

**The early childhood care and education workforce from 1990 through 2010:
Changing dynamics and persistent concerns**

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ABSTRACT

Despite heightened policy interest in early childhood care and education (ECCE), little is known about the ECCE workforce today or the extent to which this workforce has changed over a period of substantial investment in this sector. Using nationally-representative data, this paper fills this gap by documenting changes between 1990-2010 in the educational attainment, compensation and turnover of the ECCE workforce. We find that the national ECCE workforce remains a low-education, low-compensation, and high-turnover workforce. At the same time, the average educational attainment and compensation of ECCE workers increased substantially over the past two decades and turnover decreased sharply. We document a major shift in the composition of the ECCE workforce towards center-based settings and away from home-based settings. Surprisingly however, this shift towards more regulated settings *is not* the primary driver of the observed changes in the ECCE workforce. We show that improvements in the characteristics of the ECCE workforce were driven primarily by changes *within* sectors and, contrary to our expectations, we show that the home-based workforce, which faces the least stringent regulations, experienced the most improvement over the period examined, though home-based workers remain substantially different from formal care workers.

INTRODUCTION

In the United States, most children under age five receive regular care by someone other than their parents (U.S. Census Bureau 2010; Bassok 2010). Early childhood experiences play a central role in shaping subsequent developmental trajectories, and the impact of these early experiences depends largely on the quality of caregivers and teachers (Shonkoff and Phillips 2000; Peisner-Feinberg et al. 2001; Knudsen, Heckman, Cameron and Shonkoff 2006; Hamre and Pianta 2006; National Scientific Council on the Developing Child 2004, 2007).

Growing recognition of the importance of early childhood care and education (ECCE) in general, and of ECCE providers in particular, has heightened policy interest in strengthening the quality of the ECCE workforce. In 2011, the federal government funded the Race to the Top Early Learning Challenge, a competitive grant program to support states' efforts to improve early childhood education programs, and identified "supporting a great early childhood education workforce" as one of five key areas of reform. The latest reauthorization of the federal Head Start program requires that fifty percent of Head Start teachers hold a Bachelor's degree (BA) in child development or a related field by 2013 (Barnett et al. 2010). Further, 25 states are operating or developing Quality Rating and Improvement Systems (QRIS) to assess and improve the quality of ECCE, and many of these QRIS programs offer financial incentives to providers that invest in their employees' education and training (Tout et al. 2010).

Despite the interest in the improvement of this sector, we know relatively little about the current state of the ECCE workforce, and even less about the extent to which this workforce has changed over time. It is well documented that the ECCE workforce is

characterized by low levels of education, wages and stability (Brandon, 2011; Howes, Phillips and Whitebook 1992; Cost, Quality and Outcomes Study Team 1995; NICHD Early Child Care Research Network 2000; Vandell and Wolfe 2000; Committee on Early Childhood Care and Education Workforce; Institute of Medicine and National Research Council 2012). For instance, the average annual income of paid ECCE workers in 2009 ranged from \$11,500 for those working in a child’s home to \$18,000 for preschool teachers (U.S. Government Accountability Office 2012).⁵ However, while studies have documented the low education, wages and stability of ECCE workers using a variety of data sources, the diverse and dispersed nature of the industry makes systematic analysis difficult. A recent report of the National Research Council describes how the lack of comprehensive data tracking the characteristics of the ECCE workforce seriously limits policy makers’ efforts to facilitate change or track improvements over time (ADD CITATION).

Over the past twenty years utilization of “formal” ECCE services such as preschool and Head Start has increased rapidly. This increase has led to a decline in the share of workers employed in more “informal” home-based settings, such as family childcare homes (Bassok, Fitzpatrick and Loeb 2012). Given that the home-based sector faces much less stringent regulations than the formal sector, and is often singled out for providing the lowest-quality care– the shift towards formal care may have translated into overall improvements in the ECCE workforce over time. Unfortunately, attempts to describe the evolution of the ECCE workforce have been limited due to the paucity of data that allows

⁵ Education and turnover statistics present a similar picture. For instance, turnover in California child care centers between 1996 and 2000 was estimated at about 75 percent (Whitebook et al. 2001) and another study surveying child care centers in Iowa, Kansas, Nebraska and Missouri, found that 40 percent of caregivers intended to leave the ECCE industry within less than five years (Torquati, Raikes and Huddleston-Casas 2007).

for reliable comparisons of the workforce over time (Saluja, Early and Clifford 2002; Brandon and Martinez-Beck 2006; Kagan, Kauerz and Tarrant 2008).

The few studies that *have* examined the evolution of the ECCE workforce over time actually suggest that the qualifications of the workforce have either changed only modestly or have declined (Whitebook et al. 2001; Saluja, Early and Clifford 2002; Herzenberg, Price and Bradley 2005; Bellm and Whitebook 2006). However, these studies do not employ nationally representative data and/or focus only on a single sector of the ECCE industry, typically childcare centers. The lack of knowledge about changes within the home-based workforce represents a particularly relevant gap in the literature, given that this sector accounts for about a third of the national ECCE workforce (U.S. Government Accountability Office 2012).

In this policy brief we make use of nationally-representative data that encompass workers in *all three* ECCE sectors –centers, homes and schools– to address three questions:

- (1) What are the characteristics of the ECCE workforce as of 2010?
- (2) How did the characteristics of this workforce change between 1990 and 2010?
- (3) To what extent are the overall changes driven by a change in the relative importance of each sector (centers, homes, schools), and to what extent are they explained by changes in the characteristics of the workforces within each sector?

We focus on four outcomes to gauge the wellbeing of the ECCE workforce and plausibly proxy for ECCE quality: (1) the educational attainment of workers; (2) their compensation; (3) the extent to which workers exit the industry over a year; and (4) the occupational prestige of those who enter the ECCE workforce each year from other occupations. Improvements along these dimensions are likely to reflect an increased ability

to attract and retain qualified workers into the ECCE industry, and in turn may imply higher quality experiences for young children.⁶

We find that the “low-education, low-compensation, high-turnover” characterization of the national ECCE workforce continues to be valid. At the same time, we show that the average educational attainment and compensation of the ECCE workforce increased between 1990 and 2010, and that turnover from the ECCE industry decreased substantially. Our results differ from earlier studies that highlight negative or stagnant trends in the ECCE workforce. These differences are likely explained by our focus on a more recent period of analysis and our use of national data including workers from all three child care sectors. We also show that changes in the characteristics of the national workforce are mostly explained by changes in the characteristics of workers *within* each sector and less so by the shift toward center- and school-based settings. Surprisingly, we find that changes along all dimensions analyzed were most pronounced among home-based workers.

DATA

We analyze data from the March Supplement of the Current Population Survey (CPS), a nationally representative household survey that is administered every month by the U.S.

⁶ While ideally we could also assess changes over time in direct measures of caregiver quality, national data tracking such measures over time are not available. Several studies have sought to determine whether there is a causal relationship between our proxies and the quality of care children experience. The evidence here is mixed. As described above, improvements in teachers’ educational attainment are often pursued as a strategy to improve quality, and some studies suggest that, over some range, higher levels of education are related to better classroom practices (Blau 2000). On the other hand, Early (2007) raises doubts about the relationship between specific degrees and child outcomes. Higher wages are associated with better classroom practices and lower turnover from ECCE jobs (Blau 2000; Whitebook and Sakai 2003). While we are not aware of studies investigating the impact of industry turnover on children’s development, the few studies on the role of *job* turnover show that children who spend more time with their caregiver, and those who do not experience a change in the primary caregiver over the course of a year, establish more nurturing relationships with their caregiver and exhibit better cognitive outcomes (Elicker, Fortner-Wood and Noppe 1999; Tran and Winsler 2011).

Census and the Bureau of Labor Statistics. Using the Census 1990 and 2002 Industry and Occupational Codes, we identify ECCE workers and disaggregate this broad group into center-, home-, and school-based workers. We purposefully implement a broad and inclusive definition of the industry. Specifically, our center-based category includes all workers who (1) are not self-employed; (2) work in either the “child day care services” industry, or have child care occupations (e.g., “child care workers”, “pre-kindergarten or kindergarten teachers”, “early childhood teacher’s assistants”); and (3) work in an industry other than “elementary and secondary schools”, “private households”, “individual and family services”, or “family child care homes”.⁷ Our definition of the home-based ECCE workforce includes (1) all self-employed individuals who report that they work in the “child day care services” industry; (2) all those employed in the “family child care homes” industry; (3) those who have child care occupations (e.g., “child care workers”, “private household child care workers”, “pre-kindergarten or kindergarten teachers”, “early childhood teacher’s assistants”) and are employed in the “private households” or “individual and family services” industries; and (4) those who have child care occupations and are self-employed in other industries except for “elementary and secondary schools”.⁸ Finally, we define the school-based ECCE workforce as “pre-kindergarten and kindergarten teachers” and “early childhood teacher assistants” employed in the “elementary and secondary schools” industry. We observe whether each respondent was an ECCE worker in

⁷ On average over the period 1990-2010, 82.8 percent of individuals identified as center-based ECCE workers were employed in the “child day care services” industry; the remaining 17.2 percent were in other industries.

⁸ Our “home-based workforce” includes all individuals who take care of a relative, friend, or neighbor’s child, who report this to be their job. The CPS relies on self-reports and some relatives, friends and neighbors who assume child care responsibilities may not report this as a job and will therefore be excluded from our analysis. To the extent that those who fail to report their employment may differ in important way from those who do identify this way, our characterization may suffer from bias.

the week of reference and whether their longest job in the previous calendar year was an ECCE job.

The workforce characteristics that we analyze are measured as follows:

Educational attainment: The CPS collects information about each household member's highest level of education as of the week of reference. In keeping with prior studies, we describe changes in the share of ECCE workers with less than a high school degree, exactly a high school degree, at least some college education but no BA, and at least a BA.⁹

Compensation: We observe each individual's annual earnings from the longest job held in the previous calendar year. We describe the mean annual earnings of those whose main job in the previous calendar year was an ECCE job. We also estimate the hourly earnings of these workers, but here restrict our analysis to those who were full-year workers in the previous calendar year.¹⁰ We express both earnings variables in 2010 dollars.

Individuals also report whether any employer helped pay for a pension and/or health plan in the previous calendar year. We use this information to construct the share of ECCE workers that received this non-salary form of compensation. Here we restrict our sample to workers whose main job in the previous calendar year was an ECCE job, and, in

⁹ Information on educational attainment is available from 1992 to 2010. Most other workforce characteristics are available for 1990 to 2010. The exception is information on earnings and benefits available from 1990 to 2009.

¹⁰ We make this restriction because the CPS collects information about hourly wages only for a subsample of the March interviewees which excludes all self-employed individuals, thus excluding a large proportion of home-based workers. Rather than excluding home-based workers in our analysis, we estimated hourly wages of ECCE workers based on their annual earnings and their reported hours worked in a typical week. Because the CPS does not specify the number of weeks worked in the past year, we limited analysis to full-year workers for whom we assumed 50 weeks of work (see technical appendix for more details). Note that our estimates therefore apply only to those ECCE workers who were employed on a full-year basis (i.e. those who worked 9 months or more). These represent 46 and 65 percent of those workers who in 1990 and 2010, respectively, reported that their main job in the previous year had been an ECCE job. The subset of full-year ECCE workers appears to be slightly more educated than the aggregate ECCE workforce, although the differences between the two groups are not statistically significant. Still, our estimation may overestimate the hourly earnings of the aggregate workforce.

order to be sure the benefits were received from an ECCE employer, include only those workers who reported they had only one employer in the previous calendar year.¹¹

Year-to-year industry turnover: To measure child care industry turnover rates, we exploit the fact that the CPS provides information about an individual's industry and occupation both in the week of reference and for the longest job held in the previous calendar year. Among individuals whose main job in the previous calendar year was an ECCE job, we estimate the industry turnover rate as the share of those who were no longer in the ECCE workforce during the week of reference. An analogous method is used by Harris and Adams (2007) to measure turnover from elementary and secondary teaching. We can calculate industry turnover with the CPS from 1990 to 2010. Our measure only captures whether individuals remained in the ECCE workforce; among those that remain, we cannot distinguish whether individuals changed jobs. Thus, year-to-year industry turnover is a lower bound estimate of the level of instability experienced by children.

Occupational prestige of entrants into the ECCE workforce: We combine the information on a worker's occupation provided by the CPS with the widely used methodology developed by Charles Nam and colleagues (Nam 2000; Nam and Boyd 2004), to create a variable that assigns each new entrant to the ECCE workforce a score based on the occupational prestige of their previous job. A particular occupation's prestige score is constructed by comparing the median earnings and educational attainment of workers in that occupation vis-à-vis the earnings and education of workers in all other occupations. An

¹¹ Among all workers whose main job in the previous calendar year was an ECCE job, the proportion who had only one employer increased from 75 percent in 1990 to 84 percent in 2010. Throughout the whole period, these workers earn about 5% more than those whose main job in the previous calendar year was also an ECCE job but who had more than one employer. Thus our analysis may overestimate the share of workers with non-salary benefits in the aggregate ECCE workforce.

occupation's score can range from 0 to 100, and reflects the percentage of individuals in the labor force who are in occupations with combined levels of education and earnings below that occupation. We use these scores to examine the average occupational status of individuals whose main job in the calendar year before the survey was outside the ECCE industry, but who were ECCE workers in the week of reference. Increases in this occupational measure over time imply that those who are entering the ECCE workforce are coming from better educated and better paid occupations than those who were entering the workforce in previous years.

As researchers have long pointed out, existing datasets fail to fully and accurately capture the complexity of the ECCE workforce over time (Committee on Early Childhood Care and Education Workforce; Institute of Medicine and National Research Council 2012; Bellm & Whitebook, 2006; Phillips and Whitebook, 1986). Although the CPS is well-suited for nationally representative analysis tracking trends over time, it has a number of key limitations: (1) it relies on self-reported data on employment, and therefore likely excludes many unpaid ECCE workers and some paid family, friends and neighbors who take care of children but do not report child care as their occupation; (2) it does not enable us to distinguish between preschool and kindergarten teachers, or more generally, to distinguish ECCE workers by the age of the children they serve; and (3) it does not collect detailed data that are relevant to characterize ECCE workers, such as the level of ECCE-specific training, the responsibilities they have, or the quality of their interaction with children. We return to these limitations in discussing the generalizability of our results.

METHODS

To address our first and second research questions, we present the variables of interest in 2010, and discuss their change over the period 1990-2010. We assess whether trends in the ECCE workforce differ from broader trends in the economy by comparing changes in that workforce to changes among two comparison groups: all female workers and low-wage workers.¹² To address the third research question, two sets of simulations allow us to disentangle the extent to which the overall changes in the ECCE workforce are explained by an increase in the relative size of the more regulated ECCE sectors or by changes in the workforce within each sector.¹³ Given the relatively small sample size of the CPS in each year, for all analyses we use three-year moving averages to increase the precision of our estimates.

RESULTS

The ECCE workforce as of 2010

We find that the “low-education, low-compensation, high-turnover” label continues to be a valid characterization of the 2.2 million ECCE workers represented in our sample. As

shown in [Table 1](#), in 2010, nearly 40 percent of the ECCE workforce had at most a

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¹² Female workers are a relevant comparison group as females comprise the vast majority of ECCE workers. Based on our calculations, over 95 percent of ECCE workers over the period of analysis were women. The low-wage worker comparison includes workers from the main industries from which ECCE workers come when they enter the child care industry, as well as to which ECCE workers migrate when they leave the ECCE workforce. We consider the following industries: beauty salons, food services, entertainment and recreation services, grocery stores, department stores, and non-teaching jobs in elementary and secondary schools (e.g., bus drivers, cooks, janitors, teacher aides, secretaries and administrative assistants). Together, over the full period of the study, these industries represent about a third of migration from another industry into child care, and from child care to another industry.

¹³ First, we estimate what the overall change in the ECCE workforce’s characteristics would have been had the distribution of the workforce across the three sectors (center, homes and schools) changed as it did, but assuming that the characteristics of workers within each sector remained the same as in 1990. Then, to estimate the part of the overall change that is driven by changes in the characteristics of workers *within* each sector, we estimate what the overall change in the workforce’s characteristics would have been had the characteristics of the workers within each of the sectors changed as they did, but assuming the distribution of the workforce across the sectors remained the same as in 1990. The equations used for these simulations are provided in the Technical Appendix.

high school degree and a third of the workforce had some college but no Bachelor's degree. In 2009, the average ECCE worker earned an annual income of \$16,215 and an hourly wage of \$11.7, and only 28 percent of ECCE workers received a pension and/or health benefits from their employer.¹⁴ Worryingly, about a fourth of those workers who had been employed in the ECCE industry in 2009 were no longer that industry by 2010. Further, our analysis of the occupational prestige of entrants suggests that ECCE was a relatively unattractive industry to enter in 2010, attracting individuals from occupations that on average had lower levels of education and earnings than three fifths of the country's labor force.

The disaggregated results shown in Table 2 highlight stark differences across sectors. In 2010, about 56 percent of ECCE workers were employed in center-based settings; 26 percent, in home-based settings; and 18 percent, in schools. Consistent with evidence from prior studies, we find that the school-based workforce exhibits the highest levels of formal education, compensation, and stability, while the home-based workforce exhibits the lowest. The center-based workforce falls in the middle, but is more similar to the home-based than to the school-based workforce. For instance, 17.1 percent of school-based workers have at most a high-school degree. This proportion ascends to 39.8 percent and 50.7 percent among center- and home-based workers, respectively. Similarly, while school-based workers earn an average annual income of \$27,014, center workers earn on average just over half this amount (\$14,567) and the annual earnings of home-based workers are even lower (\$12,415). Finally, while 13.6 percent of those who were school-

¹⁴ Recall also that these figures likely *overestimate* the true compensation of the full ECCE workforce, due to our sampling restrictions (e.g. hourly wages are calculated based on full-year workers, benefits are calculated based on workers with only one job in the past year).

based ECCE workers in 2009 had left the ECCE industry by 2010, the industry turnover rate among center- and home-based workers in 2010 was 24.4 and 28.5 percent, respectively.

Changes in the characteristics of the ECCE workforce in 1990-2010

The very low levels of formal education, compensation and stability among the ECCE workforce warrant concern. However, as Table 1 indicates, we also find meaningful signs of improvement. In fact, among the ECCE workforce as a whole we show that all of the characteristics analyzed –education, compensation, turnover and prestige of entrants– exhibited significant and substantial changes in the direction hypothesized to improve ECCE quality.¹⁵

As shown in [Figure 1](#), the share of ECCE workers with at least some college education rose from 47 to 62 percent between 1992 and 2010. Mean annual earnings increased by 51 percent, from \$10,746 to \$16,215 between 1990 and 2009. While part of this increase was driven by an increase in the number of hours worked by ECCE workers,¹⁶ the mean hourly earnings of ECCE workers also increased substantially over that period (by 33 percent, from \$8.8 to \$11.7 per hour), and so did the share of ECCE workers with employer-paid pension and/or health benefits (from 19 to 28 percent). Annual turnover from the ECCE industry decreased substantially over the period of analysis (from 32.9 percent in 1990 to 23.6 percent in 2010). Finally, individuals who moved into child care from other occupations in 2010 came from somewhat more prestigious occupations than those who moved into child care in 1990. The average occupational prestige score of ECCE

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¹⁵ The changes in educational attainment, compensation and industry turnover that we discuss throughout are statistically significantly different from zero at the 5 percent level. Changes in the occupational prestige score of ECCE entrants are significantly different from zero at the 15 percent level. Note that the analysis of average occupational prestige scores applies only to individuals who entered the ECCE workforce in a given year. This is a very small sample, so we evaluate significance at the 5, 10 and 15 percent levels.

¹⁶ The mean hours worked per week increased from 29.9 to 31.8 between 1990 and 2010.

entrants increased by 4.7 percentile points over this period, from 37.6 to 42.3, perhaps indicating an improvement in the ECCE industry's ability to attract more qualified workers.

The changes observed among the ECCE workforce do not simply reflect trends in the female labor force and/or in low-wage industries. Compared to female workers, the ECCE workforce exhibited a larger increase in compensation and a steeper decline in industry turnover; and compared to low-wage workers, *all* variables exhibited a larger improvement among ECCE workers. Further, the changes observed reflect a stable trend within the industry and are not the product of the economic crisis that began in 2008.¹⁷

Sector-specific changes?

In Table 2 we show that the overall improvements seen in this workforce are driven by improvements among home-based workers, and to a lesser extent center-based workers. In the home-based sector, the average educational attainment, compensation and industry turnover of workers improved significantly and substantially over the period of analysis. With respect to educational attainment, there was a significant increase in the share of workers with at least some college (by 21.4 percentage points (p.p.)), and a significant decrease in the share of workers with less than a high school degree (by 17.8 p.p.). The average annual and hourly earnings of home-based workers increased by 92 and 50 percent, respectively, and the share of home-based workers with pension or health benefits rose as well (by 4.5 p.p.). Finally, industry turnover declined among home-based workers (by 8.4 p.p., from 36.9 percent in 1990 to 28.5 in 2010).

¹⁷ One plausible hypothesis is that the observed improvements in ECCE workers' qualifications and stability are the product of the economic crisis. However, in supplementary analysis available upon request, we explored whether there were changes in trends following the economic crisis that began in 2008. We find no evidence to support this claim and, if anything, our results suggest that the improvement in ECCE workers' characteristics was stalled or reversed during the crisis period.

Changes within the center-based sector also suggest improvements over time, but these changes are of a smaller magnitude. For instance, between 1990 and 2009, the average annual earnings among center-based ECCE workers increased by 35 percent and average hourly earnings rose by 18 percent. Industry turnover rate dropped significantly, from 34 percent in 1990 to 24.4 percent in 2010. Other characteristics appear to change in a direction consistent with improvement, although the changes are not statistically significant. Differences remain between the sectors with respect to all the characteristics analyzed, but the pronounced changes within the home-based sector imply a narrowing of the gap with respect to the other two sectors.

Expansion of formal care as an explanation for gains?

As shown in the fourth panel of Figure 1, between 1990 and 2010 there was a significant change in the relative importance of the ECCE sectors in accounting for the size of the aggregate workforce. The relative importance of home-based workers declined sharply (by 21.8 p.p.), compensated mostly by an increase in the relative importance of center-based workers (by 17.5 p.p.). Although the relative importance of school-based workers increased only slightly (by 4.3 p.p.), the *number* of workers in this sector increased by 45 percent over this time period, a trend consistent with both the expansion of state pre-kindergarten programs and the shift towards full-day kindergartens. The number of center-based workers also increased dramatically (by 61 percent), while the number of home-based workers decreased (by 39 percent). This redistribution of ECCE workers from child care homes to centers and schools is consistent with the recent decline in the share of children under age five whose main child care arrangement is in a home setting (U.S. Census Bureau 2010).

As discussed above, home-based workers have far lower levels of education and compensation and higher levels of industry turnover than do center- or school-based workers. The decline in the relative importance of home-based workers is one plausible explanation for the observed increase in the educational attainment, compensation and stability of the national ECCE workforce. However, changes in these characteristics *within* sectors are also relevant – and, in fact, more relevant than the changes in the distribution the workforce across sectors.

We decompose aggregate changes in the ECCE workforce into the part explained by the expansion of the formal sector and the part explained by changes in the characteristics of workers within the sectors. We present the estimations in Panel A of Table 3. While both factors contribute to the overall change, for most variables (educational attainment, annual and hourly wages, and industry turnover), changes *within* the sectors explain most of the aggregate improvement, with changes in the relative importance of the sectors explaining only a small portion of the overall improvement. For example, increases in earnings within sectors explain 78 percent of the overall increase in annual earnings, while the redistribution of workers across sectors explains only 22 percent. Similarly, within-sector changes explain 86 percent of the decline in industry turnover.

Further, as reported in Panel B of Table 3, changes within the home-based workforce explain most of the change in educational attainment and earnings that is attributable to within-sector changes. Indeed, improvements within the home-based sector drive over two thirds of the increases in the ECCE workforce’s educational attainment.

DISCUSSION

This policy brief highlights the current state of the ECCE workforce and explores whether this workforce has experienced meaningful changes over a period characterized by heightened interest and investment in early childhood programs. Echoing earlier work, we find that this labor force continues to be characterized by very low levels of education, compensation and stability. However, we also show that both the educational attainment and the compensation of the ECCE workforce increased meaningfully between 1990 and 2010 and that turnover from the ECCE industry decreased substantially. Taken together the findings are mixed, highlighting both improvements over time and the persistence of troubling issues. For example, our data show that in 1992 ECCE workers with a BA earned 47 percent less than elementary school teachers with the same educational level. Despite the significant increases in both educational attainment and earnings among ECCE workers that we document in this paper, in 2009 ECCE workers still earned 38 percent less than elementary school teachers. Given our increased understanding of the importance of early childhood interventions and of high-quality ECCE providers, these patterns are concerning. However, the positive trends we document suggest that substantial changes in this workforce are in fact taking place.

It is worth noting that the positive trends we document differ significantly from those reported in prior studies, which document a *decline* or modest change in the educational attainment and compensation of the ECCE workforce. One explanation is that prior studies have generally focused on the center-based workforce and have not accounted for the evolution of the home-based workforce, where we find meaningful improvements (Whitebook et al. 2001; Saluja, Early and Clifford 2002; Herzenberg, Price and Bradley 2005; Bellm and Whitebook 2006).

A second explanation is that our study makes use of more current data than earlier work. For instance, an earlier study that relies on the same data used here but tracks the center-based workforce only through 2003 reports a *decline* in the proportion of that workforce that holds a BA (Herzenberg, Price and Bradley 2005). We replicate that finding here, but show that between 2004 and 2010 this trend is reversed. Overall we do not observe significant changes (either increases or decreases) in the educational attainment of the center-based workforce over the period 1990-2010, but document significant improvements in the compensation and stability of this workforce.

We also document a dramatic reconfiguration of the ECCE workforce, such that the majority of workers now work in formal rather than home-based settings. Surprisingly, however, we show that the shift away from home-based care and towards center-based settings is not the primary explanation for the improvements observed in the industry at large. In fact, most of the improvements in the ECCE workforce are explained by *within-sector* improvements in the characteristics of workers. Further, while the center-based workforce exhibited significant increases in earnings and a remarkable decline in industry turnover, improvements within the home-based workforce were the primary driver of the increase in the educational attainment and earnings of the aggregate ECCE workforce.

These findings –that the overall improvement of the ECCE workforce was primarily driven by improvements within the home-based workforce– are surprising in light of the policy emphasis on expanding and improving formalized ECCE settings such as preschools and pre-kindergarten programs over informal settings. Improvements within the home-based workforce may be the result of recent efforts to increase the qualifications and stability of these workers. For instance, recent initiatives reward participation in

professional development and the acquisition of further education; supplement the wages of home-based workers to ensure they meet a locally-determined minimum living wage, and facilitate the provision of employer-sponsored health plans by pooling together workers from different child care centers and homes (Kagan, Kauertz and Tarrant 2008). Still, further study is needed to understand what has driven the observed improvement in the education, compensation and stability of home-based workers, to understand how to continue this positive and unexpected trend.

Study limitations

While the current study provides new evidence about the current status of the ECCE workforce and its changing nature over the past two decades, the CPS was not designed to study the ECCE industry and several of its limitations are worth highlighting:

First, the CPS, while commonly used in analyses of workers, relies on self-reported data. To the extent that certain segments of the ECCE workforce are less likely to report their employment, our estimates will not accurately generalize to the ECCE workforce in its entirety. Further, if these non-reporters have lower earnings and educational attainment than do other workers, our findings will overestimate conditions in this industry, a troubling point given the already low levels we document. While we are unable to assess the extent of non-reporting in our sample, it is likely we exclude some portion of the informal sector including unpaid workers, paid workers who do not report taxes, or paid family, friends and neighbors who despite assuming child care responsibilities do not report it as a job. These informal settings represent a meaningful portion of the market, and more nuanced data are necessary to better understand the composition of this group.

Second, the CPS does not provide direct measures of care quality and thus cannot be used to assess whether and how more proximal measures of care quality have changed. While our outcomes provide a clear picture of the economic status of the ECCE workforce, an important issue in its own right, ultimately policymakers wish to improve early childhood experiences for children and the relationship between each of these measures and care quality is not as well understood as we would like. It is difficult to know, for example, to what extent changes in earnings over time amount to better care for young children. We have interpreted our findings as indicative of improvements in the quality of the ECCE workforce, but a competing hypothesis is that the increase in ECCE workers' compensation and the reduction of turnover reflect an increase in the demand for ECCE services, without a corresponding improvement in the actual quality of these workers. Additional work investigating the link between structural measures such as the ones available in administrative datasets would help here.

Third, our statistical inferences are limited by our small sample size. Each March, the CPS surveys around 670 center-based workers, 530 home-based workers and 230 school-based ECCE workers. Using three-year moving averages, we were able to describe the evolution of the center- and home-based workforces with reasonable precision. However, our sample size was too small to make reliable inferences about the evolution of the school-based workforce.

Finally, the CPS cannot be used to distinguish between ECCE workers who work with infants and toddlers, and those who work with preschoolers. Similarly we are unable to distinguish between pre-kindergarten and kindergarten employees. Data that allows for

these types of delineations would better allow us to unpack trends and begin to understand the mechanisms driving these patterns.

Conclusion

While our findings echo other recent work on the low levels of earnings and education within the ECCE workforce, our findings also shed an optimistic light on the possibility of positive improvements. We show that the qualifications, compensation and stability of the ECCE workforce can improve, and in fact have improved meaningfully over the past two decades. The decline in turnover from the ECCE industry has been particularly marked. While some degree of turnover may be desirable in order to replace ineffective workers, the annual ECCE industry turnover rate in 1990 was 32.9 percent, roughly three times higher than the industry turnover rate of 11 percent observed among elementary and secondary education teachers. By 2010, however, the gap between the two had narrowed significantly, owing to the reduction in turnover among ECCE workers. To our knowledge, ours is the first study to look at the evolution of turnover for a nationally representative sample of the ECCE workforce. While we are unable to observe job turnover, which is a more proximal measure of the instability children experience, industry turnover is an important measure in its own right, showing that individuals are staying within the industry longer than they did in the past which may translate to positive outcomes for children and may indicate that early childhood jobs are more attractive than they once were.

The improvements we have identified for ECCE workers have taken place within both the center- and home-based sectors, which together account for over eighty percent of the workforce. Improvements within home-based child care have been particularly

remarkable. To the extent that the characteristics we analyzed are, in fact, proxies of ECCE quality, our findings imply a narrowing in the quality gap between home-based and other more formalized types of child care. This finding is important because as recently as 2005, the home-based sector, historically singled out as the lowest-quality sector within child care, served around forty percent of children under five years whose mothers were employed (U.S. Census Bureau 2010), and there is some evidence that it is the preferred type of arrangement among Hispanic families (Fuller, Holloway and Liang 1996; Liang, Fuller and Singer 2000; Fuller 2008). Put differently, workers in childcare homes remain substantially less qualified than workers in the formal childcare sector, but the trends we observe suggest that closing the quality gap between the sectors is possible.

Figure 1. Evolution of selected characteristics of the ECCE workforce, and of the relative importance of each ECCE sector, over time (1990-2010)

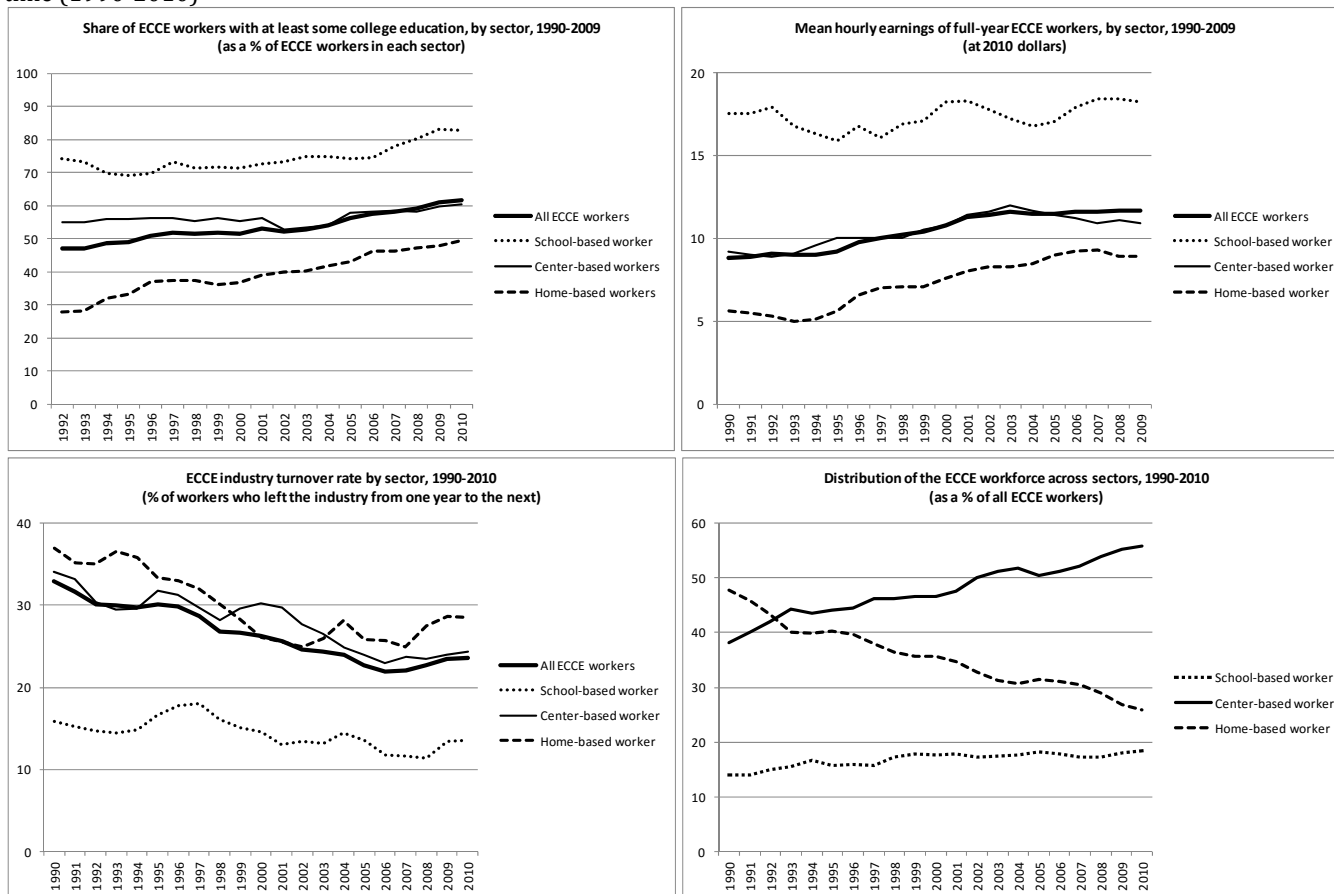


Table 1. Evolution of the ECCE workforce, and comparison to female and low-wage workers (1990-2010)

	1992	2010	2010 vs. 1992
Distribution of the workforce by educational attainment			
<i>ECCE workers</i>			
Less than high school	21.4	11.5	-9.9 *
High school degree	31.5	26.9	-4.6 *
Some college or Associate's degree	26.1	33.3	7.2 *
At least a Bachelor's degree	20.9	28.4	7.5 *
<i>Female workers</i>			
Less than high school	11.5	8.1	-3.4 *
High school degree	36.0	26.4	-9.6 *
Some college or Associate's degree	29.2	31.9	2.7 *
At least a Bachelor's degree	23.2	33.6	10.4 *
<i>Low-wage workers</i>			
Less than high school	20.5	17.0	-3.5 *
High school degree	38.9	33.5	-5.4 *
Some college or Associate's degree	26.7	31.1	4.4 *
At least a Bachelor's degree	13.9	18.4	4.5 *
	1990	2009	2009 vs. 1990
Mean annual earnings of all workers (at 2010 dollars)			
<i>ECCE workers</i>	10,746	16,215	51% *
<i>Female workers</i>	24,427	30,629	25% *
<i>Low-wage workers</i>	18,266	21,298	17% *
Mean hourly earnings of full-year workers (at 2010 dollars)			
<i>ECCE workers</i>	8.8	11.7	33% *
<i>Female workers</i>	16.3	19.0	17% *
<i>Low-wage workers</i>	13.4	14.2	6% *
Share of workers with pension and/or health benefits paid at least partly by the employer			
<i>ECCE workers</i>	19.0	28.0	9.0 *
<i>Female workers</i>	56.4	57.9	1.5 *
<i>Low-wage workers</i>	42.5	42.2	-0.3
	1990	2010	2010 vs. 1990
Industry turnover rate			
<i>ECCE workers</i>	32.9	23.6	-9.3 *
<i>Female workers</i>	24.7	17.9	-6.8 *
<i>Low-wage workers</i>	26.5	19.1	-7.4 *
Average occupational prestige in the year before entering the workforce			
<i>ECCE workforce enterers</i>	37.6	42.3	4.7
<i>Low-wage workforce enterers</i>	41.8	42.0	0.2

* denotes change with respect to 1990 or 1992 is statistically significantly different from zero at the 5% level.

Changes in the share of workers by educational attainment, the share with pension and/or health benefits, and the industry turnover rate are measured in percentage points; changes in annual and hourly earnings, as a percent change; and changes in the average occupational prestige score of those entering the ECCE workforce, in percentiles.

Source: Authors based on the March Supplement of the Current Population Survey.

Table 2. Evolution of the ECCE workforce by sector (1990-2010)

	Center-based workers		Home-based workers		School-based workers	
	1992	2010	1992	2010	1992	2010
<i>Distribution of the workforce by educational attainment</i>						
Less than high school	12.3	9.8	37.6	19.8 *	5.3	5.1
High school degree	32.7	30.0	34.5	30.9	20.6	12.0 *
Some college or Associate's degree	33.3	36.6	21.8	34.3 *	17.5	21.7
At least a Bachelor's degree	21.6	23.7	6.1	15.0 *	56.6	61.2
	1990	2009	1990	2009	1990	2009
<i>Mean annual earnings of all workers (at 2010 dollars)</i>	10,809	14,567 *	6,480	12,415 *	24,191	27,014
<i>Mean hourly earnings of full-year workers (at 2010 dollars)</i>	9.2	10.9 *	5.6	8.9 *	17.5	18.2
<i>Share of workers with pension and/or health benefits paid at least partly by the employer</i>	20.4	24.5	3.1	7.6 *	64.3	68.8
	1990	2010	1990	2010	1990	2010
<i>Industry turnover rate</i>	34.0	24.4 *	36.9	28.5 *	15.9	13.6
<i>Average occupational prestige in the year before entering the ECCE workforce</i>	41.3	44.6	32.3	33.4	51.4	54.1

* denotes change with respect to 1990 or 1992 is statistically significantly different from zero at the 5% level.

Source: Authors based on the March Supplement of the Current Population Survey.

Table 3. Decomposition of the overall changes in the characteristics of the ECCE workforce (1990-2010)

	Panel A				Panel B		
	Change attributable to changes in the characteristics of workers within the sectors		Change attributable to changes in the distribution of workers across sectors		Sector contributions to the part of the change attributable to changes in the characteristics of workers within the sectors		
	Center-based workers	Home-based workers	School-based workers				
	2010 vs. 1992				2010 vs. 1992		
Distribution of the workforce by educational attainment							
Less than high school	-8.8	(65%)	-4.7	(35%)	12%	88%	0%
High school degree	-4.0	(84%)	-0.8	(16%)	28%	39%	32%
Some college or Associate's degree	7.4	(84%)	1.4	(16%)	19%	73%	8%
At least a Bachelor's degree	5.4	(58%)	3.9	(42%)	16%	71%	13%
	2009 vs. 1990				2009 vs. 1990		
Mean annual earnings of all workers (at 2010 dollars)	42%	(78%)	12%	(22%)	37%	55%	8%
Mean hourly earnings of full-year workers (at 2010 dollars)	25%	(72%)	10%	(28%)	35%	60%	4%
Share of workers with pension and/or health benefits paid at least partly by the employer	4.3	(48%)	4.7	(52%)	41%	45%	14%
	2010 vs. 1990				2010 vs. 1990		
Industry turnover rate	-8.1	(86%)	-1.3	(14%)	53%	44%	4%
Average occupational prestige in the year before entering the ECCE workforce	2.1	(49%)	2.1	(51%)	58%	28%	14%

Changes in the share of workers by educational attainment, the share with pension and/or health benefits, and the industry turnover rate are measured in percentage points; changes in annual and hourly earnings, as a percent change; and changes in the average occupational prestige score of those entering the ECCE workforce, in percentiles.

Source: Authors based on the March Supplement of the Current Population Survey.

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