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Joan R. Rodgers
University of Wollongong, jrrodger@uow.edu.au

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Living Arrangements and Income Poverty

by

Joan R. Rodgers

School of Economics
University of Wollongong
Wollongong, NSW 2522

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Corresponding Author:
Joan R. Rodgers
Email: joan_rodgers@uow.edu.au
Tel: 02-4221 4583
Fax: 02-4221 3725

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Living Arrangements and Income Poverty

Abstract

Australians' living arrangements have changed over the last several decades. Greater proportions of households contain only one person, a couple or a single-parent family. Such demographic trends have implications for poverty, which is identified at the household level. This paper explores the relationship between the depth of poverty and household type using longitudinal, unit-record data. Lone persons and single parents are the poorest. Poverty increases significantly at the beginning of a spell of living alone regardless of previous living arrangements but especially for people leaving the household of their parent(s). Except for the elderly, poverty decreases significantly at the end of a spell of living alone regardless of the subsequent household type. Notably, poverty decreases when people living alone become single parents and single parents who begin living alone experience an increase in poverty. The explanation lies with accompanying changes in government non-income support payments, imputed rent on owner-occupied, public and rent-free housing, and the number of nondependent people in single parents' households.

1. Introduction

Australians' living arrangements have changed substantially in the last thirty years. According to the 1976 Census, 15.7 per cent of households contained only one person whereas by the 2006 Census that figure had risen to 24.4 per cent. It is forecast that by 2026 about 30 per cent of households will be lone-person households (ABS 2010, Chapter 7). Contributing factors are delayed marriage, increases in separation and divorce, and an ageing population in which women live longer than men. Also predicted are increasing numbers of couples without children and single-parent families. These demographic changes could have important implications for people's material well being because multi-person households can share income, take advantage of economies of scale in household consumption and achieve a more efficient division of labour between market and household production. People who live in households with no more than one adult of working age are more vulnerable during periods of high unemployment than otherwise similar people who live in households with a second potential, if not actual, income earner.

The objective of this paper is to measure income poverty among Australians living in different types of household and to determine the extent to which poverty changes when living arrangements change. Unlike most previous studies, the depth as well as the incidence of poverty is measured, and imputed rent on owner-occupied, public and rent-free housing is included among household resources. Although a number of studies have used cross-sectional data to explore the relationship between the incidence of poverty and household type in Australia, few studies have used longitudinal Australian data to investigate poverty.[1] To the best of my knowledge, no study has used panel data to control for unobserved heterogeneity in an investigation of the relationship between household type and the depth of poverty in Australia.

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[1] Examples of studies based on cross-sectional data are Harding, Lloyd and Greenwell, 2001; Saunders and Bradbury, 2006; ABS, 2012. Studies based on Australian longitudinal data are Headey, Marks, and Wooden, 2005; Abello and Harding, 2006; Buddelmeyer and Verrick, 2008; Rodgers and Rodgers, 2009.

Consistent with findings from previous research, people who live alone and people who live in single-parent households are observed to be poorer than couples and people in two-parent households. In addition, when poverty among lone persons is decomposed according to previous living arrangements the poorest group by far is found to be people who lived with their own parents immediately prior to living alone. More generally, poverty increases significantly at the beginning of a spell of living alone regardless of previous living arrangements, and poverty decreases significantly at the end of a spell of living alone regardless of the subsequent household type. The one exception is elderly persons, most of whom live alone or as couples. These people experience a small increase in poverty when they begin living alone but those who later form couple-only households experience no significant change in poverty. When poverty among single parents is decomposed by previous household type, little variation is observed among the subgroups. Most single parents were previously resident in two-parent households and they experience an increase in poverty immediately upon becoming single parents. Single parents who later become part of a two-parent household experience a slightly smaller decrease in poverty. People who switch from living alone to living as a single parent, on average, experience a decrease in poverty; while poverty increases, on average, for those moving in the opposite direction.

The paper proceeds as follows. Section 2 lays out the theoretical underpinnings of the investigation, while Section 3 describes the data set used in the empirical analysis and explains how poverty is measured. Living arrangements in Australia and the association between poverty and household type are documented in Section 4. Sections 5 and 6 use longitudinal data to investigate the relationship between changes in the depth of poverty and changes in household type, with observed and unobserved individual effects taken into account. Section 7 concludes.

2. Theoretical Framework

Poverty is measured at the level of the household. As explained in the next section, all people in the same household have the same equivalised income, the level of which determines their level of poverty. Equivalised income equals household income divided by a measure of household size and composition, called the number of adult equivalents in the household. Therefore, changes in equivalised income occur as a result of changes in household income or changes in the number of adult equivalents in the household. If household size and composition remain the same, equivalised income will vary directly with household income. A common example is when adults in a household move into, or out of, employment. If household income remains constant, equivalised income will be negatively correlated with the number of adult equivalents in the household. For example, the birth of a child will reduce, whereas a dependent child leaving home will increase, the equivalised income of the other members of the household.

Often times however, household income and the number of adult equivalents in the household change simultaneously, or in close enough proximity to each other to be viewed as simultaneous from an empirical point of view. For example, if a two-parent household splits into a household comprised of female parent and her children and a household containing a lone male, both resulting households will have fewer adult equivalents than the original household, and their incomes will probably change too. Those household incomes will depend upon the adults' employment arrangements following the split, upon any changes to income from non-labour sources such as financial assets, property or government transfers, and upon changed access to owner-occupied, public or rent-free housing. Therefore, it is impossible to predict *a priori* the direction of change in equivalised income of either resulting household, although in this example it is likely that the lone male will experience an increase, and those in the single-parent household will experience a decrease.

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This paper measures the changes in equivalised income – or more precisely changes in the deficiency of equivalised income – that accompany changes in living arrangements of various types. No attempt is made to imply causality; in many cases household type is a choice and changes in household type could cause, or be caused by, changes in equivalised income. Nevertheless, certain factors such as age and education that would otherwise confound the analysis are taken into account when measuring changes in equivalised income associated with changes in living arrangements.

3.   Methodology and Data

There are two main approaches to identifying poor households: the input approach observes resources, the outcomes approach observes living conditions. Typically, resources are measured by income whereas living conditions are measured either by expenditure or, following Sen (1992), by a vector of outcomes such as food, clothing, shelter, health, access to a clean and safe environment, leisure, social interactions and personal autonomy. Whereas the input approach measures the potential material standard of living achievable, the outcomes approach measures the standard of living actually experienced. The input approach is less heavily dependent on preferences than the outcomes approach and, if financed from borrowing, outcomes are less likely to reflect a sustainable standard of living than inputs. Therefore, in this study, poverty is measured using household income from all regular sources so as to obtain a measure of the household's potential, sustainable standard of living.

Longitudinal data on a comprehensive measure of annual income are collected in the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a detailed discussion of which can be found in Wooden and Watson (2007).[2] This study uses data from the

unbalanced panel of enumerated people in Release 11 of the HILDA data sets.[3] The measure of disposable income is the aggregate of wages and salary, business income, investment income, private income from pensions and transfers, Australian Government income support payments (pensions, parenting payments and allowances), Australian Government non-income support payments (family payments, mobility and carer allowances), other domestic government benefits, regular public scholarships and foreign pensions, minus income tax (see Summerfield, 2010, pp.47-54).

In addition to annual income, imputed housing rentals are considered to be a regular, household resource for the purpose of this study.[4] Home ownership varies among different groups of people and is particularly high among the elderly, many of whom live alone or as couples. Therefore, the inclusion of imputed rent has a substantial impact on measured poverty of these household types. Unlike other durable goods, investments in owner-occupied housing are similar to investments in income-earning assets. A person who purchases financial securities earns income from those assets. Someone who purchases a home receives no cash income from the asset but a non-cash benefit is received that is conceptually similar to the income earned from the financial securities. Furthermore, someone living in rental accommodation, with an income that is just above the poverty threshold, is not likely to be materially better off than a person living in their own home, with an income just below the poverty line. Consistent with these examples, there are two main approaches to measuring imputed housing rentals: as the opportunity cost of the funds invested in the property and as the rent that would have to be paid for housing of an equivalent standard. The household

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[3] With panel data, attrition is a potential issue. However, Wooden and Watson (2007, p. 217) conclude that although response rates do vary by sample characteristic, with the possible exception of country of birth, variation 'appears to be not so great as to lead to serious concerns about attrition bias'.

[4] The United Nations (1977) recommended that imputed rent on owner occupied housing be included in household income. Yates (1994) was the first Australian study to implement the UN recommendations. Recent Australian studies that have included imputed rent on owner-occupied housing are Flatau and Wood (2000), Chotikapanich, *et al.* (2003), Saunders and Siminski (2005) and Headey and Warren (2008). Beginning with the 2003-04 and 2005-06 Surveys of Income and Housing, the Australian Bureau of Statistics has provided estimates of imputed rent on owner-occupied and subsidised housing (ABS, 2008).

imputed rental values included in this study are those contained in the HILDA component of the Cross National Equivalent File (CNEF) (see Lillard *et al.*, 2009, p. 2-5). Imputed rent on owner-occupied housing is computed as four per cent of the difference between the imputed house value and the remaining mortgage principal. Imputed rent for public housing tenants is the difference between rent paid and typical rent for the location. For people living in rent-free accommodation imputed rent is the rent they would have to pay to rent the property. These imputed rentals on owner-occupied, public and rent-free housing were added to household disposable income, year by year, and the result was deflated by the consumer price index.[5]

Finally, to facilitate the necessary comparison of resource availability across households of different sizes and compositions, household annual, disposable income plus any imputed housing rental was expressed on an 'adult-equivalent' basis using an equivalence scale. Most of the analysis in this paper is based upon the equivalence scale of the Organisation for Economic Cooperation and Development (OECD), which is commonly used by Australian researchers. The scale assigns one point to the first adult in the household, 0.5 points to each additional adult and 0.3 points to each child less than 15 years old. However, the sensitivity of poverty measures to the choice of equivalence scale is investigated in Section 4 below. For brevity, throughout the remainder of this paper the term 'equivalised income' will be used to refer to 'equivalised, household, real, annual, disposable income, including imputed housing rental'.

A person is considered to be poor in a given year if, and only if, he or she lives in a household with equivalised income in that year that is below a chosen poverty line. In accordance with common practice in Australia, this paper follows the relative-poverty approach. Furthermore, the poverty line is set equal to 60 per cent of the median equivalised income in each year, a threshold used by countries of the European Union to identify people at

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[5] The inclusion of imputed housing rentals is consistent with an an emerging literature that measures poverty using household net worth (see, for example, Brandolini, Magri and Smeeding (2010) and citations therein).

risk of poverty (European Commission, 2008).[6] Three measures of poverty are computed. The first is the poverty rate (or head-count ratio, H), which is the proportion of people in the population who are poor. H takes no account of the depth of poverty so two additional poverty indices are employed. The first is the mean poverty-gap ratio of poor people expressed as a percentage of the poverty line, $I = 100(z - \mu_p)/z$. The second is the average poverty gap of all people, poor and non-poor (the non-poor have a zero poverty gap), expressed as a percentage of the poverty line, $HI = 100(m/n)(z - \mu_p)/z$. In these formulae z is the (relative) poverty line, μ_p is the mean equivalised income of poor people, m is the number of poor people and n is the total number of people, poor and non-poor.[7] HI is also called the normalised deficit. If under reporting of income at the lower end of the distribution is common, as some believe, then μ_p will be under estimated and I and HI will over estimate poverty. Only 0.24 per cent of observations in the HILDA data entailed negative household incomes and these were excluded from the analysis. Of the remainder, only about one per cent had incomes less than $10,000 per annum, about two per cent had incomes less than $12,000 per annum and about 3.5 per cent had incomes less than $15,000 per annum, which suggests that under-reporting of low incomes is not a significant problem.

4.   Poverty and Household Type

Since members of the same household have the same equivalised income in any given year, an investigation of poverty logically begins with an analysis of the relationship between poverty and household type.

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[6] In Australia there is no official poverty line but both 50 per cent and 60 per cent of median equivalised income are commonly used by researchers. This paper refers to those with incomes below 60 per cent of the median as being 'in poverty' rather than 'at risk of poverty'.

[7] HI was advocated as a measure of poverty by Watts (1968). Both HI and I, like H, are additively decomposable. I and especially HI have several other desirable properties that H lacks. The properties of H, I and HI are discussed in Rodgers and Rodgers (1991).

People living alone constitute 9.6 per cent of observations (see Table 1). Another 20.2 per cent of observations are of people living as couples in two-person households. Most person-year observations in the data set, 53.7 per cent, are of people living in families comprised of couples and other people (dependents or non-dependents)[8]. A further 12.6 per cent are of people living in lone-parent families containing dependent or non-dependent children. In this study both one-parent and two-parent families may be part of a single-family or a multi-family household. The remaining 3.9 per cent of observations are of people living in group households of unrelated people, or in households containing people, to some of whom they are related but not via marriage or a de facto relationship and none of whom are children. The distribution of people by household type was found to be approximately constant over the eleven years from 2001 to 2011.

The choice of equivalence scale potentially can affect the relationship between poverty and household type (see Hunter, Kennedy and Biddle, 2004), so this issue was investigated first. If an absolute poverty line is employed, the more weight given to children in the equivalence scale, the larger the proportion of households with children that will be classified as poor. The more weight assigned to household size in the equivalence scale, the larger the proportion of large households that will be classified as poor. But with a relative poverty line, things are not so straight forward because the equivalence scale affects the poverty line as well as equivalised incomes. Appendix 1 lists annual poverty lines that are based on two commonly used scales: the modified OECD scale and the square-root scale, which has been used in recent OECD publications (for example OECD, 2008) and defines the number of adult equivalents as the square root of the number of people of all ages in the household.

Section A of Table 1 shows the decomposition by household type of income poverty based on the modified OECD equivalence scale. Standard errors (in parentheses) take account

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[8] Dependents are children under 15 years and students. Students are aged 15 to 24, studying full-time, not working full time and living in a household with their parent (natural, step, foster or adopted) with no partner or child of their own in the household (Summerfield, 2010, p.40).

of the complex survey design under which the data were collected (see Hayes, 2008). Differences among the HI indices of the five household types can be attributed more to differences in the incidence of poverty, H, which ranges from 12.1 per cent to 30.6 per cent of observations on people, than to differences in the depth of poverty among the poor, I, which ranges from 22.0 per cent to 30.6 per cent of the poverty line. Which household type is poorest depends on whether the normalized deficit or the head-count ratio is used. People living alone are the poorest according to HI, their equivalised incomes being, on average, 8.5 per cent below the poverty line. They have the second highest poverty rate (H = 27.7) but the poor among them have the largest mean poverty-gap ratio (I = 30.6). A close second are people living in single-parent households. Their equivalised incomes are, on average, 7.3 per cent below the poverty line. They have the highest poverty rate (H = 30.6) but poor members of their households have the third largest mean poverty-gap ratio (I = 23.9). A substantial amount of poverty is also experienced by people in the 'other n.i.e.' household category. They have the third highest poverty rate (H = 22.3) and poor members of these households have the second highest mean poverty-gap ratio (I = 28.9 per cent) so overall their equivalised incomes are 6.5 per cent below the poverty line. People in the couple-only and two-parent households are significantly less poor than people in the other three household types, according to all three indices.

Section B of Table 1 shows the HI, I and H poverty indices according to the square-root equivalence scale. The ranking of household types is the same as that based on the modified OECD scale; in particular, the poorest groups are lone persons and people in single-parent households. This suggests that the distribution of poverty by household type is not an artefact of the equivalence scale, at least not scales that are commonly used. In the remainder of this paper, income has been equivalised using the modified OECD scale.

People are classified as poor if they live in poor households but the household is not a static concept: people form couples, have children, couples divorce, new families form, children grow up and leave home, and sometimes partners or parents die. The study of poverty dynamics involves observing people, not households, over time. Over a period of several years the typical individual lives in more than one type of household containing different sets of people. Indeed, 37 per cent of the people in the sample used to construct Table 1 changed from one of the five broad household types to another at least once during the 11 years from 2001 to 2011.

In the remainder of the paper, the focus is on the two poorest groups: lone persons and single parents.[9] Table 2 decomposes poverty measures using person-year observations of lone persons (Part A) and single parents (Part B). In each case the categories are the living arrangements of the person prior to living alone or as a single parent. The categories are defined such that living with one's own parent(s), living as a parent in a two-parent family and living as a parent in a one-parent family may take place within a single-family or multi-family household. See Appendix 2 for details of how the categories are defined.

Clearly, the high level of poverty among lone persons observed in Table 1 is attributable primarily to poverty among people who have left the parental home immediately prior to living alone (HI = 13.1). Being young (their median age is 23 years), these people stand a good chance of improving their economic position over time either through higher earnings and by marriage. Persons younger than 60 years who have broken up with their partners are the least poor (HI = 5.3), and lone persons who have split from their partners and children are the second least poor (HI = 6.2). Most of the latter people are men (86 per cent) and previous research has shown that they fare better than their partners following divorce or separation. This is supported by evidence in Row 4 of Part B of the table, which documents

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[9] The outcomes of single parents, rather than all people in single-parent households, are explored because the latter would involve multiple observations all with the same level of poverty.

the level of poverty among single parents who previously had a partner. Most are women (84 per cent) and following family breakdown, their poverty is HI = 7.6, which is considerable higher than the HI = 6.2 for their ex-partners. The least poor single parents are those who previously lived in households made up of other related or unrelated people (HI = 4.7).

5.   Changes in Poverty and Changes in Household Type

If living arrangements are a source of poverty then moving out of, or into, particular types of household should be accompanied by a change in income poverty. This was emphasised in an influential paper by Bane and Ellwood (1986), who advocated focussing on household formation decisions and the behaviour of secondary family members.

There are 3,189 people in the data set who were ever observed to live alone and whose living arrangements prior to becoming a lone-person household are known. The majority of them, 1072, previously resided in the household of their parent(s) but sizeable numbers are also observed in the other categories (see the odd-numbered rows, Column 2, Part A of Table 3). These observations were used to determine the change in poverty associated with moving into a lone-person household. There are 2,131 people in the data set who changed their living arrangements subsequent to a spell of living alone (see the even-numbered rows, Column 2, Part A of Table 3). These observations were used to determine the change in the poverty-gap ratio associated with moving out of a lone-person household. There is considerable mobility in and out of lone-person households, there being more than 200 hundred observations in all cases except for the 47 elderly lone persons who later find a partner and form a couple-only household.[10]

There are also 1,058 people in the data set who were ever observed to be single parents and whose prior living arrangements are known (see Part B of Table 3). They were

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[10] Ideally, the analysis would follow the same people as each person moved both into and out of living alone or into and out of living as a single parent. Unfortunately, there are too few people in the panel displaying multiple moves for such an analysis to be feasible.

used to determine the change in the poverty-gap ratio associated with becoming a single parent. Similarly, the 959 single parents with known living arrangements subsequent to single parenthood were used to determine the change in poverty associated with ceasing live as a single parent. There are fewer observations on single parents than on lone persons, the least populated category being the 19 single parents who later return to the home of their own parent(s). Consequently, some of the observed changes in poverty of single parents reported below are not statistically significant.

The average effect on the poverty-gap ratio of changes in living arrangements is shown in the remaining columns of Table 3. The methodology takes account of time-invariant unobserved factors that influence both poverty and household type such as innate ability and preferences for different life styles. It also allows for asymmetrical effects of moving out of a household of type A into a household of type B, and vice versa. The odd-numbered rows in Part A of the table give the effect on HI of beginning a spell as a lone person. Columns 3 - 5 give the 'difference estimator' and it was calculated using only the subsample of observations with a particular origin household in year t-1 and living alone in year t.[11] Similarly, the average change in the poverty-gap ratio of people who change from living alone is given in the even-numbered rows. This 'difference estimator' (in Columns 3 - 5) was calculated using only the subsample of observations with a particular destination household in year t+1 and living alone in year t.

The last three columns of Table 3 give the 'difference-in-difference (DID) estimator'. The odd-numbered rows show the average change in the poverty-gap ratio of people who begin to live alone minus the average change in the poverty-gap ratio of people who remain in the origin type of household. The DID estimator was calculated using the subsample of observations with a particular origin household in year t-1 and a destination household in year

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[11] The difference estimator and its standard error were found by regressing the poverty-gap ratio on a constant.

t that was either unchanged or a lone-person household.[12] For example, people who continued to live with their parents experienced, on average, a decrease in their poverty-gap ratio of 0.07 percentage points so the net change for people who ceased living with their parents and began living alone was [21.87 – (-0.07) =] 21.94 percentage points. The even-numbered rows list the average change in the poverty-gap ratio of people who cease to live alone minus the average change in the poverty-gap ratio of people who remain in lone-person households. Thus, people who ceased living alone and returned to live with their parents, experienced a decrease in their poverty-gap ratio, net of the decrease of 0.72 percentage points experienced by people who continued living alone, of [-18.26 – (-0.72) =] 17.54 percentage points.

The difference and difference-in-differences estimates are quite similar because there was little change from year to year in the poverty-gap ratios of people who maintained their existing living arrangements. Consistent with the high poverty levels of lone persons documented in Tables 1 and 2, movements into lone-person households, no matter what their origin, were accompanied, on average, by an increase in the poverty-gap ratio. Movements out of lone-person households, no matter what their destination, were accompanied by a decrease in the poverty-gap ratio, except in the case of elderly lone people who form couple-only households. On average, this group experienced a small increase in their poverty-gap ratio, but it is only marginally significant, statistically speaking (p-value = 0.06).

Also consistent with the cross-sectional results in Table 2, the largest change in the poverty-gap ratio by far is for people who changed from living with their parents to living alone. On average, these people's HI increased by approximately 22 percentage points at the time of the move. Lone people who returned to the home of their parents experienced, on average, a smaller decrease in their poverty-gap ratio of about 18 percentage points. When young couples split up the individuals experience an increase in the poverty-gap ratio of about

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[12] The difference-in-difference estimator and its standard error was found by regressing the poverty-gap ratio on a constant and a dummy variable equal to one if the household type changed from year t-1 to year t, zero otherwise.

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five percentage points, but when lone persons form couples HI decreases by about the same amount (four percentage points). Parents who live alone following marriage breakdown also experience an increase in the poverty-gap ratio of about five percentage points, on average. But lone persons who later become a parent in a two-parent family experience a decrease in HI of about the same amount (four percentage points). An important role is played by households made up of other related or unrelated people. Moving out of these households to live alone is accompanied by an increase in the poverty-gap ratio of about seven percentage points, while HI decreases by about ten percentage points on average when lone persons move into these households. In summary, when people begin living alone there is, on average, an increase in poverty but, with the exception of elderly people, that increase can be reversed by a change of living arrangements.

Part B of Table 3 shows the average change in the poverty-gap ratio of people who changed their living arrangements to, and from, living as a single parent. The only statistically significant results concern parents moving between two-parent and one-parent families and between living alone and as a single parent. Single parents who were previously living with a partner in a two-parent family experienced, on average, an increase in the poverty-gap ratio of approximately seven per cent, whereas single parents who subsequently joined a partner in a two-parent family experienced an average decrease in HI of about five per cent.

Of particular note is the increase in the poverty-gap ratio associated with ceasing to live as a single parent and beginning to live alone, and the decrease in the poverty-gap ratio associated with a change from living alone to living as a single parent.[13] For these changes in HI to occur, household income must necessarily change in the same direction as the number of adult equivalents in these people's households. That is, household income must fall when single parents begin to live alone and rise when lone persons become single parents.

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[13] The increase is about three percentage points and the decrease is four percentage points.

There are several ways in which this can occur. First, nondependent children may move out of their parent's household, reducing the household income of the parent as they go, while nondependent children who move back in with a parent may contribute to household income. Indeed, the number of nondependents decreased significantly, by 0.78 on average, for the single parents in the data set who began to live alone whereas the number of nondependents increased significantly, by 0.67 on average, for those lone persons who began to live as single persons. Second, rent on owner-occupied, public or rent-free housing may decrease when single parents begin to live alone and increase when lone people begin to live as single parents. In fact, there was no significant change in these imputed housing rentals for people who changed from living as a single parent to living alone, but the rentals increased by an average of $6,958 per annum for people who ceased living alone and began living as single parents. A third possibility is that Australian government non-income support payments (such as the Family Tax Benefits A & B) decrease when single parents commence living alone, and increase when lone people begin to live as single parents. On average, these transfer payments decreased by $2,041 per annum for people who changed from living as a single parent to living alone, and increased by $3,474 per annum for people who ceased living alone and began living as single parents. Therefore, the empirical evidence suggests that all three possible explanations are contributing factors.

6.   Changes in Poverty and Changes in Household Type with Controls

Previous research using Australian data (Buddelmeyer and Verrick, 2008) found that education is an important factor associated with falling into poverty, and remaining poor having done so. This section investigates whether the changes in the poverty-gap ratio displayed in Table 3 are affected by education levels of the people concerned. People who experience a spell of living alone or as a single parent and whose previous living arrangements

are known are classified at the beginning of the spell into three groups: those with a tertiary level of education, those with Year 12 or a trade certificate, and people with no more than Year 11 in the year prior to living alone or as a single parent. People with a spell of living alone or as a single parent whose subsequent living arrangements are known are also classified into three groups at the end of the spell according to their level of education in the year subsequent to living alone or as a single parent.

Table 4 presents, for each of the three levels of education, difference-in-difference estimates of the effect of living arrangements for lone persons, and for single parents moving in and out of two-parent families.[14] The results confirm that education is a shield against poverty. For example, elderly couples, people exiting two-parent or one-parent families, and people leaving households containing related or unrelated people experience no significant change in their poverty-gap ratio when they begin living alone – provided they have a tertiary education. Furthermore, people who live alone after leaving the home of their parent(s) experience, on average, a much smaller increase in their poverty-gap ratios if they have a tertiary education than if they have a Year12/certificate, or (particularly) no more than a Year 11 education. Conversely, lone persons with low levels of education have more to gain by changing their living arrangements than people with higher levels of education.

Single parents who were previously one of two parents in a two-parent family experience smaller increases, on average, in their poverty-gap ratios, the higher is their level of education (see Row 13). On the other hand, single parents with lower levels of education, who find partners and become part of two-parent families, experience larger decreases in their poverty-gap ratios than single parents with more education (Row 14). People who change between living alone and living as a single parent experience no significant change in the poverty-gap ratios if they have more than a Year 11 education (Rows 9-10). However, lone

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[14] The sample sizes for the other three pairs of movements were at most 33, which is too small for a meaningful analysis to be conducted.

persons with a Year 11 education or less who become single parents experience a decrease in their poverty-gap ratios, on average, while single parents with at most a Year 11 education who change to living alone experience an increase in their poverty-gap ratios.

7.   Summary and Conclusions

The availability of longitudinal data has made the study of poverty dynamics possible. People are classified as poor if they live in poor households but the household is not a static concept. Over a period of several years the typical individual lives in more than one type of household containing different sets of people and this study has found these living arrangements to be closely associated with the poverty status of the individual.

The first part of the study examined the relationship between household type and the incidence and depth of poverty. Household resources were measured by equivalised, annual, real disposable income plus imputed rent on owner-occupied, public and rent-free housing. Consistent with previous research, people who live alone and people living in single-parent households were found to have the highest poverty rates. They also had the greatest depth of poverty.

The contribution of the study is to exploit the longitudinal nature of the data to relate changes in individuals' poverty-gap ratios to changes in their living arrangements. When poverty among lone persons is decomposed according to previous living arrangements the poorest group by far is found to be people who lived with their own parents immediately prior to living alone. Most of these people are young and, on average, they experience a large increase in poverty concurrent with moving out of the parental home. On the other hand, young lone persons, on average, experience an immediate decrease in poverty when they form couples, an even larger decrease if they move in with other related or unrelated people, and they restore their poverty almost to its original level if they move back in with their parents.

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In general, poverty increases significantly at the beginning of a spell of living alone regardless of previous living arrangements, and poverty decreases significantly at the end of a spell of living alone regardless of the subsequent household type. The one exception is elderly persons, most of whom live alone or as couples. These people experience a small increase in poverty when they begin living alone but those who later form couple-only households experience no significant change in poverty.

When poverty among single parents is decomposed by previous household type, little variation is observed among the subgroups. Most single parents were previously resident in two-parent households and they experience an increase in poverty immediately upon becoming single parents. Single parents who later become part of a two-parent household experience a slightly smaller decrease in poverty. Of note is that people living alone who become single parents experience a decrease in poverty while single parents who begin living alone experience an increase in poverty. The explanation lies with changes in government support payments, imputed housing rentals and the number of nondependent household members that accompany these changes in living arrangements.

The results of the study indicate the precariousness of living alone and as a single parent. As lone-person and single-parent households are predicted to become more common over the coming decades, these results suggest that increases in poverty are likely to occur. Future research could explore causal relationships between the depth of poverty and the events and circumstances that lead to changes in living arrangements, particularly those that result in people living alone or in single-parent households for long periods of time.

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Table 1: Income Poverty, by Household Type

A. Modified OECD equivalence scale

	Household Type (1)	Obs (%) (2)	HI (3)	I (4)	H (5)
1	Lone person	9.6	8.5 (0.3)	30.6 (0.6)	27.7 (0.8)
2	Couple only	20.2	3.1 (0.2)	22.1 (0.6)	13.9 (0.7)
3	2-Parent family	53.7	2.7 (0.2)	22.0 (0.6)	12.1 (0.7)
4	1-Parent family	12.6	7.3 (0.3)	23.9 (0.5)	30.6 (1.4)
5	Other household, n.i.e.	3.9	6.5 (0.7)	28.9 (1.9)	22.3 (1.8)
6	All households	100.0	4.1 (0.1)	24.2 (0.3)	16.7 (0.6)

B. Square-root equivalence scale

	Household Type (1)	Obs (%) (2)	HI (3)	I (4)	H (5)
1	Lone person	9.6	10.5 (0.3)	31.4 (0.5)	33.5 (0.9)
2	Couple only	20.2	3.5 (0.2)	22.6 (0.6)	15.6 (0.7)
3	2-Parent family	53.7	2.4 (0.2)	21.6 (0.6)	11.0 (0.6)
4	1-Parent family	12.6	9.2 (0.4)	26.7 (0.5)	34.2 (1.4)
5	Other household, n.i.e.	3.9	6.0 (0.7)	31.0 (1.9)	19.2 (1.6)
6	All households	100.0	4.4 (0.1)	25.3 (0.3)	17.4 (0.5)

Source: Author's computations based on pooled data from waves 1-11 of the unbalanced panel from HILDA, Release 11.0 and CNEF 11.
Note: Standard errors (in parentheses) were computed using STATA's 'svy regress' command, with 122 strata and 613 PSUs.

Table 2. Income Poverty, by Previous Living Arrangements

A. Lone Persons

	Previous Living Arrangement (1)	No. obs (2)	HI (3)	I (4)	H (5)
1	Living with one's own parent(s)	2,620	13.1	40.3	32.5
2	Living as a couple only (<60 years)	1,206	5.3	33.0	16.1
3	Living as a couple only (>=60 years)	1,203	6.8	22.7	30.2
4	Living as a parent in a 2-parent family	999	6.2	37.1	16.6
5	Living as a parent in a 1-parent family	1,132	7.3	27.5	26.7
6	Living with related or unrelated others	1,936	8.8	37.5	23.4
7	Unknown previous arrangements	14,274	8.2	28.1	29.1
8	All lone persons	23,370	8.5	30.6	27.7

B. Single Parents

	Previous Living Arrangement (1)	No. obs (2)	HI (3)	I (4)	H (5)
1	Living alone	615	8.0	27.1	29.5
2	Living with one's own parent(s)	166	8.5	23.6	36.1
3	Living as a couple	68	6.4	24.2	26.5
4	Living as a parent in a 2-parent family	2,113	7.6	26.8	28.3
5	Living with related or unrelated others	159	4.7	19.1	24.6
6	Unknown previous arrangements	5,547	6.5	23.6	27.4
7	All lone parents	8,668	6.8	24.5	27.8

Source: Author's computations based on pooled data from waves 1-11 of the unbalanced panel from HILDA, Release 11.0 and CNEF 11.

Note: Column 2 states the number of person-year observations.

Table 3: Effect on the Poverty-Gap Ratio of Changing Living Arrangements

A. To/from Living Alone			Difference			Diff-in differences		
Change of Living Arrangements (1)	Obs (2)	Coef (3)	p-value (4)	(5)		Coef (6)	p-value (7)	(8)
1 Parental to lone	1072	21.87	0.00	*		21.94	0.00	**
2 Lone to parental	284	-18.26	0.00			-17.54	0.00	
3 Couple <60yrs to lone	453	4.33	0.00			4.59	0.00	
4 Lone to couple <60yrs	837	-4.59	0.00			-3.87	0.00	
5 Couple >=60yrs to lone	285	3.36	0.00	***		3.36	0.00	***
6 Lone to couple >=60yrs	47	2.18	0.17			2.90	0.06	
7 2-parent family to lone	389	4.78	0.00			4.77	0.00	
8 Lone to 2-parent family	270	-3.99	0.00			-3.28	0.00	
9 1-parent family to lone	347	2.85	0.00			3.14	0.00	
10 Lone to 1-parent family	227	-5.12	0.00			-4.40	0.00	
11 (Un)related others to lone	643	6.74	0.00	***		6.99	0.00	**
12 Lone to (Un)related others	466	-10.84	0.00			-10.12	0.00	

B. To/from Living as a Single Parent			Difference			Diff-in differences		
Change of Living Arrangements (1)	Obs (2)	Coef (3)	p-value (4)	(5)		Coef (6)	p-value (7)	(8)
1 Lone to single parent	227	-5.12	0.00			-4.40	0.00	
2 Single parent to lone	347	2.85	0.00			3.14	0.00	
3 Parental to single parent	51	5.05	0.11			5.12	0.10	
4 Single parent to parental	19	-3.14	0.38			-2.85	0.40	
5 Couple to single parent	30	-0.80	0.83			-0.66	0.86	
6 Single parent to couple	40	-6.34	0.01			-6.04	0.01	
7 2-parent family to single parent	683	6.75	0.00	*		6.74	0.00	**
8 Single parent to 2-parent family	469	-4.76	0.00			-4.46	0.00	
9 (Un)related others to single parent	67	-0.24	0.89			0.02	0.99	
10 Single parent to (un)related others	84	-0.57	0.74			-0.27	0.87	

Source: Author's computations based on pooled data from waves 1-11 of the unbalanced panel from HILDA, Release 11.0 and CNEF 11.

Note: *,** and *** indicate that the sum of the effects of moving from A to B and from B to A is significantly different from zero at the 10%, 5% and 1% levels, respectively.

Table 4: Effect on the Poverty-Gap Ratio of Changing Living Arrangements,
by Education Level

Change of Living Arrangements (1)	Tertiary		Year 12 or Cert		Year 11 or less	
	Coef (2)	p-value (3)	Coef (4)	p-value (5)	Coef (6)	p-value (7)
1 Parental to lone	6.98	0.00	19.42	0.00	33.25	0.00
2 Lone to parental	-8.68	0.00	-17.52	0.00	-23.19	0.00
3 Couple <60yrs to lone	4.12	0.00	5.38	0.00	3.91	0.04
4 Lone to couple <60yrs	-2.17	0.01	-4.27	0.00	-5.81	0.00
5 Couple >=60yrs to lone	-0.09	0.94	6.63	0.02	2.92	0.06
6 Lone to couple >=60yrs	3.10	0.10	5.72	0.15	0.76	0.74
7 2-parent family to lone	2.37	0.14	5.19	0.00	5.79	0.02
8 Lone to 2-parent family	-0.34	0.65	-1.03	0.35	-9.65	0.00
9 1-parent family to lone	1.37	0.36	1.75	0.21	5.61	0.00
10 Lone to 1-parent family	-2.61	0.31	-3.79	0.09	-6.22	0.01
11 (Un)related others to lone	2.17	0.12	7.58	0.00	11.65	0.00
12 Lone to (Un)related others	-6.48	0.00	-10.98	0.00	-11.90	0.00
13 2-parent family to single parent	5.03	0.00	7.04	0.00	7.65	0.00
14 Single parent to 2-parent family	-1.80	0.14	-6.33	0.00	-4.04	0.01

Source: Author's computations based on pooled data from waves 1-11 of the unbalanced panel from HILDA, Release 11.0 and CNEF 11.
Note: Difference-in-differences estimates.

Appendix 1: Poverty Lines (in 2010-11 $) (60% Median Income), by Equivalence Scale

Year	OECD scale	Square-root scale
2000-01	21459	23614
2001-02	21847	24173
2002-03	22757	24783
2003-04	23726	26057
2004-05	24217	26566
2005-06	25144	27591
2006-07	26377	29166
2007-08	27145	30003
2008-09	28549	31588
2009-10	28177	31270
2010-11	27963	30869

Source: Author's computations based on pooled data from waves 1-11 of the unbalanced panel from HILDA, Release 11.0 and CNEF 11.

Household Type	Relationship in Household*												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Couple family wo children or others	0	0	0	Couple only	0	0	0	0	0	0	0	0	0
2 Couple family wo children w other related	Parent in a two-parent family				0	0	0	0	0	0	other	0	other
3 Couple family wo children w other not related					0	0	0	0	0	0		0	other
4 Couple family with children < 15 wo others					0	0	0	Living with one's parent(s)				0	other
5 Couple family with children < 15 w other related					0	0	0				other	0	other
6 Couple family with children < 15 w other not related					0	0	0					0	
7 Couple family with depst wo others					0	0	0					0	
8 Couple family with depst w other related					0	0	0				other	0	other
9 Couple family with depst w other not related					0	0	0					0	
10 Couple family with ndepchild wo others					0	0	0					0	
11 Couple family with ndepchild w other related					0	0	0				other	0	other
12 Couple family with ndepchild w other not related					0	0	0					0	
13 Lone parent with children < 15 wo others	0	0	0	0	Parent in a one-parent family							0	
14 Lone parent with children < 15 w other related	0	0	0	0							other	0	other
15 Lone parent with children < 15 w other not related	0	0	0	0								0	
16 Lone parent with depst wo others	0	0	0	0								0	
17 Lone parent with depst w other related	0	0	0	0							other	0	other
18 Lone parent with depst w other not related	0	0	0	0								0	
19 Lone parent with ndepchild wo others	0	0	0	0								0	
20 Lone parent with ndepchild w other related	0	0	0	0							other	0	other
21 Lone parent with ndepchild w other not related	0	0	0	0								0	
22 Other related family wo children < 15 or others	0	0	0	0	0	0	0	0	0	0	other	0	
23 Other related family wo children < 15 w others	0	0	0	0	0	0	0	0	0	0		0	other
24 Lone person	0	0	0	0	0	0	0	0	0	0	0	Lone person	0
25 Group household	0	0	0	0	0	0	0	0	0	0	0	0	
26 Multi family household	Parent in a two-parent family				Parent in a one-parent family			Living with one's parent(s)			other	0	other

* 1 Couple w child < 15; 2 Couple w depst (no child < 15); 3 Couple w ndepchld (no child < 15 or depst); 4 Couple wo child; 5 Lone pnt w child < 15; 6 Lone pnt w depst (no child < 15);
7 Lone pnt w ndechld (no child < 15 or depst); 8 Child < 15; 9 Dependent student; 10 Non-dependent child; 11 Other family member; 12 Lone person; 13 Unrelated to all HH members