The 1990s Head Start Expansion and the Employment Decisions of Single Mothers

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Abstract

In the 1990s, the low-income preschool program, Head Start, experienced a tripling in funding and enrollment nearly doubled. For many low-income mothers, this expansion significantly subsidized the cost of childcare, potentially allowing more women to work. Also during this time, employment rates of single mothers rose dramatically. Often this rise in employment is attributed to changing tax policy (the Earned Income Tax Credit) and welfare reform, but it is unclear how much of this secular change can be attributed to changes in the availability of preschool through Head Start. In this paper, we exploit variation over time and across metropolitan areas in Head Start funding to estimate the impact of Head Start funding on female labor force participation. Increases in Head Start funding increased employment rates among single mothers with age-eligible children, relative to mothers with younger, ineligible children in the same area. This also resulted in more average weeks worked and higher wage earnings. Overall, the increased availability of Head Start can explain a small, but not negligible, share of the rise in single mother employment in the 1990s.

JEL: D13, H42, H52, I28, I38, J13, J18, J22

In the 1990s, the annual employment rates of single mothers in the United States rose by approximately ten percentage points (see Figure 1). These gains in employment were concentrated among single mothers with children under the age of six (see Figure 2) and single mothers with a high school degree or less (see Figure 3). A voluminous literature has been devoted to explaining this rise in employment, often finding the most important factors to be increases in the Earned Income Tax Credit (EITC) for low income households with children, welfare reform, and the booming economy.[1] Exploring many potential policy factors, Meyer and Rosenbaum (2001) suggest that the expansion of the EITC accounted for approximately 35 percent of the increase in annual employment among single mothers, while changes in welfare benefits accounted for approximately 8 percent. Although much of the rise in labor supply among single mothers during the 1990s can be attributed to changes in tax and welfare policy, nearly 20 percent of the rise remains unaccounted for (Meyer & Rosenbaum, 2001).

During the same time period, the United States congress expanded funding for Head Start preschool for low-income three- and four-year-olds and to a smaller extent Early Head Start for low-income infants and toddlers (see Figure 4). Starting with the Head Start Expansion and Quality Improvement Act of 1990, funding per age-eligible child nearly tripled over the next ten years. Accompanying the sizeable increases in funding was dramatic growth in enrollment. Head Start enrollment nearly doubled between 1989 and 1999 (see Figure 5). Beyond contributing to children's human capital formation in low-income households, Head Start expansion may have operated as a childcare subsidy for low-income single mothers with young children, potentially changing employment feasibility. In theory, public provision of preschool provides a subsidy for childcare. Because wages, net of employment costs such as childcare, rise with a subsidy, we

[1] See Blank, 2002; Cancian and Levinson, 2006; Dickert, Houser, and Scholz, 1995; Eissa and Hoynes, 2004, 2006; Eissa and Liebman, 1996; Hotz, Mullin, and Scholz, 2002; Meyer, 2002; Meyer and Rosenbaum, 2001

would expect some mothers to enter the labor market when a childcare subsidy is introduced. Additionally, when net wages reside near the reservation wage, which is often true for single-mothers, substitution effects dominate labor supply responses, and we expect that mothers would increase hours on the intensive margin as well.

In this paper, we determine whether increased funding and enrollment expansion of Head Start in the 1990s led to an increase in labor supply of less-educated single women. Further, we estimate how much of the secular rise in labor force participation of single mothers with young children through the 1990s can be explained by Head Start expansion. By exploiting close geographic variation in spending increases in a generalized fixed effects framework, we compare single women with 3- and 4-year-olds to single women with children under 3 to measure whether and to what extent funding amounts per child affect female labor supply. The geographic variation we exploit is not strongly correlated with the variation in EITC and welfare reform, suggesting Head Start can explain a substantial portion of the additional variation in employment rates over this period. Our findings suggest that the expansion in Head Start funding explains an additional seven percent of the increase in employment rates among single mothers with young children during the 1990s.

We combine data from several sources to measure effects. We construct metropolitan-level measures of Head Start expenditure per 3- and 4-year-old using the Consolidated Federal Funds Reports (CFFR). We link increases in expenditure to increased enrollment using the Current Population Survey (CPS) October education supplement and state-level head start enrollment data. Finally, we use the March CPS Annual Social and Economic Supplement (ASEC) between 1983 and 2000 to compare single mothers with age eligible children to other single mothers with dependent children within the same metropolitan area.

Consistent with Head Start expansion subsidizing childcare, we find that a $500 increase in per child Head Start spending increases pre-school enrollment in the CPS October supplement by 3.7 percentage points (8.6 percent). We also find that a $500 increase in per child Head Start spending increased annual employment rates by 2 percentage points among single mothers with young children, suggesting that the probability of being employed increased by 54 percent among single mothers when their child enrolled in preschool. Surprisingly, we find that mothers with both age eligible children and younger children in the home also respond. By comparing single mothers with eligible children to single mothers with ineligible children in the same metropolitan area, we account for region specific characteristics or trends that might have led to increased funding and also affected employment of single mothers. This approach is similar to a generalized triple difference, and estimates the causal impact of Head Start funding on employment as long as funding is not correlated with unobserved local characteristics that affect the employment decisions of mothers of three- and four-year-olds, but not mothers with only younger children. Our estimates are robust to individual controls, samples used, time varying demographic trends, and policy controls (such as the EITC and welfare reform).

Our work intersects with a growing literature exploring the effects of subsidized childcare provision on maternal labor supply. Research on mothers' labor supply suggest that from 1960 to 1990, prior to the Head Start expansion, single mothers without a younger child responded to kindergarten eligibility (Gelbach 2002) and the staggered roll out of kindergarten (Cascio 2009) by increasing labor supply. Recent research exploring maternal employment during the late 1990s and early 2000s, a decade after the Head Start expansion, suggests the effects of universal preschool and kindergarten enrollments on maternal labor supply were small at best and concentrated among low-income mothers (Cascio and Schanzenbach, 2013) and single mothers

(Fitzpatrick 2010, 2012).[2] Prior literature addresses effects at a local or state level rather than national in scope, presumably due to the difficulty of identifying effects at the national level. National surveys conducted during Head Start's rollout during the 1960s do not contain needed information, preventing researchers from using exogenous variation in the rollout of the program to identify effects. We make a valuable contribution by assessing impacts at a national level using program expansion for identification. We analyze an understudied time period coinciding with rapid increases in maternal labor supply, and our results shed light on changing secular trends in labor supply responsiveness to subsidized childcare among single mothers. We compare our findings to previous work, focusing on similar settings but prior and subsequent time periods. The 1990s saw rapid expansion in preschool access and enrollment among low-income families, which might help explain why research examining the end of the decade saw little response within this group to universal access to preschool and kindergarten. Blau and Tekin (2007) do explore the effect of 1996 welfare reform childcare subsidies on maternal employment, but these changes likely had a minimal impact on employment rates (Meyer and Rosenbaum, 2001). To the best of our knowledge, no prior research exploits the increases in Head Start funding in the early 1990s to evaluate the impact of widespread changes in preschool and early preschool availability on the employment decisions of single mothers.

Comment [JW1]: Added in some discussion about why our work at the national level is an improvement over past work and why it has been hard to do in the past.

Understanding the relationship between changes in Head Start funding and the increased labor supply of single mothers is interesting for several reasons. First, there is surprisingly little work studying maternal labor supply responses to expanded access to high quality childcare, although the literature is growing. Most prior work on Head Start in particular and early education more generally focuses on short- and long-term benefits to children only, neglecting

[2] There is also work documenting that access to early childhood schooling increases maternal labor supply in other countries (Carta & Rizzica, 2018; Gathmann & Sass, 2018).

the benefits to mothers and society more generally. No prior work has evaluated mothers in the context of the large 1990s national expansion of Head Start. By giving attention to mothers, we provide additional insight into the cost and benefit debate surrounding Head Start and early childhood education more generally.

Second, our analysis of single mothers in particular provides information about responses in a segment of the population often targeted in welfare reform due to their high risk for poverty and disadvantage (Kimmel, 1995). Single mothers report difficulty securing high quality childcare and balancing work with family (Council of Economic Advisors, 2015). Past research documents associations between family structure and income mobility of children, educational outcomes of children, and the probability of children's family structure as adults (Musick & Mare, 2007). Given the interdependence of family structure and poverty, our focus on single mothers makes a valuable contribution to welfare policy conversations about the role of childcare subsidies in encouraging the welfare-to-work transition of single mothers.

Finally, changes in Head Start funding provide a plausible source of exogenous variation in net wages, furthering collective understanding about female labor supply responses to changes in government subsidies during the 1990s. By evaluating our results with changes to the EITC and other welfare reforms, we find that Head Start accounts for changes in labor supply in addition to other policies, rather than in place of other policies. Understanding these simultaneous responses to multiple welfare policies informs policy makers designing social insurance and redistribution policies. Importantly, we shows that the Head Start expansions in the 1990s provided a large enough subsidy to single mothers to induce many to enter the labor force, perhaps earlier than they would have been otherwise able to.

Head Start Program Expansion

Head Start is a federally funded preschool education program serving economically disadvantaged children across the United States. The program aims to increase school readiness, health, and social development for low-income children in an effort to reduce persistent educational attainment gaps between these children and their more advantaged peers (Gibbs, Ludwig, & Miller, 2013). Children between ages three and five are eligible if their household income is below the federal poverty threshold, their household receives Temporary Assistance for Needy Families (TANF) support, their family receives Supplemental Security Income (SSI), they are homeless, or if they are a foster child. Head Start initially began in 1965 as part of President Lyndon B. Johnson's "war on poverty," and although it began as a small summer program, it quickly moved to a 9-month half-day program. As explained by Kose (2018), prior to 1990, the Federal Government apportioned Head Start funds to states based on need as determined by the number of families receiving welfare benefits, the number of unemployed adults, and the number of children living below the poverty line. Local administrators who could provide at least 20% of their own funding applied to states for Head Start fund through a competitive grant writing process, and states awarded funds to local preschool providers. The process rewarded cost-effectiveness, although states gave preference to prior applicants. Although Head Start required providers to comply with educational standards, the program was marked by variance in sponsoring organizations, size of individual providers, overhead costs, and labor costs. As a result, substantial geographic variation in funding per eligible child existed prior to the 1990 expansion in Head Start (Currie and Neidell, 2007).

In 1990, Congress pass the Head Start Expansion and Quality Improvement Act, thereby providing substantially more funding for teacher salaries, teacher training, facilities, and family services. The expansion sought to improve the quality of the educational programming as well as

increase the number of children enrolled. Program administrators, allocated additional funds to states based on the previous proportion of funding they received, resulting in geographic variation in funding increases. This variation in funding changes provides a natural experiment with which to study the program effects on maternal labor supply. In 1994, the early preschool program expanded in scope with the introduction of the Early Head Start program, which targeted children younger than three in order to better address the comprehensive needs of low-income children. However, Early Head Start remained small, serving less than three percent of eligible children and accounting for only eight percent of Head Start funding by 2009 (Hoffman, 2010).

Data

For our analysis we rely on two main data sources. The first is the annual Consolidated Federal Funds Report (CFFR) from 1983 to 2010 (Consolidated Federal Funds Report: County Areas, 2011). These reports provide detailed municipality level information on federally funded items, including payments for Head Start.[3] Funds are then aggregated up to the metropolitan area, as this is the level of geography available in the CPS. We then aggregate up the Surveillance, Epidemiology, and End Results Program (SEER) annual county- level population estimates by age to estimate the annual metropolitan population of three- and four-year-olds (National Cancer Institute, 2017). Using this measure we are able to construct Head Start funding per age eligible child, which we convert to real 2017 dollars using the personal consumption expenditures price index from the Bureau of Economic Analysis. In general these funding reports track total national spending on Head Start very closely, except in 2000, when the government began to advance funds from the prior year's appropriation (1.4 billion dollars in 2000), and thus

[3] From 1991 on these funds are recorded under code 93.600. Prior to that they are coded as 13.600.

do not appear in the CFFR. As demonstrated in Figure A1 in Appendix A, we measure dramatic increases in funding following program expansion, with average funding increasing by more than 300 percent. Further, we measure dispersion in Head Start funding per child prior to the 1990 expansion, with the top ten percent of metropolitan areas receiving roughly three time the funding as the bottom ten percent. Figure A2 in Appendix A demonstrates that average funding increases were accompanied by an increased reach of the Head Start program as significantly more metropolitan areas received funding over time.

We combine the CFFR data with the CPS ASEC from 1983 through 2000 (Flood, King, Rodgers, Ruggles, & Warren, 2018). We restrict our analysis to variation before the year 2000, as we are explicitly interested in understanding what happened during the 1990s. From the CPS, we collect information for all single mothers with young children, defined as a women with children 5 and under in the home. We use the household roster to determine if the mother has children of a given age in the home. In the ASEC supplement, participants report on employment during the previous calendar year. For this reason, we are interested in mothers who currently have a four- or five-year-old in the home, as the child would have likely been three or four in the previous calendar year and age eligible for Head Start. Our main outcome of interest is the extensive margin measure for ever employed in the previous calendar year, which we define to equal one if the woman worked any weeks during the previous year, and zero if not. Additionally, we consider work intensity by constructing other outcomes as well, such as the binary measure for full year employment, part year employment, the number of weeks worked, and the natural log of wage income.[4]

[4] To include mothers who did not work, we add one to the weeks worked and wage income before taking the natural log, so the outcome will not be undefined. Results are nearly identical if we instead use the inverse hyperbolic sine transformation.

Our baseline sample includes 21,672 single mothers with a child under the age of 5 who was observed between 1983 and 2000 in the CPS ASEC. Women living outside of metropolitan areas are not includes, because they can only be assigned the funding level in the remainder of the state, which might introduce measurement error. In Table 1, we provide basic summary statistics separately for women with and without an age eligible child in the previous year in metropolitan areas that experienced below and above average increases in Head Start funding. Between 1990 and 1999, metropolitan area-level Head Start funding per year per age-eligible child increased by $363 (2017$) in below average increase areas, and by $675 in above average increase areas. Single mothers with children under five had similar characteristics, regardless of age eligibility for Head Start. Single mothers with age-eligible children were slightly more likely to be employed, more likely to be employed full-year, worked more weeks and had higher wage income than single mothers with younger children. They were also slightly more educated, younger, and had more children on average.

Empirical Approach

Enrollment. By using Head Start funding per child to proxy for access to Head Start, the current empirical strategy implicitly assumes that additional Head Start funding increases enrollment. To test this assumption, we first estimate the relationship between Head Start funding and school enrollment using two different data sources. The CPS October supplement includes measures of current school enrollment for children three and older. Using the children observed during this supplement, we estimate the impact of metropolitan area level Head Start funding on the probability three- and four-year-olds are enrolled in pre-kindergarten.

$$In\ PreK_{it} = \beta_1 HS\ funding\ per\ child_{mt-1} + X_{it}'\Gamma + \phi_m + \delta_t + \varepsilon_{it} \qquad (1)$$

$In\ PreK_{it}$ is the binary outcome of being enrolled in pre-kindergarten, estimated over the sample of three- and four-year-olds. The coefficient β_1 captures the percentage point change in pre-kindergarten enrollment when there is a $500 increase in Head Start funding per child at the metropolitan area level (m). We include a vector of individual level controls (age indicators, race, ethnicity, education), policy controls in t-1 (maximum EITC refund eligibility, availability of Temporary Assistance for Needy Families (TANF) waiver in the metropolitan area, maximum TANF benefit, presence of States Children's Health Insurance Program (SCHIP), and the real state and federal minimum wage), and state level demographic trends (race, marital status, and education percentiles). We also include a metropolitan area fixed effect, to compare children from the same area, and year fixed effects to control for year shocks and secular trends in preschool attendance. We weight observations by the individual probability weights provided in the CPS. Unlike later regressions, this specification does not difference out trends using non age-eligible children in the same metropolitan area because (1) children under age three are not asked about schooling, and (2) very few children over four are enrolled in preschool.[5] Although pre-kindergarten enrollments in the CPS are general and not specific to Head Start, we observe increases in pre-kindergarten enrollments following expansions in Head Start funding.

To focus specifically on changes in Head Start enrollments, we also examine state-level annual Head Start enrollment between 1988 and 1999 from the Kids Count data center (Kids Count Data Center, 2018). Using the SEER population estimates, we construct the state-level Head Start enrollment rate among three- and four-year-olds and estimate the following equation:

$$HS\ rate_{st} = \beta_1\ HS\ funding\ per\ child_{st-1} + \phi_s + \delta_t + \varepsilon_{st} \qquad (2)$$

[5] Estimation similar to equation (3) comparing three- and four-year-olds' preschool enrollment to older children's preschool enrollment provide similar coefficients, but increases the precision.

In equation (2), Head Start funding per capita is measured at the state-level, so the coefficient β_1 represents the percentage point increase in the Head Start enrollment rate associated with a $500 increase in state-level Head Start funding per child. Using the state-level data we also explore the impact of Head Start expansion on enrollment of children younger than three, through Early Head Start.

Although this seems like a setting that would lend itself well to an instrumental variables estimation capable of relating pre-kindergarten enrollment to maternal labor supply, this is potentially problematic for several reasons. First, enrollment outcomes and employment outcomes are estimated using different samples, with slightly different specifications. Although the October CPS survey also includes monthly employment surveys, we would not be able to observe the first stage outcome for the control group because preschool enrollment is not reported for children younger than age three. Second, it is not clear the exclusion restriction holds, as Head Start funding might affect maternal labor supply through other channels, and finally, the first stage relationship is fairly weak. For these reasons, we do not provide instrumental variable estimates and instead focus on estimating the reduced form impacts of changes in funding levels directly on maternal labor supply.

Maternal Employment. Identification of the causal effect of preschool enrollment on maternal labor supply is difficult given likely connections between a mother's desire for her child to be educated and a mother's labor market options. To investigate whether preschool enrollment influences maternal labor supply, we focus on the potentially exogenous and heterogeneous expansion of the Head Start program. To investigate whether Head Start availability affects maternal labor supply, we exploit variation in per child Head Start funding across both geography and time. We argue that the timing and size of funding increases in

metropolitan areas were independent of mothers' preferences and characteristics. One concern with this generalized fixed effects approach is that it is unclear why certain municipalities saw increases in Head Start funding after the national expansion while others did not. When Head Start was expanded nationally in 1990, the additional funds were allocated to states based on the previous proportion of funding they received. If, for example, local administrators were more likely to apply for and secure funding in areas where single mothers had a greater propensity to work, the estimated coefficients would be biased. Another identification concern arises if area-specific shocks coincide with the Head Start expansion. To account for potential policy endogeneity, we expand our analysis to a generalized triple difference approach using the age of a child as an additional source of identification. We argue that comparing single mothers with eligible children to single mothers with ineligible children (who are close in age) in the same metropolitan area produces causal estimates, because local changes experienced by mothers of young children likely had similar effects regardless of whether their children were born before or after the eligibility deadline.

To estimate the effect of per child Head Start funding on mother's employment in the previous year, we compare single mothers with age eligible children to single mothers with non-eligible younger children in the same metropolitan area as follows:

$$
\begin{aligned}
&Ever\ Employed\ last\ yr._{it} \\
&\quad = \beta_1 HS\ funding\ per\ child_{mt-1} * (Child\ 3\ or\ 4\ last\ yr.)_{it} \\
&\quad + \beta_2 HS\ funding\ per\ child_{mt-1} + \beta_3 (Child\ 3\ or\ 4\ last\ yr.)_{it} + X_{it}'\Gamma + \phi_m + \delta_t + \varepsilon_{it}
\end{aligned}
\tag{3}
$$

The outcome of interest is the binary indicator for whether the woman was employed at all last year. The coefficient β_1 captures the effect of Head Start funding per child in the previous year

on employment for single mothers who had a child that was age eligible in the previous year, relative to women who did not have an eligible child. By including the metropolitan area fixed effect (ϕ_m), we compare mothers in the same metropolitan area. As such, any change in metropolitan-level Head Start funding that correlates with local trends in the employment of single mothers is controlled for and captured in β_2. The year fixed effect controls for national changes over time in both employment rates and Head Start funding. We include a vector individual level controls (race, ethnicity, education), controls for policies in the previous year (maximum EITC refund eligibility, availability of Temporary Assistance for Needy Families (TANF) waiver in the state, maximum TANF benefit, presence of States Children's Health Insurance Program (SCHIP), and the real state and federal minimum wage), and state level demographic trends (race, marital status, and education percentiles).[6] In all regressions, observations are weighted by the individual probability weights provided in the ASEC. To account for potentially correlated errors among individuals in the same metropolitan area, we cluster standard errors at the metropolitan area level (Bertrand, Duflo, & Mullainathan, 2004).

Our specification fundamentally relies on a parallel trends identifying assumption, namely, that single mothers with age eligible children would have behaved like mothers in the same metropolitan area with non-eligible children if the Head Start expansion had not occurred and affected them. This assumption seems reasonable as all single mothers in a metropolitan area face the same local labor market conditions, but we also check the potential validity of this assumption by examining whether "effects" are detectable before the funding expansion.

Results

[6] A special thanks to Kearney and Levine (2013) for providing data on state level policy and demographics.

Graphical Analysis. We first explore trends in single mothers' employment before and after the expansion in Head Start funding graphically. To do this we estimate the following equation:

$$Ever\ Employed\ last\ yr._{it} =$$

$$\sum_{\tau=83,84/85}^{99/00} \beta_{\tau-1}(Child\ 3\ or\ 4\ last\ yr.)_{it} * (year = \tau) + \gamma(Child\ 3\ or\ 4\ last\ yr.)_{it} + X_{it}'\Gamma + \phi_m + \delta_t + \varepsilon_{it} \quad (4)$$

The outcome is once again any employment in the previous calendar year, but now the β_τ coefficients trace out the difference in employment over time between single mothers with age eligible children and single mothers in the same metropolitan area without age eligible children. For power, years are grouped into bins (1983, 1984-1985, 1986-1987 etc.) and the interaction with 1990 is excluded to make this the reference period.[7] The regression outlined in equation (4) does not solely capture changes in employment due to Head Start Funding. Other policies, such as the EITC and TANF, were also changing during the 1990s, and policy changes in welfare and taxation might have differentially affected mothers with age eligible children. For example, Looney and Manoli (2013) show that much of the rise in employment among single mothers in the 1990s was concentrated among mothers with young children, but that mothers with young children were also more likely to have multiple children, thereby affecting the maximum earned income tax credit the woman was eligible to receive. To separately identify the effects of Head Start we need another source of variation.

To focus on the role of Head Start funding graphically, we separate metropolitan areas by the percent change in per child Head Start funding between 1989 and 1999. We then separately

[7] The figure is similar, but more imprecise if *Child 3 or 4 in t-1* is interacted with each year individually.

estimate equation (4) for individuals in metropolitan areas in the bottom half of the increase distribution and in the half of the distribution (weighting metropolitan areas by the population of three- and four-year-olds). The bottom half of the distribution includes 172 metropolitan areas, where the increase in funding per child was less than 209% between 1989 and 1999, with an average increase of 142%. The top half includes 142 metropolitan areas, where the increase in funding per child was greater than 209% between 1989 and 1999, with an average increase of 291%. Panel A of Figure 7 plots the coefficients for both of these regressions. For metropolitan areas in the bottom half of the distribution, employment trends before Head Start expansion were flat and not significantly different from zero. This continued following the expansion of Head. For metropolitan areas in the top half of the distribution, areas that experienced relatively large increases in Head Start funding, employment trends before the expansion were more not significantly different from zero, but visually there is a downward trend. If anything, single mothers with age eligible children in metropolitan areas with large increases in Head Start funding were becoming less likely to be employed relative to other single mothers before Head Start expansion. To account for potentially different trends by treatment status, we also estimate the equation for both samples but include linear trends for women with a 3- to 4-year-old child. These coefficients are plotted in Panel B of Figure 7. Under both specifications, the coefficients begin to rise, following the Head Start program expansion in 1990, suggesting that single mothers with age eligible children in highly funded areas were perhaps more likely to be employed. However, the gaps between single mothers in high funded versus low funded areas are not statistically significant (and especially imprecise when linear trends are included). Although this does not directly relate to our empirical approach outlined above, it suggests that

increases in employment among single mothers with age eligible children were largest in areas that saw the largest increases in Head Start funding.

Impact on Enrollment. Estimation results using both the individual-level enrollment data from the October CPS and the state-level Head Start enrollment data are reported in Table 2. From the October CPS, a $500 increase in per child Head Start funding in a metropolitan area associates with a 3.7 percentage point increase in the probability of a three- or four-year-old being enrolled in pre-kindergarten. This represents an 8.6 percent increase off of a base of 43 percent enrolled in pre-kindergarten. Among children with a mother with a high school degree or less, a group more likely to be Head Start eligible, the effect is an increase in enrollment of 4.8 percentage points, or approximately 15 percent. When looking at state-level Head Start enrollment, $500 of state-level per child Head Start funding increased enrollment among three- and four-year-olds by 4.9 percentage points, more than doubling Head Start enrollment on average. When analyzing Early Head Start enrollments, prior to 1995, the year Early Head Start began, the effect of Head Start funding on enrollments on children younger than three was small and insignificant. However, when including years following the initiation of Early Head Start, the coefficient increases to 0.21 percentage points and becomes statistically different from zero, although it is not statistically different than the estimate in Column (4).

Both data sources suggest that increases in Head Start funding associate with expansions in enrollment, a finding that underscores the mechanism behind equation (1), making estimates of the effect that Head Start funding had on maternal labor supply more meaningful. We now calculate the employment impacts for a given increase in preschool funding.

Impact on Maternal Employment. Given the observed increase in preschool enrollment, we next estimate the effects of Head Start funding on maternal employment

decisions in Table 3. In column (1), we observe that a $500 increase in per child Head Start funding is associated with a 2.0 percentage point increase in the probability of being employed when considering all single mothers with children ages 5 and under between 1983 and 2000. From an average employment rate of 62 percent, this represents a 3.2 percent increase. Because Early Head Start began in 1995, the control group in column (1) is potentially contaminated as some children younger than three would be eligible for Head Start after 1995. When we restrict the sample to pre-Early Head Start years in column (2), the coefficient increases to 3.5 percentage points and is highly significant, suggesting this is not a concern. The findings suggest that along the participation margin, Head Start funding induced increases in labor supply among single mothers.

A single mother's labor supply response may differentially respond depending on whether she has younger children at home in addition to a Head Start eligible child. We hypothesized that mothers with age eligible children who also had younger children would be less affected by the Head Start expansion. However, as seen in column (3) of Table 3, employment responses for mothers of age eligible children and younger children were indistinguishable from employment responses of mothers with age eligible children and no younger children. This suggests that the presence of younger children did not dampen the employment effects of Head Start for single mothers and stands in contrast to previous work finding differential effects prior to 1990 (Cascio, 2009; Gelbach, 2002).

Robustness. Table 4 demonstrates that estimates are robust to the inclusion of controls for other work related policies (such as the EITC, TANF benefits, and minimum wages), and the inclusion of mothers in non-metropolitan areas. The estimates are also robust to including metropolitan area by year fixed effects, essentially controlling for changes in metropolitan area

trends. Estimates are not sensitive to adjusting the ASEC sample to include only one observation per person rather than treating the data as repeated cross sections using all observations.[8] Finally, we find similar results when comparing single mothers with eligible children to all mothers with children under age 18, rather than using only mothers of young children as a comparison group.

Heterogeneity. We next consider heterogeneous treatment effects in Table 5 by estimating equation (1) for various demographic groups. Consistent with less educated mothers being more likely to be eligible, $500 of Head Start funding per child has a larger effect of 3.6 percentage points, or 6.6 percent, for single mothers with a high school degree or less. The effects for mothers with any college education are smaller and insignificant. When looking by race and ethnicity, the effects are largest for minority single mothers (2.6 percentage points), with no significant effect for Non-Hispanic White single mothers. We find similar employment responses among single mothers even in households where grandmothers, potential care substitutes, resides. We also find that when we expand our analysis to married mothers, there is a smaller 1.6 percentage point increase in annual level employment.

Impact on Other Labor Market Outcomes. To this point we have only explored the impacts of Head Start access on maternal employment decisions at the extensive margin. In Table 6 we discuss the impacts on other labor market measures to better understand intensive margin changes such as work weeks and hours worked. However, because the data set is a repeated cross-section, we will not be able to fully separate the extensive and intensive margins.

The increase in Head Start funding increased both the full-year and part-year employment rate by an insignificant one percentage point. This is consistent with half of the increase in any

[8] In theory, we could check for effects by linking mothers across CPS survey waves to create a two-year panel. In practice, the linking ID for the ASEC in IPUMS only goes back to 1989, which excludes most pre-period mothers. Additionally, about 9.4 percent of ASEC respondents were oversampled, preventing linking from one year to the next for these observations.

employment going to full year employment and half going to part year employment. However, given the cross-sectional nature of the data, we do not know if new entrants became full-year workers, or if some part-year workers became full-year workers, and new entrants became part-year workers. In column (3), Head Start funding increased the number of weeks worked in the previous year by 7.4 percent. At the average this would suggest that annual weeks worked increased by 1.8 weeks. If the entire one percentage point increase in full-year employment were due to new entrants, this would translate into an average increase of 0.5 weeks worked. The larger increase of 1.8 weeks suggests there were intensive margin adjustments in annual weeks worked in addition to extensive margin entry. Consistent with this pattern of increased attachment along the intensive margin, we find that usual weekly hours worked increased by 6.9 percent, or approximately 1.5 hours at the mean. We also estimate that wage earnings increased by 18 percent. These findings suggest that the Head Start expansion facilitated increased attachment to the labor market through intensive margin channels.

Decomposing Changes in the Labor Supply of Single Mothers. Prior research suggests that the creation of the EITC and welfare reform accounted for a large share of the rise in employment among single mothers during the 1990s. We estimate the relative contributions of these policies to the rise in labor supply of single mothers to determine if other welfare programs had complementarities with Head Start, and Table 7 reports these estimates. We estimate that the EITC accounted for about 56% of the overall increase in labor force participation of less educated single mothers with children ages 5 and younger. We also estimate that changes in the maximum welfare benefit accounted for over 10% of the overall increase in labor force participation of single mothers. Our findings confirm prior estimates of the effects of the EITC, although our estimates remain high (Dickert, Houser & Scholz, 1995; Eissa & Liebman, 1996;

Meyer & Rosenbaum, 2001). In addition, we find that the expansion of Head Start accounted for 7 percent of the increase in labor force participation of single mothers in addition to, and not at the expense of increases attributed to welfare reform. We find no evidence that explaining the expansion of Head Start diminished the magnitude of the effects of the EITC.

Discussion & Conclusion

Our difference in difference analysis results show that Head Start expansion in the 1990s had a statistically and economically significant effect on employment outcomes among single mothers with eligible young children, increasing their participation in the labor market by two percentage points, increasing employment hours for those already employed, and increasing earned income. The results remain robust to individual controls, samples used, time varying demographic trends, and policy controls. This finding suggests that childcare subsidies remain an important policy lever in encouraging the welfare-to-work transition of single mothers. Our findings are consistent with the previous research of Gelbach (2002) and Cascio (2009), which finds that public provision of educational services for young children led to increased maternal labor supply for single mothers without younger children prior to 1990; however we additionally measure effects for single mothers with younger children.

Our finding diverge from similar work by Fitzpatrick (2010) and Cascio and Schanzenbach (2013). Both studies explore the impact of universal pre-kindergarten in Oklahoma and Georgia on maternal labor supply (as well as other outcomes). Fitzpatrick (2010) uses a regression discontinuity to explore the employment decisions of mothers with children just above and just below the age eligibility threshold. She finds no systematic evidence of employment effects. Cascio and Schanzenbach (2013) exploit the introduction of these universal programs (in 1995 and 1998) in a difference in differences framework, and only find weak

evidence of a short run employment response (which would be consistent with our findings). There are two potential explanations for the difference in findings. First, because means-tested preschool programs like Head Start were available to low-income children in Oklahoma and Georgia before universal eligibility, many children of single mothers were eligible for subsidized preschool even before the expansion to universal pre-kindergarten. Accordingly, pre-kindergarten expansion was likely most salient for families in other parts of the income distribution. Second, female labor supply elasticities have been declining over time (Blau & Kahn 2007; Heim 2007), and the population of women working at the margin may have changed significantly between the 1990s Head Start expansions and the sample time frame used in this previous work. Changes in maternal labor supply responsiveness and shifts in lifecycle patterns, such as family structure, make the setting of the 1990s potentially different from studies covering later time periods.

The increased household income earned as a consequence of the Head Start expansion suggests that the Head Start program not only provided educational services to children in low-income families, but had spillover effects in leading to improved financial security of single women with young children. From a policy perspective, examining the increased salary to single mothers in light of the costs of the Head Start expansion provides additional information on the program's cost efficiency. For a $500 increase in Head Start funding per eligible child, the average salary of single mothers with an eligible child increased contemporaneously by 18 percent, translating into an average salary increase of $2,122 (2017$). To weigh the overall cost of the Head Start program against the benefit of increased income to single mothers, we estimate the total number of age eligible children with single mothers in each metropolitan area. Approximately one fifth of age eligible children live in single mother households, suggesting that

a $500 increase in funding per child corresponds to approximately a $2,500 increase per eligible child in a single mother household. This would suggest that income for single mothers increased immediately by $0.79 for each dollar that was spent on the program. The added income is a contemporaneous measure and does not including the value of increased experience on future income. Additionally, the estimate does not make adjustments for potential decreases in welfare transfers to the households, further contributing to the benefits of the program. Although we focus on single mothers, a segment of the population of interest to policy makers, these benefits were only part of broader social benefits reaped by the program's expansion. In addition to the benefits we measure for single mothers, many evaluations studies of early childhood program have examined how a participating child's future earnings compare with the cost of providing early childhood programs. These studies imply that there are substantial benefits for each child, ranging from $1.60 to $5.90 for every $1 spent (Bartik, Gormley, & Adelstein, 2012; Cascio & Schanzenbach, 2013; Duncan, Ludwig, & Magnuson, 2010; Heckman et al., 2010; Ludwig & Miller, 2007). Duncan and Magnuson's (2013) meta-analysis of Head Start in particular implies a benefit-cost ratio to a child of over $2 for every $1 spent on Head Start. Additionally, girls' participation in Head Start has measurable positive intergenerational transmission effects on their children in the form of improved educational outcomes, reduced teen pregnancy, and less participation in crime (Barr & Gibbs, 2018). Social benefits in terms of reduced transfer payments and remedial education expenditures are additional areas of potential benefit of Head Start expansion, as is reduced involvement in criminal activities (Heckman et al., 2010), and we hope to see research in the future measuring these effects. Our result imply that providing access to quality educational opportunities to young children not only affects children's human capital accumulation but is also effective in improving employment among single mothers.

Explaining the role of subsidized childcare during the 1990s does not diminish previous estimates of the effects of other welfare programs that changed during the same time frame (Meyer & Rosenbaum, 2001). Importantly, we show that expanding Head Start, independent of other welfare policies, facilitated increased labor market attachment for many single mothers and was an important contributor to the overall increase in female labor force participation during the 1990s.

Our results measure immediate and contemporaneous effects only, and more work is needed to understand the long-term influence of subsidized childcare on maternal labor supply. Our focus on single mothers in urban areas holds importance alone, and we remain cautious in generalizing our findings to other demographic groups. Married and single mothers display measurable differences in labor market attachment, and our research leaves room for future work to explore the effects of subsidized childcare in other family structures and locations. Overall, the expansion in Head Start funding explains a small but non-negligible increase in employment rates among single mothers with young children during the 1990s.

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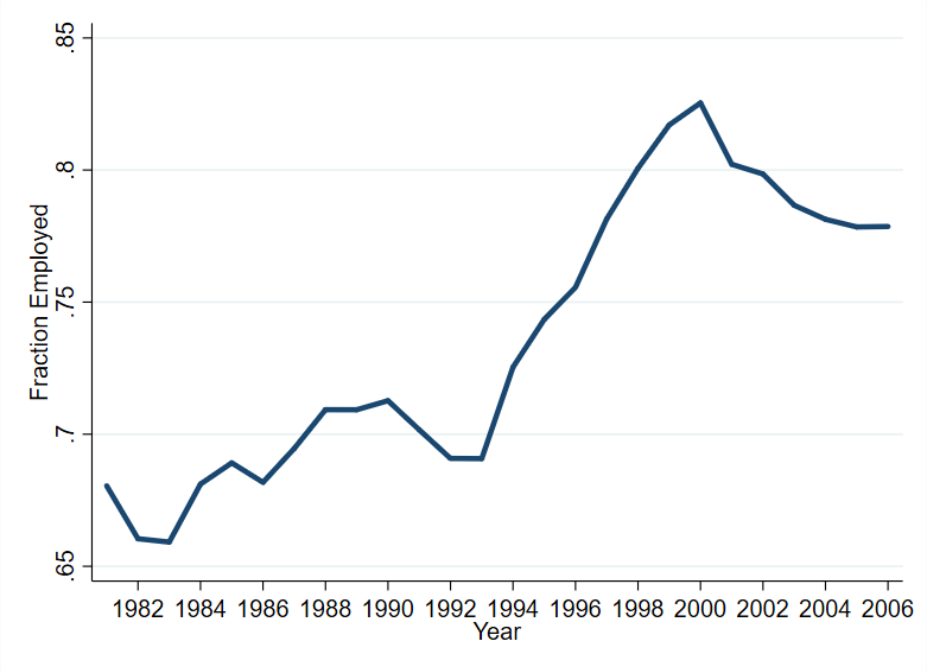
Tables and Figures

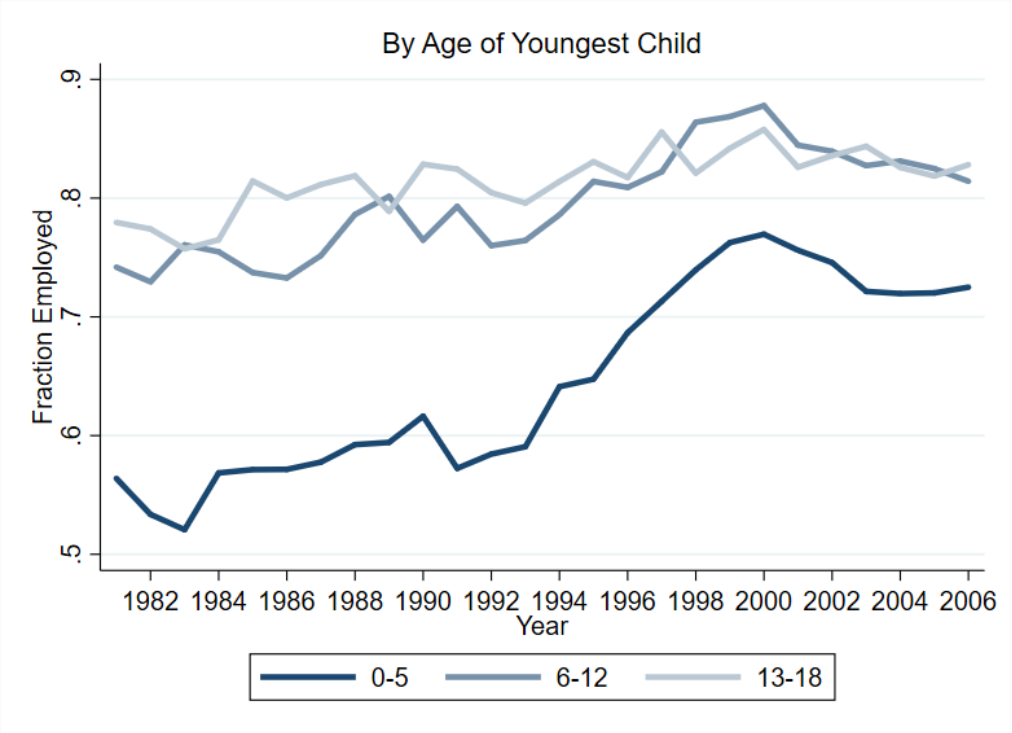
Figure 1. Total Employment Rate among Single Mothers



Notes: Recipients report employment during the previous calendar year. As such, the employment rate is lagged to the appropriate year.

Source: Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for single women with children between 1982 and 2007. Authors' Calculations.

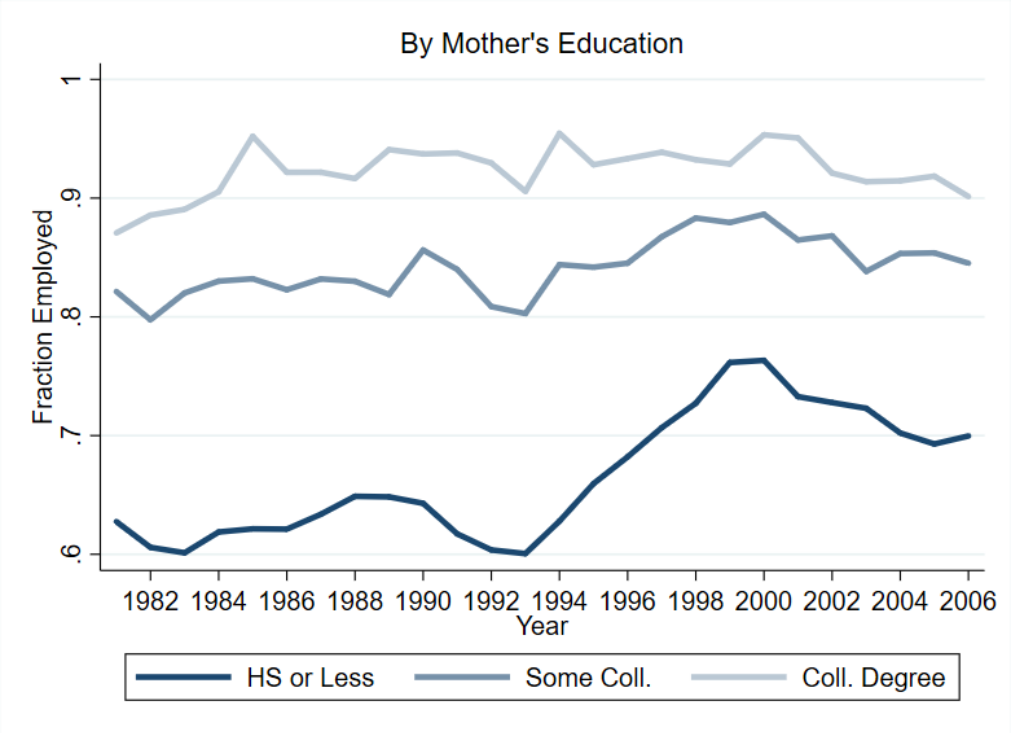
Figure 2. Employment Rates of Single Mother's by Age of Youngest Child



Notes: Recipients report employment during the previous calendar year. As such, the employment rate is lagged to the appropriate year.

Source: Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for single women with children between 1982 and 2007. Authors' Calculations.

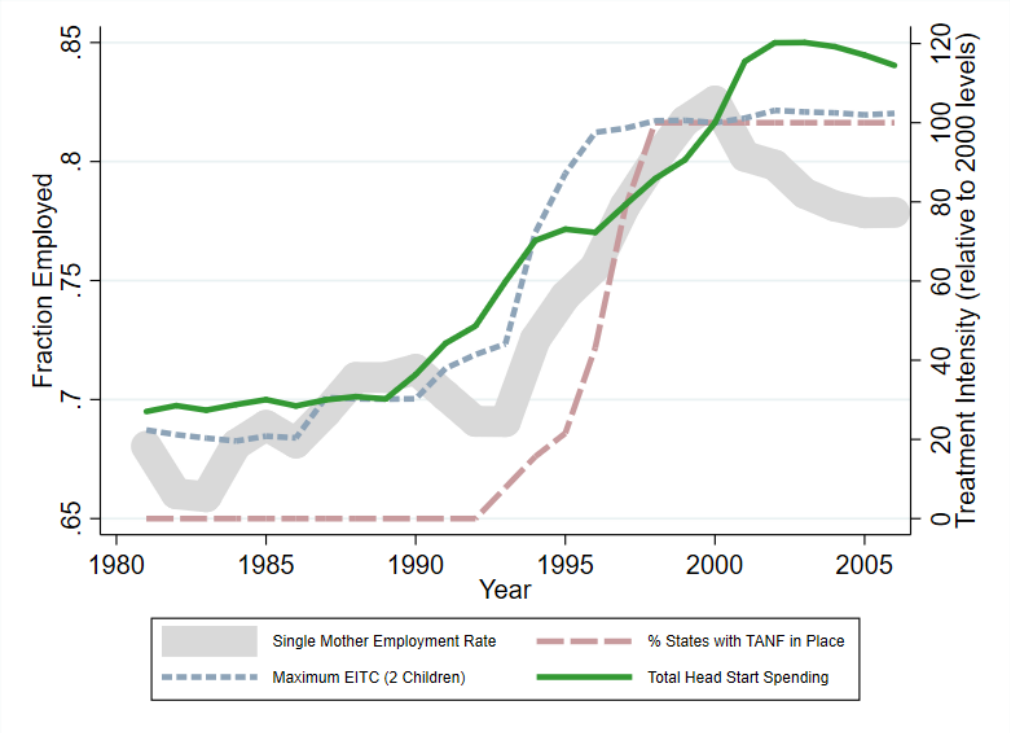
Figure 3. Employment Rate of Single Mother's by Educational Attainment



Notes: Recipients report employment during the previous calendar year. As such, the employment rate is lagged to the appropriate year.

Source: Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for single women with children between 1982 and 2007. Authors' Calculations.

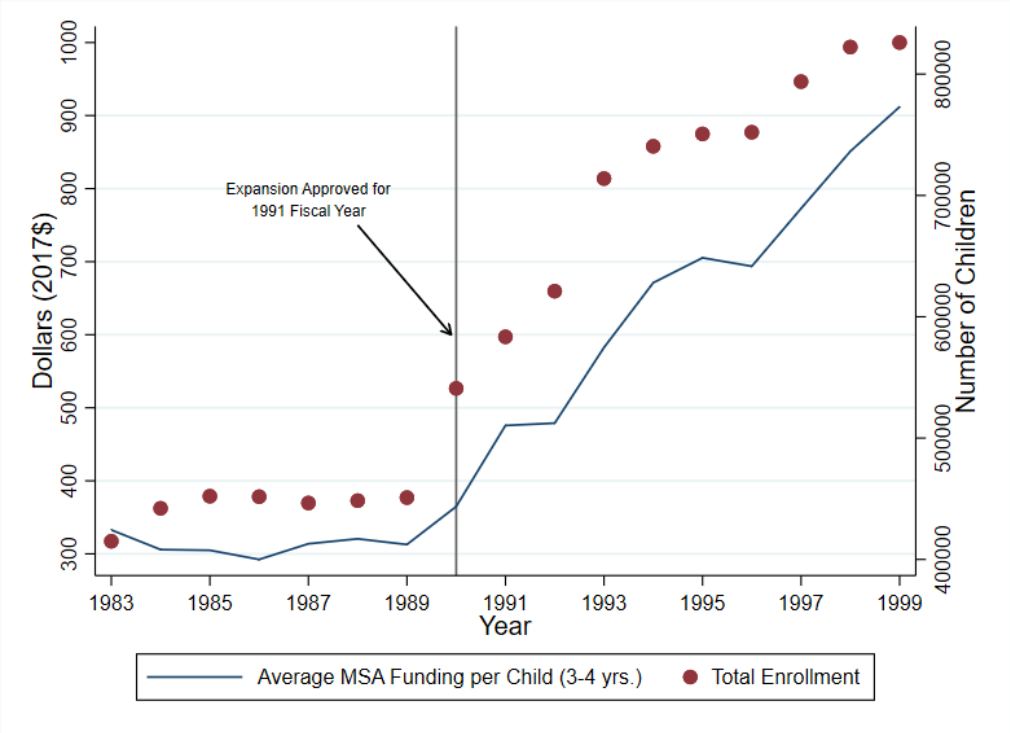
Figure 4. Policy Trends in the 1990s



Notes: Measures of TANF, the EITC maximum refund, and total Head Start spending are normalized relative to the level of treatment (generosity) in 2000.

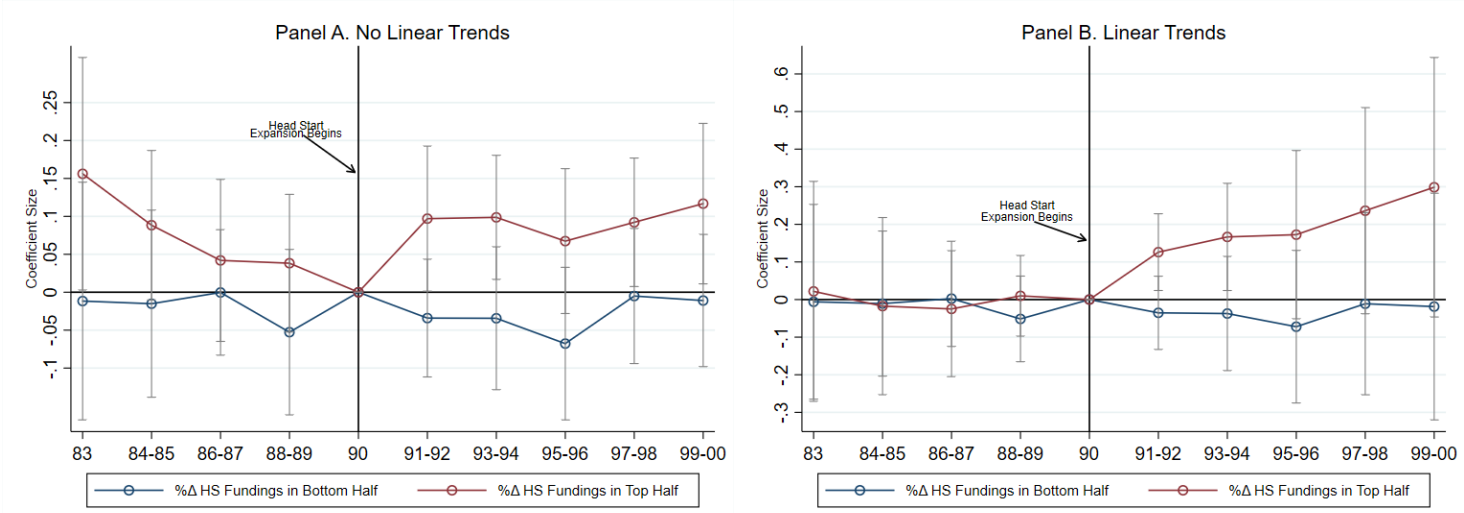
Source: Employment rates constructed from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for single women with children between 1982 and 2007, data on TANF waivers generously provided by Kearney and Levine (2013), Maximum EITC refunds calculated from the Tax Policy Center, and Head Start spending provided by the Office of Head Start. Authors' Calculations.

Figure 5. Expansion in Head Start Funding and Enrollment



Source: Total enrollment obtained from the Office of Head Start. City level funding obtained from the historic Consolidated Federal Funds Report and aggregated to the MSA-level.

Figure 6. Trends in Mothers' Employment by Child's Age Eligiblity and the Percent Change in per capita Head Start Spending between 1989 and 1999



Notes: Coefficients from equation (4) plotted, showing the change in employment rates for single mothers with an age eligiblie 3- or 4-year-old, relative to single mothers with children younger than three. Regressions are estimated separately for MSA where the change in per capita Head Start Funding was in the bottom two thirds of the distribution and in the top third of the distribution. Linear trends for mothers with 3- or 4-year-old children are included in Panel B. Ninetieth percent confidence intervals also provided. To interpret, 0.05 is a five percentage point change.
Source: CPS ASEC 1983-2000. Authors' calculations.

Table 1. Summary Statistics for Single Mothers with Any Children Under Five

	Below Average Increase in Funding from 1989 to 1999		Above Average Increase in Funding from 1989 to 1999	
	Had 3-4 Year old Last Year	No 3-4 Year old Last Year	Had 3-4 Year old Last Year	No 3-4 Year old Last Year
Ave. Increase in Head Start per Child	363		675	
Employed Last Year	0.67	0.64	0.6	0.56
Employed Full-Year Last Year	0.39	0.3	0.35	0.25
Employed Part-Year Last Year	0.28	0.35	0.25	0.31
Weeks Worked Last Year	27.59	24.26	24.69	20.82
Wage Income (2017$)	14454.57	11526.93	12260.03	9428.19
High School or Less	0.68	0.71	0.71	0.74
Some College	0.25	0.22	0.23	0.22
College Graduate	0.07	0.06	0.06	0.05
Non-Hispanic White	0.44	0.43	0.37	0.35
Non-Hispanic Black	0.42	0.42	0.4	0.38
Non-Hispanic Other	0.02	0.02	0.02	0.02
Hispanic	0.11	0.12	0.21	0.24
Age	29.03	25.69	29.31	26.05
Number of Children	2.24	1.59	2.28	1.68
Age of Youngest Child	3.47	1.33	3.51	1.35
Observations	4,733	6,482	4,258	6,199

Notes: CPS ASEC 1983-2000. Sample means are weigted, using the individual level ASEC weights.

Table 2. Impact of MSA-level Head Start Funding on Preschool Enrollment

	In Pre-Kindergarten		State Level Head Start Enrollment Rate		
	All Education	Mother HS or Less	Enrollment Rate 3-4	Enrollment Rate 0-2	Enrollment Rate 0-2
	(1)	(2)	(3)	(4)	(5)
Head Start Funding per Child (3-4 yr.)$_{t-1}$	0.037*	0.048*	0.049***	0.0021***	0.0016
	(0.019)	(0.026)	(0.008)	(0.0007)	(0.0010)
Years of Data	1983-1999	1983-1999	1988-1999	1988-1999	1988-1994
Dependent Mean	0.43	0.32	0.081	0.002	0.001
Observations	31,360	15,133	539	539	294

Notes: Data for columns (1)-(2) from the CPS October education supplement 1983-2000 repeated cross sections. Sample restricted to 3-and 4-year-olds in the October Supplment. Data for columns (3)-(5) from Kids Count Data Center. The level of observation is the state by year level Head Start enrollment from 1988-1999. The dependent variable "In Pre-Kindergarten" indicates if the child is currently enrolled in Pre-Kindergarten. In columns (1)–(2) Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, and whether the state has a childs health insurnace program (SCHIP) in place. These regressions are weighted using the individual monthly CPS weights. In Columns (3)-(5) Head Start Funding per Child is measured at the State level in units of $500 (2017$) and regressions are weighted by the state population of the given age group. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Impact of MSA-level Head Start Funding on Maternal Employment

	Outcome: Any Employment in t-1 Sample: Single Mothers with Children ≤ 5		
	(1)	(2)	(3)
Head Start Funding per Child$_{t-1}$	0.020**	0.035***	0.019*
*Child 3-4 in t-1	(0.008)	(0.010)	(0.011)
Head Start Funding per Child$_{t-1}$	0.013	-0.038	0.009
	(0.024)	(0.039)	(0.024)
Child 3-4 in t-1	0.015	0.016	0.090***
	(0.012)	(0.013)	(0.018)
Head Start Funding$_{t-1}$			
*Child 3-4 in t-1			0.014
*Youngest 0-2 in t-1			(0.018)
Head Start Funding$_{t-1}$			0.009
*Youngest 0-2 in t-1			(0.011)
Child 3-4 in t-1			-0.226***
*Youngest 0-2 in t-1			(0.027)
Youngest 0-2 in t-1			0.044***
			(0.017)
Years in Sample	1983-2000	1983-1994	1983-2000
Ave. Employment Rate	0.62	0.57	0.62
Observations	21,672	13,219	21,672

Notes: Data from the CPS ASEC 1983-2000 repeated cross sections. Sample restricted to women with a child 5 or younger. Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, whether the state has a childs health insurnace program (SCHIP) in place, and the maximum EITC the family is eligible to receive. All regressions are weighted using the individual CPS ASEC weights. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Robustness: Sensitivity of Employment Response

	Outcome: Any Employment in t-1				
	No Policy Controls (1)	Include Non-MSA (2)	MSA by Year Fixed Effects (3)	Single Mothers with Children ≤ 18 (4)	Only One ASEC Observation per Person (5)
Head Start Funding per Child$_{t-1}$	0.016*	0.018**	0.018*	0.022***	0.020**
*Child 3-4 in t-1	(0.009)	(0.007)	(0.011)	(0.008)	(0.009)
Head Start Funding per Child$_{t-1}$	0.015	-0.009		0.014	0.036
	(0.024)	(0.019)		(0.016)	(0.033)
Child 3-4 in t-1	0.012	0.015	0.016	-0.090***	0.007
	(0.012)	(0.011)	(0.014)	(0.011)	(0.015)
Ave. Employment Rate	0.62	0.63	0.62	0.72	0.65
Observations	21,672	30,416	21,130	49,605	11,972

Notes: Data from the CPS ASEC 1983-2000 repeated cross sections. Sample restricted to single women with a child 5 or younger, except for column (4). Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, whether the state has a childs health insurnace program (SCHIP) in place, and the maximum EITC the family is eligible to receive. All regressions are weighted using the individual CPS ASEC weights. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Heterogeneous Effects by Mother's Characteristics

	Outcome: Any Employment in t-1						
	Single Mothers						
Sample:	All Single Mothers	Mothers with HS or Less	Mothers with Any College	Non-Hispanic White	Non-White and Hispanics	Grandmother in Home	Married Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Head Start Funding per Child$_{t-1}$	0.020**	0.036***	-0.006	0.011	0.026***	0.031***	0.016**
*Child 3-4 in t-1	(0.008)	(0.012)	(0.010)	(0.018)	(0.007)	(0.010)	(0.008)
Head Start Funding per Child$_{t-1}$	0.013	-0.003	0.028	0.024	0.003	0.017	0.013
	(0.024)	(0.030)	(0.026)	(0.037)	(0.028)	(0.036)	(0.015)
Child 3-4 in t-1	0.015	0.001	0.042**	0.042**	-0.003	0.041*	-0.046***
	(0.012)	(0.015)	(0.016)	(0.018)	(0.015)	(0.025)	(0.008)
Ave. Employment Rate	0.62	0.55	0.81	0.72	0.55	0.58	0.66
Observations	21,672	15,753	5,905	8,222	13,431	5,096	86,104

Notes: Data from the CPS ASEC 1983-2000 repeated cross sections. Sample restricted to women with a child 5 or younger. Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, whether the state has a childs health insurnace program (SCHIP) in place, and the maximum EITC the family is eligible to receive. All regressions are weighted using the individual CPS ASEC weights. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Impact of Head Start Funding on Other Labor Market Outcomes

	Worked Full-year in t-1 (1)	Worked Part-year in t-1 (2)	Natural Log Weeks Worked (3)	Natural Log Usual Hours Worked (4)	Natural Log Wage Income (2017$) (5)
Head Start Funding per Child$_{t-1}$	0.010	0.010	0.074**	0.069**	0.180*
*Child 3-4 in t-1	(0.007)	(0.007)	(0.031)	(0.031)	(0.096)
Head Start Funding per Child$_{t-1}$	-0.006	0.017	0.022	0.049	-0.020
	(0.025)	(0.017)	(0.099)	(0.089)	(0.247)
Child 3-4 in t-1	0.086***	-0.068***	0.134***	0.091**	0.295**
	(0.011)	(0.009)	(0.045)	(0.045)	(0.121)
Dependent Mean (in levels)	0.31	0.31	24.2	22.2	11,793
Observations	21,672	21,672	21,672	21,672	21,672

Notes: Data from the CPS ASEC 1983-2000 repeated cross sections. Sample restricted to women with a child 5 or younger. Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Part year employment is employment for less than 52 weeks. For both the number of weeks worked and wage income, a value of one is added before taking the natural log, to allow for the inclusion of zero values (the results are similar if instead the inverse hyperbolic sine is used). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, whether the state has a childs health insurnace program (SCHIP) in place, and the maximum EITC the family is eligible to receive. All regressions are weighted using the individual CPS ASEC weights. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

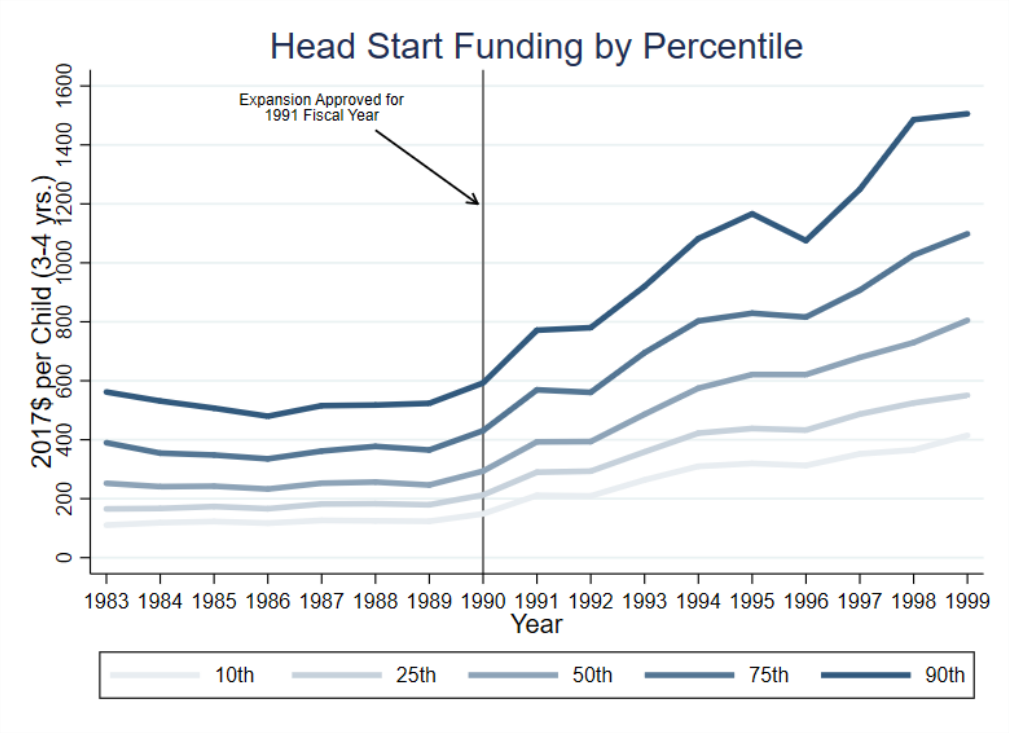
Table 7. Decomposition: Effects of Policy Changes on Annual Employment Among Less-Educated Single Mothers

	Outcome: Any Employment in t-1		Implied Impact on Employment Rates of single Mothers with Children 0-5	
			Percentage Points	Percent of Total
	(1)	(2)	(3)	(4)
Maximum EITC Refund$_{t-1}$	0.058***	0.054***	8.76	55.8%
($1000 2017$)	(0.010)	(0.010)		
Maximum Welfare Benefit$_{t-1}$	-0.016	-0.016	1.6	10.2%
($100 2017$)	(0.014)	(0.014)		
Head Start Funding per Child$_{t-1}$		0.027*	1.1	7.0%
*Child 3-4 in t-1		(0.016)		
Head Start Funding per Child$_{t-1}$		0.002		
($500 2017$)		(0.031)		
Ave. Employment Rate	0.55	0.55		
Observations	15,753	15,753		

Notes: Data from the CPS ASEC 1983-2000 repeated cross sections. Sample restricted to women with a child 5 or younger. Head Start Funding per Child is measured at the MSA level in units of $500 (2017$). Controls include indicators for mother's race and education, state level demographic controls, and policy controls, including an indicator for TANF, the maximum TANF benefit for a family of three, the federal and state minimum wage, whether the state has a childs health insurnace program (SCHIP) in place, and the maximum EITC the family is eligible to receive. All regressions are weighted using the individual CPS ASEC weights. Standard errors are corrected for clustering at the MSA level. *** p<0.01, ** p<0.05, * p<0.1.

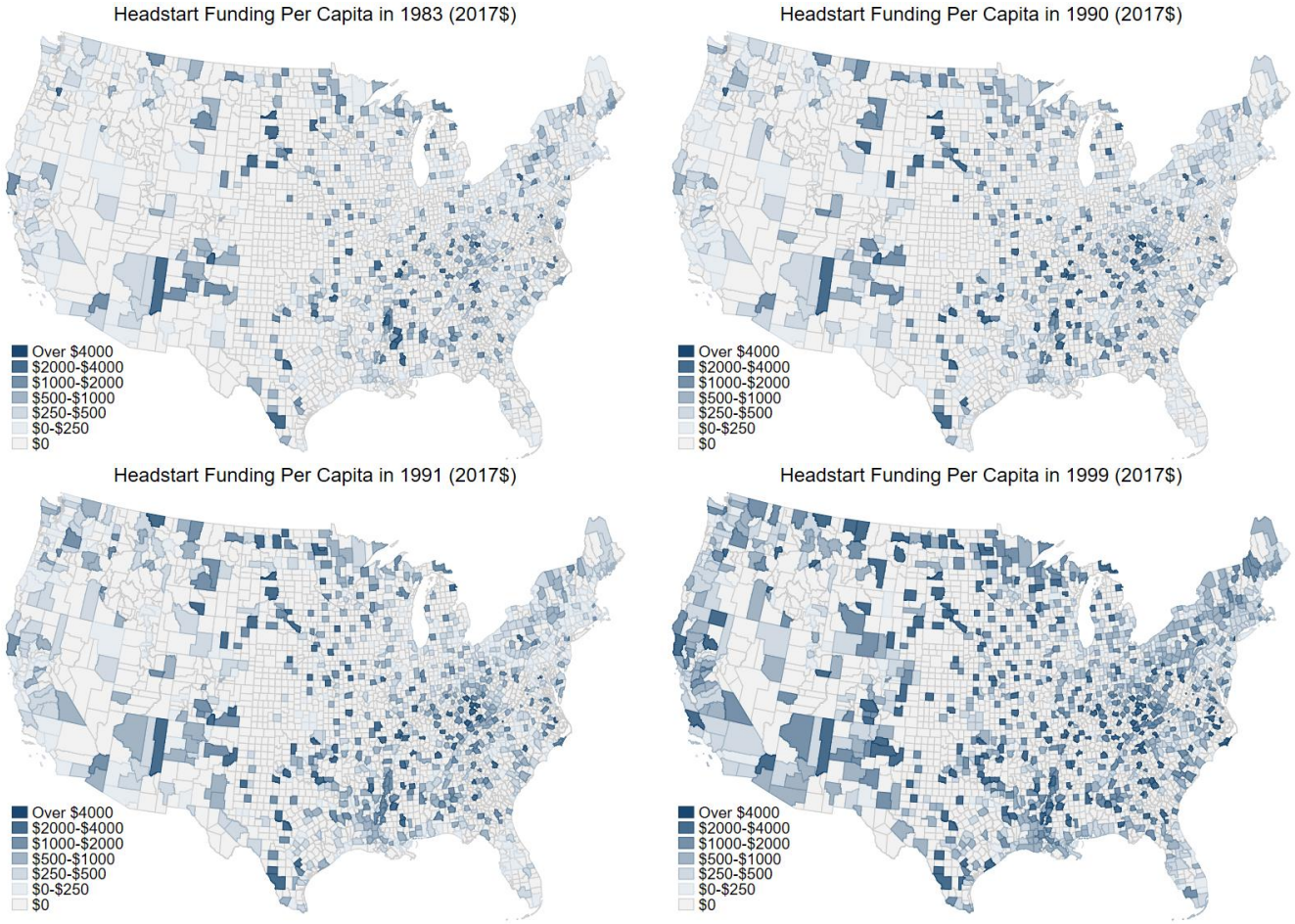
Appendix Tables and Figures

Appendix Figure A1. Heterogeneity across MSA in Head Start Funding per Child



Source: City level funding obtained from the historic Consolidated Federal Funds Report and aggregated to the MSA-level.

Appendix Figure A2. Heterogeneity in Head Start Funding Across Geography and Over Time



Source: City level funding obtained from the historic Consolidated Federal Funds Report and aggregated to the MSA-level.