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Relationship Separation and Length of Time in Receipt of Income Support Payments: A Longitudinal Analysis of Australian Government Administrative Data

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NON-TECHNICAL SUMMARY

Government administrative data is increasingly accessible to social researchers providing new opportunities to examine social behaviour, life course pathways, and evaluations of social policies and programs. This paper outlines results from a collaboration with the Australian Government Department of Human Services (DHS) where administrative data was used to address a substantive research and policy question concerning the association between income support and relationship breakdown. Overall, we explored a process by which a team of university-based researchers could effectively partner with an Australian Government agency to securely generate research evidence from administrative data that records income support payment information for the entire population. We applied innovative statistical methods to investigate the research question and found that unpartnered individuals, following initial receipt of income support payments in a partnered relationship, are significantly less likely to exit payment receipt

Our research highlights some of the strengths and limitations of administrative data compared to survey data and the importance of close collaboration with data custodians when analysing administrative data. Current directions and trends toward more open data access in Australia, as well as many other countries, suggest that new opportunities for realising the value of administrative data for research, as well as policy design and evaluation will become increasingly available. This is unlikely to negate the importance of continuing to collect rich longitudinal data from national survey samples, such as that provided by HILDA, but it does open new possibilities for important new research and policy insights into hard-to-reach minority groups, who are often under-represented in sample surveys. For researchers concerned with understanding pathways into and out of disadvantage for such groups, as is the case for those involved in the Life Course Centre, access to administrative data is thus imperative and an exciting new development in social science infrastructure.

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ABSTRACT

In recent years, the Australian government has encouraged open access to administrative data, providing new opportunities to examine life course pathways and evaluate social policies, particularly those aimed at supporting minority populations such as single parent families. Expenditure on government income support in Australia is expected to rise, largely due to increasing costs associated with an ageing population and the introduction of a national disability insurance scheme, raising concerns about the long-term fiscal viability of government spending on welfare. This paper investigates the association between income support receipt and relationship breakdown using two potential sources of national data: administrative data on income support payments and the Households, Income and Labour Dynamics in Australia panel survey. A comparative approach showed that the administrative data provided much greater statistical power for detecting associations for minority groups than was possible with panel data highlighting the importance of administrative data for understanding the outcomes of such groups.

Keywords: administrative data; relationship separation; event-history analysis; income support payments; Australia

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1. Introduction

Government administrative data is increasingly accessible to social researchers providing new opportunities to examine social behaviour, life course pathways, and evaluations of social policies and programs (Connelly *et al.*, 2016; Crichton *et al.*, 2015). The strengths of these data include the size of the sample, usually large and sometimes covering a whole population such as the population of income support recipients; coverage of hard-to-reach populations who may not typically participate in survey collections, such as highly disadvantaged groups; and on some measures, more reliable information than survey data, especially if the data are collected for the purposes of delivery of a service relating to these outcomes, as might be the case for earnings or health data. Of course, administrative data also has limitations, including the potentially limited scope of the measures which may not cover areas of importance for social researchers, such as attitudinal measures; the data may be hard to analyse effectively due to lack of documentation about the measures or inconsistencies in collection methods across jurisdictions or agencies; the data may not be readily accessible to researchers due to ethical and privacy concerns; and the size of the data may mean that dedicated infrastructure with enhanced computing power is required to appropriately analyse the data. Administrative data may therefore involve extensive data management procedures to make it user-friendly. Nevertheless, such data can be an alternative and complementary data source for social researchers, providing independent and objective measures and additional information for a complete population (Connelly *et al.*, 2016).

In recent years, the Australian government has moved to more open access for administrative data, in part driven by examples from other countries, such as New Zealand where new policies have promoted the potential of these data to inform efforts to reduce welfare burdens by enabling targeted investment to support at-risk groups. Australian policy has moved in similar directions. A review of Australia's welfare system, released in 2015 found that national social support systems are unnecessarily complex, inconsistent, and incoherent, while also providing disincentives for some groups to participate in the workforce, leading to patterns of long-term income support dependence (McClure *et al.*, 2015). The review recommended that a new social support system be developed that identifies groups at risk of long-term income support dependence and redirects investment towards targeted interventions that support individuals through difficult life transitions. The rationale is that early intervention and investment can help prevent debilitating cycles of long-term and intergenerational welfare dependence. An inquiry by the Australian

Productivity Commission Inquiry in 2017 also recommended more open access to administrative data. This report found that Australia lagged behind other countries like the United States, United Kingdom and New Zealand in the provision of open access to public sector data, and that failure to provide the framework and infrastructure to make such data available was a lost opportunity for business, consumers, government and researchers (Productivity Commission, 2017).

Researchers in the Australian Research Council Centre of Excellence for Children and Families over the Life Course (Life Course Centre) have worked closely with the Australian government to build the case for more open public-sector data, trial different methods of accessing and analysing administrative data and produce a number of proof-of concept reports and papers that highlight the strengths and limitations of administrative data. This paper outlines results from a collaboration with the Australian Government Department of Human Services (DHS) where administrative data was used to address a substantive research and policy question concerning the association between income support and relationship breakdown. The Life Course Centre is concerned to understand the transmission of social disadvantage over the life course and across generations and to identify the mechanisms that support individuals and families to move out of disadvantage. Many previous studies have highlighted a link between relationship breakdown and poverty, particularly for women (Adkins *et al.*, 2003; Cramer & Carter, 2002; Smith, 2005). This collaboration offered an exciting new opportunity to investigate this area using unique data that had not previously been available to social researchers.

This paper reports the findings from this collaboration and addresses three main issues. First, we outline one model of accessing and analysing administrative data and assess some of the advantages and limitations of this approach. Second, we examine the link between income support and relationship breakdown to provide new knowledge about the associations between family structures, government income support and social disadvantage. Third we assess the potential of administrative data to provide new information on the characteristics of individuals in receipt of income support and the mechanisms contributing to ongoing dependence on income support. We achieve this by comparing our results with those obtained from a high quality, large scale longitudinal public use survey which also collects information on income support and relationship breakdown, the Households, Income and Labour Dynamics in Australia survey (HILDA). In doing so, we provide insight into both

substantive questions about relationship breakdown and length of time on government income support, as well as the analytical strengths and limitations of administrative data.

2. Background

2.1. The Australian context

Expenditure on government income support in Australia has continued to increase despite the introduction of policies to increase social participation and to reduce unemployment and poverty (Brady & Cook, 2015). In 2016/17 the Australian government allocated 35.2 percent of total expenditure to income support. These expenses are estimated to have increased 12.8 percent by 2019/20 (Commonwealth of Australia, 2016). The increase in income support expenditure is largely driven by population growth and ageing, changes to the labour market and economic circumstances as well as policy changes relating to eligibility requirements (Commonwealth of Australia, 2016). While aged pensions constitute the largest share of total expenditure, income support for families, carers and individuals with a disability are also sizeable due to the long-term nature of the requirement for support across a range of payment types (Department of Social Services, 2017). Recently, findings from the Australian Priority Investment Approach to Welfare (Department of Social Services, 2017) have shown that the longer the period of time people receive support, the more likely they are to remain in receipt of support payments. It follows that new policies designed to reduce an individual's requirement for income support also need to address the mechanisms that lead to long-term reliance on income support.

Similar to many OECD nations, Australia has experienced fundamental changes over the last few decades in the pathways to partnership formation and the rate of relationship breakdown, with individuals entering partnerships at a later age, increased rates of de-facto cohabitation, and historically high separation and divorce rates (Australian Bureau of Statistics, 2016; OECD, 2016). Cohabitation rates have risen dramatically and importantly, while the divorce rate has steadily declined since the 1990's (Australian Bureau of Statistics, 2016), the number of cohabiting couples separating is continuing to increase (Australian Bureau of Statistics, 2016). This highlights the importance of considering both cohabiting and marital relationships when examining how relationship separation is associated with economic outcomes for men and women (Australian Institute of Family Studies, 2018). Separation and divorce are particularly common among younger couples and couples without dependent children (Australian Bureau of Statistics, 2016). Further, individuals separating

from marriage have substantially lower incomes, fewer assets and lower employment rates pre-divorce than people who remain married (De Vaus *et al.*, 2014). This highlights the importance of considering the association between relationship separation and government income support.

2.2. Income support receipt and relationship separation

A wide range of studies has demonstrated an association between separation from a relationship and decreased economic wellbeing. There is also evidence that these patterns are gendered with women faring worse than men, leading to prolonged financial instability and long-term support dependence (De Vaus *et al.*, 2008, 2014; Maroto, 2015; Smock *et al.*, 1999; Smyth & Weston, 2000). A combination of social and economic factors are likely to explain why women experience greater financial hardship following relationship breakdown compared to men. Although women's participation in the labour market has increased markedly since the 1970s, women in Australia still tend to have primary care of children, and many partnered women typically withdraw from the labour market or reduce their hours of employment when they have children (Cipollone *et al.*, 2014; Craig *et al.*, 2010; Gaudet *et al.*, 2011; Leigh, 2010). This gendered division of care work means that women who experience relationship separation are more at-risk of financial hardship than men due to the loss of support from partner earnings (De Vaus *et al.*, 2014, 2015; Sheehan, 2002; Smyth *et al.*, 2015; Smyth & Weston, 2000). Women who attempt to re-enter the labour market after divorce may not be able to do so because of the loss of work experience and career interruption (Van Damme, 2010). Additionally, divorced women have been found to experience a significantly higher probability of work disability, due to the long-term effects of divorce on women's health, influencing their ability to work (Tamborini *et al.*, 2016). Legal costs associated with the divorce process and costs associated with residential change and setting up a new household contribute further to financial instability.

Findings for men are mixed, but typically show a less detrimental effect of separation on men's household income (Andreß *et al.*, 2006; De Vaus *et al.*, 2014; McKeever & Wolfinger, 2001; Tach & Eads, 2015). This may be associated with men continuing employment during child rearing years without the experience of a disconnection from the labour market. Hence their earnings capacity after separation is typically greater compared to that of women (Andreß *et al.*, 2006; De Vaus *et al.*, 2014). There is also much less evidence that separation from a relationship is associated with increased use of government income support for men.

Whilst separation is one of the main risk factors associated with increased reliance on government funded income support for women, marriage may be an important factor that reduces their use of government income support (Bane & Ellwood, 1986; Moffitt, 1992; O'Neill *et al.*, 1987; Tienda, 1990). Studies in the US have shown that in cities where more potential mates are available, and marriage markets are thus more favourable to women, women have a lower likelihood of welfare receipt (Fitzgerald, 1991, 2003; Winkler, 1994). But little research has investigated the association between marriage and income support at an individual level.

In addition to separation from a relationship, several other factors have been found to be associated with entry to and exit from income support payments (Stellmack *et al.*, 2003). These variables include education, work experience and occupational skills, the presence and age of children, ethnicity and English language skills. While higher levels of education has been found to be positively associated with employment (Bora *et al.*, 1998; Harris, 1993; Kroch & Sjoblom, 1994; Meyer & Cancian, 1998), having limited education has been associated with longer periods of reliance on income support payments (Bane & Ellwood, 1983; Coe, 1981; Petersen, 1995). Prior work experience and occupational skills have also been reported to enable employment (Cheng, 2002; Leahy *et al.*, 1995). The presence and age of children has a disadvantageous impact on coming off income support payments, in particular when there is a need for childcare (Stellmack *et al.*, 2003). Ethnic minorities have been found to be less likely to leave the welfare system (Bane & Ellwood, 1983; Cheng, 2002; Gault *et al.*, 1998; Meyers & Heintze, 1999; Piskulich, 1993) and those with higher proficiency with the English language were shown to have higher probabilities of moving off income support (Stellmack *et al.*, 2003). In Australia, demographic characteristics shown to be associated with long-term reliance on income support payments include Indigenous and refugee status (Department of Social Services, 2017).

Some early empirical studies on the length of time in receipt of income support used annual panel survey data from the PSID, with respondents receiving the US Aid to Families with Dependent Children (AFDC) selected for analysis (Bane & Ellwood, 1994; Bane & Ellwood, 1983, 1986; O'Neill *et al.*, 1987). These studies found that the majority of AFDC recipients stayed on support for a relatively short period. However, a distinct group was persistently in receipt of support for five years or more. This group mainly consisted of single women or single mothers. Persistent welfare reliance was further found amongst black recipients. Later studies used monthly data from the PSID on AFDC spell patterns and length

to investigate welfare durations, dependencies and recidivism and the association with other factors such as the marriage market (spouse availability), level of education, other income sources, presence of children, local labour market conditions and local area (Blank & Ruggles, 1994; Fitzgerald, 1991; Fitzgerald, 1995; Harris, 1993, 1996; Pavetti, 1994).

The use of survey based data to examine length of time on income support has been shown, however, to be relatively unreliable due to the limitations and biases of memory and recall (Blank & Ruggles, 1994; Pavetti, 1994). Arguably more reliable results regarding length of time on income support may be sourced from administrative data. An early study used US administrative AFDC participation data to examine how the length of time on support affects the probability of its termination and found that the probability of no longer receiving payments in any month did not appear to be strongly associated with the length of time the current spell had lasted (Blank, 1989). Further, Blank (1989) found that the spell length is associated with a variety of demographic household characteristics and household composition transitions – particularly marriage and remarriage. Based on Canadian administrative data from the social assistance program from 1986-1993, Barrett (2000) found gender disparities in the duration of welfare spells. Educational attainment, number of children and the presence of a spouse were more important in explaining the dynamics of women's welfare participation than that of men. Wilson (1999) used the administrative New Zealand Benefit Dynamics Dataset (BDD) to show that only four percent of welfare recipients received support for five full years. However, over one third of recipients were not able to maintain financial independence after welfare exit, but experienced multiple spells over five years. Wilson (1999) further found that age, partnership status, the presence and age of children, ethnicity and sex were associated with length of time on income support. The probability of long spell durations was particularly high for individuals aged 50 to 59 years, women and singles. The presence of children and particularly the presence of young children also seemed to increase the duration of receiving income support. While assessing the effect of ethnicity using BDD data was limited due to missing values, tentative results by Wilson (1999) suggest that Māori were 1.8 times more likely to experience long welfare spells compared to members of the European ethnic group.

In Australia, a limited number of studies have investigated receipt of income support payments using administrative data. Tseng and Wilkins (2003) and Tseng *et al.* (2008) have used the Longitudinal Data Set (LDS) which contains fortnightly income support payment records for a one percent sample of income recipients. The time period available for their

sample extended over a five-and-a-half-year data window from January 1995 to June 2001. This body of research investigated the extent and nature of reliance on income support in Australia for individuals aged 15-64 years who have received income support payments at any point during the specified time period. The researchers found that although a significant number of individuals relied on income support payments temporarily, a large number became reliant long-term (Tseng & Wilkins, 2003). Long-term reliance was associated with the Age Pension payment. Furthermore, a high incidence of repeated spells and transfers across different income support programs was reported (Tseng *et al.*, 2008). In our research we limit the age group of the analytical sample so that Age Pension payments are excluded, since men and women become eligible for Age Pension at the age of 65 years with some residence requirements (Department of Social Services *et al.*, 2017). Including Age Pension recipients in our analysis would lead to biased estimates of the impact of separation on income support payments reliance.

Overall research on factors influencing the receipt of income support payments including relationship breakdown, is limited in Australia. Bradbury and Norris (2005) examined the association between income support and separation. Their analytic sample was comprised of women with at least one Family Tax Benefit Part A (FTBA) qualifying child aged under 16 years in 2001 and who reported their marital status as partnered. They used the LDS to report descriptive statistics and complemented these with a multivariate analysis using the first two waves (2001 and 2002) of the Household Income and Labour Dynamics of Australia (HILDA) survey. The descriptive results from the LDS show separation rates for partnered mothers between 2001 and 2002 by different levels of FTBA, and the authors report those mothers who are in lower income categories and hence receiving higher levels of support, experience a much higher separation rate. Using HILDA, they examined a range of variables such as marital status, age at marriage, employment status, age of youngest child, and measures for life satisfaction, relationship satisfaction, and mental and emotional well-being, which are non-existent in the LDS. The statistical model applied was a logistic regression model for separation in the second wave with income support status as well as the variables listed above from the first wave, included as the explanatory variables. The HILDA analysis confirms the findings from the descriptive statistics produced from the administrative dataset, that income support recipients are almost three times more likely to separate compared to middle- and high-income families.

Compared to previous studies, the research in this paper takes a unique longitudinal approach to address the question on associations between relationship separation and on income support payments reliance. We investigate this association from a different angle and over a much longer time period compared to Bradbury and Norris (2005). We make use of detailed fortnightly information on income support payments ranging over a ten-year time period from 2003 to 2013 and compare our results to those using HILDA data for the same time period. Rather than investigating whether income support payment recipients are more likely to separate, our approach is to investigate the impact of separation on the duration of receiving income support payments. Specifically, we investigate the following substantive question: Is relationship breakdown associated with the likelihood of remaining on income support payments?

2.3. Australian administrative data on receipt of income support

Compared to survey data, which draws a representative sample from the population, administrative data includes the entire population of individuals and families that receive the service. This improves inference from the data available. Additionally, administrative data also facilitates examination of minority populations which are frequently underrepresented in survey samples (Connelly *et al.*, 2016). But while government administrative datasets provide complete information on individuals' income support payments, they do not typically record information on individuals during periods that they are not eligible for payments. Thus, it is not possible to observe the complete income trajectories of individuals who no longer receive income support, but we do know at what stages of their lives individuals are in receipt of income support payments.

DHS is responsible for the provision of social and health payments, services and other welfare policy in Australia. They deliver policies for these services and interact with the Australian population through a portfolio of government agencies, the most visible of which are Medicare and Centrelink. The organisations in the DHS portfolio assess the eligibility of individuals and families to receive payments and organise the delivery of these payments and other services. Additionally, DHS work on social welfare and health reforms, and efficient delivery. For example, a key priority of the DHS 2015-19 Strategic Plan is to continue developing mechanisms enabling customers to manage their own interactions with the Department, through digital delivery systems. DHS collects data from its Medicare, Centrelink and Child Support organisations and disseminates aggregated information, in

accordance with the Australian Government's Declaration of Open Government made in July of 2010. Statistical information at an aggregate level is publicly available and data for de-identified unit records can be requested for research. DHS facilitates access to these data in collaboration with the Australian Government Department of Health, Australian Government Department of Social Services, Australian Bureau of Statistics and the Australian Institute of Health and Welfare. This current study is the outcome of a strong partnership between a group of multidisciplinary academics in the Life Course Centre and DHS with the joint goal of trialling a collaborative process for the analysis of unit-record administrative data and dissemination of results that have both scientific and policy relevance.

A catalogue of datasets from many Government services are available on the Australian Government Data website[1], in accordance with the Declaration of Open Government. These are publicly available aggregated datasets where identifying values have been classified or obscured. Researchers are able to gain access to specialised data by liaising with DHS. Possible types of data include de-identified unit records, consent studies, personal information, and linked data. DHS works within ethical processes, for example requiring prior approval for using linked Centrelink and Medicare data in consent studies, and releases information based on assessment of purpose, anonymity, consent, secrecy provisions, and privacy. DHS describes their policies and practices toward confidentiality issues in their privacy policy[2]. It is a legislative requirement of DHS to operate in accordance with the Privacy Act (1988).

The next section on Research Methodology is structured in line with the main issues that are addressed in this paper, starting with the processes by which academic researchers can effectively partner with government agencies to analyse and generate evidence from administrative data recording information for whole populations. This is followed by a description of the administrative and survey data, including an assessment of the strengths and weaknesses of administrative data compared to survey data and the analytical method applied to answer the substantive question considered here.

[1] Australian Government Data website, data.gov.au
[2] The DHS privacy policy is available here: www.humanservices.gov.au/corporate/publications-and-resources/privacy-policy

3. Research Methodology

The data collection processes for the two databases examined here are very different and so the final estimates derived from each approach are not directly comparable. The purpose of the analysis of the two different sources of data is to demonstrate the results that can be obtained from each approach and how the corresponding interpretations relate to our substantive question.

3.1. Collaboration for research using government administrative data

DHS are the data custodians of the highly sensitive data on income support recipients in Australia, and as such they have administrative responsibilities for the data. For the successful execution of the current research project, a close collaboration between researchers external to the Department and DHS personnel was essential. Since Australia's government administrative data has untapped potential as a resource for research and policy and remains underutilised in research, our approach allowed us to advance new knowledge and insights from one specific case study that may inform future research collaborations between researchers and policy makers.

Due to security restrictions and legislation related to privacy and confidentiality associated with the administrative data, it was agreed that a research fellow from the Life Course Centre would be provided a placement position at the DHS Brisbane office to access and analyse the data in a secure environment. Access was approved after a clear criminal history check of the academic researcher. The collaboration was successful due to the commitment to the project from both parties. The DHS personnel assigned to this project had extensive experience with the administrative database and its contents, as well as expertise and knowledge of the systems and payments. Through regular meetings and discussions, the population of interest and variables required to conduct the analysis were identified and extracted by the DHS personnel. Subsequent extensive data management conducted by the researcher transformed the information provided into a rectangular dataset suitable for the proposed analysis using SAS statistical software.

Some of the challenges of our collaborative approach included the requirement for the physical location of the researcher on the government site, which hindered discussions on analysis decision amongst the research team. This was further complicated by the requirement for all output produced to be checked and verified by DHS personnel before it could be taken outside the DHS office. The statistical analysis software used within DHS was

restricted to SAS, which means that prior SAS knowledge of the researcher is essential to manage and analyse the administrative dataset.

3.2. Administrative data and analytic population

DHS has data records on more than 8 million people who currently actively receive welfare payments. This is in addition to the millions of historical records for people who are no longer receiving income support payments. To address the research question posed in this paper on the association between relationship separation and time spent on income support. we analysed a data extract that consisted of individuals aged 15-54 years, eligible for any type of income support payment on the 30th of June 2003 and who had received payments the previous financial year, between 1st July 2002 and 30th June 2003. Further, the sample was restricted to those registered as partnered on the 30th June 2003. This resulted in a dataset containing 538,365 individuals.

Restricting the sample to those aged 15-54 years old in 2003 ensured that we mostly excluded individuals on Age Pension or starting on Age Pension before the end of the observation period which, for the purpose of this research, was set to the 30th June 2013. When a person is receiving the Age Pension, the main reason for the payments to cease is in the event of death and so it is not relevant to include individuals eligible for Age Pension in this analysis examining the probability of exit from income support.

The final number of individuals included in the analysis is 537,912 and excludes the following individuals: a) those who entered the welfare system after the observation period end date of 30 June 2013, and b) those who received an income support payment for one day only, which usually refers to one off payments. Similar to those eligible for Age Pension, individuals receiving one off-payments are not relevant to this analysis as separation would not have an impact on the time spent receiving income support.

The longitudinal nature of this dataset facilitates examination of individual payment histories over the observation period. In addition to payment type and payment amount, the dataset included a range of measures of individual characteristics such as whether they are partnered or not, permitting analysis of the association of the length of time on income support with relationship separation for those individuals who have received income support for a period of time.

3.2.1. Time in receipt of income support payment

DHS collects daily information on the receipt and type of payment allocated to an individual. This information is updated fortnightly in the database. For this study the focus was on the length of time someone is receiving income support, without differentiating between the numerous types of income support payments. Hence, the analysis did not take into account the type of income support, but this could be considered in future research. A period on income support was defined from the first date of receiving any income support to the last date of receiving a payment. However, if an individual discontinued receiving income support and returned to receiving support within three months of the last day of the previous period, the two periods were combined and defined as one period of income support. The rationale for this was that an income support recipient was not actually exiting the DHS system if they returned within three months, but rather exited 'temporarily'. Payments received on one day only (e.g. lump sum payments) were excluded from the analysis because these one-off payments are unlikely to be related to relationship separation. Also of note is that one period on income support can include a combination of several different payment types. For example, an individual could move from receiving Parental Payment Partnered to receiving Parental Payment Single. Since we were interested in income support per se, and not concerned with the type of support received, these changes were not considered and we defined this as one period in receipt of income support, regardless of type of payment. There was one exception. We did control for whether the individual had received Disability Support Pension (DSP) during the period in receipt of income support, coded as [1] yes, [0] no. Through discussions with the DHS personnel we learned that this was necessary as disability payments are typically associated with irreversible long-term conditions. An individual is very unlikely to have payments of this type discontinued following confirmation of eligibility. Not controlling for DSP would have resulted in an underestimation of the effect of separation on income support reliance.

3.2.2. Relationship separation and demographic variables

Information on relationship status is collected while a person receives income support and the start date and end date of the relationship status is collected. There is generally no information on relationship status available for individuals once they have exited the DHS system. Administrative data is not collected for research purposes and therefore the information captured with each variable depends primarily on the type of information needed for administrative purposes. With regards to relationship status, the extent of information

needed for the Department to assess income support eligibility is whether a person is partnered or not, and does not distinguish in finer detail between the relationship definitions of cohabiting and married, or divorced and separated. For this reason, the value of relationship status was defined as partnered [1] or not partnered [0].

As noted above, previous research has shown that certain demographic characteristics are associated with income support. The data provided information on the following characteristics which were included as time-constant covariates in the analysis: Gender coded as [1] male and [0] female; age in 2003 grouped into [1] 15-24, [2] 25-34, [3] 35-44, [4] 45-54; Indigenous status coded as [1] Indigenous, [0] non-Indigenous; refugee indicator in 2003 coded as [1] yes, [0] no; and non-English speaking indicator with interpreter required, coded as [1] yes, [0] no.

3.3. HILDA data and analytic sample

The analytic survey sample was obtained from the HILDA longitudinal survey, a nationally representative annual household panel study from 2001 with 13,696 individuals aged 15 years and older (from 7,682 households) participating in the first wave of the survey (Watson & Wooden, 2001). Data collected for the period from 2003 to 2013 were extracted to maintain consistency with the time period specified for analysis of the administrative data. Individuals were selected if at wave 3 (2003) of the HILDA dataset they were receiving income support payments, were partnered (legally married or de facto) and aged 14-54 years. The relevant sample from the HILDA dataset included 834 individuals. It is important to note that this sample is not necessarily representative of the population of Australians who were in receipt of income support in 2003, across all payment benefit types, and who subsequently became separated after receiving income in a relationship.

3.3.1. Time in receipt of income support payment

Unlike the data recorded in the administrative database, the HILDA survey does not collect exact start and end time for receipt of income support but does include a question that asks the participant whether they have received any government pensions, benefits and allowances during the last financial year. The response to this question provided data on the annual receipt of income support payments. Time recorded annually is not characterised as continuous but discrete. Therefore, using this data, it was necessary to use an appropriate analytical approach to analyse duration on income support with time as a discrete variable.

3.3.2. Relationship separation and demographic variables

Variables measuring gender, age (at wave 3 in 2003), relationship status and Indigenous status were recorded annually in HILDA. Time-varying relationship status was the primary variable of interest and was collapsed into partnered (legally married or de facto) and not-partnered (separated, divorced, widowed). Age was grouped accordingly to allow comparisons with the administrative dataset. The recording of Indigenous status has been shown to vary over time (Biddle & Crawford, 2015), however, exploratory analysis showed that this did not occur for the individuals in the analytic sample. The requirement for an interpreter was measured by indication of whether the interview with the HILDA participant was completed with the assistance of a third party, such as an interpreter or another member of the family, at wave 3. From wave 4 (2004), the HILDA survey captures whether the participant and their family came to Australia as refugees or under a humanitarian migration program. If at any wave the participant indicated that they arrived in Australia as a refugee, they were classified as a refugee at wave 3 in 2003. The HILDA survey also captures whether the participant received disability support payment (DSP), which is used in the model as a control variable, since, as noted above, DSP recipients are unlikely to discontinue receiving this type of payment. Information on year of death was helpful to accurately identify the reason for income exit. Descriptive statistics for these variables are shown in Table 2.

3.4. Analytic Strategy

We used event-history analysis to address our substantive question. (Allison, 2014). An event-history model is typically used when interest focuses on the time to occurrence of an event which, in this study, is the time to exit from the DHS system, conditional on receipt of income support in the previous time period. The primary covariate is the event of separation from a relationship and interest is in its association with the likelihood of exit from income support with duration from first receipt of income support. This model allows us to include other covariates that may also be associated with the length of time for which an individual receives income support including age, gender, Indigenous status, refugee status, non-English speaking background, and receipt of DSP. An individual is ‘at risk’ of experiencing the exit event from the first time that they received an income support payment. There are several different approaches to event-history analysis that are adapted to the form of data recorded and these are described in Sections 3.4.1 and 3.4.2.

3.4.1. Event-history analysis for administrative data

Cox proportional hazards model

A conditional model which is an extended Cox proportional hazards model (Prentice *et al.*, 1981) was fitted to the data. In this formulation, the logarithm of the hazard is modelled as a function of the baseline hazard and selected explanatory variables which may vary with time following entry into the risk set. The hazard represents the probability of an event (exit from income support) occurring among those individuals who have not yet experienced the event (Allison, 2014). Each person can receive income support during multiple non-consecutive periods of time and hence can contribute to more than one income support period in the pool of observations. To adjust for this 'clustering' of observations and to correct for statistical dependence robust standard errors were computed using the 'sandwich' method of Huber (1967) and White (1980).

Censoring

In event-history analysis, the term censoring is used to describe incomplete data for an individual during the observation period. The two common types of censoring are left and right censoring. Left censoring occurs when a history is only partially observed due to some events having occurred before the start of the observation period. Left censoring was not required for the administrative data used in this analysis, however, right censoring did occur. We have complete information on individuals' income support history, however, due to the observation period ending on 30th June 2013, we had artificially cut the individuals time on income support so that the end of the income support spell did not correspond to an exit from the income support system. Hence, individuals in this dataset are (right) censored when they have not exited the welfare system by the 30th June 2013. Individuals who were deceased during the period of receiving income support were also (right) censored.

3.4.2. Event-history analysis for HILDA data

In the HILDA panel survey, the receipt of income support is recorded annually without an actual start or end date and hence it is not possible to apply the cox proportional hazards regression model to the income support data using the same formulation that was applicable to the administrative data. To investigate the association of relationship status with the length of time in receipt of income support using data from the HILDA panel survey requires application of the discrete-time proportional hazard model, which is appropriate for responses measured at discrete time intervals (Allison, 2014). With this approach, a record is created for

each discrete time interval in the survey (corresponding to a survey wave), separately for each individual. A binary variable is generated for recording exit from income support which takes the value zero for each year in which an exit did not occur, and the value one when income support was not received in the previous year, corresponding to an exit. A duration variable is also created which incrementally records the number of years since the first year in which an income support payment was recorded. The discrete-time proportional hazard model takes the form of a logistic regression model where the hazard of exit from income support is defined as the probability of exit during the previous year, conditional on the individual being in the risk set. The logistic regression model includes the baseline hazard function which varies with time and selected time-varying explanatory variables.

Identification of the year of entry to the income support payment spell was not always possible for the HILDA panel data. If the date of entry to income support is not known, then the time at risk of experiencing the exit event is also unknown which corresponds to left truncation of the data and hence the requirement for left censoring. The percentage of individuals for which left truncation was observed is large (63%) and cannot be ignored (Table 1). Left truncation occurred not only for individuals who have already been receiving income support since wave 1, but also for those individuals who have missing observations in waves prior to wave 3. Table 2 shows patterns of income support payment receipts for the first three waves. A value of '0' indicates that the individual has not been in receipt of income support in the previous financial year, '9' represents missing information, and '1' indicates that the individual has received income support in the previous financial year. The patterns highlighted in bold are left truncated, as we do not know when these individuals have started receiving income support.

Table 1: Patterns for receipt of Income Support in first three waves of HILDA survey (2001-2003).

Income Support Pattern	N	%
001	134	16.1
011	109	13.1
091	9	1.1
101	54	6.5
111	382	45.9
191	16	1.9
901	12	1.4
911	43	5.2
991	75	9

Right censoring occurred when the individual was either deceased during the previous year, was still receiving income support by wave 13 (and had been receiving income support 'continuously' from at least wave 3 onwards), and when an individual had been receiving income support in one wave and not participated or reported income support status in the following wave. For example, an individual may not have received income support in waves 1 and 2, received income support during waves 3, 4 and 5, had no information on income support in wave 6 and reported that they were no longer receiving income support from wave 7 onwards. It is not clear whether this person had stopped receiving income support in wave 6 or wave 7 and was therefore treated as right censored. This particular type of right censoring occurred for 179 individuals. Given the large number of left truncated observations, we investigated the associations between individuals who had left truncated income support spells and those that did not have a left truncated spell with demographic characteristics, as potentially those with left truncated income support usage may be more likely to have received income support prior to wave 1.

The explanatory variables of relationship status, age and gender were included in the discrete-time event history model. However, due to the large number of missing values for the refugee identifier, Indigenous status, non-English speaking background and receipt of DSP for the HILDA data (see Table 2) these variables could not be included in the model.

4. Results

4.1. Descriptive analysis

The population of participants in the administrative data includes N=537,912 individuals and shows different characteristics on key demographic variables when compared to the total Australian population. Table 2 shows that 62% were females (compared to 50.6% in 2011 (Australian Bureau of Statistics, 2011b)), 67% were aged between 35-54 years (compared to 28.7% in 2011 (Australian Bureau of Statistics, 2011b)), 6% identified as Indigenous (compared to 3% in 2011 (Australian Bureau of Statistics, 2011c)), approximately 3% were refugees and 12% required an interpreter (compared to 2.4% in 2011 speaking English not well or not at all (Australian Bureau of Statistics, 2011a)). During the observation period, 4% (22438) of individuals were recorded as deceased. The 537,912 individuals included in the analysis were observed for 855,181 spells of income support receipt of which 184,683 (22%) corresponded to receipt of DSP.

Further, Table 2 shows the differences on the key demographic variables of the administrative dataset with HILDA. In comparison to the administrative dataset, the HILDA data has a higher percentage of female individuals, (HILDA: 67%; administrative dataset: 62%), the sample is overall younger (aged 14-34 years: HILDA: 44%; administrative dataset: 33%), there is a slightly lower percentage of individuals who identified as Indigenous (HILDA: 4%; administrative dataset: 6%); a higher percentage that were refugees (HILDA:14%; administrative dataset: 3%); and a lower percentage of individuals that require an interpreter or have received DSP (interpreter required: HILDA: 3%; administrative dataset: 12%; DSP: HILDA: 14%; administrative dataset: 22%). In the HILDA data 2% deceased compared to 4% in the administrative dataset.

Table 2: Frequency of individuals by demographic characteristics for Administrative and HILDA data

		Administrative Dataset		HILDA	
Variable	**Categories**	**N**	**%**	**N**	**%**
Gender[H]*	female	334550	62.19	560	67.15
	male	203362	37.81	274	32.85
Age group [H]*	14-24	48540	9.02	127	15.23
	25-34	129586	24.09	237	28.42
	35-44	170878	31.77	287	34.41
	45-54	188908	35.12	183	21.94
Indigenous status [H]	indigenous	34141	6.35	37	4.44
	non-indigenous	503771	93.65	616	73.86
	missing	n/a	n/a	181	21.7
Refugee[# Z]*	Yes	18134	3.37	118	14.15
	No	519778	96.63	17	2.04
	missing	n/a	n/a	699	83.81
Interpreter required [H]*	Yes	65535	12.43	23	2.76
	No	461486	87.57	804	96.4
	missing	n/a	n/a	7	0.84
received DSP[## H]	Yes	184683	21.6	118	14.15
	No	670498	78.4	414	49.64
	missing	n/a	n/a	302	36.21
Deceased	Yes	22438	4.17	19	2.28
	No	515474	95.83	815	97.72

[#] N=10,891 not asked (administrative dataset); [##] defined as per spell (total number of spells=855,181), not per individual (administrative dataset); [*] as of 30th June 2003 for the administrative dataset; [H] as of wave 3, in 2003 for the HILDA dataset; [Z] if mentioned at any point during the HILDA survey

4.1.1. Event-History analysis for administrative data

Table 3 shows the results from the event-history model fitted to the administrative data on exit from income support. Four models were fitted to the data (Models 1-4) with each model

building on the previous model by including additional explanatory variables. All models included the baseline hazard function but only the estimated hazard ratios (HR) for the explanatory variables on exit from income support are shown in Table 3. Model 1 is the simplest model and includes only relationship status (non-partnered versus partnered) as the explanatory variable. The hazard ratio estimated for Model 1 is the odds of exiting income support in any given quarter for individuals who are no longer partnered relative to those who have remained in a partnership since commencing receipt of income support, without controlling for any other demographic variables. Model 2 builds on Model 1 by including gender and age as explanatory variables in addition to relationship status. Model 3 builds on Model 2 by including Indigenous status, whether an interpreter is required or not and whether the individual identifies as a refugee. The final Model 4 includes an indicator identifying whether DSP was received during the spell. The first column in Table 3 includes the variable name and the second column includes the categories of the variables. The third column shows the estimated hazard ratio for Model 1, followed by the 95% hazard ratio confidence limits. The remaining columns show the estimated hazard ratios and corresponding 95% confidence intervals for the variables in Models 2-4.

Without controlling for any other demographic variables, results for Model 1 show that individuals who separate from their partner are marginally less likely to exit income support (HR=0.97) compared to those that remain partnered. While this ratio is very close to one, the 95% confidence limits indicate that this finding is statistically significant at the 5% level. With gender and age added as explanatory variables, the results for Model 2 show that individuals who are no longer partnered (HR=0.86), and females (HR=0.70), are less likely to exit income support. Younger individuals aged 14-24, 25-34 and 35-44 are more likely to exit income support than those aged 45-54 years old (hazard ratios >2.0). The estimates for Model 3 additionally show that individuals of Indigenous status (HR=0.82), those who required an interpreter (HR=1/1.46=0.68), and identify as a refugee (HR=1/1.14=0.88), are also less likely to exit income support.

In the final Model 4, an indicator for DSP is included to examine the change in hazard ratio for relationship status after controlling for this typically long-term payment. As expected, the hazard ratio for individuals in receipt of DSP is high (HR=7.74) and the hazard ratio for individuals who are no longer partnered remains stable at HR=0.87. The hazard ratio for females to exit income support has decreased to HR=0.54 (from 0.69 in Model 3). Indigenous status is also associated with a lower hazard of exiting income support compared

to non-Indigenous individuals (HR=0.78) and younger individuals aged 14-24, 25-34 and 35-44 are more likely to exit than those aged 45-54 years old, however, the hazard ratios have decreased from those estimated in Model 3 to 1.72, 1.71 and 1.65, respectively.

Table 3 has shown that while the overall estimated hazard of exiting income support is marginally but significantly lower for individuals who become separated following entry to income support (HR=0.97), this association becomes more pronounced when gender and age are also considered (HR=0.86). While each of the four variables representing Indigenous status, requirement for an interpreter, refugee status and DSP indicator are also associated with the hazard of exiting income support the effect of relationship status remains stable when they are added to the model following gender and age.

Table 3: Administrative Data: Event-history analysis of likelihood of exit from income support and hazard ratio estimates and 95% confidence intervals for association with demographic characteristics.

Variable	Categories	Model 1		Model 2		Model 3		Model 4	
		Hazard ratio	95% CLs	Hazard ratio	95% CLs	Hazard ratio	95% CLs	Hazard ratio	95% CLs
Relationship status	Non-partnered	0.97	[0.96, 0.98]	0.86	[0.85, 0.87]	0.84	[0.83, 0.85]	0.87	[0.86, 0.88]
	Partnered [ref]	-	-	-	-	-	-	-	-
Gender	Female			0.70	[0.69, 0.70]	0.69	[0.69, 0.70]	0.54	[0.537, 0.544]
	Male [ref]			-	-	-	-	-	-
Age group	14-24			2.70	[2.67, 2.73]	2.63	[2.60, 2.66]	1.72	[1.70, 1.74]
	25-34			2.48	[2.46, 2.50]	2.44	[2.41, 2.46]	1.71	[1.70, 1.73]
	35-44			2.05	[2.03, 2.07]	2.03	[2.01, 2.05]	1.65	[1.63, 1.66]
	45-54 [ref]			-	-	-	-	-	-
Indigenous status	Indigenous					0.82	[0.81, 0.83]	0.78	[0.77, 0.78]
	Non-Indigenous [ref]					-	-	-	-
Interpreter required	No					1.46	[1.44, 1.48]	1.52	[1.51, 1.54]
	Yes [ref]					-	-	-	-
Refugee status	No					1.14	[1.12, 1.16]	1.16	[1.14, 1.18]
	Yes [ref]					-	-	-	-
Received DSP	No							7.74	[7.63, 7.84]
	Yes [ref]							-	-

4.1.2. Event-History analysis for HILDA data

As discussed in Section 3.3, the HILDA survey does not collect exact start and end time for receipt of income support. Therefore, it is not possible to investigate the duration from first receipt of income support to exit for individuals who first received income support prior to 2002 or with missing information on income support prior to 2003 (see Table 1). For these individuals, the data were considered as left censored. Table 4 shows that left censoring was significantly more likely to occur than not, for individuals who identified as refugee ($p=0.041$), Indigenous ($p=0.013$), and recipient of DSP ($p<0.001$). This finding is not surprising as individuals with these characteristics are also known to receive income support for longer periods of time and this was confirmed in the results from the event-history analysis of administrative data discussed in Section 4.1. The analytic sample from the HILDA survey contains only 834 individuals and the entry data for income support is unknown or left censored for 63% of these observations. Of the individuals who responded to the corresponding question, only 25 required an interpreter, 17 identified as a refugee, 37 were Indigenous. A total of 132 individuals were in receipt of DSP, however, 80% of these observations were left censored. Due to the low numbers of observations on these four variables that were not censored, only Model 2 including the variables for relationship separation, gender and age was estimated using the HILDA analytic sample.

Table 4: Chi-squared tests of association for left truncation or not with demographic variables, HILDA data.

Variables	N*	No truncation		Left truncation		Chi-squared statistic	P-value
		Number	%	Number	%		
Gender	***834***	***309***		***525***			
Female		217	70.2	343	65.3		
Male		92	29.8	182	34.7	2.111	0.146
Indigenous	***653***	***229***		***424***			
No		223	97.4	393	92.7		
Yes		6	2.6	31	7.3	6.122	0.013
Interpreter required	***827***	***307***		***502***			
No		298	97.1	506	97.3		
Yes		9	2.9	14	2.7	0.041	0.840
Refugee	***135***	***63***		***72***			
No		59	93.7	59	81.9		
Yes		4	6.3	13	18.1	4.183	0.041

DSP recipient	***563***	***165***		***398***			
No		147	89.1	292	73.4		
Yes		18	10.9	106	26.6	16.793	<0.001

*Non-missing sample from 834

Compared to the analysis using the administrative dataset, the analysis with the HILDA data posed challenges due to incomplete information on income support spells and small sample sizes for indicators of disadvantaged groups.

The results from Model 2 fitted to this data (Table 5) show that the association between relationship separation following receipt of income support and the likelihood of exit from income support did not reach statistical significance. In other words, there is insufficient evidence to conclude that there is a significant association even though the estimated hazard ratio of 0.76 for individuals who are no longer partnered is in the same direction to that estimated using the administrative data (HR=0.86). Furthermore, the estimated hazard ratio for gender is not statistically significant but the hazard ratio for the youngest age category of 14-24 years (HR=1.84) is significant indicating that the odds of exiting income support are higher for this youngest age category relative to the oldest age category of 45-54 years. These differences are likely to be the outcome from the significantly smaller sample size of the HILDA sample that matched our selection criteria.

Table 5: HILDA Survey Data: Event-history analysis of likelihood of exit from income support and hazard ratio estimates and 95% confidence intervals for association with demographic characteristics

Variable	**Categories**	**Hazard ratio**	**95% CLs**
Relationship status	Non-partnered	0.76	[0.50, 1.17]
	Partnered [ref]	-	-
Gender	Female	0.98	[0.75, 1.29]
	Male [ref]	-	-
Age group	14-24	1.84	[1.22, 2.75]
	25-34	1.20	[0.85, 1.70]
	35-44	0.78	[0.55, 1.10]
	45-54 [ref]	-	-
Number of observations		4038	
AIC		1723.7	
BIC		1830.8	

Exponentiated coefficients; 95% confidence intervals in brackets.

5. Discussion

This project was a collaboration between the Australian Government Department of Human Services (DHS), and the Life Course Centre with three main objectives: First to trial a model of accessing and analysing administrative data. Second to examine a substantive question on the impact of relationship breakdown on income support reliance. And finally, to assess the potential of administrative data for research. Overall, we explored a process by which a team of university-based researchers could effectively partner with an Australian Government agency to securely generate research evidence from administrative data that records income support payment information for the entire population in receipt of this benefit.

In order to securely access and analyse the dataset, the university researcher worked from the DHS premises. This enabled the data analysis, but also facilitated DHS as an active collaborative partner. As DHS personnel have sophisticated knowledge of their data, having the Department's input was vital particularly during the data management period. Regular face-to-face meetings were necessary to understand the structure of the data and the payments system. We found that university researchers and DHS personnel apply different work strategies and routines and both parties adjusted to facilitate a successful project outcome. Any outputs produced by the university researcher required clearance by several DHS personnel before it was permitted to be taken outside the DHS premises and shared with the remaining university team for discussion. Open and frequent continuing communication was key to ensuring that an accurate statistical model was applied to the data to ensure that realistic results were obtained and interpreted correctly. The collaboration with the Department was central to this project, given their thorough knowledge of the welfare payment system, eligibility requirements, and data collection and storage processes. We would encourage researchers seeking to use administrative data to collaborate closely with data custodians in the identification and development of research projects to produce policy relevant outputs.

We applied innovative statistical methods to investigate the research question and found that unpartnered individuals, following initial receipt of income support payments in a partnered relationship, are significantly less likely to exit payment receipt. This result held while controlling for other factors known to have an impact on the use of income support, including gender, age, Indigenous status, whether an interpreter is required, refugee status and whether or not the individual has received disability pension. The Australian Government Department of Social Services has been investing in research to further understand the

population in need of income support and their outcomes in order to develop evidence-based policies to improve the underlying welfare model and increase employment opportunities leading to self-reliance (Department of Social Services, 2017). Through this process the Department identified groups of individuals who have particularly high lifetime costs that can be reduced through improved policy settings and targeted interventions. Our results show that individuals on income support are less likely to exit the welfare system following a relationship breakdown compared to their partnered counterparts. Furthermore, we found that females compared to males are almost half as likely to exit the welfare system. This result points to the need for targeted support for these groups.

Our research has highlighted the importance of both administrative data and national longitudinal survey data for social science research and some of the strengths and weaknesses of each type of data. There were several advantages to using the administrative dataset. As it includes the full population of income support recipients, it is particularly useful when the research is focused on minority groups and hard-to-reach populations. This became apparent from the descriptive analysis of the income support data and the panel survey data. For example, when selecting people receiving income support from the panel survey and additionally investigating differences by refugee status, the number of observations were too small to be included in the analysis.

On the other hand, due to the size of the administrative dataset, data management was extensive and the processing times for the statistical models were lengthy. As the data is not collected for research, some of the key demographic variables were not recorded in a consistent way as we would expect from well-managed longitudinal surveys. Marital status, for example, is often measured in surveys to distinguish between married, de-facto, divorced, separated, widowed and single states. However, this level of detail is not required in the administrative context and participants may report being divorced, followed by being single and a return to being divorced. This does not cause problems in the administrative context as the required question is whether the person is partnered or not. The downside is that detailed marital transitions cannot be accounted for in analyses of these data. Another common feature of administrative data is that information is collected about the individual throughout the period of requiring the particular service such as income support. Once the service is no longer required, there is no further information available about this person. This makes is difficult to investigate triggers that lead to service requirements and subsequent outcomes after service provision has been relinquished.

Compared to administrative data, the panel survey data investigated here was designed to provide a representation of households from the national population rather than of households in receipt of a government service. It is therefore a much smaller sample and hence provides an underrepresentation of minority groups. In our analyses of the HILDA data, variables representing refugee status, Indigenous status and receipt of disability support payment could not be included in the model due to underrepresentation in our cohort of interest. In contrast to the findings from the administrative data, statistical significance was not detected for relationship status, gender and some age-groups in our models, however, we found the same general patterns in terms of direction. These differences may not indicate different substantive findings from the models based on the administrative data, but rather are likely due to variation in the specifications of models.

Our research highlights some of the strengths and limitations of administrative data compared to survey data and the importance of close collaboration with data custodians when analysing administrative data. Current directions and trends toward more open data access in Australia, as well as many other countries, suggest that new opportunities for realising the value of administrative data for research, as well as policy design and evaluation will become increasingly available. This is unlikely to negate the importance of continuing to collect rich longitudinal data from national survey samples, such as that provided by HILDA, but it does open new possibilities for important new research and policy insights into hard-to-reach minority groups, who are often under-represented in sample surveys. For researchers concerned with understanding pathways into and out of disadvantage for such groups, as is the case for those involved in the Life Course Centre, access to administrative data is thus imperative and an exciting new development in social science infrastructure.

6. References

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