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The Impact of Child Support Receipt on Household Income and Labour Supply

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NON-TECHNICAL SUMMARY

In Australia, one in seven households is headed by a lone parent, one quarter of whom experience relative income poverty in a given year. One way in which lone parent households are supported financially is through the child support paid by a non-resident parent.
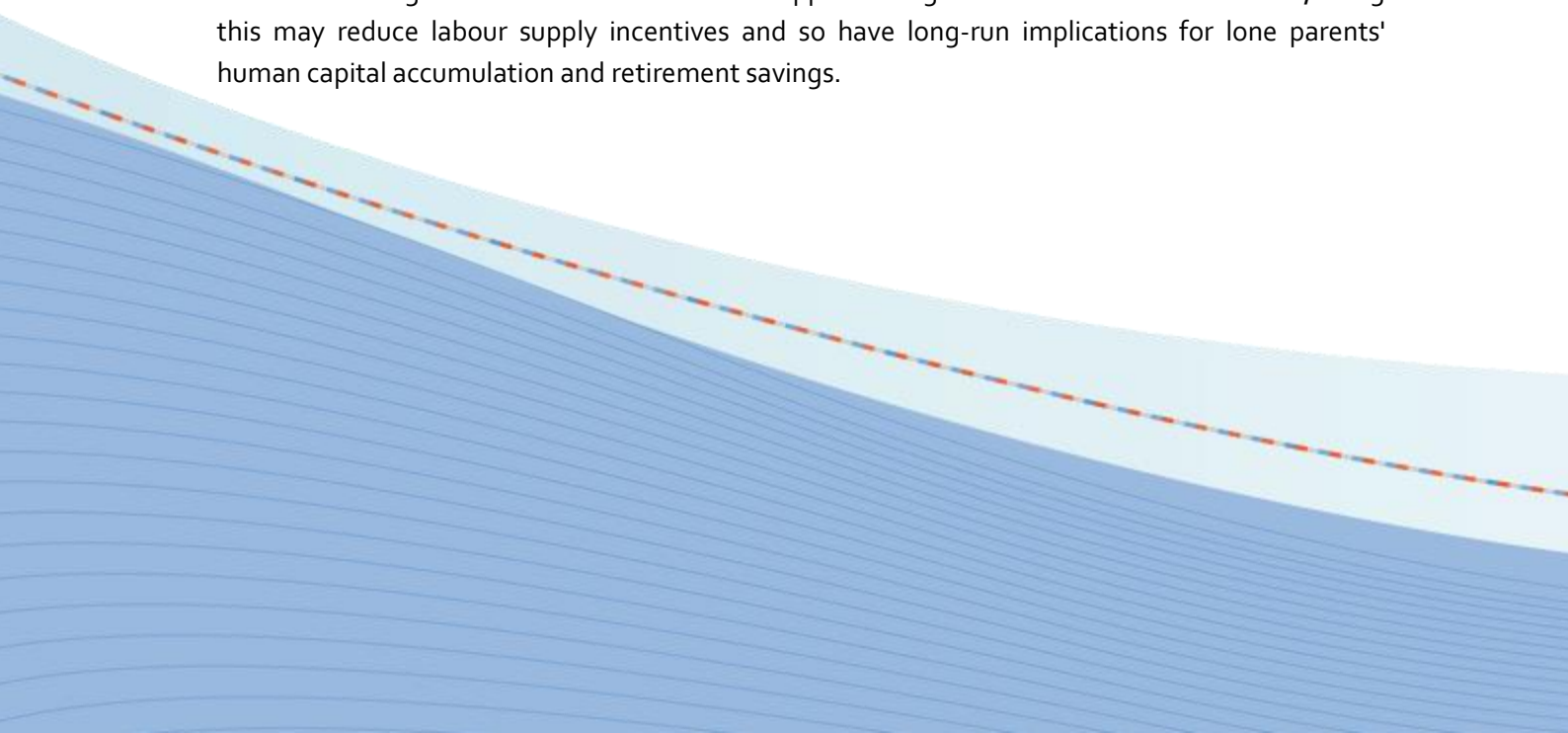
Child support schemes have been established in many countries in response to the increasing prevalence of lone parent families since the 1970s. These schemes aim to ensure both parents remain financially responsible for their children in the event of relationship breakdown, to reduce the incidence of child poverty and to limit the costs of government transfers to support lone parents.

Understanding the effects of child support receipt on government transfers and labour supply is important as child support policy is particularly contentious: an increase in the amount of child support deemed appropriate is a direct transfer from one parent to the other, and occurs in an emotionally charged environment. Without a strong evidence base for the effects of receiving child support, policymakers lack a basis on which to reconcile these competing interests.

In Australia, child support interacts with government transfer receipt, with the level of Family Tax Benefit decreasing as the amount of child support received increases. This means that there is an effective tax on child support for child support payees receiving more than the base level of Family Tax Benefit, which in turn creates an incentive to increase labour supply and earnings to avoid this tax.

Using recent, nationally representative data, I find that the receipt of any child support leads to a $8,503 reduction in government transfer receipt. Conditional on receiving any child support, a $1 increase in the amount received leads to a 45 cent fall in the receipt of government transfers. A $1000 increase in child support received leads to a 2.9 percentage point reduction in the probability of being out of the labour force, and a 2.3 percentage point increase in the probability of working full time.

These results have broad implications for the design of child support and government transfer systems. One way to increase the child support received by lone parents is to reduce the effective tax rate resulting from the interaction of child support with government transfers. However, doing this may reduce labour supply incentives and so have long-run implications for lone parents' human capital accumulation and retirement savings.

ABOUT THE AUTHOR

Hayley Fisher is a Lecturer in the School of Economics at the University of Sydney. Her research focuses on the causes and consequences of family formation and dissolution, including the influence of family law and the strategies used to smooth the shock of relationship breakdown. Recent work has been published the *Journal of Law, Economics and Organisation* and *Fiscal Studies*. Email: hayley.fisher@sydney.edu.au.

Abstract

International evidence suggests that child support schemes provide a small but significant contribution to the household income of lone parents and have modest success in reducing child poverty. There are, however, concerns that receiving child support may discourage labour force participation. I use data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to estimate the effect of receiving child support on government transfer receipt, earned income, hours worked and labour force participation of eligible mothers. OLS estimates of the effect of receiving child support on household behaviour may be biased as a mother's income partly determines the level of support received, and due to the interaction of child support with government transfers. I exploit information about the employment status of a child's non-resident father and find that receiving any child support is associated with a reduction in government transfers, an increase in earned income, and an increase in household income in excess of the amount of child support received. Mothers receiving child support are more likely to be in full time employment, work more hours per week, and are less likely to be out of the labour force.

1   Introduction

Formal child support schemes have been established in many countries in response to the increasing prevalence of lone parent families since the 1970s. The stated aims of these policies vary across countries, but generally aim to ensure both parents remain financially responsible for their children in the event of relationship breakdown, support the standard of living of affected children, reduce the incidence of child poverty, and to reduce the costs to the government of supporting lone parents (Skinner et al. 2012). The extent of cost recovery varies across countries, ranging from no cost recovery in the UK (ie. recipients receive all child support paid, regardless of government transfer receipt), to full cost recovery in most US states where the effective tax rate on child support is 100% for welfare recipients.[1] This policy choice affects the labour supply implications of child support receipt.

The child support received by a parent can be viewed as unearned income, leading to concerns that the receipt of child support may discourage labour force participation among recipient parents through a standard income effect. However, if receiving child support reduces government transfers then child support is effectively taxed at a higher rate when government transfers are received. This means that an increased level of child support can encourage labour supply. It is therefore an empirical question whether child support receipt affects labour supply.

This paper examines the household income and labour supply effects of child support in Australia. The extent of cost recovery in Australia lies between the extremes of the UK and most US states, with the effective marginal tax on child support at 50% and the average effective child support tax rate of around 32%.[2] This broadens our understanding of the effects of the interactions between child support and welfare policy.

Understanding the effects of child support receipt is important as child support policy is particularly contentious: an increase in the amount of child support deemed appropriate is a direct transfer from one parent to the other, and occurs in an emotionally charged environment. Without a strong evidence base for the effects of receiving child support, policymakers lack a basis on which to reconcile these competing interests. Whilst there is a body of empirical evidence suggesting mixed effects of child support on labour market outcomes in the United States, there is far less in other countries, and in particular the

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[1]See p.162–163 of Huber et al. (2014) for a full listing of state child support pass through and disregard policies.

[2]This average rate is based on average child support liability and average number of children in 2008-09 (latest available data) and applying that year's maintenance income test (Commonwealth of Australia 2009). The effective tax is higher for those in social housing, whose rent increases with child support receipt.

paucity of strong evidence in Australia has been noted (Cook et al. 2011).

In this paper, I use data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to estimate the effect of child support receipt on the labour force participation, government transfer receipt and earned income of eligible mothers in Australia. In the Australian context, there is likely to be reverse causality between a mother's labour supply and her child support receipt due to the child support formula (which directly reduces the child support liability of the father as the mother's income increases) and due to the incentive to use the administrative 'Child Support Collect' transfer system. Failing to account for this leads to an underestimation of the effect of child support on labour market decisions.

I exploit variation in the amount of child support received resulting from (lagged) changes in the employment status of the father of the child support child. By controlling for a rich set of individual and geographical characteristics, the father's prior employment status affects the amount of child support received but does not affect the mother's labour market decisions except through the amount of child support received. Using the father's lagged employment status as an instrumental variable for child support receipt, I find that receiving any child support leads to a \$8,503 reduction in government transfer receipt, and that conditional on receiving child support, a \$1 increase in the amount received leads to a 45 cent fall in the receipt of government transfers. Household market income increases by \$43,329 and \$2.62 respectively. A \$1000 increase in child support received leads to a 2.9 percentage point reduction in the probability of being out of the labour force, and a 2.3 percentage point increase in the probability of working full time.

Relaxing the assumption of the exogeneity of lagged father's employment status using the Imperfect Instrumental Variables method of Nevo and Rosen (2012) supports these results, ruling out a significant increase in the receipt of government transfers and a significant reduction in market income, full time employment and hours worked.

These results are in contrast to existing Australian estimates that do not account for the endogeneity of child support receipt which find that receiving a higher level of child support is associated with working fewer hours (Taylor and Gray 2010). However, they reflect findings from the United States which find that higher child support payments reduce welfare dependence and increase hours worked (Hu 1999; Huang et al. 2002; Neelakantan 2009).

These results have broad implications for the design of child support and government transfer systems. One way to increase the child support received by lone parents is to reduce the effective tax rate resulting from the interaction of child support with govern-

ment transfers. However, doing this has the potential to reduce labour supply incentives which could have long-run implications for lone parents' human capital accumulation and retirement savings.

Section 2 describes the existing research on the labour market effects of child support. Section 3 outlines the key features of the Australian Child Support Scheme, and section 4 describes how this policy is expected to affect labour market activity in a leisure-consumption model. Sections 5 and 6 describe my data and empirical strategy, with results presented in section 7. Section 8 describes the robustness checks relaxing the instrumental variables assumptions.

2   Literature

This is a substantial body of research examining the effects of various aspects of child support policy in the United States. Higher levels of child support have been linked to higher labour supply and lower welfare participation (Hu 1999; Huang et al. 2002; Neelakantan 2009), more contact with non-resident fathers (Nepomnyaschy 2007), lower levels of informal support (Nepomnyaschy and Garfinkel 2010), and a lower propensity to cohabit with a new partner (Cancian and Meyer 2014). As the level of child support increases, lone mothers have higher household income, are less likely to live in poverty (Meyer and Hu 1999), and are less likely to experience food insecurity (Garasky and Stewart 2007). Receiving more child support is also associated with better child cognitive performance (Amato and Gilbreth 1999), and better health outcomes for children (Baughman 2014). On the other hand, there is some evidence that as the level of child support expected increases, fewer child support orders are made (Roff 2010).

There is also a body of research examining the effects of stronger enforcement of child support, exploiting state and time variation in the methods of enforcement available and funding allocated. Stronger enforcement of child support is associated with higher child support payments (Freeman and Waldfogel 2001), though the importance of funding to support enforcement activities is noted. Births to teenagers and to unmarried women eligible for welfare are lower with stronger child support enforcements (Aizer and McLanahan 2006; Plotnick et al. 2004), and lone mothers are more likely to exit and remain off welfare (Huang et al. 2002). Stronger enforcement is also associated with more contact with the non-resident parent (Peters et al. 2004).

The interaction of child support with the welfare system – that is, the amount of child support disregarded by the welfare system – has also been examined. When the

amount of income disregarded is higher (and so the receiving parent keeps more of the child support paid), more child support orders are made (Roff 2010) and in-kind child support is higher (Gunter 2013), reflecting a higher propensity of non-resident parents to contribute to the costs of raising their children when more of the money paid reaches the children. Relatedly, a higher level of child support debt results in fathers being less likely to work (Cancian et al. 2013).

Outside of the United States, there is far less evidence on the effect of child support payments. Walker and Zhu (2006) find that a higher level of child support in the United Kingdom is associated with reduced dissolution risk amongst intact couples. Using Danish register data and exploiting discontinuities in child support guidelines, Rossin-Slater and Wüst (2015) find that higher child support payments cause lower labour force participation from fathers, and higher new-partner fertility.

Whilst there is a body of Australian research considering child support, much of this is descriptive or qualitative (Cook et al. 2011). The most relevant study for this analysis is Taylor and Gray (2010), who use data from the Longitudinal Study of Australian Children (LSAC) and show no significant relationship between child support receipt and labour force participation but some evidence of high levels of child support being associated with working fewer hours. More broadly, Walter et al. (2010) use one wave of HILDA data and show that receiving more child support is associated with better housing conditions, and, based on in-depth interviews with parents who receive child support, Natalier (2012) discusses that the unreliability of child support payments means that lone mothers rarely see child support as contributing to their housing costs. Whilst this body of descriptive and correlational research gives background information about the state of child support in Australia, no empirical studies have acknowledged and attempted to correct for the potential endogeneity of the amount of child support received and the outcome in question. This study therefore contributes to an important expansion of the understanding of the effects of child support outside of the United States, particularly in regimes with a more generous welfare system, as well as providing the first causal analysis of the labour market effects of child support in Australia.

3   Child support in Australia

Before 1988, child support in Australia was determined by the courts. In 1988 and 1999, legislation was introduced to transfer responsibility for the calculation of child support amounts and for the enforcement and collection of child support to the newly estab-

lished Child Support Agency (CSA).[3] The legislation addressed concerns that the level of court-ordered child maintenance was insufficient and that collection and enforcement were ineffective (Department of Social Services 2013). This was related to a growing concern about the feminization of poverty in Australia driven by the poor circumstances of lone parents, and the resultant burden on goverement finances (Cook et al. 2011).

The level of child support payable is determined by an administrative formula, with the payer's transfer being determined by their income, the proportion of that income they would be deemed to contribute to the costs of raising their children in an intact relationship, an allowance for their self-support, and the payee's income above a disregard level. The initial scheme remained in place without substantial changes until 2006 when, in response to the findings of the Ministerial Taskforce on Child Support, a series of reforms were implemented over a three year period. The reforms incorporated four ideas: the equal treatment of income from both parents; a more accurate reflection of the costs of raising children; recognition of contributions through care and contact; and equal treatment of second families (Department of Social Services 2013). This was achieved by recognising in-kind payments (for example payment of school fees), reducing the maximum and increasing the minimum child support payment, increased efforts to collect and enforce payments, and a new formula.

The new formula was constructed to treat income from both parents equally and to allocate the costs of raising children according to the proportion of care provided. Moreover, the proportion of income assumed to be allocated to raising children was changed from a fixed percentage, regardless of income level and age of children, to a proportion that declines as the relevant combined income increases and increases with the age of the children (Smyth and Henman 2010). As the formula changed along a number of dimensions, this did not result in an unambiguous gain or loss for either paying or receiving parents. Smyth and Henman (2010) show that, assuming no changes in behaviour, 49% of receiving parents were expected to receive less child support under the new formula, whilst 37% were expected to receive more. Amongst paying parents, 51% were expected to pay less, and 33% to pay more.

There is no requirement for separated parents to seek an administrative assessment of child support liability under the Scheme, and private agreements can be made and enforced at levels above or below the formula amount. However, those in receipt of more than the base level of Family Tax Benefit (FTB) Part A are required to "take reasonable action to obtain child support". Lodging an application for assessment under the child support formula and implementing at least the assessed child support transfer

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[3]The Child Support Agency functions were incorporated into the Department for Human Services (DHS) in 2011.

either privately or via the CSA satisfies this requirement (Commonwealth of Australia 2009). This provides strong encouragement for the majority of receiving parents to engage with the Child Support Scheme: in 2003, the CSA estimated that 85-90% of potentially eligible separated parents make use of the Scheme (Standing Committee on Family and Community Affairs 2003). Of those separated parents managing their cases through the CSA in 2008-09, 87% used the formula amount (Commonwealth of Australia 2009).

Once an amount has been set, parents can opt to make transfers privately (Private Collect) or to use the Child Support Collect system. Under Child Support Collect, the paying parent transfers funds to the CSA, which are then passed on to the receiving parent. In the event that the paying parent does not make the transfer, the CSA has the power to garnish wages and government transfer payments. If a debt accumulates, the CSA can also garnish tax refunds, undertake litigation, and apply for Departure Prohibition Orders. In 2011-12, 46% of child support cases used the Child Support Collect system, with $1.31 billion transferred.

A child support assessment is valid for a maximum of 15 months, after which it is reassessed based on the latest tax return information available. Either parent can also apply for a variation in the child support assessment at any time; the majority of such applications are due to changes in the income or earning capacity of one of the parents (Commonwealth of Australia 2009).

The main interaction of child support with the welfare system is through FTB Part A and the Maintenance Income Test. FTB Part A is a payment per child per fortnight. As of 2014-15, the base level (payable to all parents) was $56.70 per child, with a maximum of $230.02 for a child aged over 13. The maximum rate was received by those with family taxable income below $50,151. As mentioned above, separated parents must demonstrate reasonable action to obtain child support to be entitled to a payment above the base level: with the median income of receiving parents in the child support system being under $27,000 in 2008-09, the majority of lone parents have an incentive to apply for a child support assessment. The Maintenance Income Test means that parents can receive up to at least $1522.05 per year in child support without any effect on their FTB Part A payment;[4] above this, child support reduces FTB Part A by 50 cents in the dollar until the base rate of FTB Part A is reached.

When parents opt for Private Collect, the maintenance income test is implemented assuming that the child support amount is paid in full. In contrast, if Child Support Collect is used, the actual amount of child support transferred is used for the maintenance income test: this creates an incentive for women with higher FTB eligibility (and less

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[4]This amount increases by $507.35 for each additional Child Support child.

reliable payers) to opt for Child Support Collect instead of Private Collect.

Note that child support recipients are likely to be eligible for a number of further government transfers. In 2008-09, 41% of receiving parents were also receiving Parenting Payment ($720.30 per fortnight). These additional payments are not affected by the amount of child support received (although they are included in the parent's income for the purposes of calculating the relevant child support payment).

4 Child support and government transfers: theoretical predictions

In the absence of a welfare system that in some way accounts for child support received, a mother should respond to receiving child support with a pure income effect. In a standard labour supply framework, this suggests that labour supply should not increase: instead, consumption and leisure should increase. This explains the common expectation that mothers receiving child support are less likely to be in employment. However, when child support receipt interacts with the welfare system (effectively taxing the child support received), the expected labour supply effects depend on how much of the child support is taxed away. Figure 1 illustrates how the budget constraint may change and how that can affect labour supply.[5]

In all panels of figure 1, the pre-child support budget constraint is $OGBX$, reflecting an out of work transfer of OG which is withdrawn as earnings increase up to point B where all of the benefits have been withdrawn. Panel (a) then assumes that all child support (OC) passes directly to the receiving parent, shifting the entire budget constraint upwards to $OAB'Y$. In this case, any parent choosing the corner solution at point G (ie. not working) before receiving child support will remain out of the labour force after receiving child support, choosing point A. No parent would enter the labour force, and no parent would increase hours worked, as a result of receiving child support.

Panel (c) instead illustrates a system that does not pass through any child support: there is an effective tax rate of 100% up to the point that all welfare benefits have been withdrawn. The budget constraint when receiving OC of child support is then $OGB'''Y$. As all of the child support received by a non-working parent is taxed away, there is no income effect for those who are out of the labour market. Some non-working parents can become better off by entering the labour market, choosing point Z. So in this case the

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[5]These diagrams are an extension of Hu (1999) which illustrates the 100% effective tax rate scenario given in panel (c).

Figure 1: Labour supply effects of child support receipt for different pass through amounts
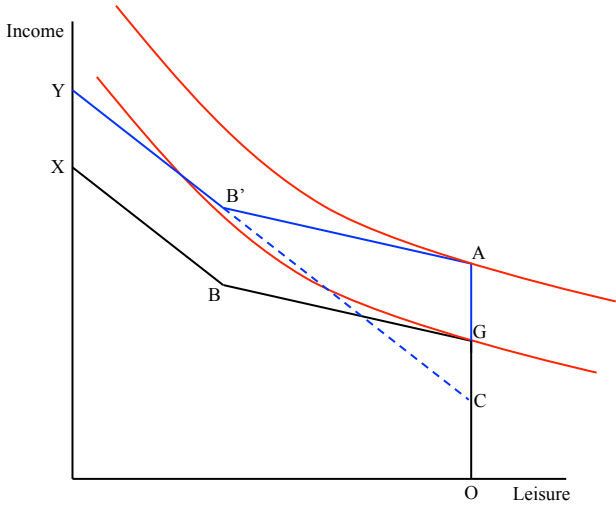
(a)
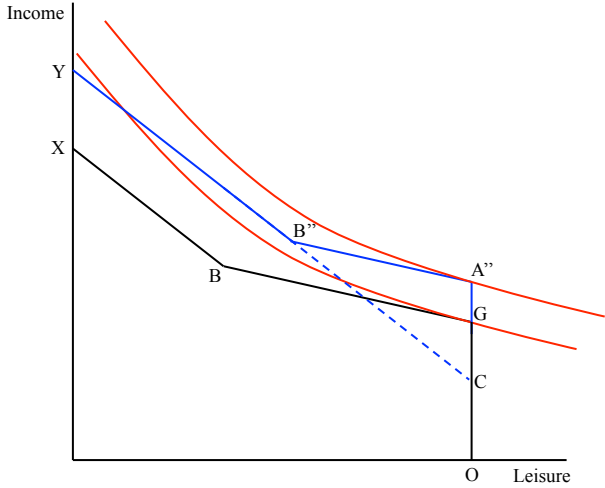
(b)
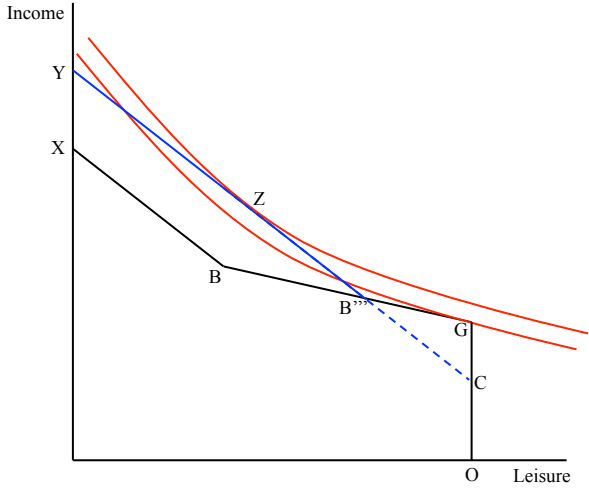
(c)

receipt of child support actually induces labour force participation, and the receipt of a higher level of child support would make this more likely.

Panel (b) shows an intermediate case: an effective tax rate of 50% on the amount of child support received. The budget constraint becomes $OA'B''Y$. In this case, a parent with the wage rate and preferences illustrated will not enter the labour market. As the effective tax rate falls, the parent is less likely to enter the labour market.

In all cases, a parent who is working before the receipt of child support will never increase their hours worked: all aggregate labour supply responses predicted by this standard model operate at the extensive margin.

The Australian welfare and child support system passes through a portion of child support regardless of transfers received, withdrawing transfers in excess of the maintenance income threshold at a rate of 50%. In comparison to the United States, this is a high level of pass through, and so we might expect that labour supply participation responses to receiving child support would be smaller in Australia than in the United States.

5   Data

Data is drawn from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. This is a longitudinal survey with a broad social and economic scope, with the first wave collection taking place in 2001 and interviewing 7,682 households. All members of these original households are classed as Continuing Sample Members (CSMs) and eligible to be followed. In addition, any children born to a CSM become a CSM. Adult CSMs are interviewed annually, giving detailed information on income, labour force participation and household structure.[6]

Each wave respondents are asked a bank of questions regarding a respondent's biological and adoptive children regardless of coresidence. Where those children are aged under 24, information is sought regarding the location of the other parent and about any financial support paid or received for the child (including in-kind support).[7] For the youngest child with a parent living elsewhere information is also collected about how much time the child spends with the other parent, and (from wave 3 onwards) the employment status of the other parent. It is, however, not possible to link the child support reported to the

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[6]For further information about HILDA see Summerfield et al. (2014).

[7]In addition, the amount of child support and/or spousal maintenance is requested alongside other sources of income. Since this amount includes spousal maintenance I choose to use the variable derived from payments specifically related to child expenses. Results using the measure including spousal maintenance are consistent with those presented below.

child: if the parent is receiving child support from multiple fathers, only the total amount received is observed.

My estimation sample consists of women who have a child living with them for at least 50% of the year where the child's other parent lives elsewhere. Due to my identification strategy (outlined below), the respondent must also report the employment status of the non-resident parent in the previous wave, limiting my sample observations to wave four and later. After dropping observations with missing data, I have a sample of 867 women, with 3123 total observations. 50% of these women are first seen in the survey where they already have a resident child with a parent living elsewhere: in these cases there is no further information about the parent living elsewhere except for that reported by the respondent.

The outcome variables I examine are the amount of government transfer payments, market income and gross income received by the household in which the mother lives. I also examine binary variables indicating if the mother is employed, or is not in the labour force, and the number of hours worked per week.

Unfortunately there is relatively little information about the children with separated parents. Unlike other comparable surveys, HILDA only collects detailed information about those aged 15 and older. This limits the range of outcomes I can examine. In addition, the children with parents elsewhere and relationship history information of the responding parent are not linked to each other. The former relationship status and amount of time passed since relationship breakdown are therefore not certain. HILDA collects complete marital histories, so it is possible to infer whether the youngest child with a parent living elsewhere was born in a year in which the mother was married or in the year immediately following separation. If this is the case, I assume that the reported marriage is between the child's biological parents. Information about de facto relationships prior to 2001 is less complete: the first and the most recent (excluding an ongoing relationship) are reported. Again, if the youngest child with a parent living elsewhere was born in a calendar year in which the mother was in a de facto relationship or the year immediately following relationship breakdown, I assume that the child's parents were in a de facto relationship. Where the youngest relevant child's birth year cannot be placed in either a marriage or reported de facto relationship I assume that the child's parents were never in a cohabiting relationship.[8] The reported year of relationship breakdown, or the year of the child's birth, is then used to estimate the number of years since relationship breakdown.

Further important control variables for my empirical strategy are indicators for whether

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[8]This will misclassify some de facto parents as no relationship parents – however, characteristics of the de facto and no relationship mothers are similar, with similar coefficients on both de facto and no relationship indicators in the analysis below.

the mother worked before the birth of the youngest child with a parent living elsewhere, and whether formal maternity leave was taken. These questions are asked only in waves 5, 8 and 11. These responses are linked to the youngest relevant child in that wave, and distributed across other observations for the same relevant child.

Table 1 gives summary statistics for my estimation sample. 60% of the sample receive some child support, with the average amount received (conditional on receiving any) $5,120. The average number of relevant children is 1.68, with the youngest Child Support child being 9.5 years old, and 57% of mothers were once married to the father of the youngest CS child. The sample of mothers is aged 39 on average, and was 25 at first birth. 56% of the women worked before the birth of their youngest CS child, with 18% taking formal maternity leave. This sample has broadly similar characteristics to the population of Child Support Agency cases in 2008-09 (the median observation is from wave 9, collected in 2009), most notably with respect to the taxable income of child support recipients. Mean personal private income (excluding any income from government transfers) in the sample is $21,376 (in 2001 Australian dollars), with the CSA population average at $21,626. Median private income in the sample is $24,959 compared to $26,095 for the population (Commonwealth of Australia 2009). The 2008-09 population average annual liability was $3,343, compared to $3,061 in the sample, representing the amount of child support received rather than the child support due.[9]

The table also sets out the summary statistics by whether the woman reports receiving some child support or not. Mothers in these categories are similar along a number of dimensions: there is no significant difference in education and the propensity to be out of the labour force or to repartner. There is also no significant difference in the distance from the non-resident father or their prior relationship status. On the other hand, mothers not receiving any child support have less and older CS children on average, and have former partners who are less likely to be working full time. They are also more likely to be born outside of Australia and less likely to have worked before the birth of their youngest CS child. They are more likely to be working full time and receive less government transfers. These raw statistics provide an indication that receiving child support is associated with a lower probability of working full time and higher government transfer receipts. However, these raw differences do not account for the fact that working full time (and so having higher market income) can lead to receiving less child support, and that women receiving a higher level of FTB have a greater incentive to use the administrative system to collect their child support, perhaps leading to the receipt of a higher proportion of awarded child support.

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[9]Moreover the geographical distribution by state is similar to that reported for the population of CSA cases.

Table 1: Summary statistics

	All		Some CS		No CS	
	Mean	sd.	Mean	sd.	Mean	sd.
Receives some child support	0.60	0.49	1	0	0	0
Amount of child support ($000)	3.06	5.03	5.12	5.64	0	0
Number of CS children	1.68	0.86	1.74	0.89	1.59	0.81
Age of youngest CS child	9.53	4.61	9.28	4.62	9.92	4.58
Worked before birth	0.56	0.50	0.57	0.49	0.53	0.50
Took maternity leave	0.18	0.38	0.19	0.39	0.16	0.37
Distance from father						
<10km	0.32	0.47	0.31	0.46	0.33	0.47
10-50km	0.33	0.47	0.34	0.47	0.32	0.47
>50km	0.35	0.48	0.35	0.48	0.34	0.47
Prior relationship status with father						
Married	0.57	0.49	0.58	0.49	0.56	0.50
De facto	0.22	0.41	0.22	0.41	0.22	0.42
No relationship	0.21	0.41	0.21	0.40	0.22	0.41
Lagged father's employment status						
Employed full time	0.74	0.44	0.80	0.40	0.65	0.48
Employed part time	0.08	0.27	0.06	0.25	0.10	0.30
Unemployed	0.06	0.24	0.05	0.22	0.08	0.28
Not in labour force	0.11	0.32	0.08	0.28	0.16	0.37
Not working	0.18	0.38	0.14	0.34	0.24	0.43
Years since breakdown	6.57	4.16	6.46	4.05	6.75	4.31
Age	39.32	8.83	38.56	8.31	40.45	9.45
Age at first birth	24.87	5.55	24.93	5.56	24.79	5.54
Number of resident children	1.87	0.98	1.95	1.01	1.76	0.92
Current partner	0.34	0.47	0.34	0.47	0.35	0.48
Country of birth						
Australia	0.84	0.36	0.87	0.34	0.81	0.39
Overseas (English speaking)	0.09	0.28	0.07	0.26	0.11	0.31
Overseas (other)	0.07	0.26	0.06	0.24	0.08	0.28
Education						
Less than year 12	0.32	0.47	0.32	0.47	0.32	0.47
Year 12	0.13	0.34	0.14	0.34	0.13	0.34
Further education	0.35	0.48	0.35	0.48	0.33	0.47
Higher education	0.20	0.40	0.19	0.39	0.22	0.41
Employment status						
Not in labour force	0.27	0.45	0.28	0.45	0.27	0.45
Full time	0.33	0.47	0.30	0.46	0.37	0.48
Part time	0.35	0.48	0.37	0.48	0.31	0.46
Hours worked	21.21	18.22	20.54	17.76	22.22	18.85
Household income sources						
Government transfers ($000)	13.66	10.88	13.97	10.68	13.20	11.18
Market income ($000)	45.02	49.62	44.35	49.45	46.00	49.88
Gross income ($000)	62.22	44.68	63.86	44.62	59.79	44.67
Observations	3123		1868		1255	
Individuals	867		496		615	

6   Empirical strategy

The aim of this paper is to estimate the effect of receiving a higher level of child support on women's household income, labour force participation, and household consumption patterns. The baseline model estimated is as follows:

$$Y_i = \theta CS_i + \beta X_i + e_i \tag{1}$$

where Y_i is the outcome of interest, CS_i is either an indicator for the receipt of any child support or the reported amount of child support received, X_i is a vector of individual characteristics of the mother and ε_i is an error term which is clustered at the individual level. I include a set of wave, state and remoteness area indicators.

Estimating this model with OLS would provide an unbiased and consistent causal estimate of the effect of additional child support on the outcome if the receipt of child support (CS_i) is independent of and uncorrelated with the error term. Since it is likely that, for example, more highly educated mothers receive less government transfers on average, have higher income former partners and so receive more child support, it is important to include these observable characteristics in the vector of control variables X_i. This will reduce the correlation between child support receipt and the error term, reducing the likelihood of an inconsistent estimate.

It is likely that controlling for observable characteristics is not sufficient to eliminate this correlation. There may be unobservable characteristics that affect both child support receipt and labour market and consumption decisions. Reverse causality is also present for two reasons: after the 2006-08 reforms, as a mother's income increases, the amount of child support she receives will fall due to the child support formula. Second, mothers receiving more than the base level of FTB are required to have an administrative child support assessment. The mother is also encouraged to use the Child Support Collect system so that any underpayment of child support is accounted for in the calculation of FTB. This might lead to a positive correlation between child support received and government transfers received. Failing to account for these mechanisms will produce an inconsistent estimate of θ. In the case of the receipt of government transfers, θ will be higher than the true casual estimate, whereas for labour income it will be lower.

A further concern is that the care of the child support child is determined partly by details of the benefits system. For example, post-2008 a non-resident parent can claim a share of Family Tax Benefit if they care for the child for at least 35% of the time. However, survey evidence suggests that these welfare system details are not widely known amongst

this population, and indeed relevant parents who believe they understand the interaction of child support, care, and the welfare system, in fact do not (Smyth et al. 2012). I therefore treat the mother's proportion of care as independently determined (conditional on individual characteristics).

To avoid the bias driven from reverse causality, I adopt an instrumental variables (IV) approach. A valid instrument is correlated with the endogenous variable (the amount of child support received), but is uncorrelated with the error term in equation 1 above: the only way in which it affects the outcome, conditional on individual characteristics X_i, is through the endogenous variable. If we assume that mothers make their labour market and consumption decisions independently of those of the non-resident parent, then the lagged employment status of the non-resident parent is a candidate instrument. As the non-resident parent's employment status changes, the amount of child support received by the mother will also change at the next reassessment. Hence, when father becomes unemployed or withdraws from the labour force more broadly, the child support received by the mother is expected to fall in the future – and not due to any behaviour change or characteristic of the mother. The strength of this relationship can be tested, and it is shown below that lagged father's employment status is a strong predictor of receiving any child support, and the amount of child support received.

The second assumption needed for this IV approach to be valid is that lagged father's employment status is uncorrelated with the error term in equation 1 above. There are a number of concerns about this assumption. Most importantly, the father's characteristics are likely to be correlated with those of the mother. First, positive assortative matching means that a child's father's employment status will be correlated with their mother's employment status, as individual characteristics including age and education are correlated. It is therefore important to control for these individual characteristics. Whilst my data do not allow me to control for the characteristics of the father, I am able to control for the mother's characteristics, which, via assortative matching, will capture the father's characteristics. Second, the mother and father may be located in the same local area, and so be subject to the same local labour markets. Including state unemployment and participation rates by gender as control variables contributes some confidence that this does not violate the excludability assumption. I also include a set of indicators for the decile of the Index of Economic Resources of the local area: this is an indicator constructed by the Australian Bureau of Statistics to capture financial aspects of relative socio-economic advantage and disadvantage in local areas containing 200-800 people. The crucial assumption is that, conditional on the vector X_i, father's employment status is unrelated to the outcome variable except via its effect on child support receipt. Section 8 presents results that relax this assumption.

I implement the IV approach using two stage least squares. The first stage estimation involves estimating the probability of receiving child support, and the level of reported child support:

$$CS_i = \gamma ES_i^f + \delta X_i + \eta_i \tag{2}$$

The second stage then takes the predicted value of CS_i from the first stage and uses them in place of the reported level: this is the relevant child support variable purged of the component that is correlated with the error term.

$$Y_i = \theta' \widehat{CS}_i + \sigma X_i + \varepsilon_i \tag{3}$$

In all cases, standard errors are clustered at the individual level to account for multiple observations per mother.

7 Results

7.1 Determining the level of child support

Columns 1 and 3 of table 2 shows results of the estimation of the first stage of the IV specification (equation 2) for the binary variable of receiving any child support, and the continuous variable of the amount of child support received (when positive). The first row shows the instrument: a binary variable equal to one if the non-resident father was not employed at the previous survey. The probability of receiving any child support is 16.4 percentage points lower if the father was not working, and conditional on receiving some child support, an out of work father pays \$3,008 less per year than a father working full or part time. In this full sample, the out of work variable is statistically significant with an F-statistic of 28.3 in the binary regression and 66.3 in the level regression. These F-statistics are sufficiently high to suggest no weak instrument problem. More broadly, child support is more likely to be received and is higher when the mother has more children eligible for child support, when the mother has primary or above primary care (70-100% of the time) and where the parents were once married. When the mother was born in Australia, has a higher age at first birth, moved out of home when aged 20 or over, and does not live in a very remote area, child support receipt is higher.

Columns 2, 3, 5 and 6 introduce a number of additional regressors that are not included

Table 2: Predicting child support receipt: first stage regressions

	Any child support			Amount of child support, $000		
	All	Pre-2008	2008 on	All	Pre-2008	2008 on
	(1)	(2)	(3)	(4)	(5)	(6)
Father not employed last period	-0.164*	-0.134*	-0.170*	-3.008*	-3.473*	-3.090*
	(0.031)	(0.044)	(0.038)	(0.369)	(0.477)	(0.486)
Number of CS children	0.028	0.085	-0.028	1.640*	0.604	1.792*
	(0.031)	(0.053)	(0.038)	(0.421)	(0.553)	(0.510)
Age youngest CS child	-0.000	0.004	-0.000	0.211$^+$	0.289*	0.253$^+$
	(0.007)	(0.009)	(0.008)	(0.126)	(0.138)	(0.149)
Proportion of care category						
Primary	0.255*	0.367*	0.213*	1.392*	2.948*	0.781
	(0.044)	(0.068)	(0.050)	(0.566)	(0.772)	(0.566)
Above primary	0.224*	0.331*	0.182*	0.766	1.385$^+$	0.658
	(0.045)	(0.069)	(0.050)	(0.571)	(0.715)	(0.579)
Former relationship status (with father of youngest CS child)						
De facto	-0.045	-0.078	-0.029	-1.236*	-1.184*	-1.603*
	(0.038)	(0.051)	(0.046)	(0.474)	(0.592)	(0.512)
No relationship	-0.047	-0.122*	-0.023	-0.794	-0.772	-1.413*
	(0.041)	(0.054)	(0.050)	(0.623)	(0.711)	(0.697)
Years since breakdown	0.007	0.004	0.009	-0.186*	-0.204*	-0.151
	(0.005)	(0.007)	(0.006)	(0.087)	(0.098)	(0.108)
Worked before birth	0.033	0.069	0.037	-0.236	0.563	0.007
	(0.031)	(0.043)	(0.037)	(0.457)	(0.671)	(0.495)
Formal maternity leave	0.020	0.022	0.079	-0.405	-0.450	0.277
	(0.041)	(0.054)	(0.048)	(0.614)	(0.824)	(0.738)
New partner		-0.024	-0.091*		-1.933*	-1.130*
		(0.042)	(0.038)		(0.542)	(0.475)
Labour income ($000)		-0.001	-0.002*		-0.015	-0.033$^+$
		(0.001)	(0.001)		(0.018)	(0.017)
Mother's employment status						
Part time		0.030	0.058		0.816	0.600
		(0.049)	(0.037)		(0.581)	(0.450)
Unemployed		0.094	-0.095		-0.031	0.049
		(0.080)	(0.067)		(0.798)	(0.696)
Not in LF (marginal)		-0.013	0.015		0.450	0.674
		(0.068)	(0.058)		(0.849)	(0.632)
Not in LF		0.001	-0.022		-0.362	2.322*
		(0.063)	(0.055)		(0.823)	(0.685)
Observations	3123	1198	1925	1868	724	1144
Individuals	867	496	679	615	347	459

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls: age, age squared, total number of children in mother's household, mother's education, age at first birth, age left home, indicator for parents ever divorced, distance from father, state unemployment and participation rates by sex, wave indicators, state indicators, remoteness area indicators, indicators for decile of Index of Economic Resources of local area

in the subsequent analysis, but which highlight the effect of the 2006-08 reforms. Columns 2 and 5 restrict attention to observations before 2008, and columns 3 and 6 to observations from 2008 onwards when the new formula was introduced. In the later time period, a higher level of labour income is associated with a lower level of child support receipt, which is consistent with the inclusion of recipient income in the child support formula. In addition, being out of the labour force is associated with a higher level of child support in the later period. This is evidence of the direct effects of the change in the child support formula – that is the inclusion of the resident parent's income in the formula – on the level of child support.

7.2   Household income sources

I first examine the effect of the amount of child support on household income, considering government transfer income, market income (including business and labour income) and gross household income. To complement these continuous measures, I also examine binary outcome variables for employment status (not in the labour force, employed, employed full time and employed part time), as well as the number of hours worked. Results are also presented for different time periods, different educational groups, different care levels and the presence of a new partner.

Tables 3 to 5 show the results for the components of household income examined for a number of different specifications. Columns 1-4 in each table present results for a binary indicator of the receipt of any positive amount of child support, with columns 5-8 presenting results for the continuous measure of child support conditional on any receipt. Columns 1 and 5 show results for the base OLS specification (not accounting for the anticipated endogeneity of child support and household income variables), controlling for the observable characteristics of the mother, the proportion of time the mother cares for the child and a set of time indicators. Columns 2 and 6 add a set of location indicators (state, remoteness area and area decile of socioeconomic disadvantage), male and female state unemployment and participation rates, indicators for the mother's employment status and maternity leave before/at the birth of the youngest Child Support child, an indicator for whether the parents were ever married and the number of years since the relationship broke down. These additional variables proxy for the unobserved characteristics of the child's father and the parental relationship before breakdown. Columns 3, 4, 7 and 8 present comparable instrumental variables results using the lag of the father's employment status as the instrument for the receipt of any child support or the amount of child support received.

Table 3: Effect of child support receipt on level of government transfers received

| | Receives any child support | | | | Level of child support received ($000) | | | |
| | OLS | | IV | | OLS | | IV | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child support	-0.244	0.385	-17.231*	-8.503*	-0.051	0.028	-0.868*	-0.449+
	(0.478)	(0.410)	(4.204)	(3.670)	(0.052)	(0.045)	(0.226)	(0.254)
No. of CS children	3.691*	2.673*	4.139*	2.999*	3.841*	2.694*	5.396*	3.527*
	(0.736)	(0.610)	(0.945)	(0.704)	(0.854)	(0.754)	(1.050)	(0.907)
Age youngest CS child	-0.389*	-0.242+	-0.350*	-0.222	-0.411*	-0.174	-0.359*	-0.054
	(0.110)	(0.124)	(0.140)	(0.140)	(0.154)	(0.161)	(0.173)	(0.182)
Proportion of care category								
Primary	2.531*	1.911*	6.809*	4.163*	2.217+	1.687+	3.180*	2.381*
	(0.896)	(0.717)	(1.539)	(1.277)	(1.169)	(0.865)	(1.359)	(0.977)
Above primary	2.885*	2.219*	6.197*	4.090*	2.595*	2.062*	2.779*	2.348*
	(0.885)	(0.695)	(1.386)	(1.164)	(1.181)	(0.871)	(1.347)	(0.927)
Years since breakdown		-0.223*		-0.174+		-0.279*		-0.381*
		(0.090)		(0.105)		(0.124)		(0.145)
Worked before birth		-3.642*		-3.216*		-2.892*		-2.866*
		(0.635)		(0.724)		(0.794)		(0.830)
Maternity leave		-2.368*		-2.150*		-2.635*		-2.763*
		(0.614)		(0.749)		(0.770)		(0.830)
Former relationship status (with father of youngest CS child)								
De facto		1.356+		0.905		1.741*		1.101
		(0.698)		(0.803)		(0.867)		(0.987)
No relationship		2.314*		1.783+		3.874*		3.456*
		(0.827)		(0.995)		(1.072)		(1.160)
Wave indicators	✔	✔	✔	✔	✔	✔	✔	✔
State indicators		✔		✔		✔		✔
Remoteness indicators		✔		✔		✔		✔
Unemployment rates		✔		✔		✔		✔
IER decile		✔		✔		✔		✔
Observations	3123	3123	3123	3123	1868	1868	1868	1868
Individuals	867	867	867	867	615	615	615	615
F statistic			34.912	28.326			100.026	66.289

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls (columns 1, 3, 5 and 7): age, age squared, total number of children in mother's household, mother's education, country of birth. Columns 2, 4, 6 and 8 also control for: age at first birth , age left home, indicator for parents ever divorced, distance from father.

Table 3 shows results for the amount of government transfers received. The first four columns show OLS and IV results for the effect of receiving any child support on the level of transfers received. OLS estimates are imprecise and do not reveal a correlation between receiving some child support and the amount of government transfers received, even with a rich set of controls. Columns 3 and 4 show comparable IV estimates: receiving any child support leads to a reduction in the amount of government transfers received. Using the full set of control variables which account for the common environment of the mother and father reduces the magnitude of this effect, suggesting that receiving any child support leads to receiving $8,503 less in government transfers, with the average level of receipt in the sample at $13,660. Columns 5-8 show estimates for the effect of the amount of child support received, conditional on receiving any child support. Again, the OLS estimates show no significant effect of the amount of child support received, but the IV estimates show a statistically significant negative effect: for every dollar of child support received (conditional on receiving any child support), government transfers fall by 45 cents. The reduction in government transfer receipt at the extensive and intensive margin of child support receipt reflects two mechanisms: first, the mechanical reduction in FTB (50 cents in the dollar for child support in excess of $1500), and second the changes in behaviour described in section 7.3 below.

Table 4 presents similar results for the amount of household market income. This includes income from labour, business, investments and private pensions. OLS results show little relationship between receiving any child support and market income, but conditional on receipt, higher levels of child support are negatively correlated with market income: this reflects the concern that child support has an income effect, discouraging labour supply and reducing market income for receiving parents. Controlling for the mother's work history is important for finding this negative correlation as it strongly predicts current employment status and market income, and mothers who worked before the birth of the child have, on average, more child support. IV estimates, on the other hand, suggest that the receipt of child support increases the amount of household market income. With a full set of controls, receiving any child support is associated with an increase in household income of $43,329 (with average market income in the sample at $45,020). On the intensive margin, an extra dollar of child support receipt leads to an additional $2.62 of household market income.

The effect on gross household income is shown in table 5. With no behavioural changes, a one for one increase in household income would be expected, and receiving any child support would be associated with an increase equal to the average amount of child support received. However, changes in labour market participation and benefit receipt will affect the overall level of household income, as well as any changes in living arrangements. Table

Table 4: Effect of child support receipt on level of household market income

| | Receives any child support | | | | Level of child support received ($000) | | | |
| | OLS | | IV | | OLS | | IV | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child support	0.160	-2.720	85.654*	43.329*	-0.158	-0.562*	4.709*	2.617*
	(2.413)	(1.988)	(19.411)	(15.226)	(0.269)	(0.261)	(0.992)	(0.994)
No. of CS children	-13.880*	-8.701*	-16.138*	-10.389*	-11.048*	-5.396+	-20.309*	-10.940*
	(3.339)	(2.799)	(4.714)	(3.425)	(3.623)	(3.195)	(4.829)	(3.897)
Age youngest CS child	2.460*	0.866	2.264*	0.761	3.435*	1.661*	3.123*	0.865
	(0.515)	(0.571)	(0.689)	(0.675)	(0.621)	(0.715)	(0.790)	(0.878)
Proportion of care category								
Primary	-5.901	-2.885	-27.433*	-14.548*	-4.274	-1.863	-10.007	-6.482
	(4.672)	(3.848)	(7.588)	(5.957)	(6.026)	(4.335)	(7.035)	(4.778)
Above primary	-7.086	-4.059	-23.752*	-13.751*	-4.973	-2.127	-6.067	-4.025
	(4.678)	(3.895)	(6.992)	(5.607)	(6.177)	(4.696)	(7.028)	(4.819)
Years since breakdown		1.773*		1.518*		1.831*		2.511*
		(0.472)		(0.528)		(0.594)		(0.720)
Worked before birth		17.347*		15.141*		17.353*		17.178*
		(3.200)		(3.459)		(4.059)		(4.245)
Maternity leave		6.917+		5.791		2.249		3.102
		(4.133)		(4.733)		(4.574)		(4.975)
Former relationship status (with father of youngest CS child)								
De facto		-1.855		0.483		-9.042+		-4.781
		(4.623)		(5.265)		(5.115)		(5.789)
No relationship		-12.386*		-9.632*		-17.452*		-14.671*
		(3.767)		(4.498)		(4.418)		(5.269)
Wave indicators	✔	✔	✔	✔	✔	✔	✔	✔
State indicators		✔		✔		✔		✔
Remoteness indicators		✔		✔		✔		✔
Unemployment rates		✔		✔		✔		✔
IER decile		✔		✔		✔		✔
Observations	3123	3123	3123	3123	1868	1868	1868	1868
Individuals	867	867	867	867	615	615	615	615
F statistic			34.912	28.326			100.026	66.289

Standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$

Other controls (columns 1, 3, 5 and 7): age, age squared, total number of children in mother's household, mother's education, country of birth. Columns 2, 4, 6 and 8 also control for: age at first birth , age left home, indicator for parents ever divorced, distance from father.

Table 5: Effect of child support receipt on level of household income

| | Receives any child support | | | | Level of child support received ($000) | | | |
| | OLS | | IV | | OLS | | IV | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child support	4.817*	2.435	83.880*	48.923*	0.860*	0.498*	4.827*	3.050*
	(2.152)	(1.806)	(17.930)	(14.552)	(0.223)	(0.231)	(0.856)	(0.869)
No. of CS children	-8.756*	-4.594+	-10.844*	-6.298*	-7.100*	-2.732	-14.648*	-7.182*
	(2.841)	(2.451)	(4.196)	(3.114)	(2.980)	(2.723)	(3.978)	(3.281)
Age youngest CS child	2.191*	0.894+	2.010*	0.788	3.141*	1.614*	2.887*	0.974
	(0.459)	(0.509)	(0.616)	(0.608)	(0.533)	(0.630)	(0.653)	(0.736)
Proportion of care category								
Primary	-2.027	0.513	-21.939*	-11.262*	-1.281	0.584	-5.954	-3.123
	(4.089)	(3.464)	(6.894)	(5.557)	(5.227)	(3.940)	(5.968)	(4.201)
Above primary	-3.843	-1.327	-19.256*	-11.112*	-1.973	0.320	-2.864	-1.204
	(4.088)	(3.554)	(6.375)	(5.309)	(5.337)	(4.316)	(5.950)	(4.313)
Years since breakdown		1.385*		1.126*		1.491*		2.037*
		(0.424)		(0.481)		(0.536)		(0.626)
Worked before birth		13.834*		11.607*		14.615*		14.474*
		(2.857)		(3.120)		(3.663)		(3.768)
Maternity leave		4.780		3.643		0.353		1.038
		(3.723)		(4.315)		(4.099)		(4.334)
Former relationship status (with father of youngest CS child)								
De facto		-1.225		1.136		-6.993		-3.574
		(4.225)		(4.924)		(4.605)		(5.144)
No relationship		-10.844*		-8.063*		-13.519*		-11.287*
		(3.338)		(4.088)		(3.875)		(4.521)
Wave indicators	✔	✔	✔	✔	✔	✔	✔	✔
State indicators		✔		✔		✔		✔
Remoteness indicators		✔		✔		✔		✔
Unemployment rates		✔		✔		✔		✔
IER decile		✔		✔		✔		✔
Observations	3123	3123	3123	3123	1868	1868	1868	1868
Individuals	867	867	867	867	615	615	615	615
F statistic			34.912	28.326			100.026	66.289

Standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$

Other controls (columns 1, 3, 5 and 7): age, age squared, total number of children in mother's household, mother's education, country of birth. Columns 2, 4, 6 and 8 also control for: age at first birth , age left home, indicator for parents ever divorced, distance from father.

5 shows results for the absolute level of household income. OLS results are consistent with household income increasing by the average amount of child support received if child support is received, and with one dollar of child support leading to a one dollar increase in household income. The IV results, however, reject this hypothesis, finding that household income increases by more than what would be expected in the absence of behavioural changes. With the full set of controls, receiving any child support leads to household income increasing by $48,923, reflecting the $5,120 of child support payments alongside the reduction in government transfer receipt and increase in market income.[10] Each dollar of child support received is associated with an increase in household income of $3.05, significantly greater than one.

These results for household income suggest that receiving any child support reduces reliance on government transfers and increases the market income of payee mothers, and conditional on receiving any child support, as the amount increases household market income increases and gross income increases by more than the amount of child support received.

7.3 Labour market activity

Table 6 shows results for a number of measures of labour market activity. In all cases, the full set of control variables are included. OLS and IV estimates are presented. The first four lines of the table show the effects of any child support receipt and conditional-on-positive levels of child support received on binary indicators for being not in the labour force, employed, employed full time, and employed part time. OLS estimates suggest that receiving any child support is associated with a lower chance of being employed full time and a higher chance of being employed part time. However, this may reflect reverse causality: women working full time have higher incomes and so are entitled to less child support. Conditional on receiving some child support, an additional dollar is associated with a 0.4 percentage point increase in the probability of being out of the labour force and a 0.6 percentage point reduction in the probability of working full time. IV results present a different picture: receiving any child support leads to mothers being 23 percentage points more likely to be working full time and no effect on the probability of working part time. Conditional on receiving child support, receiving an additional $1000 leads to being 2.9 percentage points less likely to be out of the labour force, 3.1 percentage points more likely to be employed, and 2.3 percentage points more likely to be working full time. What is striking about these results is that the increase in labour

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[10]There is some additional variation in household income from other private transfers, including spousal maintenance payments and those received by other members of the household, and also from any windfall payments received.

market activity caused by the receipt of child support is via full time employment, not part time employment.

Analysis of usual hours worked per week in the fifth line of table 6 reinforces this result. The OLS result in column 3 corresponds to the results of Taylor and Gray (2010), finding that a higher level of child support receipt is associated with working fewer hours. However, IV results contradict this and suggest that the OLS results are contaminated with reverse causality: women working more hours have higher income and so receive less child support. Receiving any child support is associated with working an additional 12.9 hours per week, and each additional $1000 received leads to an additional 1.4 hours worked.

Table 6: Effect of child support receipt on labour market activity

| | Any child support | | Amount ($000) | | Sample |
| | OLS | IV | OLS | IV | average |
	(1)	(2)	(3)	(4)	(5)
Not in labour force	-0.006	-0.260	0.004^+	-0.029^*	0.274
	(0.018)	(0.164)	(0.002)	(0.013)	
Employed	0.009	0.236	-0.004	0.031^*	0.672
	(0.019)	(0.159)	(0.002)	(0.012)	
Full time	-0.048^*	0.233^*	-0.006^*	0.023^*	0.327
	(0.020)	(0.153)	(0.002)	(0.010)	
Part time	0.057^*	0.003	0.002	0.017	0.345
	(0.022)	(0.183)	(0.003)	(0.013)	
Hours worked	-0.965	12.936^*	-0.201^*	1.381^*	21.214
	(0.715)	(5.721)	(0.087)	(0.377)	
Observations	3123	3123	1868	1868	
Individuals	867	867	615	615	
F statistic		28.326		66.289	

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls as in columns (2), (4), (6) and (8) of tables 2-5.

7.4   Results for different population groups

Tables 7 to 10 show results in various population sub-groups. First, table 7 shows results split by whether the observation is before or after the 2008 changes to the child support formula. Within these groups, instrument strength becomes weaker and so estimates are less precise. Heterogeneity between the two periods is concentrated in the response of government transfers: a significant negative effect of child support on government transfers only occurs in the pre-reform period, with significant market income responses in both

periods. The larger effect on government transfers in the pre-reform period reflects the larger labour supply responses at the extensive margin.

Table 8 splits the sample into low (Year 12 and below) and higher education groups. It is expected that women with lower education are likely to be receiving higher levels of government transfers, and therefore have a greater scope for government transfers to respond. This is confirmed by the analysis: a significant effect of the amount of child support on government transfer receipt is only seen in the lower education group, and market income and employment responses are significantly stronger in this group, particularly on the intensive margin. There is evidence that more highly educated women respond in terms of increased hours worked and a move into full time work. In contrast, mothers with lower education respond by moving into part time work.

In table 9 I split the sample by the presence of a new partner. In most cases, women who have repartnered will have less access to welfare benefits and so are far less likely to have a positive labour supply response to receiving child support. As expected, the full set of responses are significant in the lone parent sample, with little significance except for at the gross household income level for women who have repartnered. For lone mothers, an additional $1000 of child support received leads to a 4.0 percentage point reduction of being out of the labour force, and a 2.7 percentage point increase in the probability of being employed full time. The amount of government transfers falls by $637 and market income increases by $2269, leading to an increase in gross household income for lone mothers in excess of the amount of child support received.

One possible concern for these results is that there is joint decision making between the mother and father in choosing labour supply. To address this I present results splitting the sample into mothers with below 85% of care (shared care, or primary care) and those with 'above primary' care. 56% of the sample has above primary care, and over half of these mothers have care of the child for 100% of the time (the child spends no nights with their father). It is far less likely that mothers with high levels of care for the child are making joint decisions about labour supply with the father of the child, as the father is not spending time in childcare. Table 10 shows that government transfer and household income effects are stronger amongst mothers with above primary care, and that labour supply effects are smaller and less statistically significant for mothers with lower levels of care. In particular, the increase in full time employment as a result of receiving child support is only significant for high care proportion mothers, as are the effects on hours worked. One separate conclusion from this analysis is that for mothers with less than 85% care of their youngest child support child, there is an increase in part time employment when child support is received or increases.

Table 7: Effect of child support on income and labour supply: pre- and post-reform

| | Pre-2008 | | | 2008 onwards | | |
| | Any CS | Amount ($000) | Average | Any CS | Amount ($000) | Average |
	(1)	(2)	(3)	(4)	(5)	(6)
Gov. transfers	-10.002	-0.835*	13.232	-7.287	-0.105	13.927
	(6.091)	(0.316)		(4.368)	(0.326)	
Market income	60.566	3.424*	39.705	37.803$^+$	2.230$^+$	48.320
	(29.542)	(1.186)		(17.390)	(1.296)	
Gross income	68.213*	3.542*	56.734	43.020*	2.935*	65.641
	(29.626)	(1.025)		(16.369)	(1.139)	
Not in labour force	-0.438	-0.041*	0.318	-0.232	-0.024	0.247
	(0.331)	(0.016)		(0.183)	(0.016)	
Employed	0.189	0.036*	0.625	0.260	0.030$^+$	0.721
	(0.325)	(0.015)		(0.182)	(0.015)	
Full time	0.209	0.033*	0.280	0.223	0.017	0.356
	(0.288)	(0.013)		(0.171)	(0.013)	
Part time	-0.020	-0.003	0.346	0.037	0.013	0.345
	(0.322)	(0.017)		(0.208)	(0.017)	
Hours	9.968	1.544*	19.176	14.043*	1.354*	22.482
	(11.311)	(0.455)		(6.580)	(0.536)	
Observations	1198	724		1925	1144	
Individuals	496	347		679	459	
F statistic	9.059	48.575		20.978	39.787	

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls as in columns (2), (4), (6) and (8) of tables 2-5.

Table 8: Effect of child support on income and labour supply: by education group

	Low education			High education		
	Any CS (1)	Amount ($000) (2)	Average (3)	Any CS (4)	Amount ($000) (5)	Average (6)
Gov. transfers	-8.061 (5.022)	-1.051* (0.484)	16.290	-6.400 (4.825)	-0.031 (0.265)	11.487
Market income	35.215+ (19.124)	4.831* (1.986)	35.325	39.331 (22.901)	0.999 (1.125)	53.022
Gross income	36.164* (18.038)	4.592* (1.770)	54.829	51.440* (22.466)	1.918+ (0.979)	68.336
Not in labour force	-0.206 (0.236)	-0.032 (0.025)	0.398	-0.242 (0.237)	-0.026+ (0.014)	0.172
Employed	0.214 (0.233)	0.045+ (0.024)	0.531	0.177 (0.220)	0.019 (0.013)	0.788
Full time	-0.033 (0.159)	0.003 (0.015)	0.224	0.545* (0.272)	0.033* (0.013)	0.412
Part time	0.247 (0.243)	0.042+ (0.024)	0.308	-0.368 (0.292)	-0.015 (0.015)	0.376
Hours	6.817 (6.987)	1.303* (0.703)	15.685	18.252* (9.363)	1.298* (0.457)	25.782
Observations	1413	845		1710	1023	
Individuals	426	307		490	341	
F statistic	15.997	28.614		12.181	44.211	

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls as in columns (2), (4), (6) and (8) of tables 2-5.

Table 9: Effect of child support on income and labour supply: by partner status

	Lone parent			New partner		
	Any CS (1)	Amount ($000) (2)	Average (3)	Any CS (4)	Amount ($000) (5)	Average (6)
Gov. transfers	-7.725*	-0.637*	15.917	-10.647$^+$	0.224	9.317
	(3.668)	(0.266)		(5.588)	(0.417)	
Market income	26.159*	2.269*	28.284	62.937$^+$	1.948	77.209
	(11.382)	(0.822)		(25.062)	(1.611)	
Gross income	31.028*	2.502*	48.021	66.932*	3.077*	89.553
	(11.212)	(0.756)		(24.433)	(1.379)	
Not in labour force	-0.384*	-0.040*	0.279	0.032	-0.008	0.264
	(0.193)	(0.015)		(0.244)	(0.024)	
Employed	0.284	0.038*	0.661	0.042	0.002	0.692
	(0.180)	(0.014)		(0.246)	(0.021)	
Full time	0.274	0.027*	0.322	0.260	0.016	0.335
	(0.176)	(0.012)		(0.241)	(0.018)	
Part time	0.010	0.011	0.339	-0.218	-0.014	0.357
	(0.216)	(0.015)		(0.314)	(0.024)	
Hours	15.843*	1.773*	21.019	7.071	0.335	21.589
	(6.959)	(0.492)		(8.006)	(0.711)	
Observations	2055	1239		1068	629	
Individuals	644	456		345	242	
F statistic	21.707	36.693		12.587	32.772	

Standard errors in parentheses; $^+$ $p < 0.10$, * $p < 0.05$

Other controls as in columns (2), (4), (6) and (8) of tables 2-5.

Table 10: Effect of child support on income and labour supply: by proportion of care

| | Less than 85% | | | Above Primary (¿85%) | | |
| | Any CS | Amount ($000) | Average | Any CS | Amount ($000) | Average |
	(1)	(2)	(3)	(4)	(5)	(6)
Gov. transfers	-2.317	-0.229	13.082	-9.726[+]	-0.275	14.106
	(2.907)	(0.498)		(5.327)	(0.233)	
Market income	29.316*	1.492	46.628	29.977	1.768*	43.772
	(13.129)	(1.873)		(19.407)	(0.899)	
Gross income	35.760*	2.058	63.609	39.700*	2.447*	61.158
	(12.234)	(1.611)		(18.523)	(0.812)	
Not in labour force	-0.186	-0.036	0.227	-0.273	-0.021[+]	0.310
	(0.181)	(0.032)		(0.225)	(0.011)	
Employed	0.311[+]	0.050	0.717	0.151	0.023*	0.637
	(0.177)	(0.032)		(0.213)	(0.010)	
Full time	-0.040	-0.011	0.329	0.313	0.023*	0.325
	(0.140)	(0.020)		(0.221)	(0.009)	
Part time	0.351[+]	0.061*	0.388	-0.161	0.000	0.312
	(0.185)	(0.032)		(0.267)	(0.012)	
Hours	7.655	1.038	22.382	14.136[+]	1.180*	20.314
	(6.075)	(0.931)		(7.790)	(0.324)	
Observations	1359	824		1764	1044	
Individuals	483	328		638	437	
F statistic	28.830	21.902		15.262	67.105	

Standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$

Other controls as in columns (2), (4), (6) and (8) of tables 2-5.

8 Robustness check

As outlined in section 6, one concern with these results is that the common characteristics and environment of the mother and father could affect the employment status of both parents, and that the vector of characteristics in X_i is not sufficient to control for this. To provide a robustness check for the results reported above, I use the Imperfect Instrumental Variables approach of Nevo and Rosen (2012) to relax the excludability assumption. This allows for some correlation between the father's employment status and the structural error term, and gives an interval estimation for the parameter of interest.

Nevo and Rosen (2012) propose an approach that substitutes the assumption that the instrument is (conditionally) uncorrelated with the structural error term (in equation 1 above), with the assumption that the correlation is smaller in absolute terms than the correlation between the endogenous variable (child support receipt) and the structural error term. They refer to the instrument as an 'Imperfect Instrumental Variable' (IIV). This is a substantial relaxation of the excludability assumption.

The IIV approach rests on two further assumptions. First, the IIV must be negatively correlated with the endogenous variable:

$$\rho_{ES^f, CS} \leq 0$$

Second, the correlations of the IIV and the endogenous variable with the structural error term must have the same sign:

$$\rho_{ES^f, e} \rho_{CS, e} \geq 0$$

Together, these two assumptions imply that the true parameter lies between the OLS and IV estimates. The third key assumption, that the absolute correlation between the IIV and the error term is smaller than that between the endogenous variable and the error term, allows us to tighten this bound.

$$|\rho_{ES^f, e}| < |\rho_{CS, e}|$$

If the ratio of the correlations of the structural error term were known, it would be possible to construct an instrument uncorrelated with the error term. If $\frac{\rho_{ES, e}}{\rho_{CS, e}} = \lambda^*$, then the weighted sum $V(\lambda)$ is a valid instrument:

$$V(\lambda) = \sigma_{CS} ES^f - \lambda^* \sigma_{ES^f} CS$$

Assumption 3 bounds the ratio λ^* between zero and one, and so allows us to estimate the

parameter assuming the ratio is equal to zero (this is the IV estimate assuming a perfect instrument) and then assuming that the ratio is equal to one. This tightens the bounds from the OLS estimate.

I use the father's lagged employment status as an IIV. I use a bootstrap approach to estimate confidence intervals for the bounds (see Woutersen (2006)): this accounts for the imprecision of estimates of both the upper and lower bounds.

8.1   Satisfying the assumptions

The first assumption requires that the IIV is negatively correlated with the receipt of child support and its level. Table 2 shows that each employment status indicator has a significant negative coefficient. To assess whether the analysis in this paper is amenable to the IIV approach, I split my outcomes of interest into two groups. The first group is the amount of government transfers and the indicator for being out of the labour force. For both of these outcomes, the concern with the OLS estimates is that the receipt of child support and amount of child support is positively correlated with the structural error term (receipt of more government transfers is more likely when out of the labour force, and if government transfers are received then there is a stronger incentive to use Child Support Collect and so have higher child support receipt). So, the predicted correlation of the three indicators for father's employment status with the structural error term should also be positive. If the father is not working full time, the common characteristics of the mother and father suggest that the mother should be receiving more government transfers and be more likely to be out of the labour force. So it is plausible that the correlations of father's employment status and the amount of child support with the error term are of the same sign.

The second group of outcomes consists of market income, total household income, hours worked, and indicators for being employed and employed full time. For these variables, the concern is that receipt of child support is negatively correlated with the error term for OLS approaches: as the mother's income increases, there is a mechanical reduction in child support received. If the father is not employed full time, shared characteristics suggest that the mother is likely to have lower market income, lower household income, work fewer hours and be less likely to be employed. So a negative correlation between the instruments and the error term is expected. This means that the father's employment status indicators and child support receipt are both negatively correlated with the error term, satisfying the second assumption. It is not clear whether to expect the father's employment status indicators to be positively or negatively correlated with

the error term in the model predicting whether a mother works part time, as working part time is compatible both with receiving more government transfers and with having higher market income. I therefore do not report robustness results for working part time.

8.2   Interval estimation results

Results from this robustness check are given in tables 11 and 12. The tables reproduce the OLS and IV estimates from the tables above, and show interval estimates and confidence intervals for the Nevo and Rosen approach. These interval estimates provide some evidence in support of the conclusions described above. Table 11 shows results for the receipt of any child support. OLS results are insignificant, with the exception of a reduction in full time employment. IV results suggest that child support receipt reduces government transfers, increases market income and increases hours worked. In all cases except for full time employment, the OLS point estimates do not lie within the 95% confidence interval for the IIV interval estimate, so this set of results rules out the conclusion that the receipt of any child support increases reliance on government transfers or reduces labour market activity amongst separated mothers. Moreover, there is support for the conclusion that receiving any child support has a positive effect on employment at the extensive margin: 90% confidence intervals imply a significant increase in the probability of being employed of between 3.3 and 24 percentage points if any child support is received, and a significant reduction in the probability of being out of the labour force of between 0.6 and 44 percentage points.

Table 12 shows similar results for the amount of child support received (conditional on receiving some child support). Here, OLS results suggest that each dollar of child support received reduces market income by 56 cents and so only increases gross income by 50 cents. A $1000 increase in child support is also associated with a 0.6 percentage point reduction in the probability of working full time and a reduction of 0.2 hours worked per week. The IV results reverse these conclusions: an increased level of child support leads to a reduction in government transfers and an increase in market income, reflected in a reduction in the probability of of being out of the labour force, an increase in the probability of working full time and an increase in hours worked per week. The IIV bounds reinforce the rejection of the OLS estimates: with the exception of government transfers, the OLS results do not lie within the 95% confidence intervals for the IIV bounds calculated. These IIV bounds rule out a significant negative effect of increased child support receipt on market income, employment and labour supply. In particular, a causal reduction in hours worked as a result of an increased amount of child support is ruled out, and instead a positive effect is indicated.

Table 11: Interval estimation with Imperfect Instrumental Variables: any child support receipt

	OLS	IV	IIV bounds
Government transfers	0.385	-8.503*	[-8.503, -0.567]
standard error	(0.410)	(3.670)	
95% confidence interval			(-13.74, 0.214)
90% confidence interval			(-12.37, 0.0211)
Market income	-2.720	43.329*	[2.213, 43.33]
standard error	(1.988)	(3.670)	
95% confidence interval			(-0.870, 66.65)
90% confidence interval			(-0.199, 61.46)
Gross income	2.435	48.923*	[7.415, 48.92]
standard error	(1.806)	(14.552)	
95% confidence interval			(4.580, 73.77)
90% confidence interval			(5.185, 66.24)
Not in labour force	-0.006	-0.260	[-0.260, -0.0333]
standard error	(0.018)	(0.164)	
95% confidence interval			(-0.505, 0.00346)
90% confidence interval			(-0.442, -0.00643)
Employed	0.009	0.236	[0.0334, 0.236]
standard error	(0.019)	(0.159)	
95% confidence interval			(-0.00280, 0.476)
90% confidence interval			(0.00415, 0.414)
Full time	-0.048*	0.233	[-0.0179, 0.233]
standard error	(0.020)	(0.153)	
95% confidence interval			(-0.0495, 0.461)
90% confidence interval			(-0.0433, 0.405)
Hours	-0.965	12.936*	[0.525, 12.94]
standard error	(0.715)	(5.721)	
95% confidence interval			(-0.629, 22.06)
90% confidence interval			(-0.399, 19.75)

Other controls as in columns (2), (4), (6) and (8) of tables 2-5. Interval estimates in square brackets, 95% and 90% confidence intervals constructed from Woutersen's bootstrap approach (1000 replications) in parentheses.

Table 12: Interval estimation with Imperfect Instrumental Variables: amount of child support

	OLS	IV	IIV bounds
Government transfers	0.028	-0.449[+]	[-0.449, -0.0524]
standard error	(0.045)	(0.254)	
95% confidence interval			(-0.810, 0.0425)
90% confidence interval			(-0.734, 0.023)
Market income	-0.562*	2.627*	[-0.0251, 2.617]
standard error	(0.261)	(0.994)	
95% confidence interval			(-0.396, 3.984)
90% confidence interval			(-0.316, 3.669)
Gross income	0.498*	3.050*	[0.929, 3.050]
standard error	(0.231)	(0.869)	
95% confidence interval			(0.617, 4.354)
90% confidence interval			(0.693, 3.986)
Not in labour force	0.004	-0.029*	[-0.0291, -0.00120]
standard error	(0.002)	(0.013)	
95% confidence interval			(-0.0488, 0.00294)
90% confidence interval			(-0.0437, 0.00217)
Employed	-0.004	0.031*	[0.00211, 0.0307]
standard error	(0.012)	(0.012)	
95% confidence interval			(-0.00183, 0.0503)
90% confidence interval			(-0.00104, 0.0451)
Full time	-0.006*	0.023*	[-0.00104, 0.0235]
standard error	(0.002)	(0.010)	
95% confidence interval			(-0.00453, 0.0370)
90% confidence interval			(-0.00379, 0.0339)
Hours	-0.201*	1.381*	[0.0660, 1.381]
standard error	(0.087)	(0.377)	
95% confidence interval			(-0.0604, 1.966)
90% confidence interval			(-0.0367, 1.815)

Other controls as in columns (2), (4), (6) and (8) of tables 2-5. Interval estimates in square brackets, 95% and 90% confidence intervals constructed from Woutersen's bootstrap approach (1000 replications) in parentheses.

Overall, the interval estimation results support the conclusions that receiving any child support does not increase the receipt of government transfers or reduce the amount of market income earned, and significantly increases household gross income. Mothers who receive child support are more likely to be in employment and less likely to be out of the labour force, and no less likely to be working full time. Conditional on receiving child support, higher levels do not increase government transfer receipt or reduce market income. Moreover, any significant reduction in employment levels or hours worked is ruled out.

9 Conclusion

If all child support is passed directly to the recipient, economic analysis suggests that the recipient will face a pure income effect, reducing hours worked and discouraging labour force participation. In Australia, there is popular concern that lone parents receiving child support are able to choose to live comfortably on a combination of government transfers and the child support received. However, not all child support paid is received by the recipient due to the interaction with Family Tax Benefit (Part A). The withdrawal of FTB when child support is received (through the maintenance income test) leads to ambiguous predictions of the effect of receiving child support on the recipient's labour supply decisions: as the net gain from child support for a benefit recipient falls, the receipt of any child support, and increases in the level of child support, are more likely to induce an increase in labour market activity. This is because the recipient keeps all of the child support when her market income is sufficiently high. This means she is made strictly better off by working if the amount of child support and the effective tax on it when not working are both sufficiently high.

The results presented above suggest that the Maintenance Income Test in the Family Tax Benefit system plays an important role in reducing the labour market disincentives of child support receipt. Indeed, under the current system the receipt of any child support increases employment and decreases the probability of being out of the labour force, and does not reduce hours worked or increase the receipt of government transfers. Increasing the level of child support among recipients does not discourage participation and does not decrease hours or employment. Concerns of adverse labour market effects of child support appear to be unfounded in the current system.

One implication of these results is that marginal increases in the mandated level of child support would be expected to have no negative effect on labour force participation and hours worked, and may (given the upper bound of effects estimated above) increase hours

and employment. This could have short- and longer-term benefits for the welfare of child support recipients. Moreover, if the policy objective is to increase the income of separated parents with care of children, reducing the effective tax on child support receipt may have unintended consequences: removing the interaction between child support receipt and FTB would remove any work incentives and so could result in lower total income and negative longer term consequences for separated parents in terms of reduced human capital and retirement savings.

However, drawing policy conclusions is less clear cut than this. Unlike a government transfer funded from general taxation, the burden of an increase in the amount of child support received is borne exclusively by child support payers. Without considering the welfare implications of this burden, it is not possible to draw conclusions about the desirability of an increase in the level of child support. Given that paying parents are more likely than the general population to be in receipt of a government pension or allowance (18% received Newstart Allowance or Disability Support Pension in 2008-09 (Commonwealth of Australia 2009)), the potential burden of such a change should be considered carefully.

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