Earnings instability and child protection: Evidence from state administrative data

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Abstract

Given previous inconclusive results on unemployment and involvement with the child welfare system (CPS) and the growing attention on precarious labor market conditions, this article relies on administrative data on wage and social benefits from the state of Wisconsin to investigate the relationship between employment instability and subsequent child maltreatment investigations. Using an event history approach, this study analyzes earnings instability—measured by one-time wage shocks, cumulative wage shocks, and stable earnings duration—on child maltreatment risk. It also pays attention to the role of safety net programs on buffering the risk of adverse wage shocks on child welfare involvement. I find that experiencing a negative earnings shock of 30% or more increases the likelihood of CPS involvement by approximately 18%. The effect diminishes and becomes nonsignificant when an earnings decline is compensated by benefit receipt. Each additional earnings drop is associated with a 15% greater likelihood of CPS involvement. Each consecutive quarter with stable income is associated with 5% lower probability of a CPS report. The results are more pronounced for abuse than neglect and are marginally significant for neglect reports. The findings suggest that accessing sufficient social benefits as supplemental income when negative earnings shocks occur serves to effectively buffer against the risk of child maltreatment, particularly among families with young children. This study confirms income support as an important instrument to reduce child maltreatment risk; it indicates that policies aimed at boosting income and stabilizing low-income family economics could substantially increase children's safety and well-being.

Key words: child maltreatment, earnings instability, income supplement, social policy

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Introduction

Practitioners, researchers, and policy makers have a significant interest in preventing child maltreatment and related family involvement with child protective services (CPS) systems. Although it has long been documented that low-income levels and economic hardship are closely intertwined with CPS involvement (Berger, 2004; Drake & Pandey, 1996; Slack et al., 2011; Waldfogel, 1998), we know relatively little about whether or how economic instability, particularly negative earnings shocks, affects a family's risk of child welfare involvement. Despite the robust economic recovery in the aftermath of the Great Recession, many families are encountering involuntary job loss and experiencing economic instability (Hardy, 2017; Hardy et al., 2019; LaBriola & Schneider, 2020). Some parents work low-wage jobs with unpredictable tenure or hours, few benefits (Hollister, 2011; LaBriola & Schneider, 2020; Lambert & Henly, 2013), and last-minute shift cancelations (Schneider & Harknett, 2019, 2020). These unfavorable labor-market experiences may trigger job churning or frequent entry into and exit from the labor market, resulting in short-term, frequent changes in family income, particularly for hourly workers.

Experiences of economic instability are not distributed equally. It is more common and consequential among members of the most disadvantaged groups, including low-income, single-parent, and non-white families (Hardy, 2017; LaBriola & Schneider, 2020). Approximately 70% of low-income individuals report unstable incomes (Schmeiser et al., 2014); they also report that having a stable, albeit lower, income is preferable to having a somewhat higher but more unpredictable income or involuntary turbulence in labor force activities (Morduch & Schneider, 2017; Hill et al., 2013). Children growing up in such families often become hidden victims of uncertain contemporary economic circumstances (Gennetian et al., 2015; Gennetian et al., 2019).

This is especially the case for children at the lower end of the family income ladder, whose likelihood of experiencing income instability is about twice that of their top-income counterparts (Morris et al., 2012). Approximately 10% of low-income adults with children have experienced (at minimum) an economic shock resulting in a 50% income drop over one year. Only half of these adults recovered their full pre-shock incomes in the following year (Acs et al., 2009). Children of color face not only a consistently lower level of economic resources but also more instability in their intra-year parental income (Gennetian et al., 2019). Most CPS-involved families are financially disadvantaged such that they may lack the savings or other liquid assets necessary to mitigate the effects of a negative earnings shock (Rothwell & Han, 2010). Although these families are already economically vulnerable, experiencing unfavorable labor market shocks may further exacerbate this vulnerability, widening economic disparities between them and their more affluent counterparts. However, the child welfare literature has not fully considered the specific impact of earnings instability with regard to the role of economic conditions preceding child welfare involvement.

Another unanswered question is whether sufficient access to social benefits effectively counteracts the consequences of negative economic shocks with respect to CPS involvement. Contemporary safety net programs gradually have shifted toward noncash benefits and work-conditioned eligibility (Hardy et al., 2019; Hill & Ybarra, 2014; Moffitt, 2013; Pac et al., 2017). However, low-income families may not have control over the consistency of their employment and work hours. Families with unstable labor-market activities might encounter difficulties obtaining or sustaining social welfare benefits because their earnings are used to determine their benefit eligibility at a given time point, even though their earnings may vary substantially over short periods (Hill & Ybarra, 2014). The effectiveness of social safety net programs in mitigating

the risk of income loss on child welfare involvement in a context of unstable employment and earnings is unclear. By taking advantage of longitudinal administrative data from Wisconsin, this paper examines the associations between intra-family earnings instability and child welfare involvement, paying close attention to whether such instability was met with sufficient income supplements from social benefits.

Background

Children growing up in families with unstable incomes may face negative outcomes. Increasingly, attention has been focused on frequent intra-year income instability and its consequences for child well-being (Gennetian et al., 2015); however, little is known about how such intra-year income instability is related to child abuse and neglect. Instability in income or economic resources, more generally, can result from multiple factors, including instability in intra-family employment, earnings, and benefit receipt (Hill et al., 2017). This study mainly focuses on negative earnings instability, which is likely the results of instability in employment and/or work hours.

In fact, income instability results in financial and nonfinancial costs, especially when it is frequent, negative, and unanticipated. The care received by children may be affected by their parents' ability to provide the goods and services necessary for healthy development as well as the quality of the home environment and parenting behaviors to which they are exposed. Much of the literature on the association between income and child well-being has emphasized the influence of economic resources through two major channels. First, limited (or unstable) income may increase the risk of CPS involvement due to parents' limited access to money and stimulating environments. From the family-investment perspective, having a higher income level is linked to better financial conditions supporting child nurturing, which often lead to better

outcomes for children and positive capacity building (Becker & Thomes, 1986; Behrman et al., 1982). Second, low (or unstable) income may increase the risk of child maltreatment by affecting parenting behaviors. The economic stress model, entailing caregivers' psychological and mental responses to the amounts of resources they possess, may explain how income insecurity or financial deficits affect individual behaviors and the children's outcomes resulting from such behavioral effects (Conger et al., 1994; Conger et al., 2012; McCubbin & Patterson, 1983). Income instability, particularly losses of income within a context of already limited resources could be detrimental to parents' mental stress and parenting methods (Elder, 1999; Elder et al., 1995).

Specifically, instability in income might affect parenting through two main mechanisms, in turn affecting CPS involvement. First, earnings instability is disproportionately experienced by low-income and poor families (Acs et al., 2009). Even among families that have experienced a negative earnings shock but stayed above the poverty line, some may still confront material hardship (Gershoff, 2003; Heflin, 2016). Less financially stable caregivers may experience multiple stressful events, which constrain their patience and their ability to cultivate and offer quality, consistent parenting to their children (Gershoff et al., 2007; Hill et al., 2013). Second, adverse earnings instability may affect parenting behaviors because it reflects working reduced hours or becoming unemployed. In addition to the financial loss, these events cause stress in adults, which may lead to behavioral changes within the family context, including how adults parent or nurture their children, potentially resulting in colder and poorer communications with children (Neppel et al., 2015) as well as abusive or harsh parenting and disciplinary behaviors (Berger, 2005; White et al., 2015; Yeung et al., 2002).

Prior work relating to economic conditions and child maltreatment reflect both of the aforementioned mechanisms, particularly the first scenario, testing the direct income or material hardship effects on CPS involvement. For instance, both child maltreatment risk and a CPS investigation have been found to be inversely related to income (and variation therein) in studies leveraging state-level Earned Income Tax Credit (EITC) expansions (Berger et al., 2017), random assignment to a full child support pass-through payment (Cancian et al., 2013), and higher state-level minimum wage laws (Raissian & Bullinger, 2017). Beyond income level, Slack and colleagues (2007)—drawing upon administrative data in Illinois—found that experiencing a drop in cash welfare without compensation from other income sources, such as earnings or the Supplemental Nutrition Assistance Program (SNAP), was associated with increased CPS reports. A state-level analysis in an earlier groundbreaking study by Paxson and Waldfogel (2002) suggested that having decreased state-level welfare benefits is associated with increased foster care placements. In addition, studies have found increased CPS involvement among children in families with material deprivation, particularly housing hardship (Maguire-Jack & Font, 2017; Slack et al., 2003; Yang, 2015).

The literature is less clear about relationships between (un)employment or job loss and child maltreatment. Although unemployment is directly related to a family's financial well-being, among prior research findings, Raissian (2015) reported that an increase in the local unemployment rate resulted in decreased reports of child maltreatment in New York. Focusing on the Great Recession, Schneider et al. (2017) found that a greater local labor-market downturn was related to lower risk of child neglect but also an increase in physically harsh parenting practice. This may be attributable to gender-specific employment status. For example, Lindo et al. (2018) found that only paternal unemployment was linked to increased maltreatment rates.

Likewise, Cherry and Wang (2016) showed that higher state-level employment rates among men aged 20 to 34 years old could result in a lower child maltreatment rate at the state level.

Taken together, researchers gradually are accumulating robust knowledge about the link between economic well-being and child maltreatment risk, particularly the risk of child neglect. However, no prior research has studied the temporal and cumulative effects of short-term earnings instability or the buffering effect of social benefit systems, given limited microlevel, frequent-time-interval, and panel data available. Yet, despite the literature on (un)employment and CPS involvement being inconclusive overall, good reasons exist to believe that income matters for parental engagement and parenting behaviors, which often are deemed proxies of child maltreatment risk. More importantly, a critical need exists to study unstable earnings for understanding child maltreatment risk, particularly given the related mental stress and parenting practices and their implications for child welfare involvement. Currently, families are experiencing more churning in the labor market, and the financial consequences of an unfavorable labor market shock might have an immediate impact on child-rearing.

The present study expands the existing literature on economic conditions and child maltreatment in several ways. First, due to the limited availability of suitable micro-data that measure both family economic resources and CPS involvement consistently within short intervals over time, researchers know relatively little about the potential relationship between economic instability and child maltreatment. Using quarterly administrative data from a sample of families at risk of CPS involvement (defined by having had a prior CPS investigation) and time-to-event analyses, this study provides insight into the timing of earnings instability and the risk of CPS involvement. Second, earnings instability could be multidimensional. This paper depicts several aspects of earnings instability, namely its direction, magnitude, and frequency.

Taking into account one-time and recurrent negative earnings shocks as well as the duration of earnings instability is critical for understanding the relationship between economic instability and CPS outcomes. Third, this paper is the first to examine whether an extensive array of social benefits, including cash and in-kind support, has buffering effects on the risk of child maltreatment under unstable labor-market circumstances.

Data and Method

The study relies on state administrative data from a randomized controlled trial (RCT) conducted in Milwaukee, Wisconsin. The intervention was intended to offer needs assessment and community economic support counseling to promote financial literacy among a group of families with recently closed CPS investigations without detectable child safety concerns. It did not systematically provide income transfers, although some treatment group families received a one-time in-kind good or service to address an immediate financial crisis (e.g., eviction, utility shut-off). In this rare circumstance, the emergency fund was used only to obtain necessities instead of providing families with money directly. In addition, there was no other economic service intervention systematically offered to these families in the absence of this RCT. Although the analytic sample draws data from the RCT, the intervention is not the focus of this paper. The study controls for treatment status in all models and the coefficient for that indicator is never significant. A sensitivity check is also performed using only the control group (see result section). Having a CPS investigation that was closed without child safety concerns within one quarter prior to randomization was the criteria for families to enter the RCT; therefore, families may still have experienced investigations or substantiation prior to participation in the study.

Administrative records of these families' earnings, social benefits received, and other demographic characteristics were obtained through the Wisconsin Administrative Data Core

housed at the Institute for Research on Poverty at the University of Wisconsin-Madison. Child welfare involvement was measured using administrative data, obtained through the Wisconsin Statewide Automated Child Welfare Information System. The CPS-relevant administrative data and a series of detailed social benefits, wages, and basic characteristics were linked for sample families.

The analytic sample consists of families who entered the study between late 2012 and 2014, who were followed through the end of 2016. This enabled tracking of their CPS involvement in the administrative data for at least two years or more post-randomization, allowing observation of the occurrence of a CPS event as time elapsed. Cash benefits in the present study include Temporary Assistance for Needy Families (TANF, [a program tied to work or training-to-work eligibility criteria]), Supplemental Security Income (SSI, [a program providing a minimum level of income to adults with difficulty meeting basic needs due to age or disability, and to needy children with severe disabilities]), Unemployment Insurance (UI, [a program designed to provide cash flow to displaced workers while they are searching for jobs]), and child support; in-kind benefits include SNAP and childcare subsidies. All earnings and benefit amounts are in consistent 2014 US dollars.

Capitalizing on the state administrative data, the study enables observation of the exact investigation date and corresponding type of maltreatment allegation for each specific CPS investigation. Given that administrative data on earnings are measured by quarter, different program participations and CPS events are computed quarterly, beginning from the quarter prior to each family's randomized entry into the study through the end of 2016. Some families have administrative records that could not be used to determine household composition, resulting in a proportion of observations without identified family structures. Instead of dropping these missing

cases, a dichotomous variable for missing information is created, and the observations are preserved in the present study. The analytic sample contains 2,429 unique caregivers. Based on the concern that results may be biased due to treatment receipt, analyses are replicated among the control group only (1,486 unique caregivers) as a sensitivity check.

Outcome variables: The key outcome in the present study is the first incidence of a CPS investigation post-randomization. The paper estimates separately whether a family experienced (1) any investigated report, (2) investigated abuse report, and (3) investigated neglect report, regardless of whether substantiation occurred. In this study, only physical abuse is considered as an abuse report. Neglect is defined by the following allegation types: lack of care, lack of supervision, and medical neglect.

Explanatory variables: Earnings instability is conceptualized using several dimensions: magnitude, direction, and frequency. The independent variables in the study consist of three sets of predictors, all of which are time-dependent. First, negative earnings shock is a binary variable defined as a reduction in earnings by 30% or more from one quarter to the next. If a family's earnings during a quarter are 30% (or more) lower than its earnings in the previous quarter, the family is assigned a value of 1; otherwise, it is assigned a value of 0. As a sensitivity check, results are also estimated using 50% as the cutoff to capture larger earnings shocks. In addition to this time-varying dichotomous variable, in some models, a continuous indicator is used to denote the cumulative numbers of negative reductions (of 30% or more) in earnings a family has experienced, as of the current quarter.

Second, earnings instability is measured using the longest period of consecutive quarters during which a family experienced stable earnings. A family may have experienced several periods with stable earnings before a CPS event occurred. As a time-dependent variable, the

indicator is always indexed with the greatest number of consecutive quarters with relatively steady earnings as of the current quarter. That is, a family may still have experienced earnings variation, but if its quarter-to-quarter reduction did not reach the 30% negative shock benchmark, the family is classified as having stable earnings.

Finally, one key research question in the present study is to understand whether social safety net benefits buffer the risk of child maltreatment in a context of earnings instability. Thus, the third key predictor derives from the first measure—a reduction of 30% or more in quarter-to-quarter earnings—but accounts for whether such a shock is accompanied by benefit supplements. Benefit measures include TANF, SSI, UI, child support, SNAP, and child care subsidy receipt. To match the quarterly structure of the administrative UI earnings data, all monthly benefits receipt is converted to quarterly totals. These are then summed to arrive at the gross income measure. Specifically, if a family experienced an earnings shock, but its gross income reduction did not reach the 30% shock benchmark, the family is considered to experience the buffering effects of income supplements from social benefit programs. That is, if a family experienced an earnings shock that resulted in a total income reduction of 30% or more, the family is considered to have experienced a negative shock with no compensatory supplement. If a family experienced a negative earnings shock of 30% or more but received compensatory benefits, such that its gross income did not fall by at least 30%, it is considered to have experienced a negative earnings shock with compensatory benefit supplementation. Families that did not experience a negative earnings shock of at least 30% are coded as having no negative shock. Therefore, this indicator comprises three categorical variables: negative earnings shock without sufficient income supplementation, negative earnings shock with sufficient income supplementation, and no negative shock. The last category serves as the reference group.

Covariates: Most control variables in the study are measured at randomization, including three dichotomous variables, indicating SNAP, Medicaid or State Children's Health Insurance Program (SCHIP), and child support receipt at baseline. Other relevant economic indicators include gross income for the quarter prior to randomization and baseline employment status. Some demographic characteristics may also affect a family's CPS involvement propensity. These include a caregiver's race or ethnicity, age, nativity, family configuration, and number of children in the household. Several dummy variables for race and ethnicity include non-Hispanic White, non-Hispanic Black, Hispanic, Asian, and other race, with non-Hispanic Black serving as the reference group. Family configuration captures a child's living arrangement at baseline and includes the following: two-parent family, single-mother family, and single-father family. Moreover, a dummy variable indicating that family structure is missing is included, as a nontrivial proportion of children's living arrangements are not identifiable in the administrative data. Note that a fraction of individuals does not have earnings information in the administrative data. This might be because their jobs are not eligible for unemployment insurance, or they are not working. A binary variable is created to indicate whether the person is missing wage data, and their earnings information is recoded to zero for that quarter. All analyses include this dummy variable. Finally, the present study considers a family's previous CPS history by adjusting for whether prior CPS substantiation occurred. Regarding the control variables, one caveat is that the administrative data did not contain caregivers' education level, so the study cannot control for a caregiver's educational background. That said, given that this sample overwhelmingly include single mothers with a high risk of CPS involvement, a relatively disadvantaged group, excluding educational background from the models may not have a large impact on the estimates. Although treatment status is not the focus of the present study, given the

nature of this RCT, a dummy variable is included to indicate whether a family is in the sample's treatment group.

As this study examines the timing and duration of economic shocks and their associations with subsequent CPS investigations, I use an event history approach to understand the hazard rate (risk) that a CPS investigation occurs in the quarters following an earnings shock. I first use a Kaplan-Meier (KM) analysis to summarize the raw probability of “survival” (not experiencing a CPS investigation) in each quarter of the 2-4 years following randomization. The KM method is reported as a survival curve and is descriptive in nature. As a conditional probability, this approach enables a basic estimate of the proportion of families without CPS investigations by any given quarter. For example, the probability of not having CPS contact beyond the fourth quarter is the product of probabilities of remaining free of CPS events in the previous three quarters and the probability of not having CPS contact in the present quarter (fourth quarter, in this case). It is worth noting that, in many event history analyses, a right time-censoring issue is common. This study is no exception. Some families in the sample might not have the chance to make an event transition, experiencing a CPS investigation in this case, during the study period.

Though the KM curves visually present the proportion of families free of CPS events by a given point in time, they present only unadjusted descriptive estimates for specific samples. Consequently, I estimate a Cox proportional hazard specification to identify associations of employment instability with CPS investigation after adjusting for other important determinants of CPS involvement. This facilitates the inclusion of time-dependent and time-invariant predictors. The models take the following form:

$$\ln Y_h(t) = \ln h_0(t) + X_i + Z_{i,t}$$

Where $h(t)$ is a hazard function of experiencing a CPS event Y at time t and h_0 is the baseline hazard, X is the time-varying key predictor(s) of interest, including either (1) a dichotomous variable indicating whether a negative earnings shock occurred in the particular quarter, (2) a continuous variable representing the cumulative number of adverse shocks experienced as of the given quarter, (3) a continuous variable indicating the longest period with relatively stable earnings up to a given quarter, or (4) a set of dummy variables indicating whether a negative shock was accompanied by income supplementation from social benefits in a given quarter. Each of these measures is examined in a separate model. Those who experienced no negative shocks serve as the reference group. Z is a set of characteristics that is fixed for family i , such as the caregiver's race or ethnicity, age, nativity, family size, family structure at baseline, benefits receipt at baseline, economic status prior to baseline, and treatment (vs. control) group status. Standard errors are clustered at the family level in all analyses.

One merit of using Cox models based on survival data is the ability to predict the proportional hazard for family i at time t , assuming a CPS investigation has not yet occurred. Specifically, I begin by estimating separate models for each of the aforementioned earnings instability predictors: one-time negative shocks, cumulative number of shocks, and the longest period with no shocks. Furthermore, the study assesses whether safety net programs have an impact on CPS outcomes by dividing the subgroup that experienced negative shocks into whether a shock was buffered by income supplementation from an array of safety net programs. Finally, I construct lagged variables for predictors pertaining to time-dependent negative shocks, including them in the models to detect any differences in delayed effects resulting from instability. Thus, the last set of models loses one quarter of the observation period to allow for

the lagged measure in each observation period. I then replicate these specifications for each outcome of interest: any CPS investigation, abuse investigation, and neglect investigation.

Results

Table 1 shows descriptive statistics for the key outcomes, predictors, and covariates for the full analytic sample and by family CPS investigation status. The outcomes and key predictors of earnings instability are time-varying, and their average value across all quarters is presented. On average, 45% of families are investigated for maltreatment during the observation period; 18% are investigated for alleged child abuse and 38% for alleged child neglect (these categories are not mutually exclusive, as a report may include both abuse and neglect). Turning to earnings instability, slightly more than half of the studied families experience an earnings shock with earnings reduced by 30% or more from one quarter to the next at some point during the observation period. Note that this indicator represents time-dependent earnings shocks a family experienced at some point during the study period, thus, the “any earnings shock,” “any earnings shock without benefit supplement,” and “any earnings shock with benefit supplement” categories are not mutually exclusive. One-third of families experience a shock that was buffered, whereas 40% experience a shock that was not buffered. Furthermore, families, on average, experience 7 consecutive quarters without an earnings shock. Interestingly, families that do not experience a new CPS investigation are disproportionately likely to experience shocks. At the same time, however, families that are not re-investigated experience, on average, a span of more than 9 consecutive quarters of stability, approximately 5 quarters longer than that of CPS-investigated families.

[Table 1 about here]

As mentioned above, this is a relatively disadvantaged sample of families, which is evident in their characteristics. Their average quarterly total income prior to baseline is about \$3,000. An overwhelming majority of sampled families, 81%, rely on SNAP; nearly three-quarters receive Medicaid or SCHIP. Slightly less than half were employed when they entered the study. Fifty-five percent are female-headed, single-parent families, whereas more than half have at least one child under the age of six. Non-Hispanic Blacks comprise 56% of sample caregivers; another 16% are Hispanic, whereas 25% are White. Black families disproportionately experienced at least a negative shock over the study period, accounting for 63% of families who experience substantial shocks, though they only make up 56% of the total sample. Those with at least one child under 6 and single-mother families are also overrepresented in families with unstable earnings experiences (results available upon request).

Turning to differences by CPS re-involvement, compared to families that were subsequently investigated, those that were not reinvestigated during the study period have relatively higher quarterly incomes at baseline, are more likely to be employed and less likely to rely on benefits, are less likely to have a prior substantiated CPS report, and are less likely to be headed by a single mother.

[Figure 1 about here]

These descriptive analyses should be interpreted with caution, given that exposure to an earnings shock is particularly time-sensitive. As mentioned above, one of the present study's main contributions is that it takes advantage of the timing of earnings shocks and CPS investigations. Before the paper proceeds to multivariate results from models that account for time-dependent predictors of interest, a survival curve is presented in Figure 1. This depicts a family's probability of not having a CPS event by whether a shock is buffered by other income

benefits among families with unstable earnings experiences. As a step function graph, the horizontal line in each time quarter corresponds to the proportion of families who do not have CPS events in that quarter. Whereas the gradients of the curves are similar, a slightly higher risk of being investigated by CPS is observed for those who ever experienced a shock that was not compensated by social benefits. Again, this approach does not account for when the period of stability or shock occurred, which triggers further multivariate analyses to understand the timing of the shock and its subsequent impact on CPS outcomes.

Regression results

Negative earnings shocks

Table 2 presents associations of negative-earnings shocks with three different outcomes produced from Cox hazard regression models. I present estimates from two specifications: (1) an uncontrolled model that estimates time raw quarterly hazard rate of CPS investigation following a 30% decrease in earnings; and (2) a model that estimates this hazard rate net of a family's socioeconomic and demographic characteristics, such as baseline benefit receipt, employment status, prior gross income, a caregiver's race or ethnicity, age, family structure, place of birth, household size, any previously substantiated reports, and treatment group status.

[Table 2 about here]

Model 1 suggests that there is an unconditional association between a loss of earnings and each of the three outcomes in the expected direction, with significant relationships observed for any investigation ($p < .05$) and abuse investigation ($p < .01$). As shown in Model 2, with the addition of the full set of controls, the point estimates become slightly smaller and only marginally significant. Overall, the uncontrolled models show that an earnings shock increases the risk of an investigation by about 21%, and the risk of an abuse investigation by 39%. The

magnitude of these estimates decreases to 18% ($p < .1$) and 26% ($p < .1$) with the inclusion of the covariates. No significant association between earnings shocks and neglect investigations is detected. Though the main focus is negative earnings instability, some other coefficients of covariates are worth attention. Noticeably, single mothers have an approximately 29% higher risk of having a neglect report, compared to two-parent families, which may reflect the economic disparity in resources across different family types. If a caregiver is working at baseline, the likelihood of having a neglect investigation is significantly lower than for their nonworking counterparts, which again may suggest that economic resources matter in affecting CPS involvement, particularly for neglect reports.

Number of negative earnings shocks and length of earnings stability

Table 3 introduces models using additional measures of earnings instability to address frequency of earnings instability (Panels A and B) and whether negative earnings shocks were buffered by social welfare benefit supplementation (Panels C and D). These measures are also time-variant, such that they vary by quarter. Panel A shows estimates for the total number of earnings shocks a family experienced up to a given quarter. This is a cumulative exposure measure. Panel B shows estimates for the greatest number of consecutive quarters during which a family experienced stable earnings up to the present quarter. Again, both unadjusted and adjusted models are reported.

[Table 3 about here]

Overall, the relationship between the total number of negative shocks experienced and the three CPS outcomes appears to be statistically significant, and the point estimates remain robust to the full set of controls. The magnitude of such relationships does not vary greatly across outcomes examined, with each additional negative shock being associated with an

increase of approximately 13% to 15% in the risk of having a CPS report. One interesting finding in Table 3, Panel A, is the significant result for neglect reports, despite a nonsignificant estimate on this outcome in Table 2. This may indicate that the effects of ongoing earnings instability on children's material needs and supervision (neglect) are more salient than a single negative earnings shock, whereas child abuse risk may have been triggered by a single incident.

The second panel (Panel B) of Table 3 displays results for the longest consecutive number of quarters during which a family experienced no earnings shock. Again, this is a time-varying measure. For each point in time over the period, a family is coded according to the greatest number of consecutive quarters during which they had experienced stable earnings up to the quarter of observation. Consistent with the observed adverse impact of earnings instability, the longest duration with no labor-market shock is negatively associated with each outcome. Net of the full set of covariates, each additional consecutive quarter with stable earnings is significantly associated with 4-6% lower risk of CPS investigation.

Social welfare benefit supplementation of negative earnings shocks

The results thus far indicate that negative earnings shocks are associated with increased CPS investigations. However, it is important to consider whether such shocks may be buffered by increases in income from social benefit programs, as associations with CPS investigation may vary by the total amount of income lost. Thus, the paper next shows results from models that regress each CPS outcome on dichotomous time-varying indicators of whether an earnings shock was offset by social welfare benefit supplementation; again, no earnings shock is the reference category. The results in Panel C of Table 3 indicate that negative income shocks are associated with increased CPS investigations only when they are not buffered by social welfare benefits. Net of the controls, such shocks are associated with a 27% increase in any investigation, a 38%

increase in abuse investigations, and a 25% increase ($p < .1$) in neglect investigations. By comparison, negative earnings shocks that are accompanied by an income supplement have no association with CPS involvement. These estimates are robust to the addition of lagged indicators of earnings shocks (Panel D), although the lagged measures are nonsignificant, suggesting that earnings shocks that are not accompanied by income supplementation have an immediate, rather than lagged influence on CPS involvement.

Lastly, given that the impact of economic instability on children may vary according to a child's age, exploring heterogeneity by child's age should provide more nuance in understanding the magnitude of the impact that income instability may have on a child's development. However, the data on which this analytic sample are based refer to the adults who allegedly perpetrated the reported maltreatment, and these adults may have had multiple children. Separate models are estimated for each CPS involvement measure, where each predictor interacts with the youngest child's age. Youngest child age is categorized into three groups: 0-4 years, 5-12 years, and 13-17 years. Overall, the relationship operates in the same direction (results available upon request), although the interaction coefficients are insignificant with one exception. A negative earnings reduction that is offset by income supplementation is associated with about 12% decrease in CPS involvement among children under 5 years, and their risk of abuse decreases by nearly half. This may confirm that income supplementation is critical for families in the face of unfavorable earnings shocks, particularly for families with young children.

Robustness checks

As a robustness check, I reconstruct the negative shock as earnings reduced by 50% or more from one quarter to the next, rather than by 30% or more as in the primary analyses, and replicate the full set of analyses using the previous specifications. Given the observed

relationship between negative income shocks and risk of child maltreatment, a larger negative earnings shock would be expected to be associated with a similar or greater increase in the chance of being investigated by CPS. Indeed, the findings in Table 4 confirm this pattern, with more substantial increases to CPS involvement for most of the models. The most notable difference is in any negative earnings shock (Panel A). The risk of CPS involvement increases significantly by 5 percentage points more when earnings drop by 50% than by 30%; that is, the hazard ratio suggests a 23% increase in any CPS report, compared to an 18% increase, as shown in Table 2. The difference is greater for abuse reports (about 12 percentage points) and for neglect reports (7 percentage points), which is statistically significant in this specification, but not in the primary specification. The results in Panel B show that cumulative negative shocks of 50% increase a child's likelihood of having a screened-in report by 2 to 3 percentage points, compared to shocks of 30% of earnings. Results for cumulative quarters without an earnings shock (Panel C) are quite consistent when the 50% and 30% thresholds are used. Likewise, the results for earnings shocks being buffered by social transfers are consistent in magnitude across specifications, although using the 50% cutoff, the estimate is significant when the lagged indicators are also included in the model.

[Table 4 about here]

Based on the concern that results may be biased due to treatment receipt, analyses are replicated among the control group only (1,486 unique observations) as a sensitivity check. Overall, results are largely similar to the primary estimates, and the direction of the relationship between multiple earnings instability measures and child welfare involvement remains unchanged. Results are shown in Appendix Tables A1 and A2.

Conclusion

The findings from this study provide evidence that a negative labor market shock, as measured through reductions of quarterly earnings by 30% or more, significantly increases the risk of child welfare involvement, particularly abuse investigations. However, this is primarily the case when earnings drops are not buffered by social benefit supplements. In addition, the findings indicate that a cumulative number of unfavorable earnings shocks have larger associations with CPS investigations. Further, longer spells of stable earnings (no earnings reductions of 30% or more) are associated with lower risks of CPS involvement. Experiencing more earnings stability, irrespective of receiving other benefits, may impact CPS involvement through several channels: increased economic resources to provide a child with multi-domain material needs; greater, stable emotional and mental health of caregivers; and less family conflict to enable a more nurturing home environment and parent–child relationship. In addition, the most direct potential policy impact of this study is the suggestive evidence of the critical role of safety net programs among this vulnerable population. Ensuring that families can access sufficient social benefits as income supplements when such shocks occur may effectively buffer the risk of child maltreatment. CPS-involved families are relatively economically disadvantaged. Experiencing substantial earnings drop may deteriorate their life circumstances, and whether sufficient benefit supplements are possible may further exacerbate the within-group economic disparities. The current findings signify that adequate social benefits access is crucial to offset some of the adverse impacts resulting from earnings instability, which may narrow the gaps of financial circumstances among CPS-involved families.

Prior studies on income and child maltreatment have often found significantly greater links between economic resources and child neglect than child abuse. As such, it is noteworthy

that current findings appear to show somewhat smaller or equivalent links between earnings shocks and neglect. Given that a lack of income and neglectful behavior are closely linked, this result suggests that persistently low-income and negative earnings shocks may be differently associated with neglect. This may, in part, reflect that the study uses time-to-event analysis and focuses mainly on short-term earnings instability. In particular, the study captures the magnitude of time-sensitive negative shocks. It thus unpacks the instantaneous impact of large earnings shocks, which may have a more immediate impact on child abuse. By contrast, the impacts on child neglect may take time to evolve and be detected, especially when related to material needs. Notably, associations of negative earnings shocks with neglect tend to be somewhat larger and more likely to attain statistical significance when they are larger in magnitude, greater in number, and adjusted for prior earnings shocks. This, too, may suggest that neglect takes longer than abuse to materialize in response to negative earnings shocks. It may also be the case, however, that persistently low income is more closely linked to neglect, whereas negative earnings shocks—even in the context of low-income—are more closely linked to abuse.

This study is not without limitations. First, though the utilization of administrative records on earnings, an extensive set of social benefits, and child welfare outcomes are appealing, the disadvantaged families in the study may have had some unobserved income or private transfers from other households that administrative data do not capture. The unobserved funds often understate a family's earnings or gross income; to the extent that this differs by earnings shock status, the results could be biased. Another caveat is that the data lack information on a family's access to other social services (beyond transfer programs). Some of the sampled families might be more aware of different types of services (e.g., home visiting) or more likely to have better help-seeking strategies to cope with negative labor market shocks. Again, if

this differs systematically by earnings shock status, it may bias the estimates. Second, the results are based only on a relatively small sample of families in one state within the United States. This may limit the generalizability of the results. Labor market conditions can vary drastically across locations, which might impact the surveyed participants' experiences with earnings instability in different ways. Thus, future studies using nationally representative data would be particularly useful to understand associations of earnings instability and child maltreatment risk in a more generalizable sample. Results from a previous study may signal different impacts of gender-specific unemployment on child maltreatment, with only male unemployment associated with increased CPS involvement (Lindo et al., 2018). However, given that the current analytic sample is highly inclusive of single mother families, the study is unable to test for gender differences in earnings instability. Future studies based on a larger sample size that stratifies parental employment instability and gender would be extremely beneficial.

These findings have several implications for policy. Results from this study show earnings reductions without compensatory social welfare benefit supplementation substantially increase child maltreatment risk. However, no significant relation is observed for earnings shocks offset by benefit supplements. Thus, income (support) appears to matter for disadvantaged families. CPS-involved families are relatively vulnerable, and most rely on means-tested social programs in combination with limited earnings to make ends meet. Easing restrictions on access benefits and providing additional services to assist these families in securing benefits is crucial. Restricting access to social benefits that would compensate for negative income shocks is likely to increase child maltreatment risk, a costly social problem for children, families, and society as a whole. Furthermore, given the strong links between income and CPS involvement, as well as the prevalence of frequent earnings instability experienced by

lower-income families, a more frequent, stable income payment would serve as a floor for families to cope with financial hardship resulting from unstable employment. Though policy through the tax code provides families with a lump sum payment to purchase goods or services necessary (Halpern-Meekin et al., 2015), it is still on an annual basis, and it is unclear how beneficial such a one-time payment would be to help needy families meet weekly or monthly basic household expenses, and enrich the home environment for their children's learning. A stable, adequate monthly income payment, such as child allowances recommended by the National Academies of Sciences, Engineering, and Medicine (2019), is crucial for families, especially those lacking sufficient savings or liquid assets to pay bills, have their basic needs met, and in turn, to benefit their children. Finally, although the study does not observe the reasons for which families incur negative income shocks, low-income parents are often forced to cut hours worked or take unpaid leave to accommodate their children's needs, particularly if they lack consistent childcare. Thus, access to paid leave and expanded child care options may help parents to stabilize their earnings and, in turn, protect children from maltreatment.

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Table 1. Descriptive Statistics

	Total	No CPS investigation	CPS investigation	Sig.
CPS involvement				
Any investigated CPS report during the study period	0.45	-	-	
Any physical abuse report	0.18	-	-	
Any neglect report	0.38	-	-	
Earnings Instability				
Any earnings shocks	0.51	0.61	0.38	***
Any earnings shocks w/o benefit supplement	0.40	0.51	0.27	***
Any earnings shocks w/ benefit supplement	0.33	0.39	0.25	***
No. of consecutive quarters with relative stable earnings	7.22 (4.64)	9.50 (4.24)	4.42 (3.42)	***
Family characteristics				
Quarterly gross income prior to baseline	2,943 (3,199)	3,203 (3,366)	2,625 (2,952)	***
Respondent working at baseline	0.46	0.51	0.41	***
SNAP receipt at baseline	0.81	0.75	0.89	***
Medicaid and SCHIP receipt at baseline	0.74	0.69	0.81	***
Child support receipt at baseline	0.30	0.28	0.31	†
Substantiated report prior to baseline	0.10	0.07	0.13	***
Non-Hispanic White	0.25	0.24	0.27	*
Non-Hispanic Black	0.56	0.56	0.56	
Hispanic	0.16	0.17	0.15	
Asian	0.02	0.03	0.01	**
Others	0.005	0.00	0.01	
US born	0.89	0.85	0.93	
Two-parent family	0.21	0.23	0.19	*
Single-mother family	0.55	0.53	0.57	*
Single-father family	0.04	0.05	0.03	

Family structure missing	0.20	0.20	0.20	
Earnings missing	0.51	0.50	0.53	†
Caregiver age	30.12	30.61	29.52	***
At least one child under age 6	0.51	0.56	0.44	***
Number of children	3.34 (2.47)	2.89 (2.09)	3.89 (2.79)	***
Treatment status	0.39	0.39	0.39	
N	2,429	1,336	1,093	

Note: Mean (and standard deviation) or proportion presented. Race or ethnicity and nativity refer to the caregiver's characteristics. *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Figure 1. Survival curves by ever experience of a shock with or without income supplement

Table 2. Cox proportional hazards estimates of associations of negative earnings shocks with CPS investigations

	Any investigated report		Physical abuse report		Neglect report	
	HR	RSE	HR	RSE	HR	RSE
Negative earnings shocks	1.21(.11)*	1.18(.10)†	1.39 (.18)**	1.26(.17)†	1.13 (.11)	1.13 (.11)
Single mother		1.16(.10)†		1.02(.13)		1.29(.12)**
Single father		1.04(.19)		0.69(.21)		1.01(.21)
Family structure missing		1.07(.11)		0.97(.15)		1.10(.12)
Non-Hispanic White		1.47(.11)***		1.28(.15)*		1.46(.12)***
Hispanic		1.09(.10)		1.00(.15)		1.08(.11)
Asian		0.82(.24)		1.27(.48)		0.90(.27)
Others		1.07(.44)		0.45(.45)		1.34(.55)
Caregiver's age: 26-40		0.79(.06)**		0.87(.11)		0.73(.06)***
Caregiver's age: 41-60		0.53(.08)***		0.78(.18)		0.52(.09)***
Caregiver's age: >60		0.44(.22)		1.04(.62)		0.24(.17)*
Number of children		1.12(.01)***		1.12(.02)***		1.13(.01)***
At least one child under 6		0.81(.06)**		0.62(.07)***		0.88(.07)

Treatment indicator	1.05(.07)	1.03(.10)	1.03(.07)
US Born	1.57(.21)***	1.49(.32)†	1.54(.23)**
Substantiation prior to baseline	1.25(.12)*	1.13(.16)	1.33(.13)**
Working at baseline	0.85(.07)*	1.23(.15)†	0.75(.06)***
SNAP receipt at baseline	1.49(.16)***	1.33(.22)†	1.73(.22)***
Medicaid and SCHIP receipt at baseline	1.14(.10)	1.23(.17)	1.08(.10)
Pay child support at baseline	0.91(.18)	1.37(.37)	0.90(.21)
Earnings missing	0.79 (.06)**	0.58 (.07)***	0.81 (.07)*
Average income prior to baseline	1.00(.00)†	1.00(.00)	1.00(.00)
N	2,429	2,429	2,429
Person-Quarters	24,901	30,303	26,206

Note: Negative earnings shock is measured by 30% decline in earnings. No earnings shock is the reference category. White is the reference category for race. Two-parent family is the reference category for family structure. Age 18-25 is the reference category for caregiver's age. HR = Hazard ratio. Robust standard error (RSE) is presented in parenthesis.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Table 3. Cox proportional hazards estimates of associations of numbers of earnings shocks, quarters with stable earnings, and social welfare benefit supplementation in the face of earnings shocks with CPS investigations

	Any investigated report		Physical abuse report		Neglect report	
	HR	RSE	HR	RSE	HR	RSE
Panel A						
Total number of negative earnings shocks	1.14	(.03)***	1.15	(.03)***	1.17	(.05)***
Additional family characteristics controlled		X		X		X
Panel B						
# of consecutive quarters with stable earnings	0.95	(.01)***	0.95	(.01)***	0.92	(.02)***
Additional family characteristics controlled		X		X		X
Panel C						
Negative shocks without income supplement	1.27	(.14)*	1.27	(.14)*	1.50	(.24)**
Negative shocks with income supplement	1.14	(.15)	1.07	(.14)	1.38	(.22)*
Additional family characteristics controlled		X		X		X
Panel D						
Negative shocks w/o income supplement		1.27 (.14)*		1.37 (.22)*		1.26 (.15)†
Negative shocks w/ income supplement		1.05 (.14)		1.08 (.21)		0.96 (.14)
Negative shocks w/o income supplement (lagged)		1.16 (.2)		1.05 (.27)		1.41 (.26)†
Negative shocks w/ income supplement (lagged)		0.91 (.12)		0.82 (.15)		0.99 (.15)
Additional family characteristics controlled		X		X		X
N	2,429	2,429	2,429	2,429	2,429	2,429
Person-Quarters	24,901	24,901	30,303	30,303	26,206	26,206

Note: Negative earnings shock is measured by 30% decline in earnings. No earnings shock is the reference category in panels C and D. Models include a series of same covariates from Table 2. HR = Hazard ratio. Robust standard error (RSE) is presented in parenthesis.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Table 4. Cox proportional hazards estimates of associations of negative earnings shocks with CPS investigations—alternative threshold for negative earnings shocks (50% decline in earnings)

	Any investigated report	Physical abuse report	Neglect report
	HR RSE	HR RSE	HR RSE
Panel A			
Negative shocks (50 percent or more)	1.23 (.12)*	1.38 (.2)*	1.20 (.13)†
Additional family characteristics controlled	X	X	X
Panel B			
Total number of negative earnings shocks	1.18 (.04)***	1.18 (.06)**	1.16 (.04)***
Additional family characteristics controlled	X	X	X
Panel C			
# of consecutive quarters with stable earnings	0.94 (.01)***	0.94 (.02)*	0.95 (.02)**
Additional family characteristics controlled	X	X	X
Panel D			
Negative shocks without income supplement	1.30 (.20)†	1.43 (.32)	1.30 (.22)
Negative shocks with income supplement	1.19 (.14)	1.36 (.23)†	1.14 (.15)
Additional family characteristics controlled	X	X	X
Panel E			
Negative shocks w/o income supplement	1.27 (.14)*	1.37 (.22)*	1.26 (.15)†
Negative shocks w/ income supplement	1.05 (.14)	1.07 (.21)	0.96 (.14)
Negative shocks w/o income supplement (lagged)	0.95 (.20)	0.80 (.23)	1.24 (.29)
Negative shocks w/ income supplement (lagged)	0.81 (.14)	0.64 (.15)†	0.96 (.20)
Additional family characteristics controlled	X	X	X
N	2,429	2,429	2,429
Person-Quarters	24,901	30,303	26,206

Note: No earnings shock is the reference category in panels D and E. Models include a series of same covariates from Table 2. HR = Hazard ratio. Robust standard error (RSE) is presented in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Appendix

Table A1. Cox proportional hazards estimates of associations of one-time earnings shock, numbers of earnings shocks, quarters with stable earnings, and social welfare benefit supplementation in the face of earnings shocks with CPS investigations among families in the control group

	Any investigated report		Physical abuse report		Neglect report	
	HR RSE	HR RSE	HR RSE	HR RSE	HR RSE	HR RSE
Panel A						
Negative earnings shock	1.27(.14)*	1.20(.13)†	1.47 (.24)*	1.32(.22)†	1.18 (.14)	1.15 (.14)
Additional family characteristics controlled		X		X		X
Panel B						
Total number of negative earnings shocks	1.14 (.04)***	1.13 (.04)**	1.17 (.06)***	1.12 (.06)*	1.12 (.04)**	1.12 (.04)**
Additional family characteristics controlled		X		X		X
Panel C						
# of consecutive quarters with stable earnings	0.95 (.02)**	0.96 (.02)*	0.92 (.02)**	0.95 (.03)†	0.96 (.02)*	0.96 (.02)†

Additional family characteristics controlled			X		X	
Panel D						
Negative shocks without income supplement	1.32 (.18)*	1.28 (.18)†	1.54 (.31)*	1.41 (.29)†	1.21 (.18)	1.22 (.19)
Negative shocks with income supplement	1.22 (.20)	1.11 (.18)	1.39 (.33)	1.21 (.29)	1.15 (.20)	1.07 (.19)
Additional family characteristics controlled			X		X	
Panel E						
Negative shocks w/o income supplement		1.26 (.18)†		1.40 (.29)†		1.22 (.19)
Negative shocks w/ income supplement		1.08 (.17)		1.17 (.28)		1.04 (.18)
Negative shocks w/o income supplement (lagged)		1.02 (.21)		0.93 (.28)		1.29 (.29)
Negative shocks w/ income supplement (lagged)		0.78 (.12)		0.64 (.14)*		0.84 (.15)
Additional family characteristics controlled			X		X	
N	1,486	1,486	1,486	1,486	1,486	1,486
Person-Quarters	15,605	15,605	18,903	18,903	16,352	16,352

Note: Sample is restricted to control group only. Negative earnings shock is measured by 30% decline in earnings. No earnings shock is the reference category in panels D and E. HR = Hazard ratio. Robust standard error (RSE) is presented in parenthesis.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10

Table A2. Cox proportional hazards estimates of associations of negative earnings shocks with CPS investigations—alternative threshold for negative earnings shocks (50% decline in earnings) among families in the control group

	Any investigated report	Physical abuse report	Neglect report
	HR RSE	HR RSE	HR RSE
Panel A			
Negative shocks (50% or more)	1.34 (.16)*	1.57 (.27)**	1.27 (.17)†
Panel B			
Total number of negative earnings shocks	1.18 (.05)***	1.20 (.08)**	1.16 (.05)***
Panel C			
# of consecutive quarters with stable earnings	0.95 (.02)**	0.95 (.03)†	0.96 (.02)*
Panel D			
Negative shocks without income supplement	1.31 (.26)†	1.72 (.47)*	1.17 (.27)
Negative shocks with income supplement	1.19 (.14)	1.49 (.31)†	1.32 (.20)†
Panel E			
Negative shocks w/o income supplement	1.26 (.18)†	1.41 (.29)	1.22 (.19)
Negative shocks w/ income supplement	1.08 (.17)	1.17 (.28)	1.04 (.18)
Negative shocks w/o income supplement (lagged)	0.76 (.18)	0.68 (.23)	1.11 (.31)
Negative shocks w/ income supplement (lagged)	0.62 (.12)*	0.49 (.13)**	0.78 (.19)
N	1,486	1,486	1,486
Person-Quarters	15,605	18,903	16,352

Note: Sample is restricted to control group only. All models include same covariates from Table 2. No earnings shock is the reference category in panels D and E. HR = Hazard ratio. Robust standard error (RSE) is presented in parenthesis.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.10