HUD Jobs Plus Outcomes Evaluation

Long-term Effects from the Original Jobs Plus Demonstration: Employment and Earnings for Public Housing Residents after 20 Years

U.S. Department of Housing and Urban Development | Office of Policy Development and Research

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Foreword

The original Jobs-Plus demonstration program operated from 1998 to 2003 at public housing developments in areas of concentrated underemployment and joblessness. The overall goal of the demonstration was to take a comprehensive approach to increase economic empowerment and mobility for public housing residents. The residents at participating sites benefitted from employment-related services at onsite job centers, rent-based work incentives that allowed residents to keep more of their earnings, and activities to promote neighbor-to-neighbor exchanges that support work. The program targeted all working-age residents without disabilities at select public housing developments in six cities: Baltimore, Maryland; Chattanooga, Tennessee; Dayton, Ohio; Los Angeles, California; St. Paul, Minnesota; and Seattle, Washington.

A 2005 analysis by MDRC found that the program produced substantial earnings gains for residents in three of the six sites during the first 4 years of the program. These three sites had fully implemented and sustained the program. A followup study in 2010 found that the initial effects persisted, with residents in the three sites earning 16 percent more on average than those in comparison sites. HUD sponsored this long-term impact analysis to understand the long-term economic mobility and labor market effects of a *fully implemented* place-based employment initiative for adults and to explore intergenerational effects of economic well-being.

This report examines whether the earlier reported successes were sustained 15 years after the program ended and whether gains in residents' earnings translated into improvements in their children's employment and earnings. This report finds that participants at the three sites that fully implemented the original Jobs Plus model continued to have positive effects on adult residents' earnings and employment between 2017 and 2019, two decades after the program launched. Moreover, exploratory analysis found positive effects for residents who were children at the time of the demonstration and are now of working age. By contrast, participants at sites that did not fully implement the Jobs Plus model experienced long-term negative effects on adults' income and employment. These findings demonstrate the potential benefits of place-based interventions in areas of concentrated underemployment and joblessness. They also suggest, however, that for these interventions to have these long-term benefits they must be well implemented.

This report contributes to the growing literature on self-sufficiency program effectiveness and the value of investments in place-based interventions for intergenerational gains, particularly for residents who are most impacted by systemic disinvestment. HUD is committed to continuing to support the self-sufficiency of assisted families.

Solomon J. Greene
Principal Deputy Assistant Secretary for Policy Development and Research
U.S. Department of Housing and Urban Development

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Executive Summary

Public housing residents in the U.S. face many challenges in improving their economic situations: many developments are located in areas of concentrated poverty, and residents often struggle with poor work histories, limited education, lack of adequate childcare, health or medical problems, and concern about crime and safety. In the mid-1990s, the U.S. Department of Housing and Urban Development (HUD), the Rockefeller Foundation, and MDRC created the Jobs Plus demonstration to address these challenges. The Jobs Plus program takes a comprehensive approach to helping public housing residents improve their employment situations. It combines three key components—on-site employment-related services and activities, rent-based financial incentives, and community support for work—and leverages the place-based nature of the program to aim for "saturation," targeting all residents in the development and intentionally providing opportunities for community building and social supports around residents' economic self-sufficiency goals.

This demonstration, which operated from 1998 to 2003, was the subject of a rigorous evaluation which found that three of the six developments that were able to implement and sustain implementation of all three components of the model saw the program boost annual earnings.[1] Since the program was first implemented, and given its demonstrated positive and enduring effects on residents' earnings, Jobs Plus has been expanded to at least 50 public housing agencies (PHAs) across the country through local replication efforts and more recent scale-up through HUD.[2] This report examines whether the significant gains observed in residents' earnings due to the implementation of Jobs Plus—which did not show signs of fading during the full four years of implementation or the three years following the completion of the program—were sustained 15 years after the end of the intervention.[3] This report also explores whether the program results in long-term improvements in children's employment and earnings, thus testing the possibility that a well-implemented place-based employment intervention can produce positive effects for adults exposed to the program and also spur intergenerational effects and improve the economic well-being of children growing up in these developments.

Data and Methods

This report examines the long-term effects of the Jobs Plus demonstration on labor market outcomes for two study samples: (1) the nonelderly, nondisabled adults living in the Jobs Plus and comparison study developments at the time that implementation began in 1998 and who had not reached retirement age (age 65) by the end of the long-term analysis study period, and (2) individuals who were children (ages 0 to 17) living in the Jobs Plus and comparison developments at the time of program launch. The long-term

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[1] Riccio (2010).

[2] Since 2015, HUD has awarded approximately $108 million in four-year grants to 43 PHAs to implement Jobs Plus. See Verma et al. (2019) for a description of some key departures in the design of the Jobs Plus model that is being scaled-up as part of the HUD replication effort.

[3] Part of this effort includes an impact evaluation of the first 24 housing authorities implementing Jobs Plus as part of HUD's national scale up of this program.

effects for both samples are examined 20 to 21 years after program launch (14 to 15 years after program implementation ended), during the time period of July 2017 to June 2019. The analysis uses employment and earnings outcomes created with the National Directory of New Hires (NDNH) data for this time period. The NDNH data contain quarterly wage data for workers in employment covered by the unemployment insurance (UI) system.

Average annual earnings in years 20 and 21 and average quarterly employment in years 20 and 21 are the two confirmatory outcomes for this study. The confirmatory outcomes analysis is focused only on the strong implementation sites and for the adult sample. All remaining analyses of long-term effects, including those for children, are considered exploratory.

The study uses Ordinary Least Squares (OLS) to examine the long-term effects of Jobs Plus on labor market outcomes. This methodology leverages the very close match in baseline earnings and employment levels and trends in the 6 years leading up to Jobs Plus implementation to compare the labor market outcomes for the Jobs Plus program group with the outcomes of the comparison group about 15 years after the program ended in 2003, and it includes covariates to further increase the precision of the estimates and control for differences between the Jobs Plus and comparison groups at baseline. The methodology differs from that of the early impact analysis of the Jobs Plus demonstration, which used comparative interrupted time series, but that was not feasible for the long-term analysis because the 6 years of pre-Jobs Plus employment and earnings data could not be used to reasonably predict employment and earnings levels and trends 20 to 21 years later.

One limitation of this analytic method is that it does not account for the fact that the intervention was delivered at the development level (rather than to randomly selected individuals within developments) or for factors at the development level that will affect outcomes for all residents in that development. For this reason, this model most likely overestimates the precision and statistical significance of estimated impacts. Additional analyses are conducted to provide some assessment of how much the model overestimates statistical significance, and the findings are discussed in the report.

Key Findings

This long-term impact analysis aims to answer two main research questions. The primary research question asks: Were the Job-Plus-induced gains in residents' earnings found for the strong implementation sites sustained 15 years after the end of the intervention? The secondary research question is: Did the Jobs Plus-induced gains in residents' earnings from the original Jobs Plus demonstration translate into long-term improvements in their children's employment and earnings?

The following are the key findings from the analysis:

- **Jobs Plus continued to positively impact earnings of work-able residents in the stronger implementation sites 15 years after the program ended.**

The top panel of exhibit ES-1 presents the estimated effects of the Jobs Plus demonstration on the subset of nonelderly, nondisabled adults living in the Jobs Plus developments (and who had not yet reached retirement age by the end of the followup period) on employment rates and average earnings 20–21 years after the program was launched in 1998, for sites that fully implemented the Jobs Plus program during the demonstration. These sites include Dayton, Ohio, Los Angeles, California, and St. Paul, Minnesota.

The evaluation of the original demonstration found positive effects on average annual earnings for work-able Jobs Plus residents for the second 2 years of program implementation (after the 2-year rollout period), and these earnings gains were sustained for 3 years after the Jobs Plus program ended in those sites. Across these 5 years, the Jobs Plus program led to an average increase in annual earnings of about $1,300 per year in 2003 dollars, which is equivalent to about $1,800 in 2019 dollars.

Exhibit ES- 1. Impacts on Average Annual Earnings and Average Quarterly Employment Rates in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study and Children in Households from the 1998 Cohort, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Adults				
Average Annual Earnings, Years 20 and 21 ($)	16,860	15,190	1,670*	0.056
Average Quarterly Employment, Years 20 and 21 (%)	54.3	50.1	4.2**	0.047
Sample size (total = 4,105)	914	1,073		
Children				
Total Annual Earnings, Average of Years 20 and 21 ($)	20,961	18,255	2,706***	0.000
Average Quarterly Employment, Years 20 and 21 (%)	72.8	66.6	6.2***	0.000
Sample size (total = 6,337)	1,622	1,700		

Notes: The adult sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency. The child sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Stronger implementation sites include Dayton, Ohio, Los Angeles, California, and St. Paul, Minnesota.

P-values are based on standard errors that are adjusted to account for individuals from the same household using Huber-White standard errors.

The impact estimates for the two confirmatory outcomes (average annual earnings over Years 20 and 21 and average quarterly employment across Years 20 and 21) were each statistically significant, therefore, based on the Benjamini-Hochberg multiple hypothesis testing approach, no further adjustments to the p-values were needed.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

The present study found that these earnings gains were sustained 15 years after the program ended, and there was little evidence that the magnitude of the effect faded over time. In this long-term followup period that covered 14 and 15 years after the program ended, the estimated effect on average annual earnings was $1,670 in 2018 dollars, or an 11-percent increase. There is evidence that these long-term earnings gains can be at least partly attributed to increased employment rates: the Jobs Plus group had an average quarterly employment rate of 54.3 percent, which is 4.2 percentage points higher than the comparison group during the same time period. This estimated effect was also statistically significant.

As noted, the analysis model used to estimate program impacts likely overestimates their statistical significance. Additional analyses suggest that the p-value of the effect on earnings is closer to 0.249 rather than 0.056, as shown in exhibit ES-1. The p-value for the effect on employment is likely closer to 0.166, rather than 0.047. Thus, the estimates should be considered with this limitation in mind and can be seen as somewhat suggestive of long-term impact. One factor that may suggest evidence of true impact, however, is that the effects observed here, in Years 20 and 21, are a continuation of a pattern found in the short-term.

- **The children living in the Jobs Plus developments at the time that the program was implemented also experienced higher earnings and employment in adulthood, compared with their comparison group counterparts.**

The bottom panel of exhibit ES-1 shows the estimated effects of the Jobs Plus demonstration on the average earnings and the employment rates of the children (any child under 18 years old) who were living in the three Jobs Plus developments with stronger implementation at the time the program started. As discussed above, earlier analyses found positive effects on the average earnings of the work-able adults living in those households.

The results of the present long-term analysis show that living in one of these three Jobs Plus developments with stronger implementation led to increased employment and earnings 14 to 15 years after the program ended, when the children were between ages 18 and 38.

Exhibit ES-1 shows that children living in stronger implementation sites had average annual earnings that were $2,706 higher than children living in comparison developments that did not implement Jobs Plus. Children living in these three Jobs Plus developments earned, on average, $20,961 across Years 20 and 21, compared with earnings of $18,255 for children in the comparison group. Children living in Jobs Plus developments with stronger implementation also had higher annual employment rates than their counterparts living in comparison developments. As shown in exhibit ES-1, average quarterly employment rates were 72.8 percent in followup years 20 and 21 in the program group, compared with 66.6 percent in the comparison group, for an estimated effect of 6.2 percentage points. These estimated effects on average earnings and employment are statistically significant.

A similar analysis was conducted to assess the extent to which the analytic method overestimates the precision of the impact estimates for children. The findings suggested that the

effects were somewhat less precisely estimated but still statistically significant at the 10 percent level.

Conclusion

The results described in this paper provide important evidence on the potential long-term effects of a comprehensive place-based employment program for public housing residents. Jobs Plus was designed to address the challenges of concentrated poverty and the barriers to economic mobility faced by residents of urban public housing developments. Although varied self-sufficiency programs for housing subsidy recipients have been implemented to address these types of challenges and some have been evaluated, the present study is one of the rare studies to follow program participants for many—in this case, 21—years to test whether program effects are sustained over the very long term, and whether they have intergenerational effects on their children.

Findings from the earlier analyses of the effects of Jobs Plus examined as part of the original demonstration and the followup analysis conducted 3 years after the implementation ended demonstrated that Jobs Plus, where it was implemented well, had sustained positive effects on the earnings of work-able adults. The findings from the present long-term study provide suggestive evidence that these effects were sustained over a very long time period: through 21 years post-program launch, or 15 years after implementation ended. Furthermore, it provides evidence that the program also led to long-term positive effects on the employment and earnings during adulthood for children living in the Jobs Plus developments at the time of implementation.

The main findings of the present study are based on three sites with strong implementation, which is a small number of sites for a test of a place-based program where the intervention occurs at the site level and not the individual level. The extended followup period exposes the long-term employment and earnings outcomes to further influences that may have affected one research group and not the other or affected the two groups disproportionately. Despite the very close match in baseline levels and trends in average earnings and employment rates and the random assignment of developments within sites, the study methodology (OLS) would not account for potential differences in the long-term trajectories of employment and earnings between the program and comparison group that might have existed even in the absence of Jobs Plus. Therefore, these findings should be interpreted with some caution.

While the findings for children are exploratory, the implications—if the findings are replicated—are important. While much attention has been paid to the benefits of children leaving public housing in high poverty areas for lower poverty areas in the Moving to Opportunity (MTO) study, the findings from the present study of the long-term effects of Jobs Plus suggest that children can also benefit meaningfully from public investments in improving the environments in which they already live. These findings also emphasize the importance of the robust implementation of the Jobs Plus program, since they provide evidence that when well-implemented, it can serve as a platform for producing lasting economic gains for adults and children.

I. Introduction

What are the long-term economic mobility effects of a successful, place-based multicomponent employment initiative offered to public housing residents? Does it lead to long-term labor market effects for adults? Does it spur intergenerational effects and improve the economic well-being of children growing up in these developments? In the mid-1990s, the U.S. Department of Housing and Urban Development (HUD), the Rockefeller Foundation, and MDRC conceived the Jobs Plus demonstration to address the significant challenges to self-sufficiency that residents of public housing developments faced.[4] This demonstration, which operated from 1998 to 2003, was the subject of a rigorous evaluation that found that three of the six developments that fully implemented the model saw the program boost annual earnings.[5] Since the program was first implemented, and given its demonstrated positive and enduring effects on residents' earnings, Jobs Plus has been expanded to 50 public housing agencies (PHAs) across the country through local replication efforts and more recent scale-up through HUD.[6] This report focuses on new evidence on the long-term impacts for families exposed to the original Jobs Plus demonstration.

To understand whether Job Plus is an effective economic mobility program in the long run, HUD has sponsored an evaluation of the Jobs Plus effort, including a special focus on the original Jobs Plus demonstration (hereafter referred to as the *long-term impact analysis*), to examine whether the significant gains observed in residents' earnings due to the implementation of Jobs Plus—and which did not show signs of fading during in initial follow-up period—were sustained 15 years after the end of the intervention.[7] A related question of interest for this special focus on the original Jobs Plus demonstration is whether the program also results in long-term improvements in children's employment and earnings, thus testing the possibility that a place-based employment intervention can produce positive effects for adults exposed to the program and also serve as a platform for enhancing the economic mobility of children in adulthood.

This report begins by providing some background on the original Jobs Plus demonstration: the model, the sites involved in the effort, features of the sites that successfully implemented this model and produced positive results, and the early evidence about its effectiveness. Following that, the report describes the data and methods for the long-term impact analysis for adults and children and highlights important distinctions between the original analysis and the current one. Findings for

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[4] The original model was named Jobs-Plus (with a hyphen), but the current program replicated by HUD is referred to as Jobs Plus (without the hyphen). This report uses the current treatment for all iterations of the program.

[5] As discussed later in this report, three of the six sites were identified as having implemented and sustained implementation of all three components of the Jobs Plus model for the duration of the demonstration: employment services, rent incentives, and community support for work. Also see Bloom, Riccio, and Verma (2005).

[6] Since 2015, HUD has awarded approximately $108 million in four-year grants to 43 PHAs to implement Jobs Plus. See Verma et al. (2019) for a description of some key departures in the design of the Jobs Plus model that is being scaled-up as part of the HUD replication effort.

[7] Part of this effort includes an impact evaluation of the first 24 housing authorities implementing Jobs Plus as part of HUD's national scale up of this program.

the adult and child samples are examined in separate sections, before wrapping up with discussion and conclusions.

The Jobs Plus Model[8]

This model's theory of change rests on three components shown to be promising in prior research in welfare reform and other fields. It was hoped that combining them into a single model would be mutually reinforcing and make for a more robust intervention.[9] The three components include: on-site employment-related services, such as job search assistance, referrals to education and training programs, and support services coordinated by staff located within the development to make it easier to engage residents, and to make Jobs Plus staff more a part of the community they serve; rent-based financial incentives to help "make work pay" by reducing how much a family's rent contributions increase when they enter work or increase their earnings, allowing them to see a bigger financial return from work; and, based on a growing recognition of the importance of social networks and social capital, the community support for work (CSW) component emphasizes resident-to-resident outreach, information-sharing, and mutual support, as well as connections to potentially instrumental external social networks.

Jobs Plus was also designed to operate at saturation levels—that is, to offer services, a rent incentive, and community support for work to everyone living in the development. Residents who formally enrolled in Jobs Plus and receive services or enroll in the rent incentive can influence other residents in the development without formal involvement in the program through strengthening and leveraging social networks among residents, sharing information about employment opportunities and availability of services in the community, and encouraging residents to attend Jobs Plus events that may benefit residents. In this way, it aspires to benefit residents beyond the personal benefit received through participating in employment and other support services and through the rent incentive.

Another unique feature of the original demonstration was its "mandatory collaborative," an effort to promote governance, accountability, and support that was intended to craft, fund, and operate this comprehensive initiative. These collaboratives included local public housing agencies, resident representatives, and local public human services and workforce development agencies, which worked together and were accountable to one another. It was deemed that each partner had something special to offer, but each was also limited in what it could do alone.[10]

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[8] This section draws heavily on Bloom, Riccio, and Verma (2005), which provides a fuller description of the demonstration and findings through 2003, when it ended; Riccio (2010) updates some of the main findings, covering another three years of follow-up.
[9] See Bloom, Riccio, and Verma (2005); Blank and Wharton-Fields (2008); and Greenberg et al. (2015).
[10] Kato and Riccio (2001).

The Jobs Plus Developments

Public housing developments in six cities were selected to implement Jobs Plus: Baltimore, Maryland; Chattanooga, Tennessee; Dayton, Ohio; Los Angeles, California; St. Paul, Minnesota; and Seattle, Washington.[11] Three developments (in Baltimore, Chattanooga, and Dayton) were populated almost exclusively by African American residents, who made up 94 percent or more of the Jobs Plus sample for those sites.[12] Residents of the other Jobs Plus developments included higher numbers of Hispanic and Asian/Pacific Islander households and substantial numbers of immigrants. The Jobs Plus developments also varied with respect to other demographic characteristics, such as the percentage of females (ranging from 65 percent to 91 percent of the sample) and households with two or more adults (ranging from 14 percent to 74 percent). The latter households were most highly represented in the sites with high proportions of immigrants (Los Angeles, St. Paul, and Seattle), which included many two-parent households.

Resident mobility was much higher than had been anticipated at the start of the demonstration. Nearly one-third (31 percent) of the residents in the 1998 cohort for all Jobs Plus developments combined moved out of their respective developments within 2 years of the program rollout (that is, before October 2000), and 42 percent had done so within 3 years (before October 2001). The move-out rates were highest in Baltimore, Chattanooga, and Dayton, cities with softer housing markets (especially Baltimore and Dayton) and where public housing appears to have served more as transitional housing for a large proportion of families. At the other three developments (Los Angeles, St. Paul, and Seattle), move-out rates were considerably lower. though hardly trivial, with 22 percent to 38 percent of residents leaving within 3 years. Residents in developments that experienced lower levels of mobility also had the opportunity to be exposed to a more mature and fully developed expression of the program.

Jobs Plus Implementation

Following a 2-year program rollout period, from 1998 to 2000, during which the participating agencies began planning and operating elements of the model, four of the six sites were determined to have developed programs of reasonable quality. Three sites, Dayton, Los Angeles, and St. Paul, were able to contend best with the operational challenges they confronted and fully implement the core components of the model. Baltimore and Chattanooga had a more difficult time getting and keeping all the Jobs Plus components in place. Finally, Seattle, which operated a strong program in the first few years of the demonstration, received a HOPE IV grant and had to contend with reconstruction and temporary dislocation of its residents at its Jobs Plus site. As a result, Jobs Plus ceased being a place-based intervention at this site, and Seattle was withdrawn from the national demonstration. However, because the site continued to operate a Jobs Plus program at the

[11] Each development nominated had at least 250 units occupied by families with a working-age adult. No more than 30 percent of these families could have an employed member, and at least 40 percent had to be receiving welfare.
[12] See Tables 2.1 and 2.2 in Bloom, Riccio, and Verma (2005).

development in modified form as the centerpiece of its HOPE VI community and supportive services plan (under the name "HOPE-Plus"), MDRC continued to evaluate the Seattle program.[13]

Based on the implementation experiences of the sites, the original evaluation clustered the Jobs Plus developments into "stronger" and "weaker" implementation sites, summarized in exhibit 1 (see appendix exhibits B.1, B.2, and B.3 for additional highlights on each study site and its Jobs Plus implementation challenges and accomplishments). The analysis presented in this report continues to use the same classification for the study sites.

Exhibit 1. Housing Developments in the Original Jobs Plus Demonstration

City	Jobs Plus Development	Comparison Development	Jobs Plus Implementation Strength
Baltimore	Gilmor Homes	Perkins Homes Somerset Courts	Weaker
Chattanooga	Harriet Tubman Homes	College Hill Courts Emma Wheeler Homes	Weaker
Dayton	DeSoto Bass Courts	Arlington Courts Parkside Homes	Stronger
Los Angeles	William Mead Homes	Dana Strand Village	Stronger
St. Paul	Mt. Airy Homes	Roosevelt Homes	Stronger
Seattle	Rainier Vista Garden Community	Yesler Terrace	Weaker

Residents of the comparison sites were not necessarily devoid of the types of services and incentives available through Jobs Plus, but what was available to them was more limited. For instance, all the housing authorities offered residents of the comparison developments at least some self-sufficiency programs—on-site basic education, computer, or job readiness classes—other than Jobs Plus. Some housing authorities also offered a limited number of opportunities for apprenticeship training, such as in buildings maintenance and groundskeeping. The residents of the comparison developments also had access to rent-based work incentives that were available housing agency-wide. However, these incentives were less generous than those offered by Jobs Plus or were available only to residents who met certain conditions. But comparison developments were also much less

[13] In Seattle, the housing authority received a federal HOPE VI grant in 1999, which was used to rebuild the Rainier Vista development where Jobs Plus was located. HOPE VI is a HUD program that is aimed at redeveloping the most "severely distressed" housing projects across the country. The redevelopment process involves replacing public housing units with apartments or townhouses, some of which will become available at market rate to working families in an effort to reduce the concentration of poor households in the development communities.

aggressive in marketing and implementing their incentives to residents than were the developments implementing Job Plus.[14]

Prior Evidence of Jobs Plus Effectiveness

MDRC's evaluation of the original Jobs Plus demonstration examined the program's impacts from two perspectives: an individual-level analysis and a development-level analysis, allowing the study to examine outcomes for individuals, whether or not they remain in public housing, and what happens to the earnings levels in the developments themselves as current residents leave and new ones move in. The individual-level analysis followed one cohort of residents (i.e., *all* the working-age, nondisabled residents living in the development in 1998), even after they moved out of the development.[15] This analysis showed that the program increased earnings for the six-site pooled sample by a small but statistically significant amount over the 4 years following the end of the rollout period, but the earnings effects were large for three of the six sites (Dayton, Los Angeles, and St. Paul) that had fully implemented the essential elements of the model throughout the 4 years of post-rollout implementation.[16] These sites also had positive earnings effects across a range of subgroups. Related to the program's effects on employment, the rates were close, with no notable statistically significant differences for the Jobs Plus and the comparison developments. A subsequent analysis, focusing on additional years of followup, 4 years during program implementation and 3 years after the program ended, found that Jobs Plus households in these three sites continued to experience a gain in average annual earnings of $1,300, or a gain of 16 percent over the full 7-year followup period.[17]

The "development-focused" analysis compared outcomes of the group of residents living in the Jobs Plus developments during each followup year with the group of residents living in the comparison group developments. This analysis differs from the individual-level analysis, mentioned above, which followed the 1998 cohort of residents over time; it focuses on residents in the development in each year of followup, regardless of when they moved into the development. The findings of this analysis showed that the stronger implementation sites produced positive effects on overall development-level earnings, but the magnitude of the effects varied according to each site's resident turnover rates—which, in turn, were related to the tightness of the local private rental

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14 Gardenhire (2004).

15 In this sense, this is not a voluntary sample enrolled in the study, as is the case in most employment-focused interventions: the "sample" was not "recruited" to be in the study. Furthermore, because many 1998 cohort members moved away during the first 2 years that Jobs Plus was being implemented, some were not exposed to the full program. To help account for this "dosage dilution," the analysis was also repeated for a later cohort, including all working-age, nondisabled adults who were residents of a Jobs Plus development or comparison development in October 2000 ("the 2000 cohort").

16 Bloom, Riccio, and Verma (2005).

17 The gain of $1,300 is in nominal dollars, or not adjusted for inflation.

housing market. In particular, the development-level impacts were lowest in Dayton, where tenant mobility (and access to affordable private rental housing) was highest.[18]

Positive results from the original Jobs Plus demonstration prompted a community nonprofit that served the largest housing development in New York City (and the nation) to begin adopting elements of Jobs Plus, and subsequently, for the New York City government to implement an adapted version of Jobs Plus in multiple areas of the city.[19] While the New York City replication included more robust financial coaching, the Jobs Plus providers served much larger public housing developments, and the housing authority offered a less generous financial incentive to work.[20] The effort targeted housing developments operated by the New York City Housing Authority, starting with Jefferson Houses in 2009 and adding eight new sites between 2011 and 2014. An impact evaluation commissioned by New York City Mayor's Office for Economic Opportunity found that Jobs Plus participants had significantly higher employment rates and average earnings in the year and a half following program entry, compared with other eligible residents in the same developments who had not (yet) enrolled. [21] Unlike the evaluation for the original demonstration, the New York City study did not have the benefit of a comparison group of individuals that were like Jobs Plus members but lacked access to the program (making it difficult to attribute effects of the program). The analysis controlled for several demographic and employment characteristics, but it is uncertain how much of the estimated difference is attributable to selection bias (for example, at least hypothetically, residents who enrolled in Jobs Plus early or at all may have been more motivated to improve their employment situation than residents who enrolled much later or did not enroll at all) rather than program effects.

Neither of these studies examined the potential effects of these programs on children. For the original Jobs Plus evaluation, the younger children who were in households exposed to the program are now old enough to be engaged in the labor market. A baseline analysis of the children residing in the developments at the start of Jobs Plus examined whether the characteristics of their parents and the communities they lived in were associated with differences in their circumstances and well-being.[22] The findings showed that on some, but not all, measures of school and behavioral outcomes,

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[18] In Dayton, people with earnings moved out at a higher rate, and people with lower or no earnings replaced them, keeping the year-to-year averages at the development level lower. A development-level analysis was originally proposed for the HUD-funded long-term impact study but was dropped due to data limitations.

[19] Building on the work by the East River Development Alliance (now Urban Upbound), a community organization in Queens, New York, to adapt Jobs Plus for Queensbridge Houses, the City of New York scaled up the replication of Jobs Plus.

[20] See Leopold (2019). As described, the average Jobs Plus provider had more than 2,000 public housing units in its service area (for comparison, the original demonstration sites averaged about 560 units per housing development. The New York housing agency also had less flexibility to alter the rent calculation of public housing residents to reduce financial disincentives to work.

[21] Leopold et al. (2019)

[22] See Morris and Jones (2002).

a substantial proportion of children living in public housing exhibited negative outcomes—and older children and boys were at greater risk than younger children and girls.

Beyond the above-described efforts to estimate program effects on employment and earnings, Jobs Plus has been the focus of in-depth implementation and process studies, documenting its scale-up, first as part of the Social Innovation Fund's replication effort[23] in the Bronx, New York, and San Antonio, Texas, and next as part of HUD's national replication effort. HUD has also commissioned an impact study of its replication effort, focusing on the first 24 sites to implement the program.[24]

The HUD-commissioned longer-term impact study for the original Jobs Plus participants offers an unusual opportunity to examine relatively long-term effects of an employment-focused program. Few studies, especially related to households receiving housing subsidies, have tracked employment outcomes for such extended periods of time; the Moving To Opportunity demonstration, a randomized controlled trial that offered families living in public housing vouchers to move to lower-poverty neighborhoods, is an exception, but helping families move to low-poverty neighborhoods is the main pathway out of poverty for that intervention.[25] Evaluations of welfare-to-work initiatives, mostly from the 1990s, along with more recent sector-focused employment programs, provide some context for assessing the lasting gains from interventions that offer employment and training services and financial assistance in the case of some. For the New Hope program, which offered services and financial incentives to low-income families in two inner-city neighborhoods in Milwaukee, Wisconsin, labor market effects were assessed over 8 years of follow-up. The results showed that New Hope's effects on employment and income lasted for most families only during the 3 years in which the program operated; for a subgroup of individuals facing moderate barriers to work, New Hope increased employment, earnings, and income through Year 8.[26] A randomized controlled trial of Project Quest, a program in San Antonio, Texas, which offers to help low-income adults earn post-secondary credentials and access to jobs in specific sectors, found that program participants earned substantially more than control group members in the third through ninth years after random assignment—the program's impact on annual earnings grew to $5,239 in year nine—a difference that was both statistically significant and the largest of any year.[27] Long-term impact analysis for three sites in the National Evaluation of Welfare-to-Work Strategies, a random assignment study testing the effects of alternative approaches to helping welfare recipients find jobs, showed that for approaches that were promising and effective in the short term (i.e., the first 5 years),

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[23] See Greenberg et al. (2015).

[24] Program impacts are being examined by MDRC as part of a companion study.

[25] The study finds that receiving housing vouchers to move from public housing in high-poverty neighborhoods to rental units in lower-poverty neighborhoods during childhood led to long-lasting influences on their well-being in adulthood (i.e., increased college attendance and earnings and reduced single parenthood rates). These effects were present for children who moved before turning 13 years old. See Chetty, Hendren, and Katz (2016).

[26] See Miller et. al. (2008). From the start, and as hypothesized, New Hope was found to have larger effects on moderately disadvantaged individuals or those with only one barrier to employment. The large effects for this group stood out over time, persisting through Year 5 and growing larger by Year 8.

[27] Roder and Elliot (2019).

their effects dissipated over time.[28] Whether the initial promising effects observed for the stronger implementation site in Jobs Plus are enduring—and whether they spur positive effects for children—is an open question and the focus of the remainder of this report.

II. Long-Term Impacts Analysis: Research Questions, Study Sample, Data Sources, and Analytic Approach

The long-term impact analysis of the effects of the original Jobs Plus demonstration examines effects on labor market outcomes for both the work-able residents living in Jobs Plus developments at the time Jobs Plus was launched in 1998 (who have not yet reached retirement age by the end of the long-term follow-up period) and the children living in Jobs Plus developments at the time of the launch. The analyses use an Ordinary Least Squares (OLS) methodology, leveraging the very close match in baseline earnings and employment levels and trends in the 6 years leading up to Jobs Plus implementation to compare the labor market outcomes for the Jobs Plus program group with the outcomes of the comparison group about 15 years after the program ended in 2003. This section describes the study's research questions, how the adult and child study samples were defined, the timeframe of the analysis, the data sources used for the analyses, and the analytic approach used to estimate long-term program impacts. Exhibit 2 offers a high-level summary of some of the key distinctions in the approaches used for the original individual-level analysis and the longer-term impact study, distinctions covered in the rest of this section.

Exhibit 2. Summary of Key Distinctions in the Approach Toward the Individual-Level Analysis in the Original and Longer-Term Impact Analyses

Feature	The Original Jobs Plus Evaluation	The HUD-Funded Long-Term Impact Analysis
Target population	Adult residents in the study developments	Adults and children in the study developments
Sample definition	All working-age, non-disabled residents, ages 21–62 in 1998	All working-age, non-disabled residents, ages 18–44 in 1998 (ages 38–64 during analysis period); Children age 17 and under living in the developments in 1998 (ages 20–38 during analysis period)
Analytic method	Comparative Interrupted Time Series	Ordinary Least Squares
Data source for earning and employment	State Unemployment Insurance data	National Directory of New Hires
Followup period	1998 to 2006	June 2017 to May 2019

[28] Hamilton and Michalopoulos (2016).

Research Questions and Hypothesized Long-Term Effects

Two research questions are at the center of the long-term impact analysis for residents living in the original Jobs Plus sites in October 1998 (see exhibit 3). The first question focuses on the adult residents of the original Jobs Plus developments and seeks to understand whether the significant program-induced gains in residents' earnings due to the implementation of Jobs Plus in the housing development—and which did not show signs of fading through 2006—were sustained 15 years after the intervention ended. The two confirmatory outcomes for the adult-focused analysis are ***1) average annual earnings over Years 20 and 21, and 2) average quarterly employment rates over Years 20 and 21***. A 2-year average is a more accurate picture of earnings at the end of the followup period, given the variability in earnings from year to year. Confirmatory outcomes represent the key measures for assessing the effectiveness of an intervention and are typically based on a well-grounded theory of change. Given their primacy, impact findings on confirmatory outcomes are often subjected to further statistical adjustments to account for multiple hypothesis testing and reduce the risk of a false positive finding. The analysis for adults also includes exploratory outcomes, which are not the key outcomes of interest but can help to explain how a program had its effects, are more distal outcomes, or can uncover interesting patterns in the data. Included in this group are impacts for subgroups of interest, impacts by sites, impacts on earnings and employment in a given year, and impacts on measures of the persistence of employment. Impacts on exploratory outcomes are not typically subjected to statistical adjustments for multiple hypothesis testing.

The second question focuses on the potential intergenerational effects of this program and examines whether the gains in earnings of its participants also translated into long-term improvements in their children's employment and earnings. All analysis of long-term effects for children, including effects for strong implementation sites, effects by individual sites, and effects for subgroups of interest, are considered exploratory, given that they are not the study's key outcomes of interest.

The analysis for adults is conducted for the sample pooled across sites and by program implementation strength, for individual sites, and for age-specific subgroups within each sample. However, the confirmatory outcomes analysis is focused only on the strong implementation sites. The analysis of the long-term effects for children focuses on the group of sites with stronger implementation, where there was evidence of sustained effects for work-able adults, and effects are also examined for individual sites and for age-specific subgroups within that sample.

Exhibit 3. Key Research Questions for the Long-Term Impact Analysis

Primary research question:

- Were the Job Plus-induced gains in residents' earnings found for the strong implementation sites sustained 15 years after the end of the intervention?

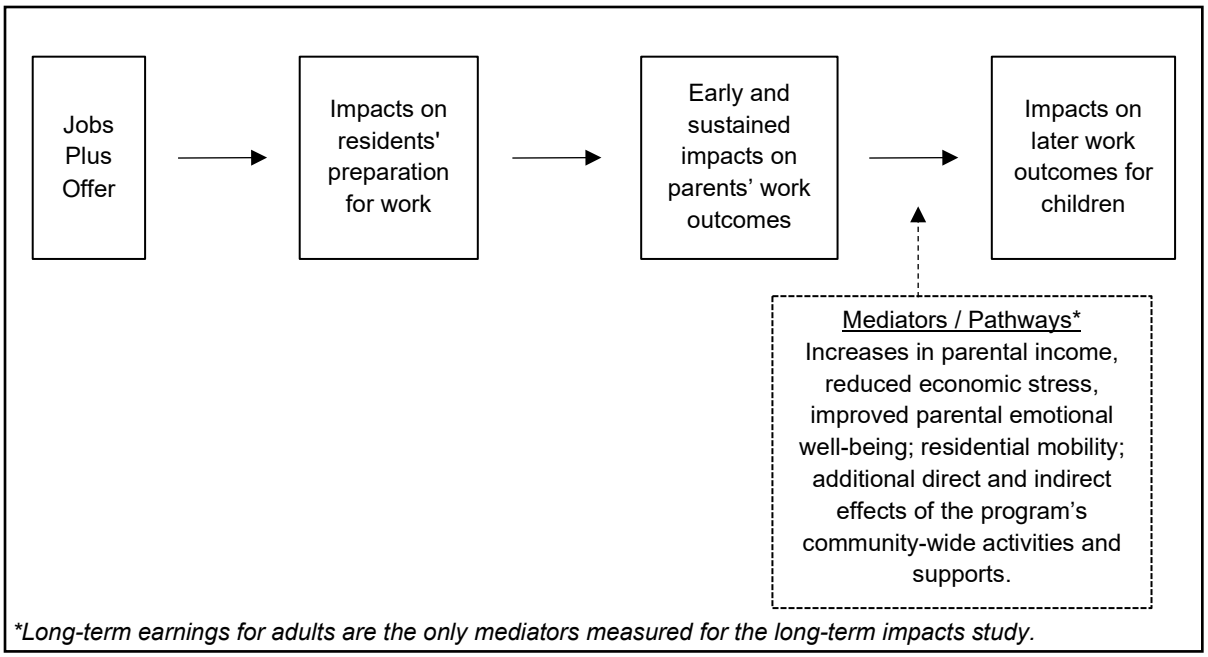
Secondary research question:

- Did the Jobs Plus-induced gains in residents' earnings found for the strong implementing sites translate into long-term improvements in their children's employment and earnings?

Exhibit 4 offers a simplified illustration of the hypothesized pathways for the longer-term effects of Jobs Plus. While the program was operational, its multicomponent approach was fundamental to its vision for producing large impacts on employment and earnings: tackling residents' obstacles to work through employment services, financial incentives, and social network strategies to enhance residents' interest in and commitment to work, their capacity to look for and find work, their skills to qualify for better jobs, and their knowledge about job opportunities.[29] These changes, in turn, would increase their participation and success in the labor market. Sustained employment and earnings, if they occurred, could spur a range of family well-being outcomes. Findings from the original evaluation showed that Jobs Plus's positive effects on residents' earnings were substantial and enduring, even after many residents moved out of public housing (and were no longer eligible for program services and incentives). Furthermore, 7-year trends in the program's earnings impacts also indicate that Jobs Plus's effects continued to be evident in the 3 years after the program ended (the duration of a follow-up analysis).

[29] See Bloom et al. (2005) for a fuller depiction of the program's underlying theory of change.

Exhibit 4. Simplified Illustration of the Hypothesized Long-Term Effects of Jobs-Plus



Over time, as in the extended followup period captured by the long-term impact analysis, Jobs Plus may continue to affect participants earnings in a few ways. Individuals who were exposed to—and benefited from—the program might be more likely to continue working, move back into work more quickly if unemployed, and experience greater earnings growth by changing jobs or advancing on the job. Any training opportunities they took advantage of during the program period may also support their employment and earnings trajectories over the long term.

One factor to keep in mind when interpreting the impacts is that the environments in the developments (both Jobs Plus and comparison) may have changed over time as new policies or programs were developed. One example that was documented in the original evaluation report is that the Seattle Jobs Plus site underwent HOPE VI revitalization, meaning that large numbers of residents were relocated during the followup period. But other changes likely took place during the 15 years spanning the long-term followup, some of which are known and some of which are not known. For example, PHAs may have implemented new programs in comparison developments, designed to increase residents' employment and earnings. When discussing the findings, the report documents any known changes in the developments that may have affected impacts over the long term. In a place-based study, however, where many people were still living in the developments for years after the program ended, it is important to consider that other factors or policies may have been occurring that worked to sustain or diminish Jobs Plus's effects over time.

Related to the effects on children, child development theory points to two primary mechanisms through which increased parental income can improve children's well-being.[30] The first is through reducing parental stress: with increased income, parents reduce their stress levels and improve their interactions and relationship with their children.[31] The second is through increased material investment: parents are able to provide more material goods that can improve children's well-being, such as improved nutrition or higher quality childcare and education.[32] Several studies that analyzed the causal links between increased parental income and improved child well-being—including rigorous quasi-experimental analyses leveraging random assignment designs and natural experiments—have consistently shown that increases in parental income lead to small but positive effects on children's cognitive outcomes, behavioral outcomes, and academic achievement. [33]

In the case of Jobs Plus, the effects on children would primarily occur through the effects of the program on the children's parents or other adults in the household. In the stronger implementation sites, Jobs Plus had sustained impacts on the earnings of work-able adults living in the Jobs Plus developments. With earnings rising in both the program and comparison groups over the period of the demonstration, the rent incentive could have further contributed to increased disposable household income since households in Jobs Plus developments did not have to increase the amount of rent they paid when their income increased, as households in the comparison group did. There was no evidence that Jobs Plus increased employment rates across the three sites. Therefore, it is reasonable to expect that a key pathway through which Jobs Plus might affect children's later labor market outcomes in adulthood would be through increases in parents' (and other adult household members') earnings throughout and beyond the Jobs Plus program. It is possible, however, that while increased income from additional earnings and the rent incentive can improve children's wellbeing, if those increased earnings are derived from working longer hours (which would not be captured by estimating effects on employment rates), reductions in time that parents spend with their children may have negative effects on their well-being. It is possible that increased household income was not the *only* pathway through which children could have benefited from Jobs Plus. As implied by the saturation nature of this initiative, children could have been affected in other ways, at least in theory, through various community-building experiences, mutual support among families, or through some employment services like childcare assistance. Finally, another factor that may affect children's earnings as adults is residential mobility, either by the parents when the children were young or by the children as adults. Other research documents the positive effects of mobility to neighborhoods with more resources.[34]

The findings described later in this paper will contribute to the body of evidence on the broader question of how program exposure affects child outcomes. As shown in exhibit 4, this study

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[30] For a fuller discussion of these pathways, see Gennetian et al. (2010).
[31] McLloyd (1990).
[32] Becker (1981); Coleman (1988).
[33] Gennetian et al., (2010); Cooper and Stewart (2017).
[34] See Chetty, Hendren, and Katz (2016).

does not measure the effects on any of the mediators that could lead to such long-term labor effects, such as other community-based inputs, parental stress and mental and emotional well-being, how parents invested their increased income, or any intermediate child outcomes such as academic or behavioral outcomes. Nevertheless, it provides important insight into one aspect of how a place-based employment program that has been shown to be effective in improving the earnings of adults in a housing subsidy program can also improve the long-term outcomes for children living in their households.

Subgroup Analyses

The study examines the long-term effects for two types of subgroups in both the adult and child analyses: (1) by site, and (2) by age at baseline. Effects are estimated separately for individual sites to understand if there was variation in long-term effects by site and to interpret any variation in effects in the context of the site-level patterns of effects found in the original demonstration. The 1998–2003 impact analysis had found large and positive effects on annual earnings of similar magnitude across all three stronger implementation sites. However, in that analysis, Dayton was the only site to show some evidence of effects on annual employment rates through the end of the program implementation period. Were the long-term effects also comparable across the three sites? Did they translate into similar effects on children's labor market outcomes?

Effects on employment and earnings were also examined separately for different baseline age groups and compared statistically across those groups. For the adult sample, the age categories were: (1) 18 to 24 years old; (2) 25 to 34 years old; and (3) 35 to 44 years old at the start of Jobs Plus implementation in 1998. The youngest age group was just entering the labor market at the time that Jobs Plus was first implemented, and some of those adults would have been participating in post-secondary education programs. The oldest age group includes adults nearing retirement age at the Years 20 and 21 follow-up period, and it is possible that the Jobs Plus program affects how long participants remain in the labor market.[35]

For the child sample, effects were examined for the following age categories: (1) under age 5 (early childhood), (2) age 6 to 12 (middle childhood), and (3) age 13 to 17 (adolescence). Prior research shows that income increases can have larger benefits for younger children.[36] It is also important to keep in mind, however, that any differences in effects across different age groups may be driven not only by the age of the child at the time of the demonstration and the differential influence of increasing household income at different stages of child development, but also by the age of the child at the time of followup in Years 20 and 21 and when any influences of increased income during childhood might manifests themselves in adulthood. For example, any child who was under 5 years old at the time of the start of the demonstration will not yet have reached 25 years of

[35] As shown in exhibit 5, this sample excludes individuals who were 45 to 62 in 1998 and were included in the impact analysis reported in Bloom et al. (2005) and Riccio (2010).
[36] Morris et al. (2005); Vortruba-Drzal (2006).

age, a common threshold for studying effects on adult earnings, given post-secondary education, by the start of the long-term followup period.

Samples and Timeframe

The long-term employment and earnings outcomes are examined for two samples: an adult sample and a child sample. As shown in exhibit 5, the adult sample includes working-age, non-disabled members of the original cohort of residents living in program and comparison developments who were between the ages of 18 and 44 years in October 1998—in other words, they had not reached retirement age, or age 65, by the end of this study's followup period in 2019. Exhibit 5 also shows how the sample for the long-term impact study overlaps with original study 1998 cohort.

Exhibit 5. Samples in the Original Jobs Plus Demonstration Evaluation and the HUD Long-Term Impact Analysis

<table>
<tr><th colspan="5">Age at Baseline (1998)</th></tr>
<tr><th>0–17</th><th>18–20</th><th>21–44</th><th>45–61</th><th>62+</th></tr>
<tr><td colspan="2"></td><td colspan="2">Original Demonstration Sample
(Work-able, non-disabled)</td><td></td></tr>
<tr><td></td><td colspan="2">Long-Term Impact Analysis Adult Sample
(Work-able, non-disabled)</td><td colspan="2"></td></tr>
<tr><td>Long-Term Impact Analysis Child Sample</td><td colspan="4"></td></tr>
</table>

Although the adult sample in this report is not identical to the sample used in the original study, in aggregate there are very few differences in their baseline characteristics. Exhibit 6 shows baseline characteristics of the adult sample in this report. Across race, ethnicity, gender, and household composition, the adult sample in this report aligns closely with the 1998 cohort demographics.[37] The adult sample in this report does skew to a younger group than the 1998 cohort: the average age of adults in 1998 is around 30 years, and adults under the age of 34 make up almost 60 percent of the sample. This difference is to be expected given the focus of the analysis on assessing effects on residents 20 years after the implementation of Jobs Plus.

All children living in the Jobs Plus developments in 1998 are included in the child sample, regardless of whether the adults in their households were included in the long-term impact analysis

[37] Baseline characteristics of the original study 1998 cohort can be found in Table 2.1 of Bloom et al. (2005).

sample. For example, if all the work-able adults in a household were excluded from the adult sample in the present long-term analysis because they were older than 44 years at baseline, any children in that household would still be included in the child sample of the present analysis. These children were between age 18 and 36 at the start of the long-term followup period. This report examines effects for children using the following age subgroups, based on age in 1998: early childhood (ages 0 to 5 years), middle to late childhood (ages 6 to 12 years), and adolescence (ages 13 to 17). In this report, there are 1,050 children who were under the age of 5 years in 1998, 1,566 in middle to late childhood (6 to 12 years), and 706 in adolescence (13 to 17 years).

Only a small proportion of individuals in both samples were still receiving some form of housing assistance at the end of the followup period covered in this analysis (Year 21).[38] Exhibit 7 shows housing subsidy receipt rates for the adult and child samples in each Jobs Plus site 21 years after the implementation of the program. Across the six sites, approximately 31 percent of adults in the long-term impact analysis sample were still receiving some type of housing assistance.[39] This rate ranged from 37.1 percent in Seattle to 24.1 percent in St. Paul. About 26 percent of the child sample were receiving some form of housing subsidy in Year 21, ranging from 32.4 percent in Chattanooga to 18.8 percent in St. Paul.

[38] For those individuals no longer receiving some form of housing assistance in Year 21, it is unclear how long they continued to live in the development after Jobs Plus ended. Furthermore, as described, some of the developments in the study, both in Jobs Plus and comparison sites, experienced HOPE VI and RAD-related reconstruction and relocation, which could also have affected the subsidy receipt rates reported in exhibit 6. For these reasons, this analysis does not examine the effects of Jobs Plus on housing subsidy receipt.

[39] This includes public housing, Section 8, project-based assistance, multifamily housing, and other types of housing subsidies.

Exhibit 6. Selected Baseline Characteristics of Adults from the 1998 Cohort Included in the Long-Term Impact Analysis

Outcome	Baltimore	Chattanooga	Dayton	Los Angeles	Seattle	St. Paul	All Developments Combined
Race/ethnicity (%)							
White (non-Hispanic)	0.3	3.8	6.2	0.8	7.0	6.4	4.0
Black (non-Hispanic)	99.0	94.1	91.5	8.8	34.8	24.5	64.6
Hispanic	0.1	1.6	0.2	79.2	1.3	3.2	12.8
Asian/Pacific Islander	0.0	0.0	0.1	8.0	28.8	55.4	12.1
Other	0.0	0.0	0.2	0.2	11.0	0.8	1.8
Missing	0.6	0.4	1.7	3.1	17.1	9.6	4.7
Household head (%)	80.4	86.8	86.0	48.3	62.0	62.2	73.1
Female (%)	82.7	87.6	80.9	61.8	72.1	69.8	76.9
Age (%)							
18–24 years	23.2	34.9	35.1	30.1	25.1	27.5	29.6
25–34 years	23.2	34.9	35.1	30.1	25.1	27.5	29.6
35–44 years	36.2	24.5	24.0	39.3	36.1	28.5	31.1
Average age (years)	31.0	29.0	28.7	31.0	30.9	29.8	30.0
Lived in a household with (%):							
Two or more adults	26.1	17.3	20.3	63.7	45.8	52.8	35.1
No children	31.9	19.4	24.7	25.7	23.7	9.2	23.3
Children ages							
0–5 years	31.2	45.1	46.6	28.1	44.8	53.6	41.2
6–17 years	57.2	57.6	51.6	67.2	58.5	77.3	60.2
Sample size	792	728	874	615	598	498	4,105

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.
Rounding may cause slight discrepancies in sums and differences.
Distributions may not add to 100 percent because of rounding.
Source: MDRC calculations from housing authority records collected for the original Jobs Plus demonstration evaluation.

Exhibit 7. Housing Subsidy Receipt Among Adults and Children in Year 21 of Followup for Jobs Plus and Comparison Developments Combined by Site

	Percentage Receiving Housing Assistance in Year 21	
Site	Adults	Children
Baltimore	33.5	28.7
Chattanooga	32.6	32.4
Dayton	27.2	29.1
Los Angeles	31.8	21.3
St. Paul	24.1	18.8
Seattle	37.1	28.9
Sample size	4,716	6,731

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

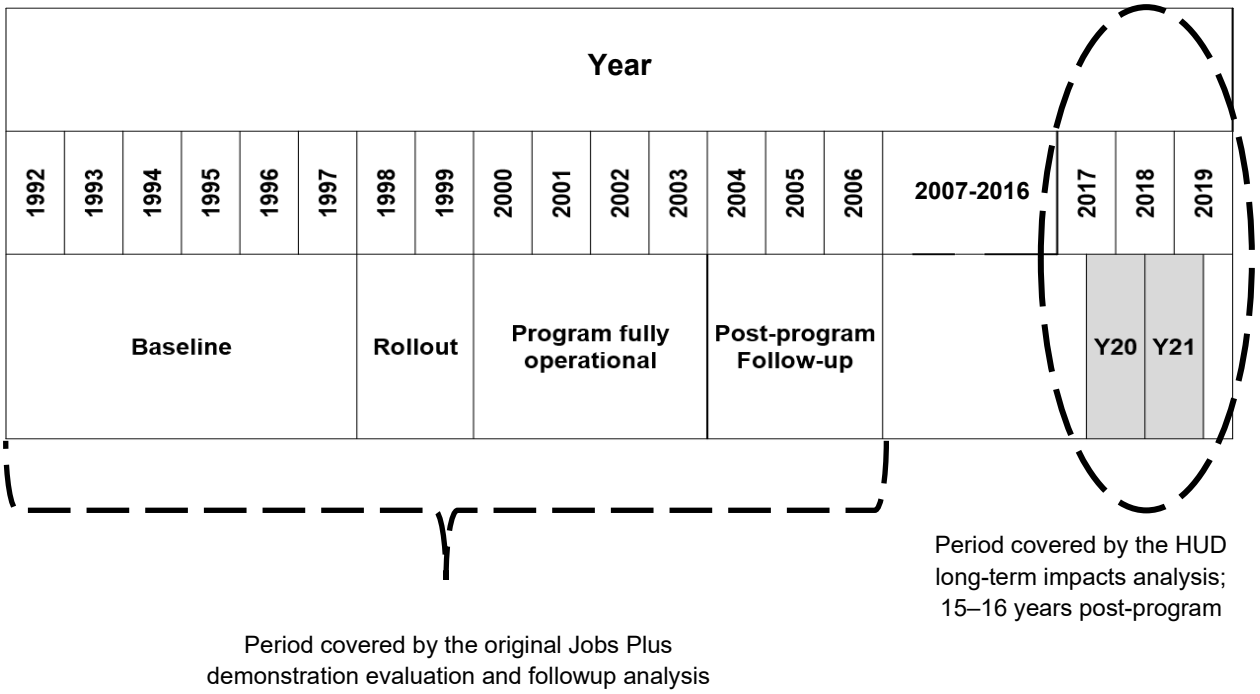
The children sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

This table reflects receipt of any type of housing assistance captured in HUD IMS/PIC data, including public housing, housing choice vouchers, and multifamily housing.

Source: MDRC calculations using HUD IMS/PIC data.

The timeframe for the original and long-term outcomes analysis spans from 1992 to 2020. As shown in exhibit 8, the original Jobs Plus demonstration was implemented during the years 1998–2003. Effects have been estimated in previous studies for the followup period 1998–2006. For both the adult and child samples, the analyses presented in this paper estimate the effects for the followup period Quarter 3 2017 to Quarter 2 2019, the quarters of data that approximate Years 20 and 21 after the program was launched. Specifically, Year 20 is estimated using data from Quarter 3 2017 to Quarter 2 2018 and Year 21 is estimated using data from Quarter 3 2018 to Quarter 2 2019.

Exhibit 8. Timeline of the Original Jobs Plus Demonstration and Followup Analysis



Data Sources and Key Outcomes

The three data sources used in the analyses are described below.

- **National Directory of New Hires (NDNH).** NDNH data contain quarterly wage data for workers in employment covered by the unemployment insurance (UI) system.[40] These data are used to create two primary outcome measures (annual earnings and employment) and a set of secondary outcome measures (length of employment spells and earnings distributions) for sample members during the followup period, Quarter 3 of 2017 to Quarter 2 of 2019, roughly 20 and 21 years respectively following program launch.

- **HUD Inventory Management System (IMS)/PIH Information Center (PIC) data**. These data are used to describe residents' rates of continued participation in subsidized housing programs in Years 20 and 21 of followup for both the adults of the original Jobs Plus evaluation and their children.

- **Baseline data from the original demonstration**. Housing authority records collected for the original Jobs Plus demonstration are used to identify the sample and to create measures that

[40] These data miss some employment that is not covered by the UI system, including informal work and self-employment.

are used as covariates in the impact model. These include demographic characteristics (including age, race/ethnicity and gender), household composition, baseline earnings, and employment.

Analytic Approach

To determine whether Jobs Plus improved residents' labor market outcomes, the original evaluation set up a careful research design that included a reliable comparison group. Within each city participating in the demonstration, several housing developments that were similar in size and in the demographic composition of their residents were identified. MDRC then randomly allocated one of these developments to a program group that got Jobs Plus, while the other one or two were allocated to the comparison group. This cluster random assignment strategy, combined with an interrupted time-series analysis using long-term trend data, allowed researchers to estimate the impact of living in a Jobs Plus housing development on employment and earnings, relative to what those outcomes would have been in the absence of Jobs Plus. The impact of Jobs Plus on work and welfare was estimated by comparing changes in outcomes after Jobs Plus was launched for the Jobs Plus group with changes in outcomes for the comparison group.

The present analysis of effects in Years 20 and 21 is conducted using a different method. Impact models are estimated using individual-level data, in which earnings in Years 20 and 21 are regressed on treatment status, a series of variables capturing demographic characteristics, and a measure of the individual's earnings in 1998, included as a series of variables capturing ranges of earnings.[41] Earnings in 1998 (the first year of Jobs Plus rollout, during which the program was not expected to generate impacts) is used to control for any pre-program differences between the Jobs Plus and comparison residents. The original evaluation found that the program and comparison developments within each site included residents who, on average, were very well matched, both in demographic characteristics and in long-term pre-program employment and earnings trends. Good matches were obtained for all sites combined, as well as within each site. The fact that the Jobs Plus and comparison groups were so well matched from the outset suggests that the regression method will provide a credible estimate of Jobs Plus's long-term impact.

Nonetheless, a sensitivity analysis (not shown) was conducted using data from the original evaluation and a continuous measure of 1998 earnings. For the analysis sample, a regression model was used to estimate the effect of Jobs Plus on earnings in 1998. The resulting estimate, used as a measure of the pre-program difference between the two research groups, is then subtracted from the main estimate presented in the text, akin to a difference-in-difference analysis. The pre-program

[41] Standard errors are adjusted to account for the clustering of outcomes for adults from the same household using Huber-White standard errors. Furthermore, it was not possible to include the continuous variable of baseline earnings as a covariate in the model due to restrictions on how the NDNH wage data could be linked with other data sources. In an effort to minimize the risk of identifying individuals, data on actual earnings could not be linked with NDNH data, but data aggregated into ranges of earnings could be linked.

difference in earnings was very small ($72 for sites with stronger implementation and $227 for sites with weaker implementation), so the results from the sensitivity analysis are very similar to those presented in the main report.

One limitation of this analytic method is that it does not account for the fact that the intervention was delivered at the development level (rather than to randomly selected individuals within developments) or for factors at the development level that will affect outcomes for all residents in that development. For this reason, this model most likely overestimates the precision and statistical significance of estimated impacts. Although there are standard statistical methods available to account for this issue, using them requires many sites, more than the six sites available for this analysis. To provide some assessment of how much the model overestimates statistical significance, we conduct a separate "permutation test" for all analyses and discuss the results in the text (see appendix E for details and full results). Thus, the estimates presented in the exhibits should be interpreted with this limitation in mind.

The same analytic method used for the adult analysis is used to estimate the effects on children's employment and earnings in adulthood.[42] The child-level analysis focuses on the three Jobs Plus sites with stronger implementation, which had evidence of positive impacts on adult earnings at the time the program was implemented and for 3 years after the program ended. However, effects on children were also estimated for the sites with weaker implementation (and that did not demonstrate effects on earnings for adults) to test whether the pattern of effects (or lack of effects) is consistent with the expectation that larger gains in parental earnings would lead to stronger effects on children's later employment and earnings outcomes.

Finally, when many impacts are estimated, there is an increased risk that at least one estimate will be statistically significant simply by chance. For this reason, impacts on confirmatory outcomes are typically subjected to statistical adjustments to account for multiple hypothesis testing and reduce the risk of a false positive. Impacts on the two confirmatory outcomes presented in this report (average earnings over Years 20 and 21 and average quarterly employment over Years 20 and 21) are adjusted using the Benjamini-Hochberg method.[43]

Covariates

The evaluation of the original demonstration used aggregate data for its comparative interrupted time series methodology and did not include any covariates. For the OLS model that will be used for this analysis, covariates are important for increasing the precision of the estimates and for controlling for differences between the Jobs Plus and comparison groups at baseline. For each followup year in the original CITS analysis, the comparison-group deviation from its baseline

[42] Standard errors are adjusted to account for the clustering of outcomes for children from the same household using Huber-White standard errors.
[43] Benjamini and Hochberg (1995).

outcome trend was used as the counterfactual for the corresponding deviation from the baseline trend of the Jobs Plus group. In the present OLS analysis however, the *outcome* of the comparison group for a given follow up year is the counterfactual for the outcome of the treatment group. As noted earlier, this counterfactual is credible because the baseline levels and trends in the earnings were very similar between each Jobs Plus group and its comparison group. Including covariates, however, will further improve the balance in baseline characteristics between the two groups. The covariates for the adult analysis include baseline employment, earnings, age, gender, race/ethnicity, number of children in the household, and site indicators. The models for the child analysis include the same set of covariates, except that they include household-level employment and earnings instead of individual-level employment and earnings. As noted, due to restrictions in analyzing NDNH data, both earnings and age are included as ranges in the impact models.

III. Long-Term Effects for Adults

Exhibit 9 presents effects on earnings and employment for residents from all sites combined. The top panel of the exhibit shows Summary Outcomes, averaged for Years 20 and 21 combined, and the bottom panel presents the annual estimates (or Yearly Outcomes). Throughout the discussion, long-term effects are compared with the effects found from the original evaluation, with the dollar amounts adjusted for inflation and shown in 2018 dollars. Although the earlier effects were estimated using a different statistical method than for the original study sample, they provide a useful reference point for considering long-term effects.

First, starting with the top panel (Summary Outcomes), consider outcomes for the comparison group. Comparison group residents earned on average $15,531 per year over the 2-year period. This average includes zeros for those who did not work during a year. On average, about 50 percent of the comparison group worked in a given quarter over the 2-year period.

In terms of program impact, the estimated impact on earnings during the final year (2003) of the original followup period was $472, a statistically significant difference. In contrast, the impact on average earnings in Years 20 and 21 was -$236 and not statistically significant. One reason for the different impacts at the two points in time is that in the original evaluation, the positive effect for all sites was driven by positive effects in the sites that were deemed strong implementers of Jobs Plus. Effects for the weaker implementing sites were close to zero. As the next table shows, in the long-term followup, the negative effect overall, although statistically insignificant, reflects both positive and negative effects across sites. Finally, effects on earnings and employment in individual years (shown in the Yearly Outcomes panel) show a similar story and are also statistically insignificant.

Exhibit 9. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, All Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Summary Outcomes				
Average Annual Earnings, Years 20 and 21 ($)	15,295	15,531	– 236	0.694
Average Quarterly Employment, Years 20 and 21 (%)	50.2	50.8	– 0.5	0.713
Yearly Outcomes				
Total Earnings ($)				
Year 20	15,136	15,618	– 482	0.429
Year 21	15,858	15,833	25	0.969
Employed at least One Quarter (%)				
Year 20	55.4	56.5	– 1.0	0.497
Year 21	55.1	55.7	-0.6	0.677
Average Quarterly Employment (%)				
Year 20	50.5	51.5	– 1.1	0.462
Year 21	50.4	50.4	0.0	0.996
Sample size (total = 4,105)	1,780	2,325		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Exhibit 10 presents effects by implementation strength. The left panel presents effects for the stronger implementation sites (Dayton, Los Angeles, and St. Paul), and the right panel present effects for the weaker implementation sites (Baltimore, Chattanooga, and Seattle). Jobs Plus continued to positively impact earnings in the strong implementing sites. The effect on average annual earnings is $1,670, an 11-percent increase that is statistically significant. Average quarterly employment rates were also higher for the Jobs Plus group, with an increase of 4.2 percentage points over the 2-year period. In the 3-year follow-up for the original study report, or 2000 through 2003, Jobs Plus increased earnings by about 14 percent. Thus, the effect is somewhat smaller in the longer term, but still notable.

Exhibit 10. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Program Implementation Strength

	Stronger Implementation Sites				Weaker Implementation Sites				
Outcome	Program Group	Comparison Group	Difference	P-Value	Program Group	Comparison Group	Difference	P-Value	
Summary Outcomes									
Average Annual Earnings, Years 20 and 21 ($)	16,860	15,190	1,670*	0.056	13,778	15,744	-1,967**	0.019	†††
Average Quarterly Employment, Years 20 and 21 (%)	54.3	50.1	4.2**	0.047	46.4	51.1	-4.7**	0.018	†††
Yearly Outcomes									
Total Earnings ($)									
Year 20	16,752	15,306	1,445	0.103	13,603	15,776	-2,174**	0.010	†††
Year 21	17,357	15,461	1,896**	0.038	14,406	16,077	-1,671*	0.055	†††
Employed at least One Quarter (%)									
Year 20	59.6	56.0	3.6	0.105	51.4	56.6	-5.2**	0.015	†††
Year 21	59.4	55.3	4.1*	0.065	50.9	55.9	-5.0**	0.019	†††
Average Quarterly Employment (%)									
Year 20	54.5	51.0	3.6*	0.098	46.6	51.7	-5.1**	0.013	†††
Year 21	54.4	49.6	4.8**	0.026	46.5	50.8	-4.3**	0.035	†††
Sample size (total = 4,105)	914	1,073			866	1,252			

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul. Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

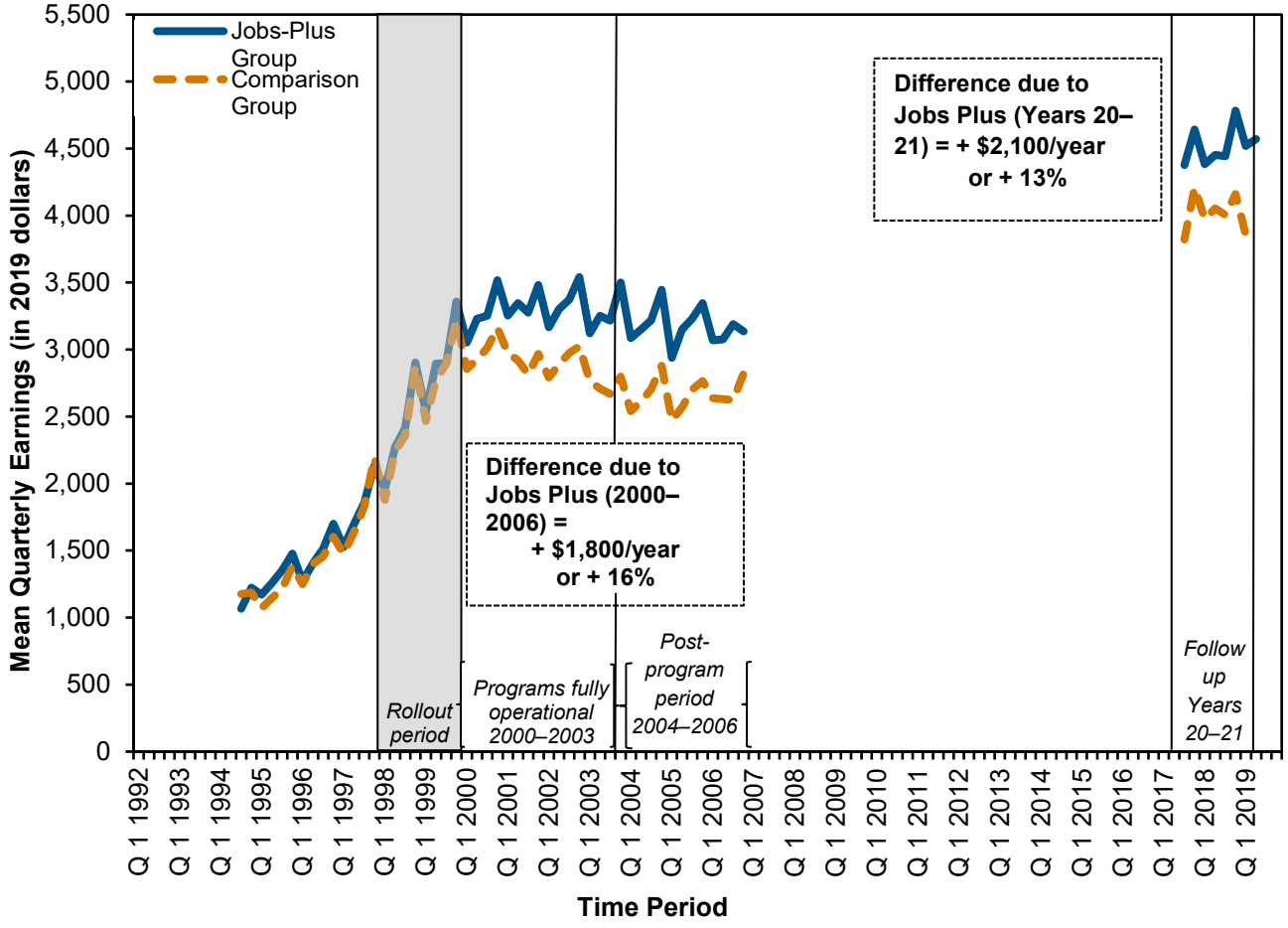
The impact estimates for the two confirmatory outcomes (average annual earnings over Years 20 and 21 and average quarterly employment across Years 20 and 21) were each statistically significant; therefore, based on the Benjamini-Hochberg multiple hypothesis testing approach, no further adjustments to the p-values were needed.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

As noted earlier, the analysis method likely overestimates the precision of the impact estimates, as denoted by the p-value and asterisks. The p-value indicates the likelihood that the observed difference between the Jobs Plus and comparisons groups arose by chance. The p-value of .056 for the impact on earnings in the strong implementation sites suggests that the impact is statistically significant, having a very low (6 percent) probability of having arisen by chance. The permutation test (described in appendix E) was conducted to assess how much the precision may be overestimated. The findings from that analysis suggests that the p-value of the impact on earnings is 0.249, suggesting a 25 percent chance the effect arose by chance. The p-value for the effect on employment was 0.166 from the permutation test, versus 0.047 in the table.

Thus, the findings suggest that there is somewhat more uncertainty around the effects of Jobs Plus in the strong implementation sites. Nonetheless, the estimated effects reflect the same patterns that were observed previously for shorter-run outcomes, as illustrated in exhibit 11. Hence, the present findings provide suggestive, albeit weaker, evidence that longer-term Jobs Plus impacts for adults are qualitatively similar to the shorter-term impacts.

Exhibit 11. Mean Quarterly Earnings for the Work-Able Adults in the 1998 Cohort and the Long-Term Impact Sample: Stronger Implementation Sites



Note: All earnings amounts shown are in 2019 US dollars. In 2003 dollars, the earnings difference due to Jobs Plus was $1,300/year.

The original sample included work-able adults ages 20 to 61. The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

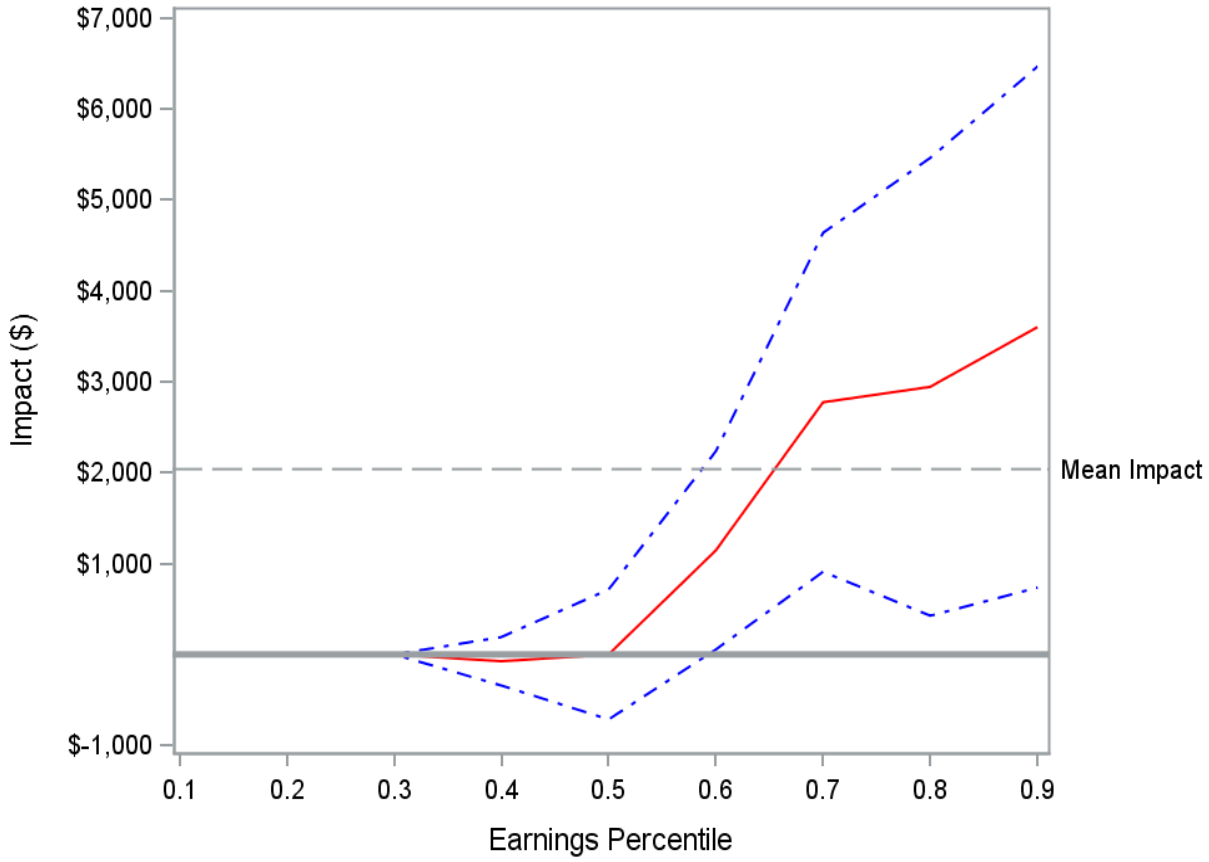
Source: MDRC calculations using National Directory of New Hires (NDNH) data.

The estimated impact of $1,670 on earnings is an average effect across the full sample, but it does not mean that all sample members increased their earnings by $1,670. It could mean that the intervention had smaller, zero, or even negative effects on some parts of the sample and positive effects that are even larger than the average effect for other parts of the sample, based on individual levels of earnings. To assess these possibilities, a distributional analysis of the Jobs Plus and comparison group samples was conducted, where average earnings over Years 20 and 21 for both the Jobs Plus and comparison groups were rank-ordered, and instead of comparing the average outcomes, it compares the outcomes at multiple points in the distribution. Exhibit 12 shows the result: Jobs Plus had no measurable impact on the distribution over the lowest 50 percent of the sample, which is not surprising because much of the bottom 50 percent (about 40 percent) in both groups reported no earnings.[44] Earnings impacts for the top 40 percent of the sample, however, are statistically significant, with about a $1,500 positive impact seen at the 60th percentile and about a $3,500 difference at the 90th percentile.

Cases in which the long-term findings differ from the original study findings are for the weaker implementing sites, which show large negative effects on earnings—a statistically significant reduction of $1,967. (Findings from the permutation test yielded a p-value of 0.111, suggesting that the statistical significance is only slightly overestimated.) In the original study, the weaker sites did show a negative difference in earnings, but one that was relatively small and statistical insignificant. This early slightly negative effect overall has grown into a relatively large and statistically significant negative effect in the long-term. Exhibit 13 illustrates which sites may be driving the results.

[44] The dark line represents estimated effects, and the dashed lines represent 90 percent confidence intervals around those estimates. The confidence interval illustrates the uncertainty, or margin of error, around an estimate, and if that interval includes the value 0, then the estimate is not statistically different from zero. Since earnings are zero at the lower percentiles for both the Jobs Plus and comparison groups, the impact at those lower percentiles is also zero, and it is indistinguishable from the grey line indicating zero impact.

Exhibit 12. Effect on Average Annual Earnings Distribution, Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, Stronger Implementation Sites



Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.
The effects shown are calculated using quantile regression to estimate these effects at each decile of the annual earnings distribution. The measure used in this regression is the average annual earnings across Years 20 and 21.
Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Exhibits 13 and 14 present effects for individual sites by implementation strength. For the stronger implementation sites, the positive overall effect is being driven by large effects in Los Angeles and St. Paul, although the impacts in St. Paul are not statistically significant at the 10 percent level. The effect in Dayton is not significant. Comparing these effects to the inflation-adjusted effects in Year 6 illustrates how the impacts changed over time: the impact changed from $1,754 to -$932 in Dayton, from $1,892 to $3,812 in Los Angeles, and from $2,919 to $2,902 in St. Paul. Thus, the effects dissipated in Dayton, grew larger in Los Angeles, and stayed the same in St. Paul.

The sustained positive effects in the stronger implementation sites as a whole are encouraging and consistent with the finding that earnings increase with work experience. It is not clear what may have driven the fading effects in Dayton. One potential factor, however, may be the

higher move-out rates in that site, which reduced program exposure. By Year 2, for example, 48 percent of Dayton residents had moved out of the Jobs Plus development, compared with 17 percent in Los Angeles and 27 percent in St. Paul.[45]

Finally, another factor to consider, as noted earlier, is potential changes in either the Jobs Plus or comparison developments over time. The comparison development in Los Angeles went through a HOPE VI redevelopment during the later part of the original followup period. By the end of 2003, demolition was complete, and all residents had been relocated, with Section 8 vouchers. Thus, it is possible that this disruption for the comparison residents led to increased impacts on earnings over time.

Similar to the positive effects in the stronger implementation sites, the negative effects in the weaker implementation sites are driven by individual sites. Comparing the long-term effects with those in Year 6 shows the following: the effect changed from -$420 to -$673 in Baltimore, from -$1,311 to -$2,693 in Chattanooga, and from -$355 to -$2,684 in Seattle. Thus, the effect grew more negative in the latter two sites, particularly in Seattle, although the impact estimate is not statistically significant at the 10 percent level.

It is unlikely that Jobs Plus led to negative effects in the weaker implementation sites, and evidence suggests that it may be due to other changes to the Jobs Plus and comparison developments. First, consider Seattle. The original study report provides some insight into why the early positive impacts in that site may have faded by Year 6. First, the Seattle site underwent a HOPE VI revitalization during the followup period, meaning that a large number of residents were relocated to other housing. Moving to housing potentially in other neighborhoods may have reduced access to jobs and supportive networks. Also, the comparison sites introduced new employment services and rent incentives as part of the housing authority's Moving to Work demonstration. The latter factor may have also contributed to the long-term negative effects in this site.

Exhibit 13. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Stronger Implementation Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value	
Dayton					
Average Annual Earnings, Years 20 and 21 ($)	13,567	14,499	– 932	0.399	††
Average Quarterly Employment, Years 20 and 21 (%)	53.5	55.8	– 2.3	0.458	†
Sample size (total = 874)	308	566			
Los Angeles					
Average Annual Earnings, Years 20 and 21 ($)	18,241	14,429	3,812**	0.038	††
Average Quarterly Employment, Years 20 and 21 (%)	52.4	43.9	8.5**	0.040	†

[45] Bloom et al. (2005).

Outcome	Program Group	Comparison Group	Difference	P-Value	
Sample size (total = 615)	326	289			
St. Paul					
Average Annual Earnings, Years 20 and 21 ($)	19,845	16,943	2,902	0.174	††
Average Quarterly Employment, Years 20 and 21 (%)	53.9	47.6	6.3	0.173	†
Sample size (total = 498)	280	218			

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Exhibit 14. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Weaker Implementation Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value
Baltimore				
Average Annual Earnings, Years 20 and 21 ($)	13,820	14,493	– 673	0.636
Average Quarterly Employment, Years 20 and 21 (%)	43.2	45.4	-2.2	0.510
Sample size (total = 792)	276	516		
Chattanooga				
Average Annual Earnings, Years 20 and 21 ($)	11,483	14,176	– 2,693**	0.018
Average Quarterly Employment, Years 20 and 21 (%)	51.2	57.1	-5.9*	0.077
Sample size (total = 728)	269	459		
Seattle				
Average Annual Earnings, Years 20 and 21 ($)	16,881	19,565	– 2,684	0.164
Average Quarterly Employment, Years 20 and 21 (%)	45.3	51.0	-5.8	0.157
Sample size (total = 598)	321	277		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Next, consider the Chattanooga site, which had negative effects by Year 6. Although it is easy to imagine that reductions in work and earnings in the short-term can lead to lasting effects, it is not clear why this site had a negative effect at the outset. As noted in the original study report, in Year 5 of the followup period, Chattanooga changed the Jobs Plus program to financial incentives only, given continued challenges in providing the other two components, and even this component was not strongly implemented. Thus, the program was never fully implemented, although the move to financial incentive only should not have led to negative effects. In terms of the larger negative effects in the long-term, one factor may be the relocation of the Jobs Plus residents. The Jobs Plus development was vacated in 2015 after the city bought the land on which it sits.[46] As with the HOPE VI revitalization in Seattle, the resulting dislocation may have negatively affected former residents. The extent to which former residents were affected, however, would depend on what proportion of the sample was still living in the development in 2015, 17 years after the start of Jobs Plus.

The original study report presented effects for several subgroups within the stronger implementation sites. Effects on earnings were larger, for example, for 1) residents not receiving TANF at program start, 2) residents who had lived in the development for 4 or more years, and 3) younger residents. Exhibits 15 and 16 present effects by age at program launch for stronger implementation sites and for weaker implementation sites. Effects do not significantly differ for the stronger implementation sites. Effects on earnings, for example, range from $1,038 to $2,154, variation that is not statistically significant. Negative effects on earnings in the weaker implementation sites are larger for younger residents, although the differences in impacts across the three age groups are not statistically significant.

Finally, the study examined effects on measures of employment stability (e.g., number of consecutive quarters employed) and measures of earnings levels (e.g., earnings above certain thresholds). Because these are secondary outcomes, the results are presented in appendix C. In general, the findings align with those presented for the primary outcomes of earnings and employment. The strong implementation sites increased sustained employment and increased the number of residents with moderately high earnings (or above $7,500 per year and above $10,000 per year). The weaker implementation sites reduced sustained employment and reduced the number of residents with earnings above these thresholds.

[46] https://wdef.com/2019/01/16/former-site-harriet-tubman-homes-rezoned/

Exhibit 15. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Stronger Implementation Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18-24				
Total Annual Earnings, Average of Years 20 and 21 ($)	22,205	21,167	1,038	0.558
Average Quarterly Employment, Years 20 and 21 (%)	65.7	65.4	0.3	0.939
Sample size (total = 629)	285	344		
Age 25-34				
Total Annual Earnings, Average of Years 20 and 21 ($)	17,381	15,790	1,591	0.248
Average Quarterly Employment, Years 20 and 21 (%)	59.5	54.7	4.8	0.163
Sample size (total = 764)	362	402		
Age 35-44				
Total Annual Earnings, Average of Years 20 and 21 ($)	10,645	8,491	2,154	0.121
Average Quarterly Employment, Years 20 and 21 (%)	35.0	29.5	5.4	0.163
Sample size (total = 594)	267	327		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

Ages referenced in this exhibit indicate the age of adults at baseline in 1998. In Year 20 of followup, the corresponding ages of these adults are 38–44, 45–54, and 55–64.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Exhibit 16. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Weaker Implementation Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18-24				
Total Annual Earnings, Average of Years 20 and 21 ($)	18,540	21,907	– 3,367*	0.063
Average Quarterly Employment, Years 20 and 21 (%)	60.3	70.6	– 10.2***	0.006
Sample size (total = 588)	230	358		
Age 25-34				
Total Annual Earnings, Average of Years 20 and 21 ($)	14,365	16,832	– 2,467*	0.069
Average Quarterly Employment, Years 20 and 21 (%)	50.9	54.4	-3.5	0.292
Sample size (total = 849)	355	494		
Age 35-44				
Total Annual Earnings, Average of Years 20 and 21 ($)	9,316	9,154	162	0.897
Average Quarterly Employment, Years 20 and 21 (%)	29.4	30.6	– 1.2	0.735
Sample size (total = 681)	281	400		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

Ages referenced in this exhibit indicate the age of adults at baseline in 1998. In Year 20 of followup, the corresponding ages of these adults are 38–44, 45–54, and 55–64.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

IV. Long-Term Effects on Labor Market Outcomes of Children Living in Jobs Plus Households

This section turns to an analysis of the program's effects on employment and earnings for the children who were living in the Jobs Plus developments when the program launched in 1998. As noted earlier, the analysis of long-term effects for children are considered exploratory and includes all children living in the Job Plus developments, whether or not the adults in their households are included in the adult impact analysis. The patterns of labor market effects for children discussed in this section align with the patterns for adults: children living in households in the Jobs Plus developments that fully implemented the program had higher average earnings and employment rates about 20 years after program implementation began than their counterparts in comparison developments, whereas there was no evidence of any effects on employment rates or average earnings for children living in Jobs Plus developments where implementation was incomplete or weak.

Effects on Children's Later Labor Market Outcomes in Stronger Implementation Sites

As with the exhibits in the previous section, the top panel of the exhibits in this section show Summary Outcomes, averaged for Years 20 and 21 combined, and the bottom panel presents the annual estimates (or Yearly Outcomes). The findings show that the Jobs Plus demonstration as a whole—pooling together all six sites that participated in the demonstration, regardless of implementation completeness—improved children's labor market outcomes 20 years after the start of program implementation, when children who were 17 or under at the time of the 1998 program launch were ages 18 through 36 at the start of the long-term follow-up period and 20 to 38 years old at the end of the period.[47] As expected, these positive effects on children's long-term labor market outcomes are driven almost entirely by the children who were living in the sites with stronger implementation (Dayton, Los Angeles, and St. Paul). The study hypothesized that any effects on children's later labor market outcomes would have occurred in the stronger implementation sites, where there were positive and sustained effects on the work-able adult residents' average earnings, rather than in the weaker implementation sites that did not demonstrate evidence of positive effects on work-able residents' employment or earnings outcomes.

In these three sites combined, results from the evaluation of the original demonstration found positive effects on average earnings of work-able adults—an increase in about $1,300 (or 16 percent) per year in 2000–2006 dollars (the equivalent of about $1,800 in 2019 dollars), on average, across the 4 years of post-rollout program operations and the 3 years following, as mentioned earlier—but no overall effects on employment rates across these three sites. The results of the present long-term analysis show that these sustained effects on adult work-able residents' earnings translated to substantial improvements to the long-term average earnings for the children living in those

[47] Appendix exhibit C.12 shows the estimated long-term effects on average earnings and employment rates for children in all six sites that participated in the demonstration pooled together.

developments, whose effects on average annual earnings even exceeded those of the effects on adult earnings.

Exhibit 17 shows that children living in stronger implementation sites had average annual earnings that were about $2,700 higher 20 and 21 years later than children living in comparison developments that did not implement Jobs Plus. Children living in these three Jobs Plus developments earned about $21,000 annually, on average, across Years 20 and 21. In contrast, children in the comparison group had average annual earnings of about $18,300 during this followup period. These estimated effects on average earnings are highly statistically significant in both followup years. It is interesting to note that, for both the program and comparison groups, the earnings levels for the child sample during Years 20 and 21 are significantly higher than for the adult sample, which were approximately $17,000 annually for the program group and $15,000 annually for the comparison group during the followup period. This might be explained by the lower employment rates for the adult sample, likely because of their older ages.

Exhibit 17. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Summary Outcomes				
Average Annual Earnings, Years 20 and 21 ($)	20,961	18,255	2,706***	0.000
Average Quarterly Employment, Years 20 and 21 (%)	72.8	66.6	6.2***	0.000
Yearly Outcomes				
Total Earnings ($)				
Year 20	20,322	17,977	2,345***	0.001
Year 21	22,143	19,095	3,048***	0.000
Employed at least One Quarter (%)				
Year 20	81.9	76.6	5.3***	0.001
Year 21	81.5	75.7	5.7***	0.000
Average Quarterly Employment (%)				
Year 20	72.7	67.4	5.3***	0.001
Year 21	73.2	66.1	7.1***	0.000
Sample size (total = 3,322)	1,622	1,700		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.
Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.
Rounding may cause slight discrepancies in sums and differences.
Distributions may not add to 100 percent because of rounding.
Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.
The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.
Stronger implementation sites include Dayton, Los Angeles, and St. Paul.
P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.
Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

The theory of change predicts that increasing parents' earnings should increase their children's earnings as adults. However, other research suggests that the size of Jobs Plus effects observed for the children are larger than what would be expected from parents' earnings gain alone. This research, on economic mobility, examines the correlation between parents' and children's earnings, and data from the U.S. suggests that increasing income for parents by 10 percent, for example, can lead to a positive effect on children's adult earnings of between 3 and 5 percent.[48] Thus, the effect observed for Jobs Plus (an increase in earnings of 15 percent for the children) is large, given that the effects on earnings for adults were about 16 percent in the shorter-term and 11 percent in the long-term. This finding suggests that the effect on children may have operated through additional pathways. If parents moved to neighborhoods with more resources, for example, or if the children moved as adults, this would affect their adult outcomes. Data on mobility are not available to assess this hypothesis.

Finally, as was done for the adult impacts, the effects for children were estimated using the permutation test to assess how much the standard model overestimates the precision of the impact estimate. That analysis (shown in appendix D) suggested that the effects for children are statistically significant. The permutation test for effects on earnings and employment in the stronger implementation sites yielded p-values of 0.083. P-values of less than 0.10 are typically considered statistically significant.

In addition to the long-term effects of Jobs Plus on average later earnings for children living in the Jobs Plus developments, like the long-term impact analysis for the adult sample, the study also examined the long-term effects at various points throughout the *distribution* of earnings during this 2-year followup period. Exhibit 18 illustrates the effects on average annual earnings for Years 20 and

[48] See Aaronson and Mazumder (2008). There is, however, some research showing that this association between parents' and children's earnings is stronger at the lower end of the income distribution (Palomino, Marrero and Rodriguez, 2018).

21 at each decile of the distribution.[49] It shows that the long-term impact on children's earnings is consistently positive and statistically significant from the 10th percentile of the distribution to the 90th percentile, with the impact rising from about $1,000 at the 20th percentile to about $4,000 at the 90th percentile. Thus, Jobs Plus had positive impacts on all parts of the earnings distribution for children. Beginning around the 30th percentile, the effects ranged from about $2,800 to $4,300, without a clear pattern of effects being concentrated in any part of the distribution above the 30th percentile and without any clear upward or downward trend.

Children living in Jobs Plus developments with stronger implementation also had higher annual employment rates than their counterparts living in comparison developments. Exhibit 17 shows that average quarterly employment rates were 6.2 percentage points higher for program group children than comparison group children living in the Jobs Plus developments during the 2-year followup period. Average quarterly employment rates were 72.8 percent in the program group, compared with 66.6 percent in the comparison group. Like with annual earnings, the child sample had much higher employment rates in Years 20 and 21 compared with the adult sample. The adult sample had annual employment rates of 54.3 percent for the program group and 50.1 percent for the comparison group in these households living in the stronger implementation sites during the same time period.

The impact estimates on the yearly outcomes in exhibit 17 align with the impact estimates on these summary measures of average annual earnings and average quarterly employment across the 2-year followup period. The impact estimates on total annual earnings, annual employment, and average quarterly employment for Years 20 and Years 21 are all positive and highly statistically significant.

The estimated effects of Jobs Plus on employment stability and earnings levels (secondary outcomes for the study) align closely with these patterns of findings for average earnings and employment rates described above. These results are presented in appendix exhibit C.14. In stronger implementation sites, children in the program group are employed, on average, 5.8 quarters of the 8-quarter followup period 20 to 21 years after Jobs Plus began, compared with 5.3 quarters for the comparison group. The average length of the longest employment spell within the 8-quarter follow-up period is 5.5 quarters for the program group and 5.0 quarters for the comparison group. Seventy-three percent of the child sample in the program group worked for at least four consecutive quarters within this study period, compared with 66 percent of the comparison group children. The program group had a higher proportion of sample members who earned above each of the three earnings thresholds examined—$7,500, $10,000 and $15,000 annually—compared with the comparison group.

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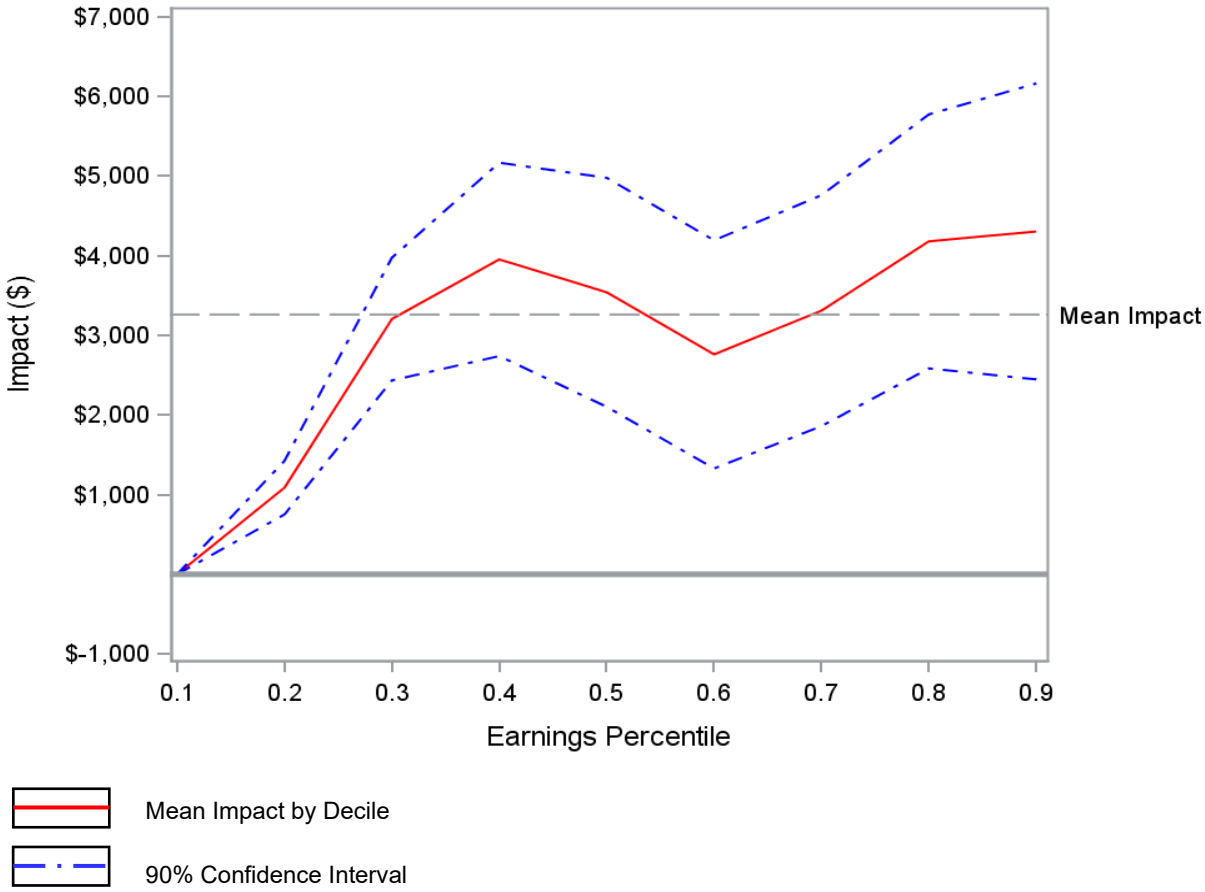
[49] For example, a program group member with annual earnings during the long-term followup period that is at the median (the 50th percentile) of program group earnings had earnings during that period that were $3,451 higher than a comparison group member who had annual earnings at the median of the comparison group.

Exhibit 18. Effects on Average Annual Earnings Distribution, Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, Stronger Implementation Sites



Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

The effects shown are calculated using quantile regression to estimate these effects at each decile of the annual earnings distribution. The measure used in this regression is the average annual earnings across Years 20 and 21.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

As expected, in weaker implementation sites where there was no evidence of effects on work-able adults during 4 years of the program or the 3 years following the end of implementation, there was also no evidence of long-term effects on labor market outcomes of children living in those developments. The results for the weaker implementation sites are presented in appendix exhibit C.13 and compared statistically with the effects on stronger implementation sites. The estimated effects on employment and earnings outcomes for children living in weaker implementation sites are close to zero and not statistically significant in the weaker development sites, both for the primary earnings and employment outcomes in appendix exhibit C.13 and for the secondary employment stability and earnings distributions outcomes in appendix exhibit C.14 The differences in effects between the two groups (children living in stronger versus weaker implementation sites) are highly statistically significant.

Effects on Children's Later Labor Market Outcomes by Site

The present study also examined the effects of Jobs Plus on children's later labor market outcomes separately for each of the three stronger implementation sites: Dayton, Los Angeles and St. Paul. Impact estimates for individual sites should be interpreted with some more caution than the pooled results because the smaller sample sizes within each site lead to less certainty about the estimated effects, and results from single sites are less generalizable to other public housing developments than pooled results from three sites combined.

Exhibit 19 shows that the estimated effects of Jobs Plus on children's later adult earnings are similar in magnitude across the three stronger implementation sites. The increases in average annual earnings range from about $1,900 to $2,300, depending on the site. Due to the smaller sample sizes by site, the differences in earnings between the program and comparison groups are only statistically significant in Dayton. A statistical test of the differences in the effects across the three sites also showed that these differences were not statistically significant for any of the earnings and employment outcomes in exhibit 19, though this could be due to the smaller samples by sites and the low statistical power to detect differences in effects across sites. In other words, it is uncertain whether the variation in estimated impacts across sites reflects a true difference.

While the estimated effects on earnings are comparable in size across the three stronger implementation sites, exhibit 19 shows a pattern of larger effects on employment rates in two of the three stronger implementation sites, Dayton and Los Angeles compared with St. Paul. The effects on average quarterly employment rates during the 2-year follow-up period are similar between Dayton and Los Angeles, with estimated effects of 7.5 and 7.0 percentage points, respectively. In St. Paul, however, the estimated effect on average quarterly employment rates during this 2-year period is much smaller (1.5 percentage points) and not statistically significant. The differences in effects on average quarterly employment, however, were not statistically significant for this 2-year summary measure, possibly due, in part, to the smaller sample sizes by site. Appendix exhibit C.15 presents the effects on the more detailed yearly measures by site and shows that the differences in effects on both

annual employment and average quarterly employment are statistically significant in followup Year 21, but not followup Year 20.

Exhibit 19. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Site, Stronger Implementer Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value
Dayton				
Average Annual Earnings, Years 20 and 21 ($)	14,841	12,613	2,228***	0.008
Average Quarterly Employment, Years 20 and 21 (%)	70.2	62.7	7.5***	0.001
Sample size (total = 1,379)	467	912		
Los Angeles				
Average Annual Earnings, Years 20 and 21 ($)	23,223	20,922	2,301	0.141
Average Quarterly Employment, Years 20 and 21 (%)	72.0	64.9	7.0**	0.036
Sample size (total = 818)	417	401		
St. Paul				
Average Annual Earnings, Years 20 and 21 ($)	26,231	24,292	1,939	0.160
Average Quarterly Employment, Years 20 and 21 (%)	76.5	75.0	1.5	0.571
Sample size (total = 1,125)	738	387		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

Effects on Children's Later Labor Market Outcomes by Child Age During Jobs Plus

It is possible that the effects of living in a Jobs Plus household as a child on later adult labor market outcomes may differ based on the child's age at the time of Jobs Plus implementation. A subgroup analysis was conducted to compare the effects of living in a Jobs Plus household on later employment and earnings across the following three age groups: early childhood (0 to 5 years old), middle childhood (6 to 12 years old) and adolescence (13 to 17 years old).

Prior research shows that income increases can have larger benefits for younger children. It is also important to keep in mind, however, that any differences in effects across different age groups may be driven not only by the age of the child at the time of the demonstration and the differential influence of increasing household income at different stages of child development, but also by the age of the child at the time of followup in Years 20 and 21 and when any influences of increased income during childhood might manifests itself in adulthood. For example, any child who was under 5 years old at the time of the start of the demonstration will not yet have reached 25 years of age, a common threshold for studying effects on adult earnings, given post-secondary education, by the start of the long-term followup period. Therefore, if program effects emerge later in their adulthood, the estimated long-term effects for this age group may be smaller at the time of Year 20 and year 21 followup compared with potential effects 5 or 10 years later, making it inappropriate to directly compare estimated effects between the 0–5-year-old subgroup and the older, 6–12-year-old subgroup and draw conclusions about the relative influence of Jobs Plus based on the child's age during the time of program implementation.

Exhibit 20 shows the results of this subgroup analysis. The estimated effects for both earnings and employment were positive for all three age groups; however, the pattern of effects shows that estimated effects on average annual earnings in both followup years were largest for children who were in middle childhood (age 6 to 12) at the time that Jobs Plus began in 1998, followed by those who were in early childhood (age 0 to 5)[50]. Average employment rates were largest for those who were in early childhood. While these patterns in effects by child age generally align with prior evidence of the effects of income on children, a statistical comparison of the effects shows that there are no statistically significant differences in the effects on any of the employment and earnings outcomes examined across the three age groups. It is possible that the sample sizes become too small when the sample is split into the three age groups (especially for the adolescent group) to detect differences in effects, but the lack of statistical significance in the test of effects across the three age groups indicates that, while there is evidence of effects for the full sample of children living in Jobs Plus developments, there is a high likelihood that the observed differences in effects across the three age groups are due to chance.

[50] A sensitivity test was conducted that split the 6- to 12-year-old age group into two groups, 6- to 9-year-olds and 10- to 12-year-olds, and effects were estimated for those two groups separately. The estimated effects for each group were very similar to one another. The results are presented in appendix exhibit C.21.

Exhibit 20. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Stronger Implementation Sites Summary Outcomes

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 0-5				
Average Annual Earnings, Years 20 and 21 ($)	15,893	14,288	1,605*	0.066
Average Quarterly Employment, Years 20 and 21 (%)	75.2	68.7	6.5***	0.006
Sample size (total = 1,050)	482	568		
Age 6-12				
Average Annual Earnings, Years 20 and 21 ($)	22,353	19,202	3,151***	0.002
Average Quarterly Employment, Years 20 and 21 (%)	72.9	67.4	5.4**	0.012
Sample size (total = 1,566)	770	796		
Age 13-17				
Average Annual Earnings, Years 20 and 21 ($)	25,044	22,899	2,146	0.248
Average Quarterly Employment, Years 20 and 21 (%)	68.1	62.3	5.8	0.118
Sample size (total = 706)	370	336		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

Ages referenced in this table indicate the age of children at baseline in 1998. In Year 20 of follow-up, the corresponding ages of these children are 20-25, 26-32, and 33-37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires.

V. Discussion of Findings

Exhibit 21 summarizes the effects on employment and earnings assessed so far: from the earlier analyses of the effects examined as part of the original demonstration, the followup analysis conducted shortly after the evaluation ended, as well as the long-term effects analyzed in the present study. The pattern of findings demonstrates that, where it was implemented well, Jobs Plus had sustained effects on the earnings of work-able adults living in the developments and that the program also results in long-term positive effects on the labor market outcomes of children living in the Jobs Plus developments at the time of implementation. The first row in exhibit 21 shows that, for the sites with stronger implementation together, there was evidence of positive effects on earnings across the 4 years of program implementation in the 2000–2003 analysis, the effects on earnings were sustained for 3 additional years after program operations ended (as shown in the 2000–2006) analysis, and that there was evidence of long-term effects on employment and earnings 15 years after program operations ended in the present 2017–19 long-term analysis. There was evidence of positive effects on employment and earnings for children in the same 2017–19 followup period.

For the three sites with weaker implementation (the second row in the exhibit), there was no evidence of effects during program implementation in the 2000–2003 analysis. Fifteen years after program operations ended, the comparison group had higher employment rates and average earnings than the program group (possibly due to disruptions to program group developments unrelated to Jobs Plus). There were no effects on children living in those developments with weaker implementation.

Study Limitations

While the findings from the long-term analysis are promising, it is important to recognize some of the caveats and interpret the findings with some caution. First is the study methodology. Two important strengths of the analytic approach are that (1) developments were randomly assigned within sites, and (2) there was a very close match in baseline levels and trends in average earnings between the program group and the comparison group. Despite these strengths, the study uses a methodology (OLS) that is less rigorous than the comparative interrupted time series methodology used in the original Jobs Plus demonstration evaluation (which was not feasible for the long-term analysis) and likely overestimates the statistical significance of the impact estimates. Separate analyses (using the permutation method) suggested that the effects on adults in the strong implementation sites were less precisely estimated that the standard analysis model would suggest. The impact estimates, however, reflect the same patterns that were observed previously for shorter-run outcomes and thus provide suggestive evidence of longer-term effects for adults. The positive effects of children were also subject to the permutation test and remained statistically significant.

This analytic method also does not account for potential differences in the long-term trajectories of employment and earnings between the program and comparison group that might have existed even in the absence of Jobs Plus. In other words, there might exist unobserved differences between the

program and comparison group that might influence long-term labor market outcomes that OLS cannot account for.

Second, the demonstration included six sites, and only three implemented the Jobs Plus model fully. It is a small number of sites for a test of a place-based program where the intervention occurs at the site level and not the individual level.

Exhibit 21. Summary of Impacts on Earnings and Employment for Adults and Children in the Jobs Plus Demonstration: Original Sample and Followup Study Samples

Jobs Plus Program Implementation Strength	Work-Able Adults						All Children, 1998 Cohort	
	1998 Cohort				1998 Cohort in Long-Term Impacts Sample			
	2000–2003		2000–2006		2017–19		2017–19	
	Employment	Earnings	Employment	Earnings	Employment	Earnings	Employment	Earnings
Stronger	0	+	NA	+	+	+	+	+
Weaker	0	0	NA	NA	–	–	0	0

Notes: 0 indicates no statistically significant impacts. + indicates positive statistically significant impacts. – indicates negative statistically significant impacts. NA indicates that these impacts were not calculated.

Source: Bloom, Riccio, and Verma (2005), Riccio (2010), and MDRC calculations using quarterly wage data from the National Directory of New Hires.

Third, the long followup period introduces additional uncertainty given the potential influences unrelated to Jobs Plus that could have affected outcomes for either the program or comparison group. Two such instances were identified and discussed earlier in the report—a HOPE VI redevelopment of the comparison development in the Los Angeles site early near the end of program implementation and the redevelopment of the program development in Chattanooga close to the long-term followup period—and these disruptions had implications for the interpretation of the differences in outcomes between the program and comparison groups in those sites. Since all the members of the program group and all the members of the comparison group within each site were living in different physical developments and in different neighborhoods at the start of Jobs Plus, the extended followup period exposes the long-term employment and earnings outcomes to further influences that may have affected one research group and not the other or affected the two groups disproportionately. Additional examples include self-sufficiency initiatives serving residents in one development in a site but not the other(s), or a transportation option being added to the location of one development and not the other(s).

VI. Conclusion

The results described in this paper provide important evidence on the potential long-term effects of a comprehensive place-based employment program for public housing residents. Jobs Plus was designed to address the challenges of concentrated poverty and the barriers to economic mobility faced by residents of urban public housing developments. Although varied self-sufficiency programs for housing subsidy recipients have been implemented to address these types of challenges, and some have been evaluated, the present study is one of the rare studies to follow program participants for many— in this case, 21—years to test whether program effects are sustained over the very long-term, and whether they have intergenerational effects on their children.[51]

Furthermore, while much attention has been paid to the benefits of children leaving public housing in high-poverty areas for lower-poverty areas in the Moving to Opportunity (MTO) study, the findings from the present exploratory study of the long-term effects of Jobs Plus suggest that children can also benefit meaningfully from public investments in improving the environments in which they already live. Additionally, the findings from the present Jobs Plus long-term impact analysis might provide additional insights into the findings described in this report. Examining the effects for households with children separately from households without children might provide a more useful context for the estimated effects on children's later labor market outcomes. Further exploratory analysis using survey data from the original demonstration—which included data on children's behavioral and school outcomes in select sites—might provide some insight into the mechanisms of the effects on children's later labor market outcomes.

What should the policymakers and practitioners make of the longer-term impacts for current replications and adaptations of the original Jobs Plus model? The general takeaways are encouraging, and they do seem to suggest that a robust implementation of Jobs Plus could serve as a platform for producing lasting economic gains for adults and children. As HUD continues to invest in the scale-up of the Jobs Plus program, it will be important to pay close attention to program implementation experiences and assess how best program exposure can be maximized for residents in developments where this program is being implemented. Another aspect of the model to assess is the strength of local partnerships in the current iteration of Jobs Plus, especially given the important role of mandatory collaboratives in the stronger implementation sites in the original demonstration. Similarly, it will be important for HUD to pay attention to the evidence emerging from the replication study, focused on the early cohorts, to see whether those results also suggest any significant pattern of early impacts and what, if any, opportunities are presented for continuous program improvement.

Keeping in mind the caveats and cautions listed above, it is also worth considering the potential long-term benefits—or returns—of making investments in Jobs Plus type of place-based

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[51] Other evaluations of more traditional employment-focused programs, some which relied on sectoral strategies, followed participants for shorter periods of time (Project Quest, for instance, followed participants for 9 years). While findings from these studies are positive and show encouraging long-term impacts on career advancement, for example, a question remains whether their impacts will persist as individuals change jobs or sectors.

self-sufficiency efforts. Until now, no information was available to assess whether, in the long term, Jobs Plus produces enduring outcomes. The results described in the report suggest a possible return on investment that more than covers the program's net costs in a few years.[52] Drawing on the experience of the three stronger implementation sites (and without a formal cost analysis), the original evaluation developed a rough estimate of costs of operating the *on-site features of the program* (including the rent incentives): approximately $150 per targeted resident in any given month, or $1,800 per year. [53] Although not entirely comparable, the costs of the original Jobs Plus program are somewhat similar to the costs of the HUD Jobs Plus replication program, an analysis based on the first batch of HUD grantees that reached "steady state" operations. So far, HUD's Jobs Plus grants have ranged between $1 to $3 million, depending on the development size and other factors, and are nonrenewable, one-time grants covering 4 years of program implementation and financial incentives—a scale of investment that may be justified for effective programs.

Finally, Jobs Plus programs around the country today serve roughly thousands of households in about 50 housing developments (HUD and non-HUD funded). The results presented in this report suggest that robust implementation of the program can prepare residents for successful transition to or advancement in the workforce. The report also just scratches the surface of unpacking the potential long-term and intergenerational effects of a successful place-based program.

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[52] Given the pattern of results for children, the study examined the feasibility of projecting lifetime earnings gains for children in the strong implementation sites (i.e., is Jobs Plus a good financial investment for families?). Depending on the assumptions made for the pattern of impacts over time, the estimated gain in lifetime earnings for a given individual ranges from $19,000 to $79,000. See appendix D for a brief discussion.

[53] Bloom, Riccio, and Verma (2005). Using this rough estimate, which the authors argue might represent a "high-end" estimate, PHAs with, for example, 250 eligible, working-age residents may need an annual budget in the vicinity of $450,000 per year to provide the on-site services and rent incentives.

APPENDIX A: Analytic Model and Specifications

Building on the close match of the baseline trends of the Jobs Plus and comparison groups, this analysis will use an Ordinary Least Squares (OLS) model with prior earnings (four categorical annual earnings flags consisting of $5,000 intervals beginning with $1–$4,999 and ending with earnings of $15,000 or more) and other baseline variables as covariates in the model. It will adjust the standard errors for clustering at the household level to account for the lack of independence among adults in the same household. The model is specified as follows:

$$Y_{ij} = \alpha + \beta \mathrm{T}_{ij} + \gamma PY_{ij} + \sum_k \delta_k X_{ikj} + \sum_j \varphi_j + eij \quad [1]$$

In this model:

Y_{ij} = annual earnings (or employment) for individual *i* in site *j,*

α = the mean outcome for the comparison development(s),

T_i = 1 if individual *i* lived in the Jobs Plus development and 0 if they lived in the comparison development,

β = the mean program effect,

PY_{ij} = the pre-test (P) value of *Y* over the baseline period for individual *i* in site *j,* broken into categories,

γ_q = the coefficient for the pre-test variable,

$\sum_k X_{ikj}$ = a series of background characteristics *k* for participant *i* from site *j,*

δ_k= a set of coefficients for the background characteristics, and

$\sum_j \varphi_j$= a series of indicators for each site to account for program fixed effects.

e_i = A random error that varies independently across individuals with a mean of zero and a variance that can differ between treatment and comparison group members.

APPENDIX B: Summary of Program Implementation for the Sites in the Jobs Plus Demonstration

Exhibit B.1. Operational Highlights for Stronger Implementation Sites

Dayton: *DeSoto Bass Courts. A* nonprofit agency, formerly the housing authority's Resident Services division, administered Jobs Plus and provided stable and capable leadership and staff.

- Enduring high-level support in securing funding and program services of the housing authority and other collaborative partners, including Montgomery County's multiservice "one-stop" job center.
- Program offered extensive outreach, short-term training, job readiness and search, intensive case management, colocated welfare caseworker, and on-line access to local one-stop's employment database. First site to recruit residents for community support for work component (building captains).
- Rent incentives were implemented in May 2000.

Los Angeles: *William Mead Homes.* Jobs Plus was reconstituted in 2001 after a slow buildup due to PHA staffing gaps, leadership turnover, and equipment needs.

- Became a strong program that provided on-site job search, GED classes for Spanish speakers, and training, with intensive outreach and case management as well as on-site welfare-to-work caseworker and job developer from other public agencies.
- Rent incentives were implemented in June 2000, active promotion by PHA staff.
- Strong community support for work component. Beginning in November 2000, residents were hired and trained as community coaches to help Jobs Plus publicize activities and job opportunities and recruit participants; played leading role in bringing basic education classes on-site.

St. Paul: *Mt. Airy Homes.* Had consistent, professional staffing and colocation of staff from partner agencies.

- Offered on-site job counseling, job clubs, and case management, some customized short-term training classes, U.S. citizenship classes, and ESL and GED instruction. Hmong Women's Support Group assisted with mental health and cultural issues. Head Start and after-school and summer programs were available for children and youth. Education and training were offered through referrals to local schools and agencies.
- Had to address special language- and immigrant-related barriers to outreach, service delivery, and employment.
- First site to implement rent incentives, beginning in November 1998, using PHA funds. Strong management office support in recruiting, orienting, and enrolling households for Jobs Plus as well as administering rent incentives.

Notes: ESL refers to English as a Second Language. GED refers to General Educational Development.
Source: Bloom, Riccio, and Verma (2005).

Exhibit B.2. Operational Highlights for Weaker Implementation Sites

Baltimore: *Gilmor Homes*

- Made a promising start with a full complement of staff and good relationships with an extensive network of local service agencies. Distinctive in its close coordination with a special on-site health office early on.
- Rent incentives were available in November 2000 but poorly administered by the housing authority.
- Jobs Plus had peaked by the end of 2000. Reductions in funding following the expiration of key grants starting in 2001 resulted in a steady loss of staff, including case managers, colocated welfare caseworkers, and job developers. Retrenchment of workforce services in local Sandtown-Winchester neighborhood eroded the capacity of referral network to offer employment services to Jobs Plus participants. On-site health office closed in 2002.

Chattanooga: *Harriet Tubman Homes*

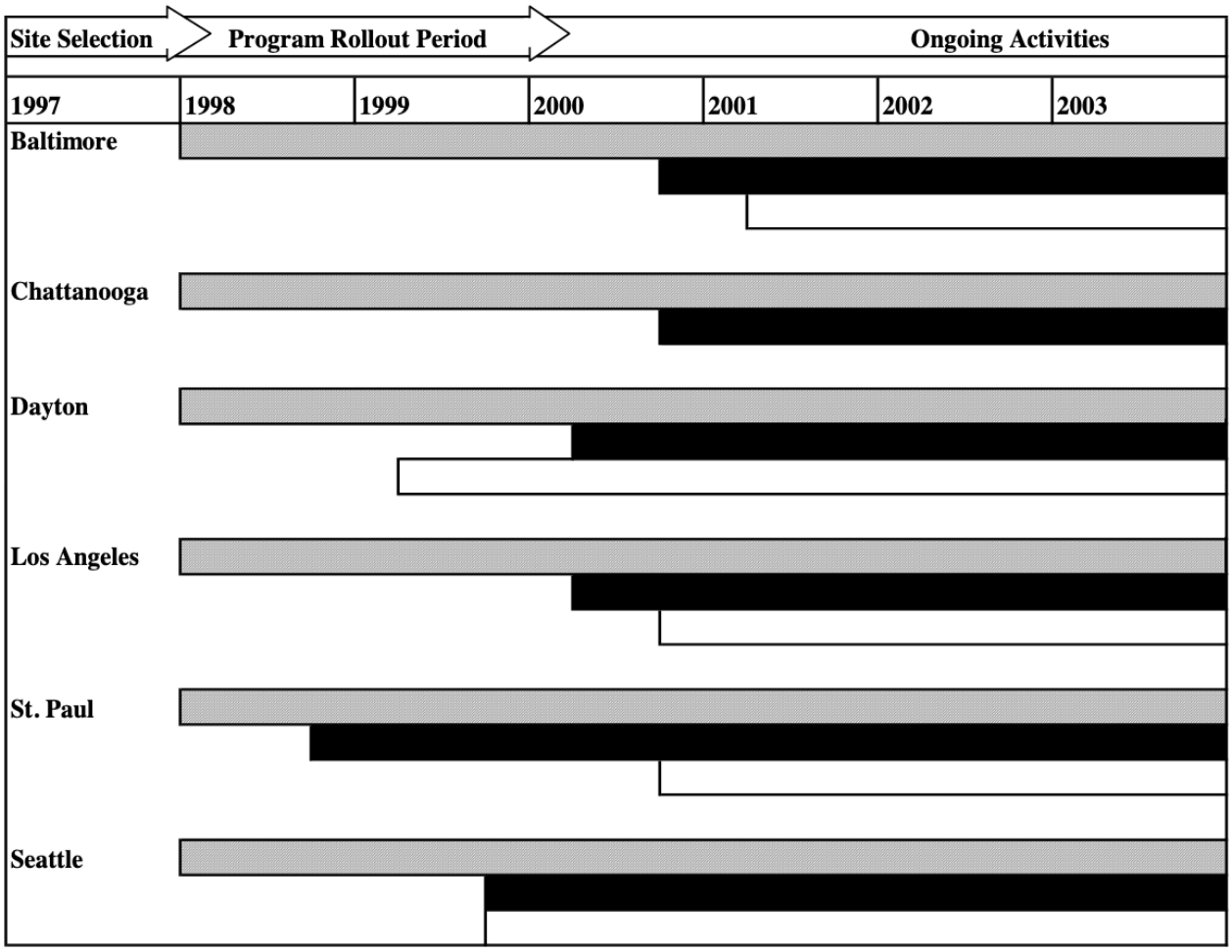
- Until 2000, Jobs Plus foundered. The program was partially staffed by residents unprepared for their roles and given inadequate oversight by senior housing officials. Rent incentives were implemented in November 2000.
- Program was reconstituted between June 2000 and June 2002 with improved staffing, employment counseling, service referrals, and management. Overall, however, progress in strengthening program quality remained limited. Community support for the work component was never fully implemented.
- PHA gave low priority to Jobs Plus after a change in housing authority leadership. Its focus on privatizing its property management and resident services operations made it unlikely that the agency could oversee Jobs Plus adequately.
- In the summer of 2002, the PHA and national demonstration partners agreed to continue a scaled down, financial-incentives-only version of the program (although provision of some on-site services continued informally).

Seattle: *Rainier Vista Garden Community.* The program had strong and stable staff. HOPE VI funding led to the site's formal withdrawal from the national demonstration at the end of 1999. Jobs Plus continued to operate with an expanded mission that included helping residents deal with issues related to relocation.

- Resident relocation under way from 2000 to mid-2002, part of the first stage of redevelopment.
- Rent incentives were implemented in September 1999. Enrollment in this component closed in April 2001 with phasing in of HOPE VI.
- With declining numbers of residents at Rainier Vista, the intensity of services on-site declined as staff were assigned additional responsibilities. Few services were provided to residents once they relocated out of public housing.

Source: Bloom, Riccio, and Verma (2005)

Exhibit B.3. The Original Jobs Plus Demonstration Implementation Timeline



Refers to the availability of the **employment-related services** component at each site, beginning with the year when the local Jobs-Plus program opened an office and began assisting residents. Chattanooga scaled back these services in 2002.

Refers to the availability of the **financial (rent) incentives** component at each site, beginning with the year when Jobs-Plus could begin enrolling households into the incentives program.

Refers to the availability of the **community support for work** component at each site, defined in this figure as the establishment of a formal cadre of volunteer resident outreach workers. Chattanooga had not fully implemented this component. Seattle included a range of other community-building activities under this component.

NOTES: "Program Rollout Period" refers to the demonstration time period during which the sites had not implemented all of the Jobs-Plus components and were still developing the program flow and building the program staff.

"Ongoing Activities" refers to the demonstration time period during which the full complement of Jobs-Plus components was generally in place across the sites (with the exception of Chattanooga). However, activities began to wind down at several sites around mid-2003.

Source: Bloom, Riccio, and Verma (2005).

APPENDIX C: Supplemental Impact Exhibits

Exhibit C.1. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, All Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Number of quarters employed	4.0	4.1	0.0	0.713
Length of longest employment spell	3.9	3.9	– 0.1	0.567
Ever worked 4 consecutive quarters (%)	49.9	50.7	– 0.9	0.587
Highest earnings in Year 20 (%)				
Earned above $7,500/year	47.2	48.5	–1.3	0.399
Earned above $10,000/year	44.5	45.7	–1.3	0.420
Earned above $15,000/year	38.1	41.1	-3.0*	0.050
Highest earnings in Year 21 (%)				
Earned above $7,500/year	48.6	47.7	0.9	0.565
Earned above $10,000/year	46.3	45.3	1.0	0.525
Earned above $15,000/year	40.1	41.2	– 1.1	0.472
Sample size (total = 4,105)	1,780	2,325		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.2. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Program Implementation Strength

	Strong Implementers				Weak Implementers				
Outcome	Program Group	Comparison Group	Difference	P-Value	Program Group	Comparison Group	Difference	P-Value	
Number of quarters employed	4.3	4.0	0.3**	0.047	3.7	4.1	– 0.4**	0.018	†††
Length of longest employment spell	4.2	3.9	0.3*	0.088	3.6	4.0	– 0.4**	0.019	†††
Ever worked 4 consecutive quarters (%)	54.3	50.5	3.8*	0.093	45.6	50.6	– 5.0**	0.020	†††
Highest earnings in Year 20 (%)									
Earned above $7,500/year	51.0	47.8	3.2	0.166	43.5	48.9	– 5.4**	0.014	†††
Earned above $10,000/year	47.9	45.4	2.5	0.267	41.3	45.8	– 4.5**	0.037	††
Earned above $15,000/year	41.1	41.3	– 0.1	0.957	35.3	40.7	-5.4**	0.012	†
Highest earnings in Year 21 (%)									
Earned above $7,500/year	52.7	47.0	5.8**	0.011	44.6	48.0	– 3.4	0.123	†††
Earned above $10,000/year	50.5	44.4	6.0***	0.008	42.5	45.8	– 3.3	0.130	†††
Earned above $15,000/year	42.8	40.4	2.4	0.279	37.5	41.7	– 4.2*	0.052	††
Sample size (total = 4,105)	914	1,073			866	1,252			

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul. Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.3. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value	
Dayton					
Total Earnings ($)					
Year 20	13,157	14,491	– 1,334	0.235	††
Year 21	14,065	14,845	-780	0.504	††
Employed at least One Quarter (%)					
Year 20	59.5	61.8	– 2.3	0.482	
Year 21	60.5	61.3	-0.8	0.817	
Average Quarterly Employment (%)					
Year 20	53.0	56.9	– 3.9	0.224	††
Year 21	54.2	55.1	– 0.9	0.781	
Sample size (total = 874)	308	566			
Los Angeles					
Total Earnings ($)					
Year 20	18,549	15,155	3,394*	0.072	††
Year 21	18,834	14,339	4,495**	0.018	††
Employed at least One Quarter (%)					
Year 20	58.3	50.8	7.5*	0.087	
Year 21	57.4	49.3	8.2*	0.066	
Average Quarterly Employment (%)					
Year 20	53.5	45.0	8.4**	0.044	††
Year 21	52.1	43.4	8.7**	0.039	
Sample size (total = 615)	326	289			
St. Paul					
Total Earnings ($)					
Year 20	19,575	16,612	2,963	0.165	††
Year 21	20,236	17,473	2,763	0.219	††
Employed at least One Quarter (%)					
Year 20	57.9	52.3	5.6	0.251	
Year 21	56.4	52.3	4.2	0.388	
Average Quarterly Employment (%)					
Year 20	54.0	47.6	6.4	0.177	††
Year 21	53.9	47.7	6.1	0.194	
Sample size (total = 498)	280	218			

Note: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.4. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value	
Dayton					
Number of quarters employed	4.3	4.5	– 0.2	0.458	†
Length of longest employment spell	4.1	4.3	– 0.2	0.316	†
Ever worked 4 consecutive quarters (%)	53.0	57.8	– 4.9	0.147	††
Highest earnings in Year 20 (%)					
Earned above $7,500/year	48.2	52.7	– 4.5	0.190	†
Earned above $10,000/year	44.9	48.8	– 3.9	0.260	
Earned above $15,000/year	36.1	42.1	– 6.0*	0.079	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	51.4	52.1	– 0.6	0.853	
Earned above $10,000/year	48.7	47.9	0.8	0.820	
Earned above $15,000/year	40.1	43.5	– 3.4	0.327	
Sample size (total = 874)	308	566			
Los Angeles					
Number of quarters employed	4.2	3.5	0.7**	0.040	†
Length of longest employment spell	4.0	3.4	0.6*	0.062	†
Ever worked 4 consecutive quarters (%)	51.9	42.1	9.8**	0.028	††
Highest earnings in Year 20 (%)					
Earned above $7,500/year	50.0	43.1	6.9	0.120	†
Earned above $10,000/year	47.2	42.2	5.0	0.254	
Earned above $15,000/year	41.6	39.4	2.2	0.612	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	50.4	41.6	8.8**	0.047	
Earned above $10,000/year	48.5	41.1	7.4*	0.096	
Earned above $15,000/year	41.1	38.0	3.2	0.465	
Sample size (total = 615)	326	289			
St. Paul					
Number of quarters employed	4.3	3.8	0.5	0.173	†
Length of longest employment spell	4.2	3.7	0.5	0.196	†
Ever worked 4 consecutive quarters (%)	54.0	48.1	5.9	0.226	††

(continued)

Exhibit C.4 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	51.7	45.8	5.9	0.237	†
Earned above $10,000/year	49.0	44.5	4.5	0.367	
Earned above $15,000/year	45.5	42.5	3.0	0.542	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	53.4	45.0	8.5*	0.088	
Earned above $10,000/year	51.9	43.2	8.7*	0.079	
Earned above $15,000/year	45.5	38.2	7.3	0.138	
Sample size (total = 498)	280	218			

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Standard errors are adjusted to account for the clustering of outcomes for adults from the same household.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.5. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Weaker Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Baltimore				
Total Earnings ($)				
Year 20	14,228	14,223	5	0.997
Year 21	14,409	14,849	– 440	0.763
Employed at least One Quarter (%)				
Year 20	46.6	50.2	– 3.6	0.312
Year 21	46.7	50.9	– 4.2	0.231
Average Quarterly Employment (%)				
Year 20	43.6	45.1	– 1.5	0.656
Year 21	43.7	45.9	– 2.2	0.511
Sample size (total = 792)	276	516		
Chattanooga				
Total Earnings ($)				
Year 20	10,762	13,842	– 3,080***	0.006
Year 21	12,186	14,669	– 2,483**	0.042
Employed at least One Quarter (%)				
Year 20	57.8	63.5	– 5.7	0.101
Year 21	56.5	61.9	– 5.3	0.129
Average Quarterly Employment (%)				
Year 20	51.3	57.8	– 6.5*	0.056
Year 21	51.1	56.5	– 5.4	0.114
Sample size (total = 728)	269	459		
Seattle				
Total Earnings ($)				
Year 20	16,774	20,594	– 3,820*	0.051
Year 21	17,344	19,688	– 2,344	0.243
Employed at least One Quarter (%)				
Year 20	50.8	55.9	– 5.2	0.233
Year 21	49.8	54.9	– 5.1	0.240
Average Quarterly Employment (%)				
Year 20	45.8	53.2	– 7.4*	0.079
Year 21	45.1	49.9	– 4.9	0.239
Sample size (total = 598)	321	277		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.6. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Site, Weaker Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value	
Baltimore					
Number of quarters employed	3.5	3.6	– 0.2	0.510	
Length of longest employment spell	3.4	3.5	– 0.1	0.623	
Ever worked 4 consecutive quarters (%)	43.4	44.1	– 0.7	0.843	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	42.1	43.7	– 1.6	0.649	
Earned above $10,000/year	40.7	41.1	– 0.4	0.916	
Earned above $15,000/year	36.3	35.1	1.2	0.724	††
Highest earnings in Year 21 (%)					
Earned above $7,500/year	41.4	43.9	– 2.5	0.481	
Earned above $10,000/year	41.1	42.9	– 1.8	0.610	
Earned above $15,000/year	37.7	38.4	– 0.7	0.849	
Sample size (total = 792)	276	516			
Chattanooga					
Number of quarters employed	4.1	4.6	– 0.5*	0.077	
Length of longest employment spell	3.9	4.4	– 0.5**	0.048	
Ever worked 4 consecutive quarters (%)	49.7	56.0	– 6.3*	0.085	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	45.1	52.3	– 7.2*	0.056	
Earned above $10,000/year	41.0	47.7	– 6.7*	0.075	
Earned above $15,000/year	30.9	41.6	– 10.7***	0.003	††
Highest earnings in Year 21 (%)					
Earned above $7,500/year	46.9	51.2	– 4.3	0.251	
Earned above $10,000/year	42.9	47.8	–5.0	0.186	
Earned above $15,000/year	36.2	43.7	– 7.4**	0.042	
Sample size (total = 728)	269	459			
Seattle					
Number of quarters employed	3.6	4.1	– 0.5	0.157	
Length of longest employment spell	3.5	4.0	– 0.5	0.164	
Ever worked 4 consecutive quarters (%)	44.7	52.8	– 8.1*	0.065	

(continued)

Exhibit C.6 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	44.3	51.8	– 7.5*	0.088	
Earned above $10,000/year	43.0	50.2	– 7.2	0.102	
Earned above $15,000/year	40.6	47.4	– 6.9	0.115	††
Highest earnings in Year 21 (%)					
Earned above $7,500/year	46.3	49.1	– 2.8	0.513	
Earned above $10,000/year	44.3	46.4	– 2.1	0.622	
Earned above $15,000/year	39.3	43.5	– 4.2	0.331	
Sample size (total = 598)	321	277			

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Sources: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.7. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18–24				
Total Earnings ($)				
Year 20	22,416	21,659	757	0.683
Year 21	23,033	21,163	1,870	0.307
Employed at least One Quarter (%)				
Year 20	72.5	71.9	0.6	0.886
Year 21	73.9	71.1	2.9	0.458
Average Quarterly Employment (%)				
Year 20	65.5	66.7	– 1.2	0.761
Year 21	66.7	64.4	2.3	0.543
Sample size (total = 629)	285	344		
Age 25–34				
Total Earnings ($)				
Year 20	17,061	15,477	1,584	0.242
Year 21	17,809	16,331	1,479	0.312
Employed at least One Quarter (%)				
Year 20	64.8	61.5	3.3	0.353
Year 21	63.7	61.3	2.4	0.507
Average Quarterly Employment (%)				
Year 20	60.0	55.1	4.9	0.157
Year 21	59.1	54.6	4.5	0.197
Sample size (total = 764)	362	402		
Age 35–44				
Total Earnings ($)				
Year 20	10,388	8,700	1,688	0.226
Year 21	10,920	8,731	2,189	0.133
Employed at least One Quarter (%)				
Year 20	38.9	33.5	5.4	0.208
Year 21	38.3	32.6	5.7	0.170
Average Quarterly Employment (%)				
Year 20	35.0	30.5	4.5	0.260
Year 21	35.0	29.1	5.9	0.137
Sample size (total = 594)	267	327		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

The ages referenced in this exhibit indicate the age of adults at baseline in 1998. In Year 20 of followup, the corresponding ages of these adults are 38–44, 45–54, and 55–64.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.8. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Stronger Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18–24				
Number of quarters employed	5.3	5.2	0.0	0.939
Length of longest employment spell	5.0	5.1	0.0	0.884
Ever worked 4 consecutive quarters (%)	65.5	66.8	– 1.2	0.764
Highest earnings in Year 20 (%)				
Earned above $7,500/year	61.0	62.6	– 1.6	0.699
Earned above $10,000/year	58.5	59.9	– 1.4	0.742
Earned above $15,000/year	51.4	55.7	– 4.2	0.319
Highest earnings in Year 21 (%)				
Earned above $7,500/year	65.9	62.1	3.8	0.359
Earned above $10,000/year	61.9	59.3	2.6	0.530
Earned above $15,000/year	53.7	53.7	0.1	0.987
Sample size (total = 629)	285	344		
Age 25–34				
Number of quarters employed	4.8	4.4	0.4	0.163
Length of longest employment spell	4.6	4.2	0.3	0.223
Ever worked 4 consecutive quarters (%)	59.4	54.8	4.6	0.207
Highest earnings in Year 20 (%)				
Earned above $7,500/year	55.4	51.8	3.6	0.338
Earned above $10,000/year	51.6	48.2	3.4	0.364
Earned above $15,000/year	45.0	42.8	2.2	0.556
Highest earnings in Year 21 (%)				
Earned above $7,500/year	57.1	50.8	6.2*	0.094
Earned above $10,000/year	54.5	47.4	7.1*	0.060
Earned above $15,000/year	46.9	43.4	3.6	0.338
Sample size (total = 764)	362	402		
Age 35–44				
Number of quarters employed	2.8	2.4	0.4	0.163
Length of longest employment spell	2.7	2.3	0.4	0.189
Ever worked 4 consecutive quarters (%)	35.3	29.5	5.8	0.157

(continued)

Exhibit C.8 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value
Highest earnings in Year 20 (%)				
Earned above $7,500/year	34.1	28.2	5.9	0.147
Earned above $10,000/year	31.6	27.4	4.2	0.295
Earned above $15,000/year	24.9	24.9	0.0	0.994
Highest earnings in Year 21 (%)				
Earned above $7,500/year	33.0	27.4	5.6	0.161
Earned above $10,000/year	32.8	26.4	6.4	0.105
Earned above $15,000/year	25.8	23.8	1.9	0.606
Sample size (total = 594)	267	327		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.9. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Weaker Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18–24				
Total Earnings ($)				
Year 20	18,353	21,541	– 3,188*	0.081
Year 21	19,475	22,702	– 3,227*	0.089
Employed at least One Quarter (%)				
Year 20	67.7	77.7	– 10.0***	0.008
Year 21	66.9	77.5	-10.6***	0.006
Average Quarterly Employment (%)				
Year 20	61.1	70.3	– 9.2**	0.015
Year 21	60.1	71.0	– 10.9***	0.005
Sample size (total = 588)	230	358		
Age 25–34				
Total Earnings ($)				
Year 20	14,229	16,959	– 2,730**	0.048
Year 21	15,062	17,139	– 2,076	0.145
Employed at least One Quarter (%)				
Year 20	55.2	59.7	– 4.5	0.202
Year 21	56.6	59.8	– 3.2	0.368
Average Quarterly Employment (%)				
Year 20	50.3	55.5	– 5.2	0.132
Year 21	51.9	53.8	– 2.0	0.564
Sample size (total = 849)	355	494		
Age 35–44				
Total Earnings ($)				
Year 20	9,119	9,345	– 226	0.857
Year 21	9,578	9,076	502	0.698
Employed at least One Quarter (%)				
Year 20	33.6	34.8	– 1.2	0.749
Year 21	30.5	33.0	– 2.5	0.498
Average Quarterly Employment (%)				
Year 20	30.4	31.4	– 1.0	0.769
Year 21	28.7	30.0	– 1.3	0.716
Sample size (total = 681)	281	400		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

The ages referenced in this exhibit indicate the age of adults at baseline in 1998. In Year 20 of followup, the corresponding ages of these adults are 38–44, 45-54, and 55–64.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.10. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Adults from the 1998 Cohort Who Are in the Long-Term Impact Study, by Age at Baseline, Weaker Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 18–24				
Number of quarters employed	4.8	5.6	– 0.8***	0.006
Length of longest employment spell	4.6	5.5	– 0.8***	0.006
Ever worked 4 consecutive quarters (%)	58.2	70.0	– 11.9***	0.005
Highest earnings in Year 20 (%)				
Earned above $7,500/year	54.4	65.2	– 10.9**	0.012
Earned above $10,000/year	53.4	59.7	-6.4	0.150
Earned above $15,000/year	45.4	52.5	– 7.1	0.109
Highest earnings in Year 21 (%)				
Earned above $7,500/year	57.6	65.0	– 7.4*	0.083
Earned above $10,000/year	53.1	61.7	– 8.6**	0.049
Earned above $15,000/year	48.5	56.5	– 8.1*	0.069
Sample size (total = 588)	230	358		
Age 25–34				
Number of quarters employed	4.1	4.4	– 0.3	0.292
Length of longest employment spell	4.0	4.3	– 0.3	0.268
Ever worked 4 consecutive quarters (%)	51.1	54.0	– 2.8	0.433
Highest earnings in Year 20 (%)				
Earned above $7,500/year	47.3	53.0	– 5.7	0.116
Earned above $10,000/year	44.7	51.1	– 6.5*	0.072
Earned above $15,000/year	38.2	45.7	– 7.4**	0.037
Highest earnings in Year 21 (%)				
Earned above $7,500/year	49.8	51.5	– 1.7	0.628
Earned above $10,000/year	48.7	49.0	– 0.4	0.924
Earned above $15,000/year	41.5	44.8	– 3.3	0.366
Sample size (total = 849)	355	494		
Age 35–44				
Number of quarters employed	2.4	2.4	– 0.1	0.735
Length of longest employment spell	2.3	2.4	– 0.1	0.824
Ever worked 4 consecutive quarters (%)	28.4	30.2	– 1.8	0.622

(continued)

Exhibit C.10 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value
Highest earnings in Year 20 (%)				
Earned above $7,500/year	30.0	30.0	0.0	0.997
Earned above $10,000/year	27.3	27.4	– 0.1	0.978
Earned above $15,000/year	24.0	24.4	-0.4	0.896
Highest earnings in Year 21 (%)				
Earned above $7,500/year	27.8	29.1	– 1.4	0.703
Earned above $10,000/year	26.4	28.0	– 1.6	0.650
Earned above $15,000/year	24.1	24.9	– 0.8	0.817
Sample size (total = 681)	281	400		

Notes: The sample for this analysis includes all adults living in a Jobs Plus or comparison development who were between the ages of 18 and 44 years in October 1998 and were not listed as disabled by their public housing agency.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

P-values are based on standard errors that are adjusted to account for adults from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.11. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, All Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Total Earnings ($)				
Year 20	18,394	16,962	1,432***	0.003
Year 21	20,032	18,496	1,537***	0.002
Employed at least One Quarter (%)				
Year 20	78.9	76.4	2.6**	0.019
Year 21	78.7	75.5	3.2***	0.005
Average Quarterly Employment (%)				
Year 20	69.6	66.1	3.5***	0.002
Year 21	69.8	66.0	3.9***	0.001
Sample size (total = 6,337)	2,902	3,435		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.12. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, All Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Number of quarters employed	5.6	5.3	0.3***	0.001
Length of longest employment spell	5.3	5.0	0.3***	0.000
Ever worked 4 consecutive quarters (%)	69.5	64.9	4.6***	0.000
Highest earnings in Year 20 (%)				
Earned above $7,500/year	60.4	57.1	3.3**	0.011
Earned above $10,000/year	55.8	52.3	3.5***	0.007
Earned above $15,000/year	47.2	43.3	3.9***	0.003
Highest earnings in Year 21 (%)				
Earned above $7,500/year	62.3	59.3	3.1**	0.019
Earned above $10,000/year	58.0	55.4	2.6**	0.048
Earned above $15,000/year	50.1	47.7	2.4*	0.071
Sample size (total = 6,337)	2,902	3,435		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.13. Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Implementation Strength

	Stronger Implementation Sites				Weaker Implementation Sites				
Outcome	Program Group	Comparison Group	Difference	P-Value	Program Group	Comparison Group	Difference	P-Value	
Summary Outcomes									
Average Annual Earnings, Years 20 and 21 ($)	20,961	18,255	2,706***	0.000	16,697	16,370	327	0.615	†††
Average Quarterly Employment, Years 20 and 21 (%)	72.8	66.6	6.2***	0.000	66.1	64.7	1.5	0.338	††
Yearly Outcomes									
Total Earnings ($)									
Year 20	20,322	17,977	2,345***	0.001	16,328	15,695	634	0.339	†
Year 21	22,143	19,095	3,048***	0.000	17,753	17,616	137	0.847	†††
Employed at least One Quarter (%)									
Year 20	81.9	76.6	5.3***	0.001	75.8	75.6	0.2	0.900	††
Year 21	81.5	75.7	5.7***	0.000	75.9	74.9	1.1	0.521	††
Average Quarterly Employment (%)									
Year 20	72.7	67.4	5.3***	0.001	66.5	64.3	2.2	0.179	
Year 21	73.2	66.1	7.1***	0.000	66.2	65.3	1.0	0.563	†††
Sample size (total = 6,337)	1,622	1,700			1,280	1,735			

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul. Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

The impact estimates for the two confirmatory outcomes (average annual earnings over Years 20 and 21 and average quarterly employment across Years 20 and 21) were each statistically significant; therefore, based on the Benjamini-Hochberg multiple hypothesis testing approach, no further adjustments to the p-values were needed.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.14. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Program Implementation Strength

	Strong Implementers				Weak Implementers				
Outcome	Program Group	Comparison Group	Difference	P-Value	Program Group	Comparison Group	Difference	P-Value	
Number of quarters employed	5.8	5.3	0.5***	0.000	5.3	5.2	0.1	0.338	††
Length of longest employment spell	5.5	5.0	0.5***	0.000	5.0	4.8	0.1	0.241	††
Ever worked 4 consecutive quarters (%)	72.8	65.5	7.3***	0.000	66.0	63.7	2.3	0.205	†
Highest earnings in Year 20 (%)									
Earned above $7,500/year	64.4	59.4	5.0***	0.006	56.1	54.2	1.9	0.322	
Earned above $10,000/year	60.0	54.7	5.2***	0.004	51.4	49.3	2.1	0.275	
Earned above $15,000/year	51.3	46.1	5.2***	0.004	43.0	39.9	3.1	0.101	
Highest earnings in Year 21 (%)									
Earned above $7,500/year	66.2	60.6	5.6***	0.002	58.3	57.4	1.0	0.616	†
Earned above $10,000/year	62.4	57.5	5.0***	0.006	53.2	52.7	0.5	0.794	†
Earned above $15,000/year	54.6	50.1	4.5**	0.015	45.2	44.7	0.5	0.805	
Sample size (total = 6,337)	1,622	1,700			1,280	1,735			

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul. Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.15. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Site, Stronger Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value	
Dayton					
Total Earnings ($)					
Year 20	14,096	12,284	1,812**	0.033	
Year 21	15,596	13,029	2,567***	0.004	
Employed at least One Quarter (%)					
Year 20	79.9	75.2	4.6*	0.054	
Year 21	82.2	74.4	7.9***	0.001	††
Average Quarterly Employment (%)					
Year 20	69.2	63.4	5.8**	0.015	
Year 21	71.2	62.0	9.3***	0.000	†
Sample size (total = 1,379)	467	912			
Los Angeles					
Total Earnings ($)					
Year 20	22,743	20,719	2,024	0.214	
Year 21	24,682	22,324	2,358	0.166	
Employed at least One Quarter (%)					
Year 20	78.6	72.4	6.2*	0.076	
Year 21	79.9	71.8	8.1**	0.021	††
Average Quarterly Employment (%)					
Year 20	71.7	65.7	6.0*	0.086	
Year 21	72.8	64.9	7.9**	0.023	†
Sample size (total = 818)	417	401			
St. Paul					
Total Earnings ($)					
Year 20	25,565	23,823	1,742	0.220	
Year 21	27,677	25,235	2,442	0.101	
Employed at least One Quarter (%)					
Year 20	86.0	82.4	3.6	0.169	
Year 21	81.9	82.6	– 0.7	0.794	††
Average Quarterly Employment (%)					
Year 20	77.5	75.1	2.3	0.401	
Year 21	75.8	75.0	0.8	0.782	†
Sample size (total = 1,125)	738	387			

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.16. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Site, Stronger Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Dayton				
Number of quarters employed	5.6	5.0	0.6***	0.001
Length of longest employment spell	5.2	4.6	0.6***	0.002
Ever worked 4 consecutive quarters (%)	69.7	61.1	8.6***	0.002
Highest earnings in Year 20 (%)				
Earned above $7,500/year	54.0	50.1	3.9	0.183
Earned above $10,000/year	48.3	43.0	5.4*	0.062
Earned above $15,000/year	38.0	33.9	4.1	0.141
Highest earnings in Year 21 (%)				
Earned above $7,500/year	57.7	50.5	7.2**	0.013
Earned above $10,000/year	51.7	46.0	5.7*	0.051
Earned above $15,000/year	41.4	37.1	4.3	0.131
Sample size (total = 1,379)	467	912		
Los Angeles				
Number of quarters employed	5.8	5.2	0.6**	0.036
Length of longest employment spell	5.5	5.0	0.5**	0.043
Ever worked 4 consecutive quarters (%)	73.6	63.2	10.4***	0.006
Highest earnings in Year 20 (%)				
Earned above $7,500/year	69.4	62.2	7.3*	0.060
Earned above $10,000/year	66.4	60.2	6.2	0.111
Earned above $15,000/year	58.6	50.4	8.1**	0.043
Highest earnings in Year 21 (%)				
Earned above $7,500/year	70.7	64.6	6.1	0.111
Earned above $10,000/year	68.9	62.5	6.4	0.103
Earned above $15,000/year	63.0	57.3	5.7	0.159
Sample size (total = 818)	417	401		
St. Paul				
Number of quarters employed	6.1	6.0	0.1	0.571
Length of longest employment spell	5.9	5.8	0.1	0.575
Ever worked 4 consecutive quarters (%)	76.3	75.0	1.3	0.679

(continued)

Exhibit C.16 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value
Highest earnings in Year 20 (%)				
Earned above $7,500/year	73.1	70.0	3.2	0.329
Earned above $10,000/year	69.2	67.1	2.1	0.531
Earned above $15,000/year	61.4	60.3	1.0	0.767
Highest earnings in Year 21 (%)				
Earned above $7,500/year	73.5	72.6	0.8	0.796
Earned above $10,000/year	70.9	70.1	0.8	0.798
Earned above $15,000/year	64.5	62.8	1.7	0.617
Sample size (total = 1,125)	738	387		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.17. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Site, Weaker Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Baltimore				
Total Earnings ($)				
Year 20	15,592	14,377	1,214	0.316
Year 21	16,989	16,746	243	0.852
Employed at least One Quarter (%)				
Year 20	72.7	71.2	1.5	0.632
Year 21	72.0	72.3	– 0.2	0.940
Average Quarterly Employment (%)				
Year 20	62.8	60.1	2.7	0.381
Year 21	62.2	64.0	– 1.8	0.566
Sample size (total = 967)	306	661		
Chattanooga				
Total Earnings ($)				
Year 20	13,467	13,764	– 297	0.730
Year 21	14,956	15,495	– 539	0.570
Employed at least One Quarter (%)				
Year 20	79.7	80.4	– 0.7	0.757
Year 21	80.2	78.2	2.0	0.402
Average Quarterly Employment (%)				
Year 20	69.8	68.9	0.9	0.720
Year 21	69.8	68.6	1.2	0.625
Sample size (total = 1,174)	471	703		
Seattle				
Total Earnings ($)				
Year 20	21,088	19,771	1,317	0.385
Year 21	22,498	21,525	972	0.553
Employed at least One Quarter (%)				
Year 20	74.2	74.2	0.0	0.997
Year 21	73.5	73.7	– 0.2	0.959
Average Quarterly Employment (%)				
Year 20	65.4	62.9	2.5	0.438
Year 21	64.4	62.2	2.2	0.501
Sample size (total = 874)	503	371		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.18. Impacts on Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Site, Weaker Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value	
Baltimore					
Number of quarters employed	5.0	5.0	0.0	0.873	
Length of longest employment spell	4.7	4.7	0.1	0.804	
Ever worked 4 consecutive quarters (%)	61.6	61.2	0.4	0.918	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	54.7	50.8	3.9	0.266	†
Earned above $10,000/year	47.7	48.1	– 0.3	0.924	
Earned above $15,000/year	41.7	39.2	2.5	0.462	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	55.7	57.1	– 1.4	0.698	
Earned above $10,000/year	53.0	52.2	0.7	0.837	
Earned above $15,000/year	46.0	44.1	1.9	0.600	
Sample size (total = 967)	306	661			
Chattanooga					
Number of quarters employed	5.6	5.5	0.1	0.689	
Length of longest employment spell	5.2	5.1	0.1	0.660	
Ever worked 4 consecutive quarters (%)	68.9	67.9	1.0	0.722	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	52.0	55.6	– 3.6	0.228	†
Earned above $10,000/year	47.7	47.3	0.5	0.876	
Earned above $15,000/year	37.3	35.8	1.4	0.619	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	56.5	56.7	– 0.2	0.942	
Earned above $10,000/year	48.0	51.1	– 3.1	0.303	
Earned above $15,000/year	37.8	41.9	– 4.0	0.173	
Sample size (total = 1,174)	471	703			
Seattle					
Number of quarters employed	5.1	5.0	0.2	0.476	
Length of longest employment spell	4.9	4.7	0.2	0.347	
Ever worked 4 consecutive quarters (%)	65.6	60.4	5.3	0.147	

(continued)

Exhibit C.18 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value	
Highest earnings in Year 20 (%)					
Earned above $7,500/year	61.8	56.2	5.6	0.119	†
Earned above $10,000/year	58.7	53.7	5.0	0.167	
Earned above $15,000/year	51.0	46.9	4.1	0.259	
Highest earnings in Year 21 (%)					
Earned above $7,500/year	62.4	58.4	4.0	0.278	
Earned above $10,000/year	59.5	55.1	4.3	0.244	
Earned above $15,000/year	53.5	49.8	3.7	0.326	
Sample size (total = 874)	503	371			

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.19. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 0–5				
Total Earnings ($)				
Year 20	14,471	13,461	1,010	0.250
Year 21	17,305	15,206	2,099**	0.030
Employed at least One Quarter (%)				
Year 20	86.6	80.8	5.8**	0.016
Year 21	86.5	78.9	7.6***	0.003
Average Quarterly Employment (%)				
Year 20	74.1	69.7	4.4*	0.081
Year 21	76.2	67.8	8.4***	0.001
Sample size (total = 1,050)	482	568		
Age 6–12				
Total Earnings ($)				
Year 20	21,732	19,020	2,712***	0.009
Year 21	23,482	19,918	3,564***	0.001
Employed at least One Quarter (%)				
Year 20	81.7	77.4	4.2*	0.060
Year 21	80.7	76.5	4.1*	0.071
Average Quarterly Employment (%)				
Year 20	72.9	68.3	4.5**	0.046
Year 21	73.1	66.9	6.3***	0.006
Sample size (total = 1,566)	770	796		
Age 13–17				
Total Earnings ($)				
Year 20	25,307	23,280	2,028	0.290
Year 21	26,088	23,764	2,325	0.239
Employed at least One Quarter (%)				
Year 20	74.3	69.2	5.1	0.193
Year 21	74.6	69.9	4.7	0.233
Average Quarterly Employment (%)				
Year 20	69.1	62.7	6.4*	0.094
Year 21	68.0	62.7	5.2	0.175
Sample size (total = 706)	370	336		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

The ages referenced in this exhibit indicate the age of children at baseline in 1998. In Year 20 of followup, the corresponding ages of these children are 20–25, 26–32, and 33–37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.20. Impacts Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 0–5				
Number of quarters employed	6.0	5.5	0.5***	0.006
Length of longest employment spell	5.6	5.2	0.5**	0.020
Ever worked 4 consecutive quarters (%)	75.3	67.0	8.2***	0.005
Highest earnings in Year 20 (%)				
Earned above $7,500/year	58.2	56.2	2.0	0.539
Earned above $10,000/year	52.1	48.8	3.3	0.306
Earned above $15,000/year	41.5	36.6	4.9	0.122
Highest earnings in Year 21 (%)				
Earned above $7,500/year	64.6	58.8	5.8*	0.065
Earned above $10,000/year	58.6	54.2	4.4	0.166
Earned above $15,000/year	46.6	43.4	3.2	0.318
Sample size (total = 1,050)	482	568		
Age 6–12				
Number of quarters employed	5.8	5.4	0.4**	0.012
Length of longest employment spell	5.6	5.1	0.5***	0.006
Ever worked 4 consecutive quarters (%)	72.8	66.7	6.1**	0.017
Highest earnings in Year 20 (%)				
Earned above $7,500/year	67.6	62.2	5.3**	0.042
Earned above $10,000/year	63.2	58.0	5.2*	0.050
Earned above $15,000/year	54.3	50.4	3.8	0.159
Highest earnings in Year 21 (%)				
Earned above $7,500/year	67.0	61.7	5.3**	0.045
Earned above $10,000/year	63.7	59.6	4.2	0.115
Earned above $15,000/year	57.5	53.2	4.3	0.111
Sample size (total = 1,566)	770	796		
Age 13–17				
Number of quarters employed	5.4	5.0	0.5	0.118
Length of longest employment spell	5.3	4.8	0.5	0.106
Ever worked 4 consecutive quarters (%)	68.2	61.6	6.6	0.114

(continued)

Exhibit C.20 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value
Highest earnings in Year 20 (%)				
Earned above $7,500/year	65.6	59.0	6.6	0.111
Earned above $10,000/year	63.3	57.6	5.7	0.172
Earned above $15,000/year	58.5	52.0	6.5	0.127
Highest earnings in Year 21 (%)				
Earned above $7,500/year	66.5	61.2	5.3	0.205
Earned above $10,000/year	64.8	58.3	6.5	0.124
Earned above $15,000/year	59.8	54.1	5.6	0.191
Sample size (total = 706)	370	336		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

The ages referenced in this exhibit indicate the age of children at baseline in 1998. In Year 20 of followup, the corresponding ages of these children are 20–25, 26–32, and 33–37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.21. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Stronger Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 6–8				
Total Earnings ($)				
Year 20	19,677	17,177	2,500*	0.057
Year 21	21,587	18,156	3,431**	0.013
Employed at least One Quarter (%)				
Year 20	82.4	79.0	3.4	0.271
Year 21	82.0	77.4	4.6	0.148
Average Quarterly Employment (%)				
Year 20	73.8	69.6	4.2	0.182
Year 21	74.7	67.8	6.9**	0.029
Sample size (total = 775)	363	412		
Age 9–12				
Total Earnings ($)				
Year 20	23,607	21,021	2,586	0.104
Year 21	25,191	21,873	3,317**	0.043
Employed at least One Quarter (%)				
Year 20	81.2	75.5	5.7*	0.080
Year 21	79.6	75.4	4.2	0.207
Average Quarterly Employment (%)				
Year 20	72.2	66.8	5.4	0.100
Year 21	71.8	65.6	6.2*	0.064
Sample size (total = 791)	407	384		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Stronger implementation sites include Dayton, Los Angeles, and St. Paul.

The ages referenced in this exhibit indicate the age of children at baseline in 1998. In Year 20 of followup, the corresponding ages of these children are 26–32, and 33–37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

A test for significant differences across subgroups was done. Like the main results that combine these two age categories, there was no statistically significant difference in the effects across the four age groups.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.22. Yearly Impacts on Earnings and Employment in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Weaker Implementation Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 0–5				
Total Earnings ($)				
Year 20	12,409	11,529	880	0.305
Year 21	15,127	13,635	1,492	0.123
Employed at least One Quarter (%)				
Year 20	77.1	79.7	– 2.6	0.322
Year 21	77.6	79.9	– 2.3	0.379
Average Quarterly Employment (%)				
Year 20	66.3	64.7	1.5	0.559
Year 21	67.7	67.3	0.4	0.889
Sample size (total = 1,051)	443	608		
Age 6–12				
Total Earnings ($)				
Year 20	17,857	17,157	699	0.493
Year 21	18,872	19,236	– 364	0.744
Employed at least One Quarter (%)				
Year 20	75.8	74.8	1.0	0.680
Year 21	76.0	72.8	3.1	0.202
Average Quarterly Employment (%)				
Year 20	67.3	64.7	2.6	0.261
Year 21	65.8	64.9	0.9	0.725
Sample size (total = 1,404)	601	803		
Age 13–17				
Total Earnings ($)				
Year 20	19,849	20,151	-302	0.874
Year 21	20,023	21,231	– 1,207	0.535
Employed at least One Quarter (%)				
Year 20	73.3	69.8	3.6	0.383
Year 21	72.6	70.0	2.6	0.532
Average Quarterly Employment (%)				
Year 20	64.7	62.5	2.3	0.573
Year 21	64.8	62.3	2.5	0.542
Sample size (total = 560)	236	324		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

The ages referenced in this exhibit indicate the age of children at baseline in 1998. In Year 20 of followup, the corresponding ages of these children are 20–25, 26–32, and 33–37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Exhibit C.23. Impacts Employment Stability and Earnings Distribution in Years 20 and 21 of Followup, Children in Households from the 1998 Cohort, by Age at Baseline, Weaker Implementer Sites

Outcome	Program Group	Comparison Group	Difference	P-Value
Age 0–5				
Number of quarters employed	5.4	5.3	0.1	0.685
Length of longest employment spell	5.0	4.9	0.2	0.397
Ever worked 4 consecutive quarters (%)	67.1	62.8	4.3	0.163
Highest earnings in Year 20 (%)				
Earned above $7,500/year	51.4	48.7	2.7	0.410
Earned above $10,000/year	44.6	41.8	2.9	0.380
Earned above $15,000/year	33.8	30.4	3.4	0.261
Highest earnings in Year 21 (%)				
Earned above $7,500/year	57.0	54.9	2.1	0.519
Earned above $10,000/year	51.2	47.6	3.6	0.273
Earned above $15,000/year	41.9	37.8	4.1	0.200
Sample size (total = 1,051)	443	608		
Age 6–12				
Number of quarters employed	5.3	5.2	0.1	0.473
Length of longest employment spell	5.0	4.9	0.1	0.539
Ever worked 4 consecutive quarters (%)	65.5	65.2	0.3	0.915
Highest earnings in Year 20 (%)				
Earned above $7,500/year	57.7	57.5	0.1	0.958
Earned above $10,000/year	53.7	53.0	0.7	0.805
Earned above $15,000/year	47.2	43.6	3.5	0.200
Highest earnings in Year 21 (%)				
Earned above $7,500/year	57.8	58.5	– 0.7	0.797
Earned above $10,000/year	53.6	55.1	– 1.4	0.613
Earned above $15,000/year	46.9	47.9	– 1.0	0.730
Sample size (total = 1,404)	601	803		
Age 13–17				
Number of quarters employed	5.2	5.0	0.2	0.578
Length of longest employment spell	4.9	4.7	0.2	0.527
Ever worked 4 consecutive quarters (%)	66.0	61.4	4.6	0.296

(continued)

Exhibit C.23 (continued)

Outcome	Program Group	Comparison Group	Difference	P-Value
Highest earnings in Year 20 (%)				
Earned above $7,500/year	60.7	56.5	4.1	0.359
Earned above $10,000/year	58.1	54.9	3.2	0.479
Earned above $15,000/year	49.8	49.0	0.8	0.863
Highest earnings in Year 21 (%)				
Earned above $7,500/year	62.4	59.3	3.1	0.492
Earned above $10,000/year	55.9	56.3	– 0.4	0.938
Earned above $15,000/year	47.1	50.3	– 3.2	0.491
Sample size (total = 560)	236	324		

Notes: The sample for this analysis includes all children living in a Jobs Plus or comparison development who were between the ages of 0 and 17 in October 1998.

Year 20 of followup aligns with calendar months July 2017 to June 2018. Year 21 of followup aligns with calendar months July 2018 to June 2019.

Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because of rounding.

Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Differences across subgroups were tested for statistical significance. Statistical significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.

Weaker implementation sites include Baltimore, Chattanooga, and Seattle.

The ages referenced in this exhibit indicate the age of children at baseline in 1998. In Year 20 of followup, the corresponding ages of these children are 20–25, 26–32, and 33–37.

P-values are based on standard errors that are adjusted to account for children from the same household using Huber-White standard errors.

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

APPENDIX D: Estimating the Gain in Lifetime Earnings for Children of Adult Participants

The positive effects on earnings for adults who were children during Jobs Plus are encouraging and raise questions related to benefit-cost analyses. Do the gains in lifetime earnings for these children outweigh the costs of the program? An informal analysis suggests that the gain in lifetime earnings per individual is somewhere between $19,000 and $79,000. While the exact number is uncertain, the range suggests that the gain is positive.

Although a benefit-cost analysis is beyond the scope of this report and was also not conducted as part of the original Jobs Plus study, this appendix presents a brief analysis of the potential gains in lifetime earnings for children in the strong implementation sites, based on the impacts observed during Years 20 and 21. For all children, Jobs Plus led to an increase in earnings of 14.8 percent over the control group average of about $19,000. Over these 2 years, the individuals ranged in age from 20 to 38.

Several assumptions are necessary to produce an estimate of the net present value of the gains in earnings over individuals' working lives. One assumption, for example, is about the trajectory of earnings levels over time for the control group. It is assumed, based on literature in economics, that earnings increase with experience (at about 8 percent per year), but at a decreasing rate, following the typical inverted U-shaped pattern over the working life.[54] In this case, earnings start at about $11,000 at the age of 20, peak at just over $27,000 at age 36, and fall to $25,500 by age 65. Note that this assumption results in earnings levels that match those presented in exhibit 20, showing control group earnings by child age group. Another assumption required to present the stream of future gains in today's dollars (or the net present value) is the interest rate, which is assumed to be 3 percent.

The most important assumption, however, is whether the impacts on earnings remain constant over time or whether they decay. In this case, an assumption must also be made about whether the observed impact on earnings of 14.8 percent appeared at the start of their working lives.

At one extreme, assuming a constant percentage impact on earnings from ages 20 to 65 produces a net present value gain in lifetime earnings of just under $79,000. This is likely an upper-bound estimate, given that sustained earnings gains from an intervention tend to be the exception rather than the norm. At the other extreme, assuming that the impact on earnings is 14.8 percent through age 30, but zero after that, produces a net present value gain of about $19,000. The actual value is probably somewhere between these two estimates.

The original study did not produce a formal estimate of programs costs but suggested that the costs per family served might run between $1,000 to $1,800 per year, or $5,000 to $9,000 over the 5-year program period. A formal benefit-cost analysis would need to compare the costs of the program with its benefits on participating adults and their children.

[54] Polachek, S.W. 2007. "Earnings Over the Lifecycle: The Mincer Earnings Function and Its Applications," IZA Discussion papers No. 3181, Institute for the Study of Labor, Bonn.

APPENDIX E: Using Permutation Tests to Assess the Statistical Significance of Long-Term Jobs Plus Impact Estimates

The present appendix explains:

1. The problem with using an ordinary least squares (OLS) standard error to assess the statistical significance of a long-term Jobs Plus impact estimate.
2. The strengths and limitations of using a permutation test for this purpose.
3. The mechanics of such a permutation test.
4. How to interpret the results of this test.

The Problem with Ordinary Least Squares Standard Errors for the Present Analysis

As described in the main report, the present analysis estimates Jobs Plus impacts on long-term mean earnings levels and employment rates for the three strong-implementation Jobs Plus sites combined and the three weak-implementation Jobs Plus sites combined using an Ordinary Least Squares (OLS) regression of the following form:

$$Y_i = \sum_{k=1}^{3} \alpha_k S_{ki} + \beta P_i + \sum_{m=1}^{M} \gamma_m X_{mi} + e_i \qquad (1)$$

where:

$Y_i =$ a measure of long-term earnings or employment for sample member i,

$S_{ki} =$ one if sample member i is from site (city) k and zero otherwise,

$P_i =$ one if sample member i is from a Jobs Plus housing development and zero otherwise,

$X_{mi} =$ baseline covariate m for sample member i and

$e_i =$ a random error for sample member i that is independently and identically distributed with a normal distribution, a mean of zero, and a variance of σ^2.

The estimated value of β in Equation 1 is the estimated impact of Jobs Plus on long-term earnings or employment, and the OLS standard error of this impact estimate is an appropriate basis for assessing the impact estimate's statistical significance if sample members had been assigned *individually* to Jobs Plus or its comparison group. However, sample members for the Jobs Plus evaluation were randomly assigned to Jobs Plus or its comparison group in "clusters" defined by the public housing development in which they lived. Consequently, an OLS standard error will tend to underestimate the true standard error of the impact estimate and thereby *overstate* its statistical significance (understate its p-value).[55]

The Possibilities and Mechanics of a Permutation Test for the Present Analysis

Several statistical approaches, such as multi-level regression (Raudenbush and Bryk, 2002) or cluster-robust standard errors (Angrist and Pischke, 2009, p. 312–15), are often used to estimate standard errors of impact estimates which adjust for the clustering of sample members. However,

[55] See Jacob et al. (2010) for a discussion of this issue.

to provide meaningful results, these methods require many clusters. [56] Unfortunately, this is not the case for Jobs Plus, with a total of seven clusters (developments) for its three strong-implementation sites and eight clusters for its three weak-implementation sites.

To address this problem, we used an alternative approach from the statistics literature called a permutation test (Wilcox, 2003). This approach can, in principle, accommodate cluster assignments with few clusters. To implement the approach, we proceeded as follows, separately for the three strong-implementation sites and the three weak-implementation sites.

Step #1: Use Equation 1 to estimate the true Jobs Plus impact ($\hat{\beta}_{TRUE}$) from individual data for sample members using the true definition of all Jobs Plus and comparison developments (true values for P_i).

Step #2: Use Equation 1 to estimate a Jobs Plus pseudo-impact ($\hat{\beta}_{PSEUDO}$) from individual data for sample members for a series of "re-definitions" of P_i that represent all possible permutations of Jobs Plus and comparison developments. In other words, one permutation would reassign treatment status to residents in the comparison development in one city (i.e., pretend they are in a Jobs Plus development) and comparison status to residents in the Jobs Plus development in that city. All other assignments in other cities would be unchanged.

The total number of such permutations for strong-implementation sites (including that for the true definition of all Jobs Plus developments) is 12 (3 permutations for Dayton times 2 permutations for Los Angeles times 2 permutations for St. Paul), and its counterpart for weak-implementation sites is 18 (3 permutations for Baltimore times 3 permutations for Chattanooga times 2 permutations for Seattle).

Step #3: Rank-order the resulting true and pseudo impact estimates from most to least positive. This result is a sampling distribution of cluster-randomized impact estimates under the strong null hypothesis of uniformly zero Jobs Plus impacts (Wilcox, 2003).

Step #4: Locate $\hat{\beta}_{TRUE}$ in its sampling distribution and determine the corresponding p-value based on this location. For example, with 12 permutations, if $\hat{\beta}_{TRUE}$ had the largest positive value in its sampling distribution, an estimate this positive or larger could occur by chance under a null hypothesis of uniformly zero impacts with a probability/p-value of

[56] A small number of clusters provides few degrees of freedom for estimating a cluster-level variance component, which in turn produces very low power (substantial uncertainty) for program impact estimates. Because the original Jobs Plus impact analysis was based on comparative interrupted time-series analysis, which leveraged time-series data for 6 baseline years at each housing development in the study sample. For each study site, annual baseline earnings levels and employment rates for the Jobs Plus development were consistently very similar to those for its comparison development/s (i.e. there was very little year-to-year fluctuation in this relationship); for this reason, the statistical precision of that analysis did not face a serious degree of freedom problem.

$\frac{1}{12}$ = 0.083. Correspondingly, if $\hat{\beta}_{TRUE}$ were the second most positive value in its sampling distribution, its p-value would be $\frac{2}{12}$ or 0.167; and so on.[57]

For a negative value of $\hat{\beta}_{TRUE}$, the direction of p-values should be reversed. Thus, with 12 permutations, if $\hat{\beta}_{TRUE}$ is the most negative impact estimate in the sampling distribution, it would have a p-value of 0.083; if it were the second most negative impact estimate, it would have a p-value of 0.166.

Correspondingly, with 18 permutations for weak-implementation sites, the p-value when $\hat{\beta}_{TRUE}$ is the most or least positive estimate in the sampling distribution is $\frac{1}{18} = 0.056$.

Note that the difference between seven clusters for strong-implementation sites and eight clusters for weak-implementation sites creates a corresponding difference between 12 permutations and 18 permutations. This, in turn, produces a higher-resolution (more continuous) sampling distribution for weak-implementation sites.

To summarize the preceding steps, exhibit E.1 illustrates the determination of a permutation-based p-value for our OLS estimate of the Jobs Plus impact on the long-term earnings of adults in strong-implementation sites. Note that permutation #1, which represents all true Jobs Plus and comparison clusters and is highlighted in yellow, is 3rd from the top of the sampling distribution. This implies a p-value of 0.249.

Exhibit E.1. Sampling Distribution and Permutation P-value for the Estimated Long-term Jobs Plus Impact on Adult Earnings in Strong-Implementation Sites

Permutation Number	Impact Estimate	Permutation P-value
11	2,710	0.083
7	2,380	0.166
1	1,670	0.249
2	1,251	0.332
12	819	0.415
6	347	0.498
9	– 370	0.581
4	– 877	0.664
8	– 1,259	0.747
3	– 1,706	0.830

[57] This p-value is for a *one-sided* hypothesis test whose direction is specified in advance. Such a test is most appropriate when existing theory or empirical evidence strongly suggest the direction of an impact. This seems reasonable for the present analysis because it seeks to determine whether the long-term pattern of earnings and employment for Jobs Plus developments versus their comparison-group counterparts is qualitatively the same as their previously reported shorter-term pattern.

Exhibit E.1. (continued)

10	– 2,205	0.913
5	– 2,498	1.000

Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Interpreting Permutation Test Results for the Present Analysis

When assessing the quality of long-term Jobs Plus impact estimates, it is important to distinguish between their statistical significance and their internal validity (lack of selection bias). To assess their statistical significance requires determining the extent to which an estimated mean outcome difference for residents of Jobs Plus and comparison developments represents a *true difference* or *estimation error*. This is the goal of determining p-values, which is the subject of the present appendix.

To assess the internal validity of long-term Jobs Plus impact estimates requires determining whether an observed true long-term outcome difference was *caused* mainly by Jobs Plus or by other factors, a topic which is discussed elsewhere in the report.

To focus on statistical significance, exhibit E.2 presents estimates of mean Jobs Plus impacts on the long-term earnings and employment of adults and children in strong- and weak-implementation sites. For each impact estimate, the exhibit also reports its OLS p-value, its permutation p-value, and the location of the impact estimate in its sampling distribution.

Exhibit E.2. Estimates of Long-term Jobs Plus Impacts and their Alternative P-Values

Sample and Outcome Measure	Actual Impact Estimate	OLS P-value	Permutation P-Value[a]	Permutation Position[b]
	Strong Jobs Plus Implementation Sites			
Adults				
Earnings ($)	1,670	0.056	0.249	3rd from top
Employment Rate (%)	4.2	0.047	0.166	2nd from top
Children				
Earnings ($)	2,706	0.000	0.083	top
Employment Rate (%)	6.2	0.000	0.083	top
	Weak Jobs Plus Implementation Sites			
Adults				
Earnings ($)	– 1,967	0.019	0.111	2nd from bottom
Employment Rate (%)	– 4.7	0.018	0.111	2nd from bottom

Exhibit E.2. (continued)

Children				
Earnings ($)	327	0.615	0.278	5th from top
Employment (%)	1.5	0.338	0.222	4th from top

[a] This p-value reflects a one-sided hypothesis test of whether the direction of a long-term program- and comparison-group outcome *difference* is the same as that for its shorter-term counterpart.
[b] The "permutation position" of a real Jobs Plus impact estimate is its location in its sampling distribution.
Source: MDRC calculations using quarterly wage data from the National Directory of New Hires

Consider first the results for strong-implementation sites. Here, estimated Jobs Plus impacts on annual earnings and employment rates for adults are $1,670 and 4.2 percentage points, respectively, with corresponding OLS p-values of 0.056 and 0.047. These p-values, however, overstate statistical significance. On the other hand, permutation p-values, which are consistent with the clustered random assignment of sample members, are equal to 0.249 and 0.166, respectively. This suggests that we cannot determine with a high degree of confidence whether the estimated positive long-term outcome differences represent mainly true positive differences or positive impact error.

Nonetheless, the two impact estimates for adults are near the top of their sampling distribution and reflect the same patterns that were observed previously for shorter-run outcomes. Hence, one might conclude that the present findings provide suggestive but weak evidence that longer-term Jobs Plus impacts for adults are qualitatively similar to their shorter-run counterparts.

In contrast, findings in exhibit E.2 for children strongly suggest that those who had lived in a Jobs Plus development during the program period experienced long-term earnings levels and employment rates that were appreciably higher than those of their comparison-group counterparts. Not only are the magnitudes of these estimated differences large, but their OLS and permutation p-values suggest that they probably represent, at least in part, true differences.

Now consider the results for weak-implementation sites. Note first that these results for children provide no evidence of a positive or negative program- versus comparison-group outcome difference. The magnitudes of these estimated differences are quite small, and they are not at all statistically significant (based on OLS or permutation p-values).

However, results in the exhibit for adults provide evidence of a negative program- versus comparison-group outcome difference, with OLS and permutation p-values that are statistically significant at well below or near the 0.10 level. These findings suggest that this negative difference probably represents more of a real difference than estimation error. The remaining question, in this case, is whether this negative difference was caused by Jobs Plus or by other factors. As the report discusses, it is likely due to factors other than Jobs Plus that affected residents in these developments.

VII. References

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