

**Childhood Homelessness and Adult Employment: The Role of Education,
Incarceration, Mental Health and Welfare Use***

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Abstract:

This paper assesses the long-term consequences of children experiencing homelessness. Our primary goal is to assess the importance of alternative pathways that potentially link childhood homelessness and adult employment. We find that children who experience homelessness are less likely to be employed in adulthood and that this link is strongly explained by poor educational attainment. We also find important gender differences in the mediating influences of incarceration in youth, which tends to matter primarily for men and welfare use, which tends to matter primarily for women. Interestingly, there is no evidence to suggest that mental health issues play a mediating role for either men or women.

Keywords: employment, homelessness, mental health, welfare receipt, education, incarceration

JEL Codes: J1, J2, I2

* This paper uses data collected from, the Journeys Home project, a longitudinal survey based study managed by the Melbourne Institute of Applied Economic and Social Research on behalf of the Australian Government Department of Social Services (DSS). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute. Contact Author: Anna Zhu: anna.zhu@unimelb.edu.au.

“For in every adult there dwells the child that was, and in every child there lies the adult that will be.”

John Connolly, *The Book of Lost Things*

1. Introduction

Childhood experiences often have long-lasting effects. Adverse childhood circumstances – e.g. poverty, poor health, maltreatment, family violence, neighborhood disadvantage, etc. – in particular are frequently associated with constrained opportunities, reduced well-being, and diminished life chances in adulthood. This connection between childhood experiences and adult outcomes is the mechanism through which social and economic disadvantage is passed from one generation to the next. Identifying the most important channels, and finding appropriate remedies, is one of the greatest challenges facing modern societies.

Homelessness is an especially extreme form of disadvantage. It results from an unfortunate combination of personal disadvantage (e.g. poor health), structural factors (e.g. tight housing markets), and bad luck (see for example O’Flaherty 2004, 2009a, 2009b; Curtis et al. 2011; Gould & Williams 2013; Shelton et al. 2009). Over time, society’s perception of homelessness changed as inadequate housing – once confined mainly to derelict single men – became a broader social problem facing women, young people, and families (see McChesney et al. 1990; Lee et al. 2010; Grant et al. 2013). In the United States today, for example, families with children represent the fastest growing segment of the homeless population (Tobin and Murphy 2013). Overall, families account for 37 percent of the total homeless population making nearly every one in four homeless Americans a child under the age of 18 (US HUD 2014). Many more children are “doubled up” with either extended family members or friends with no homes of their own.

Like homeless adults, homeless children often experience mental and physical health problems, victimization, abuse, etc. and they often struggle to access adequate health care and

keep up with their school work (see Wildeman 2014 for a review). While there is evidence that the economic and employment costs of adult homelessness can be substantial and persistent (Zuvekas and Hill 2000), the costs of child homelessness are likely to be even greater given that important human capital investments during children's formative years are disrupted (see Miller 2011; Masten et al. 2014). Unfortunately, however, we know very little about the long-term consequences of children experiencing homelessness and, as a result, we risk failing to fully address any social problems which are rooted in children's inability to access adequate housing.

The objective of this paper is to fill a void in the literature by using unique nationally-representative panel data to assess how the timing of homelessness affects adult employment outcomes. In particular, our estimation relies on six waves of data from the Journeys Home Project which follows nearly 1700 adult Australians experiencing housing insecurity over a three and a half year period. These data provide information on respondents' current employment, health, and housing outcomes as well as detailed retrospective information on their experiences, including homelessness, during childhood. Nearly all Journeys Home respondents have experienced homelessness in the past, with fully 26 percent of the sample reporting being homeless before age 16. Thus, our data are ideal for assessing the impact of homelessness which first occurs early rather than later in life. We are particularly interested in the following questions. First, is there an employment penalty associated with first experiencing homelessness as a child (i.e. before age 16) rather than as an adult? Second, how important are poor education, incarceration, mental health problems, and welfare receipt as pathways through which experiences of childhood homelessness are transmitted to employment opportunities in adulthood?

Journeys Home respondents are representative of the population of adult Australians experiencing housing insecurity. Thus, it is important that we carefully account for any adult

disadvantage, e.g. housing insecurity, poor health, victimization, etc. which would also affect employment outcomes in order to isolate any separate impact of childhood homelessness. We resolve this issue by i) using methods that exploit our six waves of data to control for adult disadvantage and ii) exploiting panel information in order to pinpoint the time-order of events to avoid any reverse causation issues. It is also important that we carefully account for any unobserved heterogeneity that might confound the interpretation of our main variable of interest (i.e. childhood homelessness) and our four mediating variables (i.e. education, incarceration, mental health, and welfare receipt). Our strategy for this is three-fold. First, we rely on our detailed controls to do much of the work in minimizing any unobserved heterogeneity. Given our data, however, we will be unable to identify the effect of childhood homelessness separately from the family circumstances (e.g. parental unemployment, family breakdown, poverty, health issues, etc.) that produced it. Consequently, we consider childhood homelessness to be a proxy for extreme childhood disadvantage. Second, we estimate a model which permits estimation of the effect of time-invariant controls (i.e. childhood homelessness) without requiring the time-varying controls to be independent of the individual-specific effects. Finally, we adopt the identification strategy proposed by Lewbel (2012) in order to test the sensitivity of our results to a model in which childhood homelessness, our mediating variables, and adult employment are driven in part by a common unobserved, individual-specific effect.

We make several important contributions to the literature. First, given the prevalence of homelessness among children, it is imperative that we begin to develop a deeper understanding of the long-term consequences of this form of extreme disadvantage. Previous researchers have made great progress in documenting the adverse effects of homelessness for children themselves (e.g. Molnar et al. 1990; Park et al. 2011; Tobin and Murphy 2013; Masten et al 2014). To our knowledge, however, we are the first to examine the adult

consequences of childhood homelessness in a nationally-representative sample. Our focus on disadvantaged adults is particularly important because childhood homelessness typically occurs in conjunction with other poverty-related risk factors (see Miller 2011), rather than in isolation. Moreover, employment outcomes are fundamental to the social and economic well-being of individuals at risk making them particularly interesting. Thus, we add to the body of evidence documenting the links between childhood and adult disadvantage.

Second, we explicitly compare the outcomes of those who were homeless as children with those who were homeless for the first time only as adults. This focus on the timing of homelessness extends previous research that relies on low-income housed children or youth to provide a counterfactual. As the effects of family stress and economic events, including homelessness, on educational outcomes are age-sensitive (Obradović, Long et al. 2009), it is reasonable to expect that experiencing homelessness during critical periods of development may also have more decisive effects on later outcomes than experiencing homelessness after these critical periods.

Finally, we are unique in our ability to use the detailed panel nature of the data and in particular the linked longitudinal administrative welfare records to pinpoint the time-ordering of events and to account for adult disadvantage in order to isolate the separate effects of homelessness that occurs for the first time in childhood. This is important in shedding light on the persistence of the adverse consequences resulting from childhood homelessness. Importantly, our empirical strategy also allows us to assess the extent to which experiencing homelessness as a child has both direct as well as indirect effects on adult employment through mediating factors such as diminished education, incarceration, poor mental health, and welfare receipt. Disentangling these pathways is critical in our efforts to find sensible remedies for the problem of childhood homelessness.

We find that children who experience homelessness are less likely to be employed in adulthood and that this link is strongly mediated by poor educational attainment. We also find important gender differences in the mediating influences of incarceration in youth, which tends to matter primarily for men and welfare use, which tends to matter primarily for women. Interestingly, there is no evidence to suggest that mental health issues play a mediating role for either men or women.

This paper is structured as follows. Section 2 reviews the literature; Section 3 describes the data and main confounding variables; Section 4 outlines the empirical strategy; Section 5 discusses the results and Section 6 concludes.

2. Literature Review

There is a large literature establishing direct links between childhood disadvantage and an array of adult outcomes including education, health, income, and criminal activity. Breaking these links is particularly challenging because childhood disadvantage is multi-faceted and appears to be transmitted to adulthood through several avenues. In particular, a vast range of childhood conditions such as poor health (Case, Fertig et al. 2005), maltreatment (e.g. Currie and Teakin 2012), poverty (e.g. Duncan and Brooks-Gunn 1997; Duncan et al 2010; Currie 2009), low socio-economic status (e.g. Currie 2009; Gregg and Machin 2000), welfare receipt and neighborhood disadvantage (e.g. Haveman and Wolfe 1995; Wodtke et al. 2011; Islam 2013) have all been demonstrated to have profound long-term consequences for individuals' life chances.

The growing number of families without access to adequate housing has resulted in researchers increasingly directing their focus to the issue of what being homeless means for children. Several important insights are beginning to emerge. In particular, homelessness is often associated with family disruption (e.g. Wildeman 2014) and with lower investments in

children's education and health (Miller 2011; Masten et al. 2014). Wildeman (2014), for example, finds that, in the United States, paternal incarceration increases the risk of child homelessness substantially. (e.g. on their mental and physical health as well as their cognitive and social development (Rescorla, Parker et al. 1991, Masten, Miliotis et al. 1993)). Cite Monar et al (1990) here.

In addition, childhood homelessness does not occur in isolation, but typically emerges in conjunction with other precipitating factors such as behavior problems, poverty, family breakdown, foster care, physical or sexual abuse, and mental health issues (see Flouri and Buchanan 2004 for a review). This raises the question of whether or not it is homelessness *per se* that matters. Thus far, the evidence is mixed on whether there is disparity in the outcomes of homeless children and their similarly disadvantaged, housed peers. Park et al. (2011), for example, analyze data from the Fragile Families and Child Well-Being Study (FFCW) and conclude that – in a sample of low-income children – housing status had little adverse impact on young children's physical or mental health, cognitive development, or health care use. Instead, “a set of stressors common to many children in poverty, rather than housing status, contributed to poor child health and development” (p. S260). Miller (2011) reaches a similar conclusion after reviewing what is known about the impact of student homelessness on educational outcomes.

In contrast, other scholars stress the unique disruption that a homeless experience brings. For example, homeless students, compared to low-income housed students, typically experience higher rates of school mobility and subsequently, have diminished cognitive outcomes and greater school dropout rates (Buckner, Bassuk et al. 2001). They also experience higher rates of emotional and social isolation both in school and from immediate and extended family networks (Zlotnick, Robertson et al. 1999). Finally, homeless children face a higher incidence of victimization (Hagan and McCarthy 1997), greater exposure to

infectious diseases (Haddad, Wilson et al. 2005), lower access to health care services (Kushel, Vittinghoff et al. 2001), as well as poorer educational and health outcomes (Buckner 2008).

Unfortunately, we know very little about the long-term consequences of child homelessness. Making progress on this issue has been severely limited by data restrictions on the availability of data linking childhood homelessness to adult outcomes and by sample representativeness.¹ Given the heterogeneity in the outcomes of disadvantaged children, it is important to identify and to understand the extent to which certain factors can mitigate (or exacerbate) the effects of early disadvantage. Flori and Buchanan (2004), for example, analyze data from the British National Child Development Study and find that in families with low socio-economic status parental involvement with their sons (e.g. reading, outings, interest in education) protects against an adult experience of homelessness. It is an open question whether similar parental investments mitigate the impact of child homelessness specifically. Similarly, evaluations of U.S. programs designed to ameliorate mobility and isolation issues by allowing homeless students to choose between attending their schools of origin or enrolling in schools near the shelters in which they are living have found that the reach of these services are improving. Yet it remains to be seen how effective they are in lifting the educational achievements of homeless students.

Thus, while much of the literature concerned with the socio-economic and health consequences of childhood homelessness has centered on the immediate, short-term effects, the persistent direct and indirect impacts of child homelessness on disparity in adult outcomes may be far greater. Understanding the adult consequences of childhood homelessness as well as the mechanisms linking childhood and adult disadvantage is an important step in

¹ For example, the Fragile Families and Child Wellbeing Study follows children until the age of nine and other individual-level data are usually small and cross-sectional convenience samples.

addressing the diverging life chances of those who do and do not experience homelessness in childhood.

3. The Journeys Home Data

Our analysis relies on unique data from the Journeys Home Project in which a representative sample of individuals experiencing housing insecurity were interviewed over six waves about their housing circumstances, employment patterns, health, demographic and human capital characteristics, and family background. Individuals' survey data can also be linked to their administrative welfare records. Together, these data provide a unique opportunity to study the long-term consequences of childhood homelessness.

3.1 Journey's Home Estimation Sample

Unlike the case in the United States where welfare is a state responsibility, all social benefits in Australia (e.g. child care, unemployment, and housing benefits, single parent allowances, old-age pensions, etc.) are administered at the national level through one central agency known as Centrelink. Importantly, Centrelink houses the administrative data for the universe of Australians receiving any form of social assistance since July 1, 2002. These administrative data provide the sampling frame for the Journeys Home Project.

In particular, Journeys Home researchers identified a total population of 139,801 individuals in the Centrelink data who were experiencing housing insecurity (see Wooden et al. 2012 for details). A stratified random sample of 2,992 in-scope individuals across 36 distinct locations was then selected for interview. Nearly 62 percent of this group (n=1,682) participated in a wave 1 interview which compares favorably with response rates in other studies of seriously disadvantaged populations (O'Callaghan 1996; Randall & Brown 1996; Weitzman et al 1990). Wave 1 interviews were conducted in September - November 2011 with five follow-up interviews subsequently occurring at six-month intervals. Interviews

were mainly conducted face-to-face, with telephone interviews used only when this was not feasible. Fully, 84 percent of wave 1 respondents were successfully re-interviewed in wave 6 and over 98 percent of respondents consented to having their survey and administrative data linked. These administrative data contain highly accurate and frequent (fortnightly) information about respondents' benefits history (back to July 2002).

We restrict the sample to individuals aged 21 - 54 years and drop any observations with missing data on the key variables of interest. This results in an unbalanced panel of 750 individuals and 4,218 person-wave observations.

3.2 Key Variables of Interest

Our dependent variable is an indicator of employment status equals one if the individual is employed at the time of the survey, and zero if they are unemployed or not in the labor force. As a sensitivity analysis, we also consider the proportion of time an individual is employed over the last three-and-a-half years.

Journeys Home respondents report the "age [of the] first time without a place to live...", where experiences of being without a place to live include: 1) stayed with relatives temporarily or 2) stayed at a friend's house temporarily or 3) stayed in a caravan, mobile home, cabin, houseboat or 4) stayed at a boarding house or hostel or 5) stayed in crisis accommodation or a refuge or 6) squatted in an abandoned building or 8) slept rough or 9) ever stayed somewhere else. Thus, our definition of childhood homelessness is not restricted to 'street' or 'shelter' homelessness, as is the case with much of the previous research (Sosin et al. 1990; Chamberlain & Mackenzie 1992; Argeriou et al. 1995; Cordray & Pion 1997; Hopper 1997; Jacobs, Kemeny & Manzi 1999; Springer 2000; Chamberlain & Johnson 2001; Watson 2001; Pleace 2005). Instead, it encompasses broader experiences of homelessness

such as being in state care, transitory accommodation, and doubling up (living with friends and family).

We use this information to construct our main explanatory variable of interest which is an indicator of childhood homelessness that occurs at or before age 15. This is a socially significant age – it is the age that most Australian students decide whether they will continue with secondary schooling beyond the minimum required age of school cessation. It is also the minimum age at which individuals may access welfare benefits in their own right independent of their carers. However, we test the sensitivity of our results to other age thresholds.

We distinguish between four types of mediating effects: the role of education, the role of incarceration during youth, welfare receipt and mental health. These variables are constructed using both the retrospective portion of the survey as well as information from the linked administrative welfare records. This allows us to gauge approximately when these events occurred in an individual's life course, and, more importantly, when they occurred relative to the other key events we analyse such as childhood homelessness, and adult employment. To do so we divide an individual's life into three distinct periods in: *childhood*, which we consider to be at or before age 15, *young adulthood*, which we consider to be between the ages of 16 to 21 and *adulthood*, which we define as from age 21 and onwards.

Educational attainment is defined as one if an individual completed Year 12 or above, and zero otherwise.² In our sample, 14 per cent of individuals in our sample did not complete Year 10, which is commonly undertaken at age 15 to 16 years. Thus there is a chance that some individuals in our sample dropped out of secondary school before their first homelessness experience. However, we argue that the most viable direction of effect is of that from early homelessness to educational disruption (and thus lower educational attainment).

² Individuals who obtain a certificate I or II, however, do not complete year 12, are allocated into the base case.

As a sensitivity test, we later test the sensitivity of the results to different age thresholds for early homelessness.

Youth incarceration is a binary variable, which equals to one if the individual was incarcerated between the ages of 16 to 21 years. Individuals who commit or allegedly commit an offense from age 17 years onwards, in most states and territories, are no longer managed by the youth justice system but enter the adult justice system.

We also consider two mediating effects based on the administrative data, which allows us to construct a) a measure of welfare receipt dependency, which we define as the proportion of time a person is in receipt of welfare over the 24 months *before* the beginning of the survey and b) a measure of mental illness, which we define as the proportion of time that a person is in receipt of disability welfare payments (Disability Support Pension (DSP)) for mental illness-related reasons. We preference the use of this administrative record over the self-reported questions around mental distress such as, the Kessler 6, as DSP receipt indicates more permanent and serious forms of mental illness since the eligibility criteria for DSP requires potential recipients to obtain a diagnosis of mental illness by a specialist.

3.3 Control Variables

The child background and parental characteristic variables are constructed from the retrospective survey questions, which ask the individual at what age they first experienced an important event or exhibited certain behaviour. The main childhood background and parental variables that we account for in the regression analyses include: the age of the individual (as a polynomial function of order two); Aboriginal or Torres Strait Islander background indicator, any experience of emotional abuse (threats of abuse against child or child's friends, family or pets), physical or sexual violence as a child by someone living in the household or elsewhere

(modelled as separate indicators); whether the child smoked on a daily basis before the age of 12, foster, residential or kin care as a child; whether or not either the male or female primary caregiver spent time in jail; and whether or not either the male or female primary caregiver had a drug, drinking or gambling problem.

A number of the above indicators of disadvantage may occur following the respondent's first homeless experience, and thus might absorb some of the effect of childhood homelessness on adult employment. However, we include these covariates in our regression models as they can proxy for important personality traits or childhood conditions that explain the underlying link between childhood and adult disadvantage.

We also have a set of time-varying control variables that are measured at the time of the survey including: an indicator for primary homelessness (street or shelter), peer effect variables looking at the number of friends who are homeless, risky drinking behaviour (more than 2 standard alcoholic drinks at least 3 days a week), physical conditions (ever diagnosed with a physical condition³), relationship status (single), and the presence of young children (ages 0-4) in the care of the respondent. These variables are included in addition to the child background and parental characteristic variables as a way of analysing the direct effects of childhood homelessness on adult employment, once adult disadvantage is taken into account. As these variables may well mediate some of this relationship, they also act as a lower bound estimate of the results that do not include these variables.

4. Empirical Strategy

We begin with a conceptual framework in which childhood homelessness is linked to adult employment outcomes through human capital formation. In particular, episodes of

³ The complete list of physical conditions that respondent are asked about include: stroke, heart or other circulatory conditions, diabetes, asthma, chronic bronchitis, cancer, liver problems, arthritis, epilepsy, kidney disease, Hepatitis C, chronic neck or back problems, and acquired brain injury.

homelessness are assumed to disrupt investments in human capital. Because human capital production is a cumulative process subject to critical investment periods (see Kautz et al. 2014 for a review), homelessness that occurs during childhood when foundational cognitive and non-cognitive skills are being formed is likely to have more severe and long-term consequences than homelessness that occurs later. Moreover, as human capital endowments are fundamental to many life outcomes, e.g. health, economic well-being, criminal activity, which themselves drive employment opportunities, we expect childhood homelessness to have will have wide-ranging effects through a number of avenues.

4.1 Empirical Model:

We begin by assuming that employment for adult i , at time t is given by the following:

$$Emp_{it}^{adult} = \alpha_0 + \alpha_1^{direct} H_i^{child} + \alpha_2 X_i^{child} + \alpha_3 M_i + \varepsilon_{it} \quad (1)$$

$$M_i = \gamma_0 + \gamma_1 H_i^{child} + \gamma_2 X_i^{child} + \mu_i, \quad (2)$$

where Emp_{it}^{adult} denotes adult employment status, H_i^{child} denotes childhood homelessness, and X_i^{child} is a vector of early life conditions (i.e. indicators for emotional, physical or sexual abuse, foster, residential or kin care, daily smoking before or at age 12), family background (i.e. indicators for caregivers with drinking, drug or gambling problems or ever incarcerated), and demographic characteristics (i.e. age, age squared, indigenous status). In addition, M_i is a mediating factor which itself is a function of childhood homelessness as well as early life conditions, family background, and demographic characteristics. Thus, α_1^{direct} captures the direct effect of childhood homelessness on adult employment outcomes, while γ_1 captures the effect of childhood homelessness (H_i^{child}) on the mediating factor (M_i). Finally, ε_{it} and μ_i are i.i.d. error terms.

To illustrate our estimation strategy, substitute equation (2) into equation (1) resulting in:

$$\begin{aligned}
Emp_{it}^{adult} &= \alpha_0 + \alpha_1^{direct} H_i^{child} + \alpha_2 X_i^{child} + \alpha_3(\gamma_0 + \gamma_1 H_i^{child} + \gamma_2 X_i^{child} + \mu_i) + \varepsilon_{it} \\
&= (\alpha_0 + \alpha_3 \gamma_0) + (\alpha_1^{direct} + \alpha_3 \gamma_1) H_i^{child} + (\alpha_2 + \alpha_3 \gamma_2) X_i^{child} + (\mu_i + \varepsilon_{it}) \\
&= A + B H_i^{child} + C X_i^{child} + e_{it}
\end{aligned} \tag{3}$$

where $A = (\alpha_0 + \alpha_3 \gamma_0)$, $B = (\alpha_1^{direct} + \alpha_3 \gamma_1)$, $C = (\alpha_2 + \alpha_3 \gamma_2)$, and $e = (\mu_i + \varepsilon_{it})$.

In equation (3), the indirect effect of childhood homelessness operating through M_i is $\alpha_3 \gamma_1$, while the direct effect is α_1^{direct} making the total effect B equal to $(\alpha_1^{direct} + \alpha_3 \gamma_1)$.

Researchers often assess the importance of direct versus indirect effects by estimating models with (equation 1) and without (equation 3) controls for mediating variables allowing the total and the direct effects of the variable of interest to be compared. Alternatively, we draw on the work of Tubeuf et al. (2012) who model the mediating role of education and lifestyle choices in the relationship between early life conditions and adult health. These authors utilize an approach in which the determinants of the mediating factors themselves are estimated directly allowing their impact to be calculated and more complex relationships between mediating variables to be considered. In our case, we first generate an estimate of the direct effect of child homelessness on adult employment (α_1^{direct}) using equation (1). We then estimate $\hat{\gamma}_1$ using a series of mediating effects models based on equation (2). Finally, we calculate the total effect of child homelessness on adult employment outcomes using the relationships given in equation (3).

We are particularly interested in understanding the extent to which childhood homelessness affects adult outcomes through its impacts on i) educational attainment; ii) incarceration; iii) welfare receipt; and iv) mental health. First, we examine the extent to

which youth disadvantage, i.e. dropping out of secondary school or incarceration between the ages of 16 and 21 years, accounts for the relationship between childhood homelessness and adult employment (see equations 4 and 5 below). Second, we use the panel nature of our data to examine whether or not any link between youth disadvantage and adult employment operates through welfare use or poor mental health in adulthood (see equations 6 and 7 below). Specifically, our mediating factors are given by the following:

$$Educ_i = \gamma_0^{educ} + \gamma_1^{educ} H_i^{child} + \gamma_2^{educ} X_i^{child} + \mu_i^{educ}, \quad (4)$$

$$Jail_i = \gamma_0^{jail} + \gamma_1^{jail} H_i^{child} + \gamma_2^{jail} X_i^{child} + \mu_i^{jail}, \quad (5)$$

$$Welf_i = \gamma_0^{welf} + \gamma_1^{welf} H_i^{child} + \gamma_2^{welf} X_i^{child} + \gamma_3^{welf} Educ_i + \mu_i^{welf}, \quad (6)$$

$$MH_i = \gamma_0^{MH} + \gamma_1^{MH} H_i^{child} + \gamma_2^{MH} X_i^{child} + \gamma_3^{MH} Educ_i + \mu_i^{MH}. \quad (7)$$

Each of these four mediating effects equations are estimated separately and then combined with estimates derived from the model of adult employment given in equation (1). The combination of estimates from equation (4) and equation (1) yields an estimate of the mediating effect of dropping out of secondary school ($\alpha_3 \widehat{\gamma_1^{educ}}$), while combining estimates from equation (5) with those of equation (1) provides an estimate of any impact of child homelessness operating through youth incarceration ($\alpha_3 \widehat{\gamma_1^{jail}}$).

The mediating effects of adult welfare use and mental health problems are more complex. Individuals' welfare receipt and mental distress are measured after they reach adulthood and have completed their secondary education. Consequently, we are able to distinguish between (i) the extent to which poor mental health accounts for the relationship between childhood homelessness and adult employment i.e. $\alpha_3 \widehat{\gamma_1^{MH}}$; and (ii) the extent to which poor mental health *further* explains the mediating influence of education on the relationship between childhood homelessness and adult employment (i.e. does childhood

homelessness operate on adult employment through education via the influence of welfare dependency or mental health?). Specifically, the overall mediating effect of mental health on the relationship between childhood homelessness, adult employment, and education is given by $\alpha_3\gamma_3^{\overline{MH}}\gamma_1^{educ}$.⁴ As we are unable to establish whether individuals' mental health issues and welfare history began before or after any incarceration in adolescence, we omit incarceration from our model of welfare receipt and mental health.

4.2 Identification:

We rely on the panel nature of our data to avoid concerns about reverse causality. Most importantly, we use information about the timing of events to ensure that the individual's welfare receipt and mental distress status are predetermined with respect to their employment patterns.

Our primary empirical challenge will, as usual, be to carefully account for any unobserved heterogeneity which might confound the interpretation of the main variables of interest, childhood homelessness, and the mediating variables. We adopt a multifaceted approach. First, we rely on detailed controls to do much of the work in eliminating any threats to causality. Specifically, in addition to our baseline model which controls for childhood conditions and parental characteristics, we also estimate a second specification that accounts for several indicators of adult disadvantage, including; illegal drug use, risky drinking, adult homelessness, and the number of friends who are homeless. These detailed controls increase the potential for the conditional independence assumption to hold (Rubin 1977). Moreover, they allow us to assess whether there are any lingering impacts of childhood homelessness on the employment of adults experiencing similar degrees of

⁴ To see this, substitute equation (4), into (7) and then further into equation (1).

economic and social disadvantage. As childhood homelessness may affect adult employment opportunities in part through these indicators of adult disadvantage, controlling for them provides lower bound estimates of the effect of childhood homelessness operating through other channels.

Second, we use a Mundlak (1978) approach in which the means of time-varying variables are used to control for unobserved heterogeneity. This allows us to make weaker identification assumptions than would be required in a random effects model. Moreover, we can use this approach to estimate the impact of the time-invariant variable of childhood homelessness, which would not be possible with fixed-effects estimation, while avoiding the strong and often implausible assumptions underpinning instrumental variables models.

Finally, we conduct a series of robustness checks in which we adopt Lewbel's (2012) approach to control for time-invariant, unobserved heterogeneity. This approach utilizes higher moments of the data to construct instruments, thus providing less reliable and weaker identification power than standard instrumental variables estimation which relies on exclusion restrictions to achieve identification. As a result, we place greater emphasis on the results from the Mundlak specification. We also test the sensitivity of the results to variations in the timing of childhood homelessness i.e. we use a different age cut-off at age 14 years. Results can be found in Section 5.

4.3 Estimation:

We estimate our model of adult employment (equation 1) within a Mundlak framework, using Generalised Least Squares (GLS).⁵ We cluster our standard errors on the individual in order to account for any autocorrelation induced by having repeated person observations

⁵ As a sensitivity analysis, we also consider the proportion time employed over the last three-and-a-half years (see section ???).

across time. We estimate our models of high school completion and youth incarceration equations (4) and (5) respectively, using linear probability models. The determinants of the proportion of the previous two years that individuals' received welfare or was mentally ill (in receipt of DSP for mental illness-related issues (equations 6 and 7) are estimated using OLS. We bootstrap the standard errors for all the estimates of the indirect effects.⁶

5. Results

As previously outlined, our data makes it difficult for us to distinguish between childhood homelessness experienced with the family as opposed to run-away and unaccompanied youth homelessness. These experiences are unlikely to be uniform (Duffield 2001, Miller 2011) although they both imply that the child endures a spell of housing instability for reasons that are beyond their control. Unaccompanied homeless youth may resort to leaving the family home if they face issues such as family conflict and/or emotional, physical or sexual abuse (Duffield 2001).

Thus we proceed to interpret our results with this in mind. The estimated associations between childhood homelessness and adult employment are reported in Table 1, separately for men and women. The first set of results in Columns (1)-(3) presents the associations with minimal control variables (M1). Columns (4)-(6) accounts for the potential confounding effects of childhood adversity and parental disadvantage. We have also accounted for an indicator of primary homelessness in adulthood and the mean of this variable across the six waves. Columns (7)-(9) further accounts adult disadvantage indicators in order to assess the associations once we keep the recent and adult histories of disadvantage in homelessness, peer effects, risky drinking behaviour, and physical health diagnoses, along with longer term measures of these variables constant across our groups of early versus later-in-life homeless.

⁶ We use 1,000 replications.

As the coefficients presented in Table 1 represent the difference in the employment rates between those who were homeless early in life (before or at the age of 15) and later in life, they can be interpreted as the percentage point difference in the probability of being employed between these two groups.

We find that there is a long-term employment penalty associated with experiencing homelessness earlier compared to later in life. Those who were homeless before or at the age of 15 years are up to approximately 12 percentage points less likely to be employment in adulthood, compared to those who experienced homelessness after the age of 15. The magnitude and statistical precision of this employment penalty applies equally to men and women. This association is substantial given that the overall employment rate in this sample is approximately 25 percent.

A causal interpretation of these results would suggest that if only 12 percent of the childhood homeless had alternatively experienced homelessness later in life, then they would be moved into employment in adulthood, and this would lift the overall employment rate for the whole sample by nearly 50 percent. One rationale for a causal interpretation is provided by Cunha and Heckman's (2010) self-productivity theory, which purports that experiencing disadvantage has negative cumulative effects to human capital – thus those who experience an earlier spell compared to a later spell of disadvantage have lower levels of human capital in adulthood. Another rationale is that an earlier spell of homelessness can have scarring effects if they occur during sensitive or critical periods in one's life – such as disruptions to secondary schooling attainment, which can prevent a person from accumulating further skills or exclude them from participating in the labour market.

However, there are a number of reasons that would prohibit such a causal interpretation. Those who experience homelessness at an earlier age may be fundamentally different to those who experience homelessness at a later age. Johnson (2010) argues that

there are two main types of children who become homeless before the age of 18 years – ‘dissenters’ – those who leave the family home because they are rebellious in nature and ‘escapers’ – those who leave the family home because their family situation is corrosive and discordant. Although, ‘run-aways’ comprise only part of our sub-sample of early homeless respondents (as some will have become homeless with their families and unfortunately our data does not allow us to clearly distinguish between these sources), these personality traits or childhood adversities may be over-represented in this group compared to those who become homeless later in life. These factors may not only determine early homelessness but also have a direct relationship with adult employment. Thus the potential consequence of this selection issue is that we overestimate the association between childhood homelessness and adult employment.

We control for variables that may proxy for these background characteristics in M2 (Columns (4)-(6)), such as experiences of sexual, physical and emotional abuse, parental incarceration, or drug and alcohol issues as well as indicators for impulsivity such as smoking on a daily basis before the age of 12 years. We also account for whether or not the child was ever in state care, as defined by residential, kin or foster care. Table 1 suggests that these controls indeed account for part of the correlation between childhood homelessness and adult employment. However, this is largely driven by the results for females. The association between childhood homelessness and employment reduces by 4 percentage points and is only statistically significant at the 10 percent level for females. One possible suggestion for this is that the controls are better proxies for underlying characteristics or the primary instigators of childhood homelessness for females compared to males.

Table 1: Coefficients of the adult employment regressions, separately for men and women

	Basic controls: M1			M1 + homelessness vars (M2)			M2 +adult variables (M3)		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
<i>Homeless before age 16 years</i>	-0.107***	-0.088**	-0.117***	-0.084***	-0.083**	-0.077*	-0.068**	-0.075**	-0.053
<i>Age</i>	0.013	-0.003	0.035***	0.013	-0.004	0.036***	0.011	-0.002	0.032***
<i>Age-squared</i>	-0.000*	0.000	-0.000***	-0.000*	0.000	-0.000***	-0.000*	0.000	-0.000***
<i>Aboriginal or Torres Strait Islander</i>				-0.126***	-0.107***	-0.142***	-0.104***	-0.101***	-0.107***
<i>Ever in foster, residential or kin care</i>				-0.014	-0.011	-0.020	-0.013	-0.019	-0.025
<i>Experienced emotional abuse as a child by any adult living in the same household</i>				0.003	0.005	-0.004	0.005	0.011	0.002
<i>Experienced sexual abuse as a child by any adult living in the same household</i>				-0.080***	-0.049	-0.067*	-0.069***	-0.031	-0.061
<i>Experienced physical abuse as a child by any adult living in the same household</i>				0.011	0.018	-0.012	0.01	0.017	-0.019
<i>Smoked on a daily basis since age 12</i>				0.000	-0.006	0.021	0.002	-0.009	0.013
<i>Either parent had a drinking or gambling problem while respondent was a child</i>				0.013	-0.007	0.031	0.011	-0.007	0.037
<i>Either parent spent time in jail while respondent was a child</i>				-0.047	-0.013	-0.091**	-0.028	-0.004	-0.064
<i>Homeless (primary) in the last 6 months</i>				-0.129**	-0.181**	-0.032	-0.134**	-0.179**	-0.051
<i>Primary Homeless (mean across six waves)</i>				0.067	0.118	-0.028	0.063	0.104	0.031
<i>Some or most friends are homeless in last 6 months</i>							-0.007	-0.011	-0.004
<i>Risky drinking behaviour in the last 6 months (>2 standard drinks at least 3 days a week)</i>							0.052***	0.053**	0.053
<i>Diagnosed with a physical health problem in the last 6 months</i>							0	0.031	-0.067
<i>Relationship status (single)</i>							-0.036	-0.057	0
<i>Any children under the age of 4</i>							-0.051	-0.011	-0.094**
<i>Friends are homeless (mean across six waves)</i>							-0.306***	-0.318***	-0.279**
<i>Risky drinking (mean across six waves)</i>							-0.065	-0.023	-0.203***
<i>Physical health (mean across five waves)</i>							-0.076	-0.115	-0.003
<i>Relationship status (single) (mean across five waves)</i>							-0.038	0.023	-0.045
<i>Any children under the age of 4 (mean across five waves)</i>							-0.085*	0.081	-0.085
<i>Wave=2</i>	0.046***	0.065***	0.02	0.046***	0.064***	0.021	0.045***	0.061***	0.022
<i>wave=3</i>	0.052***	0.054**	0.050**	0.052***	0.052**	0.051**	0.051***	0.048*	0.054**
<i>wave=4</i>	0.056***	0.068***	0.041	0.057***	0.067***	0.042*	0.055***	0.062**	0.045*
<i>Wave=5</i>	0.050***	0.063**	0.033	0.050***	0.060**	0.034	0.048**	0.054**	0.037
<i>wave=6</i>	0.048**	0.063**	0.027	0.048**	0.062**	0.029	0.047**	0.053**	0.036
<i>Number of observations</i>	4218	2438	1780	4218	2438	1780	4218	2438	1780
<i>R-squared</i>	0.015	0.022	0.019	0.038	0.035	0.054	0.062	0.054	0.097

Notes: Population consists of an unbalanced panel of individuals aged between (and inclusive of) 21 to 54 years from the Journeys home survey. The number of person observations is 750 for all, 436 for males, and 314 for females. The standard errors have been clustered at the individual level. * p<0.1, ** p<0.05, *** p<0.01

On the other hand, the different reasons that give rise to an early versus later spell of homelessness may lead us to underestimate the results. Those who experience an early spell may have encountered family-background issues, which are largely outside the control of the

individual. In contrast, those who experience homelessness later in life may have more individual-related issues, such as alcohol-related issues or physical disability. To ensure that later-life factors are constant across our two groups, we also account for adult indicators of disadvantage. Table 1 (Columns (7)-(9)) show that the association between childhood homelessness and adult employment reduce slightly yet again, in a more pronounced way for females than males where the total effect of childhood homelessness is no longer statistically significant for females. However interestingly, for females, the magnitude of the employment penalty associated with childhood homelessness is close to the penalty associated with being a victim of sexual abuse or having parents who were incarcerated during the respondent's childhood.

Turning to another key research question, Table 2 presents the direct and indirect effects of childhood homelessness on adult employment via key mediating factors. As outlined in Equations (4) to (7) in the methodology section, we estimate four separate mediating effects equations and substitute them into Equation (1) in order to derive the coefficient of indirect effects. The direct effects (Columns (3), (6) and (9)) refer to the direct association between childhood homelessness and adult employment once we control for the mediating factor/s in the regression and the indirect effects are presented in Columns (2), (5) and (8). Columns (4), (7) and (10) present the proportion of the total effect that is explained by the indirect effect. As before, we present these estimates separately for men and women. Further, we estimate two sets of presents – one that does not control for adult controls as presented in Panel A and regressions that do control for adult controls in Panel B.

The coefficients of indirect effects can be interpreted as the percentage point gap in employment rates between those who were homeless early versus later in life that is associated with the former group's higher secondary school drop-out rate or level of incarceration, for example. Note that the addition of the direct and indirect effects for the first

two rows within each sub-sample equals to the total effect of childhood homelessness on adult employment. This coefficient is also presented in Table 1. For the remaining rows in Table 2, we present the two-tiered indirect effects, for example, the association between childhood homelessness and adult employment via welfare dependence or mental illness as well as the association between education, childhood homelessness and adult employment via welfare and mental illness.

Table 2: Estimates of the indirect and direct effects (of childhood homelessness before or at the age of 15 years), separately for men and women

	All			Boys			Girls		
	Indirect	Direct	Indirect/ Total	Indirect	Direct	Indirect/ Total	Indirect	Direct	Indirect/ Total
<i>Panel A: Regression results where the total effects model includes no adult controls (except for homelessness variables)</i>									
Educ and Jail separately									
H on Y via educ	-0.026	-0.058**	30.849	-0.021	-0.061*	25.88	-0.030	-0.047	38.847
H on Y via jail	-0.010	-0.074***	11.997	-0.018	-0.065*	21.99	-0.011	-0.065	14.428
Two-tiered effects									
H on Y via welfare (controlling for educ)	-0.015	-0.045*	17.542	-0.010	-0.054	11.88	-0.025	-0.022	32.349
H on Y via educ via welfare	-0.005		5.851	-0.002		1.91	-0.011		14.845
H on Y via educ (controlling for welfare)	-0.021		24.325	-0.020		23.07	-0.019		24.295
H on Y via mental illness (controlling for educ)	-0.009	-0.049*	11.225	-0.001	-0.060*	1.67	-0.014	-0.033	17.856
H on Y via educ via mental illness	-0.002		2.435	-0.001		1.01	-0.002		3.028
H on Y via educ (controlling for mental illness)	-0.024		28.191	-0.020		24.78	-0.027		35.554
<i>Panel B: Regression results where the total effects model includes adult controls (as well as homelessness variables)</i>									
Educ and Jail separately									
H on Y via educ	-0.025	-0.043	36.662	-0.020	-0.054	27.21	-0.025	-0.027	47.754
H on Y via jail	-0.009	-0.059**	12.572	-0.016	-0.060	20.79	-0.011	-0.041	20.850
Two-tiered effects									
H on Y via welfare (controlling for educ)	-0.008	-0.036	12.201	-0.007	-0.050	8.52	-0.017	-0.011	31.242
H on Y via educ via welfare	-0.004		6.142	-0.001		1.67	-0.009		16.254
H on Y via educ (controlling for welfare)	-0.020		29.567	-0.019		24.58	-0.017		31.600
H on Y via mental illness (controlling for educ)	-0.008	-0.035	11.382	-0.001	-0.053	0.83	-0.011	-0.016	21.621
H on Y via educ via mental illness	-0.002		2.469	0.000		0.63	-0.002		3.496
H on Y via educ (controlling for mental illness)	-0.023		33.912	-0.020		26.55	-0.023		43.947

We find that educational disruption is instrumental in explaining the gap in adult employment rates between those who were homeless early versus later in life. In fact, dropping out of secondary school explains approximately one third of the overall association, and is statistically significant. For men, this educational disruption explains just over a quarter of the association, and for women, it explains over one third of the association.

We also find important gender differences in the mediating influences of incarceration in youth, which tends to matter primarily for men and welfare use, which tends to matter primarily for women. Interestingly, there is no evidence to suggest that mental health issues play a mediating role for either men or women.

*** to be completed***

6. Robustness

We utilize a method that relies on internal instruments based on simple functions of the model's data to address the underlying correlation between childhood disadvantage and outcomes that is potentially (partly) attributable to unobserved influences (Lewbel 2012). This approach essentially places conditions upon the higher moments in order to identify the model. Recently, there have been a number of authors who have used this approach to address endogeneity or measurement error issues and move their empirical analyses closer to assessing causal impacts (Sabia 2007, Welsch and Zimmer 2010, Drichoutis, Nayga Jr et al. 2012, Denny and Oppedisano 2013, Brown 2014).

More specifically, identification in Lewbel's approach is achieved by exploiting heteroskedasticity in the first stage regression, (which in our case is the homelessness variable regressed on a vector of exogenous variables, X , and an error term, τ_i) to provide identification in the second stage regression, which is the adult employment equation. Note that Lewbel also allows for additional endogenous variables in the model, which in our case

will be our mediating variable equations. In our model, we apply the Breusch-Pagan test of heteroskedasticity and strongly reject the null of homoskedasticity, with a p-value of 0.01.

Given the presence of heteroskedasticity, Lewbel shows that Two-Stage Least Squares (2SLS) estimation is possible in the absence of external instruments. However, this approach provides for less reliable and statistically weaker than identification based on the coefficient zero restrictions.

Table 4: Estimates of the direct and indirect effects from the Lewbel model (of childhood homelessness before or at the age of 15), separately for men and women

	All			Boys			Girls		
	Indirect	Direct	Total	Indirect	Direct	Total	Indirect	Direct	Total
Educ and Jail separately									
H on Y via educ	-0.011	-0.046	-0.057	-0.016	-0.058	-0.074	-0.005	-0.003	-0.008
H on Y via jail	-0.014	-0.051	-0.065	-0.026	-0.064	-0.090	-0.003	-0.023	-0.025
Two-tiered effects									
H on Y via welfare (controlling for jail)	-0.001	-0.061	-0.072	0.003	-0.059	-0.077	-0.013	0.001	-0.015
H on Y via jail via welfare	-0.001			0.000			0.001		
H on Y via jail (controlling for welfare)	-0.009			-0.022			-0.004		
H on Y via welfare (controlling for educ)	-0.005	-0.052	-0.066	-0.003	-0.062	-0.087	-0.010	0.013	-0.009
H on Y via educ via welfare	-0.004			-0.004			-0.002		
H on Y via educ (controlling for welfare)	-0.005			-0.018			-0.010		
H on Y via mental illness (controlling for jail)	-0.018	-0.032	-0.067	-0.011	-0.039	-0.087	-0.005	-0.020	-0.028
H on Y via jail via mental illness	0.005			0.014			-0.001		
H on Y via jail (controlling for mental illness)	-0.023			-0.052			-0.002		
H on Y via mental illness (controlling for educ)	-0.009	-0.032	-0.057	0.001	-0.046	-0.068	-0.004	0.000	-0.013
H on Y via educ via mental illness	-0.001			-0.002			0.000		
H on Y via educ (controlling for mental illness)	-0.015			-0.021			-0.009		

The key assumptions required in this model include: 1) the regressors, X (excluding the homelessness and mediating variables), are uncorrelated with the errors in both the first stage and second stage equations 2) heteroskedastic error terms in the first stage, as stated above, and 3) the regressors need to be uncorrelated with the product of the heteroskedastic errors. Intuitively, we can interpret this last condition as saying that the unobserved

employment penalty, such as discrimination to an unobservable trait, such as poor social skills, for example, is uncorrelated to the vector of X controls.

*** to be completed***

7. Conclusions

The objective of this paper was to assess how the timing of homelessness affects adult employment outcomes. Also, we set out to assess the importance of alternative pathways that potentially link childhood homelessness and adult employment. We find that educational disruption is instrumental in explaining the gap in adult employment rates between those who were homeless early versus later in life. In fact, dropping out of secondary school explains approximately one third of the overall association, and is statistically significant. For men, this educational disruption explains just over a quarter of the association, and for women, it explains over one third of the association.

We also find important gender differences in the mediating influences of incarceration in youth, which tends to matter primarily for men and welfare use, which tends to matter primarily for women. Interestingly, there is no evidence to suggest that mental health issues play a mediating role for either men or women.

*** to be completed***

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