												
HS Diploma	0.20720	0.01338	***	0.14230	0.01349	***	0.20761	0.01340	***	0.14160	0.01351	***
Some College	0.32610	0.01404	***	0.25380	0.01420	***	0.32636	0.01407	***	0.25270	0.01423	***
Associate's Degree	0.44470	0.01576	***	0.35600	0.01601	***	0.44563	0.01578	***	0.35550	0.01604	***
Bachelor's Degree	0.62820	0.01448	***	0.54160	0.01476	***	0.62927	0.01450	***	0.54110	0.01479	***
Master's, Professional, or Doctoral Degree	0.79610	0.01644	***	0.71280	0.01661	***	0.79713	0.01647	***	0.71210	0.01665	***
Enrolled in School	-0.11360	0.01362	***	-0.05282	0.01369	***	-0.11478	0.01364	***	-0.05270	0.01372	***
Unionized Job	0.06275	0.02874	*	0.06301	0.02837	*	0.06255	0.02875	*	0.06291	0.02837	*
Age	0.00598	0.00032	***	0.04581	0.00172	***	0.00597	0.00032	***	0.04605	0.00173	***
Age Squared				-0.00046	0.00002	***				-0.00047	0.00002	***
Female	-0.17980	0.00722	***	-0.19230	0.00715	***	-0.17847	0.00723	***	-0.19130	0.00715	***
African American	-0.06115	0.01107	***	-0.07419	0.01094	***	-0.06148	0.01107	***	-0.07485	0.01094	***
Hispanic	-0.06061	0.01253	***	-0.06822	0.01237	***	-0.06145	0.01253	***	-0.06936	0.01237	***
Spanish Speaking	-0.19910	0.02235	***	-0.21200	0.02206	***	-0.19961	0.02235	***	-0.21230	0.02207	***
Respondent Born in US	0.05116	0.01143	***	0.06518	0.01130	***	0.05178	0.01144	***	0.06582	0.01130	***
Region: (<i>Referent: Northeast</i>)												
North Central	-0.07003	0.01053	***	-0.06935	0.01040	***	-0.07030	0.01053	***	-0.06972	0.01040	***
South	-0.09442	0.01005	***	-0.09141	0.00992	***	-0.09486	0.01005	***	-0.09184	0.00992	***
West	0.00042	0.01114		0.00002	0.01099		-0.00058	0.01114		-0.00096	0.01099	
Reside in Metropolitan Area	-0.16400	0.00952	***	-0.16430	0.00940	***	-0.16449	0.00952	***	-0.16480	0.00940	***
Child Care Worker	-0.33430	0.02737	***	-0.30910	0.02703	***	-0.33463	0.02738	***	-0.30960	0.02704	***
R Squared	0.4188			0.4337			0.4185			0.4335		
Residual Standard Error	0.4968			0.4904			0.4969			0.4905		
Degrees of Freedom	21099			21098			21099			21098		

Appendix 1-C. Description of Methodology: *Estimation of Economic Value, Applying Wages and Prices to Hours of ECE*

In this section we bring together the various estimates from the previous sections to derive estimates of the economic value of early care and education of children age B-5.

The broad logic of Chapter 1 is to estimate the economic value of the hours spent providing early care and education (ECE) for young children in two ways: (1) applying the prices charged for such care and (2) applying wages and related costs for the individuals providing the care. The two approaches were then compared conceptually and empirically to derive a hybrid approach, with wages used for some hours of ECE and prices for others.

For both of these approaches, the starting point was the number of hours in ECE by age of child and type of arrangement. The derivation of these hours was described in Appendix 1-A and the estimated hours applied in this section are shown on page 103 of this Appendix.

In section 1-A we described our approach of estimating the number of paid workers responsible for children by applying ratios of children to adults to the reported hours children are in each type of care. Since we our primary estimate is all hours experienced by children, and caregivers often care for more than one child, we cannot apply their full wage equivalent to each hour of ECE for each child. To apply wages or prices to hours of parental and FFN care we must also adjust hours for child to adult ratios. The table below adjusts the table of total hours for these ratios. The ratio for parental caregivers was 1.5:1; for FFN it was 1.8:1. These ratios were derived from a weighting of the NHES and ECLS-B observed ratios for parental and non-parental caregiving. The ATUS data also allows us to distinguish between primary and secondary caregiving activities, as described in the previous Appendix 1/B. The data show that 23% of the FFN care is primary and 25% of parental caregiving is primary. These factors were also applied to the primary estimate of weekly hours to derive the adjusted hours in the table below. These figures were then used as the basis for both wage-based and price-based estimates of economic value.

Table C-1 Weekly Hours In Each Type of ECE, 2005
Parent-Care and FFN Hours Adjusted for Ratios and Primary/Secondary Caregiving

	Center	Head Start	FCC	FFN (Primary)	Public Pre-K	Parent-Care (Primary)
Infants (0-18 mos.)	21,121,278	884,736	16,548,448	4,438,177		25,472,548
Toddlers (19-36 mos.)	40,914,691	4,274,100	21,164,458	4,498,317		25,448,056
Pre-Schoolers (3-5 yrs.)	78,613,629	18,660,128	19,609,498	6,373,648	17,345,046	32,334,798
Total Children B-5	140,649,598	23,818,963	57,322,403	15,310,142	17,345,046	83,255,402

Source: HSPC Calculations from the National Household Education Survey, 2005

Price-based Estimate of Economic Value of ECE

A basic tenet of economics is that the price of a good or service reflects its economic value. In this section we discuss how we derived appropriate prices, and how we applied them to estimate economic value.

Market Price Surveys (Center-based and FCC)

For the market-based components of formal care – community-based centers and Family Child Care businesses (as opposed to no-fee publicly-provided services such as Head Start or public preschool) - we were able to take advantage of data collected for another project. States are required under federal regulations to conduct market price surveys of child care at least every other year, for use in establishing reimbursement rates for subsidized ECE. There is considerable variation in methods across the states, and thus sources of unreliability in the data (see Grobe, et.al. 2008). However, these are the best available sources of price data, there are no known systematic biases, and thus many of the sources of variability can be assumed to average out across the 50 states. However, there are some reasons to expect prices to be a lower-bound estimate of economic value. There is some amount of donated and volunteer time, plus parental fundraising, that contribute to the conduct of formal ECE, which is not reflected in the price. This can cause price to be an underestimate of actual cost or economic value. It is also possible that providers discount prices for some individuals who have difficulty paying, or provider sibling discounts. However, if those discounts are offset by a higher overall price schedule, there would be zero net effect on economic value. It is conventional wisdom that many low-income parents do not pay providers the co-payment amounts, and that providers absorb this cost. If the absorbed losses are covered by fundraising or other non-price sources, rather than by increased prices to other payers, then they would constitute an under-estimate of economic value. The impact of public subsidies on prices is also unknown. To the extent that public subsidy reimbursement rates reflect market prices, they may reinforce a stickiness in prices, with providers reluctant to charge middle or moderate income families more than the public rate. On the other hand, where states reimburse providers of ECE to low income families at or near the 75th percentile price (which is the federal guideline), they may be effectively driving up the prices for providers who would otherwise be charging a price equivalent to a lower percentile. Since there appears to be greater potential for price to under-estimate rather than over-estimate provider cost and economic value, we believe that price yields a lower-bound estimate of value, but not by a substantial order of magnitude below actual value.

State market price surveys typically compute and publish either 50th or 75th percentile prices for the three age groups we are considering. We were able to compile such data for 2005-06 from 46 states, of which 31 released both 50th and 75th percentile prices. The missing states did not exhibit any particular pattern that would make the remaining sample non-representative.

Examining the ratio of 50th to 75th percentile price, we found that it was quite stable and that we were thus able to impute 50th percentile prices to those that only published 75th, and the error is not likely to exceed 10% per state. This would not be likely to introduce significant error into the national average. We then weighted median prices by state population age B-5 to develop a national average for each age group and type of arrangement.

Imputed Prices, Parental and FFN Care

Parental care and FFN care are not market transactions, so there is no observed price available. For the purposes of this exercise, we therefore imputed prices for each of those modes of care.

For parental care hours, we substituted the prices that parents would have to pay if they were to purchase care in the market. We calculated this as the weighted average of center and FFC prices, with the weighting based on the share of hours that children are currently in each of those modes of ECE. This implicitly

assumes that parents not using formal ECE would use it in the same ratio of Center/FCC hours as those parents currently using these modes. Since it is not known what mode of ECE parents would prefer if they were not providing their own care, and center and FCC prices are quite different, there is substantial uncertainty in this assumption.

For FFN care, we imputed 70% of the average price of FCC. This was based on an analysis of costs in a representative sample of FCC providers by Helburn, Morris & Modigliani (2002). Their data showed that about 70% of the costs were related to compensation of providers and food; the remaining 30% included business costs, such as insurance, that would not be incurred by FFN caregivers. Again, this is an imprecise proxy for FFN price.

- Our estimated national average prices for 2005-2006 are shown in the Table C-2 below.
- In the next Table C-3, we show the estimated economic value derived by annualizing weekly hours and applying the prices shown in Table C-2.

Program Budget Valuation

It should be noted that for hours children spend in Head Start, Public Pre-K and Military Child Care, there are no price equivalents. However, the total budget allocations supporting these programs are known and are therefore attributed as economic value. There is minor uncertainty in the Military Child Care estimate. The best available source (Singer & Davis, 2007) estimates the total expenditure as \$532 million, but does not provide a precise division into care provided directly on base and that purchased off base, which would be included in the center and FCC hours. However, Singer & Davis indicate that most of the care is provided directly on base. We have therefore rounded the non-market estimate down to \$500 million. We also do not know how the funding for military child care is divided among infants, toddlers and preschoolers. This degree of uncertainty would not substantially change the overall estimate of economic value or the amount attributed to each age group.

Table C-2: Hourly Prices, Observed and Imputed

Weighted Average Median Price per Hour, per Child

	Center	FCC	FFN Imputed*	Parental Care Imputed**
Infants (0-18mo)	3.89	2.83	1.98	3.42
Toddlers (19-36mo)	3.35	2.65	1.86	3.11
Pre-Schoolers (3-5y/o)	2.98	2.52	1.76	2.89

*FFN priced at 0.7 FCC;

**Parent priced at weighted average of Center and FCC

Source: HSPC Compilation of state market price surveys, weighted for state population age B-5.

Table C-3 Annualized Economic Value, Price-Based Estimate (\$2005)

	Center	Head Start (Program Based)	FCC	FFN Total	Public Pre-K (Program Based)	Military Child Care (Program Based)	Parent-Care Hours	Total Value: Non-Parental	Total Value: Including Parental
Infants (0-18mo)	4,272,412,049		2,434,409,048	457,023,921			4,535,202,245	7,163,845,019	11,699,047,264
Toddlers (19-36mo)	7,120,956,458		2,916,462,270	433,907,658			4,114,631,120	10,471,326,386	14,585,957,507
Pre-Schoolers (3-5y/o)	12,181,967,950	6,843,114,000	2,569,628,626	584,641,962	2,836,737,647		4,856,187,178	25,016,090,185	29,872,277,363
Total B-5	23,575,336,457	6,843,114,000	7,920,499,945	1,475,573,541	2,836,737,647	500,000,000	13,506,020,544	43,151,261,590	56,657,282,134

Wage-based Estimate of Economic Value of ECE

In this section we pursue an alternative method of estimating economic value, based on the estimated number of paid ECE staff and the wages paid to them. The underlying hours of ECE are the same as used for the price-based estimates. However, they are converted to number of ECE workers.

The general formula used for this calculation is:

$$\text{Economic Value} = \text{Number of ECE Workers} \times \text{Annual Cost/Worker}$$

Where:

$$\begin{aligned} \text{Annual Cost per Worker} = \\ \text{Average Hourly Wage} \times \text{Non-Personnel Factor} \times 1,586 \text{ hrs/year} \end{aligned}$$

Average hourly wages for center-based ECE were derived from BLS/OES annual average wage reports for child care workers and preschool teachers. Since BLS/OES shows both average wages and number of workers, we developed a weighted average wage for center workers. This is shown in Table C-4 below. It should be noted that the total number of workers does not match that in our demand-based estimate, since the BLS does not include all ECE locations. However, we believe the BLS data offer a reasonable estimate of market wages which would apply to workers in other market-based locations. The ECE locations that are likely to have significantly different wage structures – Head Start and public-school PreK – are treated separately.

The non-personnel factor for centers was derived by the author from examining the HSPC cost simulation analyses conducted for a number of states, which included a detailed breakdown of personnel and non-personnel costs. The cost model developed for the HSPC simulations built upon the best previous cost analyses available, and added additional factors. While these simulations were focused on potential costs of higher quality ECE, the analyses included simulation of current costs with current salaries and ratios. These exercises matched median prices reported in state surveys within less than 5%, so we are confident they reflect current cost components. Averaged across a number of analyses, wage costs were about 70% of the total, and this was used to develop the non-personnel factor (it is coincidental that this matches the 70% found by Helburn et.al. for FCC cost structure).

Foregone wages for parental and FFN caregivers developed by the regression analysis of the ATUS as described in Appendix 1-B were applied in this section. The weighted (by gender and minutes of care) average wage equivalents were \$20.86 for parental caregivers and \$17.43 for FFN caregivers.

We do not believe it is feasible to construct a wage equivalent for Family Child Care. If FCC providers were identified in a data set like the ATUS, it would be possible to derive an

equivalent wage from their employment and demographic characteristics.¹⁷ However, it is not clear that even if data were available, this would be a valid inference. Family child care homes operate as a business enterprise charging fees per child in care. The proprietor is normally the only employee, although they sometimes employ an assistant – and that assistant is often a spouse or adolescent child not being paid a market wage. The net income is thus a product of the hourly price and the number of child-hours billed, and not necessarily related to the particular characteristics of the FCC provider. We could apply the 70% cost factor from the Helburn et.al. study cited earlier; however, when we added back non-personnel costs, we would end up with the price of FCC. We have therefore substituted the price-based estimate for FCC into this analysis.

Similarly, we have inserted the same program-based costs for Head Start, public Pre-K and Military Child Care as used in the price-based analysis. While we could possibly estimate wage costs for at least the Head Start and public Pre-K components (though not with great accuracy, due to the limited nature of data available), applying appropriate non-personnel cost factors would yield totals equal to the budgets. This would be the same kind of circularity as noted for FCC.

Thus, this estimate of ECE market value is not a fully price-based estimate; it is price-based for those market-based components where a price estimate is conceptually and empirically reasonable.

Table C-4 Weighted Average Wages for ECE Staff in Centers (\$2005)

Source: BLS/OES May 2005 <http://www.bls.gov/oes/2005/may/oes252011.htm>

	Number Workers	Median Wage	Mean Wage
Child Care Worker	557,680	8.20	8.74
Pre-K Teacher	348,690	10.57	12.09
Average Weighted by Number of Workers		9.11	10.03

Table C-5 below shows the wages and their adjustment to annual cost per worker. It should be noted that we applied different wages for different age groups. Preschool age children are served by preschool teachers, so we used just the average preschool teacher wage from the BLS/OES series for that age group. Younger children are served by a mixture of staff classified as child care workers and preschool teachers, so we used the weighted average for those age groups.

It is also important to note that we used 1,586 hours per year to annualize wage-based costs, rather than the standard full time equivalent of 2,080 hours. That is because our estimated number of workers was derived from the BLS estimate of 30.5 average work-hours per week, which reflects a mixture of full and part time staff (the relatively heavy reliance on part time

¹⁷ Obtaining comparable characteristics of large, representative samples all types of ECE providers is an important objective of the national child care supply and demand study that ACF/OPRE is intending to conduct in the next year or two; a pilot phase is currently under way.

workers for ECE is corroborated by the fact that the 2005 average hours per week for all civilian occupations was 33.5).

Table C-5. Deriving Average Cost per Worker for Center-based ECE

Centers	Annual Wage	Wages/Hour	Hourly Cost	Annual Cost/Worker @ 1586*
Infants (0-18mo)	20,861	10.03	14.33	22,729
Toddlers (19-36mo)	20,861	10.03	14.33	22,729
Early Head Start	NA	NA	NA	NA
Pre-Schoolers (3-5y/o) PRIVATE	25,150	12.09	17.28	27,401
Pre-Schoolers (3-5y/o) PUBLIC	NA	NA	NA	NA
All O-5 Year Olds	22,660	10.89	15.57	24,688

* 1586 = 52 wks @ 30.5 hrs, which was used for estimating workforce

Table C-6 Economic Value of ECE Estimated from Wages Earned and Foregone (\$2005)

	Center-Based ECE	HS (Program-based Budget Amount)	Family Child Care (Price-based estimate)	Family Friend and Neighbor Care (Primary)	Public Pre-K (Program-based Budget Amount)	Military Child Care (Program-based Budget Amount)	Parent-Care Hours (Primary)	Total Value: Non-Parental	Total Value: Including Parental
Infants (0-18mo)	\$5,064,923,421		\$2,434,409,048	\$4,020,278,092			\$27,630,582,413	\$11,519,610,561	\$39,150,192,974
Toddlers (19-36mo)	\$7,018,609,419		\$2,916,462,270	\$4,074,755,472			\$27,604,015,599	\$14,009,827,162	\$41,613,842,761
Pre-Schoolers (3-5y/o)	\$10,157,601,839	6,843,114,000	\$2,569,628,626	\$5,773,505,091	2,836,737,647	\$500,000,000	\$35,074,201,703	\$28,680,587,203	\$63,754,788,906
Total Children B-5	\$22,241,134,679	\$6,843,114,000	\$7,920,499,945	\$13,868,538,655	\$2,836,737,647	\$500,000,000	\$90,308,799,715	\$54,210,024,926	\$144,518,824,641

Table C-7 Comparison of Wage-Based and Price-Based Estimates of Economic Value (Wage Based/Price-Based)

Wage Based Divided by Price-Based Estimate	Center-Based ECE	HS (Program-based Budget Amount)	Family Child Care (Price-based estimate)	Family Friend and Neighbor Care (Primary)	Public Pre-K (Program-based Budget Amount)	Military Child Care (Program-based Budget Amount)	Parent-Care Hours (Primary)	Total Value: Non-Parental	Total Value: Including Parental
Infants (0-18mos.)	1.185		1.000	8.797			6.092	1.608	3.346
Toddlers (19-36mos.)	0.986		1.000	9.391			6.709	1.338	2.853
Pre-Schoolers (3-5yrs.)	0.834	1.000	1.000	9.875	1.000		7.223	1.146	2.134
Total B-5	0.943	1.000	1.000	9.399	1.000	1.000	6.687	1.256	2.551

Sensitivity Analysis: Hybrid Estimation of Economic Value of ECE

The design of this project was to develop two alternative approaches – wage-based and price-based estimation of economic value. We conducted a sensitivity analysis comparing the two approaches.

The discussion in the previous section elucidated two problems with the wage-based estimation of economic value for the formal sector. The wage-based approach does not fit conceptually with the nature of FCC as an enterprise, and there is not a strong empirical basis from which to derive a wage-equivalence measure. Deriving wages for center-based ECE involves many estimations, each of which introduces uncertainty, especially since the basic BLS data series on wages do not cover the entire workforce.

Overall, the wage-based and price-based estimates for center-based care are quite close, with a 5.7% average difference. This 5.7% difference could be explained entirely by the range of uncertainty in the estimates of the shares of personnel and non-personnel costs. Prices, of course, accurately combine personnel and non-personnel costs, including reserves for non-profit entities or return on investment for profit-making enterprises.

We note that the closeness of the wage and price-based estimates provides a degree of validation for our approach to estimating the number of ECE workers from hours and ratios. If the workforce estimates were highly inaccurate, then there would be great divergence between the wage and price-based estimates, unless there were other offsetting factors.

It is significant that while the overall estimates for center-based ECE are close in the two approaches, the shares for different age groups vary considerably. The price-based estimate is 18.5% lower for infants and 6.5% higher for preschoolers. That probably reflects the fact that infant prices are usually set lower than costs in order to make them more affordable. This is offset by centers charging prices in excess of costs for preschool age children (see Witte 2002 for empirical validation of the conventional wisdom that such cross-subsidization is common practice). The premium for preschoolers does not need to be as large as the discount for infants, because there are many more preschoolers enrolled than infants. It could be argued that the wage-based attribution of costs is a more appropriate measure of actual economic value, since it reflects the wages of workers actually providing the service, without the cross-subsidy. However, the cross-subsidy may also be considered a discount offered to obtain market share. If a firm cross-subsidized different parts of its product line in order to obtain a greater market share, it is the value of the individual products that are counted in GDP.

It is our judgment that while it is a close call, the uncertainties in the wage-based estimates of center based ECE are greater than those for the price-based estimates. As noted above, the wage-based approach is not applicable to FCC either conceptually or empirically. We therefore believe that for the formal components of the ECE sector, the price-based estimate is more appropriate than the wage-based.

The picture seems quite different for the informal part of the sector – parental and FFN care. The

wage-based estimate is 6.7 times as large as the price-based for parental care and 9.4 times as large for FFN care. These great discrepancies are easily attributable to two major factors already discussed: the wages are much higher for parents and FFNs than for child care staff, and the child to adult ratios are much lower.

Conceptually, there are two approaches to placing an economic value on these types of care. One is the price that parents would have to pay for ECE in the market if they were not providing this care themselves or by calling on relatives or friends. The alternative is to value the care by the wages they forego to provide it.

We believe the determining factor here is the great discrepancy in education levels and other characteristics between parent and FFN caregivers and child care workers. The analysis discussed in Appendix 1-B demonstrated that the child care workers are less qualified and command lower wages than either parental or FFN caregivers. The educational background of caregivers has been closely associated with the quality of caregiving and such child outcomes as development of language skills. Lower child to adult ratios are also an important indicator of quality, and a major reason that many parents prefer alternatives to center-based ECE. It may therefore be inferred that parents are purchasing a higher-quality or higher-utility care by staying home or using their relatives who also have greater qualifications and lower ratios than paid child care workers.

It thus seems most appropriate to value such caregiving by the wages parents or FFN caregivers could draw if they worked those additional hours, and at the actual lower child to adult ratios. Since the majority of parental and FFN caregivers report paid employment, and we have a robust model for estimating the wages of non-employed caregivers, we feel confident in the accuracy of the foregone wage estimates. In contrast, imputing prices for such care would require application of highly uncertain assumptions.

We therefore followed a hybrid approach for our final estimation of economic value of ECE. This approach combines:

- The price-based method for center-based and Family Child Care.
- Estimated foregone wages for parental and FFN care.
- Program budgets for Head Start, public Pre-School and Military Child Care.

Table C-8 shows the results of this hybrid approach. We present our findings both as absolute dollars (\$2007 values) and as a percent of the current estimate of GDP for 2007.

Our original estimates were all derived in 2005 values, since our primary sources of data were available for that year. However, the values for the other chapters in this study were derived from 2007 data. We therefore converted our estimates to 2007 values. To do this, we assumed that the value of ECE would be a constant share of GDP, reflecting real growth in population and wages, rather than just increases in prices. We therefore adjusted the 2005 estimates by the ratio of 2007 GDP to 2005 GDP, which is 1.114. The estimate of 2005 GDP as \$12,638.4 Billion and 2007 GDP as \$14,077.6 Billion are from the July 2009 updated estimates by the Bureau of Economic Analysis (U.S. Dept of Commerce, 2009).

For the comparison of ECE economic value to public elementary-secondary education spending, we applied the \$2007 ECE estimate to the elementary-secondary spending estimate for the 2007 school year (IES, 2009).

For the share of ECE economic value accounted for by public federal and state outlays and tax expenditures, we compiled public investment data specific to FY2007.

There is some slight inconsistency in the data since we did not have a basis on which to accurately adjust between calendar years and fiscal years.

Table C-8: Hybrid Price-Wage Estimate of the Economic Value of ECE in the United States (\$2007 Billions)

	Infants (0-18 mos.)	Toddlers (19-36 mos.)	Pre-Schoolers (3-5 yrs.)	Total Children Birth-5
Center (Price-based Estimate)	\$4.8	\$7.9	\$13.6	\$26.3
Head Start (Program-based Budget Amount)			7.6	7.6
FCC (Price-based estimate)	\$2.7	\$3.2	2.9	\$8.8
FFN (Wage-based Estimate)	\$4.3	\$4.3	\$6.1	\$14.7
Public Pre-K (Program-based Budget Amount)			3.2	\$3.2
Military Child Care (Budget Amount)			\$0.6	\$0.6
Parent-Care Hours (Wage-based Estimate)				
	\$29.4	\$29.4	\$37.3	\$96.1
Total Value: Non-Parental	\$11.7	\$15.5	\$33.9	\$61.1
Total Value: Including Parental	\$41.1	\$44.9	\$71.2	\$157.2
Total ECE Economic Value as Percent U.S. GDP (2007)				
	0.29%	0.32%	0.51%	1.12%

References

- Burton, A., Brandon, R.N., Maher, E., Whitebook, M., & Young, M., Bellm, D., Wayne, C. (2002), *Estimating the Size and Components of the U.S. Child Care Workforce And Caregiving Population*. Center for the Child Care Workforce and Human Services Policy Center.
- Burton, A., Sakai, L. & Whitebook, M. (1999). A Profile of the Sacramento County California Child Care Workforce. Washington, DC: Center for the Child Care Workforce.
- Chase, R.A. (2001). Staff Recruitment and Retention in Early Childhood Care and Education and School Age Care. Saint Paul, MN: Wilder Research Center.
- Grobe, D, Weber, R., Davis, E., Kreader, J, Pratt, C. (2008), “Validating Child Care Market Rae Surveys.
- Helburn, S., ed. (1995). Cost, Quality and Child Outcomes in Child Care Centers. Denver: University of Colorado at Denver.
- IES (2009). US Department of Education, Institute for Education Sciences, National Center for Education Statistics, Education Finance Statistics Center.
<http://nces.ed.gov/edfin/tables.asp>, Table 4.
- Kontos, S., Howes, C., Shinn, M. & Galinsky, E. (1992). Quality in Family Child Care and Relative Care. New York: Families and Work Institute.
- Li, G., Maher, E. J., Brandon, R. N., & Scarpa, J. P. (2005, March). *Exploring the costs of head start and child care partnerships in Ohio*: Human Services Policy Center, Evans School of Public Affairs, University of Washington.
- Mulligan, G. & Flanagan, K., (2006) “Age 2: Findings from the 2-year old follow-up of the early childhood longitudinal study, birth cohort (ECLS-B). Washington, DC: U.S. Department of Education, National Center for Education Statistics (NCES 2006-043)
- Whitebook, M., Sakai, L., Gerber, E., & Howes, C. (2001). Then and Now: Changes in Child Care Staffing, 1994-2000. Washington, DC: Center for the Child Care Workforce.
- Willer, B., Hofferth, S., Kisker, E., Divine-Hawkins, P., Farquahar, E. & Glantz, F. (1991). The Demand and Supply of Child Care in 1990: Joint Findings from the National Child Care Survey 1990, and A Profile of Child Care Settings. Washington, DC: National Association for the Education of Young Children.
- Singer & Davis, 2007
- Stanley, T. D. and Stephen Jarrell. 1998. “Gender Wage Discrimination Bias? A Meta-Regression Analysis.” *Journal of Human Resources* 33(4):947–73.

U.S. Census Bureau. 2005-2007 American Community Survey, Data Profile, United States.

U.S. Department of Commerce (2009), Bureau of Economic Analysis website:
http://www.bea.gov/newsreleases/national/gdp/2009/pdf/gdp2q09_adv.pdf.

U.S. Department of Labor, Bureau of Labor Statistics. American Time Use Survey. Washington, DC.

U.S. Department of Labor, Bureau of Labor Statistics. Current Employment Statistics. Washington, DC.

U.S. Department of Labor, Bureau of Labor Statistics. Occupational Employment Statistics. Washington, DC.

U.S. GDP. Dept of Commerce, BEA News Release, July 31, 2009.
http://www.bea.gov/newsreleases/national/gdp/2009/pdf/gdp2q09_adv.pdf

Appendix 2: Methodology

In this section, we discuss in more detail the data sources we used for all three components of the ITP sector and the methodologies we employed to derive the estimates of the economic value of child care, child health care, and consumption by and on behalf of young children.

Health Care Goods and Services

Measuring Value

Before calculating the size of the sector and assessing its “shape,” it is necessary to first decide how economic value in this component will be measured. As set out above, there are a number of possible ways to compute that value. One option is replicating the methodology used for the first component: estimating the workforce size and using wages to compute the economic value of the sector. In this case, that would mean assessing the number of doctors (including pediatricians and others), nurses and nursing assistants, lab technicians, medical secretaries, and hospital janitors who devote their working time to serving young children, and determining how much they earn.¹⁸ The data source best equipped to provide workforce statistics is the Bureau of Labor Statistics (BLS). However, while the BLS estimates FTEs (full-time employee equivalents) for all medical professionals, the age of clients served is outside the scope of its mandate. As a result, BLS figures cannot be used to estimate the number of medical professionals currently caring for young kids, nor the number that might be needed to meet “basic needs.”¹⁹

A second method for estimating the size of this sector is to use “consumption” data – figures on payment for services provided to children from birth to age five. Ideally, this would mean simply calculating what consumers had paid toward health care for children age five and under. Given the hybrid public-private system of health care provision for children, however, it is critical to employ a data source that includes public insurance and service payments as well. Given the above needs and limitations, we have estimated the economic value of child health services by examining the Medical Expenditure Panel Survey (MEPS) to assess the share of health expenditures devoted to young children.

*MEPS: Description and Items Included*²⁰

The MEPS began in 1977 as the National Medical Care Expenditure Survey (NMCES) with the goal of understanding financing and use of medical care in the United States and became the National Medical Expenditures Survey (NMES) in 1987. Co-sponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics, MEPS was enacted in 1996, incorporating “design enhancements and efficiencies that provide a more

¹⁸ This would require adding non-personnel expenses, since medical care includes items such as equipment, medicines, lab materials. It is thus difficult to measure and also cannot be assumed constant between total health spending and child health.

¹⁹ Estimates do exist of the percentage of pediatricians’ time spent, on average, treating children ages 0-5, but as this is only one small part of the component, it fails to provide sufficient information to allow a useful workforce estimate for these purposes.

²⁰ These descriptions of the MEPS and its components are based on the descriptions provided on the MEPS website, accessed at http://meps.ahrq.gov/mepsweb/data_files/publications/st205/stat205.pdf. For more information about MEPS, call the MEPS information coordinator at AHRQ (301-427-1406) or visit the MEPS Web site at <http://www.meps.ahrq.gov/>.

current data resource to capture the changing dynamics of the health care delivery and insurance system.” The data provide “nationally representative estimates of health care use, expenditures, sources of payment, and insurance coverage for the U.S. civilian non-institutionalized population.” The survey has three “pieces”: the Household Component (HC), which is the core; Medical Provider Component (MPC); and Insurance Component (IC). They are intended as a comprehensive data source on level and distribution of health care use and spending and for use on research, including public policy implications.

The MEPS-HC collects two sets of information: 1) detailed household information on social, demographic, and economic characteristics that allow researchers to assess how health care is used in different population segments; and 2) detailed information on health services use and spending – including payments to hospitals, doctors, and other care providers – as well as insurance and health status. The website notes that “[e]xpense estimates include amounts paid by individuals, private insurance, Medicare, Medicaid and the State Children’s Health Insurance Program (SCHIP), and other payment sources,” and also that “[m]edical conditions are reported by household respondents and are not validated with diagnoses or conditions reported by medical providers.”

*Sampling and Data Collection*²¹

“The MEPS-HC collects data from a nationally representative sample of households through an overlapping panel design. The sampling frame is drawn from respondents to the National Health Interview Survey, which is conducted by the National Center for Health Statistics. A new panel of sample households is selected each year, and data for each panel are collected for two calendar years. The two years of data for each panel are collected through a preliminary contact followed by five rounds of interviews that take place over a two-and-a-half year period. This provides continuous and current estimates of the health care expenditures at both the person and household level for two panels for each calendar year.

“Each round of MEPS-HC interviews collects information pertaining to a specific time period, called a reference period. For example, the panel reference period for the first interview of Panel 6 began on January 1, 2001 and ended on the date of each reporting unit’s Round 1 interview, conducted from March through June 2001. The reference periods for Rounds 2, 3, and 4 varied from household to household and covered the time between interview days of the previous round and the current round. The last reference period of Panel 6 (Round 5) ended on December 31, 2002. December 31st of the second calendar year is always the end of the last reference period. Therefore, data for the year 2002 consists of data collected from Rounds 3-5 of Panel 6 and Rounds 1-3 of Panel 7.

“MEPS is a large-scale and comprehensive data collection that includes many types of survey questions, some of which only pertain to subsets of the diverse respondents participating in the survey. To accommodate the extensive array of questions covered, yet minimize the number of questions asked of each respondent, data are collected using an intricate system of skip patterns and questionnaire modules grouped into sections. Computer-assisted personal interviewing (CAPI) using a laptop computer makes it possible to field such a complex data collection instrument. Since data are collected using CAPI, rather than a hard copy questionnaire, the data instrument actually consists of sections that are composed of a series of computer screens

²¹ This section is directly quoted from http://www.meps.ahr.gov/mepsweb/survey_comp/hc_data_collection.jsp.

containing questions, interviewing instructions, and skip pattern directions, as well as computer programming notes embedded along with each data item. The MEPS data collection in a given round consists of different sections. Some sections are included in every round of data collection. Other sections are only included in one or two rounds.

“The MEPS design has been reviewed and approved by the Westat IRB (Institutional Review Board), established under a multi-project assurance (MPA M-1531) granted by the Office for the Protection from Research C109. ... Each interviewer has received in-depth training and wears a MEPS picture identification badge.”

Some data are difficult, or even impossible, to obtain directly from households. These include, in particular, services paid in full or in part by third parties, or those for which receipts are not easy to interpret. As such, MEPS supplements the data received from individual payers with information obtained from health care providers, including physicians’ offices, hospitals, home health care providers, and pharmacies. This Medical Provider Component (MPC) is intended “to supplement and/or replace information received from the MEPS-HC providers. Data files containing only this supplemental respondent information are not available, but the information is incorporated into the MEPS-HC data files.”²²

Creating National Estimates of Health Care Costs from MEPS

For the purposes of this research, as well as for many other projects, it was necessary to convert the MEPS sample numbers into national estimates that take into account differences in age, race, and other demographic characteristics of the two groups. In this case, the weighting was already conducted, so that methodology is described here. AHRQ has developed an online MEPS query system, called MEPSnet, from which we obtained our national estimates. MEPSnet gives the user easy access to nationally representative statistics of healthcare use, expenditures, sources of payment, and insurance coverage. (As set out above, it is representative only for the civilian non-institutionalized population.) Using MEPSnet, we were able to generate statistics using Medical Expenditure Panel Survey (MEPS) Household Component public use files.

While more recent data are available, our estimates are based upon data from the 2002 Full Year Consolidated Data File, HC-070. These data, while from a few years ago, allowed us to employ an established methodology to convert the estimates into more comprehensive ones. In particular, MEPS omits several key categories of expenses, both in terms of items not included and groups of people left out. As discussed below, Thomas Selden and Merrile Sing, who have used MEPS extensively, created a methodology that allows for the conversion of MEPS data into estimates that are more realistic and take into account these omissions, but we were only able to employ their work using 2002 data. We felt that, on balance, correcting the missing “pieces” of MEPS would lead to a more accurate and current estimate of the size of the component than using data that is four years more current but doesn’t allow for such “translation.”

Using MEPS data to produce accurate national estimates requires applying both MEPS survey weights and a technique incorporated into MEPSnet that produces the standard errors associated with the resulting weighted estimates. In order to make subgroup data more precise, MEPS oversamples certain groups: Hispanics, African Americans, and low-income individuals.

²² See http://www.meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp.

Producing national estimates thus requires using weighted variables assigned by MEPS-HC, which restores in the national estimates the correct proportion of individuals that fall within these groups.²³

Ideally, sampling weights used to extrapolate from the survey sample to the population would perfectly match our age categories of 0 and 1-5. However, MEPSnet sampling weights are based on the child age categories 0-4 and 5-17. While MEPSnet is designed to allow cost estimates to be generated for any age grouping, including children aged 0 and 1-5, respectively, the accuracy of these estimates is decreased slightly because we did not use predefined categories associated with the MEPS sampling weights. However, we do not believe that this slight discrepancy biases the data in any significant manner.

We used MEPSnet to generate tables that provide overall estimates for children ages 0-to-5, as well as breakdowns by age, health insurance type, source/site of service (doctor's office, hospital, home health, dental office, emergency room, as well as prescription), and reported health status. We also produced tables that further break down the sample, for example by both age and insurance type. The pertinent tables are included in the body of the report, so we did not reproduce them in the Appendix.

Reconciling MEPS and NHEA²⁴

The MEPS estimate of \$38 billion dollars most likely represents the lower bound of the true cost of health care for children age 0-5. In particular, the MEPS estimate is substantially lower than estimates of national medical expenses produced by the National Health Expenditure Accounts (NHEA) data collected by the Center for Medicare and Medicaid Services (CMS). NHEA estimates are developed from aggregate provider-based data sources such as the U.S. Census Bureau's Economic Census and Service Annual Survey, the American Hospital Association, IMS Health (a market research firm that monitors drug sales from pharmacies) and government administrative data.

NHEA Estimates are produced annually by the Office of the Actuary at CMS. Expenditures for physician and clinical, dental, and other professional, home health, and nursing home services are obtained from providers through the Service Annual Survey (U.S. Census Bureau, 2004b) and quinquennial Economic Census (U.S. Census Bureau, 2004a). Personal health expenditures by source of payment are estimated as follows. First, government spending by source of payment is computed with data from government programs such as Medicare and Medicaid. Next, private expenditures are calculated as the residual of total expenditures minus government expenditures. The allocation of private expenditures across out-of-pocket, private health insurance, and other private sources is based on source of payment distributions from the Service Annual Survey, American Hospital Association (2002), and MEPS.²⁵

²³ Two articles are available for those seeking more detail on the MEPS survey design and methodology: Cohen (1997) and Chon, Monheit, Meauregard, et al. (1996).

²⁴ Descriptions of and information on the discrepancy between MEPS and NHEA are derived from Sing et al (2006) and Seldon and Sing (2008), as well as from Kashihara and Carper (2006).

²⁵ Our decision to use MEPS over NHEA was due in part to the fact that the Center for Medicare and Medicaid Services has been unable to produce NHEA spending estimates for children age 0-5, leaving MEPS as the only viable alternative. CMMS is currently investigating the possibility of producing more detailed spending estimates by age for children in future age-related studies.

Thomas Selden and Merrile Sing have conducted the most comprehensive analyses of the differences between MEPS and NHEA and produced practical suggestions for reconciling the two. As Sing et al point out in their 2006 work on the topic, 2002 NHEA estimates of \$1.6 trillion total nearly twice those of MEPS, at \$833 billion. According to Kashihara and Carper, “AHRQ and CMS have estimated that nearly 90 percent of the difference in expense estimates between MEPS and the NHEA is attributable to the more extensive range of items and broader population included in the NHEA.” (Kashihara and Carper 2008, at p.3) Indeed, Selden and Sing agree that a large portion of this discrepancy is attributed to categories of spending – administrative costs, public health, research, and construction – that are all outside the scope of MEPS (Selden and Sing 2008).²⁶ As such, they assert that the NHEA estimate of \$1.341 trillion, which narrows the MEPS shortfall to 13.8%, is a better comparison, as it captures two critical categories that are within MEPS’ scope: excluded persons and expenses within the scope of MEPS that are likely under-reported for a number of reasons.

Even within this assessment, however, they find that discrepancies vary substantially among specific services (for example, very little for Medicare-funded services, but much larger gaps in Private Health Insurance Physical expenditures). Employing current research on reporting in a number of areas and updating 2002 data, Selden and Sing thus produced improved benchmarks. Perhaps most important for the purposes of this research, they upweighted by 10 percent Medicaid and SCHIP recipients, based on evidence that “MEPS, like all household surveys, has fewer persons with coverage from Medicaid and the State Children’s Health Insurance Program (SCHIP) than are reported in administrative data.”²⁷ They also modified sampling weights to increase the prevalence of high-cost cases, which, because we omit the highest-cost cases from our tables in order to be as cautious as possible with respect to potential outliers, may be of less relevance to the research. Finally, they adjusted MEPS expenditures in other areas particularly prone to under-reporting, such as separately-billed laboratory tests. All of these adjustments are combined to increase health care costs to the level in column 3 in Table 3X.1 below (“Aligned to MEPS-consistent NHEA personal Health Care benchmarks”).

With respect to adjustments outside the scope of MEPS that the researchers believe to be logically within the range of health care services that some analyses might want to include, large items included non-medical assistance with daily living, mostly paid by Medicaid, and hospital subsidies not directly linked to patient care. These personal care services would be deemed out-of-scope for MEPS because they are primarily provided to individuals who are out-of-scope for MEPS (i.e., institutionalized individuals), and they thus likely pertain little to our population of interest, young children. As noted above, we chose a more conservative option that does not include this population. The authors go on to offer still larger adjustments that include tax subsidies outside the scope of NHEA (as well as of MEPS), which allows them to come close to closing the discrepancy gap between the MEPS and NHEA estimates, though not entirely. Kashihara and Carper note that, “[t]he remaining difference between MEPS and NHEA – only about 10% of the total – likely stems from irreconcilable definition and measurement differences between the two sources, household survey underreporting, and statistical sampling error associated with the estimates.”

²⁶ Again, we believe that excluding these costs from our estimate enhances its conservative nature; administrative costs are clearly part of national spending on health care, including services for young children.

²⁷ Selden and Sing 2008 at p.6.

Based on the above explanations of the discrepancies between MEPS and NHEA, we provide two estimates of the economic value of early childhood health care services in terms of both dollar figures and percent of 2007 GDP. Employing Seldon and Sing’s methodology, as set out above, we had five options to increase the MEPS figures to closer to the NHEA figures. Using the smallest adjustment, the only difference would involve only re-weighting the total to account for under-sampling of Medicaid and SCHIP beneficiaries, which still fails to incorporate many “missed” costs. At the other end of the range of possible changes, the least conservative method would include public health expenditures outside the scope of MEPS, as well as tax subsidies. We chose a middle option that we feel is still fairly conservative. As described above, it incorporates MEPS-consistent personal health care costs that are likely under-counted or omitted by MEPS, but does not include the administrative costs and other items that, in a more generous estimate, would be pertinent to young children, as well as to others in the population. We believe that this provides a more realistic estimate of the health care component’s contribution to the sector as a whole. Please see Table 3X.1, below, for the range of possible adjustments and the choice made here.

Table 3X.1: Benchmarking Pooled MEPS (Billions of 2002 Dollars)*

	Pooled 2002-03 MEPS	Reweighted: Medicaid and SCHIP	NHEA-PHC Only (MEPS Scope)	Augmented with more NHEA PHC amounts	Augmented with other NHEA non-PHC spending	Plus tax subsidies outside the scope of NHEA
2002 Total	833.2	880.7	964.1	1072.2	1290.6	1341.6

*Source: Adapted from Selden and Sing 2006, Table 2, same title, at Appendix p.2.

Estimating ITP Health Care Costs for 2007

In order to be consistent across the three components and to provide up-to-date estimates, we developed a method for projecting our 2002 MEPS estimates to 2007. Simply converting 2002 dollars into 2007 dollars isn’t appropriate, because health care costs have increased more rapidly than other sectors of the economy. Our key assumption was that the early-childhood share of health care GDP did not change between 2002 and 2007. This is based on census data showing that, in 2002, children birth to five accounted for 8.13% of the population, and in 2007, their share was almost identical, at 8.22%.²⁸ Moreover, no major policy or other changes took place during that period that would have caused the ITP share of health to change.

In 2002, early-childhood health care costs were \$28 billion, or 2.6 percent of total health care GDP (which was \$1,083 billion).²⁹ (This is indicated as step 1 in Table 3X.2, below.) Assuming that this share remained unchanged between 2002 and 2007, we applied the 2.6 percent share to 2007 health care GDP, which had grown by 2007 to \$1,470 billion. This yielded a 2007 estimate for early-childhood health care costs of \$38,209,600,000 (indicated on the Table as step 2). This methodology enabled us to build into our estimates health care’s growing share of GDP over these five years.

²⁸ June, 2002 estimates: <http://www.census.gov/popest/national/asrh/files/NC-EST2008-ALLDATA-R-File05.csv>

June, 2007 estimates: <http://www.census.gov/popest/national/asrh/files/NC-EST2008-ALLDATA-R-File15.csv>

²⁹ For both 2002 and 2007 GDP and health GDP, we used the Bureau of Economic Analysis National Income and Product Accounts Gross Domestic Product: Second Quarter 2009 (advance estimate), Comprehensive Revision: 1929 through first quarter 2009, Table 3A. Gross Domestic Product and Related Measures, at pp.25-26.

The next step, translating each subsection of cost – doctors’ visits, prescriptions, etc. – was conducted by calculating the multiplier used to convert 2002 to 2007 values. That number was 1.36, so that multiplier was applied to each category of health care services, assuming that each increased at roughly, if not precisely, the same rate over those years. These translated figures are represented in columns 1 through 3 in Table 3X.2, below. As the spreadsheets in the body of the chapter show, not all costs are adjusted to the NHEA-compatible higher figures, since appropriate multipliers do not necessarily apply to subcategories, but rather to the overall totals (for the entire group and each age group).

Table 3X.2: Converting 2002 MEPS to 2007 Adjusted MEPS

Age Group	1) Projected Sum	2) MEPS Basic 07 (Column 2 x 1.36)	3) MEPS Adjusted 07 (Column 3 x 1.28)
Total	\$28,203,502,747.00	\$ 38,356,763,735.92	\$ 49,096,657,581.98
Birth-1	\$ 9,585,038,348.00	\$ 13,035,652,153.28	\$ 16,685,634,756.20
1-5	\$18,618,464,399.00	\$ 25,321,111,582.64	\$ 32,411,022,825.78

Other Social Services

As discussed above, the second component was intended to capture the economic value, as measured by equivalent percentage of GDP, of ITP health and social services and goods. However, a combination of factors – the lack of reliable data, the need to employ difficult-to-collect state and local data, and the inability to assess the proportion of spending on a given program that should be attributed to children birth-to-5 – rendered inclusion of such programs not feasible. The exception, as set out in the chapter, is the federal WIC program, for which good data are available and the “target” children are fairly easy to assess. (The SNAP program is discussed in chapter 4, as part of family consumption.) Here, we thus provide a list of other social service programs that are omitted but constitute more value in the ITP second component and, again, demonstrate the conservative nature of the estimate of size that is presented in the chapter.

Table 3x.3: “Other” Social Services (non-WIC) That Fall Within Definition of ITP Second Component But Are Not Included in Estimates of Component/Sector Size

Program	Source for Spending Data
Title XX Social Services Block Grant	http://waysandmeans.house.gov/media/pdf/110/ssbg.pdf
Low-Income Home Energy Assistance Program (LIHEAP), priority for families with elderly or young children.	http://waysandmeans.house.gov/media/pdf/110/lowincome.pdf
Housing: Section 8 voucher program, HOME Block Grant program, Low Income Housing Tax Credit, Homeless Assistance Grants. Each has different priorities and guidelines, so difficult to estimate spending on children 0-5.	http://waysandmeans.house.gov/media/pdf/110/hap.pdf
Child Welfare Service. Title IV-B of the Social Security Act has two parts, both focused on preserving families and preventing the need for foster care.	http://waysandmeans.house.gov/media/pdf/111/s11cw.pdf
There are also data on total spending on foster care and adoption services.	http://www.acf.hhs.gov/programs/cb/stats_research/index.htm#afcars

Child Abuse and Prevention Treatment Act (CAPTA), small but targeted at this group.	http://www.acf.hhs.gov/programs/cb/programs_fund/state_tribal/capta.htm
Title V Maternal and Child Health Services, for health costs not captured by Medicaid and SCHIP.	https://perfdata.hrsa.gov/MCHB/DGISReports/default.aspx
Vaccines for Children Program (CDC)	http://www.cdc.gov/vaccines/programs/vfc/default.htm
Early Intervention Program for Infants and Toddlers with Disabilities, funded through IDEA Part C.	http://www.ed.gov/programs/gtep/gtep2007.pdf
Non-Medicaid mental health programs	http://mentalhealth.samhsa.gov/child/childhealth.asp

References

Cohen, J. Design and methods of the Medical Expenditure Panel Survey Household Component. Rockville (MD): Agency for Health Care Policy and Research: 1997. *MEPS Methodology Report No. 1*. AHCPR Pub. No. 97-0026.

Fleishman JA. Demographic and clinical variations in health status. Rockville (MD): Agency for Healthcare Research and Quality; 2005. MEPS Methodology Report No. 14. AHRQ Pub. No. 05-0022.

Kashihara, D. & Carper, K. National Health Care Expenses in the U.S. Civilian Noninstitutionalized Populations 2006. Statistical Brief #229. December 2008. Agency for Healthcare Research and Quality, Rockville, MD.

http://www.meps.ahrq.gov/mepsweb/data_files/publications/st229/stat229.pdf

Machlin, S.; Yu, W., and Zodet, M. Computing Standard Errors for MEPS Estimates. January 2005. Agency for Healthcare Research and Quality, Rockville, Md.

http://www.meps/ahrq.gov/survey_comp/standard_errors.jsp

Medical Expenditure Panel Survey Frequently Asked Questions Answers. Agency for Healthcare Research and Quality, Rockville, Md.

http://www.meps.ahrq.gov/mepsweb/about_meps/faq_results.jsp?ChooseTopic=All+Categories&keyword=&Submit2=Search

MEPS-HC Sample Design and Collection Process. Agency for Healthcare Research and Quality, Rockville, Md. http://www.meps.ahrq.gov/survey_comp/hc_data_collection.jsp

Selden, Thomas M. and Merrile Sing, “Aligning the Medical Expenditure Panel Survey to Aggregate U.S. Benchmarks,” July 2008, Agency for Healthcare Research and Quality Working Paper No. 08006, <http://gold.ahrq.gov>.

Appendix 3: Family Consumption

Data

Consumer Expenditure Survey & National Mean Estimates Methodology

The Consumer Expenditure Survey (CE) is an annual survey conducted by the Bureau of Labor Statistics, which estimates total household expenditures nationwide. Information about spending behavior is collected in great detail at the level of individual consumer units (an approximation of the concept of households). This consumption data is paired with demographic characteristics of each consumer unit, including the number and ages of the constituent members. Although we cannot know the amount spent explicitly for any one person, we can compare the spending patterns of families who are of a similar age, income level, and number of parents, but vary in the number and ages of children (See Table 3.2X, below).

The Consumer Expenditure Survey is comprised of two elements: a quarterly interview and a two-week diary. In the interview, respondents detail the consumption history of their consumer unit (usually a household) over the course of a year in three-month increments. In the diary, a different sample of consumer units reports their spending over two consecutive weeks. Both surveys are conducted continuously. The latest full year of spending data to be published occurred in 2007.

Each of the two independent samples is selected to be representative of the national population of consumer units. BLS calculates weights for each observation to correct for sampling imperfections. Also provided are 44 half sample replicate weights, generated by a pseudo-replication technique, to allow for variance estimation.

The purpose of having two approaches is to capture both spending that is routine and spending that is intermittent. Some expenses are captured in both surveys, but the BLS determines which method is more accurate for each type of expenditure, allowing data from the two surveys to be combined into a meaningful composite. Altogether, BLS estimates that the Consumer Expenditure Survey captures nearly all of the consumption in the economy.

For the purposes of this study, it was important not to include all types of consumption, as this would have double counted the spending in Components 1 and 2, for which more detailed analysis was possible with other data. Any reported healthcare or direct child care expenses that were duplicative were ignored. On average, Component 1 and 2 expenditures accounted for 27% of total consumer unit expenditures in 2007. (See Tables 3.1X and 3.2X, below, for total and third ITP component spending, as well as breakdowns by ECE, health, and all other consumption.)

USDA Report

Since 1960, the Center for Nutrition Policy and Promotion of the U.S. Department of Agriculture has authored a report that examines the Consumer Expenditure Survey and carefully partials out the expenditures on children. The report provides estimates of the annual expenditures on the average child of a particular age, from a family of a particular income, with a particular number of siblings, and with either one or two parents present. This amounts to forty eight distinct averages for children between the ages of 0 and 5.

The USDA report examines only those families where the parent or parents are between the ages of 20 to 60, with at least one child 17 or younger living in the household, and without any other related or unrelated people living in the household. This excludes all households that do not have children, even if they might purchase goods on behalf of a child, as grandparents or a non-custodial parent might. Moreover, any family that has young children but also has a grandparent present, or has teenage parents, is ignored. For the USDA report, this allows the averages to be more representative of a typical family. To estimate total spending on all young children, however, requires us to assume that these averages are representative of the entire population.

The Current Population Survey is prepared annually by the Census Bureau. The survey data can be used to produce accurate national estimates of the number of children of any given age living in various family arrangements. It is therefore possible to estimate the number of children represented by each of 48 averages provided in the USDA report. Summing these together provides an estimate for the national total of household expenditures on young children (See Table 3.1X, below).

It should be noted that the overlap between the ECE and health care components and the USDA report categories of Health and Child Care are not perfectly identical. This results in the exclusion of some household expenses, such as the rental of medical equipment, but the value of these items, especially on behalf of children under the age of 6, is negligible.

To determine the partial value of these categories that is child-related, two methods were used by the USDA: a multivariate analysis for Food, Transportation, Clothing, and Miscellaneous, and a 'Cost of Additional Bedroom' approach for Housing.

The USDA used the five relevant spending categories to conduct a regression that calculates household expenditures on children based on the mixture of income, number of children (1, 2, or 3 or more), and the age of the youngest child (ages 0-2, 3-5, 6-8, 9-11, 12-14, or 15-17). (See regression below for details.)

The multivariate analysis for the first four categories was conducted separately for husband-wife and single-parent households. The model regressed the household expenditures in each particular category on three independent variables: household before-tax income, which was divided evenly into three categories; number of children in the household, also divided into three categories (1 child, 2 children, 3 or more children); and the age of the youngest child, divided into six age categories (0-2, 3-5, etc.). (For single-parent households, income was divided into only two categories, which correspond to the lowest category and the top two categories of two-parent households.)

$$(1) E_i = f(Y, HS, CA)$$

where:

E_i = household expenditures on a particular budgetary component (food, transportation, health care, children's clothing, child care and education, and miscellaneous goods and services)

Y = household before-tax income (divided into three groups for husband-wife families: < \$56,870, \$56,870 to \$98,470, and > \$98,470 in 2008 dollars, and two groups for single-parent families: <\$56,870 and \$56,870 or more in 2008 dollars)

HS = number of children in the household (divided into three groups: 1 child, 2 children, and 3 or more children)

CA = age of the younger child (divided into six age groups: 0-2, 3-5, 6-8, 9-11, 12-14, and 15-17)

Source: USDA Report, page 4

After the household expenditures in each category were estimated, the USDA analysis allocated them to children. For the Clothing category, the Consumer Expenditure Survey differentiates between infant apparel, children's apparel, and adult apparel. The amount spent on each of these was divided evenly among any family member within the appropriate age group. Clothing services, such as cleaning and tailoring, were split evenly among all members of a family. Data from the 2008 USDA Food Plans were used to allocate food expenditures between household members. These estimates take into account the age of the member, total household income, and household size.

The USDA report considered only family-related transportation spending, which excludes employment-related transportation. A 2004 U.S. Department of Transportation Study (Hu & Reuscher, 2004) estimated the family-related transportation costs to be 59% of total transportation. The USDA report thus allocated 59% of the total transportation spending evenly between each family member. As they note, this approach ignores the purchase of larger vehicles because of children, so is likely an underestimate.

Miscellaneous spending includes personal care expenditures, entertainment expenditures, and financial services expenditures. The USDA report allocated these expenses evenly among all household members.

The Housing category was estimated differently. The CE includes the total spent on housing and the number of bedrooms for each household. The USDA report determined the average cost of an additional bedroom in a home, controlling for income level and whether it is a husband-wife or single-parent household. The expense of up to one bedroom per house was allocated to each child. The USDA report acknowledges that this excludes the behavior of some families that choose more expensive housing options because of community or school district concerns once they have children. For this reason, the housing expenditures are likely underestimated.

The values used in the USDA analysis were inflated to 2006 dollars from the original 2005-2006 data. After the analysis, the results were inflated to 2008 dollars before being published in the USDA report. All inflation calculations were performed using category-specific values of the Consumer Price Index (CPI).

Methodology

Use of the USDA Report in this Research

To be consistent throughout this report, USDA report values were deflated to 2007 dollars, using the category-specific values of the GDP where possible.

For each of the 48 averages reported in the USDA report, it was necessary to estimate the relevant population of children under six using the Current Population Survey (CPS). In order to include the entire population of children under 6, it was necessary to assume that the USDA analysis was generalizable to children living with teenage parents or with caretakers other than their parents.

Each average expenditure is then multiplied by the relevant population, and aggregated to produce an economy-wide value for the Family Consumption component, \$190.7 billion. In Table 3.1X, this is expressed in billions of 2007 dollars, and as a percent of 2007 GDP. The size of each expenditure category is also expressed as a share of Family Consumption expenditures.

Limitations

One major limitation to this methodology is the inability to produce a range of possibly larger and smaller estimates of the component's size. The USDA report did not include standard errors with its estimates, so it is not possible to provide confidence intervals around our estimates. Related to this, USDA methodology does not take into account each child's space within the family, which might bias estimates upward slightly. For example, second and third children are slightly less expensive with respect to clothing; many wear hand-me-downs from older siblings. The same may even be true of food; more children means that the family can purchase in bulk more often, trimming some food expenditures.

It must be recognized that, like all methodologies, this one has limitations that may cause slight bias. However, no other single source allowed for the estimate of this entire component in a way that distinguished ITP children. Moreover, in all instances in which assumptions had to be made, a more conservative choice was taken, so it is likely that this estimate is still very close to a middle-ground or even a lower-, rather than an upper-bound one.

Table 3.1x: Total Family Expenditures, Spending on ECE and Health

	Total Expenditures		ECE	Health
	3rd Component	Total Exp		
2006 USD	1.81E+11	2.48E+11	5.19E+10	1.44E+10
2006 USD, billions	181.5	247.8	51.9	14.4
2006 USD / 2006 GDP	1.35%	1.85%	0.39%	0.11%
<i>GDP Adjustment Method</i>				
2007 USD	1.91E+11	2.60E+11	5.45E+10	1.51E+10
2007 USD, billions	190.7	260.4	54.5	15.1
2007 USD / 2007 GDP	1.35%	1.85%	0.39%	0.11%

Table 3.2X: Family Consumption, All Other Categories

	Housing	Food	Transp	Clothing	Misc
2006 USD	8.76E+10	3.00E+10	2.98E+10	1.44E+10	1.97E+10
2006 USD, billions	87.6	30.0	29.8	14.4	19.7
2006 USD / 2006 GDP	0.65%	0.22%	0.22%	0.11%	0.15%
<i>GDP Adjustment Method</i>					
2007 USD	9.20E+10	3.16E+10	3.13E+10	1.51E+10	2.06E+10
2007 USD, billions	92.0	31.6	31.3	15.1	20.6
2007 USD / 2007 GDP	0.65%	0.22%	0.22%	0.11%	0.15%

Table 3.2X: 2007 Mean Household Expenditure Shares, by Age and Number of Children

	1. without children	2. with children, none 0-5	3. with children, one 0-5	4. with children, two 0-5	5. with children, 3+ 0-5
Expenditures, as share of total					
Consumable Goods	14.7%	16.1%	14.9%	15.5%	11.7%
Food at Home	6.8%	8.2%	8.0%	8.7%	7.6%
<i>Baby Food</i>	0.0%	0.0%	0.3%	0.6%	0.4%
Food Away	5.6%	6.4%	5.3%	5.3%	3.3%
Alcohol	1.2%	0.7%	0.7%	0.7%	0.2%
Smoking	0.7%	0.6%	0.7%	0.6%	0.4%
Housing	36.0%	33.2%	37.0%	37.4%	40.1%
Owned Dwellings	13.5%	14.8%	16.4%	17.6%	18.8%
Rented Dwellings	6.2%	4.0%	6.1%	5.4%	5.1%
Other Lodging	1.7%	1.3%	0.8%	0.8%	0.4%
Utilities	7.5%	7.5%	7.4%	7.2%	6.6%
Operations, Furnishings, Appliances	7.1%	5.6%	6.1%	6.4%	9.2%
<i>Table 3.2X, Continued</i>					
	1. without children	2. with children, none 0-5	3. with children, one 0-5	4. with children, two 0-5	5. with children, 3+ 0-5
Expenditures, as share of total					
<i>Infant-Related</i>	0.0%	0.0%	0.1%	0.2%	0.1%
Apparel	5.0%	5.8%	5.7%	5.5%	4.1%
Adult (16+)	2.8%	2.7%	2.3%	1.7%	0.9%
Child (2 - 15)	0.1%	1.2%	1.0%	1.2%	1.0%
Child (0 - 2)	0.1%	0.1%	0.7%	1.0%	1.2%
Personal Care	1.3%	1.2%	1.1%	1.2%	0.7%

Misc	0.6%	0.6%	0.5%	0.5%	0.3%
Transportation	18.2%	19.1%	20.1%	19.3%	21.8%
Vehicle Purchase	6.4%	7.1%	8.5%	7.8%	11.5%
Health	0.3%	0.2%	0.2%	0.2%	0.2%
Retirement and Nursing Homes	0.1%	0.0%	0.0%	0.1%	0.0%
Medical Equipment and Supplies	0.3%	0.2%	0.2%	0.1%	0.2%
Entertainment	6.1%	6.2%	5.9%	5.4%	6.0%
Athletic	1.1%	1.5%	1.1%	1.0%	1.6%
Books & Periodicals	0.3%	0.2%	0.2%	0.2%	0.1%
Events	0.2%	0.2%	0.2%	0.1%	0.1%
Hobby	0.2%	0.3%	0.3%	0.2%	0.2%
Home Theater	2.1%	2.0%	2.1%	2.0%	2.4%
Hosting	0.1%	0.0%	0.0%	0.1%	0.0%
Movie Theater	0.3%	0.4%	0.3%	0.3%	0.2%
Pets	1.0%	0.9%	0.7%	0.4%	0.3%
Toys	0.2%	0.3%	0.6%	0.6%	0.5%
Vehicle	0.6%	0.4%	0.4%	0.4%	0.5%
Education	1.9%	3.1%	1.0%	1.1%	0.4%
College	1.6%	1.6%	0.5%	0.4%	0.2%
Primary & Secondary	0.2%	1.2%	0.4%	0.4%	0.2%
Other schools	0.1%	0.3%	0.1%	0.2%	0.1%
Miscellaneous	17.8%	16.4%	15.2%	15.7%	15.8%
Fees	2.6%	2.3%	1.7%	2.1%	2.2%
Alimony & Child Support	0.8%	0.7%	0.5%	0.6%	1.8%
Donations	4.0%	2.4%	1.4%	1.7%	3.3%
Pensions & Social Security	10.4%	11.1%	11.5%	11.2%	8.6%

References

Lino, Mark & Carlson, Andrea. (2009). *Expenditures on Children by Families, 2008*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. Miscellaneous Publication No. 1528-2008.

U.S. Census Bureau. *Current Population Survey Design and Methodology*. Technical Paper 66. October 2006

Bureau of Labor Statistics, U.S. Department of Labor. 2007 Consumer Expenditure Diary Survey, Public Use Microdata User's Documentation. February 9, 2009.

Bureau of Labor Statistics, U.S. Department of Labor. 2007 Consumer Expenditure Interview Survey, Public Use Microdata User's Documentation. February 9, 2009.

Endnotes

ⁱ (The BEA calculates the size of each industrial “sector” and presents that number as a top-line figure in its North American Industry Classification System, “NAICS”.)

ⁱⁱ Barnett, W. Steven (1995). “Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes.” *The Future of Children, Long-Term Outcomes of Early Childhood Programs* 5(3):25—50. Barnett, W. Steven, Kristy Brown & Rima Shore (2004). “The Universal vs. Targeted Debate: Should the United States Have Preschool for All.” In *Preschool Policy Matters*. National Institute for Early Education Research. Karoly, Lynn, Peter Greenwood, Susan S. Everingham, Jill Hoube, M. Rebecca Kilburn, C. Peter Rydell, Matthew Sanders, James Chiesa (1998). *Investing in Our Children: What We Know and Don’t Know About the Costs and Benefits of Early Childhood Interventions*. Santa Monica, CA: RAND Corporation. Karoly, Lynn, M. Rebecca Kilburn & Jill S. Cannon (2005), *Early Childhood Interventions: Proven Results, Future Promise*. Santa Monica, CA: RAND Corporation. NICHD Early Child Care Research Network (1996). “Characteristics of Infant Child Care: Factors Contributing to Positive Caregiving.” *Early Childhood Research Quarterly* 11:269-306. NICHD Early Child Care Research Network (2000). “Characteristics and Quality of Child Care for Toddlers and Preschoolers.” *Applied Developmental Science* 4(3):116-135. Shonkoff, Jack P., and Deborah Phillips. 2001. *From Neurons to Neighborhoods: The science of early childhood development*. National Academy Press. Vandell, D. & Wolfe, B. (2000). *Child Care Quality: Does It Matter and Does It Need to be Improved*. Washington, DC: US Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation.

ⁱⁱⁱ Stahr-Breunig, G., Brandon, R.N., & Maher, E.J. (2004). “Counting the Child Care Workforce: A Catalog of State Data Sources to Quantify and Describe Child Caregivers in the Fifty States and the District of Columbia.” Report to the Child Care Bureau, Administration for Children and Families, U.S. Department of Health and Human Services.

^{iv} Singer and Davis (2007)

^v *US GDP*. Dept of Commerce, BEA News Release, July 31, 2009. http://www.bea.gov/newsreleases/national/gdp/2009/pdf/gdp2q09_adv.pdf

^{vi} The education and wage level of preschool teachers is higher than for child care workers. However, the ATUS sample does not distinguish between preschool teachers and kindergarten teachers, so we were not able to include them in this comparison.

^{vii} This difference was estimated by a multiple regression model; the results of that model are described in the Appendix to this chapter. The number of child care workers (501) in the ATUS sample was too small to present a definitive analysis of the negative effect of child care as an occupation. However, the results were so strong, and in the same range as a previous analysis (Helburn, 1995, found a difference of 24 percent in four sample states; our model explains about 50 percent of variance, considerably more than their model did), that we feel confident in reporting the relative under-payment of child care workers as an occupational group. We analyzed pre-K teachers as well as child care workers, and found the expected similar pattern of wage gaps. We did not include the pre-K teacher. The pre-K teacher results because this data set included kindergarten teachers in category. The number of respondents - 149 for 3 years - is large enough to feel comfortable about the overall pattern being reasonable, but not large enough to feel comfortable reporting a specific wage gap estimate.

^{viii} NHES includes the following conditions as ‘special needs:’ Learning Disability; Mental Retardation; Speech Impairment; Emotional Disturbance; Deafness/Hearing Problem; Blindness/Visual Problem; Orthopedic impairment; Autism; ADD/ADHD; PDD (Pervasive Development Disorder); Other Health Problem; Severe Developmental Disability.

^{ix} HSPC has developed these estimates in financing studies for a number of states and counties. See <http://www.hspc.org/publications/financeECEpubs.aspx>.

^x Institute for Education Sciences, National Center for Education Statistics (2009). *Revenue and Expenditures for Public elementary and Secondary Education, School Year 2006-07 (Fiscal Year 2007): First Look*. NCES 2009-337. March, 2009.

Downloaded at http://nces.ed.gov/pubs2009/expenditures/tables/table_06.asp.

^{xi} These values fluctuate as welfare demands wax and wane and as the amount of child care tax credits increases and decrease. The value was about \$24

billion in 2005; the reduction is largely due to lower tax credit claims.

^{xii} Note that, in the second component, young children are defined slightly more broadly than they are in the first component. Here, birth to age five includes some children who are in kindergarten, since the data do not enable easy identification of those who are not, and, unlike in the case of ECE, health care is not divided along the pre-school/kindergarten line.

^{xiii} This could include anything from the type of primary care or specialist doctor a child saw – such as a speech therapist or kidney doctor – to the specific services received, again, from lab tests to x-rays to physical therapy. Many of the same services, of course, might also be provided in the hospital setting.

^{xiv} Other health-related social supports and income transfers that fall into this component are discussed in Appendix 2.

^{xv} In the vast majority of cases, private insurance is provided by employers and subsidized by federal tax incentives, but a minority of parents and children pay privately for such coverage.

^{xvi} While many U.S. adults have no health insurance, as advocates for health care reform emphasize, CHIP and Medicaid cover the majority of privately uninsured children. Indeed, in our 2002 sample of 3,445 children ages 0-5 families, only 215, or about 6%, had no insurance at all. National estimates, however, show a larger percentage not insured, possibly reflecting reductions in employer coverage for many families over the past few years.

^{xvii} While WIC expenditures are included in this estimate, other omitted services are listed in the Appendix.

^{xviii} See Appendix 3 for a discussion of the decision to use payment, rather than workforce data, for this component.

^{xix} Kashihara, D. & Carper, K. 2008.

^{xx} Administrative costs and public health expenses are also clearly relevant to health care spending on children, but they are outside the scope of MEPS and, thus, not adjusted for in this report, adding, again, to the conservative nature of the estimates provided. As discussed in Appendix 3X, MEPS also omits costs of institutionalization, as it does not include this population in its survey, but this would not appear to have a major impact on young children.

^{xxi} Missing from both of these sources are other “pieces” of spending on young children for health-related goods and services, particularly other federal expenditures. Although they likely cumulatively represent a very small portion of the economic value of this component, we do note that this omission represents another way in which this estimate under-

counts the total economic value of the ECS. A summary of the omitted programs is provided in Appendix 3.

^{xxii} Because the ratio of under-reported costs to other costs is likely higher in some areas of care than others, adjusted figures are produced only for overall numbers, and not for broken-down categories. For that reason, as noted below, those sub-group figures are presented as percentages as well as absolute numbers, in order to make it easier to understand their relationship to the averages, maximums, and minimums.

^{xxiii} As discussed in the introduction, we decided not to convert to 2008 GPD or dollar values given the potential disruptions in the “meaning” of the economic value across all three components during a severe recession.

^{xxiv} MEPS provides more current data, up through 2007. However, as detailed in Appendix 3, 2002 is the last year for which NHEA-type “conversions” exist to adjust the overly conservative MEPS estimates.

^{xxv} While not “preventive” in the way that well-child visits are, sick child visits to the doctors’ office are usually much less expensive than hospital or emergency room visits and can represent means of preventing the latter.

^{xxvi} Mental health services may be delivered in a number of contexts: doctors’ visits may consist partly of mental health counseling; in other instances, inpatient hospital or emergency room visits may reflect mental health care.

^{xxvii} The MEPS survey also includes more detailed questions that guide labels of good versus poor health, etc.

^{xxviii} Averages are employed in this chapter, rather than regression-derived numbers that control for other, potentially confounding factors, so these “stories” are not necessarily causal in nature. Future research employing regressions could further explore the inter-relationships among the variables.

^{xxix} <http://www.ers.usda.gov/Publications/ERR73/ERR73d.pdf>.

^{xxx} This percentage grows, as shown below, when the value of WIC and SNAP social services are added.

^{xxxi} As discussed above, adjusted values represent a more accurate estimate of the economic value of health care services for young children, so lower basic figures are presented here for comparison.

^{xxxii} As discussed above, data are not available for subgroup breakdowns, so unadjusted numbers are presented here.

^{xxxiii} As discussed below, all health care is ultimately paid for by someone. In the case of low-income children with no health insurance, the state or local

government may pay through a public clinic, taxpayers may support it through the community hospital emergency room, or there may be other methods of public payment.

^{xxxiv} As discussed above, children reported to be in poor health are not included in the table, and the number in fair health could be debated, given the small percentage (2%) that they constitute in the sample. I.e., there is reason to believe that these numbers might not be entirely representative of the population as a whole.

^{xxxv} As set out above, because we did not conduct regressions to assess these possibilities and others, the figures are averages only; they are not necessarily causal.

^{xxxvi} Both young children and young adults accrue health care costs from accidental injuries, but otherwise they tend to receive quite different health care services.

^{xxxvii} Fertig and Corso 2009.

^{xxxviii} Martin et al 2007. Note: these two types of birth outcomes overlap, so they cannot be added together.

^{xxxix} Fertig and Corso 2009.

^{xl} *Id.* References to: \$7 billion Russell et al., 2007, \$9.3 billion Lewit et al., \$14.4 billion IOM, 2007.

^{xli} Louisiana's Child Poverty Prevention Council, tasked by the state legislature with producing evidence-based policy options to address the state's child poverty crisis, recommended health coverage for high-risk women before pregnancy, based on the finding that "[t]he strongest predictors of a future pre-term birth are a prior pre-term delivery or a pre-existing chronic disease [and that] 30% of women who have had a spontaneous pre-term birth will have a subsequent pre-term birth." Pilots to cover high-risk women are underway as well in Maryland and Missouri.

^{xlii} Martin JA *et al* 2009. This percentage is based on 34 states using the 1989 version of the certificate of live birth. For 12 other states using the 2003 version of the certificate of live birth, the percentage is even higher—8.2 percent.

^{xliii} Not surprisingly, children with no health insurance cost substantially less, at \$971 annually, on average.

^{xliiv} Doctors visits, the largest source of medical value for this age group, come to \$482 per privately-insured child (in adjusted 2007 dollars), versus \$368 for children with public insurance and \$258 for those with none.

^{xli v} Privately-covered kids receive an average of \$75 worth of care each year, while publicly-insured children get \$34 worth and uninsured children just \$12 worth.

^{xli vi} Aside from these, seven states – Alaska, Oregon, Idaho, Montana, North Dakota, Nebraska, and

Oklahoma – have rates between 175% and 185% of the poverty line. Twelve states and the District of Columbia cover children at 300% of federal poverty level or above.

^{xli vii} Kaiser Family Foundation Facts on Health Reform,

<http://facts.kff.org/chart.aspx?cb=56&sctn=157&p=1>

. In 2006, the 6.6 million children enrolled in CHIP was barely higher than the number of eligible uninsured children.

^{xli viii} Kaiser Family Foundation, Facts on Health Reform, Table 4: Low-Income Uninsured by Population Group.

^{xli ix} Kaiser Family Foundation, Facts on Health Reform, Table 3: Distribution of the Uninsured by Poverty Level and Age.

^l 2007 National Survey of Children's Health.

^{li} Dye and Tan 2007

^{lii} Gehshan, 2009.

^{lii i} Centers for Medicare and Medicaid Services 2007.

^{li v} As noted above, unmet needs related to food and nutrition, as well as societal benefits of the SNAP program, are discussed in more detail in the next chapter, which addresses food and other consumption for the ITP sector.

^{li v} Brunekreef et al., 1989

^{li vi} Roy 2008.

^{li vi i} In Manhattan, for example, complaints of such conditions were sharply on the rise in 2007, suggesting possible lapses in maintenance and/or enforcement. Fernandez 2007.

^{li vi i i} 2005 data, Joint Center for Housing Studies, Harvard University.

^{li x} In order to avoid any double-counting, it was necessary to exclude household expenditures on health care, early education, and child care, as these values were captured by other methods and are included in economic values of EC sector piece one and two.

^{li x} Many families also purchase a new, and often larger, care, but the data do not capture these, making the estimate conservative in this respect.

^{li xi} It is important to note that this research assesses only consumption at the household level. As such, it excludes some public spending – such as national defense, agriculture subsidies, and federal highway funding – that benefits young children along with other members of society. In other words, in keeping with the conservative nature of this estimate, the sector as measured in this work is narrowly defined. On a more micro level, the data also exclude all purchases made by households without young children, even if those goods might have been given as gifts to or shared with families with young children.

^{lxii} As noted above, the data used in this component capture only household spending. Like MEPS data, they thus exclude some government spending that falls within “other consumption” and can be attributed to the ECS population, but the vast majority is included. For example, the federal Supplemental Nutritional Assistance Program (SNAP, formerly Food Stamps) provides basic food to millions of U.S. families. As discussed below, SNAP benefits that are used to purchase food are included in the consumption data, so adding federal SNAP expenditures would double-count.

^{lxiii} Although the data do not set out the amount spent for any one person, spending patterns can compare families of similar ages, income levels, and family structure, and assess based on variation in the number and ages of children.

^{lxiv} This description is based on documentation for the CE-Interview and CE-Diary. The PDFs were accessed at <http://www.bls.gov/cex/2007/csxdairy.pdf> and <http://www.bls.gov/cex/2007/csxintvw.pdf>. Detailed information on the data, including how it is collected, is available in Appendix 3.

^{lxv} The premise is that small items that might be forgotten over the course of three months – toothbrushes, over-the-counter medicines and the like – are more likely to be captured through the diary portion of the CE survey. The two pieces of the survey are then pulled together by BLS to produce the “whole picture” of consumer spending. A full account of the survey methods and combining of the two parts is provided in Appendix 3.

^{lxvi} Each year since 1960, the Center for Nutrition Policy and Promotion of the US Department of Agriculture has released a report that uses a regression-based methodology and literature on how expenditures are associated with different age groups to distinguish spending on young children and other household members. The most recent, published in 2009 and reported in 2008 dollars, is based on the 2005-2006 Consumer Expenditure Survey Interview.

^{lxvii} This does not include expenditures made by anyone other than the parent, causing significant under-estimation of economy-wide spending on ECE and on Health Care and making necessary those separate analyses.

^{lxviii} Because there is slight overlap among the categories, we exclude some items that are of negligible value, which makes the report’s estimate of ECS value slightly more conservative. See the Appendix for more detail.

^{lxix} Details on those methodologies are available in Appendix 3. The two categories of particular interest – housing and transportation – were based on specific assumptions that are also discussed.

^{lxx} This required assuming that the USDA analysis was generalizable to children living with teenage parents or with other non-parent caretakers.

^{lxxi} See Appendix 3, Table 3.2X, for breakdowns of family expenditures by families with and without children, and comparing families with B-5 versus older children.

^{lxxii} These dollar values, reported in 2007 \$ by the USDA report, represent “average” income. See p.14 of the PDF:

<http://www.cnpp.usda.gov/Publications/CRC/crc2008.pdf>.

^{lxxiii} USDA Economic Research Service: Food Security in the United States: Key Statistics and Graphics. Downloaded from:

http://www.ers.usda.gov/Briefing/FoodSecurity/stats_graphs.htm.

^{lxxiv} According to Jim Weill of the Food Resource and Action Center (FRAC), “more than 35.8 million Americans used food stamps in July [2009], nearly 6.8 million more than a year earlier.” Szabo 2009.

^{lxxv} *Id.*

^{lxxvi} Washington University in St. Louis professor Mark Rank, quoted in Szabo 2009.

^{lxxvii} Roy 2008.

^{lxxviii} Eckholm 2008.

^{lxxix} National Center on Family Homelessness 2008.

^{lxxx} It might be argued that our approach of taking relatively conservative estimates of value for each component has biased our estimated total downward. However, our sensitivity analyses suggest that a less conservative estimate might increase economic value by 10-20 percent, which would raise the total for children B-5 to between 3.1 and 3.4 percent, still well less than half the population share.

^{lxxxi} Brandon, R. N. & I. Martinez-beck, I.,

Estimating the Size and Characteristics of the US Early Care and Education Workforce. In M. Zaslow & I. Martinez-Beck, eds., Critical Issues in Early Childhood Professional Development and Training. Brooks Publishing Company, 2005.

^{lxxxii} Note that this chapter was written prior to the 2010 health care reform legislation.

^{lxxxiii} Harry Holzer, Diane Whitmore Schanzenbach, Greg J. Duncan, and Jens Ludwig (2007), “The Economic Costs of Poverty in the United States: Subsequent Effects of Children Growing Up Poor.” National Poverty Center Working Paper #07-04.