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Article

Income and the mental health of Canadian mothers: Evidence from the Universal Child Care Benefit

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ABSTRACT

The Universal Child Care Benefit, introduced in 2006, was an income transfer for Canadian families with young children. I exploit this exogenous increase in income to answer the following questions: (1) Is there a relationship between income and mental health among Canadian mothers? (2) Is it corroborated by other measures of well-being (i.e. stress, life satisfaction)? (3) Is the effect different for lone mothers compared to those in two-parent families? I answer these questions using a difference-in-differences model and microdata from the Canadian Community Health Survey, 2003 to 2008. The estimating sample includes 26,886 mothers, 6273 of whom are lone parents.

I find the income transfer improved mental health and life satisfaction regardless of family structure, albeit not necessarily for a given individual. Rather, average scores were higher for mothers with young children after implementation of the Universal Child Care Benefit. For example, they were more likely to report 'excellent' mental health and less likely to be in each of the other categories. The transfer also reduced stress among lone mothers with young children. Specifically, they were less likely to be 'quite a bit' or 'extremely' stressed on a daily basis, and more likely to be 'not at all' or 'not very' stressed. I argue that assumptions of the model are plausible and show that results are consistent across several robustness checks.

1. Introduction

The Universal Child Care Benefit (UCCB), introduced in 2006, was an income transfer for Canadian families with young children.[1] I use this policy change to estimate the relationship between income and maternal well-being, which is otherwise endogenous. I focus on mental health, in addition to stress and life satisfaction. Moreover, I make the important distinction between lone and married mothers because they face different constraints on time and financial resources.

1.1. Income and health

There is a well-established literature on the relationship between income and health among adults. Conceptually, health status can be defined by a production function. Income reflects access to inputs including those related to lifestyle, environment and medical care (Folland, Goodman, & Stano, 2009). Likewise, Grossman (1972) postulates a model in which individuals are endowed with a depreciating health stock. It can be improved by engaging in health production or purchasing medical care. Individuals implicitly choose the duration of their lifespan through such investments, which are facilitated by socio-economic status.

Empirically, the relationship between income and health is endogenous due to reverse causation and omitted variables. For example, poor health may impede labour productivity and thus income, while individuals with low socio-economic status may have limited access to health-enabling resources (e.g. medical care, nutritious food). Likewise underlying factors, such as family background and time preference, may influence both income and health.

To address endogeneity, Ettner (1996) uses instrumental variables including the unemployment rate and parental education. She finds that income has a positive effect on self-assessed health and depression. However, instruments may affect well-being in ways that are unrelated to income (e.g. refer to Ruhm (2008) for a review of the literature on macroeconomic conditions and health).

Other studies exploit shocks to wealth via lottery winnings and inheritances. For example, Gardner and Oswald (2007) estimate the effect of lottery winnings on mental health in the United Kingdom. They find a positive relationship that is lagged by two years. Moreover, Meer, Miller, and Rosen (2003) find a small, positive relationship between income and self-assessed health using inheritances, which may be correlated with unobserved factors that affect well-being. For example,

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[1] It was replaced by a new child benefit program in July 2016.

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an affluent family background may be associated with better health and receipt of a bequest.

Another approach, which is the basis for this study, is to use policy reform to attain exogenous variation in income. For instance, Case (2004) finds that a large, unanticipated increase in old age pension for Black and Coloured South Africans protects the health of recipients and other household members. However, it is unclear whether this finding is generalizable to younger adults in more developed countries. Similarly, Frijters, Haisken-DeNew, and Shields (2005) use an exogenous increase in income for East Germans after re-unification. They find a small, positive relationship between income and health, while Frijters, Haisken-DeNew, and Shields (2004) find large improvements in life satisfaction using the same methodology.

Also related to policy reform, there is some evidence that child-related transfers improve maternal well-being. For example, Milligan and Stabile (2011) exploit variation in the Canada Child Tax Benefit and National Child Benefit Supplement across provinces, time and number of children. They find that higher child benefits reduce maternal depression. Likewise, Evans and Garthwaite (2014) consider the effect of an expanded Earned Income Tax Credit in the United States; families with two or more children were given a much larger refundable tax credit than those with one child. They find a significant reduction in the number of bad mental health days, as well as a higher probability of very good/excellent health among mothers without post-secondary education.

Finally, while not directly related to health, Schirle (2015) examines the effect of the UCCB on labour supply. She finds that married mothers used it to purchase time away from the labour market. Koebel and Schirle (2016) find comparable results for married mothers, while those who were separated or divorced increased their labour supply on the extensive margin. Moreover, they find no effect among those who were common law or never married. In this paper, I use a comparable identification strategy, based on the UCCB, to estimate the relationship between income and maternal well-being.

1.2. Universal Child Care Benefit

The UCCB is a plausibly exogenous increase in income for Canadian mothers with young children. Introduced in 2006, the UCCB paid $100 per month, or $1200 annually, for each child under the age of six. This was a sizeable transfer, especially for those at the bottom of the income distribution.[2] Moreover income-tested benefits, such as the Canada Child Tax Benefit and social assistance, were not affected by the UCCB.

The UCCB was taxed progressively. Moreover, net benefits varied by family type for a given level of income because, for tax purposes, the UCCB was claimed by lone parents or lower-earning spouses.[3] For example, Battle (2008) calculates net benefits for Manitoba families at various income levels. At $10,000 (i.e. below the taxpaying threshold), all families received the full amount of the UCCB. At $20,000, two-parent families kept the full amount, while lone parents received only $1057 per year. At higher income levels, net benefits were smaller for lone parents and dual-earner families compared to those with one earner.

Families that received the Canada Child Tax Benefit were automatically enrolled in the UCCB, otherwise parents applied to the Canada Revenue Agency. They received benefits within 80 calendar days and were entitled to retroactive payments for up to 11 months. The Treasury Board of Canada Secretariat (2009) reports that 99 percent of eligible families received the UCCB. In two-parent families, the UCCB was paid to mothers by default or to fathers with written consent. For lone parents, benefits were paid to the primary care giver. Those with shared custody could split the UCCB as of July 2011.

1.3. Maternal well-being

Kooreman (2000) finds that parents treat child benefits differently than other income sources. He concludes they experience a 'moral obligation' to spend a relatively large share on child-related goods. In contrast, Blow, Walker, and Zhu (2012) find that an unanticipated increase in child benefits leads parents to spend more on themselves. In short, child-related transfers affect parental well-being by facilitating their own needs and/or those of their children. This may be particularly true for mothers as they tend to manage household spending on goods that benefit children, such as food and clothing (Woolley, 2004). Similarly, Lundberg, Pollak, and Wales (1997) find that, in the United Kingdom, paying benefits to mothers is associated with much higher spending on clothing for women and children. In contrast, Bradbury (2004) exploits a change in how income support payments are distributed within married couples in Australia. He finds a negligible effect on expenditure patterns and not in the expected direction. For example, an increase in the income share of women is associated with higher tobacco consumption. He concludes that transfers "with specifically advertised objectives and paid to particular individuals may be more effective in influencing consumption patterns than large-scale changes to the within-household distribution of income" (page 533). In the context of this paper, mothers receive the UCCB by default and are generally responsible for child rearing. For example, women dedicate more time to household production, especially in the presence of children (Marshall, 2006). They also use time more intensively. Offer and Schneider (2011) find that, relative to fathers, mothers multitask ten more hours per week with the additional time spent on housework and child care. For these reasons, I focus on mothers rather than fathers.

I also distinguish between lone and married mothers because they face very different constraints on time and financial resources.[4] For example, married mothers tend to have higher household income and more flexibility in allocating non-market time to household production and leisure. Indeed, Burton and Phipps (2007) find that lone mothers are particularly vulnerable to time shortages and low income, not to mention economic insecurity.

By expanding the budget set, a positive income shock facilitates the purchase of necessities and other health-enabling resources. It also provides protection against potential economic losses. So, how does it affect maternal well-being? Specifically:

(1) Is there a relationship between income and mental health among Canadian mothers?
(2) Is it corroborated by other measures of well-being (i.e. stress, life satisfaction)?
(3) Is the effect different for lone mothers compared to those in two-parent families?

It is important to address these issues in a Canadian context because past studies pertain to the United States, and thus a different policy environment (e.g. Evans & Garthwaite, 2014). Moreover, Milligan and Stabile (2011) emphasize Canadian children with cursory attention to mothers. That is, they do not include corroborating measures of maternal well-being, nor do they distinguish between lone and married mothers.

In this paper, I answer the preceding questions using a difference-in-differences (DD) model. The UCCB is appropriate for this purpose because it was paid to mothers by default and represents an exogenous increase in income for those with young children.

[2] However, I argue the UCCB was too small to induce changes in fertility. Refer to Section 6.

[3] As of July 2011, lone parents could include it in: (1) their own income; (2) the income of a dependant for whom an Eligible Dependant Credit was claimed; or (3) the income of a child for whom the UCCB was paid.

[4] Another reason to focus on mothers rather than fathers is that lone-parent families are more likely to be headed the former (Statistics Canada, 2015).

2. Data

I use confidential microdata from the Canadian Community Health Survey (CCHS), which includes private households in all provinces/territories except full-time members of the military, institutional residents, those on Crown land and First Nations reserves. It covers approximately 98 percent of the Canadian population aged 12 and older (Statistics Canada, 2005). Moreover, response rates were close to 80 percent in each of the four cycles used in this paper.[5]

The CCHS was conducted every two years over the period 2001 to 2007 and annually thereafter. I pool four cross-sections: Cycles 2.1 (2003); 3.1 (2005); 4.1 (2007); and 2008. These cycles include the periods before and after implementation of the UCCB. And, pertinent variables are available and consistently defined over this interval. I scale sampling weights to sum to one within each cycle since they are representative of the same population and sample size varies across cycles.

My sample includes Canadian mothers aged 18 to 59.[6] I focus on those with children younger than 12 to facilitate comparisons between treatment and control groups. Mothers with children younger than six were treated to the income transfer as of 2006.[7] The control group includes those with children aged six to 11.

I drop proxy interviews (i.e. approximately 300 observations) given the subjective nature of the dependent variables.[8] The main dependent variable is self-assessed mental health. It is rated on a five-point scale, ranging from 'poor' to 'excellent'. As corroborating evidence, I also consider stress and life satisfaction. In the CCHS, individuals report being 'not at all', 'not very', 'a bit', 'quite a bit' or 'extremely' stressed on a daily basis. Moreover, life satisfaction is inferred from the question 'How satisfied are you with your life in general?' Responses are given on a five-point scale, ranging from 'very dissatisfied' to 'very satisfied'.

3. Descriptive statistics

Figs. 1–3 depict distributions of well-being indicators before and after the policy change. They are given for treatment and control groups, separately for lone and married mothers. I aggregate the bottom categories of mental health and life satisfaction due to small proportions of married mothers (i.e. to maintain confidentiality of respondents).

Fig. 1, Panels A and B indicate that lone mothers had marginally better mental health in the post-policy period. This was true for treatment and control groups. Moreover, as shown in Panel C, there were improvements in mental health among married mothers who received the income transfer. Specifically, a larger proportion reported 'excellent' mental health (i.e. 43.4 percent compared to 39.1 percent in the pre-policy period). The improvement came at the expense of 'very good' health since there was little change at the bottom of the scale. At the same time, mental health declined among married mothers in the control group (i.e. Panel D).

Fig. 2, Panel A indicates that lone mothers were less stressed after receiving the transfer. For example, only 24.4 percent reported 'quite a bit' of stress compared to 30.1 percent in the pre-policy period. At the same time, stress worsened among lone mothers in the control group (i.e. Panel B). Moreover, as shown in Panels C and D, there were negligible changes in stress among married mothers. This was true for treatment and control groups.

Fig. 3, Panels A and B indicate that lone mothers had better life satisfaction in the post-policy period. This was true for treatment and control groups. Moreover, as shown in Panel C, there were improvements in life satisfaction among married mothers who received the income transfer. Specifically, a larger proportion reported being 'very satisfied' with life (i.e. 51.2 percent compared to 47.3 percent in the pre-policy period). The improvement came at the expense of being 'satisfied' with life since there was little change at the bottom of the scale. The opposite was true for the control group (i.e. Panel D).

4. Methods

I use a DD model, outlined in Eq. (1), to examine whether improvements in well-being among mothers with young children occurred as a result of the UCCB.[9] Recall that mothers with young children were treated to the income transfer as of 2006. The control group includes those with children aged six to 11.

The identification strategy is comparable to that used by Schirle (2015) and Koebel and Schirle (2016) in estimating the effect of the UCCB on labour supply. However, the following model allows for different effects by family type since net benefits varied by family type for a given level of income, except below the taxpaying threshold. Recall they were generally smaller for lone parents and dual-earner families compared to those with one earner. At the same time, lone mothers have higher marginal utility of income; average household income is $17,886 compared to $38,614 among those in two-parent families.

$$Y_i = \beta_1 Lone_i + \beta_2 Young_i + \beta_3 (Lone_i \times Young_i) + \beta_4 Post_i + \beta_5 (Lone_i \times Post_i) + \beta_6 (Young_i \times Post_i) + \beta_7 (Lone_i \times Young_i \times Post_i) + \alpha X_i + \varepsilon_i \quad (1)$$

i indexes individualsY_i represents self-assessed mental health, stress and life satisfaction, respectively. $Young_i$ denotes the presence of a child younger than six, which implies eligibility for the income transfer. $Post_i$ is a dummy variable to indicate the post-policy period of 2007 and 2008. Thus, β_6 is a DD estimator to indicate the effect of the UCCB on maternal well-being. I also include $Lone_i$ and related interactions such that β_7, another DD estimator, is the additional effect for lone mothers compared to those in two-parent families.

Further to the main variables, X_i is a vector of covariates to control for the local environment (e.g. unemployment rate, rural/urban residence, province/territory) and individual characteristics. The latter include age and age-squared, as well as dummy variables for immigrant status and Aboriginal identity.[10] I also include dummy variables for education (i.e. less than high school and post-secondary compared to high school), as well as the natural logarithm of household income with adjustments for inflation, economies of scale in consumption and higher cost of living in Northern Canada.[11] Specifically, I deflate income to real 2002 dollars using the all-items Consumer Price Index by province/territory (Statistics Canada, No Date). Then, based on the 'Luxembourg Income Study' equivalence scale, I divide income by the square root of household size to account for economies of scale in consumption. For instance, a four-person household with an income of $40,000 is thought to have the same standard of living as a single individual with $20,000 (Buhmann, Rainwater, Schmaus & Smeeding, 1988). Finally, I adjust for higher cost of living in Northern Canada using the approach outlined by Daley, Burton and Phipps (2015).

α and β_j for $j = [1,7]$ are parameters to be estimated.ε_i is the error term.

[5] Response rates in Cycles 2.1 (2003), 3.1 (2005), 4.1 (2007) and 2008 were 80.7, 78.9, 77.6 and 75.2 percent, respectively (Statistics Canada, 2005; Statistics Canada, 2006; Statistics Canada, 2008; Statistics Canada, 2009).

[6] Results are robust to various age ranges. For example, Table 3 includes results for women aged 25 to 49.

[7] I do not observe whether mothers actually received the UCCB. Rather, I identify the treatment group based on eligibility (i.e. the presence of a child younger than six as of 2006). Schirle (2015) quantifies errors in defining the treatment group based on this criterion. She finds that errors randomly occur in 2.5 percent of two-parent families. Moreover, they are not more frequent among those headed by separated or divorced individuals.

[8] A proxy interview is completed by a household member on behalf of the respondent if she is unable to participate due to poor physical or mental health.

[9] I use the following to characterize the DD model: Angrist and Pischke (2009); Blundell and Costa Dias (2000); Imbens and Wooldridge (2009).

[10] I cannot differentiate between First Nations, Métis and Inuit mothers because this information is not available in all cycles of the CCHS.

[11] Income is before taxes and after transfers. Results are robust to reducing income by the amount of the UCCB for mothers with young children in the post-policy period, and to excluding income.

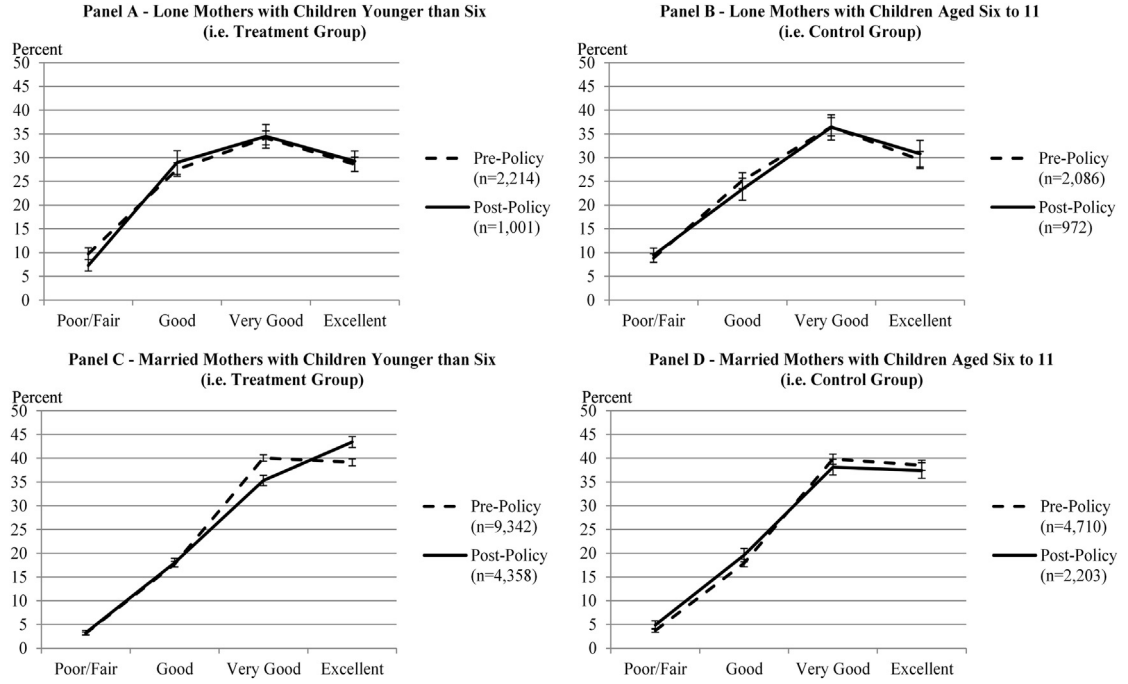

Fig. 1. Distributions of Mental Health.

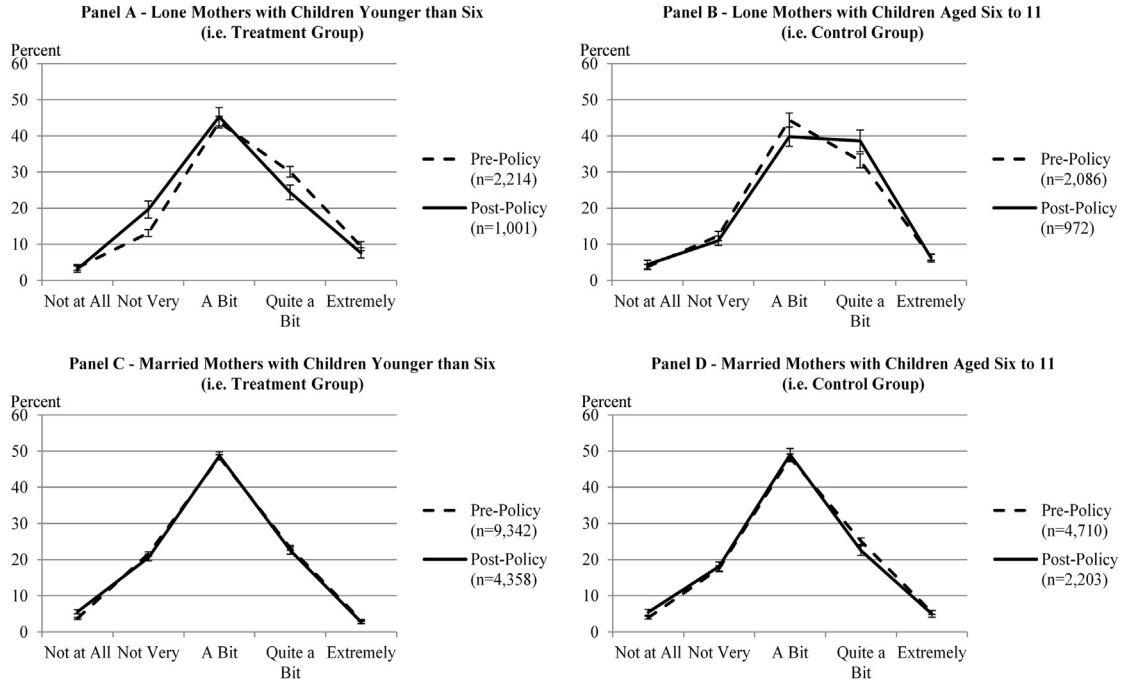

Fig. 2. Distributions of Stress.

I estimate Eq. (1) using ordered probit regressions with robust standard errors.[12] The estimating sample includes 26,886 mothers, 6273 of whom are lone parents.

5. Regression analysis

Table 1A contains ordered probit estimates of Eq. (1) for mental health, stress and life satisfaction, respectively. Recall that DD estimators indicate the effect of the income transfer on maternal well-being. I find it had a positive effect on mental health regardless of family structure (i.e. $\hat{\beta}_6$ is positive and statistically significant).[13] This was corroborated by gains in life satisfaction. Presumably, a positive income

[12] Results are robust to clustering standard errors by province/territory. I use the wild cluster bootstrap method to account for the small number of clusters (Cameron & Miller, 2015).

[13] Readers may be concerned that statistical significance, which is at the ten percent level, is driven by the large sample. However, $\hat{\beta}_6$ is nearly significant at the five percent level (i.e. the p-value is 0.054). Moreover, this result is robust to several variations in the model including one in which the sample is reduced by 20 percent (i.e. robustness check in which the treatment group is limited to mothers with one child younger than six; refer to Table 3).

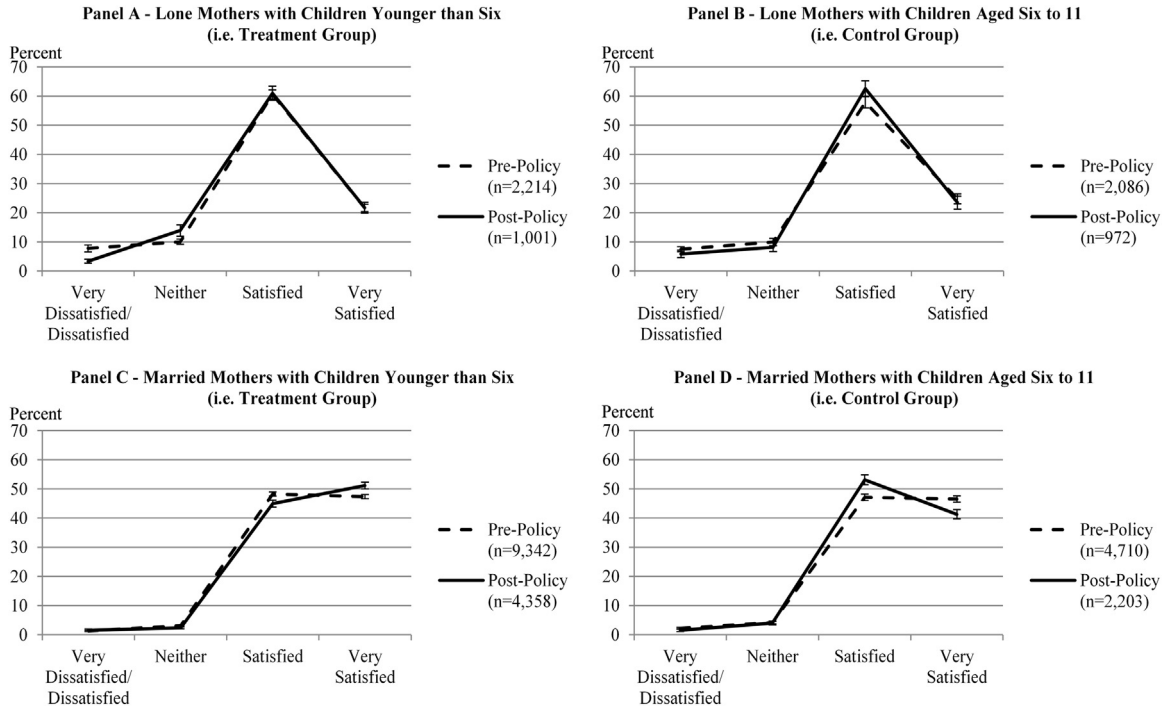

Fig. 3. Distributions of Life Satisfaction.

Table 1A
Ordered Probit Estimates of DD Model.

	Mental Health	Stress	Life Satisfaction
Young Child × Post-Policy	0.1061*	0.0310	0.1486***
	(0.0551)	(0.0533)	(0.0559)
Lone Mother × Young Child × Post-Policy	-0.0760	-0.2774**	-0.1302
	(0.1153)	(0.1170)	(0.1101)
Age	-0.0274*	0.0317**	0.0114
	(0.0151)	(0.0146)	(0.0152)
Age-Squared	0.0002	-0.0003	-0.0003
	(0.0002)	(0.0002)	(0.0002)
Aboriginal	-0.1708***	-0.0011	-0.0514
	(0.0454)	(0.0476)	(0.0491)
Immigrant	-0.0109	-0.1664***	-0.3206***
	(0.0305)	(0.0308)	(0.0309)
Less than High School Education	-0.1773***	0.0479	-0.0648
	(0.0435)	(0.0454)	(0.0446)
Post-Secondary Education	0.0822***	0.0998***	0.0795***
	(0.0266)	(0.0255)	(0.0268)
Log of Real Equivalent Income	0.1572***	0.0212	0.2450***
	(0.0176)	(0.0148)	(0.0201)
Unemployment Rate	0.0092	0.0330**	-0.0273
	(0.0166)	(0.0165)	(0.0179)
Rural	0.0613**	-0.0669**	0.0916***
	(0.0243)	(0.0237)	(0.0263)
Lone Mother	-0.2024***	0.2192***	-0.4744***
	(0.0494)	(0.0489)	(0.0524)
Young Child	-0.0176	0.0401	0.0348
	(0.0319)	(0.0306)	(0.0341)
Lone Mother × Young Child	-0.0295	0.2000***	-0.0435
	(0.0660)	(0.0664)	(0.0706)
Post-Policy	-0.0555	-0.0559	-0.1070**
	(0.0492)	(0.0466)	(0.0481)
Lone Mother × Post-Policy	0.0837	0.1539*	0.1416*
	(0.0889)	(0.0857)	(0.0813)
Pseudo R-Squared	0.0151	0.0110	0.0503
Number of Observations	26,886	26,886	26,886

I include a constant and dummy variables for province/territory in all regressions. Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

shock facilitates the purchase of necessities and other health-enabling resources. It also provides protection against potential economic losses. This is important for mothers because they are generally responsible for child rearing, often with limited means.

In addition to gains in mental health and life satisfaction, the transfer reduced stress among lone mothers (i.e. $\hat{\beta}_7$ is negative and statistically significant). This makes sense as they are most in need of assistance; they are particularly vulnerable to time shortages, low income and economic insecurity. Indeed, Table 1A indicates that lone mothers have lower self-assessed mental health relative to those in two-parent families. They are also more stressed and less satisfied with life. The former is especially true for lone mothers with young children.

These estimates provide an overview of the association between the UCCB and maternal well-being. However, dependent variables are categorical (e.g. mothers rate their mental health from 'poor' to 'excellent'). Thus, it is important to consider how the income transfer affected the probability of being in a particular category. Recall from Figs. 1–3 that a larger proportion of married mothers were at the top of the mental health and life satisfaction scales after receiving the transfer. Moreover, a larger (smaller) proportion of lone mothers were at the bottom (top) of the stress scale. To examine these differences using the DD model, Table 1B contains marginal effects based on ordered probit estimates. Baseline probabilities are calculated at sample means with dichotomous variables set equal to zero.

I find the income transfer increased the probability of having 'excellent' mental health by about ten percent (i.e. 0.04 on the baseline probability of 0.38). At the same time, it reduced the probability of being in the other categories.[14] This is consistent with the descriptive statistics and suggests that improvements in mental health were concentrated at the top of the scale. The same is true for life satisfaction.

On the other hand, among lone mothers, the income transfer reduced the probability of being 'quite a bit' or 'extremely' stressed on a daily basis. It also increased the probability of being 'not at all' or 'not very' stressed. Again, this is consistent with the descriptive statistics

[14] Again, results are significant at or near the five percent level (i.e. p-values for 'poor', 'fair', 'good', 'very good' and 'excellent' are 0.04, 0.04, 0.05, 0.09 and 0.06, respectively).

Table 1B
Marginal Effects based on Ordered Probit Estimates.

Mental Health	Poor	Fair	Good	Very Good	Excellent
Baseline Probability	0.0062	0.0334	0.1921	0.3908	0.3775
Young Child × Post-Policy	-0.0017**	-0.0068**	-0.0230*	-0.0091*	0.0407*
	(0.0008)	(0.0034)	(0.0118)	(0.0054)	(0.0213)
Lone Mother × Young Child × Post-Policy	0.0015	0.0055	0.0168	0.0048	-0.0285
	(0.0024)	(0.0087)	(0.0258)	(0.0058)	(0.0427)

Stress	Not at All	Not Very	A Bit	Quite a Bit	Extremely
Baseline Probability	0.0402	0.1875	0.4839	0.2467	0.0418
Young Child × Post-Policy	-0.0026	-0.0067	-0.0014	0.0078	0.0028
	(0.0044)	(0.0114)	(0.0025)	(0.0135)	(0.0049)
Lone Mother × Young Child × Post-Policy	0.0301*	0.0613**	-0.0043	-0.0674**	-0.0197***
	(0.0155)	(0.0261)	(0.0083)	(0.0269)	(0.0065)

Life Satisfaction	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Baseline Probability	0.0017	0.0151	0.0385	0.5152	0.4295
Young Child × Post-Policy	-0.0007***	-0.0049***	-0.0098***	-0.0433***	0.0587***
	(0.0003)	(0.0017)	(0.0035)	(0.0169)	(0.0222)
Lone Mother × Young Child × Post-Policy	0.0008	0.0053	0.0098	0.0344	-0.0505
	(0.0008)	(0.0051)	(0.0090)	(0.0271)	(0.0420)

Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

and reflects a shift in the scale from top to bottom.

6. Assumptions of the DD model

In what follows, I consider whether assumptions of the DD model are plausible.[15] First, the DD model requires that treatment is exogenous. Specifically, the error term should not contain unobserved, transitory characteristics of mothers that affected eligibility for the transfer. This is facilitated by its universality; benefits were paid to all mothers with young children. However, a possible threat to identification is that women 'opted in' by having a child. This is unlikely because the transfer was small compared to the cost of doing so. For example, Phipps (1998) finds that, relative to a childless couple, those with one child require 15.5 percent more income to maintain the same standard of living. This implies an annual cost of $12,623 in 2006 dollars. A couple with two children requires 27.9 percent more income, or $10,098 annually, for the second child. The transfer represents only 9.5 and 11.9 percent of annual costs for the first and second child, respectively. Moreover, opportunity costs associated with changes in labour supply are not considered in these calculations.

Empirically, there is mixed evidence regarding financial incentives and fertility. Gauthier (2007) reports considerable variation by data and policy design (e.g. level of benefits, eligibility criteria). She concludes that "while the additional financial support is bound to be welcomed by parents, the overall effect on fertility is likely to be small" (page 339). Indeed, trends in fertility were stable during the period in which the UCCB was implemented (Milan, 2013).

Like the exogeneity assumption, Blundell and Costa Dias (2000) argue that, with pooled cross-sectional data, it is difficult to control changes in treatment and control groups over time when individuals self-select according to an unobserved rule; "the composition of groups may change over time and be affected by the intervention" (page 443). In effect, the treatment group should be similar in the pre- and post-policy periods to remove unobserved, time-invariant characteristics that affect maternal well-being and eligibility for the transfer. The same applies to the control group. Table 2 indicates that treatment and control groups are similar across time in terms of observables. There are few statistically significant differences, and those that exist are generally small.[16]

7. Robustness checks

In this section, I present robustness checks to demonstrate that results are extraneous to other child-related policies and economic conditions, and that they persist with changes in how the treatment group and age of mothers are specified.

7.1. Other child-related policies

First, I consider whether other policies affected mothers with young children differently than the control group during the period in which the UCCB was implemented (i.e. to ensure they are not driving the results). Incidentally, most were already established and did not change during this period. For example, the Canada Child Tax Credit and National Child Benefit Supplement were introduced in 1993 and 1998, respectively. Similarly, there were no widespread changes in the availability or cost of child care. I also argue that other benefits introduced during this period were not targeted to mothers with young children (i.e. Child Disability Benefit in 2006, Children's Fitness Tax Credit and Child Tax Credit in 2007). Similarly, Schirle (2015) argues that such benefits did not affect mothers differently in terms of labour supply.

On the other hand, there was a major change in paid maternity and parental leave in Quebec. As of January 2006, it began to administer benefits through the Quebec Parental Insurance Plan. Like other

[15] One assumption is that maternal well-being would have evolved similarly for treatment and control groups in absence of the policy change. I have limited ability to check parallel trends because the CCHS only has two pre-policy cycles.

[16] Likewise, treatment and control groups should be comparable to each other to remove unobserved, group-invariant characteristics. This is confirmed in Supplementary Table 1. While there are several statistically significant differences across groups, most are relatively small.

Table 2
Means of Selected Covariates for Lone and Married Mothers by Group and Time.

	Lone Mothers Treatment Group			Lone Mothers Control Group			Married Mothers Treatment Group			Married Mothers Control Group		
	Pre-Policy	Post-Policy	Difference	Pre-Policy	Post-Policy	Difference	Pre-Policy	Post-Policy	Difference	Pre-Policy	Post-Policy	Difference
Age, Years	30.81	30.64	0.16	38.10	37.83	0.27	32.93	33.03	-0.10	39.42	39.80	-0.38*
	(0.24)	(0.34)	(0.41)	(0.23)	(0.27)	(0.36)	(0.08)	(0.12)	(0.15)	(0.10)	(0.17)	(0.20)
Aboriginal, Percent	8.45	9.55	-1.10	4.29	7.17	-2.88**	1.85	2.99	-1.14***	1.80	2.33	-0.53
	(0.79)	(1.23)	(1.46)	(0.56)	(1.07)	(1.20)	(0.16)	(0.31)	(0.35)	(0.20)	(0.35)	(0.40)
Immigrant, Percent	16.57	22.78	-6.21*	14.36	17.49	-3.12	20.08	22.29	-2.21*	21.37	25.39	-4.01**
	(1.68)	(2.70)	(3.18)	(1.59)	(2.35)	(2.83)	(0.65)	(1.09)	(1.26)	(0.97)	(1.63)	(1.90)
Less than High School Education, Percent	17.49	18.39	-0.91	12.41	9.73	2.68	6.11	5.70	0.41	6.91	5.80	1.11
	(1.26)	(2.20)	(2.54)	(1.23)	(1.41)	(1.87)	(0.34)	(0.53)	(0.63)	(0.54)	(0.91)	(1.06)
High School Education, Percent	31.00	29.12	1.88	28.18	25.95	2.23	21.95	18.08	3.86***	25.53	20.20	5.32***
	(1.51)	(2.24)	(2.70)	(1.83)	(2.65)	(3.22)	(0.59)	(0.852)	(1.04)	(0.97)	(1.35)	(1.66)
Post-Secondary Education, Percent	51.51	52.49	-0.98	59.41	64.32	-4.91	71.94	76.22	-4.28***	67.56	74.00	-6.44***
	(1.63)	(2.59)	(3.06)	(1.94)	(2.75)	(3.37)	(0.64)	(0.95)	(1.15)	(1.03)	(1.51)	(1.83)
Real Equivalent Income, 2002 Dollars	14,791	14,841	-49.27	20,487	20,279	208.19	36,241	40,347	-4,106***	39,823	41,203	-1,381
	(366.91)	(518.25)	(634.98)	(616.08)	(828.14)	(1,032)	(357.89)	(772.93)	(851.76)	(633.10)	(785.92)	(1,009)
Rural, Percent	12.23	10.56	1.67	12.12	12.43	-0.31	18.78	18.61	0.17	20.86	19.13	1.73
	(0.90)	(1.10)	(1.42)	(1.14)	(1.46)	(1.85)	(0.49)	(0.77)	(0.91)	(0.84)	(1.18)	(1.44)
Number of Observations	2,214	1,001	3,215	2,086	972	3,058	9,342	4,358	13,700	4,710	2,203	6,913

Standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

Table 3
Ordered Probit Estimates of DD Model – Robustness Checks.

		Mental Health	Stress	Life Satisfaction
Baseline (n = 26,886)	Young Child × Post-Policy	0.1061*	0.0310	0.1486***
		(0.0551)	(0.0533)	(0.0559)
	Lone Mother × Young Child × Post-Policy	(0.0760)(0.1153)	-0.2774**(0.1170)	-0.1302(0.1101)
Exclude Quebec (n = 21,505)	Young Child × Post-Policy	0.0661	0.0726	0.1337**
		(0.0609)	(0.0595)	(0.0608)
	Lone Mother × Young Child × Post-Policy	-0.0494	-0.3524***	-0.1066
		(0.1238)	(0.1259)	(0.1228)
Exclude New Mothers (n = 23,408)	Young Child × Post-Policy	0.1479***	0.0503	0.1424**
		(0.0567)	(0.0556)	(0.0577)
	Lone Mother × Young Child × Post-Policy	-0.1502	-0.3257***	-0.1348
		(0.1208)	(0.1240)	(0.1152)
Exclude Recession (n = 26,042)	Young Child × Post-Policy	0.1135**	0.0066	0.1494***
		(0.0579)	(0.0545)	(0.0580)
	Lone Mother × Young Child × Post-Policy	-0.1080	-0.2433**	-0.1315
		(0.1206)	(0.1215)	(0.1131)
Treatment Group: One Child Younger than Six (n = 21,337)	Young Child × Post-Policy	0.1177**	0.0441	0.1411**
		(0.0599)	(0.0574)	(0.0613)
	Lone Mother × Young Child × Post-Policy	-0.0400	-0.2818**	-0.1019
		(0.1237)	(0.1256)	(0.1180)
Mothers Aged 25 to 49 (n = 25,024)	Young Child × Post-Policy	0.1050*	0.0286	0.1706***
		(0.0564)	(0.0548)	(0.0571)
	Lone Mother × Young Child × Post-Policy	-0.1096	-0.2641**	-0.1244
		(0.1213)	(0.1223)	(0.1157)

I include covariates in all regressions. Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

jurisdictions, they were previously paid through employment insurance, which is relatively less generous. Thus, as a robustness check, I exclude Quebec to ensure that results reflect the impact of the UCCB on maternal well-being, and not the more generous benefits for new mothers in Quebec. Then, as a separate robustness check, I exclude all new mothers who were more likely to be on paid leave (i.e. those with children younger than one). This also ensures that results do not reflect policies aimed at improving the mental health of new mothers. Specifically, in absence of a national strategy, some provinces/territories developed programs to better prevent, diagnose and treat maternal mental health issues. British Columbia was the first to create a framework in July 2006 (BC Reproductive Mental Health Program, 2006).[17] By excluding new mothers, I ensure that such policies are not driving the results. As shown in Table 3, DD estimators are generally consistent with the baseline in terms of sign and statistical significance.[18]

[17] Saskatchewan followed in 2010 (Bruce, Béland & Bowen, 2012).

[18] Marginal effects based on ordered probit estimates are available in Supplementary Tables 2A–2E.

Table 4A
Ordered Probit Estimates of DD Model – Number of Children Younger than Six.

	Mental Health	Stress	Life Satisfaction
Number of Children × Post-Policy	0.0416	0.0110	0.0780**
	(0.0319)	(0.0302)	(0.0321)
Lone Mother × Number of Children × Post-Policy	-0.0486	-0.1895**	-0.0712
	(0.0747)	(0.0768)	(0.0746)
Pseudo R-Squared	0.0150	0.0110	0.0511
Number of Observations	26,886	26,886	26,886

I include covariates in all regressions. Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

Table 5A
Ordered Probit Estimates of DD Model – Duration of Benefits.

	Mental Health	Stress	Life Satisfaction
Duration of Benefits × Post-Policy	0.0058	0.0114	0.0278**
	(0.0129)	(0.0117)	(0.0135)
Lone Mother × Duration of Benefits × Post-Policy	-0.0011	-0.0503	-0.0483
	(0.0302)	(0.0315)	(0.0305)
Pseudo R-Squared	0.0155	0.0117	0.0541
Number of Observations	25,149	25,149	25,149

I include covariates in all regressions. Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

Table 4B
Marginal Effects based on Ordered Probit Estimates – Number of Children Younger than Six.

Mental Health	Poor	Fair	Good	Very Good	Excellent
Baseline Probability	0.0062	0.0334	0.1921	0.3908	0.3775
Number of Children × Post-Policy	-0.0007	-0.0028	-0.0091	-0.0031	0.0158
	(0.0006)	(0.0022)	(0.0070)	(0.0024)	(0.0121)
Lone Mother × Number of Children × Post-Policy	0.0009	0.0033	0.0106	0.0036	-0.0184
	(0.0013)	(0.0051)	(0.0164)	(0.0056)	(0.0284)

Stress	Not at All	Not Very	A Bit	Quite a Bit	Extremely
Baseline Probability	0.0402	0.1875	0.4838	0.2467	0.0418
Number of Children × Post-Policy	-0.0009	-0.0024	-0.0004	0.0028	0.0010
	(0.0026)	(0.0065)	(0.0012)	(0.0201)	(0.0027)
Lone Mother × Number of Children × Post-Policy	0.0164**	0.0408**	0.0075**	-0.0478**	-0.0169**
	(0.0067)	(0.0166)	(0.0032)	(0.0194)	(0.0069)

Life Satisfaction	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Baseline Probability	0.0017	0.0150	0.0384	0.5154	0.4295
Number of Children × Post-Policy	-0.0004**	-0.0028**	-0.0054**	-0.0219**	0.0306**
	(0.0002)	(0.0012)	(0.0022)	(0.0091)	(0.0126)
Lone Mother × Number of Children × Post-Policy	0.0004	0.0026	0.0050	0.0200	-0.0280
	(0.0004)	(0.0027)	(0.0052)	(0.0210)	(0.0293)

Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

7.2. Economic conditions

Next, I exclude mothers who were surveyed after September 2008 in case the recession affected those with young children differently than the control group. As outlined in Table 3, DD estimators are consistent with the baseline in terms of size, sign and statistical significance. It is interesting to note the transfer was slightly more effective in reducing stress with the inclusion of lone mothers who were surveyed during the recession. This affirms that extra income is particularly important in times of economic uncertainty.

7.3. Alternate treatment group

The treatment group consists of mothers with at least one young child, however the transfer was worth $1200 annually or a multiple thereof based on the number of young children. Thus, I limit the treatment group to mothers with one young child and find that results are robust. As shown in Table 3, the transfer had a positive effect on mental health regardless of family structure. This was corroborated by gains in life satisfaction. Moreover, the transfer reduced stress among lone mothers. I conclude that results are not driven by mothers with several young children who receive a much larger transfer.

7.4. Age of mothers

As a final robustness check, I limit the sample to mothers aged 25 to 49. Among this group, it is more common to have representation from treatment and control groups across the age distribution. Again, Table 3 indicates that results are robust.

8. Extensions

I consider two extensions to the DD model. First, I examine the effect of a larger transfer that ensued from having an additional young child since the UCCB paid $1200 annually for each. I also examine the effect of having a younger child, which implies the mother expected to receive benefits over a longer period.

8.1. Number of children younger than six

First, I replace the $Young_i$ dummy variable with the number of children younger than six. In this revised model, β_6 captures the effect of an additional young child in the post-policy period, and thus an extra $1200 annually. β_7 is the additional effect for lone mothers compared to those in two-parent families.

As shown in Tables 4A and 4B, mental health was not affected by a

Table 5B
Marginal Effects based on Ordered Probit Estimates – Duration of Benefits.

Mental Health	Poor	Fair	Good	Very Good	Excellent
Baseline Probability	0.0062	0.0339	0.1888	0.3906	0.3806
Duration of Benefits × Post-Policy	-0.0001	-0.0004	-0.0013	-0.0005	0.0022
	(0.0002)	(0.0009)	(0.0028)	(0.0010)	(0.0049)
Lone Mother × Duration of Benefits × Post-Policy	0.0000	0.0001	0.0002	0.0001	-0.0004
	(0.0005)	(0.0021)	(0.0065)	(0.0024)	(0.0115)

Stress	Not at All	Not Very	A Bit	Quite a Bit	Extremely
Baseline Probability	0.0409	0.1880	0.4848	0.2442	0.0422
Duration of Benefits × Post-Policy	-0.0010	-0.0024	-0.0004	0.0028	0.0010
	(0.0010)	(0.0025)	(0.0004)	(0.0029)	(0.0011)
Lone Mother × Duration of Benefits × Post-Policy	0.0044	0.0108	0.0019	-0.0126	-0.0045
	(0.0028)	(0.0068)	(0.0012)	(0.0079)	(0.0028)

Life Satisfaction	Very Dissatisfied	Dissatisfied	Neither	Satisfied	Very Satisfied
Baseline Probability	0.0016	0.0149	0.0380	0.5120	0.4335
Duration of Benefits × Post-Policy	-0.0001*	-0.0010**	-0.0019**	-0.0079**	0.0109**
	(0.0001)	(0.0005)	(0.0009)	(0.0038)	(0.0053)
Lone Mother × Duration of Benefits × Post-Policy	0.0002	0.0017	0.0033	0.0137	-0.0190
	(0.0002)	(0.0011)	(0.0021)	(0.0087)	(0.0120)

Robust standard errors are reported in parentheses. Statistical significance is given by: * ten percent; ** five percent; and *** one percent.

larger transfer that ensued from having an additional young child. Moreover, there was a small, positive effect on life satisfaction regardless of family structure. This suggests that $1200 annually per young child mattered more than the total amount of the transfer. It is also likely that needs associated with an additional young child were greater than the amount of the transfer.

On the other hand, having an additional young child in the post-policy period, and thus an extra $1200 annually, reduced stress among lone mothers. As before, marginal effects indicate a shift in the stress scale from top to bottom (i.e. from 'extremely' and 'quite a bit' to 'a bit', 'not very' and 'not at all'). This makes sense as lone mothers are particularly vulnerable to time shortages, low income and economic insecurity. Presumably, an increase in the total amount of the transfer helped to relax binding constraints on time and financial resources, as well as to provide protection against potential economic losses.

8.2. Duration of benefits

As a final extension, I estimate whether the amount of the transfer mattered in the context of the Permanent Income Hypothesis. Postulated by Friedman (1957), the Permanent Income Hypothesis implies that individuals smooth consumption over their lifetimes based on current income and expectations thereof. Transitory changes have little influence on consumption, while more permanent changes affect the trajectory. In this context, the amount of the transfer depends on current and future benefits as determined by the child's age. For example, mothers with newborns were entitled to benefits for six years, and thus the transfer was worth $7200. Likewise, mothers with children aged four were entitled to benefits for two years, and thus the transfer was worth $2400.

The CCHS contains the birth year of the mother's youngest child aged zero to five. I use this information to approximate the child's age and duration of benefits. I then replace the $Young_i$ dummy variable with duration of benefits, which ranges from one to six years for the treatment group. In this revised model, β_6 indicates how an extra year of benefits affected maternal well-being. Again, β_7 is the additional effect for lone mothers compared to those in two-parent families.

Tables 5A and 5B indicate a small, positive effect on life satisfaction, while mental health and stress were not affected by duration of benefits. This suggests that current benefits mattered more than the expected amount of the transfer. This does not coincide with the Permanent Income Hypothesis. However, it is possible that mothers faced liquidity constraints, which prevented them from smoothing consumption.

9. Conclusions

Introduced in 2006, the UCCB was an income transfer for Canadian families with young children. I use this policy change to estimate the relationship between income and maternal well-being, which is otherwise endogenous. The UCCB is appropriate for this purpose because it was paid to mothers and represents a plausibly exogenous increase in income for those with young children.

Using a DD model, I find the transfer improved mental health and life satisfaction regardless of family structure, albeit not necessarily for a given individual. Rather, average scores were higher for mothers with young children after implementation of the UCCB. For both mental health and life satisfaction, improvements were concentrated at the top of the scales. For example, mothers were more likely to report 'excellent' mental health and less likely to be in each of the other categories. Presumably, a positive income shock facilitates the purchase of necessities and other health-enabling resources. It also provides protection against potential economic losses. This is important for mothers because they are generally responsible for child rearing, often with limited means. In addition to gains in mental health and life satisfaction, the transfer reduced stress among lone mothers. Specifically, they were less likely to be 'quite a bit' or 'extremely' stressed on a daily basis, and more likely to be 'not at all' or 'not very' stressed.

As extensions to the main model, I find that $1200 per young child mattered more than larger transfers that ensued from having an additional young child, as well as a younger child and thus receiving benefits over a longer period. I argue that assumptions of the DD model are plausible and show that results are consistent across several robustness checks. I conclude the transfer had a robust, positive effect on maternal well-being with differences by family type (i.e. mental health and life

satisfaction for all mothers, as well as stress for lone parents).

Milligan and Stabile (2011, page 198) argue that "a broader set of outcomes should be included in any assessment of the costs and benefits of expanded transfer payments to families with children" (i.e. in addition to the labour market, education and direct consumption). I do not explicitly assess the costs and benefits of the UCCB. Rather, I use it to estimate the relationship between income and maternal well-being and, in doing so, provide evidence regarding its benefits. It is unclear whether other transfers with different parameters (e.g. level of benefits, eligibility criteria) would have the same effect.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.ssmph.2017.08.002.

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