



The impact of income on reunification among families with children in out-of-home care



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ABSTRACT

Income appears to be associated with faster time to family reunification. The observed connection between income and reunification, however, may be causal in nature or the relationship may be an issue of selection, in that other underlying factors explain both income and family safety and stability. We examine the causal role that the source of income plays in reunification. We use administrative data on primary caregivers of children placed in out-of-home care in Washington State from 2000 through 2007 ($N = 15,159$) matched with public economic support and employment data linked by the Washington State Department of Social and Health Services (DSHS) Integrated Client Database (ICDB). Using instrumental variable analysis, we estimated the effect of the amount of earnings and the amount of cash benefits on reunification. We used county unemployment rates and county food stamp participation rates as instruments. We find modest and inconsistent results that suggest higher earnings are associated with lower likelihood of reunification. We find no consistent evidence linking cash assistance to reunification.

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1. Introduction

For over half of the 402,378 children who were in an out-of-home placement on any given day in 2013, reunification with the child's parent or primary caregiver was the permanency case plan goal (Children's Bureau, 2014). Many of these families are economically poor. The out-of-home placement rate for children living in poverty was 59 per 1000 children in 2011, in comparison to 12.9 per 1000 children in the general population (Pelton, 2015). For parents with children placed out-of-home, being in poverty is associated with slowed time to reunification (Courtney, 1994). Two recent trends in American poverty—income instability and extreme poverty—may be particularly worrisome when considered in light of the demands of the child welfare system. Over the last two decades, Americans' income has grown less stable at all income levels, and increasing instability is particularly concentrated among the lowest earners (Gottschalk & Moffitt, 2009). At the same time, growing concern has focused on families living with extremely low incomes or no formal income at all (Blank, 2007; Loprest, 2003; Ovwigho, Kolupanowich, & Born, 2009; Turner, Danziger, & Seefeldt, 2006; Wood & Rangarajan, 2003). About one-fifth of families with

children in out-of-home placement report that they receive neither income from public assistance nor earnings from employment (Marcenko, Hook, Romich, & Lee, 2012; Wells & Guo, 2004). This article reports on an examination of the relationship between income—both earnings and cash benefits—and subsequent reunification.

The observed connection between poverty and child welfare outcomes such as reunification may be due to a causal connection between low income and maltreatment or it may be due to correlation. Income may play a direct, causal role in reunification through limiting the resources parents have for creating safe environments. For instance, without adequate money for food and housing families are less likely to reunify. Policies that interrupt income or encourage specific sources of income could then change the likelihood of reunification. Alternatively, the relationship may be correlational, where another factor explains both poverty and child risk. For example, if a parent is unable to maintain employment or cash benefits after her child is removed from the home because she is struggling with a substance addiction, this may both challenge her ability to stay employed while also putting her child in jeopardy. If other underlying factors contribute to a lack of income, addressing those other factors could be beneficial for strengthening the family in the long run. Common methodological approaches cannot disentangle causal relationships from these third factor (omitted variable) relationships. In this study, we use an instrumental variable approach to estimate the causal effect of income on reunification.

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Understanding aspects of income that directly lower the likelihood of reunification can help inform the policy approach that would maximize the likelihood of reunification.

2. Background

Changes to welfare and child welfare policy in the late 1990s have made income more tenuous for child welfare-involved families. Welfare reform was enacted with the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, which eliminated the cash assistance program Aid to Families with Dependent Children (AFDC) and replaced it with Temporary Assistance for Needy Families (TANF). As an entitlement program, AFDC was available with few restrictions to all eligible families; in contrast, TANF imposed restrictions including participating in work-related activities for 30 hours per week in most cases and a 60-month lifetime limit for recipients. Under PRWORA, families could lose cash grants if they did not comply with TANF requirements or hit the time limit. A year later, the Adoption and Safe Families Act (ASFA) was passed. ASFA mandates a court hearing 12 months after child removal and requires states, with some exceptions, to file a termination of parental rights petition in cases in which a child has been in care for 15 of the last 22 months. The combination of welfare time limits and shortened timelines to permanency creates enormous pressures on families and on the child welfare system. In fact, Wells and Guo (2004) found that following welfare reform, a higher percentage of children are neglected, a higher percentage are placed in foster homes, and a higher percentage are in placement for more than a year.

2.1. The causal role of income in reunification

Inadequate income causally reduces the likelihood of reunification if it brings material hardship that renders a family incapable of providing basic necessities to a child. Correlational studies consistent with a causal story indicate that lack of income, poverty, and homelessness are associated with slowed time to reunification (Courtney, 1994; Courtney, McMurtry, & Zinn, 2004; Kortenkamp, Geen, & Stagner, 2004; Wells & Guo, 2003, 2004, 2006). Caregivers with children in out-of-home placement, especially caregivers who report no income, report higher levels of unmet basic needs such as sufficient food, clothing, and a place to live, in comparison to other child welfare-involved families (Marcenko, Lyons, & Courtney, 2011; Marcenko et al., 2012). These unmet basic needs likely jeopardize the caregiver's ability to safely reunify with her children. These caregivers with no income also report lower levels of engagement with the child welfare system, which makes them a harder group of parents for child welfare to serve (Marcenko et al., 2012). When child welfare workers are able to provide services to address these basic needs, it appears that children are less likely to be placed in out-of-home care, and those who are placed are likely to reunify faster (Keegan Eamon & Kopels, 2004).

Alternatively, caregivers in the child welfare system also report high rates of substance abuse, mental health disorders, and domestic violence (Marcenko et al., 2011; Staudt & Cherry, 2009). These factors may reduce the likelihood both of sufficient income and a successful reunification. Furthermore, caregivers who are able to maintain their income from benefits¹ by meeting the necessary welfare requirements may be better situated to reunify with their children than those who struggle to meet those requirements. These caregivers may possess helpful personal or interpersonal characteristics (e.g., more organized

or greater supports) or may lack obstacles to both income and reunification in comparison to mothers who do not have income. Thus, possible omitted variable bias, and not income factors per se, may explain variation in reunification outcomes.

2.2. Aspects of income

Researchers have used event history analysis to examine the association between income and reunification. These studies have operationalized income in a variety of ways, which point to two aspects of income worth examining. First, the potential causal effect of income may be related to the increased monetary resources associated with income. Some studies suggest that any income may increase the likelihood of reunification by ensuring that the caregiver has the means to safely provide for the basic needs of a child. For example, mothers who lose cash assistance reunified more slowly than mothers who maintain benefits (Wells & Guo, 2004, 2006). Similarly, one study found that families with someone working at the time of placement compared to families without someone working at the time of placement reunified more quickly, and those who maintained benefits reunified more quickly than those who lost benefits (Kortenkamp et al., 2004). Furthermore, more than just having income, the amount of income may be related to reunification. Mothers with higher average monthly post-placement income reunified more quickly than mothers with less income (Wells & Guo, 2003, 2004, 2006). These associations between income and reunification may suggest that increased monetary resources improve the likelihood of reunification, although these existing studies fail to address unobserved differences between caregivers who maintain more income and those who lose income.

Second, more than just amount of income, different sources of income—whether earnings or benefits—may affect the likelihood of reunification differently. Sustaining income from employment versus sustaining income from benefits pose different demands and challenges for caregivers. Welfare and child welfare offices may coordinate case plans, and welfare offices may be able to be responsive to the demands of the child welfare case plan, increasing the likelihood of reunification (Ehrle, Scarcella, & Geen, 2004). If coordination does not occur, however, scheduling conflicts between TANF and child welfare requirements may arise since mandated activities for both programs typically occur during the standard work week.

Income from employment may reduce the likelihood of reunification. Although, employment may provide greater time flexibility if workers can shift to evening or weekend schedules, but many low-wage workers have little control over their scheduled work hours (Lambert, Fugiel, & Henly, 2014). Many parents involved in the child welfare system are low-wage workers, occupying “bad” jobs (Kalleberg, 2011) characterized by low autonomy, few benefits, and high precarity. Employers may be less likely than welfare offices to be responsive to the demands of a child welfare case plan, or a caregiver may not want to inform their employer of their child welfare involvement. Employed parents may have to choose between work and court appearances, mandated services, or visitations occurring during the work day. Furthermore, a mother who is employed must provide adequate childcare in her absence, which may also reduce the likelihood of reunification. Many mothers moving from welfare to work report unstable patchworks of childcare, and often rely on informal care arrangements, leaving their children with family members, boyfriends, or even leaving older children unsupervised (Scott, London, & Hurst, 2005; Williams & Boushey, 2010). These unstable patchworks of childcare may contribute to a lower likelihood of reunification.

Evidence suggests that while income from benefits may facilitate reunification, earnings may not. Earnings from work generally require time away from the home, whereas benefit receipt may not. Research has found that mothers with a higher percentage of income from employment post-placement reunified more slowly than mothers with a lower percentage of income from employment (Wells & Guo, 2003,

¹ Some states have enacted a concurrent benefits policy, where caregivers can continue to receive TANF for up to 180 days if the child welfare worker confirms that the child(ren) are expected to return home within the timeframe. Additionally, caregivers may continue to receive SSI, whether through their own SSI or that of other children who may remain in the home.

2004). In addition, mothers who lost welfare but transitioned to income from work reunified more slowly than mothers who maintained stable benefits or who never received benefits (Wells & Guo, 2003). Mothers with a chronic lack of income may rely on partners or other household members for income, may receive under-the-table income, and/or may be more able or accustomed to relying on their social networks for support. These findings may suggest that the source of income has a differential association with reunification. But, like all extant studies, these findings do not account for unobserved differences between workers and nonworkers or those who maintain cash benefits and those who do not.

2.3. The current study

Studies examining the links between income and reunification are nonexperimental, limiting our ability to draw causal conclusions. In fact, while the association between poverty and child welfare involvement is widely accepted, the causal relationship remains debated (Gustavsson & MacEachron, 2010). In lieu of a randomized study, which could carry potential ethical concerns and significant costs, quasi-experimental techniques can be helpful and informative. One such approach, instrumental variable analysis, has been used to address selection bias. For example, Shaefer and Gutierrez (2013) used instrumental variable analysis to address selection bias in Supplemental Nutrition Assistance Program (SNAP) participation. While correlational studies have found that SNAP recipients report higher levels of material hardship than eligible families who do not receive SNAP, Shaefer and Gutierrez's instrumental variable analysis demonstrates that the association between a household's decision to participate in SNAP and material hardship is related to selection bias. In their analysis, they use state policy variables to measure the difficulty of participating in the program as instruments, and find that SNAP substantively reduces material hardships. The results of prior studies likely reflected that families who applied for and received SNAP benefits were those in most need in ways that were not captured by available covariates. We do not know of any instrumental variable analysis, nor quasi-experimental studies for that matter, that examines the causal effect of income on reunification for families in the child welfare system. Cancian, Cook, Seki, and Wimer (2017-this issue) also use instrumental variable analysis to examine the association between mandatory child support payments and reunification and found that families required to pay child support reunified more slowly.

In this study, we examine the causal role of income on reunification by posing the following questions: Are caregivers with more earnings more likely to reunify than caregivers with less earnings, holding the amount of cash benefits income constant? Are caregivers with more cash benefits income more likely to reunify than caregivers with less benefit income, holding the amount of earnings constant? We used instrumental variable analysis, a quasi-experimental approach, to address omitted variable bias and examine the effect of income amount at and following placement on reunification.

3. Methods

We used eight years of linked, administrative data on primary caregivers of children placed in the child welfare system to conduct our instrumental variable analyses. We used county food stamp participation rates and unemployment rates as instruments for income from cash benefits and earnings and examined the causal effect of amount of income from earnings and cash benefits on reunification.

3.1. Data

We used data linked by the Washington State Department of Social and Health Services (DSHS) Integrated Client Database (ICDB) from three state agencies: child welfare, economic services, and employment

services. These data have been used in previous studies to examine dynamics of income from cash benefits, trajectories of economic disconnection, and reunification among child welfare families (Hook, Romich, Lee, Marcenko, & Kang, 2016; Kang, Romich, Hook, Lee, & Marcenko, 2016). This research was conducted with approval from the Washington State Institutional Review Board.

We identified primary caregivers of all children entering out-of-home care for the first time from 2000 to 2007 using child welfare data provided by DSHS to Partners for Our Children, a collaboration between DSHS and the University of Washington. We restricted the sample to birth and adoptive caregivers, which composed 95% of the sample. We removed caregivers of children placed for reasons of parental death or who were removed from out-of-state homes to minimize the number of non-matches; these are also families for whom reunification was an unlikely case goal. We also restricted our caregivers to those who were of working age, between the ages of 18 and 64, since eligibility for benefits may change for those who are underage or of retirement age. Finally, we restricted the sample to placements that lasted more than 7 days, which is common in reunification studies (Akin, 2011; Courtney & Hook, 2012). This approach is consistent with federal guidelines, as there is variation between states for these short stays, and short stays tend to be unique cases that do not require the same agency effort as placements that last longer than 7 days (Children's Bureau, 2002). In Washington State, short stayers are typically not court-involved, and are overwhelmingly adolescents (e.g., runaways). Our final sample included 15,159 primary caregivers.

This sample of caregivers was matched to data through the ICDB in order to acquire data on employment-related income (i.e., earnings or unemployment insurance [UI]) and public cash benefits (TANF, General Assistance or GA, Supplemental Security Income or SSI). We followed families through December 2008. DSHS uses a probabilistic matching process (see Hook et al., 2016 for a detailed analysis of non-matches).

We used listwise deletion to address missing data, for a final analytic sample of 14,649 cases. We lacked data on county for 3.36% of our caregivers, which consisted of out-of-state caregivers ($n = 347$, 2.29%), and those who lacked data on county ($n = 163$, 1.08%). Without data on county, we were unable to create county-level instrumental variables for these cases. Differences between caregivers retained and dropped for the analyses include: those dropped from the analyses received less benefit income and earnings, and were more likely to reunify (67.25% vs. 59.03%, $\chi^2(1) = 13.7993$, $p < 0.001$). Additionally, caregivers dropped from the analyses appear to have a slightly higher percentage of children ages 5–12 who were removed, and appear to be more likely to be Native American or not have a race/ethnicity reported. There were no differences in the other covariates: calendar year, gender, removal due to sexual abuse, removal due to physical abuse, removal due to neglect, and number of children in sibling group.

3.2. Measures

Our outcome variable was a dichotomous variable that indicated whether the caregiver and child were reunified by the end of the study period (December 1, 2008)—the outcome for the majority of the caregivers (59.0%) in our final sample. Other potential outcomes included adoption (15.8%), remaining in out-of-home care (14.3%), guardianship (5.4%), reaching the age of majority or being emancipated (3.7%), or transferred/deceased (1.9%). Table 1 presents descriptive statistics for our sample of primary caregivers.

We constructed two treatment variables, the amount of earnings and the amount of cash benefits income, using employment and benefits data. Our employment data reflect only formal earnings, while our cash benefits data include income from TANF and GA. To test for robustness, we also constructed two alternative measures of cash benefits income, one that included UI, and one that included imputed values for SSI. We knew whether a family received SSI, although we did not know the amount received. We imputed SSI income based on available

Table 1
Descriptive statistics (*N* = 14,649).

	All		Reunified		Chi-square
	<i>N</i>	%	<i>N</i>	%	
Placement result					
Reunified	8648	59.0%			
Still in care	2088	14.3%			
Adoption	2307	15.8%			
Deceased/transferred	274	1.9%			
Emancipated/reached age of majority	545	3.7%			
Guardianship	788	5.4%			
Calendar year					
2000	1941	13.3%	1245	64.1%	
2001	1790	12.2%	1102	61.6%	
2002	1774	12.1%	1065	60.0%	
2003	1790	12.2%	1099	61.4%	
2004	1832	12.5%	1126	61.5%	
2005	1927	13.2%	1124	58.3%	
2006	1815	12.4%	1034	57.0%	
2007	1780	12.2%	853	47.9%	
		Mean		SD	
Income (for the study period)					
Earnings		\$2829.60		\$ (7294.49)	
Cash benefits		\$1198.05		\$ (1626.17)	
		<i>N</i>		%	
No earnings		8835		60.3%	
No cash benefits		6697		45.7%	
No income		3564		24.3%	
		Mean		SD	
Instrumental variables (by year)					
County unemployment		6.21		1.58	
County employment		41.76		11.54	
County SNAP participation		7.94		3.21	
Average SNAP amount per county resident		7.7		3.63	
Sibling group size					
Reunified	1.13	1.44**			
Not reunified	1.10	1.42			
Number removal reasons					
Reunified	1.17	1.47			
Not reunified	1.55	0.79***			
Reunified	1.49	0.76			
Not reunified	1.64	0.82			
	All		Reunified		Chi-square
	<i>N</i>	%	<i>N</i>	%	
Female	7258	49.6%	4329	59.6%	2.2
Male	7391	50.5%	4319	58.4%	
Age category					
Infant	3772	25.8%	1854	49.2%	232.4***
Ages 1–4	3608	24.6%	2149	59.6%	
Ages 5–8	2419	16.5%	1509	62.4%	
Ages 9–12	2060	14.1%	1316	63.9%	
Ages 13–15	1958	13.4%	1301	66.5%	
Ages 16–21	830	5.7%	518	62.4%	
Race/ethnicity					
Caucasian only	9211	62.9%	5471	59.4%	0.021
Hispanic	1851	12.6%	1127	60.9%	
Non-Hispanic Black	1619	11.1%	922	57.0%	
Non-Hispanic Native American	1344	9.2%	712	53.0%	
Other	624	4.3%	416	66.7%	
Removal reason					
Sexual abuse	791	5.4%	465	58.8%	22.78***
			8183	59.1%	
Physical abuse	2535	17.3%	1604	63.3%	
			7044	58.2%	190.8***
Neglect	8678	59.2%	4719	54.4%	
			3929	65.8%	

** *p* < 0.01.

*** *p* < 0.001.

SSI summary statistics provided by the Social Security Administration (see Kang, Romich, Hook, Lee, & Marcenko, 2015, for more detail on the imputation). Models estimated with both alternative cash benefits measures were remarkably similar in direction and magnitude, so we report only the version of cash benefits income comprised of TANF and GA.

The employment data were in quarterly increments while the cash benefits data were in monthly increments, so we aggregated our cash benefits income to quarters. Hence in each quarter we can observe the amount of income families received from (1) employment (i.e., earnings), and (2) public assistance (TANF and GA). We focused on the quarter of placement and the two subsequent quarters since we are interested in how income at and after placement impacts reunification. Our previous studies indicate that changes in income around the time of placement primarily occur in those three quarters (Hook et al., 2016; Kang et al., 2016). Given the long right-tail typical of income distributions, we logged both variables, resulting in approximately normal distributions among caregivers with any income during the three quarters at and following the out-of-home placement. However, there are a high number of caregivers who received no income during the period (60.3% did not receive earnings; 45.7% did not receive any benefits; and 24.3% had neither), and thus our variables reflect an inflated number of zero values.

Finding a good instrument is a challenge in any instrumental variable analysis. We identified two instruments: county Supplemental Nutrition Assistance Program or SNAP (formerly Food Stamp Program) participation rate by year and the county unemployment rate by year. We also identified two alternative instruments: average county SNAP benefit amount per county resident and county employment rate, which we used to assess the robustness of our estimates. Others have used similar county- or regional-level variables that are likely to be related to the individual-level treatment variable, but not the individual-level outcomes variable (Fitzpatrick & Coleman-Jensen, 2014; Shaefer & Gutierrez, 2013). We probe the key instrumental variable (IV) assumptions with regards to these instruments in Section 3.3.1.

We also included control variables that are related to both the instrument(s) and the outcome but are exogenous to the model, which are presented in Table 1, along with bivariate associations with our reunification outcome. We included calendar year and controlled for county in our models as exogenous controls that may be related to both the instrument and outcome. We did not include additional controls for county economic conditions or program generosity since the welfare system is state-administered in Washington State. We also included some child demographic and placement information, as these variables have been found to be related to reunification (Akin, 2011; Courtney & Hook, 2012) and may also be correlated to the instruments. Child demographic information included gender, race/ethnicity, and age at placement. Placement-related controls included number of siblings also removed, removal for physical abuse, removal for sexual abuse, removal for neglect, and number of removal reasons.

3.3. Analyses

We used IV analysis to estimate the causal effect of amount of earnings and benefit income on reunification among families with children in out-of-home care. The problem with OLS regression is that any bias from unobserved variables will be captured in the error term, resulting in a correlation between the treatment variable and the error term. This violates OLS assumptions and thus results in biased estimates. We use instrumental variables to address the endogeneity of selection bias. In exploiting the random variation in an instrumental variable, we are able to simulate a randomized experiment. However, as with any statistical model, there are several assumptions that must hold in order for us to estimate the unbiased causal effect of income receipt on reunification. If these assumptions hold, the instrumental variable can function as a “substitute” for the treatment variable. In this way, we can produce improved, unbiased estimates.

3.3.1. IV assumptions

The three key instrumental variable assumptions are relevance, exclusion, and strength of the instrument. The first assumption, relevance, states that the instrumental variable is associated with the treatment. We reason that county SNAP participation may be related to individual benefit receipt. County-level variation in SNAP take-up may reflect local administrative practices (Cancian et al., 2001) such as more efficient or welcoming processes. Higher proportions of the local population using food stamps may also allow for greater social network knowledge about benefit access. Overall the SNAP participation rate relative to population is a combination of need (percentage of households qualifying for program) and safety net effectiveness (percentage of eligible households served). We also test a measure using county-level poverty population as the denominator; this poverty-adjusted measure captures safety net effectiveness net of need. Similarly, we expect that county unemployment rates are related to individual earnings; individuals living in counties with higher unemployment rates will be less likely to be employed and thus receiving income from employment.

Table 2 presents our bivariate analyses testing the relevance assumption for our preferred specifications for the instruments and treatment variables. Bivariate analyses indicated that the general version of SNAP participation, using the county population as the denominator, was significantly associated with the income variables. Higher rates of county SNAP participation are associated with a higher likelihood of having any income from cash benefits and lower likelihood of earnings. However, the poverty-adjusted version was only significantly associated with earnings while marginally significantly associated with benefits income. We report our findings with the general version of SNAP participation, since our bivariate analyses indicated that the poverty-adjusted version did not meet the relevance assumption for cash benefits income. Results for testing specifications of the cash benefits treatment variable with UI and SSI were largely similar. Bivariate relationships between county unemployment rate and the income variables are significant for both amount of earnings and benefit income, supporting the relevance assumption. Higher county unemployment rates are associated with a lower likelihood of income from employment and a higher likelihood of income from benefits. In addition, our alternative instrument, average SNAP amount, is also significantly related with all income variables whereas the employment rate is only significantly related to earnings.

The second assumption, commonly known as exclusion, states that the instrument cannot be related to the outcome other than through the treatment. If exclusion is not met, then there will be a correlation between the instrument and error term, resulting in a biased estimator. Unfortunately, the exclusion assumption is untestable in just-identified models (models with the same number of treatment variables and instruments) (Doyle, 2011). We argue that these instruments are related to family reunification only through income status, satisfying the exclusion assumption. We believe that county SNAP participation is probably not related to whether a child in an out-of-home placement reunifies, since different workers administer SNAP and child welfare and child welfare workers are more likely to prioritize psycho-social intervention over basic needs (Marcenko, Lyons, Lee, & Courtney, 2010). It is possible

that higher SNAP participation reflects a worse economic environment, which may (or may not) contribute to the stress of the family, which may in turn affect their ability to reunify. Regardless, how the family experiences the stress of the economic environment will be largely tied to their specific economic situation, and thus the income they receive. In this way, county SNAP participation is related to reunification through whether the parent actually receives cash benefits and is in a better position to provide for their child. Similarly, an individual's receipt of employment income is likely correlated with the county unemployment rate, whether this is due to the lack of jobs or the high prevalence of low-skilled workers. In both cases, county unemployment rate is not likely to be related to reunification except insofar as it is a reflection of caregivers' receiving income (our treatment variable) through earnings.

Finally, a third requirement is the strength of the instrument. Estimates may be biased in the presence of weak instruments (Angrist & Pischke, 2009). This assumption is often examined using the *F*-statistic for the excluded IV from the first stage regression, and the general rule of thumb is to look for an *F*-statistic greater than 10 (Angrist & Pischke, 2009; Doyle, 2011). However, in the case of two endogenous regressors, the presence of weak instrument(s) may be overshadowed by a strong instrument, and thus the *F*-statistic may not be the best indicator of the presence of a weak instrument (Angrist & Pischke, 2009). Thus, we also report tests of underidentification and weak identification. The Angrist-Pischke chi-squared Wald statistic tests the null hypothesis that a particular endogenous regressor is unidentified, while the Kleibergen-Paap tests if any endogenous regressor is unidentified (Baum, Schaffer, & Stillman, 2010). In some of our models, our fit statistics suggest weak instruments, so we provide sensitivity analyses to examine the robustness of our estimates, especially in the presence of weak instruments. Included in our sensitivity analyses are a set of models where we use our two instruments for each income variable separately, and in that case, we report the Sargan-Hansen test, where the null hypothesis is that instruments are valid (Baum et al., 2010).

3.3.2. Estimation

We used Stata 13.1 to conduct our analyses. We estimated models where we instrumented amount of earnings and cash benefits income with county unemployment rate and SNAP participation rates. Since our models include two treatment variables and two instruments, our models are just-identified. Given the likely presence of weak instruments, we used Limited Information Maximum Likelihood (LIML) estimation. LIML estimation is the preferred method to handle bias associated with weak instruments, although estimates result in wider standard errors than the standard two stage least squares approach to IV analysis (Angrist & Pischke, 2009). We estimated robust standard errors, which are robust in the presence of heteroscedasticity (StataCorp, 2015).

As a robustness check, we estimated models with alternative specifications. We also estimated models where earnings was instrumented while we controlled for cash benefits, and where cash benefits was instrumented while we controlled for earnings. We also tested the two alternative instruments, county employment rate and average SNAP

Table 2
Bivariate regression models to test relevance assumption.

	Earnings		Cash benefits		Cash benefits (no UI)		Cash benefits (with imputed SSI)	
	B	SE	B	SE	B	SE	B	SE
County SNAP participation	-5.634	1.729**	6.66	1.843**	7.553	1.849***	7.666	1.708***
Average SNAP benefit amount/population	-4.525	1.405**	3.944	1.625*	5.047	1.600**	5.325	1.414**
County unemployment rate	-0.133	0.033***	0.157	0.036***	0.121	0.038**	0.107	0.038**
County employment rate	0.745	0.363*	0.594	0.715	0.613	0.731	0.664	0.661

* *p* < 0.05.
 ** *p* < 0.01.
 *** *p* < 0.001.

Table 3
Summary of naïve OLS models estimating the effect of income on reunification.

	Naïve OLS models				Instrumental variable estimates	
	No covariates		With covariates		No covariates	
	B	SE	B	SE	B	SE
Earnings	0.018	0.001***	0.016	0.001***	−0.419	0.227 ⁺
Benefits	0.005	0.001***	0.008	0.001***	−0.311	0.203

Covariates include: calendar year, child gender, child race/ethnicity, child age at placement, number of siblings also removed, removal for physical abuse, removal for sexual abuse, removal for neglect, and number of removal reasons.

*** $p < 0.001$.

⁺ $p < 0.10$.

benefit amount; these alternatives were less strong than the main instruments but overall results were consistent.

4. Results

Table 3 reports our naïve OLS estimates with and without control variables, as well as our base IV estimates. We provide OLS estimates to allow for comparability to our IV estimates. Since any violation of assumptions about functional form leads to enormous bias in IV probit or logit models, we estimated linear probability models in our instrumental variable analyses (Elwert, 2014). Thus, our estimates capture only local average treatment effects, which mean that they are relevant only to the income range represented in our data (Angrist & Pischke, 2009). In all these naïve models, the two income variables were statistically significant. These models indicate that, while controlling for other factors related to reunification, a caregiver with 1% more in earnings than another caregiver had an approximately 0.02 higher probability of reunification. At the same time, a caregiver with 1% more in cash benefits income than another caregiver had an approximately 0.01 higher probability of reunification. The addition of control variables decreased the earnings coefficient but increased the cash benefits coefficient.

The IV estimates produce some contrasting results to the naïve models. The standard errors increase dramatically, as expected since IV estimates are consistent but not efficient. The coefficient for earnings switched direction, so earnings were associated with a lower likelihood of reunification in our IV models, and this was marginally statistically significant. A caregiver with 1% more in earnings was associated with a 0.42 lower probability of reunification than a caregiver with less earnings. However, the standard errors for these estimates are much larger. The coefficient for benefits also switched directions, but was no longer statistically significant. On the whole, the IV results suggest that the OLS estimates are upwardly bias.

Table 4 provides a more detailed report of our IV estimates. The panels report our models without controls, followed by where we controlled only for year and county, and finally our full model with controls. The coefficients change with the addition of controls, suggesting that the “treatment” and “control” groups in each of the models may not be comparable. In the ideal, these coefficients should not change with the addition of controls; in practice, even randomized control trials sometimes result in groups that are not fully comparable. Both income coefficients change direction with the addition of control variables, and the standard error for benefits increases but decreases for earnings. None of the coefficients are significant suggesting that we may not have sufficient power to detect effects since IV estimates generally have wider standard errors than OLS estimates.

The F -statistic for both earnings and cash benefits income was greater than our rule of thumb 10 in the base model only, but not in the models which included any control variables. The Kleibergen-Paap tests are not significant for any of the three models, raising concern that our models are unidentified, while the Angrist-Pischke test suggests that cash benefits, not earnings, is unidentified. Thus, our

Table 4
Instrumental variable estimates.

	1		2		3	
	B	SE	B	SE	B	SE
Earnings	−0.419	0.227 ⁺	0.124	0.117	0.082	0.089
Benefits	−0.311	0.203	0.308	0.319	0.299	0.330
First Stage F -statistic	(2, 14646)		(2, 14601)		(2, 14585)	
Earnings	25.31***		8.47***		9.03***	
Benefits	37.50***		1.27		0.83	
Angrist-Pischke chi-sq Wald statistic	4.73*		6.97**		10.36**	
Earnings	6.86**		1.09		0.97	
Kleibergen-Paap Wald F -statistic	1.76		0.56		0.49	
Controls			X		X	
Year & county			X		X	
Case characteristics					X	

Covariates include: county, calendar year, child gender, child race/ethnicity, child age at placement, number of siblings also removed, removal for physical abuse, removal for sexual abuse, removal for neglect, and number of removal reasons.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

⁺ $p < 0.10$.

estimates may be biased toward the OLS estimates. Given that we may have weak instrument bias, we conducted a series of sensitivity analyses by estimating alternative specifications and using alternative instruments. The results for earnings are reported in Table 5, and the results for cash benefits are reported in Table 6.

The coefficient for earnings changes from negative (in 6 models) to positive (in 3 models), and in only two instances out of 9 versions, is statistically significant in the negative direction. The use of the unemployment rate as an instrument results in decreases in the magnitude of the coefficient as we add controls to the model, while the use of the employment rate as an instrument results in increases in the magnitude of the coefficient as we add controls to the model. The standard error generally increases with the addition of control variables, which reflects that we are losing variability in our treatment variable. The first stage F -statistic is greater than 10 and significant for some of the models, but very small for other models, in particular models with controls. We report the Angrist-Pischke and Sargan-Hansen test for models 1–3, since we instrument earnings with both our instruments. The Angrist-Pischke tests suggest our models are identified, but the Sargan-Hansen tests raise concern about the validity of our instruments.

The coefficient for cash benefits also changes from positive (in 8 models) to negative (in 1 model), and in only two instances out of 9 versions, is marginally statistically significant in opposing directions. The magnitude of the coefficient increases with the addition of control variables, as does the standard error, reflecting our increasing uncertainty about the estimates. The first stage F -statistic is greater than 10 and significant for our base models with no controls, but very small in the remaining models. We report the Angrist-Pischke and Sargan-Hansen test for models 1–3, since we instrument cash benefits with both our instruments. The Angrist-Pischke tests suggest only our base model is identified, but the Sargan-Hansen tests raises concern about the validity of our instruments in the base model.

5. Discussion

Our analysis examined whether observed correlational relationships between caregiver income and family reunification persist after bias from unobserved variables is reduced via an instrumental variables analysis. Naïve models show that higher earnings and higher cash benefits in the quarter of and two quarters after removal are both positively associated with subsequent reunification. These results do not persist in instrumental variable models, although our analyses should be

Table 5
Wages with various specifications.

	1	2	3	4	5	6	7	8	9
Earnings coefficient	-0.19**	0.06	0.04	-0.17***	-0.09	-0.07	-0.02	-0.79	3.50
Standard error	0.07	0.05	0.04	0.04	0.09	0.07	0.06	3.12	58.69
First stage F-statistic	16.14***	7.90***	8.76**	28.72***	3.53	4.31*	9.55**	0.07	0.00
Angrist-Pischke chi-sq	32.29***	15.86***	17.61***						
Sargan-Hansen test	8.35**	5.07*	3.98*						
<i>Instruments</i>									
Unemployment rate	X	X	X	X	X	X			
Employment rate							X	X	X
SNAP participation	X	X	X						
Average SNAP benefit									
<i>Controls</i>									
CY & county		X	X		X	X		X	X
Case characteristics			X			X			X

* $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

interpreted in light of the weakness of our instruments described below. Estimates for the impact of cash benefits are statistically indistinguishable from zero, even in the models not plagued by the weak instrument problems. Results for earnings are slightly more informative. Higher earnings do not consistently positively predict reunification in the IV models. Instead, higher earners are associated with a lower probability of reunifying with their children in 8 of the 12 models presented. Although this effect is modest in magnitude, we believe it raises questions for both conventional wisdom about the role of employment as well as the current work-contingent safety net for poor families. In this discussion we review the limitations of this study, explore possible interpretations of the negative (or at least non-positive) impact of earnings, and conclude with a call for continued attention to families' material needs within the child welfare system.

5.1. Limitations

Although IV analyses can provide causal estimates when the key assumptions are met, we interpret our findings with caution. In large part, we are fairly certain that weak instruments bias our models. Our instruments appeared to perform more strongly for earnings than cash benefits, although the addition of any controls, particularly county and year, appeared to significantly reduce the strength of our instrument. Given that our instruments were measured at the county-year level, it is likely that the variability in our instruments, and thus the strength of our instruments, was reduced significantly with the addition of these controls. Some of the county subgroups were also quite small (several counties

contribute fewer than 20 cases, and 10 counties contribute fewer than 50 cases), and so the inclusion of controls for county simply reduced our ability to detect differences. Robustness tests with restrictions to counties with more than 100 cases yielded substantively similar results. At the same time, this suggests that any effects estimated in the base model may have simply reflected differences by county or year (i.e., there was a violation of the exclusion criteria). It is possible that an instrument measured at the county-month or county-quarter level may provide additional variability that we could leverage more successfully, but these data are not readily available. Regardless, given the inconsistency in our estimates, the large standard errors, and weak instrument bias, it is difficult to draw any conclusions from these estimates.

Additionally, the lack of consistency in our estimates between models with and without controls also raises concern, as this indicates that observable characteristics have not been randomized between groups, which may indicate that we have not successfully addressed any unobservable selection bias in these analyses. We also point out that, while many of our estimated effects are not significant, LIML estimators tend to have large standard errors, and often IV analyses require extraordinarily large samples (in the order of hundreds of thousands of cases) in order to detect statistical significance (Wooldridge, 2002). Our analytic sample of 14,649 is much smaller than those used in the original IV studies conducted by Angrist and colleagues (Angrist, 1990; Angrist & Krueger, 1992).

Furthermore, both earnings and benefits variables comprise a large percentage of zero values, and thus are not normally distributed. In the case of censored endogenous regressors (our income variables),

Table 6
Benefits with various specifications.

	1	2	3	4	5	6	7	8	9
Benefits coefficient	0.19 ⁺	0.35	0.32	0.02	0.72	0.49	-0.05 ⁺	1.91	1.02
Standard error	0.10	0.51	0.42	0.02	1.77	0.96	0.03	12.61	4.03
First stage F-statistic	28.11***	0.66	0.52	51.01***	0.17	0.28	27.14***	0.02	0.06
Angrist-Pischke chi-sq	56.23***	1.33	1.04						
Sargan-Hansen test	20.68***	0.32	0.15						
<i>Instruments</i>									
Unemployment rate	X	X	X						
Employment rate									
SNAP participation	X	X	X	X	X	X			
Average SNAP benefit							X	X	X
<i>Controls</i>									
CY & county		X	X		X	X		X	X
Case characteristics			X			X			X

*** $p < 0.001$.
⁺ $p < 0.10$.

estimates are likely too large and the size of the bias depends largely on the percentage of zeros (Rigobon & Stoker, 2009). In our data, there are high percentages of zeros (46–60%), but the remainder of the data appear approximately normally distributed. This suggests that there are two data-generating processes: whether a caregiver receives income, and for those who do, how much income they receive. Thus, we do not think our data reflect the bias that results from censored endogenous regressors. For robustness, we also estimated models using dichotomous income variables, which, consistent with the models we presented, also suggested that receiving any earnings compared to receiving no earnings was associated with a lower likelihood of reunification.

Finally, because the IV approach relies on the variation observed in the sample, this approach cannot test the potential effect of labor standards or income support programs that would improve the economic well-being of low-income families beyond the current range of circumstances. This approach cannot tell us what child welfare outcomes might look like in a state and time that—relative to Washington State in the early 2000s—had higher minimum wages, more widely available affordable child care, options for public jobs, or steadier and/or higher levels of public assistance. As such, this is not a test of the possible impact of greater economic resources for families but rather an attempt to untangle the causal relationships between income and outcomes under current policy regimes.

5.2. Interpretation of findings

While it is difficult to draw conclusions from our estimates, our IV results raise the possibility that there is no positive and perhaps a negative effect of income from employment on reunification. In other words, a caregiver with more earnings in the quarter of placement and two subsequent quarters is less likely to reunify with their child than a caregiver with less earnings. These findings are consistent with Wells and Guo's (2003, 2004) findings that mothers with a higher percentage of income from employment post-placement reunified more slowly than mothers with a lower percentage of employment income, but contradict other work showing that higher incomes are associated with stronger chances of reunification (Wells & Guo, 2003, 2004, 2006).

The idea that earnings may not help families reunify appears surprising at first: employment is often considered a strength because it reflects caregiver stability. However, this assumption reflects the selection bias that plagues OLS estimates but not IV estimates. Net of the unobserved factors that allow parents both to maintain employment and to successfully navigate child welfare requirements, we believe it is feasible that employment could be neutral or even detrimental to reunification prospects for a series of related reasons: the quality of jobs likely held by child welfare-involved parents, availability of childcare, and conflicts between employment and child welfare requirements.

First, employment may have a negative impact on reunification due to the conflict between low-wage jobs and family responsibilities common among low-income families. We believe many parents in our study are low-wage workers; as shown in Table 1, average earnings for the study period were \$2829, or less than \$1000 per month. Low-wage jobs are often characterized by unpredictable schedules and may require working nonstandard hours and/or overtime (Lambert et al., 2014). Such jobs also often lack sick days or family leave, and lack flexibility, often employing “no fault” policies that consider any absence, regardless of the reason, as a strike (Kalleberg, 2011; Williams & Boushey, 2010). In one study, mothers with varying work shifts and who rely on multiple care providers (i.e., patchwork of care) were more likely to experience care disruptions (Uzdansky & Wolf, 2008). Furthermore, mothers who relied on nonrelative care outside of the home (as opposed to center-based care) were more likely to miss work due to a disruption to their childcare arrangement (Uzdansky & Wolf, 2008). Depending on the job, when faced with a care disruption, a mother

may have to choose between adequate supervision for the child or losing her job (Williams & Boushey, 2010). Thus, maintaining inflexible, low-wage employment may be in direct conflict with successful reunification.

Relatedly, the reunification conditions do not always mirror the reason for placement, so even if a single parent is economically providing for her children through a new job, she must also demonstrate adequate childcare arrangements in order to reunify with her child. Childcare centers are often unavailable during nonstandard work hours, and many mothers turn to informal care arrangements (Scott et al., 2005; Williams & Boushey, 2010). The challenge employed mothers face in providing adequate childcare may increase the likelihood that she is perceived as neglecting her child (Pelton, 2015). Mothers often do not adjust informal care arrangements for the sake of quality, and report that they feel better leaving their children in the care of family or boyfriends (Scott et al., 2005). However, these informal care arrangements may not be perceived as adequate by a social worker (Scott et al., 2005), instead reducing the likelihood of reunification.

The negative effect of earnings may also reflect difficulty complying with child welfare-mandated services while also maintaining employment. Mothers with children in out-of-home placements report an extremely high number of barriers to employment, with one study reporting that 74.1% of the sample reported transportation as a barrier (Wells & Shafran, 2005). Thus, a woman with limited transportation options may struggle even more to commute to work as well as to child welfare-mandated services. If so, strategies directed at lessening this tension, such as providing bus passes or scheduling meetings in times and locations that coincide with caregivers' work and commute schedules, may help increase the likelihood of reunification.

While the estimated effect of income from earnings switched directions between the OLS and IV results, the effect of income from cash benefits changed from being small but positively correlated with reunification to statistically indiscernible from zero in our analyses. This finding likely reflects both the weakness of our analysis—as discussed above—and the weakness of the means-tested safety net. Public assistance for poor families is meager relative to economic needs—providing less than \$400 per month on average for the cases in this study—and demanding in terms of required activities. Few families receive steady support from TANF or General Assistance. In related correlational analyses of the same caseloads and time period, we find that two-thirds of the households who ever received public assistance in the period surrounding the removal of a child from the household either received it for a short period (less than a year) or lost cash assistance benefits in the months before or immediately following removal (Kang et al., 2016). TANF rules also require recipients to work or participate in work-like activities, meaning that the program is not that different from low-wage work in general. The Washington State program, tellingly called WorkFirst, allowed child welfare activities to count toward TANF requirements during the period covered in this study (Ehrle et al., 2004), but it is not known whether and how frontline caseworkers used this option. Finally, because TANF imposes requirements, the observed correlational relationship between higher benefit amounts and better child welfare outcomes may be driven by the same sort of unobserved variable bias that drives the OLS results linking employment with reunification. Parents who are better at complying with TANF case requirements may also be better at complying with child welfare mandates.

6. Conclusions

The child welfare system intervenes in the lives of families who are disproportionately poor. The assumption is that among families with children removed from their parents' homes, those with higher incomes—particularly earnings from employment—are more likely to reunify. In this study we have tested whether this correlational relationship between income and reunification persists when examined via a

quasi-experimental instrumental variables approach, which reduces bias from unobserved differences between cases. Our findings suggest that the importance of earnings may be overstated; net of the characteristics that promote both employment and reunification, families with higher earnings are no more and perhaps less likely to reunify. We believe that these findings demand further scrutiny of the work requirements in TANF and work-contingent nature of the means-tested safety net, particularly as it applies to families at risk of child welfare involvement.

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