The impact of tax credits on mothers' employment

Yekaterina Chzhen and Sue Middleton

This study reviews the impact of Child Tax Credit and Working Tax Credit on working mothers.

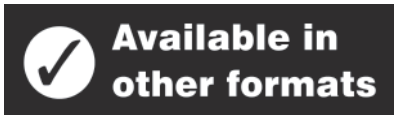
April 2003 saw the introduction of two new tax credits, Child Tax Credit and Working Tax Credit. Although working in different ways, these were both intended to support families with children, reduce child poverty, and make work pay for those on low incomes. They are a central plank of the Labour Government's ambitious policy of reducing and eventually abolishing child poverty.

This report:

- investigates the impact of the tax credits on the participation of women with children in the labour market
- explores why those eligible to receive these credits do not always take them up
- assesses whether the credits act as an incentive for mothers to reduce their working hours, and
- reviews the policy implications of the findings.

The study used data from the three latest available rounds of interviews of the longitudinal Families and Children Study (FACS), 2002/03–2004/05. The methodology also has lessons for those interested in pinpointing the most appropriate way of modelling the impact of the new tax credits.

JOSEPH ROWNTREE FOUNDATION



This publication can be provided in other formats, such as large print, Braille and audio. Please contact:
Communications, Joseph Rowntree Foundation,
The Homestead, 40 Water End, York YO30 6WP.
Tel: 01904 615905. Email: info@jrf.org.uk

The impact of tax credits on mothers' employment

Yekaterina Chzhen and Sue Middleton

JOSEPH ROWNTREE FOUNDATION

The **Joseph Rowntree Foundation** has supported this project as part of its programme of research and innovative development projects, which it hopes will be of value to policymakers, practitioners and service users. The facts presented and views expressed in this report are, however, those of the authors and not necessarily those of the Foundation.

Joseph Rowntree Foundation, The Homestead, 40 Water End, York YO30 6WP
Website: www.jrf.org.uk

About the authors

Yekaterina Chzhen is a quantitative researcher at the Centre for Research in Social Policy (CRSP).

Sue Middleton is Research Director at CRSP.

First published 2007 by the Joseph Rowntree Foundation

ISBN: 978 1 85935 606 7

A CIP catalogue record for this report is available from the British Library.

Prepared by:
York Publishing Services Ltd
64 Hallfield Road
Layerthorpe
York YO31 7ZQ
Tel: 01904 430033; Fax: 01904 430868; Website: www.yps-publishing.co.uk

Further copies of this report, or any other JRF publication, can be obtained from the JRF website (www.jrf.org.uk/bookshop/).

Contents

Acknowledgements

This report was undertaken by the Centre for Research in Social Policy (CRSP) and was commissioned by the Joseph Rowntree Foundation (JRF).

We would like to thank Chris Goulden, Principal Research Manager at the JRF, for his guidance throughout the project and for his feedback on the draft report. We are also grateful to members of the Project Advisory Group for their constructive comments and suggestions: Kate Bell, Mike Brewer, Nick Burkitt, Paul Dornan, Donald Hirsch, Lindsay Isaacs, Lindsey Jarvis and Elizabeth Rayner. We would also like to thank Professor Phil Robins for providing invaluable methodological support and feedback. Finally, particular thanks are owed to Dr Monica Magadi at CRSP for her advice on technical issues and to Nicola Selby at CRSP for administrative support to the project.

Executive summary

The new tax credits Child Tax Credit (CTC) and Working Tax Credit (WTC) were introduced in the United Kingdom in April 2003 to support families with children, reduce child poverty and make work pay for those on low incomes. The credits are a central plank of the Labour Government's ambitious policy of reducing and eventually abolishing child poverty. This report has investigated the labour market impact of the tax credits on labour market participation of women with children and explored the reasons for non-take-up of the tax credits among the eligible population. The study has used data from the three latest available rounds of interviews of the longitudinal Families and Children Study (FACS), 2002–05.

CTC and WTC are income-tested benefits that are administered by HM Revenue & Customs (HMRC). CTC supports families with dependent children, is paid directly to the main carer in the family (usually the mother) and does not depend directly on the family's work status. WTC, on the other hand, is paid to income-eligible families with children, as well as to working people over 25 years old without children. WTC has a minimum working hours requirement – in addition to meeting other conditions for receipt of WTC, an adult responsible for a child has to work 16 hours or more a week to be eligible.

Take-up of CTC and WTC

Our best estimate of take-up in 2004–05 suggests that a quarter of CTC-eligible families were not receiving it and 41 per cent of families eligible for WTC were not getting it. However, the take-up rates produced using FACS were below the 2004–05 take-up rates estimated by HMRC using a combination of survey and administrative data, which shows that administrative data tend to produce more accurate estimates of take-up than survey data alone (2007). According to FACS, among families eligible for CTC, lone parents were much more likely to be in receipt of CTC than mothers in couple families. Among families eligible for WTC, lone parents were also more likely to take it up.

Prior receipt of Working Families' Tax Credit (WFTC) – the predecessor of CTC and WTC – was a crucial predictor of take-up. CTC-eligible families who had been receiving WFTC in 2002–03 were almost twice as likely to take up CTC in 2004–05 as families who had not been claiming WFTC, while WTC-eligible families were three times more likely to take up WTC if they had been claiming WFTC in 2002–03.

CTC-eligible families with previous year's equivalised household incomes in the highest quintile were significantly less likely to take up CTC than other families. There were important differences by income among WTC-eligible families, however. Families with incomes in the second quintile were the most likely to take up WTC, while those with incomes in the first and the third quintiles were only about half as likely to take it up. Families in the fourth quintile were one-third as likely and those in the fifth quintile were only one-fifth as likely to take up WTC as those in the second quintile.

Eligible families in the London area were the least likely to be receiving CTC and WTC in 2004–05. CTC-eligible families were half as likely to be receiving CTC as those in the North of England and WTC-eligible families were half as likely to be receiving WTC as eligible families in the North. However, entitlement level was not controlled for in this study because of various data limitations. Thus, the estimated effects of these background characteristics may be partly due to their correlation with entitlement level.

The impact of CTC on labour market participation of women with children

In 2004–05, estimated employment rates of lone parents who were receiving CTC were around 11 percentage points lower than the employment rates of eligible non-recipients with a similar chance of receiving CTC. Mothers in couple families who were in receipt of CTC had an eight percentage point lower employment rate, on average, than comparable non-recipients.

From a dynamic perspective, after unobserved individual differences were accounted for but WTC receipt was not taken into account, CTC had no significant effect on the likelihood of being in work in either 2003–04 or 2004–05. This may have been because the positive effect of WTC, which was not controlled for, balanced out the negative effect of CTC.

However, when yearly changes in activity status were analysed, CTC had a negative effect on the probability of moving into work for those who had not been working at the 2002–03 round of interviews and were not in receipt of WTC at any of the two subsequent interviews. The negative effect of CTC on the probability of moving into work was larger in magnitude for lone parents.

CTC had a positive effect on the probability of moving out of work for lone parents who had been working at the time of the 2002–03 interview and were not in receipt of WTC at any of the two subsequent interviews, but a negative effect for mothers in couple families. Among CTC recipients, partnered mothers were substantially less likely to move out of work than lone parents, but there was no difference by family type among CTC non-recipients.

While there were no regional differences in the probability of moving into work, there were differences in the moving-out-of-work analysis. Women in the London area were more than twice as likely to move out of paid work than those in the North of England.

These results confirm the theoretical prediction that CTC can only ever have a negative effect on labour market participation of women with children.

The impact of WTC and CTC on working hours of women with children

In 2004–05, lone parents who were receiving WTC worked around four hours less than eligible non-recipients with a similar likelihood of receiving WTC. Women in couple families with employed partners who received WTC worked a similar number of hours, on average, to comparable non-recipients.

When changes in working hours over time were examined, after unobserved individual differences were accounted for, neither WTC nor CTC had a significant effect on working hours of women with children working 16 or more hours a week in 2003–04 and 2004–05, and eligible for WTC (and CTC) in 2004–05.

For women with children eligible for WTC (and CTC) in 2004–05, neither WTC nor CTC had a significant effect on the probability of moving from full-time work (30 or more hours a week) in 2002–03 to part-time work (between 16 and 29 hours) in any of the two subsequent years. Similarly, neither of the tax credits increased the chances of moving from part-time to full-time work among those who worked 16–29 hours a week in 2002–03.

In the context of the finding that CTC had a negative effect on participation of women with children, especially of lone parents, it may seem surprising that the tax credits had little effect on working hours. However, only those who were working 16 or more hours a week before and after the tax credits were introduced were examined

in the working hours analysis. Thus, CTC did a relatively poor job of pushing non-participating mothers into work (though, of course, this is not what CTC is supposed to do). For those who were already working and eligible for WTC, neither CTC nor WTC produced substantial changes in hours of work. This fits with the theoretical prediction that CTC is always a disincentive to work, while WTC is an incentive to reduce working hours, for those who are eligible for it.

1 Introduction

Background

Two new tax credits for families with dependent children, Child Tax Credit (CTC) and Working Tax Credit (WTC), were introduced in the United Kingdom in April 2003. The policy aim was to support families with children, reduce child poverty and make work pay for those on low incomes (HM Treasury, 2002). These credits are a central plank of the Labour Government's ambitious policy of halving child poverty by 2010 and abolishing it by 2020. Recent research has shown that increasing women's labour market participation and high levels of take-up of the tax credits will be crucial to achieving these poverty targets (Hirsch, 2006). Therefore, this report examines the impact of the new tax credits on the labour market participation of women with children in Britain.

The first point to note is that CTC and WTC are not 'true' tax credits in that they do not involve assessments for income tax purposes with the possibility of retrospective payments and/or reductions in tax liability, although they do follow the tax principle of an annual entitlement adjusted at the end of the year. Rather, CTC and WTC are income-tested benefits that are administered by HM Revenue & Customs (HMRC). CTC supports families with dependent children, is paid directly to the main carer in the family (usually the mother) and does not depend directly on the family's work status. The intention was that CTC would integrate all income-related support for children in the UK, so that all families with children with gross incomes of up to £58,175 a year (or up to £66,350 a year if the family has a child under one year old) currently can claim CTC.[1] Payments of CTC would be received from HMRC so that, for example, people in receipt of Income Support would now receive two payments: the adult element of Income Support from Job Centre Plus and CTC from HMRC. However, as we shall see, many families who were in receipt of Income Support prior to the introduction of tax credits and were still doing so in 2004–05 have not yet been 'migrated' to CTC and are continuing to receive a single Income Support payment, which contains an element for children equal to their CTC entitlement, from Job Centre Plus.

WTC, on the other hand, is paid to income-eligible families with dependent children, as well as to working people over 25 years old without children. WTC has a minimum working hours requirement – in addition to meeting other conditions for receipt of WTC, an adult responsible for a child has to work 16 hours or more a week to be eligible. It used to be paid through the wage packet to the earner, but this method

of payment began to be phased out in November 2005. It is now paid directly to the claimant. WTC provides additional support for people without children working 30 or more hours per week, disabled people or people aged 50 or over who are returning to work after a period on benefit. Parents in receipt of WTC can also receive a childcare element, which, as of April 2006, meets up to 80 per cent of the costs of eligible childcare, up to a maximum of £175 a week for one child and up to £300 a week in total for two or more children.

The effects of the new tax credits on the labour market participation of women with children have not yet been evaluated in depth. However, research on their predecessor, Working Families' Tax Credit (WFTC), showed that WFTC had a sizeable positive impact on the labour supply of lone mothers and a small negative impact on the labour supply of mothers in couples, compared to the programme of financial support it had replaced (Brewer and Browne, 2006; Brewer *et al.*, 2006a). To qualify for WFTC a family with children had to have at least one adult in employment for at least 16 hours a week, which is currently a requirement for WTC, whereas entitlement to CTC does not depend on the family's work status. Moreover, where benefit entitlement is based on the household's, rather than the individual's, income the second earner in a couple, who is usually a woman, has fewer incentives to work when the benefit level rises. Therefore, it might be expected that CTC would have a negative effect on the labour market participation of mothers, which may be counteracted by the positive effect of WTC, relative to a situation with no financial support.

At the same time, it is not obvious what effect CTC and WTC may have on hours of work for those already employed. Not only is WTC withdrawn at the rate of 37 per cent after the 'first income threshold' (currently at £5,220), but WTC claimants may also be liable for National Insurance contributions and income tax, driving the effective marginal tax rate (the tax rate on the last pound of taxable income) up to 70 per cent. However, the disregard of increases in income of up to £2,500 a year (increased to £25,000 from April 2006) means that claimants do not actually face such high marginal tax rates at the time when their gross pay increases. A change in the marginal tax rate may have an ambiguous impact on the number of hours worked, as the 'income effect' (an increase in real wages leading to an increase in consumption of 'leisure', hence a decrease in the hours worked) and the 'substitution effect' (an increase in real wages causes an increase in hours worked) will work in different directions (Blundell *et al.*, 2000). For instance, Mulheirn and Pisani (2006) found that, since its introduction in 2003, WTC had a small negative effect on working hours, but a positive effect on labour supply, for childless claimants over the age of 25. There is no similar analysis of the WTC effect for women with children at the time of this study.

At the same time, not everybody entitled to a benefit/tax credit claims it. According to HM Revenue & Customs estimates for 2003–04, the take-up rates were 79 per cent for CTC and 56 per cent for WTC (HMRC, 2006). Although economic research on what determines take-up is relatively scarce, several studies have modelled take-up of tax credits using survey data and have identified characteristics associated with take-up (see Brewer, 2003). Adam and Brewer (2005), for instance, examined the determinants of WFTC take-up and found that the higher the amount of WFTC to which families were entitled, the higher the take-up by couples and lone parents. Lone parents were also less likely to claim WFTC if they were better educated, homeowners or lone fathers, controlling for earnings and entitlement level. Brewer *et al*. (2006a) modelled labour supply and take-up of WFTC simultaneously, as did Bingley and Walker (1997) in their analysis of labour supply of lone mothers and their participation in Family Credit (predecessor of WFTC).

Policy context

This study aims to inform the current Government's strategy of reducing and eventually abolishing child poverty. Although out-of-work benefits can provide important support to workless households with children – and, arguably, will need to be increased if child poverty is to be 'abolished' – there is also a need for more people to participate in paid employment, as children living in families where all adults are working have the lowest chances of being income poor. (This, of course, ignores questions of whether it is better for children's emotional development to live in households where all adults are working or, indeed, issues of parental choice and work–life balance.)

In fact, the likely effects of the new tax credits on mothers' labour market participation, relative to a situation with no tax credits, are not clear. While the minimum working hours requirement of WTC may induce recipients to work more hours, CTC eligibility rules do not require paid employment. Therefore, CTC may reduce employment incentives, especially for second earners in families who may prefer to spend more time with their children. While providing work–life balance 'choice', this would contradict the policy of promoting paid work as the main route out of poverty. Since a larger proportion of families with children receive CTC than WTC (families with children who receive WTC always receive CTC as well), it may be of interest to attempt to separate out the labour market impact of CTC from that of the WTC, even though the two tax credits were designed to work together.

This study aims to contribute to understanding of the labour supply impact of the new tax credits by investigating their effects and possible limitations in meeting the Government's target of ending child poverty. Furthermore, as recent research by the Joseph Rowntree Foundation on the future of child poverty policy indicates, take-up will be crucial if tax credits are to remain the main vehicle for ending child poverty (Hirsch, 2006). To inform current and future policy, this project aims to identify the reasons why some of the entitled families are more likely to claim the new tax credits than others.

Research objectives

The study had two broad aims, each of which had specific objectives.

1 To evaluate the effects of CTC and WTC on labour market participation and working hours of mothers in lone-parent and couple families, compared to a situation of no financial support.
   - To estimate the impact of CTC on the labour market participation of women with children – the probability of being in paid work.
   - To estimate the impact of WTC and CTC on the working hours of women with children.
   - To evaluate the effect of CTC on the likelihood of making a transition from non-participation in the labour market to employment and vice versa for women with children.
   - To evaluate the effect of WTC and CTC on the likelihood of making a transition from part-time employment of 16–29 hours a week to 'full-time' employment of 30 or more hours a week and vice versa for women with children.

2 To explore the reasons for non-take-up of the new tax credits.
   - To identify the eligible population based on relevant eligibility criteria.
   - To single out factors associated with an increased likelihood of take-up and non-take-up of CTC and WTC separately, among those eligible.

With respect to the first main objective, we expect CTC to have a negative effect on participation of women with children and, conditional on working, a negative effect on hours worked. We also expect WTC to have a negative effect on hours worked, though not so much as to lose eligibility for WTC. There may, however, be a positive effect of the 30-hour premium, for those who work between 16 and 29 hours on very low wages (see Appendix 1, Figure A1.1).

Research design

Data

The study has used data from the three latest available rounds of interviews of the Families and Children Study (FACS). FACS is a 'refreshed'[2] panel survey that started in 1999, commissioned by the Department for Work and Pensions. Since 2001, FACS has been a representative sample of all families with dependent children in Britain and provides a wealth of information on the contemporary situation of families with children, including employment, income and benefits data. Information is available about receipt of CTC and WTC at the household level.[3] The main respondents in households are usually women. For this study, the family-level dataset has been restricted to working-age women with one or more children in the family. Furthermore, in order to focus on the labour market behaviour of mothers who do not face additional constraints on their ability to participate in the labour market, those in full-time education or receiving Incapacity Benefit or Disability Living Allowance were removed.[4] Therefore, the sample consisted of households with dependent children where women were 16–59 years old. Data collection for the fourth round of interviews (Wave 4) was conducted from September 2002 to February 2003, followed by the fifth and the sixth rounds of interviews (Wave 5 and Wave 6) one and two years later (2003–04 and 2004–05).

A difficulty arises in defining those households in the sample who were in receipt of CTC, particularly among those who were in receipt of Income Support (IS) or non-contributory Jobseeker's Allowance (JSA) in April 2003 when the tax credits were introduced. The original intention of Government was that these households would continue to receive payments for their children in IS payments until April 2004 when they would be 'migrated' to the Child Tax Credit. At this point they would receive two payments: the adult element of IS or JSA from Job Centre Plus and their Child Tax Credit payment from HMRC. They would then be aware that they were receiving a tax credit for their children. However, it is our understanding that, because of administrative difficulties, most families in receipt of IS or JSA in April 2003, and who continued to receive IS, had still not been migrated to CTC by 2005 (or, indeed, to date).[5] These families would not, therefore, find themselves in receipt of CTC, although their incomes would have increased with the introduction of CTC and, subsequently, as further increases were made (thereby contributing to the policy aim of reducing child poverty).

Defining these families in the analysis as not being in receipt of CTC would be strictly correct, but would inflate the positive impact of CTC on labour market participation

by omitting a sizeable group of non-workers on IS or JSA from the group of CTC recipients. Moreover, this would also exaggerate the impact of CTC on labour market entry because only those in receipt of Income Support who had claimed it since April 2003 would be counted as CTC recipients and these relatively short-term claimants could be anticipated to be the most likely to (re-)enter work (Shaw *et al.*, 1996). On the other hand, the work incentive aim of the policy might suggest that those who were not receiving CTC would be less likely to become aware of WTC and, therefore, be less likely to enter work. This would suggest defining those who were in receipt of IS or JSA before 2003 as non-recipients of CTC for the purposes of our analysis. Our decision was to define all IS claimants and all JSA claimants where neither partner is in work as recipients of CTC.[6] This approach avoids exaggeration of the impact of CTC on labour market participation, but these reservations about the data and how the work incentive aims of the policy might operate should be borne in mind in what follows.

Methods

A range of analytical methods have been used in this study. Obviously, the more consistent the results of these different techniques, the more we can rely on the robustness of our conclusions.

Point-in-time analysis

Since the new tax credits have already been rolled out nationally and have strict eligibility criteria, it is no longer possible to conduct an experiment where one randomly selected group would receive the tax credits and another would not. A common problem in non-experimental evaluation research is to identify a comparison group that is similar to those who experienced a policy intervention on all characteristics except the intervention itself. Propensity score matching (PSM) can help solve this problem, as it allows the choice of a comparison group that has very similar observed characteristics to the group that was subjected to the policy intervention (Becker and Ichino, 2002). This method summarises the characteristics of each individual into a single *propensity score* (the probability of receiving the policy intervention), on the basis of which matching is performed between individuals receiving the intervention (in this case the tax credits) and individuals not receiving the intervention.

PSM was employed to estimate the impact of CTC on labour market participation and the impact of WTC on hours worked, using data from the sixth round of interviews in FACS, 2004–05. PSM may be appropriate for estimating the effects of CTC on mothers' labour market participation because it allows the construction of a comparison group ('entitled non-recipients') that is similar to the treated group (recipients) on the eligibility criteria (e.g. earnings) and entitlement-level criteria (e.g. number of children). It also allows other individual and household characteristics that might be expected to affect labour market outcomes to be taken into account, since information was collected in the FACS survey before the introduction of the tax credits between September 2002 and February 2003 (observed pre-treatment characteristics). Therefore, comparing those who differ only on whether they are receiving the tax credits or not and who have been matched on other characteristics should make it possible to estimate the average effect of CTC or WTC on the recipients' labour market behaviour. However, the limitation of PSM is that it cannot take account of things that affect labour market outcomes but about which information was not collected (e.g. innate motivation to work). If recipients and non-recipients differ on such *unobservable characteristics* and these differences also affect some of the variables included in the analysis, PSM results may be biased. For example, if those who are more likely to claim CTC are less motivated to work in general, receipt of CTC would appear to have a negative effect on the likelihood of being in paid employment if motivation to work was not controlled for. However, there is no research evidence that this is likely to be the case with CTC.

Dynamic analysis

While it is very difficult to account for characteristics about which we have no information using cross-sectional data, it may be feasible with panel data.[7] Since FACS is a panel dataset with two years' worth of information on the new tax credits for the vast majority of the interviewed households, it is possible to estimate 'consistently'[8] the effects of the tax credits on labour market participation and hours of work of women with children. To account for those individual characteristics about which we do not have information, such as innate motivation to work ('unobservable individual effects'), but which may be correlated with the labour market outcomes and with other observed characteristics, such as the receipt of CTC and WTC, this study has used fixed-effects linear and logistic panel models.[9] These models use changes in individuals' characteristics over time to estimate the effects of independent variables (such as receipt of tax credits, age of youngest child, income) on the dependent variable (participation, working hours). Thus, things about individuals that may change from one round of interviews to the next (e.g. number of children in the household) are used in the estimation, while the things that stay constant (e.g. ethnic

origin), including 'unobserved individual effects' that are assumed not to vary from one round of interviews to the next, will drop out.

Another way to evaluate the effect of CTC and WTC on mothers' labour market participation and hours of work, using the panel element of FACS, is to analyse transitions (e.g. from non-participation to employment; from full-time work to part-time work), conditional on the receipt of the tax credits as well as other individual and household characteristics. Since only two years of information on the tax credits was available, a 'discrete-time' logistic regression model was used. Unfortunately, accurate *monthly* information on duration of receipt of the new tax credits was not available for a substantial proportion of the sample, so yearly periods were used instead. Analysing yearly changes in activity status and the receipt of the tax credits makes it difficult to disentangle the sequence of events within each year (e.g. starting to receive CTC/WTC and becoming employed). This does not allow firm conclusions to be reached about causality between receipt of the tax credits and labour market behaviour of women with children.

Moreover, the literature on the labour market impact of WFTC suggests that labour supply and take-up decisions are made at the same time. To take account of the joint nature of these decisions a structural model of labour supply and programme participation would have to be used (see Brewer *et al.*, 2006a). However, this method was not feasible in the present study because of the relatively small sample size of FACS. Therefore, this project has taken advantage of the panel nature of FACS to investigate labour supply decisions of women with children conditional on take-up or non-take-up of the tax credits in a dynamic perspective, keeping in mind the limitations of not modelling labour supply and take-up decisions jointly.

Alternatively, it would have been possible to use the 'difference-in-differences' methodology to identify the impact of the introduction of the new tax credits in 2003 by comparing the labour market outcomes for those who have been affected by the policy change with the outcomes for those to whom the policy change had not applied (e.g. childless people under 25 years old). Because FACS covers families without children for only one year after children left the household or stopped being dependent, the sample size of families without children, who could constitute a suitable comparison group, is not large enough for the 'differences-in-differences' approach. Moreover, it would have to be assumed that macroeconomic fluctuations affect the labour market chances of women with children and childless women similarly, which may not be the case.

Structure of the report

Chapter 2 describes the activity status and working hours of recipients and non-recipients of the new tax credits separately for lone parents and those in couple families (with working and non-working partners). The aim here is simply to set the scene for the more complex modelling that follows in subsequent chapters and so the findings should not be treated as definitive. Chapter 3 identifies the characteristics of families with children who are more likely to take up the new tax credits among those who are eligible to receive them on income grounds and, for WTC take-up analysis, on income and working hours grounds. Chapter 4 analyses the relationship between receipt of the new tax credits and the labour market participation of women with children, controlling for other relevant personal and family characteristics of women with children and using both point-in-time (cross-sectional) and dynamic (panel) techniques. Chapter 5 investigates the relationship between hours of work and receipt of the new tax credits. Chapter 6 summarises the findings and discusses policy recommendations.

Report conventions

- Throughout the report, percentages based on fewer than 50 cases are enclosed in square brackets and should be interpreted with caution (those based on fewer than ten cases are not presented and are shown as [–]).

- All percentages are weighted by either cross-sectional or longitudinal weights provided with the FACS dataset, while number of cases reflect unweighted base populations.

- Percentages are rounded up or down to one decimal place and therefore may not always sum to 100.

- Percentages less than 0.5 are shown as '*' to distinguish them from absolute 0.

2 CTC/WTC and labour market participation and working hours of women with children

This chapter describes the relationship between receipt of the new tax credits and the labour market behaviour of women with children, setting the scene for more complex analysis in the next three chapters. Using only descriptive methods, activity status and working hours of recipients and non-recipients of CTC and WTC are compared for lone parents and mothers in couple families. The analysis used information from the sixth round of interviews of FACS (2004–05), so receipt of the tax credits was based on survey data and not administrative records.[1] Since the methods in this chapter are purely descriptive, the findings in relation to receipt of tax credits, labour market participation and working hours are not conclusive. Moreover, the cross-sectional nature of this analysis does not allow us to ascertain whether participation and working hours are influencing the take-up of tax credits as a result of income and working hours eligibility criteria, or whether this is working in the other direction, that is, receipt of tax credits is influencing participation and working hours.

Families eligible for tax credits in 2004–05

The initial tax credits award is based on household income in the year before the application is made. Thus, information from the 2003–04 round of interviews was used to identify families who were income eligible during the 2004–05 round of interviews, based on the definition of income used by HMRC to assess eligibility for tax credits.[2] The following sources of income were taken into account to derive the '2003–04 weekly household pre-tax income from earnings and taxable social security benefits':

- respondent's earnings and/or income from self-employment
- partner's earnings and/or income from self-employment (if partner is present)
- Statutory Sick Pay
- Invalid Care Allowance
- Statutory Maternity Pay

- Bereavement Allowance (formerly Widow's Pension)
- Jobseeker's Allowance
- retirement pension
- Incapacity Benefit[3]
- investment income (assuming 3 per cent annual return on all savings) in excess of £300 per year
- other regular household income.

To determine a family's eligibility for CTC, the maximum CTC award was estimated first. At the taxable income level above £5,060 a year, the elements of CTC apart from the 'family element' and the 'baby addition' were tapered at the rate of 37 per cent (fast taper). At the same time, all families with dependent children with taxable incomes below £50,000[4] were entitled to the full 'family element' of CTC (and the 'baby addition', where applicable). Families with incomes above this threshold had their remaining CTC tapered away at the rate of 6.7 per cent (slow taper). Families whose CTC entitlement was not tapered away entirely were considered eligible for CTC in this analysis. Four per cent (204 unweighted cases) of the remaining 2004–05 sample appeared to be ineligible for CTC on income grounds and were excluded from the analysis. Thus, the final sample consisted only of families with children identified as eligible for CTC.

To be eligible for WTC, a family needs to satisfy both the minimum working hours and income criteria. Therefore, at least one parent has to be in paid work of 16 or more hours a week. Those among the working hours eligible families whose estimated maximum WTC entitlement exceeded 37 per cent of 'excess income' were considered eligible for WTC. Of course, all families eligible for WTC were also eligible for CTC, but the opposite is not necessarily true. For a more detailed description of how the maximum tax credits entitlement was calculated and how CTC and WTC eligibility was established see Appendix 1.

Family type and tax credit receipt

This section compares estimated take-up rates of the new tax credits of lone-parent and couple families who were found to be eligible for CTC in 2004–05. Identification

of those in receipt of the tax credits was based on the household's response to a survey question about current receipt of CTC and WTC. However, as was explained in Chapter 1, Income Support and Jobseeker's Allowance claimants who had not reported receipt of CTC were also counted as CTC recipients for the purposes of the analysis. In 2004–05, such cases constituted 12 per cent of all CTC recipients (34 per cent among lone parents and 23 per cent among families with non-working partners).

The majority of families with dependent children (75 per cent) who were eligible for CTC were receiving either CTC only or both of the new tax credits in 2004–05 (Table 1).[5] This is close to the take-up rate of 82 per cent estimated by HM Revenue & Customs using a combination of survey and administrative data (HMRC, 2007). However, one-quarter of families eligible for CTC (25 per cent) were not receiving any of the tax credits, which appears to be somewhat high. It may be that FACS, like the Family Resources Survey (FRS), under-reports the numbers in receipt of the tax credits (Brewer *et al*., 2006b). Thus, some actual recipients may have been misclassified as non-recipients in FACS. This may have implications for the analysis of labour market participation and working hours that uses eligible non-recipients as the comparison group (Chapters 4 and 5). Though the extent of the problem should not be large, the estimated labour market effects of the new tax credits need to be interpreted with caution throughout this report.

Rates of receipt of the new tax credits differed by family type and whether the partner was in paid work (Table 1). Lone parents were the group most likely to receive either both CTC and WTC or CTC only (92 per cent), by comparison with mothers in couple families with working partners (69 per cent) and those with non-working partners (82 per cent). Lone parents were also more likely to receive WTC (in conjunction with CTC) than mothers in other family types. Mothers with non-working partners were the group most likely to receive CTC on its own. However, the differences by family type are not conclusive, since various other important characteristics were not controlled for.

Table 1 Receipt of new tax credits by family type in 2004–05

New Tax Credits	Column percentages			
	Lone parent	With working partner	With non-working partner	Total
Neither	7.7	31.3	17.7	24.8
Both	38.0	17.3	20.7	22.6
CTC only	54.4	51.4	61.6	52.6
N	*1,483*	*3,607*	*230*	*5,320*

Base: working-age women with dependent children who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Since IS and JSA claimants who had not reported receipt of CTC were counted as CTC recipients in this study, it is of interest to estimate take-up rates of CTC solely for families who have not reported receipt of IS or JSA. Among these families, a higher proportion of lone parents received neither of the tax credits (13 per cent) or both (63 per cent) (Table 2) than among all CTC-eligible respondents, where 8 per cent of lone parents received neither CTC nor WTC and 38 per cent received both (Table 1). At the same time, 24 per cent of CTC-eligible lone parents not in receipt of IS or JSA were receiving CTC only, compared with 54 per cent of all CTC-eligible lone parents. This pattern is as expected, since IS and JSA recipients are not in work and so cannot claim WTC. Thus, rates of receipt of tax credits were similar among families with working partners in both analyses, since less than 1 per cent of them were in receipt of IS or JSA.

Table 3 illustrates important differences in tax credit receipt by activity status for each family type. Among lone parents, those who worked 16 or more hours a week were the most likely to receive both CTC and WTC, while those who worked under 16 hours or were out of work were the most likely to receive CTC only. This is not surprising, since CTC does not have a working hours requirement, while WTC does. Among mothers with working partners, however, the picture was mixed. Those who worked 16–29 hours a week were most likely to be receiving CTC only, which may indicate that their family incomes were too high to be eligible for WTC. Interestingly, non-working mothers with working partners were more likely to receive both CTC and WTC than those working 16 or more hours. This may be due to the fact that their working partners were receiving WTC, while families where both parents were in work were less likely to be receiving WTC because of too high (joint) family incomes. However, without controlling for household income and other relevant characteristics, these results are not conclusive.

Table 2 Receipt of new tax credits by family type in 2004–05 among families not claiming Income Support or Jobseeker's Allowance

New Tax Credits	Column percentages			
	Lone parent	With working partner	With non-working partner	Total
Neither	12.9	31.4	27.5	28.1
Both	63.3	17.4	31.5	25.6
CTC only	23.8	51.2	40.9	46.2
N	*875*	*3,589*	*143*	*4,607*

Base: working-age women with dependent children, not in receipt of IS or JSA, who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Table 3 Receipt of new tax credits by family type and activity status in 2004–2005

Work status	Row percentages within categories			
	Does not receive new tax credits	Receives both CTC and WTC	Receives CTC only	*N*
Lone parent				
30 or more hours	17.6	52.1	30.3	*395*
16–29 hours	4.9	83.4	11.7	*417*
1–15 hours	9.1	5.5	85.5	*60*
Not in work	2.8	0.9	96.3	*611*
Total	7.7	38.0	54.4	*1,483*
With working partner				
30 or more hours	38.7	11.5	49.8	*1,187*
16–29 hours	27.4	15.1	57.5	*1,123*
1–15 hours	33.2	15.3	51.5	*473*
Not in work	24.6	29.9	45.5	*824*
Total	31.3	17.3	51.4	*3,607*
With non-working partner				
30 or more hours	31.3	18.8	50.0	*59*
16–29 hours	[20.0]	[64.4]	[15.6]	*44*
1–15 hours	[13.3]	[13.3]	[73.3]	*14*
Not in work	9.2	4.6	86.2	*113*
Total	17.6	20.6	61.8	*230*

Base: working-age women with dependent children who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Table 3 also shows that small numbers of lone parents and mothers with non-working partners who were not in work or working less than 16 hours a week reported receipt of both CTC and WTC. Since WTC has a minimum working hours requirement, these cases must be due to measurement error. It may also be the case that some of these families continued receiving WTC though they were no longer eligible for it, or perhaps they were not sure which tax credits they were receiving.

Among families eligible for CTC who reported receiving CTC but not WTC, the majority (62 per cent) had incomes too high to be eligible for WTC even though they satisfied the minimum working hours requirement (Table 4). One-quarter (24.5 per cent) failed the working hours requirement, irrespective of income. Interestingly, 14 per cent of families receiving CTC only appeared to also be eligible for WTC based on both working hours and income criteria but were not taking it up. Since eligibility for CTC and WTC was determined using FACS, and not accurate administrative records, the eligible sample could not be identified with perfect precision. However, these results still suggest that WTC take-up among CTC recipients eligible for both tax credits was incomplete.

Table 4 Reasons for receipt of CTC only by family type in 2004–05

	Column percentages			
	Lone parent	With working partner	With non-working partner	Total
Not taking up WTC	12.7	14.7	11.9	14.1
Income too high for WTC	8.4	84.8	15.4	61.5
Not working 16 or more hours	78.8	*	72.7	24.5
N	*804*	*1,858*	*145*	*2,807*

Base: working-age women with dependent children who were receiving CTC only and participated in both 2003–04 and 2004–05 rounds of interviews.

There were important differences by family type. Unsurprisingly, couple families where partner was in paid work were the most likely (85 per cent) to have been income ineligible for WTC. They were also more likely (15 per cent) than other family types not to be taking up WTC, though eligible for it, while in receipt of CTC. Lone parents were the most likely (79 per cent) to receive CTC but not WTC because they did not satisfy the minimum working hours requirement for WTC.

More than half (59 per cent) of families with dependent children who appeared to be eligible for WTC on both working hours and income grounds were in receipt of WTC (Table 5). This take-up rate for 2004–05 is below the take-up rate of 94 per cent estimated for families with children using a combination of survey and administrative data by HM Revenue & Customs (HMRC, 2006). The disparity in the estimated take-up rates points to the fact that administrative data tend to be more likely to produce more accurate estimates of take-up than survey data alone. However, the methodologies used to estimate these take-up rates differed substantially. For example, *unlike in the HMRC analysis, where CTC-only recipients who also appeared to be eligible for WTC were counted as recipients of both tax credits, in the current study only those who reported WTC receipt were counted as WTC recipients.*

Table 5 Receipt of WTC by family type in 2004–05

Receives WTC	Column percentages			
	Lone parent	With working partner	With non-working partner	Total
No	22.9	55.9	39.1	41.4
Yes	77.1	44.1	60.9	58.6
N	*697*	*800*	*63*	*1,560*

Base: working-age women with dependent children who were eligible for WTC and participated in both 2003–04 and 2004–05 rounds of interviews.

There were substantial differences in take-up by family type, however. Lone parents were the most likely to take up WTC (77 per cent), compared with 44 per cent of families with working partner. Yet, this pattern has to be interpreted with caution because various important background characteristics were not controlled for in this analysis.

Activity status and tax credit receipt

This section compares activity status of recipients of tax credits and non-recipients from income-eligible lone-parent and couple families. It begins by examining the work status of women in different family types and then describes their work status taking into account their receipt (or not) of tax credits. However, since the analysis in this chapter is cross-sectional, it is impossible to establish the direction of causality between receipt of the tax credits and labour market participation or working hours, since the sequence of events (starting to receive the tax credits and changing activity status or working hours) cannot be taken into account.

Lone parents in the UK have been less likely historically to be in paid work than mothers in couple families and one of the main issues for the child poverty policy agenda has been, and remains, how to encourage more lone parents into employment. As expected, mothers with working partners had generally higher rates of employment than lone parents, although the differences were largest for 'part-time' employment of under 16 hours a week (Table 6). Only 4 per cent of lone parents worked under 16 hours a week, compared to 13 per cent of those with working partners and 7 per cent of mothers with non-working partners. Even though, overall, the association between family type and work status was statistically significant, lone parents' rate of employment of 16–29 hours a week (28 per cent) was only slightly lower than that of mothers with working partners (31 per cent), but higher than that of mothers with non-working partners (19 per cent).

Once receipt of the new tax credits was controlled for, a somewhat different picture emerged about participation and working hours. Among the families eligible for CTC but not receiving any of the tax credits, lone parents were more likely than mothers with working partners to work 30 or more hours a week but less likely to work 16–29 hours a week (Table 7). This pattern may suggest that employed lone parents who are eligible for CTC (and possibly WTC) but not claiming the tax credits tend to work longer hours than mothers with working partners for financial reasons. Or, those who work longer hours are less likely to take up tax credits, possibly because the money they are missing out on is lower.

Table 6 Work status and family type of women eligible for CTC in 2004–05

Work status	Column percentages			
	Lone parent	With working partner	With non-working partner	Total
Working 30 or more hours/week	27.4	33.2	27.6	31.5
Working 16–29 hours/week	27.7	30.7	19.4	29.5
Working 1–15 hours/week	4.1	13.3	6.5	10.7
Not working	40.8	22.8	46.6	28.4
N	*1,483*	*3,607*	*230*	*5,320*

Base: working-age women with dependent children who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Table 7 Work status by CTC receipt and family type in 2004–05

Work status	Column percentages within categories			
	Lone parent	With working partner	With non-working partner	Total
Does not receive new tax credits				
30 or more hours	62.7	41.1	[48.8]	43.0
16–29 hours	17.6	26.9	[22.0]	26.0
1–15 hours	4.9	14.1	[4.9]	13.1
Not in work	14.7	18.0	[24.4]	17.9
N	*106*	*1,101*	*36*	*1,243*
Receives both CTC and WTC				
30 or more hours	37.5	22.1	[25.0]	28.7
16–29 hours	60.9	26.7	[60.4]	42.5
1–15 hours	0.6	11.7	[4.2]	6.8
Not in work	1.0	39.4	[10.4]	22.1
N	*573*	*648*	*49*	*1,270*
Receives CTC only				
30 or more hours	15.2	32.2	22.2	27.3
16–29 hours	6.0	34.3	4.9	25.5
1–15 hours	6.5	13.3	7.6	11.3
Not in work	72.3	20.2	65.3	36.0
N	*804*	*1,858*	*145*	*2,807*

Base: working-age women with dependent children who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Among those who received both CTC and WTC, lone parents were more likely to work both 30 or more hours a week and 16–29 hours a week than mothers in couple families. Since it is joint family income that is assessed for eligibility of tax credits, lone parents working 16 or more hours are more likely to be eligible for both CTC and WTC than mothers with working partners who work similar hours but have higher family incomes. Among those who received CTC only, however, lone parents were less likely to work 16 or more hours a week than mothers with working partners. This may be reflecting different reasons why families were receiving CTC but not WTC (see Table 4 earlier in this chapter). Lone parents working 16 or more hours may have been eligible for WTC but were not taking it up, while mothers with working partners were more likely to be income ineligible for WTC. However, it is important to note that these patterns may be explained by differences in household income or other background characteristics, which were not controlled for in this particular analysis.

Working hours, family type and tax credit receipt

This section compares the average working hours of women with children who were eligible for CTC in 2004–05 by family type, separately for all those who were in work and for those who worked 16 or more hours a week.

Table 8 shows that, among all those employed, lone parents who received neither of the tax credits had a significantly longer average working week (35 hours) than those who received both of the tax credits (27 hours) or CTC only (28 hours). Similarly, mothers with working partners who received neither of the tax credits worked significantly longer on average (29 hours a week) than those who received both CTC and WTC or CTC only (26 hours).

Table 8 Working hours, family type and tax credit receipt in 2004–05

Receipt of new tax credits	Group means (unweighted *N*)					
	All in work			Those who worked 16 or more hours a week		
	Lone parent	With working partner	With non-working partner	Lone parent	With working partner	With non-working partner
Neither	34.9 (90)	28.6 (904)	[33.1] (27)	35.7 (87)	32.0 (758)	[35.3] (24)
Both	26.5 (566)	25.8 (391)	[24.4] (44)	26.6 (563)	29.0 (324)	[25.5] (42)
CTC only	27.5 (215)	26.2 (1478)	[29.50] (46)	34.2 (161)	29.1 (1249)	[34.9] (36)
All	27.7 (871)	26.9 (2773)	[28.6] (111)	29.2 (811)	30.1 (2331)	31.4 (102)

Base: working-age women with dependent children who were eligible for CTC and participated in both 2003–04 and 2004–05 rounds of interviews.

Among those who worked 16 or more hours a week, and so may have been eligible for WTC, lone parents who received neither of the tax credits (36 hours) and those who received CTC only (34 hours) worked significantly longer on average than those who received both CTC and WTC (27 hours a week). As in the whole sample, mothers with working partners still worked the longest hours if they received neither of the tax credits than if they received both or CTC only. However, it is difficult to draw conclusions about the relationship between receipt of the tax credits and working hours without controlling for other important characteristics that may influence labour market behaviour. For instance, the fact that, for all family types, non-recipients of the tax credits worked consistently longer hours on average may be the result of their higher household incomes and, hence, reduced incentives to claim the tax credits.

Summary

- Take-up of the new tax credits in 2004–05 was incomplete. According to FACS, a quarter of CTC-eligible families were not receiving it and 41 per cent of families eligible for WTC were not getting it. Non-take-up rates estimated by HMRC (2007) were lower, however.

- Lone parents were most likely to receive either CTC on its own or in conjunction with WTC, in comparison with mothers in couple families.

- Among families eligible for CTC who reported receiving CTC but not WTC, the majority had incomes too high to be eligible for WTC even though they satisfied the minimum working hours requirement. One-quarter failed the working hours requirement, irrespective of income, while the rest (14 per cent) appeared to be eligible for WTC based on both working hours and income criteria but were not taking it up.

- Among families eligible to receive WTC, lone parents were the most likely to take it up.

- Among those who received both CTC and WTC, lone parents were more likely to work 30 or more hours a week and 16–29 hours a week than mothers in couple families. Among those who received CTC only, however, lone parents were substantially less likely to work 16 or more hours a week than mothers with working partners.

- Women with children were more likely to work 30 or more hours a week if they received neither of the tax credits and were more likely to work 16–29 hours a

week if they received both CTC and WTC, especially among lone parents and mothers with non-working partners.

- Among all those employed and those who worked 16 or more hours a week, women with children who received neither of the tax credits had a significantly longer average working week than those who received both of the tax credits or CTC only.

- The analysis in this chapter did not control for various important eligibility-related and other background characteristics, so all the findings with respect to tax credit receipt and labour market participation are inconclusive. Due to the cross-sectional nature of this analysis, it is impossible to establish the direction of causality between tax credit receipt and participation or working hours.

3 Determinants of take-up of CTC and WTC

If the Government is to achieve its child poverty targets, high rates of take-up of the tax credits will be required (Hirsch, 2006). Initial estimates of take-up in 2003–04 showed that 21 per cent of the eligible population were not claiming CTC and 44 per cent were not claiming WTC, though, among eligible families with children, 12 per cent were not claiming WTC (HMRC, 2006). Descriptive analysis in Chapter 2, based on the 2004–05 FACS data, has shown that 25 per cent of families with children who were identified as eligible for CTC and 41 per cent of families identified as eligible for WTC were not receiving these tax credits. Therefore, to try to shed some light on the reasons for non-take-up of the new tax credits, this chapter investigates the characteristics that affect the likelihood of receipt of CTC and WTC among families who were apparently eligible. True take-up rates for the population are not estimated (i.e. entitled recipients as a proportion of all entitled), since the eligible sample is identified with some degree of error using survey data that does not contain precise information on income, benefits and childcare costs, and without using matched administrative data. Moreover, entitlement levels were not estimated because of the above data limitations.[1] This chapter presents a simple model of receipt of tax credits in 2004–05, separately for the samples eligible for CTC and for WTC.

Determinants of take-up of CTC and WTC in 2004–05

Regression analysis was used to predict the probability of receiving CTC (WTC) for eligible groups with different personal and family characteristics. Since the dependent variables of interest consist of two discrete and mutually exclusive categories – i.e. receiving CTC (WTC) or not receiving CTC (WTC) – binary logistic regression analysis was most suitable. Table 9 shows the results from such a model of receipt of tax credits for women with children from families eligible for CTC, while the model of WTC take-up among families eligible for WTC is presented in Table 10. Only the households who took part in all three rounds of interviews from 2002–03 to 2004–05 were included in these analyses, so that information on prior receipt of the Working Families' Tax Credit (WFTC) was available. Prior receipt of WFTC was expected to be a particularly important predictor of WTC take-up, because the two tax credits had some common features and eligibility criteria.

Table 9 Odds of take-up of CTC in 2004–05

	Odds ratio	Robust SE
Dependent children		
Age of youngest (ref. 5–10)		
0–4	1.26*	0.15
11–15	1.21	0.13
16–19	0.48**	0.07
N children aged 0–4 (ref. 2)		
1	1.04	0.11
3 or more	0.83	0.10
Mother		
Worked in 2003–04 (if lone parent)	0.45*	0.15
Worked in 2003–04 (if couple)	*0.98*	
Age in 2004–05	1.01	0.06
Age squared	1.00	0.00
Left education aged (ref. 16 or under)		
17–18	0.99	0.10
19+	0.66**	0.07
White	0.94	0.18
Has long-standing illness	1.24	0.14
Family		
Couple (if did not work in 2003–04)	0.16**	0.05
Couple (if worked in 2003–04)	*0.34*	
Own house (ref. rent)	0.71*	0.10
Received WFTC in 2002–03	1.80**	0.26
Equivalised weekly income (modified OECD scale) in 2003–04 (ref. £45.01–132)		
£45 or less	0.80	0.16
£132.01–204	0.80	0.13
£204.01–282	0.82	0.13
£282.01 or more	0.32**	0.05
Region (ref. North)		
Scotland	0.93	0.15
Centre	0.93	0.10
South	0.78*	0.09
London	0.45**	0.08
Wales	0.84	0.16
*Couple*worked in 2003–04*	2.17*	0.74
Pseudo R-square	0.17	
Unweighted cases	4,583	

Base: working-age women with dependent children eligible for CTC in 2004–05, who participated in all three rounds of interviews 2002–03 to 2004–05.
* Significant at 5 per cent; ** significant at 1 per cent (null hypothesis: odds ratio = 1).
Longitudinal weights used.

Table 10 Odds of take-up of WTC in 2004–05

	Odds ratio	Robust SE
Dependent children		
Age of youngest (ref. 5–10)		
0–4	0.90	0.17
11–15	1.13	0.21
16–19	0.72	0.18
N children aged 0–4 (ref. 2)		
1	0.98	0.17
3 or more	1.37	0.28
Mother		
Worked in 2003–04	0.95	0.17
Age in 2004–05	1.00	0.07
Age squared	1.00	0.00
Left education aged (ref. 16 or under)		
17–18	1.02	0.18
19+	0.92	0.19
White	0.60	0.17
Has long-standing illness	1.07	0.20
Family		
Couple	0.28**	0.05
Own house (ref. rent)	0.56**	0.09
Received WFTC in 2002–03	3.11**	0.48
Equivalised weekly income (modified OECD scale) in 2003–04 (ref. £40.01–79)		
£40 or less	0.49**	0.12
£79.01–116	0.46**	0.11
£116.01–177	0.39**	0.09
£177.01 or more	0.22**	0.05
Region (ref. North)		
Scotland	0.93	0.24
Centre	0.75	0.14
South	1.07	0.21
London	0.44**	0.14
Wales	1.41	0.46
Pseudo R-square	0.23	
Unweighted cases	1,348	

Base: working-age women with dependent children eligible for WTC in 2004–05, who participated in all three rounds of interviews 2002–03 to 2004–05.
** Significant at 1 per cent (null hypothesis: odds ratio = 1).
Longitudinal weights used.

The 'odds ratio' columns in Tables 9 and 10 show the impact of each variable in the model on the likelihood of receiving CTC or WTC, respectively, relative to not receiving this tax credit, when all other variables in the model are held constant. For continuous variables, such as age of mother, an odds ratio greater than 1 indicates that the likelihood of receiving the tax credit increases (decreases) when the value of the continuous variable increases (decreases). For other (categorical) variables, however, an odds ratio greater than 1 shows the factor by which the odds of receiving the tax credit for cases in one category of the variable exceed the odds for those in the reference category. The 'equivalised weekly income (modified OECD scale) in 2003–04' variable refers to household income from earnings and social security benefits but excludes any income from tax credits.

Families with the youngest child aged four or younger were 26 per cent more likely to be claiming CTC than families with the youngest child in the five to ten age category (Table 9). Families with the youngest dependent child aged 16–19,[2] however, were only half as likely to be receiving CTC as families with the youngest child aged five to ten. Though specific reasons for not applying were not stated in the data, this finding may be due to the fact that families with children in full-time non-university education aged 16–19 are not aware of their eligibility for tax credits, or perhaps they just consider applying as too much hassle. The number of dependent children on its own did not have a significant effect on the odds of CTC take-up.

Mother's activity status at the previous round of interviews was a crucial predictor of take-up. Among lone-parent families, mothers who worked in 2003–04 were only 45 per cent as likely to be claiming CTC in 2004–05 as mothers who were not employed at the time of the previous round of interviews. However, among mothers from couple families, previous work status had no significant effect on current CTC receipt, when other important characteristics were controlled for. This may suggest that working lone parents are less aware of CTC or of their eligibility for it.

Mother's education was negatively associated with CTC take-up. Those who left full-time education at the age of 19 or older were only 66 per cent as likely to be receiving CTC as those who left education at the age of 16 or younger, controlling for other characteristics in the model. Since better educated women may also have higher household incomes, this finding may be explained by their lower entitlement levels and fewer monetary incentives to claim the tax credits. However, since five income categories were controlled for, this cannot be the full explanation. In the analysis of WFTC take-up, Adam and Brewer (2005) found that more educated lone parents were less likely to claim WFTC, while education had no significant effect on couple families.

Among families where the mother did not work in 2003–04, couple families were only 16 per cent as likely to be claiming CTC in 2004–05 as lone parents. Among families where the mother was in paid work in 2003–04, couple families were 34 per cent as likely to be receiving CTC as lone parents. This supports the finding of the descriptive analysis that eligible lone parents are more likely to take up CTC than eligible couple families (Table 1 in Chapter 2). However, since entitlement levels were not controlled for in this analysis, as they could not be modelled precisely, this finding may be due to the fact that lone parents are more likely to be entitled to higher amounts. At the same time, families who owned their house were only 70 per cent as likely to be receiving CTC as those who were renting their accommodation. Families who were receiving WFTC in 2002–03 were almost twice as likely to be claiming CTC in 2004–05. This is probably because WFTC recipients were sent CTC/WTC application forms.

Though all families in the analysis were found to be income eligible for at least some level of CTC, those in the highest income quintile (more than £285 a week, equivalised using modified OECD scale) were only 32 per cent as likely to be claiming CTC as families in the second income quintile. This is not surprising, since these families must have been entitled to much lower levels of CTC and, so, had fewer financial incentives to claim it. Important regional differences in the likelihood of CTC take-up emerged. Eligible families in the South of England were 78 per cent as likely to be receiving CTC as eligible families in the North, while those in London were only 45 per cent as likely to claim CTC as those in the North. Given high rates of child poverty in London, this is a worrying finding.

Among families eligible for WTC (and, hence, for CTC as well), couple families were only 28 per cent as likely to be claiming WTC as lone parents, when other important characteristics were controlled for. This supports the findings of the descriptive analysis (Table 5 in Chapter 2) that eligible lone parents were more likely to be taking up WTC than women in eligible couple families. However, as mentioned above, it may be that lone parents are more likely to take up WTC because they are entitled to higher amounts than mothers in couple families. Families who owned their accommodation were 56 per cent as likely to be receiving WTC as those who were renting.

Prior receipt of WFTC was the most important predictor of WTC take-up. Families who claimed WFTC in 2002–03 were three times more likely to be receiving WTC in 2004–05, everything else held equal. This finding is as expected, since WFTC recipients were sent CTC/WTC application forms. Thus, those who used to receive WFTC would be more likely to apply for WTC.

Significant differences in the odds of take-up of WTC were found among eligible families from different income quintiles. Those in the second income quintile (£40.01–79) were the most likely to take up WTC. Eligible families with weekly taxable household incomes, equivalised using the modified OECD scale, of £40 or less and those in the third quintile (£79.01–116) were only half as likely to take up WTC as those in the second quintile. Unsurprisingly, families in the highest income quintile (£177.01 or more) were the least likely to be receiving WTC. Meanwhile, eligible families in London were only 44 per cent as likely to take up WTC as eligible families in the North of England.

Summary

- In 2004–05, eligible lone parents were substantially more likely to be receiving CTC and WTC (analysed separately for the CTC- and WTC-eligible samples) than mothers in couple families.

- Lone parents (but not mothers in couple families) eligible for CTC who had been in paid work in 2003–04 were about half as likely to take up CTC as those who had not been working in the previous round of interviews. Prior work status had no effect on the likelihood of WTC take-up among the eligible families; this is probably because they all satisfied the working hours requirement in 2004–05.

- CTC-eligible families who had been receiving WFTC in 2002–03 were almost twice as likely to take up CTC in 2004–05 as families who had not been claiming WFTC. WTC-eligible families were three times more likely to take up WTC if they had been claiming WFTC in 2002–03.

- CTC-eligible families with equivalised household incomes in the highest quintile were significantly less likely to take up CTC than other families. There were important differences by income among WTC-eligible families. Those with incomes in the first and the third quintiles were only about half as likely to take up WTC as those with incomes in the second quintile, those with incomes in the fourth quintile were about one-third as likely and those in the fifth quintile were one-fifth as likely to take up WTC as those with incomes in the second quintile.

- CTC-eligible families in the London area were about half as likely to be receiving CTC as those in the North of England and WTC-eligible families in the London area were about half as likely to take up WTC as those in the North.

4 The impact of CTC on labour market participation of women with children

This chapter investigates the impact of the new tax credits on the labour market participation of women with children, with particular emphasis on the effect of CTC, even though it was not designed specifically to encourage labour market participation. Compared with the scenario of no financial support for families with children, the likely effect of CTC on women's employment is unambiguously negative. Since the benefit is payable irrespective of work status, but is withdrawn as income increases, it may discourage women from entering the labour market or encourage those in paid employment to cut their hours. WTC, on the other hand, may provide a work incentive for first earners in families, since, by definition, it can be received only by those in work. For second earners in families, however, WTC provides a negative work incentive. This chapter first examines differences in the 2004–05 employment rates of CTC recipients and eligible non-recipients after they have been matched on a number of important individual and family characteristics. Second, to study the relationship between CTC receipt and employment, transitions from non-participation to employment and from employment to non-participation are analysed for those who were not in receipt of WTC.

Average impact of CTC on labour market participation of women with children: PSM analysis

To compare employment rates of eligible women with children from CTC-recipient households and those from non-recipient households, while ensuring that only sufficiently similar individuals were compared, a matching technique (PSM) was used (see Appendix 3 for model specification). Individual and household characteristics that were expected to affect the likelihood of CTC receipt, fixed at their 2002–03 values, were summarised in a single 'propensity score' (see Appendix 2, Table A2.1). Each CTC recipient in 2004–05 was then matched to one or more non-recipients with a similar propensity to be in a CTC-recipient household. The difference in average employment rates of CTC recipients and non-recipients in the matched sample was then estimated as the 'average treatment on the treated' (ATT). This is the average effect of receiving CTC on recipients and, since the majority of recipients of CTC had to actively claim it, this effect may be different for recipients than it would have been for eligible non-recipients had they decided to take up CTC.

Because the effect of CTC was expected to differ between lone parents and mothers in couple families (with working and non-working partners), matching was performed separately for women with children who were lone parents and for those who were in couple families with working partners in the fourth round of FACS interviews (2002–03), before the new tax credits became operational. Women in couple families with non-working partners were excluded from the analysis because very low case numbers did not allow separate analysis of this sub-sample. In both the sample of lone parents and the sample of mothers with working partners the balancing property of the matching was satisfied. (For detailed PSM diagnostics, see Appendix 2, Table A2.2.)

Table 11 shows the average employment rates of mothers in 2004–05 for the whole CTC-eligible samples and for the matched samples of lone parents and mothers with working partners.

In 2004–05, CTC had a significant negative effect on participation of women with children, though it was larger in magnitude for lone parents than for mothers in couple families. In the matched sample of lone parents, the average employment rate of CTC recipients was 11 percentage points lower than that of comparable non-recipients. However, this apparently negative effect of CTC on employment rates of lone parents may have been due to the fact that IS and JSA recipients, who were by definition out of work, were defined as CTC recipients, driving the average rate downwards. Yet, not all unemployed lone parents were receiving IS/JSA. This analysis still indicates that CTC recipients were, on balance, a lot less likely to be employed than eligible non-recipients with similar individual and household characteristics. This result is entirely in line with labour economics theory.

Table 11 Average employment rates of women with children in 2004–05

CTC receipt in 2004–05	Per cent			
	Lone parents in 2002–03		Couple families in 2002–03	
	All	Matched sample	All	Matched sample
Receives CTC	57	57	77	77
Does not receive CTC	81	69	84	85
ATT	–24	–11*	–7	–8**
(SE)		(0.05)		(0.02)
N	*1,313*	*1,250*	*3,057*	*3,053*
Recipients	*1,190*	*1,127*	*2,149*	*2,145*
Non-recipients	*123*	*123*	*908*	*908*

Base: working-age women with dependent children eligible for CTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.
* Significant at 5 per cent; ** significant at 1 per cent.

In the matched sample of mothers in couple families with working partners, CTC recipients had an eight percentage point lower participation rate than comparable non-recipients, on average. This difference was statistically significant. Since mothers with working partners were not in receipt of IS or JSA, the negative effect of CTC cannot be attributed to these out-of-work benefits. Interestingly, the difference in employment rates between CTC recipients and eligible non-recipients in the unmatched sample was similar to the ATT effect in the matched sample.

While PSM analysis has referred to one point in time, the following section explores the effect of CTC on participation of women with children from a dynamic perspective.

Effect of CTC on moving into work: transitions analysis

Analysis that explored further the relationship between CTC receipt and employment, using changes in the observed variables over two years and controlling for unobserved individual differences that are assumed not to change from one round of interviews to the next, showed that CTC receipt on its own did not have a significant effect on the likelihood of being in work in 2003–04 or 2004–05 (Appendix 2, Table A2.3). However, the estimated effect of CTC may have been partly due to the positive effect of WTC, which has not been controlled for, balancing out the negative effect of CTC. Thus we need to take into account the availability of WTC, which may have a positive work incentive effect. Indeed, Chapter 2 showed that a large proportion of CTC recipients also reported WTC receipt. Controlling for WTC receipt, however, is very difficult because it is conditioned on work of 16 or more hours a week and so all WTC recipients are by definition in paid employment.

One way to gauge the effect of CTC on employment separately from that of WTC is to look at moving into work only for those who were not receiving WTC in 2003–04 or 2004–05. However, since this analysis uses a non-random sub-sample, the results cannot be generalised to the whole population of women with children. For women not employed at the time of the 2002–03 interview, before the new tax credits became operational, a transition to work could have occurred in the period between the 2002–03 and 2003–04 interviews or in the subsequent year (the period between 2003–04 and 2004–05 interviews). However, because of the lack of monthly information on tax credit receipt, it is impossible to establish the sequence of the two events of interest (starting receiving CTC and moving into work). Therefore, nothing can be said with certainty about causality in the relationship between CTC receipt and employment.

Table 12 presents the results of a discrete-time event history model of moving into work (see Appendix 3 for model specification). Variable 'year' takes on the value of 1 referring to the period 2003–04 to 2004–05 and the value of 0 for the period 2002–03 to 2003–04. The variable 'CTC' indicates receipt of CTC, with non-recipients in the reference group. The variables 'CTC*year' and 'couple*CTC' refer to the *interaction effects* between CTC receipt and the period of observation, and family type and CTC receipt, respectively.

CTC had a significant negative effect on the odds of moving into work for women with children who were not employed at the 2002–03 round of interviews, did not report WTC receipt at the 2003–04 or 2004–05 interview and were identified as eligible for CTC in 2004–05. This effect varied by year and partnership status. Among lone parents who were out of work at the 2002–03 interview, those who started receiving CTC by the time of the next interview were only 8 per cent as likely to move into work in this period as those who did not start receiving CTC. Lone parents who started receiving CTC in the period between the 2003–04 and 2004–05 interviews were only 17 per cent as likely to move into work as those who did not claim CTC. Among women in couple families, CTC recipients were 42 per cent as likely to start working in the period 2002–03 to 2003–04 and 87 per cent as likely to move into work in the period 2003–04 to 2004–05 as non-recipients, everything else being equal. Among CTC recipients, women in couple families were 3.6 times more likely to move into work in any period than lone parents, while there was no significant difference by partnership status among CTC non-recipients. Everything else held equal, older mothers were more likely to move into work in either of the studied periods.

It may be a cause for concern that CTC recipients, who were not in receipt of WTC at any interview, were substantially less likely than non-recipients to move into work, after various important personal and family characteristics were controlled for. The negative effect of CTC was significantly larger in magnitude for lone parents than for mothers in couple families.

Table 12 Effect of CTC on moving into work for those not in receipt of WTC

Predictor	Odds ratio	Robust SE
Time varying		
Year: 2003–04 to 2004–05 (ref. 2002–03 to 2003–04)	0.38**	0.11
CTC if lone parent, 2002–03 to 2003–04	0.08**	0.04
CTC if lone parent, 2003–04 to 2004–05	*0.17*	
CTC if couple, 2002–03 to 2003–04	*0.42*	
CTC if couple, 2003–04 to 2004–05	*0.87*	
*CTC*year*	*2.06**	*0.73*
Couple if no CTC	0.68	0.33
Couple if CTC	*3.58*	
*Couple*CTC*	*5.27***	*2.77*
Age of youngest child	1.04	0.03
N children aged 0–4 (ref. 2)		
1	1.13	0.22
3 or more	0.67	0.14
Own house (rent)	1.23	0.29
Has long-standing illness	0.82	0.17
Time invariant		
Age	1.24**	0.09
Age squared	1.00**	0.00
Left education aged (ref. 16 or under)		
17–18	1.15	0.22
19+	0.88	0.20
White	1.06	0.33
Received WFTC in 2002–03	1.61	0.48
Weekly equivalised income in 2002–03 (£276.01 or over)		
£43 or under	0.95	0.32
£43.01–130	1.09	0.40
£130.01–203	1.45	0.43
£203.01–276	1.65	0.53
Pseudo R-square	0.13	
Wald chi-square	165.42**	
Observations	1,705	

Base: working-age women with dependent children, eligible for CTC in 2004–05, who participated in three rounds of interviews 2002–03 to 2004–05, were not employed at 2002–03 interview and did not receive WTC at either 2003–04 or 2004–05 interviews.
* Significant at 5 per cent; ** significant at 1 per cent (null hypothesis: odds ratio = 1).
Longitudinal weight used.

Effect of CTC on moving out of work: transitions analysis

Since CTC had a negative influence on the probability of moving into work for those who had not been working at the time of the interview prior to the introduction of the new tax credits, it is of interest to explore the effect of CTC on moving out of work for those who had been employed at the 2002–03 interview. Only those who were not in receipt of WTC in any of the studied periods were included in the analysis. Table 13 presents the results of a discrete-time event history model of moving out of work.

Among lone parents who were in work at the time of the 2002–03 interview, those who started receiving CTC in the period 2003–04 to 2004–05 were almost three times more likely to move out of work during this time than CTC non-recipients, everything else being equal. Women in couple families, on the other hand, were about half as likely to move out of work in the period 2002–03 to 2003–04 if they were receiving CTC as those who were not receiving CTC. Among CTC recipients, partnered mothers were only 26 per cent as likely to become unemployed as lone parents. There was no significant difference by family type among CTC non-recipients. Thus, CTC had a positive effect on the probability of moving out of work for lone parents, who were employed prior to the introduction of the new tax credits, but a negative effect for mothers in couple families.

Mothers with older children were less likely to move out of work, everything else being equal, and so were older women. Mothers from families in the lowest income quintile (2002–03 household income equivalised using modified OECD scale) were more than twice as likely to move out of work in any of the two studied periods as women from the highest income quintile. Women from the London area were more than twice as likely to move out of work as those in the North, everything else being equal.

Table 13 Effect of CTC on moving out of work for those not in receipt of WTC

Predictor	Odds ratio	Robust SE
Time varying		
Year: 2003–04 to 2004–05 (ref. 2002–03 to 2003–04)	0.54*	0.15
CTC if lone parent, 2002–03 to 2003–04	1.29	0.66
CTC if lone parent, 2003–04 to 2004–05	*2.93*	
CTC if couple, 2002–03 to 2003–04	*0.46*	
CTC if couple, 2003–04 to 2004–05	*1.05*	
*CTC*year*	2.27*	0.77
Couple if no CTC	0.73	0.35
Couple if CTC	*0.26*	
*Couple*CTC*	*0.36**	*0.18*
Age of youngest child	0.86**	0.02
N children aged 0–4 (ref. 2)		
1	0.74	0.13
3 or more	1.31	0.28
Own house (rent)	0.44**	0.08
Has long-standing illness	1.36	0.28
Time invariant		
Age	0.76**	0.06
Age squared	1.00**	0.00
Left education aged (ref. 16 or under)		
17–18	0.75	0.14
19+	0.81	0.17
White	1.48	0.59
Received WFTC in 2002–03	0.97	0.21
Weekly equivalised income in 2002–03 (£276.01 or over)		
£43 or under	2.58**	0.88
£43.01–130	1.25	0.33
£130.01–203	1.11	0.26
£203.01–276	0.93	0.20
Region (ref. North)		
Scotland	1.42	0.40
Centre	1.46	0.30
South	1.50	0.33
London	2.18**	0.65
Wales	0.86	0.34
Pseudo R-square	0.15	
Wald chi-square	253.03**	
Observations	3,852	

Base: working-age women with dependent children, eligible for CTC in 2004–05, who participated in three rounds of interviews 2002–03 to 2004–05, were employed at 2002–03 interview and did not receive WTC at either 2003–04 or 2004–05 interviews.
* Significant at 5 per cent; ** significant at 1 per cent (null hypothesis: odds ratio = 1).
Longitudinal weights used.

Summary

- In 2004–05, estimated employment rates of lone parents who were receiving CTC were around 11 percentage points lower than the employment rates of eligible non-recipients with similar propensities of receiving CTC, based on various important background characteristics. Mothers in couple families who were in receipt of CTC had an eight percentage point lower employment rate, on average, than comparable non-recipients.

- From a dynamic perspective, after unobserved individual differences were accounted for but WTC receipt was not taken into account, CTC had no significant effect on the likelihood of being in work in either 2003–04 or 2004–05. This may have been due to the positive effect of WTC, which was not controlled for, balancing out the negative effect of CTC.

- For those who had not been working at the 2002–03 round of interviews and were not in receipt of WTC at any of the two subsequent interviews, receiving CTC was associated with reduced chances of moving into paid work. The negative effect of CTC on the likelihood of moving into work was larger in magnitude for lone parents.

- For those who had been employed at the time of the 2002–03 interview and were not in receipt of WTC at any of the two subsequent interviews, CTC had a positive effect on the probability of moving out of work for lone parents, but a negative effect for mothers in couple families. Among CTC recipients, partnered mothers were substantially less likely to move out of work than lone parents, but there was no difference among CTC non-recipients.

- While there were no regional differences in the probability of moving into work, there were differences in the moving out of work analysis. Women in the London area were more than twice as likely to become unemployed as those in the North of England.

- This chapter has used a number of different analytical techniques, which were regarded as complementary, since each of them had limitations. PSM has demonstrated the differences in employment rates of otherwise comparable CTC recipients and non-recipients, but it could not capture the indirect effect of WTC awareness on employment. To isolate the effect of CTC on the likelihood of moving into work for those who were unemployed prior to the introduction of the tax credits and who were not in receipt of WTC in any of the two years after its introduction, a discrete-time event history approach (transitions analysis) was

appropriate. However, none of the employed methods could gauge the effect of WTC on participation, since those who receive WTC are, by definition, in work. Moreover, because only two years of data subsequent to the introduction of the tax credits were available and because there was no information about the sequence of events within each yearly period, these results have to be interpreted with caution.

5 The impact of WTC and CTC on working hours of women with children

This chapter investigates the impact of WTC and CTC on hours of work of women with children. First, differences in working hours of WTC recipients and eligible non-recipients in 2004–05 are examined after they have been matched on a number of important individual and family characteristics. Second, the effects of WTC and CTC are estimated using changes in various personal and family characteristics between 2003–04 and 2004–05. Third, transitions from part-time to full-time work and vice versa are described.

Average effect of WTC on working hours of women with children: PSM analysis

A matching technique (PSM) was used to evaluate the effect of WTC on hours of work for women with children who were identified as eligible for WTC in 2004–05 (see Appendix 3 for model specification). This analysis was similar to that described in the previous chapter for labour market participation and the background characteristics used in the estimation of the propensity scores are described in Table A2.4 in Appendix 2. Each WTC recipient in 2004–05 was matched to one or more non-recipients based on their propensity to be in a WTC-recipient household. The difference in average weekly working hours of WTC recipients and non-recipients in the matched sample was then estimated as 'the average treatment on the treated' (ATT).[1] This is the average effect of receiving WTC on recipients and, since recipients of WTC had to actively claim it, this effect may be different for recipients than it would have been for eligible non-recipients had they decided to take up WTC.

Since the effect of CTC was expected to differ between lone parents and mothers in couple families (with working and non-working partners), matching was performed separately for women with children who were lone parents and for those who were in couple families with working partners in the fourth round of FACS interviews (2002–03). Women in couple families with non-working partners were excluded from the analysis because very low case numbers did not allow separate analysis of this sub-group. In both the sample of lone parents and the sample of mothers with working partners the balancing property of the matching was satisfied. (For detailed PSM diagnostics, see Appendix 2, Table A2.5.)

Table 14 shows the average working hours of mothers in 2004–05 for the whole WTC-eligible sample and for the matched sample of women with children who were lone parents and those who were in couple families with working partners in 2002–03.

WTC had a significant negative impact on the working hours of both lone parents and mothers in couple families. In the matched sample of eligible lone parents, WTC recipients worked four hours less, on average, than comparable non-recipients. Estimating the effect of WTC on working hours using linear regression techniques, controlling for characteristics used in the propensity score estimation, produced a similar result with respect to the average effect of WTC to that obtained with PSM (Appendix 2, Table A2.6).

Mothers in couple families who were receiving WTC worked almost two-and-a-half hours less, on average, than comparable non-recipients in the matched sample, but this difference was not statistically significant. Again, linear regression produced a similar result, with WTC having no significant effect on working hours (Appendix 2, Table A2.6). These results suggest that, for the problem at hand, PSM offers no apparent advantage over ordinary least squares regression.

Table 14 Working hours of women with children in 2004–05

WTC receipt in 2004–05	Mean hours of work			
	Lone parents in 2002–03		Couple families in 2002–03	
	All	Matched sample	All	Matched sample
Receives WTC	26.5	26.7	26.6	26.6
Does not receive WTC	32.7	30.8	28.2	29.0
ATT	–6.2	*–4.1***	–1.6	*–2.4*
(SE)		(1.44)		(1.43)
N	*554*	*498*	*353*	*334*
Recipients	*443*	*387*	*151*	*132*
Non-recipients	*111*	*111*	*202*	*202*

Base: working-age women with dependent children eligible for WTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews, and worked 16 or more hours a week in 2004–05.

** Significant at 1 per cent.

Effect of WTC and CTC on working hours of women with children: dynamic analysis

The previous section focused on the effect of WTC on working hours at a point in time. Since all WTC recipients were also receiving CTC, the gauged effect of WTC may have represented the combined effect of CTC and WTC. However, CTC might have an independent effect on hours worked, since it was usually received separately from WTC, which was paid through the wage packet to workers. Even though, from November 2005, WTC paid directly from HMRC began to be phased in, during the period this study covers WTC was still paid through the wage packet.

As described in the previous chapter, PSM cannot control for unobserved individual differences. Not accounting for them may bias the results if unobserved individual differences affect labour market behaviour and are correlated with other variables in the model (such as receipt of tax credits). The fact that FACS is a panel dataset that collects information about the same individuals over time helps us overcome this problem, if we assume that these unobserved differences do not change from one round of interviews to the next. In other words, we can compare the behaviour of the same women over two yeas after the introduction of CTC and WTC, assuming that things about them that might affect their labour market behaviour and the propensity to take up the tax credits, but which we don't know about, will not have changed.

Table 15 presents the results of a fixed-effects linear regression of working hours and various background characteristics that may change from one interview to the next (for 'Hausman test' specification see Appendix 2, Table A2.7; for model specification see Appendix 3).[2] Only the individuals who participated in both the 2003–04 and 2004–05 rounds of interviews, worked more than 15 hours a week at the time of each interview and were income eligible for WTC in 2004–05 were included in the analysis. The effects of all variables in the model were assumed not to change over time. Variable 'year 2004–05' takes on the value of 1 for 2004–05 and the value of 0 for 2003–04, indicating the year-specific effects. Interaction terms between 'year' and CTC, 'year' and WTC, CTC and family type, and WTC and family type were tested but were not found to be statistically significant. These interaction effects were omitted from the final model.

Table 15 Effect of WTC and CTC on working hours of women with children

Predictor	B	SE
Year: 2004–05 (ref. 2003–04)	0.78**	0.25
WTC	0.26	0.54
CTC	–0.95	0.76
Couple (ref. lone parent)	0.49	0.87
Age of the youngest child (ref. 5-10)		
0–4	–0.14	0.83
11–15	–1.05	1.01
16–19	–0.49	1.45
Number of children (ref. 2)		
1	1.08	0.90
3 or more	–0.70	1.36
Mother has a long-standing illness	–0.06	.66
Constant	27.62**	1.01
Fraction of variance due to u_i	0.79	
Corr. (u_i Xb)	–0.12	
F test that all $u_i = 0$	6.83**	
Observations	1,768	
Persons	884	

Base: working-age women with dependent children, eligible for WTC in 2004–05, who participated in two rounds of interviews 2003–04 to 2004–05 and worked 16 or more hours at each interview.
u_i Unobserved individual factor.
** Significant at 1 per cent (null hypothesis: B = 0).

Unlike in the PSM analysis, WTC had no significant effect on working hours in excess of 15 hours a week for women with children eligible for WTC in 2004–05.[3] CTC had no significant effect on working hours either. There were significant unobserved individual-specific effects, with 0.12 correlation between them and the observed characteristics in the model; a high proportion of variation in the data was due to the unobserved individual-specific effects – see Appendix 3, section on 'Linear panel regression (fixed effects)'. These results suggest that, among women with children eligible for WTC in 2004–05 and working 16 or more hours a week in both years of observation, the tax credits did not influence the change in working hours, once unobserved individual differences that are stable from one round of interviews to the next were accounted for. However, these findings have to be interpreted with caution because of the relatively small numbers of cases analysed.

Effect of WTC and CTC on moving from full-time to part-time work: transitions analysis

The previous section has suggested that WTC and CTC recipients worked similar hours each week on average to those eligible for, but not receiving, WTC or CTC. However, it is possible that tax credits might encourage women to move from working full-time (30 hours or more a week) to working part-time (16–29 hours a week). Since FACS is a panel survey, it is possible to investigate this by estimating the relative probabilities of making a transition from full-time to part-time work for women with children who worked full-time in 2002–03 and were eligible for WTC and CTC in 2004–05. In order to ensure that the analysis included only women who may have been eligible for WTC in 2003–04 as well, we included only those who worked 16 or more hours a week in 2003–04 and 2004–05. Overall, only 7 per cent of those who were working 30 or more hours a week in 2002–03 had reduced their hours to 16–29 a week in each of the following two years.

To control for the receipt of tax credits and other relevant characteristics, a 'discrete-time' logistic regression model was estimated (see Appendix 3 for model specification). Once a transition to part-time employment occurred, the individual was not followed up, so that only first transitions were modelled.[4] A transition could occur in one of the two periods – 2002–03 to 2003–04 or 2003–04 to 2004–05. The effects of all variables were assumed to be constant during the studied period. The effects of CTC and WTC did not change significantly across the two studied periods, so the interaction terms between CTC (WTC) and year were omitted from the final model. Table 16 presents the results of the logistic regression analysis.

For women with children eligible for WTC (and CTC) in 2004–05, neither WTC nor CTC had a significant effect on the probability of moving from full-time work in 2002–03 to part-time work in any of the two subsequent years, when other important individual and household characteristics were controlled for. However, these findings have to be interpreted with caution because of the relatively small numbers of cases analysed.

At the same time, 14 per cent of those who worked part-time in 2002–03 moved into full-time work in one of the two subsequent years. Once the background characteristics were controlled for, there were no significant differences by WTC or CTC receipt in the likelihood of making a transition into full-time work. The results of the logistic regression model are presented in Appendix 2 (Table A2.8).

Table 16 Odds of moving from full-time to part-time work for those working 16 or more hours a week

Predictor	Odds ratio	Robust SE
Time varying		
Year: 2004–05 (ref. 2003–04)	0.48*	0.16
WTC	1.25	0.52
CTC	1.48	0.99
Couple (ref. lone parent)	1.17	0.49
Age of the youngest child	0.96	0.04
Number of children (ref. 2)		
1	0.70	0.24
3 or more	0.25	0.20
Mother has a long-standing illness	1.51	0.56
Own house (ref. rent)	0.72	0.27
Time invariant		
Mother's age in 2002–03	0.96	0.03
Left education aged (ref. 16 or under)		
17–18	1.14	0.43
19+	1.47	0.72
White	6.84	7.28
Received WFTC in 2002–03	0.42	0.17
Equivalised weekly income (modified OECD scale) in 2002–03 (ref. £188.01 or over)		
£35 or under	4.40*	3.19
£35.01–83	1.33	1.00
£83.01–120	2.02	1.10
£120.01–188	2.78	1.38
Region (ref. North)		
Scotland	0.53	0.32
Centre	0.54	0.24
South	0.92	0.46
London	3.22	2.28
Wales	1.81	1.04
Wald chi-square	37.52*	
Observations	470	

Base: working-age women with dependent children, who were eligible for WTC in 2004–05, participated in three rounds of interviews 2002–03 to 2004–05 and worked 16 or more hours at each interview.
* Significant at 5 per cent (null hypothesis: odds ratio = 1).
Longitudinal weights used.

Summary

- In 2004–05, lone parents who were receiving WTC worked around four hours less, on average, than eligible non-recipients with a similar propensity of receiving WTC, based on various important background characteristics. Women in couple families (with employed partners) who received WTC worked a similar number of hours, on average, to comparable non-recipients.

- However, when changes in working hours over time were examined, after unobserved individual differences were accounted for, neither WTC nor CTC had a significant effect on working hours of women with children working 16 or more hours a week in 2003–04 and 2004–05, and eligible for WTC (and CTC) in 2004–05.

- For women with children eligible for WTC (and CTC) in 2004–05, neither WTC not CTC had a significant effect on the probability of moving from full-time work (30 or more hours a week) in 2002–03 to part-time work (between 16 and 29 hours) in any of the two subsequent years, when other important individual and household characteristics were controlled for. Similarly, neither of the tax credits increased the chances of moving from part-time to full-time work among those who worked 16–29 hours a week in 2002–03.

6 Conclusions and implications

This report had two main objectives:

1 to analyse the impact of the new tax credits (Child Tax Credit and Working Tax Credit) on labour market participation and working hours of women with children

2 to explore reasons for non-take-up of these tax credits.

The context for the research is the Government's aim to halve child poverty by 2010 and to abolish it by 2020. However, the Government has failed to lift a quarter of children out of poverty by 2005. Recent research has shown that these ambitious aims will not be met unless further progress is made in encouraging women with children, both lone parents and those with partners, into the labour market, and will also require high take-up rates of WTC and CTC, which were introduced in April 2003. To date there has been little research on either of these areas.

The study has used data from the three latest available rounds of interviews of the longitudinal Families and Children Study (FACS), 2002–05. Since 2001, FACS has produced a representative sample of all families with dependent children in Britain and provides a wealth of information on the contemporary situation of families with children, including employment, income and benefits data. The main respondents in households are usually women, but, where the main respondent was male, the information about his female partner was used for this study. Thus, the family-level dataset has been restricted to working-age women with one or more dependent children in the family, who were not in full-time education and not receiving Incapacity Benefit or Disability Living Allowance. The analysis included only the families who were identified as eligible for CTC based on their family structure and income. A sub-set of these families were identified as eligible for WTC based on their working hours and income.

One complication for the research is that the two tax credits, while sharing the underlying aim of reducing child poverty, are likely to work in different, and possibly conflicting, directions. CTC, on the one hand, can be seen as aimed directly at reducing child poverty by providing a seamless system of income-tested financial support for children, paid to the main carer of the child(ren), irrespective of whether the parent(s) are in work or not. CTC was therefore expected to have a negative effect on women's labour market participation if women chose to remain out of work, to reduce their hours of work, or even to leave work. However, actual experiences of CTC receipt may not have been as hassle free as intended, as the evidence of various problems with the administration of the tax credits in the early years of their

operation indicates. On the other hand, WTC was expected to work indirectly on child poverty by acting as an incentive to parents to enter the labour market, since the benefit is available only to those in employment working 16 hours a week or more.

Another policy-related complication that had implications for our research needs to be mentioned here. Those who were out of work and receiving Income Support (IS) or Job Seeker's Allowance (JSA) in April 2003 when the new tax credits were introduced continued to receive allowances for their children as part of their benefit payments from Job Centre Plus. They would be unaware that their benefit was now made up of the CTC and adult elements of IS or JSA. The original intention was that these families would be migrated to the CTC by April 2004 and would then receive their payments separately. However, this has still not happened and will not start in 2007. The implications for the work-incentive effects of the tax credits are unclear and posed challenges for this research. On the one hand, mothers in receipt of IS or JSA before April 2003, mainly lone parents, would not be aware that they were receiving CTC. This could lead to the conclusion that such women should have been excluded from our analysis. However, this would have led to a massive overstatement of the work-incentive effect of both CTC and WTC, since the remaining sample would have consisted largely of those who were already employed at the time the tax credits were introduced. Furthermore, although these mothers were not receiving a sum of money labelled as CTC, they were benefiting from the increases in payments for children that CTC has provided. It was decided therefore to include this group of mothers in our research, which is consistent with the approach used by HMRC in estimating take-up rates (HRMC, 2006, 2007). Further analysis will need to be undertaken once this issue has been resolved and/or once there are more mothers who have only been in receipt of IS/JSA since the new tax credits were introduced and who will have received separate payments from the start of their claims.

Despite these reservations, the research has produced some interesting findings in relation to take-up, labour market participation and working hours, which are summarised here along with some of the policy implications.

Take-up of CTC and WTC

Our best estimate of take up in 2004–05 suggests that, among families eligible for CTC, lone parents were much more likely to be in receipt of CTC than mothers in couple families. Among families eligible for WTC, lone parents were also more likely to take it up. Given that receipt of WTC was measured at the household level and income was controlled for, this suggests that further work to improve take-up among couple families with children could prove fruitful.

The mother's activity status at the previous round of interviews was an important predictor of take-up of the new tax credits. Lone parents (but not mothers in couple families) eligible for CTC who had been in paid work in 2003–04 were about half as likely to take up CTC as those who had not been working in the previous round of interviews. Prior work status had no effect on the likelihood of WTC take-up among the eligible families, however, prior receipt of WFTC was another crucial predictor of take-up. CTC-eligible families who had been receiving WFTC in 2002–03 were almost twice as likely to take up CTC in 2004–05 as families who had not been claiming WFTC, while WTC-eligible families were three times more likely to take up WTC if they had been claiming WFTC in 2002–03. This finding is as expected, since WFTC recipients were sent CTC/WTC application forms and so were more likely to apply for the new tax credits.

CTC-eligible families with previous year's equivalised household incomes in the highest quintile were significantly less likely to take up CTC than other families, as expected. There were important differences by income among WTC-eligible families. Those with incomes in the first and the third quintiles were only about half as likely to take up WTC as those with incomes in the second quintile, those with incomes in the fourth quintile were about one-third as likely and those in the fifth quintile were one-fifth as likely to take up WTC as those with incomes in the second quintile. It is a cause for concern that WTC-eligible families in the lowest income quintile were only half as likely to take up WTC as those in the second quintile.

A particularly worrying finding was that families in the London area were the least likely to be receiving CTC and WTC in 2004–05: CTC-eligible families were about half as likely to be receiving CTC as those in the North of England and WTC-eligible families were about half as likely to be receiving WTC as eligible families in the North. Child poverty rates are high in London, 39 per cent in 2004–05 on the After Housing Cost measure of relative income poverty, compared with the national poverty rate of 27 per cent. Action to improve take-up in London is urgently needed.

The impact of CTC on labour market participation of women with children

In 2004–05, estimated employment rates of lone parents who were receiving CTC were around 11 percentage points lower than the employment rates of eligible non-recipients with similar propensities of receiving CTC, based on various important background characteristics. Mothers in couple families who were in receipt of CTC had an eight percentage point lower employment rate, on average, than comparable non-recipients.

For those who had not been working at the 2002–03 round of interviews and were not in receipt of WTC at any of the two subsequent interviews, CTC had a negative effect on the probability of moving into work during the next two years. The negative effect of CTC was larger in magnitude for lone parents. At the same time, CTC had a positive effect on the probability of moving out of work for lone parents who had been working at the time of the 2002–03 interview and were not receiving WTC at any of the next two interviews, but a negative effect for mothers in couple families. Among CTC recipients, partnered mothers were substantially less likely to move out of work than lone parents, but there was no difference by family type among CTC non-recipients. Women in the London area were more than twice as likely to become unemployed as those in the North of England.

An important omission from the study was that we were not able to look at the impact of WTC on labour market participation of women with children, which should be positive for lone parents and negative for second earners in couples.

The impact of WTC and CTC on working hours of women with children

In 2004–05, lone parents who were receiving WTC worked around four hours less than eligible non-recipients with a similar propensity of receiving WTC. Women in couple families (with employed partners) who received WTC worked a similar number of hours, on average, to comparable non-recipients. However, when changes in working hours over time were examined, after unobserved individual differences were accounted for, neither WTC nor CTC had a significant effect on working hours of women with children working 16 or more hours a week in 2003–04 and 2004–05, and eligible for WTC (and CTC) in 2004–05.

For women with children eligible for WTC (and CTC) in 2004–05, neither WTC nor CTC had a significant effect on the probability of moving from full-time work (30 or more hours a week) in 2002–03 to part-time work (between 16 and 29 hours) in any of the two subsequent years, when other important individual and household characteristics were controlled for. Similarly, neither of the tax credits increased the chances of moving from part-time to full-time work among those who worked 16–29 hours a week in 2002–03.

In the context of the finding that CTC had a negative effect on participation of women with children, especially of lone parents, it may seem surprising that the tax credits had little effect on working hours. However, only those who were working 16 or

more hours a week before and after the tax credits were introduced were examined in the working hours analysis. Thus, CTC did a relatively poor job of pushing non-participating mothers into work, but, for those who were already working and eligible for WTC, the tax credits did not produce substantial changes in hours of work. It may also be the case that employees cannot easily adjust their working hours within a short period of time.

Conclusion

For policymakers, the report contains both encouraging and discouraging findings. On take-up, further work is needed to encourage couple families to take up the tax credits and, particularly, families in London. CTC appears to have a work-disincentive effect for those who were not receiving WTC, especially for lone mothers, suggesting that, for those who wish to work under 16 hours a week, CTC is a financial disincentive to enter the labour market. However, neither CTC nor WTC appears to have resulted in mothers reducing their working hours if they already worked 16 or more hours a week.

This research was undertaken using data from the longitudinal Families and Children Study (FACS) for 2002–03 (before the new tax credits were introduced), 2003–04 and 2004–05. Therefore we had access to data only for the first two years after the tax credits were introduced. Once further data become available it is likely that more robust conclusions will be possible. For the technically minded, the report has shown the importance of selecting the most appropriate statistical method for modelling the impact of the new tax credits and the value of longitudinal data in so doing.

Notes

Chapter 1

1 Directgov – Child Tax Credit Factsheet (available at http://www.direct.gov.uk/Bfsl1/BenefitsAndFinancialSupport/BenefitsAndFinancialSupportArticles/fs/en?CONTENT_ID=10018929&chk=UPfIRv).

2 'Whilst the same people are followed at each wave, new people are also added to refresh the sample each year' (FACS 2004 User Guide, NatCen).

3 Information is also available about receipt of the childcare element but the numbers in receipt were very small, so this has not been included in the analysis.

4 Due to illness or disability, individuals receiving Incapacity Benefit or Disability Living Allowance are usually not in work (6.9 per cent of all interviewed in Wave 6). To focus on women with children, households headed by lone fathers were also removed (1.4 per cent of all interviewed in Wave 6).

5 In the statement on 6 December 2006, the Paymaster General said that 'the Government will not begin migration of the remaining IS/JSA recipients with children to the child tax credit in 2007'.

6 There was no valid information on the nature of JSA receipt (contributory or non-contributory) or its duration, but the number of JSA claimants was too low for this lack of information to bias the results.

7 Panel data are repeated observations on the same cross-section observed for several time periods (Cameron and Trivedi, 2005).

8 A consistent estimator is that which converges in probability to the true value of the parameter being estimated as the sample size grows to infinity (Cameron and Trivedi, 2005, p. 945).

9 For detailed discussion on panel data models see Greene (1993); Wooldridge, (2002); Cameron and Trivedi (2005).

Chapter 2

1 The data for 2004–05 were weighted by Wave 6 cross-sectional weights provided with the FACS dataset.

2 Similar analysis was not carried out using the 2003–04 rounds of interviews of FACS because information on costs of childcare was not available.

3 Since those who received Incapacity Benefit during the 2004–05 round of interviews were removed from the sample, only 0.5 per cent of those interviewed in 2004–05 reported receiving Incapacity Benefit in 2003–04.

4 Or below the level at which both WTC and CTC (apart from the 'family element') are tapered away entirely, if this level of income exceeds £50,000 a year.

5 Two per cent of CTC-eligible families who reported receiving WTC only were reclassified into receiving both CTC and WTC because it is impossible for a family with dependent children to receive WTC only.

Chapter 3

1 Because entitlement may be endogenous to some of the observed characteristics in the take-up model, it would also be appropriate to use the Instrumental Variables approach to account for this.

2 The vast majority of families with the youngest dependent child aged 16–19 had children aged 16–17. Children aged 16–19 were defined as dependent for benefit purposes only if they were in full-time non-university education.

Chapter 5

1 Only those in the common support region were used in the estimation of ATT. Kernel-based matching with Epanechnikov kernel and the bandwidth of 0.01 was employed, using the PSMATCH2 procedure in Stata (Leuven and Sianesi, 2003). The results were consistent when other matching estimators were used.

2 Unobserved heterogeneity was also statistically significant in the random effects model. However, there was a statistically significant difference between random effects and the fixed effects estimates, according to the Hausman (1978) test, so the consistent fixed-effects estimator was more appropriate.

3 Working hours were also estimated using Heckman's selection model, since those who were not in work or worked under 16 hours a week were omitted from the original model, but the selection effect was not statistically significant.

4 Thus, it is possible that some of the transitions to part-time work were only temporary, but we would need more years of data to model second transitions.

References

Adam, S. and Brewer, M. (2005) *Take-up of Family Credit and Working Families' Tax Credit*. London: HM Revenue & Customs

Becker, S. and Ichino, A. (2002) 'Estimation of average treatment effects based on propensity scores', *The Stata Journal*, Vol. 2, pp. 358–77

Bingley, P. and Walker, I. (1997) 'The labour supply, unemployment and participation of lone mothers in in-work transfer programmes', *The Economic Journal*, Vol. 107, pp. 1375–90

Blundell, R., Duncan, A., McCrae, J. and Meghir, C. (2000) 'The labour market impact of the Working Families' Tax Credit', *Fiscal Studies*, Vol. 21, pp. 75–104

Brewer, M. (2003) *Estimating Models of Benefit Take-up*. London: Inland Revenue

Brewer, M. and Browne, J. (2006) *The Effect of the Working Families' Tax Credit on Labour Market Participation*. Briefing Note No. 69. London: The Institute for Fiscal Studies

Brewer, M., Duncan, A., Shephard, A. and Suarez, M.J. (2006a) 'Did Working Families' Tax Credit work? The impact of in-work support on labour supply in Great Britain', *Labour Economics*, Vol. 13, pp. 699–720

Brewer, M., Goodman, A., Shaw, J. and Sibieta, L. (2006b) *Poverty and Inequality in Britain: 2006*. London: Institute of Fiscal Studies

Cameron, C. and Trivedi, P. (2005) *Microeconometrics: Methods and Applications*. New York: Cambridge University Press

Greene, W. (1993) *Econometric Analysis*. Englewood Cliffs, NJ: Prentice Hall

Hausman, J.A. (1978) 'Specification tests in econometrics', *Econometrica*, Vol. 46, pp. 1251–71

Hirsch, D. (2006) *What Will It Take to End Child Poverty?* York: Joseph Rowntree Foundation

HMRC (HM Revenue & Customs) (2006) *Child Tax Credit and Working Tax Credit Take-up Rates 2003–04*. London: HM Revenue & Customs (available at http://www.hmrc.gov.uk/stats/personal-tax-credits/takeup_rates_2003–04_mar06.pdf)

HMRC (HM Revenue & Customs) (2007) *Child Tax Credit and Working Tax Credit Take-up Rates 2004–05*. HM Revenue & Customs (available at http://www.hmrc.gov.uk/stats/personal-tax-credits/takeup-rates2004–05.pdf)

HM Treasury (2002) *The Modernisation of Britain's Tax and Benefit System Number Ten*. London: HM Treasury

Leuven, E. and Sianesi, B. (2003) 'PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing', available at http://ideas.repec.org/c/boc/bocode/s432001.html

Mulheirn, I. and Pisani, M. (2006) 'Estimating the labour supply effect of the Working Tax Credit for childless households in the UK', available at http://www.hha.dk/nat/cmsdocs/ccp/lower/papers/mulheirn.pdf

Rosenbaum, P. and Rubin, D. (1983) 'The central role of the propensity score in observational studies for causal effects', *Biometrica*, Vol. 70, pp. 41–55

Shaw, A., Walker R., Ashworth, K., Jenkins, S. and Middleton, S. (1996) *Moving off Income Support: Barriers and Bridges*. DSS Research Report 53. London: HMSO

Wooldridge, J. (2002) *Econometric Analysis of Cross-section and Panel Data*. Cambridge, MA: MIT Press

Appendix 1: Defining eligibility for CTC and WTC for 2004–05

Maximum CTC award*

- Family element: £545.
- Baby addition ('new birth to respondent since last wave'): £545.
- Child element × number of dependent children *N*: £1,625 × *N*.
- Disabled child element ('receiving DLA [Disability Living Allowance] for children'): £2,215.

Maximum WTC award**

- Basic element: £1,570.
- Couple/lone parent element: £1,545.
- Thirty-hour element***: £640.
- Childcare element:
  - one child in formal**** term-time care costing £135 per week or more: £4,914 (0.70 × 52 × 135)
  - one child in care costing less than £135 per week: 0.70 × 52 × cost
  - two or more children in care costing £200 per week or more: £7,280 (0.70 × 52 × 200)
  - two or more children in care costing less than £200 per week: 0.70 × 52 × cost.

Excess annual income

- Income 2004–05 exceeds income 2003–04 by £2,500 or less, and:
  - income 2003–04 exceeds £5,060 but less than or equal to £50,000 → **EXCESS = income 2003–04: £5,060**
  - income 2003–04 exceeds £50,000 → **EXCESS = income 2003–04: £50,000**
  - income 2003–04 is £5,060 or less → **EXCESS = 0.**
- Income 2004–05 exceeds income 2003–04 by more than £2500, and:
  - income 2004–05 exceeds £7,560 but is less than or equal to £52,500 → **EXCESS = income 2004–05: £7,560**

(Continued)

  - income 2004–05 exceeds £52,500 → **EXCESS = income 2004–05: £52,500**
  - income 2004–05 is £7,560 or less → **EXCESS = 0**.
- Income 2004–05 is equal to or less than income 2003–04, and:
  - income 2004–05 exceeds £5,060 but is less than or equal to £50,000 ? **EXCESS = income 2004–05: £5,060**
  - income 2004–05 exceeds £50,000 → **EXCESS = income 2004–05: £50,000**
  - income 2004–05 is £5,060 or less → **EXCESS = 0**.

Defining income eligibility for CTC

- One or more dependent children in the family.
- If income is below £50,000 → **ELIGIBLE FOR CTC**.
- If income exceeds £50,000, but CTC family element plus baby addition exceeds (0.067 x EXCESS) → **ELIGIBLE FOR CTC**.

Defining income eligibility for WTC

- Mother is in paid work of 16 or more hours a week or, if mother does not work or works less than 16 hours a week, father works 16 or more hours a week.
- Maximum WTC award exceeds (0.37 × EXCESS) → **ELIGIBLE FOR WTC**.

Separating CTC-only recipients who are not eligible for WTC on income or working hours grounds and those who are eligible for WTC but are not taking it up

- If not income eligible for WTC but is working hours eligible → income too high for WTC.
- If both income and working hours ineligible for WTC → not working or working under 16 hours.
- If eligible both on income and working hours grounds → not taking up WTC.

Notes

* 'Severely disabled child element' is not included because of the lack of information on higher rate DLA for children.

(Continued)

** 'Disabled worker element' and 'severely disabled worker element' are not included because families with DLA-claiming parents were excluded from the analysis. 'Fifty+ return to work payment' was not included because of insufficient information on returning to work after a six-month period on qualifying benefits.

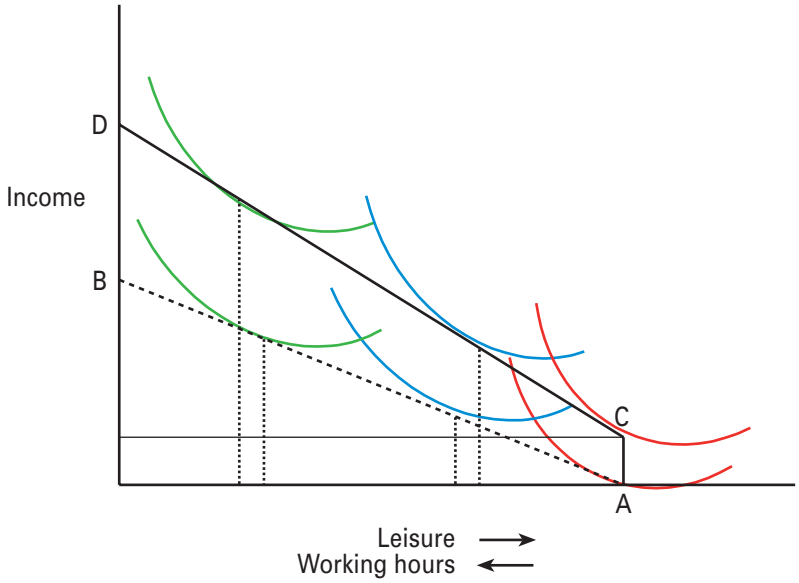
*** Mother or partner works 30 or more hours a week or, if couple family, the sum of mother's and partner's hours is 30 or more hours, provided one of them works at least 16 hours a week.

**** Formal care: day nursery, crèche, nursery school, playgroup or pre-school, registered childminder.

With the introduction of the new tax credits, a person who initially had a budget line AB and worked zero hours (hence, had maximum hours of leisure) will now face a different budget constraint (ACD) and will benefit from higher non-market income (from CTC) without necessarily moving into work. This is illustrated by the red indifference curves in Figure A1.1. However, someone who worked between 16 and 29 hours a week may now want to reduce numbers slightly, while benefiting from higher total income from earnings and tax credits than before. This is illustrated by the blue indifference curves in Figure A1.1. At the same time, someone who worked over 30 hours a week will now benefit from the 30-hour addition in WTC and may work even more hours. This is shown by the green indifference curves in Figure A1.1. Thus, compared to a situation of no financial support, the new tax credits are expected to have a negative effect on participation and an ambiguous effect on working hours (WTC may have a positive effect but CTC may have a negative effect), depending on the individual preferences for leisure and income.

For women in couple families with employed partners, the negative effect of CTC on participation is expected to be larger because of a higher non-market income (partner's earnings) to begin with. Moreover, the family becomes eligible for both WTC and CTC if the partner works 16 or more hours a week, which would have a negative effect on both participation and working hours for a second earner in the family.

Figure A1 Indifference curves analysis: anticipated effect of CTC/WTC on participation and working hours of women with children, compared to no financial support (lone parent, one dependent child, minimum wage scenario)



Appendix 2: Supplementary analysis

Chapter 4: The impact of CTC on labour market participation of women with children

Table A2.1 Personal and family characteristics used in propensity score matching (PSM) of CTC recipients and non-recipients for labour market participation analysis

Background characteristics in 2002–03	Lone parents in 2002–03		Couple families in 2002–03	
	Mean	Std dev.	Mean	Std dev.
Mother				
In work	0.52	0.50	0.76	0.43
Age	33.78	8.17	36.77	6.85
Left education aged				
17–18	0.22	0.41	–	–
19+	0.11	0.31	0.23	0.42
White	0.93	0.25	0.94	0.23
Has long-standing illness	–	–	0.85	0.36
Access to car	0.48	0.50	–	–
Family				
Age of the youngest child	6.41	4.47	5.99	4.70
N dependent children				
1	0.48	0.50	0.34	0.47
2	0.35	0.48	0.48	0.50
Own house	0.33	0.47	–	–
Receives WFTC	0.35	0.48	0.15	0.36
Equivalised weekly income (modified OECD scale)	58.25	82.30	–	–
£40 or under	–	–	0.03	0.18
£40.01–127	–	–	0.15	0.36
£127.01–200	–	–	0.25	0.43
£200.01–274	–	–	0.28	0.45
Region				
Scotland	0.12	0.33	0.08	0.28
Centre	0.25	0.43	–	–
South	0.16	0.37	0.25	0.43
London	0.09	0.29	0.07	0.25
Wales	0.08	0.27	0.05	0.22
N	1,313		3,057	

Base: working-age women with dependent children eligible for CTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.

Table A2.2 'Balancing test' of variables used in propensity score matching (PSM) of CTC recipients and non-recipients for labour market participation analysis

Background characteristics in 2002–03	Lone parents in 2002–03		Couple families in 2002–03	
	% reduction 'bias'	t-test of equality of means	% reduction 'bias'	t-test of equality of means
Mother				
In work	97.8	0.24	49.2	–2.29
Age	99.2	0.08	99.3	–0.11
Left education aged				
17–18	90.0	–0.52	–	–
19+	81.4	–1.70	90.9	1.02
White	84.7	–0.77	35.5	1.27
Has long-standing illness	–	–	53.3	0.88
Access to car	90.3	–1.05	–	–
Family				
Age of the youngest child	83.2	1.60	98.2	0.23
N dependent children				
1	–34.1	1.71	61.9	1.12
2	37.9	–1.13	100.0	0.00
Own house	99.9	0.01	–	–
Receives WFTC	96.8	–0.16	80.8	2.10
Equivalised weekly income (modified OECD scale)	98.3	–0.50	–	–
£40 or under	–	–	92.1	0.39
£40.01–127	–	–	79.8	1.47
£127.01–200	–	–	87.0	–0.79
£200.01–274	–	–	81.1	–1.12
Region				
Scotland	99.8	–0.01	–45.4	1.34
Centre	42.2	–0.91	–	–
South	77.4	1.37	52.3	0.87
London	53.1	1.40	98.5	0.13
Wales	78.5	0.85	74.3	0.21
Matched sample pseudo R-square	0.006		0.004	
LR chi-square	19.97		22.62	

Base: matched sample of working-age women with dependent children eligible for CTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.

For each variable, t-tests of the equality of means between CTC recipients (treated) and the non-recipients (controls) in the matched sample are calculated.

Table A2.3 presents the results of a fixed-effects logistic regression model of labour market participation, estimated using conditional maximum likelihood. Employment was defined as being in paid work of one or more hours a week. Only the households who participated in both the 2003–04 and 2004–05 rounds of interviews and where the mother changed her employment status from one interview to another were used, since those who did not change their employment status did not contribute anything to the estimation. The effects of all predictors were assumed to be the same over the two years. Interactions between CTC and 'year' and between CTC and partnership status were tested but were not found to be statistically significant, so the interaction terms were omitted from the final model. Variable 'year 2004–05' takes on the value of 1 for 2004–05 and the value of 0 in 2003–04, indicating the year-specific effects. Receipt of CTC did not have a significant effect on participation in either 2003–04 or in 2004–05.

Table A2.3 Odds of being employed, fixed effects

Predictor	Probability of being employed	
	Odds ratio	SE
Year: 2004–05 (ref. 2003–04)	1.43**	0.13
CTC	0.88	0.20
Couple (ref. lone parent)	1.22	0.37
Age of the youngest child (ref. 5–10)		
0–4	0.52*	0.16
11–15	0.99	0.41
16–19	2.04	1.90
Number of children (ref. 2)		
1	3.10**	0.92
3 or more	0.34*	0.17
Mother has a long-standing illness	0.85	0.19
Log likelihood	–396.31	
Observations	1,218	
Persons	609	

Base: income-eligible working-age women with dependent children who participated in two rounds of interviews 2003–04 and 2004–05 and changed their employment status from one year to another.
* Significant at 5 per cent; ** significant at 1 per cent (null hypothesis: odds ratio = 1).

Chapter 5: The impact of WTC and CTC on working hours of women with children

Table A2.4 Personal and family characteristics used in propensity score matching (PSM) of WTC recipients and non-recipients for working hours analysis

Background characteristics in 2002–03	Lone parents in 2002–03 Mean	Std dev.	Couple families in 2002–03 Mean	Std dev.
Mother				
In work	0.79	0.41	0.84	0.36
Age	35.23	7.44	35.80	7.47
Left education aged				
17–18	0.24	0.43	–	–
19+	0.12	0.32	–	–
White	0.94	0.24	–	–
Has long-standing illness	0.81	0.39	–	–
Access to car	0.61	0.49	0.80	0.40
Family				
Age of the youngest child	7.32	4.36	5.72	4.71
N dependent children				
1	0.53	0.50	0.36	0.48
3 or more	0.13	0.33	0.18	0.38
Own house				
Receives WFTC	0.45	0.50	0.82	0.39
Equivalised weekly income (modified OECD scale)	0.63	0.48	0.20	0.40
£35 or under	0.30	0.46	0.03	0.17
£35.01–81	0.26	0.44	0.09	0.28
£81.01–120	0.22	0.42	0.13	0.34
£120.01–188	0.18	0.38	0.24	0.43
Region				
Scotland	0.12	0.33	0.11	0.31
Centre	0.25	0.43	–	–
South	0.16	0.37	0.25	0.43
London	0.06	0.23	0.04	0.20
Wales	0.08	0.28	0.05	0.21
N	554		353	

Base: working-age women with dependent children eligible for WTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.

Table A2.5 'Balancing test' of variables used in propensity score matching (PSM) of WTC recipients and non-recipients for labour market participation analysis

Background characteristics in 2002–03	Lone parents in 2002–03		Couple families in 2002–03	
	% reduction 'bias'	t-test of equality of means	% reduction 'bias'	t-test of equality of means
Mother				
In work	–79.1	–0.79	99.4	0.01
Age	96.3	0.06	98.8	–0.05
Left education aged				
17–18	–547.8	–1.74	–	–
19+	74.7	1.00	–	–
White	73.3	–0.86	–	–
Has long-standing illness	–202.4	0.98	–	–
Access to car	63.9	–1.23	71.3	0.67
Family				
Age of the youngest child	–176.4	–0.79	95.2	0.14
N dependent children				
1	58.8	–0.79	–128.7	1.02
3 or more	85.2	–0.13	36.9	–0.24
Own house	81.8	–0.75	72.7	–0.93
Receives WFTC	75.4	–1.47	93.8	–0.27
Equivalised weekly income (modified OECD scale)				
£40 or under	29.4	1.91	0.9	–0.41
£40.01–127	95.6	0.28	33.5	0.95
£127.01–200	–13.2	–1.50	65.0	0.79
£200.01–274	87.5	–0.95	17.6	–0.25
Region				
Scotland	23.4	–0.56	58.1	0.49
Centre	54.2	1.10	–	–
South	81.8	–0.38	70.6	–0.17
London	90.9	0.55	82.7	0.40
Wales	–1.1	1.40	–54.9	–1.35
Matched sample pseudo R-square	0.02		0.02	
LR chi-square	21.91		7.58	

Base: matched sample of working-age women with dependent children eligible for WTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.

For each variable, t-tests of the equality of means between CTC recipients (treated) and the non-recipients (controls) in the matched sample are calculated.

Table A2.6 Effect of WTC on working hours of eligible women with children (linear regression)

Background characteristics in 2002–03	Lone parents in 2002–03		Couple families in 2002–03	
	B	Robust SE	B	Robust SE
Receives WTC in 2004–05	–4.55**	1.06	–0.92	1.31
Mother				
In work	0.42	1.55	0.41	1.85
Age	0.04	0.08	–0.12	0.11
Left education aged (ref. 16 or under)				
17–18	1.12	1.00	–	–
19+	–1.02	1.26	–	–
White	0.21	1.59	–	–
Has long-standing illness	–1.58	1.13	–	–
Access to car	0.80	0.92	0.11	1.25
Family				
Age of the youngest child	0.55**	0.11	0.37*	0.17
N dependent children (ref. 2)				
1	–0.75	0.91	–1.03	1.15
3 or more	0.30	1.32	–1.10	1.46
Own house	–0.32	0.92	1.24	1.51
Receives WFTC	–0.27	1.33	–0.01	1.56
Equivalised weekly income (modified OECD scale) (ref. £188.01 or over)				
£35 or under	–7.73**	2.55	17.42*	7.35
£35.01–81	–9.05**	2.40	–0.22	1.85
£81.01–120	–5.26*	2.49	–0.12	1.82
£120.01–188	–3.81	2.30	–1.87	1.24
Region (ref. North)				
Scotland	–1.16	1.25	–0.23	1.88
Centre	–0.98	1.06	–	–
South	–1.50	1.20	–2.09	1.32
London	–1.72	1.84	0.00	2.20
Wales	–2.21	1.67	1.13	2.57
Constant	34.22**	4.11	29.98**	3.80
R-square	0.23		0.15	
N	554		353	

Base: working-age women with dependent children eligible for WTC in 2004–05 who participated in both the 2002–03 and 2004–05 rounds of interviews.
* Significant at 5 per cent; ** significant at 1 per cent (null hypothesis: B = 0).
Longitudinal weights used.

Table A2.7 Hausman specification test of fixed effects and random effects estimators for working hours analysis

Predictor	b (fixed)	B (random)	Difference	SE
Year: 2004–05 (ref. 2003–04)	0.78	0.54	0.23	0.06
WTC	0.26	–0.77	1.03	0.26
CTC	–0.95	–1.10	0.15	0.38
Couple (ref. lone parent)	0.49	0.17	0.32	0.66
Age of the youngest child (ref. 5–10)				
0–4	–0.14	–1.39	1.25	0.60
11–15	–1.05	2.23	–3.28	0.80
16–19	–0.49	3.39	–3.88	1.10
Number of children (ref. 2)				
1	1.08	0.42	0.66	0.72
3 or more	–0.70	–0.15	–0.56	1.08
Mother has a long-standing illness	–0.06	0.64	–0.69	0.38
Chi-square			39.94**	

Hypothesis that the difference in the coefficients B and b is not systematic is rejected; b is a consistent estimator.
** Significant at 1 per cent.

Table A2.8 Odds of moving from part-time to full-time work for those working 16 or more hours a week

Predictor	Odds ratio	Robust SE
Time varying		
Year: 2004–05 (ref. 2003–04)	1.20	0.28
WTC	0.76	0.33
CTC	1.03	0.44
Couple (ref. lone parent)	1.13	0.38
Age of the youngest child	1.08*	0.04
Number of children (ref. 2)		
1	0.74	0.20
3 or more	0.73	0.30
Mother has a long-standing illness	1.38	0.44
Own house (ref. rent)	0.85	0.25
Time invariant		
Mother's age in 2002–03	0.99	0.03
Left education aged (ref. 16 or under)		
17–18	0.80	0.22
19+	0.87	0.33
White	3.12	2.97
Received WFTC in 2002–03	0.93	0.34
Equivalised weekly income (modified OECD scale) in 2002–03 (ref. £188.01 or over)		
£35 or under	1.70	0.94
£35.01–83	1.03	0.50
£83.01–120	1.98	0.99
£120.01–188	1.21	0.52
Region (ref. North)		
Scotland	1.26	0.48
Centre	1.27	0.39
South	1.55	0.52
London	1.73	1.14
Wales	1.36	0.78
Wald chi-square	21.11	
Observations	746	

Base: working-age women with dependent children, who were eligible for WTC in 2004–05, participated in three rounds of interviews 2002–03 to 2004–05 and worked 16 or more hours at each interview.
* Significant at 5 per cent (null hypothesis: odds ratio = 1).
Longitudinal weights used.

Appendix 3: Models specification

Propensity score matching

The propensity score for an individual j is defined as:

$P(X_j) = Pr\ (D_j = 1 \mid X_j)$

where:

D_j {0, 1} is the indicator of exposure to treatment,

X_j is the vector of individual's pre-treatment characteristics.

Rosenbaum and Rubin (1983) showed that, if the exposure to treatment is random within the cells defined by X, it is also random within cells defined by the values of the one-dimensional variable $P(X_j)$. Thus, the 'average treatment on the treated' (ATT) can be estimated as follows:

$$\begin{aligned}\tau &= E\ \{Y_{1j} - Y_{0j} \mid D_j = 1]\\ &= E\ \{E\ \{Y_{1j} - Y_{0j} \mid D_j = 1, p(X_j)\}\}\\ &= E\ \{E\ \{Y_{1j} \mid D_j = 1, p(X_j)\} - E\ \{Y_{0j} \mid D_j = 0, p(X_j)\} \mid D_j = 1\}\end{aligned}$$

where:

Y_{1j} is the potential outcome in the situation of treatment,

Y_{0j} is the potential outcome in the counterfactual situation of non-treatment.

Event history analysis: one-way transitions

The response variable for a discrete-time model is the binary indicator of event occurrence, so we can fit a logit regression model of the form:

$Logit\ [h_j(t)] = \alpha\ (t) + \beta\ x_j\ (t)$

where:

$h_j(t)$ is the hazard of having an event (e.g. entering employment) during time interval *t* for woman *j*, given no earlier event occurrence,

α (t) is the baseline hazard function that needs to be specified,

x_j (t) is the vector of covariates, which can be time constant or time varying, defined for woman *j*, and

β is the vector of parameters to be estimated.

Linear panel regression (fixed effects)

Estimated with panel data, this model allows each individual to have a different intercept term. However all slopes are the same.

$$Y_{jt} = \alpha_j + \beta\, x'_{jt} + \varepsilon_{jt}$$

where:

α_j is the unobserved individual-specific effect,

ε_{jt} is the error term, which is *idd* over individuals *j* and time periods *t*,

x_{jt} is the vector of time-varying covariates, defined for woman *j* and time *t*, and

β is the vector of parameters to be estimated.

The fixed effects model treats α_j as an unobserved random variable potentially correlated with the observed covariates x_{jt}.