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# WORKING PAPER SERIES

## **Urban and Rural Differences in Utilization of State Earned Income Tax Credit Programs: Minnesota's Experience**

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# Urban and Rural Differences in Utilization of State Earned Income Tax Credit Programs: Minnesota's Experience

by  
Donald P. Hirasuna and Thomas F. Stinson<sup>1</sup>

## Abstract

This paper examines utilization rates of Minnesota's earned income tax credit program by households on welfare from 1992 through 1999. We examine urban and rural differences in the rate of filing an income tax return and receiving the earned income tax credit. Tabulations show that urban areas have the lowest utilization rates, but are catching up in both income tax filing rates and earned income credit receipt rates. Regression analyses identify correlates to urban-rural differences. A modeling exercise examines how urban and rural households might respond to a 10 percent increase in the credit. Finally, policy suggestions are offered, which are relevant to urban and rural areas and are appropriate for other states.

## INTRODUCTION

State earned income credits are an important component to the portfolio of policies that help families on welfare. They supplement the earnings of low-income working households, which, in turn, provide these families with an incentive to work. In most states the credit is refundable, which means more money in the pockets of households that receive a refund when the amount of credit exceeds any taxes owed. These earned income credits are relevant to welfare reform since the work incentive is limited to lower income households, the incentive may encourage families to seek work and thereby meet the work requirements. Also, earned income credits may help families pay for basic necessities while transitioning off of welfare. The federal government facilitates the implementation of these credits by allowing states to pay for the credit with related funds from the Temporary Assistance for Needy Families (TANF) program. A fundamental concern in the evaluation of these programs is that low-income households must file an income tax return to claim the credit and many fail to do so, even when it is to their financial advantage.

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<sup>1</sup> The authors are respectively from the Research Department, Minnesota House of Representatives, and the Department of Applied Economics at the University of Minnesota. We thank Scott Allard, Bruce Weber, Bonnie Esposito, and Clyde Thurston for their helpful comments.

This paper examines the percentage of households who are on welfare and receive Minnesota's Working Family Credit, a state earned income credit. Differences across urban and rural areas are examined with respect to utilization of the credit, response to an increase in the credit amount, and demographic characteristics correlated with lower utilization of the credit. The analysis is conducted with a unique and extensive administrative database of all families who received welfare in Minnesota from 1992 through 1999. Knowledge about urban-rural differences in utilization rates might better inform analysts, legislators, and other scholarly observers about who benefits from the credit and whether these benefits are distributed evenly across geographic regions. This may facilitate policy discussions on earned income credits. Also, it may help policymakers consider the role of urban and rural places in developing low-income tax credit policy.

Research on Minnesota's earned income credit program, the Working Family Credit, is particularly useful for several reasons. The credit was implemented in 1991, which allows for a lengthy time series. As in many other states, Minnesota's credit is a refundable credit; households receive a refund if the credit exceeds taxes owed. Also, like other states, it is partially paid for with grant money from TANF. What distinguishes Minnesota's credit from the federal and other state credits is that Minnesota switched from a straight percentage of the federal credit to a two-tier credit in 1998. This paper provides information on whether changes in the second tier are correlated with a higher proportion of income tax filers and Working Family Credit recipients.

## LITERATURE REVIEW

As of 2003, 16 states and the District of Columbia offered an earned income tax credits (see table 1). Nine of those states and the District of Columbia have implemented their earned

income credit programs since 1996.<sup>2</sup> Colorado would make it ten states, but its credit was enacted with a budgetary requirement that prevented offering the credit in tax years 2002, 2003, and 2004. Virginia enacted a credit in 2004 and will implement it in tax year 2006.

Twelve states and the District of Columbia offer a refundable credit.<sup>3</sup> TANF-related funds, including grant money or the associated maintenance of effort may be appropriated for the refundable portion of the credit.<sup>4</sup> Also, the credit does not qualify as assistance and subsequently does not subject households to the 60-month time limit.

Some suggest that federal and state earned income credits contributed to the success of welfare reform. Danziger et al. (2002) suggest that the combination of a tighter labor market, a higher minimum wage, an increase in medical insurance for children, an increase in childcare subsidies, and an increased earned income credit helped make work pay. Several found that increases in the earned income credit raises employment rates of low-income households, especially that of single mothers (Ellwood 2000, Meyer and Rosenbaum 2000, Blank and Schmidt 2001, Grogger 2003). Neumark and Wascher (2001) report a positive correlation between higher state-earned income credits and the proportion of households with incomes that exceed the poverty guidelines. Smeeding, Ross-Phillips, and O'Connor found that the majority of households planned to use the credit to make economic or social mobility purchases like paying for moving expenses or purchasing an automobile.

### Utilization of Earned Income Credits

Even with such impressive outcomes, not all news is good news when it comes to earned income credits. Some households miscalculate their receipt of the federal earned income credit. For example, McCubbin (1996) reports an error rate of 25.8 percent. Part of the reason for

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<sup>2</sup> Rhode Island offered a refundable credit in 2003. Before that, Rhode Island did not explicitly have a credit, but instead allowed individuals to subtract the federal earned income credit from their taxable income.

noncompliance originates from a complex set of rules on what qualifies as a child for earned income credit purposes.

Another issue is whether all eligible participants receive the credit. Scholz (1994) and others examine what's known as the participation rate, the percent of those eligible for the credit who also receive the credit. Scholz (1994) estimated that 80 to 86 percent of eligible taxpayers received the credit in 1990.<sup>5</sup> Factors correlated with a higher probability of nonparticipation include receipt of Social Security or public assistance, larger families, single households, and households of Spanish origin. The U.S. General Accounting Office (GAO) (2001) estimates 75 percent of eligible households claimed the credit. Using simple tabulations they find that participation rates decreased with increased family size. For households with no qualifying dependent, the participation rate was 45 percent. For households with one qualifying dependent, the participation rate was 96 percent. Then, as the number of qualifying dependents increased, participation rates diminished. For families with three or more children, the participation rate fell to 63 percent. Of those eligible but not participating, households without dependents made up 60 percent, and households with three or more children, 28 percent.

When examining welfare households, participation rates may be lower. Hill et al. (1999) estimate a lower participation rate. Between 42 and 54 percent of single households on Aid to Families with Dependent Children (AFDC) in California participated in the federal earned income credit. Married households claimed the credit at a rate closer to the national statistics with 61 to 84 percent.

Similarly, lower usage rates for welfare recipients were found in a five-state sample survey of TANF recipients and TANF leavers. Although sample sizes for each state were

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<sup>3</sup> Illinois, Indiana, Kansas, Maryland, Massachusetts, Minnesota, New Jersey, New York, Oklahoma, Rhode Island, Vermont, Washington, D.C., and Wisconsin.

<sup>4</sup> 45 C.F.R. §260.20 (1999) and C.F.R. § 260.33 (1999).

relatively small, from 782 to 1,750, the results loosely corroborate with Hill et al (1999). Of current employed TANF recipients, 43 percent in New Mexico, 38 percent in North Carolina, and 41 percent in San Bernardino, California, ever used the credit. Of employed TANF leavers, 45 percent in New Mexico, 67 percent in North Carolina, and 62 percent in South Carolina ever used the credit. In Illinois, 56 percent of employed TANF applicants ever used the credit. These percentages are even lower when counting all recipients instead of only households who are employed. The study also notes that awareness and use of the credit is particularly low for Hispanics, Native Americans, and high school dropouts (Richardson 2002).

There are many potential explanations for not participating in the earned income credit. Households may have incomplete information. For example, they may be unaware of legislative changes that increased the amount of the credit. They may be uncertain whether they qualify for the credit, or they may be unaware that the credit even exists. Within Minnesota there have been several efforts to inform potential recipients of the credit, but even with these efforts, it is still possible that parents are not completely aware of the credit.

Besides a lack of information, another reason people don't participate is the time it takes to self-prepare a tax form or, alternatively, the money it costs to pay a tax preparer (Scholz 1994). A survey of paid preparers found that most, 38 out of 60, charged \$75 to \$100 for a 1040 form (Berube et al. 2002). In the Washington, D.C. area, the cost to prepare a tax form, electronically file the form, and purchase a \$1,500 refund anticipation loan (RAL) was estimated at \$189. The high price that parents pay may illustrate the lengths to which they may go to avoid preparing a tax form. Self-preparing a form may be particularly burdensome for low-income families. Barriers related to language and math skills may make it less likely that these parents file a tax return.

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<sup>5</sup> Taxpayers are individual filing units as best determined by federal tax and SIPP data. In 1990, the federal

There is sparse information regarding urban and rural differences in utilization rates. Berube and Thatcher (2004) examine the urban-rural variation of federal earned income credit filers. They map the percent of filers who claim the credit to all federal income tax filers. The resultant contours show peaks where high percentages of families claim the credit in large central cities and rural counties. They suggest the peaks represent areas where there are higher concentrations of working poor families. They use this evidence to suggest that more states consider implementing a state earned income credit.

## HISTORY OF LEGISLATION RELEVANT TO LOW-INCOME FAMILIES

Fundamental to a parent's decision to work, file an income tax return, and claim the credit are the rules that govern taxes, tax credits, and public assistance programs. Changes in tax rates or credit parameters can provide an incentive to work, which in turn can induce parents to file income taxes and receive the credit. In the years covered by our dataset, Minnesota's legislature enacted several changes relevant to low-income families. Table 2 summarizes the major legislative enactments, which include increases in the state's earned income credit, welfare reform, and decreases in income tax rates in 1999.

One prominent reform was to Minnesota's Working Family Credit in 1998. Precipitated by high marginal tax rates, legislators enacted a two-tier Working Family Credit.<sup>6</sup> The former single-tier credit imposed an interval along the phaseout of the credit in which increased wages resulted in decreased after-tax, after-transfer income (Hirasuna and Manzi 1997). After the reform, budgets showed no decrease in income with the phaseout of the credit (Wilson 2000).

The 1997 and 1998 Working Family Credit levels for households with two or more children are shown in figure 1. Dollar amounts of the credits are listed in real 2002 dollars. The

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government mailed checks to those eligible, making eligible filing units automatic recipients.



reform in 1998 increased the maximum credit from \$541 to \$1,257. With these reforms, the state maintains the same income eligibility range as the federal credit. To do so, it adjusts parameters to the credit like the phase-out rate of the credit. The appendix provides several examples that illustrate how the two-tier credit is calculated.

These changes in the tax and benefit structure for low-income households provide for a rich analysis. Changes in credit parameters may be examined for their impact upon filing rates for income taxes and receipt rates for the Working Family Credit.

## DESCRIPTION OF DATA

To construct a database for this analysis, we merge four separate datasets into a single, more comprehensive file. Data on AFDC and Minnesota Family Investment Program (MFIP) is retrieved from the Minnesota Department of Human Services. Starting in 1992 and ending in 1999, the data includes every eligible adult with AFDC or MFIP-eligible children. Data from state income tax records come from the Minnesota Department of Revenue.<sup>7</sup> Data on individual wages come from the Minnesota wage detail file. Data on wages in local labor markets come from covered employment statistics (ES-202). The last two datasets are from the Minnesota Department of Economic Security.

AFDC and MFIP data were merged with income tax records and individual wage records via Social Security numbers. Individual wage records were only available from 1995 through 1999, so analysis with this dataset excludes previous years. Data on the percent change in wages were merged based upon the household's local labor market area, and residence was based upon the most recent information from AFDC or MFIP records as of the end of each year.<sup>8</sup>

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<sup>6</sup> Testimony on March 19, 1998, over the state's omnibus tax bill noted work disincentives that occurred at a wage rate of approximately \$6 an hour, where the combination of increased taxes, decreased Working Family Credit, and decreased welfare benefits resulted in a decrease in disposable income.

<sup>7</sup> These are M-1 tax forms and do not include files for nonresidents.

<sup>8</sup> County level data was aggregated into local labor market areas as defined by the U.S. Department of Labor.

Local labor market data were used to compute the percent change in local wages, which were used as proxy for changes in job opportunities and wages from the previous year. It was expected that higher wages would increase the probability that a household find a job or receive enough of a pay increase to make it likely that the household would file a Minnesota tax return.

The constructed dataset includes a dummy variable that indicates whether the household head or its spouse filed a tax return and whether they received the Working Family Credit.<sup>9</sup> Each record is a household's record if a parent receives welfare for one or more months during that year. If families receive welfare in more than one year, separate household records are listed for each year. For example, if the household received welfare in 1994 and 1998, then two records will be listed for the household, one for 1994 and the other for 1998.

Even with this rich and detailed dataset, there are some issues that this paper will not be able to address. One is the role of withholding in the probability a household files an income tax return. Households where employers may have withheld too much in taxes may be more likely to receive a refund and more likely to file a tax return. Determination of withholding partly depends upon withholding guidelines by the state and upon how many allowances parents claim in their W-4 form.<sup>10</sup> We were not allowed access to W-4 forms or to the amount of refund received by parents, so we cannot explicitly include refunds. Instead, such behavior will be implicitly included in our regression model. Another issue is what the data does not include:

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<sup>9</sup> A household head is the parent in single-parent families and the male parent in two-parent families. On several occasions the entire household consisted of minors. If the oldest person in the family is at least 14 years older than the youngest child, that person is the household head. If no household head could be found, then the data was excluded from the analysis. A total of 645 cases, less than 0.3 percent of all cases, fit into this category and were dropped from the file.

<sup>10</sup> We investigated the possibility of whether the number of jobs a parent holds may serve as an indicator of over-withholding. On one hand, guidelines for employers to withhold for income taxes do not account for multiple jobholders. In such a case, employers may under-withhold if parent(s) work multiple jobs. This is because their income from any one employer would be less than their total income. Each employer may be withholding at a lower income bracket than the parent actually falls within. The other possibility is that the W-4 form calls for adjustments for multiple jobholders, which may result in over-withholding. We constructed a budget model examining several scenarios of withholding and were unable to find any consistent relationship between the number of jobs and the refund from their state income tax return.

Unless parents file an income tax return or receive covered wages, there are geographic identifiers. This may have policy relevance, since part of the success of welfare reform may depend upon whether parents can achieve self-sufficiency after leaving welfare. However, utilization by current welfare families is still useful in that it may help them meet work requirements and achieve self-sufficiency while on welfare.

## DATA ANALYSIS

This section tabulates the percent of households that file an income tax return, the percent that receive the Working Family Credit, and the percent of households eligible for the credit that actually receive the credit. These percentages give an idea of how many are taking advantage of the income supplement.

The paper draws upon a sub-state construct used by Berube and Thatcher (2004) with four regions: central counties of Minneapolis-St. Paul, suburban counties of Minneapolis-St. Paul, smaller metropolitan counties, and rural counties. The central counties of Minneapolis-St. Paul are Hennepin and Ramsey. The suburban counties are all remaining counties within the Standard Metropolitan Statistical Area.<sup>11</sup> Smaller metropolitan counties are the remaining Minnesota metropolitan areas of Duluth-Superior, Grand Forks-Fargo-Moorhead, La Crosse-Rochester, and St. Cloud. Rural counties are all nonmetropolitan counties. The rural county category was not constructed to suggest that all nonmetropolitan counties are rural in nature, or that all rural counties are similar in characteristics. Certainly more complicated categorization schemes can more aptly capture the complicated geographical panoply of urban and rural communities. However, for purposes of this paper, a simpler set of categories help limit the scope of analysis. It also allows for consistency with previous analyses similar to this subject.

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<sup>11</sup> The nine remaining counties are Anoka, Carver, Chisago, Dakota, Isanti, Scott, Sherburne, Washington, and Wright. Berube and Thatcher (2004) use central cities instead of counties. We do not have access to municipality-level data for all welfare recipients, so we use data from Hennepin and Ramsey counties instead.

Table 3 lists the percent of AFDC and MFIP households who filed an income tax return, who received the Working Family Credit, and who received the credit among those eligible. The percentages include observations for each year from 1992 through 1999. Suburban Minneapolis-St. Paul and rural counties have a higher percentage of households filing income taxes and receiving the credit when counting only households eligible for the credit. Households from the central counties of Minneapolis-St. Paul are least likely to file an income tax return or receive the credit.

The tables show that some households that file an income tax return do not receive the credit. For example, from the central counties of Minneapolis-St. Paul, 41.6 percent of households filed an income tax return and 35.2 percent of filers receive the Working Family Credit. Part of the remaining 6.4 percent who filed, but did not receive the credit have too much in wages to qualify for the credit.

When looking only at those eligible for the credit, it is useful to note that eligibility is determined by employment covered under the unemployment insurance program. This is an incomplete measure of eligibility since it excludes wages from some small employers and self-employed persons. However, the participation rates are similar to those found by Hill et al. (1999).

The tables show that urban and rural receipt rates increased over time and that the difference in rates converged. In 1992, the percent of central Minneapolis-St. Paul households that did not receive the credit was 14.9 percentage points lower than rural households. By 1999, the difference reduced to 4.8 percentage points. At least some of the convergence relates to a catch-up in the participation rate among eligible households in the central counties of Minneapolis-St. Paul. From 1995 through 1999, the participation rate for central Minneapolis-St. Paul counties increased from 53.9 to 61.0 percent.

In summarizing these tabulations it is useful to note that as with any regional categorical scheme, there is a distribution of rates across counties within each category. For example, there are six counties with lower filing percentages than Hennepin County. Three of the six are rural have counties and may be related to the fact that they have significant Indian reservations with higher poverty rates within their political boundaries.

## REGRESSION ANALYSIS

This section includes estimates of three different probabilities. The probability of: filing an income tax return; of receiving the credit; and of receiving the credit when eligible in terms of covered wages. When estimating the probability that households file an income tax return, we include all households eligible for welfare during the year regardless of eligibility for the credit. This adds information for comparing participation rate regressions of only eligible households since households may respond to the credit and to their surprise, end up with too much income to qualify for the credit. At that wage level, they will be required to file a tax return. Regressions on the probability of receipt of the credit among all other families are conducted because it includes those parents who do not work even when there is an increase in the credit. These are parents who opt-out of the credit because they have other sources of income or because they are unable to find a job. Finally, regressions on the probability of receipt of the credit with only those eligible are included because it helps uncover the behavior of those who choose not to receive the credit even when they are eligible.

The effect of Minnesota's earned income credit is modeled with the maximum amount of credit. When the state changed the credit, it often changed all the parameters, which makes individual parameters highly correlated. Nonetheless, it is useful to test whether households

respond to the individual parameters in a manner consistent with economic expectations.<sup>12</sup> Each of the regressions includes a model specification with the maximum credit only and with all the parameters to the credit.

Independent variables are listed in table 4 along with their means and standard deviations. For individual parameters, maximum credits for the first and second tiers and phase-in and phase-out floors are adjusted to real 2002 dollars. Only phase-in and phase-out rates are left unadjusted, which makes possible cross-year comparisons, where real wages and the parameters implicitly determine the credit amount in real dollars.

### Test for Regional Differences

This section tests for regional differences in the probability that households file an income tax return or receive the credit. Logit regressions are conducted to estimate the probabilities conditioned upon demographic characteristics, policy changes, and structural economic conditions. Table 5 lists the resultant coefficients with standard errors in parentheses.

The first two columns list the results of estimating the probability of filing an M-1 income tax return. The M-1 is the standard form filed by most Minnesota residents. Even after accounting for demographic characteristics, local job market conditions, and policy variables, the fixed effects for regions remain statistically significant. In comparison to the central counties of Minneapolis-St. Paul: (1) households from rural counties are 2.4 to 2.7 times more likely to file; (2) households from suburban counties are 1.6 to 1.7 times more likely to file; and (3) households from smaller metropolitan counties are 1.5 to 1.6 times more likely to file. These remaining regional differences might be for several reasons. Examples include differences in the distribution of wages paid by local job opportunities, differences in state-to-state migration of

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<sup>12</sup> Previous studies did not examine the impact of individual credit parameters. Meyer and Rosenbaum (2000) use a weighted average of taxes paid. Neumark and Wascher (2001) use the state's percentage of the federal earned income credit. Grogger (2004) uses the phase-in rate and the maximum credit.

welfare recipients, differences in information about the credit, and differences in access to low-cost tax preparation assistance.<sup>13</sup>

With respect to Working Family Credit parameters, an increase in the maximum credit increases the probability of filing an income tax return. For individual parameters, the estimated coefficients are largely in accordance with economic expectations. The phase-in rate, which raises the amount of the credit during phase-in, is positive and statistically significant. The first-tier maximum credit raises the credit for households with earnings within this range and is positive and statistically significant. An increase in the phase-in rate for the second tier raises the credit amount and the coefficient is positive, but not statistically significant. A higher phase-in floor to the second tier postpones the increase to a higher credit. And the coefficient is negative and statistically significant. The second-tier maximum credit is positive and statistically significant. The phase-out floor raises the amount of earnings needed before the credit begins to phase out from its second-tier maximum; as expected, it is positive and significant. A higher phase-out rate lowers the credit amount to zero at lower income levels. The coefficient is negative and statistically significant.

In 1998, Minnesota implemented MFIP, the state's version of TANF cash grants, which included a 60-month time limit, work requirements, sanctions, incorporation of food stamp benefits, and a new childcare subsidy program.<sup>14</sup> In that same year, the state implemented its two-tier credit for tax year 1998. The credit reduced high marginal tax rates imposed during the phaseout of the single-tier credit. Fixed effects, which are used to account for the 1998 reforms, are positive and statistically significant. This might imply that the other variables largely capture the expected effects of the reform and the fixed effects capture any remaining residual effects.

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<sup>13</sup> The number of observations is large and may more likely find statistically significant coefficients like rural-urban differences even after accounting for a number of other variables.

<sup>14</sup> Some of these aspects were included in Minnesota's JOBS program.

In 1999, the state lowered income tax rates for the high, medium, and low-income brackets. Lower rates provide an incentive to work, which may result in increased household eligibility for the credit, or an increase in those required to file an income tax return. To avoid perfect multi-collinearity, a single fixed effect was used to represent the decrease in tax rates for all three brackets. The estimated coefficient (REFORM99) is negative and statistically significant, which is opposite to our expectations. The reason might be related to the fact that filing rates decreased in 1999, which was the same year that the economy began to fall back into recession. One year of data may be insufficient to separate tax cuts from a faltering economy.

The demographic characteristics are consistent in sign and significance for both filing regressions. Households with Asian American household heads are less likely to file. This might be because a significant proportion of Asian Americans on MFIP are East Asian immigrants. Between January 1997 and August 2000, more than 46 percent of Asian Americans eligible for welfare were immigrants. In this group, 93 percent cited their nationality as Cambodian, Hmong, ethnic Laotian, or Vietnamese. These parents may suffer from language barriers and skill deficits that make it difficult to find a job and fill out an income tax return.

Households with African American household heads are less likely to file in comparison to whites. Lower filing probabilities may partly explain the lower aggregate filing rates depicted in table 3 in central counties of Minneapolis-St. Paul where African Americans are disproportionately located and suffer the indignities of segregated poverty (e.g., Wilson 1990). These families may be less likely to be employed and file an income tax return.

Hispanics are less likely to file. These families include migrant farm laborers who come to Minnesota in summer months and leave in the fall. Welfare caseloads in some Minnesota counties are resultantly cyclical with an upswing in May-June and a drop-off in September-October. This is not surprising when as many as 70 percent of the families on welfare in some



counties have a Hispanic household head. Migrant farm laborers would likely be required to file a nonresident income tax return, which is not included in this data. Accordingly, Hispanic households may still be receiving the Working Family Credit; they may just be applying for them through a different income tax form. Still Hispanic rural families may be less likely to file since migrant laborers have only summer earnings and their credit may resultantly be small. Moreover, Hispanics that remain in Minnesota may be less likely to be employed and may more likely lack the language or educational skills necessary to fill out an income tax form.

American Indians are less likely to file. This might be because families who live and work solely on reservations are not required to file a state income tax return and are ineligible for Minnesota's Working Family Credit. Not all American Indians work and live on reservations, but there may be a large proportion, especially in more remote rural counties.

Married parents are more likely to file. Household heads without a high school diploma serve as an indicator of employment skills and are negatively correlated with filing an income tax return. Families with more children are less likely to file. Parents from these families may have little time to search for employment, less time to form the employment networks needed to hear about an opportunity, and less time to fill out an income tax form. Having more children may also be spuriously correlated with other indicators such as lower educational attainment rates. As expected, households with older children are more likely to file, which might be because the children are more independent with less need for childcare. Age of the parent, an indicator of experience and job skills, is unexpectedly negative and statistically significant. This might be because the age of the children largely captures most of the skill effects. Or, older parents on welfare may be strapped with more significant employment barriers. Female household heads are correlated with a higher probability of filing.

Regional fixed effects were multiplied against percent changes in aggregate wages in the local labor market. This was done to account for regional differences in households' response to job growth. The largest response to a percent increase in aggregate wages is within the central counties of Minneapolis-St. Paul. The smallest is within rural counties where the coefficient indicates a slightly negative response to an increase in aggregate wages, but does not appear to be statistically different from zero.

Regressions 3 and 4 in table 5 list the results of estimating the probability of receiving the Working Family Credit for all households regardless of eligibility. Households from rural counties are 2.1 to 2.3 times more likely to receive the credit compared to households in the central counties of Minneapolis-St. Paul. Households in smaller metropolitan counties and in suburban counties of Minneapolis-St. Paul are both 1.4 to 1.5 times as likely to receive the credit.

The policy parameters are similar to the previous regression. The estimated coefficients for the maximum credit, phase-in rate, phase-in floor, maximum credits for tier one and tier two, phase-out floor, and phase-out rate are all as expected. Only the phase-in rate to the second tier is negative, which might be related to a high degree of multicollinearity between parameters. The maximum credit in regression 4 is positively related with receiving the credit.

Regressions 5 and 6 in table 5 examine the probability of receiving the credit among households eligible for the credit as determined by covered wages. Households from rural counties are 1.5 times as likely to receive the credit as households from the central counties of Minneapolis-St. Paul. Households from smaller metropolitan counties are 1.1 to 1.2 times as likely. Households from suburban counties are 1.1 times as likely.

The maximum credits for tier one and tier two, phase-in floor to tier two, phase-out floor, and the phase-out rate are all statistically significant with the expected sign. Like the previous regressions, the phase-in rate to the second tier is with an unexpected negative sign. All but two

of the remaining statistically significant coefficients carry the same signs as before. Unlike the previous regressions, Asian Americans and older parents are more likely to receive the credit when eligible.

### Filing an Income Tax Return

This section reports the results of regressions on the probability of filing an income tax return for each individual region. Region-by-region regressions were motivated out of concern over an inability to identify any regional variation in response to policy parameters, demographic characteristics, and economic conditions. Motivation for the regressions on the probability of filing an income tax return was because of residual benefits not captured by the other regressions.

Table 6 shows that a higher maximum credit increases the probability that AFDC or MFIP households file an income tax return. The largest coefficient is for suburban Minneapolis-St. Paul counties. The smallest is for smaller metropolitan counties.

When statistically significant, the individual parameters are consistent with expectations. A higher phase-in rate to tier one, higher maximum credit for tier one, lower phase-in floor to tier two, higher maximum credit for tier two, higher phase-out floor, and lower phase-out rate are all estimated to increase the probability of filing an income tax return. The 1998 reform is positively correlated with filing an income tax return and statistically significant in all but one of the regressions for smaller metropolitan counties. The 1999 income tax decrease is unexpectedly negative and statistically significant in all but one regression.

There are regional differences in response to demographic characteristics and the percent change in wages. Asian Americans are 0.8 times as likely to file as whites in rural counties and are slightly more likely than whites in smaller metropolitan counties, but the coefficient in the latter is not statistically different from zero. Hispanics in smaller metropolitan counties are 0.5

times as likely to file as whites, and in the central counties of Minneapolis-St. Paul, they are 0.9 times as likely as whites. The difference might partly be because households from rural counties are more likely to be migrant farm laborers. American Indians in rural counties are 0.2 times as likely to file as whites and 0.6 times as likely to file in suburban Minneapolis-St. Paul counties. The lower filing rates in rural counties might be because of American Indians living and working on reservations. Female heads are 1.4 times as likely to file as males in central Minneapolis-St. Paul counties and equally likely in smaller metropolitan counties. The percent change in aggregate wages in the local labor market is positive and statistically significant in all regions except rural counties. The largest coefficient is for the central counties of Minneapolis-St. Paul and the smallest is for rural counties.

#### Working Family Credit Receipt: All Families Regardless of Eligibility for the Credit

Table 7 lists the results of regressions on the probability a household receives the Working Family Credit. These regressions are different from the other regressions in that they identify the probability of all households to actually receive the credit. Whereas the previous regression may include some parents who respond to increases in the credit but end up with too much in wages to actually receive the credit. Also, these regressions differ from the next set of regressions, which selects only eligible households and examines correlates to participation. These regressions include parents who do not receive the credit in response to an increase in the credit, either because they have other sources of income, or they could not find a job.

The maximum credit, which in 1999 could deposit as much as \$1,321 in the pockets of working families, is positive and statistically significant for all regressions.<sup>15</sup> The largest coefficient is for suburban counties in the Minneapolis-St. Paul metropolitan area. The smallest coefficient is for rural Minnesota. For regressions with individual Working Family Credit

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<sup>15</sup> Maximum credit for tier 2 in 2002 dollars.

parameters, all statistically significant coefficients carry the expected sign, which indicates that a larger credit increases the probability of receipt.

There are additional differences across regions with respect to demographic groups and aggregate wages. Asian Americans are 0.7 times as likely to receive the credit as whites in rural counties and approximately equally likely in smaller metropolitan counties. African Americans are 0.7 times as likely to receive the credit in rural counties and 0.9 times as likely in the central counties of Minneapolis-St. Paul. Hispanics are 0.6 times as likely to receive the credit in smaller metropolitan counties and only slightly less likely to in the central counties of Minneapolis-St. Paul (0.9 to 1.0 times as likely, but the difference is not statistically significant). American Indians are least likely to receive the credit in rural counties (0.3 times compared to whites), and they are 0.7 times as likely in suburban counties of Minneapolis-St. Paul. Female heads in smaller metropolitan counties are just as likely to receive the credit as males. Alternatively, in central Minneapolis-St. Paul counties, females are 1.5 times as likely as males. All other demographic characteristics are similar in sign and statistical significance as before.

When looking at the percent change in aggregate wages, the estimated coefficients are positive and statistically significant except for rural counties. The biggest increase is for the central counties of Minneapolis-St. Paul when using the maximum credit and for the smaller metropolitan counties when using individual parameters.

### The Probability of Receipt of the Working Family Credit Among Those Eligible in Terms of Covered Wages

Table 8 extends the analysis to the contribution of policy, demographic, and economic variables to the probability of receipt of the Working Family Credit when selecting only eligible participants. Our data corroborate with work by Hill et al. (1999) and find that a substantial proportion of households do not receive the Working Family Credit even though they may be

eligible. The analysis here identifies eligible households with covered employment statistics, which is less rigorous than previous analyses because it does not include income from noncovered employment.<sup>16</sup> However, the overall tabulations appear consistent with prior analyses.

As expected, an increase in the maximum credit results in a higher probability of receipt. The largest response is in suburban counties of Minneapolis-St. Paul. The smallest estimated coefficient is from rural counties, although the difference is not very large. For individual parameters many of the coefficients were not significant with most of the statistically significant coefficients within the regression for the central counties of Minneapolis-St. Paul. The statistically significant estimated coefficients are almost all of the expected sign except for the phase-in rate to the second tier. The lack of statistical significance for the other regions may be because sample sizes are smaller. The largest of these regressions was for the rural counties, which included 56,006 observations. This is smaller than any of the regressions in the previous sections.

The reforms in 1998 were inconsistent in sign across the regions. It was positive and statistically significant in the central counties of Minneapolis-St. Paul, but negative and statistically significant in the suburban counties of Minneapolis St. Paul and in smaller metropolitan areas. The reform in 1999 was positive and statistically significant in the central counties of Minneapolis-St. Paul, which is consistent with our expectations of higher receipt rates.

The demographic coefficients are largely similar to the results in the previous regressions. What is different in these regressions is that Asian Americans are more likely to

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<sup>16</sup> Scholz (1994) uses SIPP data to determine eligibility. Examining current welfare recipients, Hill et al. use self-reported income to county welfare agents, California unemployment insurance data, and taxable income by source

receive the credit if they are eligible in terms of covered wages. Households in rural counties are 1.3 times more likely than whites. Households in the central counties of Minneapolis-St. Paul are 2.2 times more likely. Also, older parents are now more likely to receive the credit. The results might imply that these households are less likely to be employed, but when they are, they are more likely to file income taxes and receive the credit. Simple tabulations verify that these parents are less likely to be employed. Asian American household heads listed in this dataset are 0.7 times as likely to be employed as whites. Household heads 50 and older are 0.6 times as likely to be employed as household heads under 50.

An increase in aggregate wages results in a decrease in the probability of receipt of the credit in rural counties and an increase in smaller metropolitan counties. There might be many reasons for the negative coefficient, which includes the possibility that wage growth in rural counties allowed an increasing proportion of families to find work that paid wages above the working family credit limits. This corroborates with the data on the percent of parents that file an income tax return. In 1995, the first year we could determine eligibility, 5.8 percent of welfare recipients filed an income tax, but did not receive the earned income credit. By 1999, 8.7 percent filed, but did not receive the earned income credit.

## MODELING AN INCREASE IN THE MAXIMUM CREDIT

This section conducts a brief modeling exercise to estimate the percent change in income tax filing rates and Working Family Credit receipt rates due to a 10 percent increase in the maximum credit. The exercise helps identify what might happen if the state raised the earned income credit. We also examine whether changes to the credit disproportionately benefits any of the four regions.

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from federal income tax records. This study uses only wage detail data from covered employment statistics, but it includes former welfare recipients who will not have such earned income records on administrative welfare data.

In 1999, a 10 percent increase in the maximum credit would amount to a \$5 increase in the maximum credit for households with no dependents, \$62 for households with one dependent, and \$122 for households with two or more dependents (these are nominal dollars unadjusted for inflation). Table 9 shows that the response ranges from income tax filing rates would increase by 2.2 to 3.4 percent. When considering all households, receipt rates increase from 3.3 to 4.5 percent. When selecting only eligible households, receipt rates ranged from 1.3 to 2.0 percent. In all of these estimates, the largest response was in the central counties of Minneapolis-St. Paul and the smallest response was within smaller metropolitan counties.

## POLICY CONCLUSIONS

State earned income credits can help low-income families make ends meet by boosting their after-tax incomes. Acting as an earnings supplement, the credit effectively raises net after-tax wages and provides an incentive to work. To receive the credit, households must file an income tax return and not all households do so, even when it may be in their best interest.

This paper finds substantial urban and rural differences in receipt of Minnesota's Working Family Credit by current AFDC and MFIP recipients. The central counties of Minnesota's largest metropolitan area, Minneapolis-St. Paul, has the lowest percentages of households who file an income tax return (41.6 percent) and who receive the credit (35.2 percent of all households and 61.0 percent of eligible households). AFDC and MFIP households from the surrounding suburbs of Minneapolis-St. Paul file income taxes in the highest percentages (54.5 percent), while rural county households receive the credit in the highest percentages (46.2 percent of all households and 68.0 percent of eligible households).

The lower filing and receipt rates for the central counties of Minneapolis-St. Paul may in part be related to the low participation rates among eligible households. The slightly higher filing rates, but lower receipt rates in suburban counties may be related to higher employment



rates and a higher percentages of parents with incomes exceeding Working Family Credit eligibility limits. Similarly, lower filing rates and higher receipt rates in rural area households may be related to lower employment rates and a higher percentage of jobs that pay lower wages.<sup>17</sup>

Tabulations show a convergence in filing and receipt rates throughout the 1990s. Some of the convergence is due to a catch-up in participation rates of eligible households within central Minneapolis-St. Paul. Regressions suggest some of this catching up might be related to a more elastic response to wage growth and an increase in the Working Family Credit. The good economy of the 1990s combined with an increased credit helped make filing taxes pay in all regions, but particularly within central Minneapolis-St. Paul. Another reason for the urban catch-up may be because of a concentrated effort of nonprofits and local and state governments to encourage families to take advantage of the credit. Research by the authors finds that free tax preparation sites within the Minneapolis-St. Paul metropolitan area increased over time and are correlated with a higher probability of filing taxes and receiving the credit within central counties and within higher poverty neighborhoods, but the effects are difficult to conclusively separate from the economy. Another possibility is that Minnesota carried out several information campaigns about the credit using brochures, letters in foreign languages, radio announcements, television announcements, and notices on the backs of grocery bags. These may have contributed to the catching up of filing and receipt rates in urban centers. Such information may have proven especially useful for households that recently migrated into the central counties of Minneapolis-St. Paul from outside the state. These families may enter without knowing about the credit, but may more quickly learn about the credit through information campaigns.

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<sup>17</sup> Annual average employment rates for the years 1995 through 1999 equaled 39.0 percent for the suburban counties of Minneapolis-St. Paul and 37.3 percent for the rural counties of Minneapolis-St. Paul. The percent of households

Even after controlling for demographic conditions, policy variables, and local area wage growth, lower filing rates and receipt rates prevailed for the central counties of Minneapolis-St. Paul. This may indicate further challenges for central cities. Some suggest that part of this problem might be because filling out tax forms can be a daunting task. This may be especially true for parents with math or language skill deficits or poor skills in managing their home finances. Efforts might be produced to better target incentives to file and receive the credit directly among welfare recipients. Minnesota already requires that county caseworkers inform welfare recipients of the availability of the credit. We have evidence that this may have improved statewide filing and receipt rates. The state could implement similar activities to improve receipt rates, like requiring parents to meet with financial social workers to help with their tax forms, providing childcare when families visit free tax preparation sites, and providing transportation to free tax preparation sites.

The welfare population in central cities may be more transient in nature. Some studies in Minnesota find that welfare families will move as many as five times within a year. Targeting ways to reach such a transient population may help improve receipt rates. Information could be given to recipients on entrance and exit interviews. Within exit interviews parents might be reminded that they can receive the earned income credit for their years worth of earnings even if they move out of the state. Also, putting more effort into getting forwarding addresses to send reminder letters may help boost receipt rates.

Rural area receipt rates might further be enhanced by better information about free tax preparation sites. The majority of sites in Minnesota's rural areas are sponsored by an organization for retired persons. These sites offer their tax preparation services to all families, but some parents may perceive these sites as primarily for older workers and remain hesitant to

visit such sites. Better information letting parents know that these sites will provide services may help improve receipt rates.

Urban and rural differences related to the race of the household head also produce some substantive policy implications. American Indians in rural counties are considerably less likely to take advantage of the credit. This might be because American Indians who live and work on reservations are not subject to state income taxes and within Minnesota they are ineligible for the Working Family Credit. This may have considerable policy implications since some of the nation's worst pockets of rural poverty are within reservations. States with reservations, especially within remote rural areas, may wish to consider separate means for alleviating rural poverty in these communities.

Hispanics who live in rural and smaller metropolitan counties are less likely to take advantage of the credit. This might in part be due to a high percentage of parents being migrant farm laborers. Migrant laborers are eligible for the credit, but must file a nonresident return. Some parents may choose not to file because they can only apply Minnesota earnings to the credit, the amount of the credit may be small in comparison to the effort needed to fill out the forms. Receipt rates for migrant laborers might be increased if free tax preparation sites in other home states monitor which states offer earned income credits. They may be able to add a little more money into the pockets of these families.

For Asian Americans, efforts to address employment barriers may produce larger increases in receipt rates. For example, a significant proportion of Asian Americans within Minnesota are East Asian immigrants. Further efforts to provide language and other skills training may be useful. Also, their receipt rates for eligible households are substantially lower in comparison to urban areas. Some of this may have to do with a more developed network of

nonprofits and other sources of support in urban areas. Efforts might be taken to help all immigrants in general by sending out more letters in foreign languages and to work with local immigrant groups to encourage families to take advantage of the credit.

More research might be conducted on the characteristics of older parents on welfare. Some of these parents may have disabilities or children with disabilities, which make it difficult for them to find employment. Others may have significant hard or soft skill deficits in which training or counseling might help to find work.

Finally, administrative datasets like the one constructed here might be used to identify parents who may be eligible for the credit and are not taking advantage of it. Letters might be sent to these parents notifying them of their potential eligibility. For example, in states where the credit is a simple percentage of the earned income credit, or the range of the credit is the same as the federal credit, they may be able to merge the federal earned income credit records with state income tax records. States could identify families that filed for the federal earned income credit, but not the state credit and send letters saying they may be eligible for the credit and direct them to a free tax preparation site for more information. Directing families to free tax preparation sites may improve compliance rates by lowering the percentage of families that incorrectly calculate and claim the wrong amount of the credit.

There may be several avenues of further research with administrative datasets like the one constructed for this study. Research on the interaction of child support, food stamps, and other benefits upon usage rates of the earned income credit might be examined. States may form research coalitions and examine whether institutional differences in the form of the credit matters. Or states may further identify the costs to enacting or expanding a state earned income credit.

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**Table 1.** State Earned Income Credit Programs  
By Year of Implementation

Year Implemented	State
1975	Rhode Island
1987	Maryland
1988	Vermont
1989	Wisconsin
1990	Iowa
1991	Minnesota
1994	New York
1997	Massachusetts, Oregon
1998	Kansas
1999	Colorado <sup>18</sup>
2000	District of Columbia, Illinois, Maine, New Jersey
2002	Oklahoma
2003	Indiana
2006	Virginia

**Source:** Manzi and Michael (2003); National Conference of State Legislatures; and the State of Rhode Island, Taxpayer Assistance, Center for Budget and Policy Priorities.

<sup>18</sup> Colorado's earned income credit program was unavailable in 2002, 2003, and 2004 because of a law that disallows distribution of the credit during budget deficit years.

**Table 2.** Legislative Changes Relevant to Minnesota Low-Income Families

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 Summary of Policy Change and Date of Enactment
 

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## Working Family Tax Credit (1992-1997).

The credit, determined as a percent of the federal earned income credit, increased in 1994 from 10 percent to 15 percent.

## Federal Earned Income Tax Credit (1992-1997).

*The Omnibus Budget Reconciliation Act of 1990:* Raised the earned income credit and dropped the support test for qualifying children. The increased credit amounts were phased in over a three-year period starting January 1, 1991. *The Omnibus Budget Reconciliation Act of 1992* raised the earned income credit with increases phased in over a three-year period starting in 1994.

## Temporary Assistance for Needy Families (TANF) (1997).

Minnesota enacted the Minnesota Family Investment Program (MFIP). Reforms included increased financial work incentives, increased subsidies for child care, work requirements, a 60-month time limit, and a statutory requirement that the county human services agency inform recipients of the working family credit. Most provisions were implemented in 1998. The 60-month time limits went into effect beginning July 1997.

## Working Family Credit (1998).

Minnesota enacted a two-tier credit. The credit phases in until it reaches the first tier, remains flat until wages reach the phase-in to the second tier, remains flat through the second tier, and then phases out. The credit changed to a percentage of earnings from the prior percentage of the federal credit.

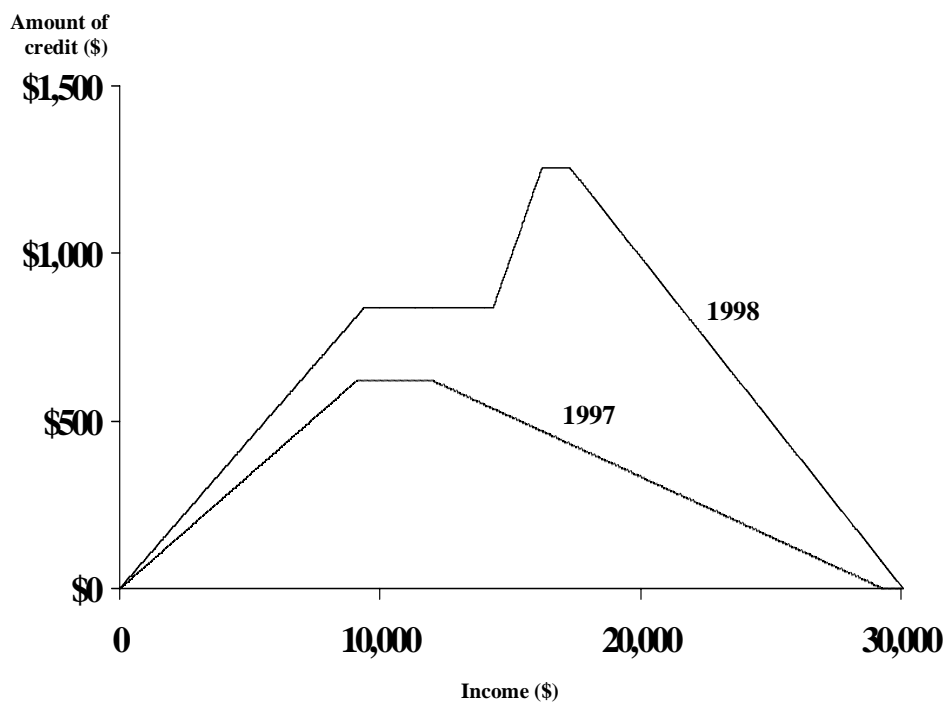
## Income Taxes and Working Family Credit (1999).

Minnesota lowered tax rates for the lower, middle, and upper income brackets. In addition, the working family credit percentage was increased by roughly 10 percent. Phase-out rate was changed so that the credit phases out at the same income level as the federal credit.

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**Source:** Manzi and Michael (2003), Meyer and Rosenbaum (2000)





**Figure 1.** Minnesota Working Family Credit 1997 – 1998

**Table 3.** Household Filing Rates for Minnesota Income Taxes, Receipt, and Participation Rates for Minnesota's Working Family Credit (1992 through 1999)

Region	1992	1993	1994	1995	1996	1997	1998	1999	Total	Number of Observations
Percent of AFDC and MFIP Households that File an Income Tax Return										
Central Counties of Minneapolis-St. Paul	29.2%	30.6%	33.3%	36.4%	39.2%	53.8%	63.6%	57.2%	41.6%	265,505
Suburban Minneapolis-St. Paul	44.3%	46.6%	50.0%	52.6%	54.7%	64.5%	70.7%	67.5%	54.5%	77,314
Smaller Metropolitan	40.0%	42.1%	44.3%	46.0%	47.5%	60.1%	69.8%	66.6%	49.8%	73,944
Rural	46.9%	47.8%	49.6%	50.8%	52.3%	61.4%	68.1%	65.3%	53.7%	153,129
Percent of AFDC and MFIP Households that Received the Working Family Credit										
Central Counties of Minneapolis-St. Paul	24.3%	26.2%	28.9%	32.5%	35.6%	41.0%	49.0%	51.8%	35.2%	265,505
Suburban Minneapolis-St. Paul	34.6%	37.7%	41.3%	44.4%	46.9%	49.7%	55.3%	56.3%	44.3%	77,314
Smaller Metropolitan	33.2%	35.8%	38.3%	40.8%	42.7%	48.3%	56.4%	58.2%	42.4%	73,944
Rural	39.2%	40.8%	43.3%	45.0%	46.8%	50.5%	57.6%	56.6%	46.2%	153,129
Percent of AFDC and MFIP Households Eligible for the Working Family Credit that Received the Credit										
Central Counties of Minneapolis-St. Paul				53.9%	57.6%	60.5%	65.4%	67.7%	61.0%	98,841
Suburban Minneapolis-St. Paul				65.1%	67.3%	67.6%	67.8%	67.7%	67.0%	29,124
Smaller Metropolitan				66.5%	67.7%	69.9%	69.2%	71.3%	68.8%	24,240
Rural				67.1%	67.5%	67.9%	69.5%	68.1%	68.0%	56,023

**Table 4.** Means and Standard Deviations of Variables (1992 through 1999)\*

Variable	All Households (N=569,892)	Rural Counties (N=153,129)	Smaller Metropolitan Counties (N=73,944)	Suburban Minneapolis-St. Paul Counties (N=77,314)	Central Counties of Minneapolis-St. Paul (N=265,505)
Suburban Minneapolis-St. Paul Counties (MSP)	0.1357 (0.342)				
Smaller Metropolitan Areas (SMETRO)	0.1298 (0.336)				
Nonmetropolitan Counties (NONMETRO)	0.2687 (0.443)				
Phase-in Rate for First Tier (RATE1)	0.0477 (0.022)	0.047 (0.022)	0.046 (0.022)	0.046 (0.022)	0.049 (0.022)
First Tier Maximum Benefit in \$000s (MAX1)	0.4598 (0.227)	0.449 (0.225)	0.444 (0.221)	0.44 (0.218)	0.476 (0.231)
Floor for Working Family Credit in \$000s (WFCFLOOR)	2.6194 (5.392)	2.442 (5.239)	2.349 (5.143)	2.357 (5.128)	2.873 (5.607)
Phase-in Rate for Second Tier (RATE2)	0.0315 (0.069)	0.029 (0.066)	0.028 (0.064)	0.027 (0.063)	0.035 (0.072)
Second Tier Maximum Benefit in \$000s (MAX2)	0.2091 (0.448)	0.194 (0.433)	0.184 (0.421)	0.182 (0.415)	0.233 (0.47)
Phase-out Floor in \$000s (PHOUTFL)	14.9753 (1.928)	14.942 (1.878)	14.888 (1.859)	14.882 (1.81)	15.046 (2.005)
Phase-out Rate (PHOUTRT)	0.0333 (0.024)	0.032 (0.024)	0.032 (0.023)	0.031 (0.023)	0.035 (0.025)
Maximum Working Family Credit in \$000s (MAXCRED)	0.5222 (0.343)	0.506 (0.34)	0.498 (0.33)	0.493 (0.32)	0.547 (0.36)
Reform in 1998 (REFORM98) (Switch to Two Tier Working Family Credit and Welfare Reform)	0.193 (0.395)	0.18 (0.385)	0.175 (0.38)	0.177 (0.381)	0.21 (0.407)
Reform in 1999 (REFORM99)	0.0929	0.087	0.084	0.082	0.102

(Lowered Income Tax Rates for all Brackets)	(0.29)	(0.282)	(0.277)	(0.275)	(0.302)
Female	0.9017	0.865	0.855	0.926	0.929
	(0.298)	(0.342)	(0.352)	(0.261)	(0.257)
Asian American (ASIAN)	0.0599	0.013	0.036	0.023	0.104
	(0.237)	(0.112)	(0.186)	(0.15)	(0.306)
African American (AFRICAN)	0.2084	0.012	0.038	0.053	0.414
	(0.406)	(0.107)	(0.192)	(0.224)	(0.493)
Latino (HISPANIC)	0.0652	0.105	0.131	0.024	0.036
	(0.247)	(0.307)	(0.337)	(0.153)	(0.185)
Native American (AMERIND)	0.0738	0.114	0.063	0.021	0.069
	(0.262)	(0.318)	(0.242)	(0.144)	(0.254)
Did not Graduate from High School (EDUCLHS)	0.2966	0.286	0.269	0.219	0.333
	(0.457)	(0.452)	(0.443)	(0.413)	(0.471)
Number of Children	2.4573	2.366	2.273	2.096	2.666
18 or younger for that year (NCHTIME)	(1.544)	(1.397)	(1.361)	(1.172)	(1.727)
Age of youngest child (AGECH)	5.3123	5.493	5.605	5.396	5.102
	(4.585)	(4.681)	(4.731)	(4.52)	(4.495)
Age of Household Head (AGEPAR)	31.0063	31.249	31.401	30.293	30.964
	(8.401)	(8.497)	(8.474)	(7.725)	(8.5)
Ever married while on AFDC or MFIP (MARRIED)	0.2732	0.338	0.355	0.231	0.225
	(0.446)	(0.473)	(0.478)	(0.422)	(0.418)
Percent Change in Aggregate Wages (PCALLJMW)	0.0669	0.063	0.056	0.088	0.066
(For BLS-LMA)	(0.027)	(0.035)	(0.026)	(0.023)	(0.019)
Percent Change in Local Labor Market Wages Times	0.0169				
Suburban Minneapolis St. Paul Suburban Fixed Effect (MSPW)	(0.033)				
Percent Change in Local Labor Market Wages Times	0.0072				
Fixed Effect for Smaller Metropolitan Counties (SMETROW)	(0.021)				
Percent Change in Local Labor Market Wages Times	0.0119				
Fixed Effects for Rural Counties (NONMETW)	(0.031)				

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\*Standard deviations were used because standard errors are equal to 0.000 for all variables.

**Table 5.** Probability of Filing an Income Tax Return and, Probability of Receiving the Working Family Credit. Examining for Differences Between Urban and Rural Areas.

Variable	Files an Individual Income Tax Return: All Households (N=569892)		Receives the Credit (Working Family Credit)			
			All Households (N=569,892)		Only Eligible Households (N=208,228)	
	(1)	(2)	(3)	(4)	(5)	(6)
MSP	0.485*** (0.034)	0.556*** (0.033)	0.340*** (0.034)	0.404*** (0.034)	0.069 (0.068)	0.103 (0.068)
SMETRO	0.373*** (0.025)	0.475*** (0.025)	0.342*** (0.025)	0.427*** (0.025)	0.133* (0.058)	0.154** (0.058)
NONMETRO	0.874*** (0.021)	1.000*** (0.020)	0.732*** (0.022)	0.849*** (0.021)	0.394*** (0.049)	0.430*** (0.048)
RATE1	26.978*** (0.857)		18.872*** (0.871)		-13.327 (13.394)	
MAX1	1.663*** (0.108)		1.152*** (0.109)		10.395** (3.055)	
WFCFLOOR	-0.209*** (0.027)		-0.226*** (0.026)		-0.467*** (0.097)	
RATE2	2.836 (5.654)		-22.369*** (5.420)		-35.057*** (7.910)	
MAX2	4.051*** (1.123)		7.246*** (1.079)		22.442*** (4.900)	
PHOUTFL	0.039*** (0.005)		0.026*** (0.006)		0.200* (0.086)	
PHOUTRT	-74.579*** (2.834)		-42.431*** (2.903)		-305.657*** (82.724)	
MAXCRED		0.728*** (0.017)		0.833*** (0.017)		0.553*** (0.029)
REFORM98	1.345*** (0.139)	0.601*** (0.015)	0.827*** (0.146)	0.199*** (0.014)	-0.111 (0.261)	-0.033 (0.020)
REFORM99	-0.353***	-0.317***	-0.296***	-0.016	0.006	0.036*

	(0.059)	(0.013)	(0.056)	(0.013)	(0.132)	(0.016)
FEMALE	0.204***	0.200***	0.212***	0.209***	0.604***	0.601***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.016)
ASIAN	-0.083***	-0.06***	-0.213***	-0.195***	0.645***	0.66***
	(0.014)	(0.013)	(0.014)	(0.014)	(0.029)	(0.029)
AFRICAN	-0.430***	-0.429***	-0.225***	-0.226***	-0.369***	-0.371***
	(0.009)	(0.008)	(0.009)	(0.009)	(0.013)	(0.013)
HISPANIC	-0.429***	-0.423***	-0.284***	-0.279***	-0.296***	-0.296***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.020)	(0.020)
AMERIND	-1.189***	-1.182***	-1.045***	-1.041***	-1.141***	-1.139***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.019)	(0.019)
EDUCLHS	-0.598***	-0.592***	-0.585***	-0.581***	-0.415***	-0.415***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)	(0.011)
NCHTIME	-0.077***	-0.094***	-0.059***	-0.073***	-0.022***	-0.033***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.005)	(0.004)
AGECH	0.018***	0.019***	0.024***	0.025***	0.005**	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AGEPAR	-0.008***	-0.009***	-0.009***	-0.009***	0.020***	0.019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
MARRIED	0.373***	0.370***	0.398***	0.396***	0.231***	0.228***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)	(0.012)
PCALLJMW	7.262***	9.214***	4.885***	6.705***	0.505	1.049*
	(0.270)	(0.251)	(0.275)	(0.256)	(0.529)	(0.517)
MSPW	-4.259***	-5.58***	-2.778***	-3.973***	0.139	-0.339
	(0.406)	(0.402)	(0.408)	(0.403)	(0.765)	(0.762)
SMETROW	-2.283***	-3.833***	-1.759***	-3.008***	1.69*	1.449
	(0.382)	(0.378)	(0.386)	(0.382)	(0.800)	(0.797)
NONMETW	-7.277***	-9.274***	-4.96***	-6.788***	-1.857**	-2.340***
	(0.310)	(0.294)	(0.314)	(0.298)	(0.648)	(0.641)
Constant	-1.044***	-0.846***	-1.362***	-1.161***	0.829	-0.826***
	(0.088)	(0.023)	(0.093)	(0.023)	(0.516)	(0.050)

\* significant at the 0.05 level

\*\* significant at the 0.01 level

\*\*\* significant at the 0.001 level

**Table 6.** Estimated Coefficients to a Logistic Regression on the Probability a Household Files a Minnesota Income Tax Return: All Current AFDC or MFIP recipients (1992 through 1999).

Variable	Central Minneapolis- St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)	Central Minneapolis-St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MAXCRED	0.766*** (0.027)	0.912*** (0.044)	0.619*** (0.047)	0.665*** (0.031)				
RATE1					33.547*** (1.383)	28.245*** (2.199)	20.087*** (2.213)	20.749*** (1.622)
MAX1					2.468*** (0.168)	0.735** (0.282)	2.099*** (0.3)	0.878*** (0.203)
WFCFLOOR					-0.279*** (0.038)	-0.286*** (0.073)	-0.102 (0.078)	-0.226*** (0.057)
RATE2					5.488 (7.968)	-11.795 (15.535)	5.875 (16.52)	-13.984 (11.672)
MAX2					5.285*** (1.586)	5.661 (3.086)	3.17 (3.283)	5.58* (2.317)
PHOUTFL					0.073*** (0.009)	0.049*** (0.015)	0.004 (0.012)	0.012 (0.009)
PHOUTRT					-105.008*** (4.48)	-47.228*** (7.268)	-77.956*** (7.852)	-44.415*** (5.208)
REFORM98	0.69*** (0.022)	0.316*** (0.038)	0.723*** (0.041)	0.444*** (0.028)	1.598*** (0.201)	1.687*** (0.38)	0.782 (0.41)	1.516*** (0.309)
REFORM99	-0.446*** (0.018)	-0.196*** (0.038)	-0.208*** (0.039)	-0.125*** (0.027)	-0.451*** (0.084)	-0.391* (0.156)	-0.209 (0.169)	-0.332** (0.121)
FEMALE	0.352*** (0.017)	0.200*** (0.029)	0.022 (0.024)	0.119*** (0.017)	0.358*** (0.017)	0.204*** (0.029)	0.025 (0.024)	0.12*** (0.017)
ASIAN	-0.013 (0.016)	-0.052 (0.050)	0.039 (0.044)	-0.258*** (0.048)	-0.029 (0.016)	-0.058 (0.050)	0.029 (0.044)	-0.277*** (0.048)
AFRICAN	-0.372*** (0.010)	-0.406*** (0.034)	-0.511*** (0.041)	-0.455*** (0.050)	-0.372*** (0.010)	-0.423*** (0.034)	-0.53*** (0.041)	-0.476*** (0.049)
HISPANIC	-0.065** (0.023)	-0.265*** (0.049)	-0.684*** (0.027)	-0.573*** (0.019)	-0.072** (0.023)	-0.272*** (0.049)	-0.687*** (0.027)	-0.581*** (0.019)
AMERIND	-0.94*** (0.019)	-0.487*** (0.052)	-1.052*** (0.035)	-1.531*** (0.020)	-0.938*** (0.019)	-0.495*** (0.052)	-1.055*** (0.035)	-1.542*** (0.020)

EDUCLHS	-0.64*** (0.010)	-0.524*** (0.018)	-0.609*** (0.020)	-0.533*** (0.013)	-0.646*** (0.010)	-0.533*** (0.018)	-0.615*** (0.020)	-0.538*** (0.013)
NCHTIME	-0.087*** (0.003)	-0.168*** (0.008)	-0.081*** (0.007)	-0.08*** (0.005)	-0.077*** (0.003)	-0.132*** (0.008)	-0.064*** (0.008)	-0.056*** (0.005)
AGECH	0.025*** (0.001)	0.014*** (0.002)	0.018*** (0.002)	0.014*** (0.002)	0.023*** (0.001)	0.013*** (0.002)	0.018*** (0.002)	0.014*** (0.002)
AGEPAR	-0.006*** (0.001)	-0.013*** (0.001)	-0.009*** (0.001)	-0.011*** (0.001)	-0.006*** (0.001)	-0.013*** (0.001)	-0.009*** (0.001)	-0.011*** (0.001)
MARRIED	0.392*** (0.011)	0.324*** (0.019)	0.399*** (0.018)	0.357*** (0.012)	0.394*** (0.011)	0.325*** (0.019)	0.405*** (0.018)	0.362*** (0.012)
PCALLJMW	8.856*** (0.284)	3.389*** (0.331)	5.527*** (0.314)	0.007 (0.155)	6.947*** (0.392)	2.428*** (0.343)	5.543*** (0.353)	0.004 (0.155)
Constant	-1.166*** (0.029)	-0.037 (0.055)	-0.191*** (0.047)	0.358*** (0.033)	-1.697*** (0.152)	-0.715** (0.243)	0.132 (0.202)	0.231 (0.154)

\* significant at the 0.05 level

\*\* significant at the 0.01 level

\*\*\*significant at the 0.001 level



**Table 7.** Estimated Coefficients to Logistic Regressions on the Probability a Household Receives Minnesota's Working Family Credit: All Current AFDC or MFIP recipients (1992 through 1999).

Variable	Central Minneapolis- St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)	Central Minneapolis- St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MAXCRED	0.88*** (0.027)	0.955*** (0.043)	0.77*** (0.046)	0.778*** (0.03)				
RATE1					25.711*** (1.431)	20.618*** (2.209)	13.75*** (2.233)	15.373*** (1.615)
MAX1					1.512*** (0.174)	0.291 (0.284)	1.419*** (0.303)	0.61** (0.202)
WFCFLOOR					-0.319*** (0.039)	-0.206** (0.07)	-0.099 (0.076)	-0.183*** (0.053)
RATE2					-29.599*** (7.843)	-18.303 (14.471)	-5.631 (15.436)	-20.39 (10.857)
MAX2					9.739*** (1.563)	5.392 (2.879)	3.669 (3.074)	5.758** (2.157)
PHOUTFL					0.047*** (0.010)	0.032* (0.015)	-0.003 (0.013)	0.012 (0.010)
PHOUTRT					-59.695*** (4.665)	-20.602** (7.44)	-42.723*** (7.981)	-24.216*** (5.234)
REFORM98	0.235*** (0.022)	-0.013 (0.036)	0.282*** (0.039)	0.162*** (0.027)	1.148*** (0.219)	0.777* (0.378)	0.408 (0.424)	0.825** (0.289)
REFORM99	-0.008 (0.018)	0.000 (0.035)	0.028 (0.037)	-0.038 (0.025)	-0.357*** (0.083)	-0.248 (0.145)	-0.08 (0.157)	-0.301** (0.112)
FEMALE	0.384*** (0.018)	0.255*** (0.029)	0.043 (0.024)	0.121*** (0.017)	0.389*** (0.018)	0.258*** (0.029)	0.046 (0.024)	0.122*** (0.017)
ASIAN	-0.135*** (0.017)	-0.125* (0.051)	-0.019 (0.044)	-0.362*** (0.049)	-0.154*** (0.017)	-0.131** (0.051)	-0.027 (0.044)	-0.378*** (0.049)
AFRICAN	-0.171*** (0.010)	-0.18*** (0.034)	-0.386*** (0.042)	-0.371*** (0.050)	-0.167*** (0.010)	-0.194*** (0.034)	-0.396*** (0.042)	-0.387*** (0.050)

HISPANIC	0.038 (0.023)	-0.135** (0.049)	-0.527*** (0.027)	-0.436*** (0.019)	0.028 (0.023)	-0.14** (0.049)	-0.533*** (0.027)	-0.442*** (0.019)
AMERIND	-0.807*** (0.020)	-0.426*** (0.054)	-0.939*** (0.036)	-1.365*** (0.020)	-0.799*** (0.020)	-0.432*** (0.054)	-0.943*** (0.036)	-1.373*** (0.020)
EDUCLHS	-0.645*** (0.010)	-0.5*** (0.019)	-0.573*** (0.020)	-0.503*** (0.013)	-0.649*** (0.010)	-0.506*** (0.019)	-0.577*** (0.020)	-0.506*** (0.013)
NCHTIME	-0.076*** (0.003)	-0.127*** (0.008)	-0.054*** (0.007)	-0.048*** (0.005)	-0.066*** (0.003)	-0.096*** (0.009)	-0.039*** (0.008)	-0.029*** (0.005)
AGECH	0.03*** (0.001)	0.023*** (0.002)	0.021*** (0.002)	0.019*** (0.002)	0.028*** (0.001)	0.023*** (0.002)	0.021*** (0.002)	0.019*** (0.002)
AGEPAR	-0.01*** (0.001)	-0.009*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)	-0.01*** (0.001)	-0.008*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)
MARRIED	0.397*** (0.011)	0.369*** (0.019)	0.422*** (0.018)	0.397*** (0.012)	0.399*** (0.011)	0.371*** (0.019)	0.426*** (0.018)	0.401*** (0.012)
PCALLJMW	5.936*** (0.29)	2.673*** (0.327)	3.767*** (0.313)	-0.066 (0.154)	2.988*** (0.4)	1.793*** (0.34)	3.387*** (0.35)	-0.087 (0.155)
Constant	-1.333*** (0.03)	-0.743*** (0.055)	-0.641*** (0.047)	-0.237*** (0.033)	-1.757*** (0.162)	-1.3*** (0.256)	-0.434* (0.21)	-0.455** (0.159)

\* significant at the 0.05 level

\*\* significant at the 0.01 level

\*\*\*significant at the 0.001 level

**Table 8.** Estimated Coefficients to a Logistic Regression on the Probability a Household Receives Minnesota's Working Family Credit: Only Current AFDC or MFIP Recipients Eligible for the Credit in Terms of Covered Wages (1995 through 1999).

Variables	Central Minneapolis- St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)	Central Minneapolis- St. Paul (N=265,505)	Suburban Minneapolis- St. Paul (N=77,314)	Smaller Metropolitan Counties (N=73,944)	Rural Counties (N=153,094)
	(1)	(2)	(3)	(4)	(6)	(6)	(7)	(8)
MAXCRED	0.588*** (0.041)	0.632*** (0.08)	0.504*** (0.087)	0.41*** (0.058)				
RATE1					-32.304 (19.16)	54.486 (36.825)	31.744 (42.237)	-33.618 (26.271)
MAX1					19.132*** (4.372)	-7.231 (8.362)	-4.249 (9.708)	10.135 (5.982)
WFCFLOOR					-48.886*** (11.420)	0.079 (0.267)	0.134 (0.310)	-0.424* (0.187)
RATE2					38.03*** (7.017)	-9.787 (20.998)	-12.587 (23.565)	-30.058 (15.594)
MAX2					-0.784*** (0.14)	-6.079 (13.337)	-2.87 (15.453)	19.137* (9.593)
PHOUTFL					0.36** (0.124)	-0.191 (0.239)	-0.233 (0.276)	0.315 (0.163)
PHOUTRT					-564.117*** (118.418)	182.263 (226.245)	120.302 (263.099)	-273.742 (161.963)
REFORM98	0.061* (0.029)	-0.225*** (0.051)	-0.127* (0.058)	-0.055 (0.039)	-0.145 (0.386)	-0.101 (0.789)	-0.819 (0.743)	0.338 (0.491)
REFORM99	0.081*** (0.024)	-0.007 (0.043)	0.085 (0.047)	-0.053 (0.031)	0.23 (0.193)	-0.587 (0.356)	-0.403 (0.413)	0.113 (0.257)
FEMALE	0.785*** (0.026)	0.663*** (0.045)	0.448*** (0.04)	0.421*** (0.028)	0.792*** (0.026)	0.666*** (0.045)	0.448*** (0.04)	0.422*** (0.028)
ASIAN	0.802*** (0.035)	0.273** (0.095)	0.429*** (0.09)	0.299** (0.099)	0.782*** (0.035)	0.274** (0.095)	0.426*** (0.09)	0.296** (0.099)
AFRICAN	-0.313*** (0.015)	-0.247*** (0.050)	-0.457*** (0.06)	-0.25*** (0.073)	-0.308*** (0.016)	-0.249*** (0.050)	-0.461*** (0.06)	-0.253*** (0.073)
HISPANIC	-0.032 (0.037)	-0.21** (0.074)	-0.378*** (0.048)	-0.499*** (0.03)	-0.031 (0.037)	-0.211** (0.074)	-0.376*** (0.048)	-0.5*** (0.03)
AMERIND	-0.885***	-0.483***	-0.845***	-1.543***	-0.88***	-0.483***	-0.843***	-1.545***

	(0.029)	(0.08)	(0.059)	(0.03)	(0.029)	(0.08)	(0.059)	(0.03)
EDUCLHS	-0.419***	-0.442***	-0.419***	-0.398***	-0.421***	-0.441***	-0.42***	-0.397***
	(0.015)	(0.03)	(0.034)	(0.022)	(0.015)	(0.03)	(0.034)	(0.022)
NCHTIME	-0.035***	-0.09***	-0.019	-0.015	-0.021***	-0.076***	-0.02	-0.012
	(0.006)	(0.015)	(0.015)	(0.009)	(0.006)	(0.017)	(0.016)	(0.010)
AGECH	0.004*	0.014***	0.007	0.001	0.004	0.013***	0.007	0.001
	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.004)	(0.004)	(0.003)
AGEPAR	0.019***	0.019***	0.022***	0.020***	0.019***	0.020***	0.022***	0.021***
	(0.001)	(0.003)	(0.003)	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)
MARRIED	0.261***	0.212***	0.225***	0.191***	0.263***	0.215***	0.225***	0.192***
	(0.017)	(0.032)	(0.033)	(0.021)	(0.017)	(0.032)	(0.033)	(0.021)
PCALLJMW	0.97	0.632	2.315***	-1.262***	0.004	0.798	2.532***	-1.35***
	(0.542)	(0.565)	(0.653)	(0.388)	(0.568)	(0.585)	(0.732)	(0.391)
Constant	-1.114***	-0.68***	-0.583***	-0.075	2.33**	-2.302	-0.174	0.277
	(0.06)	(0.097)	(0.094)	(0.061)	(0.739)	(1.551)	(1.483)	(1.010)

\* significant at the 0.05 level

\*\* significant at the 0.01 level

\*\*\*significant at the 0.001 level

**Table 9.** Change in Household Filing Rates and Receipt Rates of Working Family Credit with Respect to a 10% Increase in the Maximum Credit in 1999.

Region	Estimated Percentage Without Increase	Estimated Percentage With 10% Increase	Percent Change
<b>Filing an Income Tax Return</b>			
Central Minneapolis-St. Paul Counties	57.4%	59.4%	3.4%
Suburban Minneapolis-St. Paul Counties	67.7%	69.6%	2.9%
Smaller Metropolitan Areas	66.8%	68.2%	2.0%
Rural Counties	65.3%	66.7%	2.2%
<b>Receiving the Working Family Credit</b>			
Central Minneapolis-St. Paul Counties	51.7%	54.1%	4.5%
Suburban Minneapolis-St. Paul Counties	55.9%	58.3%	4.2%
Smaller Metropolitan Areas	58.4%	60.3%	3.2%
Rural Counties	56.5%	58.4%	3.3%
<b>Receiving the Working Family Credit Among Eligible Parents</b>			
Central Minneapolis-St. Paul Counties	67.4%	68.8%	2.0%
Suburban Minneapolis-St. Paul Counties	67.6%	69.0%	2.0%
Smaller Metropolitan Areas	71.3%	72.3%	1.4%
Rural Counties	68.0%	68.9%	1.3%

## Appendix: Calculation of the Working Family Credit

Calculation of the credit depends upon the household's earned income, the number of children, and the tax year. Prior to the 1998 reform, the credit consisted of three stages: a phase-in range, a maximum credit, and a phase-out range. Post 1998, there were five stages.

1. The phase-in:

$$WFC = \text{RATE1} \times w \quad (1)$$

where RATE1 is the phase-in rate,  $w$  is earnings, and WFC is the Working Family Credit amount.

2. The maximum allowable credit for tier one.

$$WFC = \{\text{MAX1} \mid \text{MAX1} \leq \text{RATE1} \times w\} \quad (2)$$

where MAX1 equals the tier one maximum credit.

3. The phase-in to the second tier.

$$WFC = \{\text{MAX1} + \text{RATE2}(w - \text{WFCFLOOR}) \mid \text{WFCFLOOR} \leq w\} \quad (3)$$

where RATE2 equals the phase-in rate for the second tier and WFCFLOOR equals the phase-in floor to the second tier.

4. The maximum allowable amount for tier two.

$$WFC = \{\text{MAX2} \mid \text{MAX2} \leq \text{MAX1} + \text{RATE2}(w - \text{WFCFLOOR})\} \quad (4)$$

where MAX2 equals the tier-two maximum credit.

5. The phase-out of the credit.

$$WFC = \left\{ \begin{array}{l} \text{MAX2} - \text{PHOUTRT}(w - \text{PHOUTFL}) \mid \\ w \geq \text{PHOUTFL} \text{ and } \text{MAX2} - \text{PHOUTRT}(w - \text{PHOUTFL}) \geq 0 \end{array} \right\} \quad (5)$$

where PHOUTFL equals the phase-out floor and PHOUTRT equals the phase-out rate. Once the credit reaches zero, households are no longer eligible.

Below are example credit calculations for a family with two dependents in tax year 1999. The credit parameters are as follows: (1) the phase-in rate for tier one equals 0.088; (2) the maximum credit for tier one equals \$908; (3) the phase-in floor for tier two equals \$15,769, and the phase-in rate equals 0.2; (4) the maximum credit for tier two equals \$1,321; and (5) the phase-out floor equals \$18,990, with a phase-out rate of 0.0988.<sup>19</sup>

- If the family earned \$5,000, the credit equals \$440 ( $=.088 \times \$5,000$ ).
- If the family earned \$15,000, the family receives the tier-one maximum credit of \$908.
- If the family earned \$17,500, the credit equals \$1,254 ( $=\$908 + 0.2 (\$17,500 - \$15,769)$ ).
- If the family earned \$18,500, the family receives the tier-two maximum credit of \$1,321.
- Finally, if the family earned \$20,000, the credit equals \$1,226 ( $=\$1,321 - 0.0938 (\$20,000 - \$18,990)$ ).

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<sup>19</sup> The maximum credit for tier 1, phase-in floor to tier 2, the maximum credit for tier 2, and the phase-out floor are all in 2002 dollars.