

THREE ESSAYS IN APPLIED MICROECONOMICS

BY

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DEDICATION

TO MY PARENTS, VIORICA AND ROMEO,
THANKS FOR EVERYTHING.... AND MORE

AND TO MY HUSBAND, IONUT,
FOR YOUR SUPPORT, PATIENCE, AND OPTIMISM

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ABSTRACT

This dissertation contains three chapters. The first chapter, entitled “Households’ Financial Resources during Periods of Income Shortfall Caused by Childbirth,” examines the use of unsecured debt, savings, and government assistance as potential resources in the case of a reduction in total income caused by childbirth. The results show that a decrease in total family income leads to a statistically significant but small reduction in consumption. Depending on income before childbirth, households use government assistance programs, especially Food Stamps benefits, and/or their savings, when income decreases due to childbirth. Households do not use unsecured debt.

The second chapter, entitled “The Effect of Paid Maternity Leave on Participation in Government Assistance Programs,” examines how paid and unpaid maternity leave affects participation in government assistance programs. This research uses state-mandated Temporary Disability Insurance as a measure of paid maternity leave to estimate whether access to paid leave before and after childbirth causes a decrease in reliance on government assistance programs. The results show that families with access to Temporary Disability Insurance are less likely to rely on public assistance when they have a newborn. The probabilities of participation in Food Stamps and Temporary Assistance for Needy Families are lower for families who reside in states that mandate TDI compared with families who reside in states without mandated TDI. There is no statistically significant difference for WIC.

The third chapter, entitled “The Effect of Behavior Problems on Unsecured Debt Use,” examines the effect of behavior problems on credit card debt and student debt among young adults. The results show that behavior problems, in general, do not predict credit card ownership, intensive credit card use, student loans, and high level of indebtedness. Internalizing behavior problems are associated with a lower probability of having carryover balances and a drop in unsecured debt. Behavior problems are linked to a decrease in the probability of having student loans and a drop in the student loan balance. The results also show that when families have unsecured debt, the likelihood that their children as young adults use credit cards and the balance on these credit cards are higher.

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CHAPTER 1

HOUSEHOLDS' FINANCIAL RESOURCES DURING PERIODS OF INCOME SHORTFALL CAUSED BY CHILDBIRTH

1.1 INTRODUCTION

Because more women are participating in the labor force, maternity leave benefits from work have become more important to new mothers and infants. A study on 173 countries shows that the U.S. is one of the few countries that does not offer paid maternity leave (Heymann et al., 2007). Among OECD countries, the U.S. and South Korea are the only ones that do not offer this benefit. Other countries offer paid maternity leave that provides between 50% and 100% of wages during the leave (Tanaka, 2005). The lack of paid maternity leave puts additional financial pressure on low-income

families. Frequently, new parents¹ with low income have limited access to paid work leave (e.g., sick leave or vacation days) that can be used to replace paid maternity leave, and they also have insufficient savings to cover the income loss (Grant et. al, 2005).

It is important to understand what financial resources new parents use to compensate for the lack of paid maternity leave from two reasons. First, it may provide information on how families cope with unpaid maternity leave, and, second, it adds to the literature regarding the households' responses to negative income shocks. Even though childbirth, and consequently unpaid maternity leave, is not an unexpected income shock, it might have the same consequences as an unanticipated income shock.

Families have various alternatives to smooth consumption, and each of them has a different effect on a household's future financial position. For example, if a family uses unsecured debt to overcome a period of financial distress caused by childbirth and is unable to repay the debt, it might face bankruptcy. According to White (2007) credit card debt is the primary reason Americans are filing for bankruptcy. In this case, the solution for a present problem becomes a problem itself in the future. Even though parenting is typically planned, and precautionary savings should be used to compensate for unpaid maternity leave, many times, families do not have enough savings. Gruber (2001) suggests that one third of workers do not have enough gross financial assets to replace ten percent of the income loss. If families do not have the necessary resources and rely on government assistance, the burden is transferred to taxpayers.

¹ Throughout this paper, I define new parents as families who have a new child, regardless of whether they have other children.

This paper examines the use of unsecured debt, savings, and government assistance as potential resources in the case of a reduction in total income caused by childbirth. Using Panel Study of Income Dynamics (PSID) data from the 1999 through 2009 waves, I investigate the use of the alternative resources when there is a change in total family income due to childbirth. The results show that a decrease in total family income leads to a statistically significant but small reduction in consumption. Depending on income before childbirth, households use government assistance programs, especially Food Stamps benefits, and/or their savings, when income decreases due to childbirth. Households do not use unsecured debt. The results show that childbirth is associated with a decrease in unsecured debt. First, the high interest rates and the low borrowing limit may discourage the use, and second, they may not qualify for unsecured debt.

The paper is organized as follows: Section 2 reviews the literature; Section 3 describes the data, the sample, and the methodology used for the analysis; Section 4 presents the results; and Section 5 concludes the paper.

1.2 LITERATURE REVIEW

Considering the high rate of women's participation in the labor force and the social trends showing that more children are born outside of marriage (Sandfort & Hill,

1996), the laws governing maternity leave are more important than ever. U.S. legislation includes two primary laws that protect working new mothers (Grant et al., 2005). The Pregnancy Discrimination Act (PDA), passed in 1978, protects women against discrimination on the basis of pregnancy, and the Family and Medical Leave Act (FMLA), passed in 1993, allows certain new mothers to take up to 12 weeks unpaid maternity leave, before or after giving birth.² The FMLA provides new mothers with unpaid maternity leave but leaves the wage replacement up to the employer. Several states extended the coverage of the law by changing the requirements (e.g., the employer can have less than 50 employees and still be covered by FMLA) or offering more than 12 weeks of job-protected leave (Arredondo & Mondal, 2010). Five states (Rhode Island, California, New Jersey, New York, and Hawaii) enacted programs that offer paid maternity leave through temporary disability insurance, and California was the first state to pass paid parental leave legislation (Fass, 2009).

Because paid maternity leave is not mandated at the federal level, some new parents must find additional resources if they decide to use unpaid parental leave. Research done by the Department of Labor in 2000 shows that more than 50 percent of those who take advantage of the FMLA (not only for maternity reasons) worry about their financial situation, and many are forced to reduce their leave or do not take the unpaid leave at all (Waldfogel, 2001). Research done in Germany shows a similar effect of unpaid leave on the labor supply. Germany is one of the countries that offers paid

² Employees can take job-protected unpaid leave for medical and family reasons if they have worked for their employer at least 12 months, at least 1,250 hours over the past 12 months, and work at a location where the company employs 50 or more employees within 75 miles (U.S. Department of Labor).

maternity leave, but a reform of the policy that took place in 2007 changed the length this benefit is available to new parents. The authors' conclusion is that a shorter period of paid leave prompts new mothers to return to work sooner than before the change in policy (Bergemann & Riphahn, 2011). The income of other family members also plays a role in the decision of the new mother to return to work; the higher the income of the other family members, the later the new mother returns to work (Leibowitz et al., 1992).

According to Grant et al. (2005), low-income families are frequently not covered by the FMLA, and if they are covered, they cannot afford to take the unpaid leave because they do not have other resources available to overcome the reduction in income. Many low-income families do not have access to paid leave, such as vacation or sick days that can be combined with unpaid leave to reduce the income shock. Debt and financial problems are the main factors mentioned by mothers for returning sooner to work (Stride, 2010). Better paid jobs and paid maternity leave often go hand in hand. Boushey (2008) shows that wages for women who can benefit from paid maternity leave are nine percent higher than wages for women who do not have access to paid maternity leave. A survey of employers regarding California's Paid Family Leave program finds that the employees in low-quality jobs are the ones who benefit the most and that men are taking advantage of paid family leave in order to bond with their children. The Paid Family Leave program is also linked to an increase in the use of maternity leave, especially by mothers with low income (Slater, Ruhm & Waldfogel, 2011). Watts (1994) suggest that there are three possibilities to finance family leave: savings, working part time, and borrowing.

Economic theory suggests households try to smooth consumption over time; they partially insure consumption against permanent shocks, and they completely insure consumption against temporary shocks with the exception of families with low levels of wealth (Blundell et al., 2008). The literature addresses different options households have to smooth consumption during periods of financial distress. Some of the resources are as follows unemployment insurance (Gruber, 1997), the Food Stamp Program (Gundersen & Ziliak, 2003; Cancian et. al, 2005; Mykerezi & Mills, 2010), and the Aid to Families with Dependent Children program (Gruber, 2000).

Bankruptcy can also be a method to weather bad financial periods, offering additional insurance by discharging debts (White, 2006). Grant (2010) describes two effects of bankruptcy; first, bankruptcy offers a “fresh start” for households that are unable to repay their debt, reducing the variation in consumption, and, second, bankruptcy reduces the availability of credit and increases the interest rates for the households that end up paying their obligations. Furthermore, households filing for bankruptcy do not have to meet certain requirements like they need to meet for means-tested programs; this makes bankruptcy “the most flexible insurance” (Filer & Fisher, 2005).

Households can also use precautionary savings to self-insure against income shocks. The annual average saving rate in the U.S. has decreased from around ten percent at the beginning of the 80s to less than one percent in 2006 (Dyan & Kohn, 2007), and low-income households save less than high-income households (Hurst & Ziliak, 2006). Lentz & Tranaes (2005) show that savings only partially smooth consumption over time.

Sullivan (2008) also offers a comprehensive review of the literature concerning the methods used by households to smooth consumption.

This study adds to the literature by examining a different source of income variation. Specifically, I use giving birth as a source of shock to income. To my knowledge, this is the first paper that studies the methods that families use to cope with periods of financial distress caused by childbirth. Because paid maternity leave is not available to everyone, many families have to find alternative solutions to cover the difference in monthly income. First, I examine how family income and consumption are affected by giving birth. Afterward, I consider savings, unsecured debt, and government assistance as potential resources to smooth consumption. Having children is, most of the time, a planned life event, so that future parents can save before the child birth and dissave after. Smith & Ward (1980) find that families with young children where mothers stay at home decrease consumption and dissave at the same time. Kalwij (2003) uses data from Netherland to show that parents save more before they have their first child, but they do not reduce their savings to smooth consumption during maternity leave.

Because the loss in income caused by maternity leave is temporary, unsecured debt may be a potential means to smooth consumption. Families may treat differently changes in income depending on the factors that produce the change. Sullivan (2008) studies the effect of temporary income loss due to unemployment on unsecured debt. He concludes that very low-asset families cannot rely on unsecured debt because their access

to this is limited, while low-asset families use unsecured debt to smooth consumption.³

When neither savings nor unsecured debt is available, households may rely on government assistance.

1.3 DATA AND METHODOLOGY

1.3.1 DATA

The data used for this analysis are from the Panel Study of Income Dynamics. This longitudinal survey started in 1968 with a sample of over 18,000 individuals living in 5,000 households, and it has followed these families and their split-offs since that time. The PSID includes data on employment, income, expenditures, consumption, education, and health. In my analysis, I use the main questionnaire and one of the supplemental interviews: the wealth file. For the main questionnaire the data were collected annually from 1968 to 1997 and biennially after 1997. The wealth data are available for 1984, 1989, 1994, 1999, and biennially thereafter. Because the wealth information was gathered every five years between 1984 and 1999, I limit my analysis to the last six waves of the

³ Sullivan (2008) defines very low-asset families as “those in the bottom decile of the asset distribution” and low-asset families as “those in the second and third deciles of the asset distribution.”

survey from 1999 to 2009. Even though using more waves is desirable, information from 1999 to 2009 includes an entire business cycle and also represents a period of increasing credit card use.

The PSID is considered one of the most reliable data sources available on income; it offers high quality data on total family income and labor income (Kim & Stafford, 2000), the main explanatory variables of this paper. The PSID also provides information on consumption. Li et al. (2010) find that the expenditures reported in the PSID are close to the expenditures reported in the Consumer Expenditure Survey, the most-used resource for consumption research. Ratcliffe et al. (2007) compare multiple data sets and suggest that the PSID is the “primary” resource for studying low-income households’ assets and liabilities.

The main variables I use are total family income, savings, income from Temporary Assistance for Needy Families (TANF), food stamps benefits, unsecured debt, food consumption, and housing consumption. Total family income includes taxable income of the household head and wife (e.g. wages, income from business, dividends, and annuities), transfer income of the head of the family and the wife, taxable income of other family members, transfer income of other family members, and social security income. It is important to include all potential sources of income because the household relies on total income. When total income encounters a shock, the family must find other resources to maintain the same level of consumption. Savings includes money in checking or savings accounts, money market funds, certificates of deposit, government

savings bonds, or Treasury bills. Unsecured debt includes all debt such as credit cards, medical bills, student loans, loans from relatives and legal bills.

Because I am interested in the effect of childbirth on total income and subsequently on savings, unsecured debt, and government assistance, I construct a dummy variable that takes the value of one if the family has a newborn child during a given year. I use the dummy variable and the change in total family income as the main independent variables. For robustness checks, I use the change in labor income of the head of the household and wife. Labor income includes wages and salaries, bonuses, overtime, tips, commissions, professional practice or trade, market gardening, miscellaneous labor income, and extra job income. I exclude outliers for the dollar amount variables from the sample.⁴ I express these variables in 2004 dollars.

I extend the analysis by examining the effect of changes in income on consumption. In these additional models, I use change in food consumption or change in housing consumption as dependent variables. Food consumption includes food consumed at home and food eaten out, while housing consumption includes rent or mortgage. These variables are also expressed in 2004 dollars.

The sample is composed of married-couple households and single woman households with or without children. I restrict the age of the woman in the household to between 18 and 45; the lower limit allows me to include young adults who start a family, while the upper bound allows me to include late motherhood (women who become

⁴ I exclude observations with a negative total income, observations with total income, labor income, and savings higher than \$500,000, observations with government assistance benefits higher than \$20,000, and observations with unsecured debt higher than \$200,000.

mothers later in life are more educated and have higher earnings than their younger counterparts). The age restriction also limits the sample to women who are more likely to have a child. I remove from the sample families who have newborn children in consecutive waves. This approach tries to eliminate the effect of successive (two years apart) births. Because the paper uses the change in the main variables from a year without childbirth to a year with childbirth, successive births cannot be included. I also exclude households who do not reside in the U.S.

1.3.2 DESCRIPTIVE STATISTICS

Table 1 presents the difference between years when families have newborn children and years when the same families do not have new children. Because households may react differently depending on total family income, and low-income families may use different resources than high-income families, I perform the analysis by income distribution. I divide households into three categories: low, medium, and high income. The low income category includes families in the first and second quintiles of the income distribution. The medium income group is represented by families in the third and fourth quintiles, and the high income households are those in the fifth quintile of income

distribution.⁵ The quintiles are determined using Hisnanick and Giefer (2011).⁶ Each household is assigned to a quintile based on total income at the time the family enters the sample. Because total income can change if there is a childbirth in the family, I exclude observations that have a newborn in the first wave. This strategy tries to eliminate the risk of assigning a family to the wrong quintile. Total labor income is determined by adding father's labor income and mother's labor income. For a single mother household, it represents just the mother's labor income.

For households with low total income, those in the first and second quintiles, there is no statistically significant change in total or labor income. This could be an indication that these families do not use unpaid maternity leave, or one of the parents increases the labor supply in order to compensate for the missing paycheck of the other parent. These findings are in accordance with previous research: almost 30 percent of employed women did not use maternity leave (U.S. Department of Health Resources and Service Administration, 2011), and low income families are less likely to take maternity leave (Grant et al., 2005). Total family income also includes government assistance. Therefore, total income might remain constant, if the family begins to receive social welfare.

⁵ I use three income groups instead of quintiles to improve the clarity and effectiveness of the paper.

⁶ First quintile includes families with total family income lower than \$20,500. Second quintile includes families with total family income higher than \$20,500 but lower than \$36,500. Third quintile includes families with total family income higher than \$36,500 but lower than \$55,500. Fourth quintile includes families with total family income higher than \$55,500 but lower than \$84,500. Fifth quintile includes families with total family income higher than \$84,500. Their method accounts for both income and sampling weights.

For the third and fourth quintiles, total income falls by almost \$6,930 and total labor income by \$6,724. These differences are significant at the five percent level. The decrease of almost ten percent in total labor income is the equivalent of five weeks of unpaid maternity leave. Because these families are at higher points in the income distribution, they may be able to compensate for time off in the absence of paid maternity leave. New parents experience an absolute increase in total income of \$606 and a relative decrease (compared with years when there is no childbirth in the family) of \$5,807. The changes in total labor income are similar; therefore, this can be evidence that families in the medium-income group experience a shock to income caused by childbirth, and any change in labor income translates in a similar change in total income. Households in the fifth quintile experience an increase in total labor income if there is a childbirth in the family. This may be the effect of an increase in the labor supply of one of the parents.

Table 2 presents summary statistics for consumption, government assistance, savings, and unsecured debt by income distribution. For low-income families, there is an absolute increase in food stamps benefits of \$558 and a relative increase of \$512. Considering that the descriptive statistics do not provide evidence that there is a decrease in labor or total income for families in these quintiles, the rise in food stamp benefits may be determined by the increased number of family members, and it may not be the consequence of a decline in income. The same is true for change in TANF benefits. The relative increase in these benefits of \$271 is significant at the ten percent level. The descriptive statistics do not provide any evidence of significant changes in food or housing consumption.

Households in the middle of the income distribution (third and fourth quintiles) do not smooth consumption during years when there is a birth in the family; they decrease housing and food consumption. There is a significant decrease in housing consumption in years when there is a birth in the family of \$1,227 or ten percent, and a decrease in food consumption of \$532 or seven percent. These families rely on the Food Stamp Program, increasing the benefits received by \$115 in relative terms. These changes may be the effect of the reduced total or labor income. The evidence provided by the descriptive statistics shows that these families do not use other resources such as savings or unsecured debt when there is a shock to income caused by childbirth.

Families at the highest point in the income distribution reduce their savings by \$20,865 during years when there is a birth compared with years when there is no birth in the family. The difference is significant at the ten percent level, and it may be the result of higher expenses caused by the newborn and not necessarily the result of a reduction in income.

Tables 3 and 4 present descriptive statistics by type of family. Family dynamics are different for single mothers and married couples. For example, married women can return to work as soon as possible while fathers take parental leave, or both mothers and fathers can reduce the number of worked hours. Single new mothers are also more at risk because they cannot rely on a spouse's income during maternity leave. A third of single mother families do not have enough food, and one quarter have housing problems (Eamon & Wu, 2011). According to Meyer & Sullivan (2008), it is better to select the sample based on demographic characteristics than on income because income is more

susceptible to measurement error. Total family income for married couples decreases during the years when there is a birth in the family, but the difference is not statistically significant. New mothers' labor income decreases relative to income of women who do not give birth by almost \$657. This difference is also not statistically significant. New fathers' labor income also falls, and the difference is statistically significant at the ten percent level. For single woman households, there is no significant change in income if the mother gives birth during a given year.

Descriptive statistics for the outcome variables may suggest the way families use their financial resources during the years they have a new baby. For married couples the only statistically significant change is the reduction in food consumption. The five percent decrease is an indication that families may not use other resources to smooth consumption. For single mother families, descriptive statistics show an increase in government assistance. Food Stamp benefits increase by more than \$1,200, and the difference is statistically significant at the five percent level. As previously stated, the cause may be not the change in income but the ability to qualify more easily because of an extra member in the family unit. TANF benefits increase by almost \$1,200.

Unexpected, there is a significant decrease in the value of unsecured debt. It might be interesting to examine descriptive statistics by family structure and income distribution, but because of the limited number of observations in each category, this is not possible.

1.3.3 EMPIRICAL MODEL

I start the analysis by estimating the effect of birth on total family income and total labor income. The model is specified as:

$$\Delta TI_{ist} = \alpha + \lambda_1 Birth_{ist} + \beta_x X_{ist} + \beta_s S + \beta_t T + \epsilon_{ist}. \quad (1)$$

This analysis provides preliminary evidence on the effect of birth on family income. Lack of paid maternity leave should reduce the labor and total income of the household. This effect is expected but not mandatory. Parents may decide to return to work quickly after the birth of the child, or one of the parents may increase their labor supply. These decisions are different depending on the family's income. Therefore, I estimate Equation 1 for each income category.

The variable ΔTI_{ist} represents the change in total family income from one wave to another. Because of the variable's complex definition, it includes different sources of income variation in addition to changes in the labor income. I also use change in total labor income for additional evidence. I construct a dummy variable *Birth* that takes the value of 1 if there is a newborn in the family during a particular calendar year.

X represents a vector of family, head of household, and wife characteristics. I include two dummy variables for white and black,⁷ age, highest level of education completed, a dummy showing whether the father or mother is working, a dummy showing whether the family owns (or is buying) a home or rents, and a dummy showing whether the family has a car.

In order to control for unobservable heterogeneity among states, I include a dummy variable for each state. These are represented in the model by vector S . I also use time dummies, T , to control for aggregate time trends. The last term, ϵ , represents the error term. The standard errors I report in the paper are clustered by state. Failing to control for serial correlation in difference-in-difference models can lead to overestimation of statistical significance (Bertrand et al., 2004).

In order to analyze the effect of an income shock caused by childbirth on different financial resources, I develop a multivariate model specified as:

$$Y_{ist} = \alpha + \lambda_1 \Delta T I_{ist} + \lambda_2 \Delta T I_{ist} \times Birth_{ist} + \lambda_3 Birth_{ist} + \beta_x X_{ist} + \beta_s S + \beta_t T + \epsilon_{ist}. \quad (2)$$

The variable Y alternately represents the change in unsecured debt, savings, Food Stamp benefits, and TANF benefits of household i in state s in year t . Using the differenced variables instead of the level values, I remove time invariant unobserved characteristics.⁸ Additional advantages of using the differenced variables are stationarity

⁷ The excluded category includes Latino, Native American, Asian, and other.

⁸ This methodology does not control for time-variant unobserved heterogeneity.

and elimination of autocorrelation. I do not use the log functional form because it would exclude observations where there is no change in these variables. This strategy follows Engen & Gruber (2001) who suggest that using a log approach would introduce selection bias. ΔTI_{ist} represents the change in total family income or change in total labor income. When change in Food Stamp benefits, and change in TANF benefits are dependent variables, I use only the change in total labor income as key explanatory variable. The change in total family income cannot be used because it includes government transfers.

Birth can have a direct and an indirect effect on each dependent variable. For example, the direct effect is represented by changes in behavior: the family is more prudent with its financial decisions, eats out less (less expensive), or readjusts its budget. The indirect effect is the effect that birth has on labor income and subsequently on total family income. If the new parents do not have access to paid maternity leave, and they decide to use unpaid leave, then there is a loss of income caused by childbirth that affects the dependent variables.

The model specified in Equation 2 is used to identify the change in value of different resources of the household caused by the childbirth. In my specification λ_1 represents the effect of a change in income for all households from different causes (e.g. unemployment, change in salary, or worked hours, change in family structure), while λ_2 represents the impact for families who have a new child (with or without previous children) caused by childbirth. If, for example, one is interested in the effect of a change in income on the unsecured debt for a family who has a newborn, this can be determined by adding the coefficients λ_1 and λ_2 . Using this method, I can proxy for the different

impact a change in income caused by giving birth has on the financial resources of different households. The coefficient λ_3 represents the direct effect of birth on the unsecured debt, savings, or government assistance. Using the same equation, I determine the effect of a change in total family income on food, and housing consumption. Families may not smooth consumption when they experience a shock to income caused by childbirth. Therefore, these models will provide additional information on families' behavior. The same models are estimated for changes in total labor income.

Unsecured debt has a broad definition; it includes not only credit cards but also medical bills and student loans.⁹ A possible misinterpretation of the results is the increase in unsecured debt is caused by more frequent usage of credit cards when, in reality, it is caused by the increase in medical bills for giving birth. Another concern is the change in health status that can simultaneously affect the change in income and the change in unsecured debt. One may be forced to take unpaid leave or reduce the hours of work, while the medical expenses increase and thus, increasing the value of unsecured debt. In an attempt to address these problems, I include change in medical expenses as explanatory variable. I also include a dummy variable that takes the value of one if the head of household and wife increased their level of education from the previous wave and the new level of education is higher than or equal to 13.

I also include a dummy variable if the family moved from one state to another during the sample period. Using this variable, I try to capture the effect of moving and being exposed to different credit markets. I also make use of the personal property

⁹ PSID does not offer detailed data on credit card borrowing.

exemption in case of bankruptcy for a particular state. The personal property exemption¹⁰ represents the value of certain assets that are beyond the reach of creditors, and it varies from one state to another.¹¹ The reason I introduce it is that it acts as a proxy for the availability of credit in different states. All of the other variables in this specification have the same meaning as in the previous specification.

1.4 RESULTS

Table 5 presents the coefficients determined by Equation 1 for different quintiles of income distribution. For families in the first and second quintiles, the effect of *Birth* on change in total family income and change in labor income is negative. It suggests that income decreases when there is a child birth in the family, but the estimates are not statistically significant. The results agree with Grant et al. (2005) who suggest that low income families do not always use parental leave due to financial constraints. Total income includes many different sources of income for the household and childbirth potentially only affects one of them, the labor income of the new parents. Even though one of the parents may use unpaid maternity leave, other sources can compensate the

¹⁰ When filing for bankruptcy, a debtor has the right to keep certain property that is considered excluded or exempt by the bankruptcy laws. Personal property exemptions may include items such as cars, jewelry, and tools, and are determined based on the laws of the state where the debtor resides. The value limit also depends on the state's bankruptcy laws.

¹¹ I borrow the personal property exemptions from Sullivan (2008) and Hynes, Posner & Malani (2004).

reduction in labor income. For example, the family may receive government transfer payments, or the other parent may increase his labor supply.

For the third and fourth quintiles, total income decreases by \$5,036. This estimate is significant at the five percent level. This decrease represents seven percent of total family income during years when there is no birth in the family. Because these families are at a higher point in the income distribution, they may be financially able to utilize unpaid maternity leave. The total labor income falls by \$4,537, the equivalent of almost one month of unpaid parental leave. The average length of maternity leave in the U.S. reported by the U.S. Department of Health Resources and Services Administration (2011) is 10.3 weeks. These families may have access to some paid maternity leave but not for the entire length of parental leave.

The last column of Table 5 shows the results for families in the highest quintile of the income distribution. Surprisingly, but predicted by the descriptive statistics, childbirth has a positive effect on total and labor income. Even though the estimate for total family income is positive, it is not statistically significant. The estimate for total labor income is statistically significant, and it shows an increase of \$10,758. This represents nine percent of average household labor income during years without a childbirth. The explanation for an increase in total income may be that new parents anticipate the increase in their expenses and increase their labor supply after the parental leave is over. Better paid jobs also offer better benefits. Hence, there is no shock to new parents' income, and any increase in labor supply immediately leads to an increase in income because it does not have to cover for lost income.

Table 6 presents the effect of childbirth on total family income and total labor income for the two types of households included in the sample: married-couple households and single mother families. The results do not reach statistical significance. The preliminary results presented in Table 5 and 6 show that total income and labor income are not affected by childbirth, with the exception of households in the middle of the income distribution. Even though childbirth does not significantly affect income, it may change the way families use their financial resources.

Table 7 reports estimated coefficients for Equation 2 for different dependent variables. The first column shows the effect of a change in total family income on the change in the value of unsecured debt. The effect is allowed to be different for new parents. Adding the coefficient for change in total income with the coefficient for the interaction term between change in total income and birth, I proxy for the effect of a change in total income caused by giving birth. The same strategy is used in the next columns for the other dependent variables: change in savings (Column 2), change in food consumption (Column 3), and change in housing consumption (Column 4). Table 7A presents results for change in Food Stamp benefits (Column 1) and change in TANF benefits (Column 2), but for these variables, I use change in total labor income as the dependent variable.

Households in the first and second quintiles of the income distribution reduce their unsecured debt. The results show a decrease in unsecured debt if there is a decrease in total family income caused by birth as proxied by the sum of λ_1 and λ_2 . This result is statistically significant at the ten percent level. This may be the result of a change in

borrowing behavior of new parents who become more responsible and more careful with borrowing at high interest rates. This might also be the consequence of the redistribution of family's income; other resources can be used to pay off the expensive unsecured debt. These families increase usage of Food Stamp benefits. For each \$1,000 decrease in total labor income, Food Stamp benefits increase by almost \$9. Even though this change is statistically significant, it is very small. The direct effect of childbirth on change in food stamp usage, predicted by the coefficient of the *Birth* variable, is positive. It suggests that these benefits increase with the addition of a new member, or some families might become eligible for the first time because of the addition of the new member. Low-income families also experience a decline in food and housing consumption. Food consumption falls by \$50 for each \$1,000 decrease in total family income. The interaction coefficient is statistically significant suggesting that families react differently to a change in income caused by childbirth compared with changes in income determined by other factors. New parents also decrease housing consumption; they spend \$36 less on housing for each \$1,000 drop in total family income. Families in this income group do not use savings if there is a decrease in income caused by childbirth.

Families in the middle of income distribution do not use unsecured debt to supplement their income; on the contrary they decrease the unsecured debt they own. This change represents 12 percent of average unsecured debt value owned by families who do not have a baby during the sample. As previously stated, this may be the effect of a change in behavior of new parents. This finding agrees with Elliehausen (2010) who states that households do not use credit to overcome periods of financial distress; in

general, they reduce use of credit during periods of financial hardship. At the same time, savings decrease by \$100 for each \$1,000 of income lost due to childbirth. This change is significant at the five percent level. The households in this income group do not entirely smooth consumption; they reduce food consumption by almost two cents for each dollar decrease in total income. If total income falls by \$5,000, as shown in Table 5, food consumption decreases by \$83. This is a small change, but it is statistically significant. Compared with families in the low-income group, these households do not adjust housing consumption, and they do not rely on government support. As preliminary results show, families in the third and fourth quintiles of income distribution experience a shock to income caused by childbirth, but they cope with this change in total income using their own savings, adjusting consumption, and their budget.

High income families decrease their savings when they experience a drop in total income. For each \$1,000 of income lost, they reduce their savings by \$76. This change is statistically significant. The total effect, the proxy for the effect of change in income caused by childbirth on change in savings, is not statistically significant. The other coefficients for this quintile are also not statistically significant. One potential explanation for these results is that these households may have other assets they can use.

In Table 8, I report the results for the methodology presented in Equation 2 using change in labor income as the key explanatory variable and change in unsecured debt, change in savings, and change in consumption as dependent variables. The estimates do not change much if total family income is replaced by total labor income. For example, for households in the first and second quintile, *Birth* has a direct and positive effect on

housing consumption, while for families in the third and fourth quintiles (these are the families who experience a drop in total labor income as shown in Table 5) a decrease in total labor income results in a decrease in housing consumption. A drop in labor income of \$5,000 leads to a drop in housing consumption of \$211. This cutback represents a very small percent (2 percent) of housing consumption during years when there is no childbirth in the family.

Table 9 and Table 9A present estimates for different types of households: single mother families and married couples. I perform this analysis because single female-headed families have lower total income compared with male-headed or married households (Ozawa & Lee, 2006; Grinstein-Weiss et al., 2008), and a change in total or labor income can have a bigger impact on these families. Also, families where only one parent is present may behave differently than families where both parents are present. Married-couple households change their food and housing consumption very little when they have a new child. Because my analysis includes only food and housing consumption, I cannot conclude that other types of consumption (e.g., durable goods consumption) remain unchanged. Considering that food and housing consumption do not vary much, these households may use other financial resources to cope with periods of reduction in income. The results provide evidence that married-couple households use their savings if there is a decrease in total income; for each dollar of income lost they dissave by seven cents. Because this also is not a drastic change, they might use other assets. There is no evidence that these families use unsecured credit as an alternative resource to overcome periods of financial distress caused by childbirth. In addition,

married-couple households do not rely on government assistance if there is a child birth in the household.

The estimates show that single mother families increase usage of Food Stamps and TANF programs. Single mothers who give birth receive \$1,195 more in Food Stamp benefits and \$863 in TANF benefits. The reason can be twofold; first, an additional member in the family unit can help the single mother qualify for the program, and, second, the maximum allowance increases with each additional member. The result can also be influenced by single women who become mothers for the first time and start to qualify for benefits. There is also evidence that mothers who give birth have less unsecured debt and higher savings. This might suggest that there is a change in financial behavior for new mothers. They try to avoid borrowing at high interest rates and are more inclined toward saving. Single new mothers reduce their food consumption by \$650; this change represents 20 percent of their consumption during years when they do not give birth, and it is statistically significant at the ten percent level. There are two factors that can explain the difference; first, new mothers are better able to reduce food consumption in order to cope with the financial changes caused by childbirth, and, second, they can alter their behavior (e.g. go out to eat less often) as a result of childbirth. Table 10 presents estimates for changes in total labor income.

There are three issues that must be noted. First, many times, respondents with low levels of income underreport their income (Meyer & Sullivan, 2010). A solution for this issue would be to use different measures of well-being for robustness checks. Second, if families anticipate the decline in income, they can adjust their consumption in the

previous periods or change their financial behavior before the child birth takes place.

These possibilities can skew the results, creating a downward bias and making the effect insignificant. This concern is presented by Gruber (2000), who argues that women can anticipate single motherhood and consequently adjust their consumption. A solution may be to use the lag value of change in consumption. I do not employ this approach because it would considerably reduce the size of my sample.

Third, I include in my sample families who have a newborn during the month of December. They most likely take time off next year; therefore their income is not affected in the calendar year indicated by the child's birth. The same is true for the value of unsecured debt, savings, consumption, and government transfers. In order to correct this issue, I performed the same analysis on a sample that does not include families who have a new child during the month of December. The results are not qualitatively different, so I decided to present the estimates for the entire sample.

1.5 CONCLUSION

This paper studies the use of unsecured debt, savings, and government assistance programs to smooth consumption if there is a shock to income caused by childbirth. Because in the U.S. there is no law mandating paid maternity leave, new parents may take unpaid parental leave to take care of their babies. I extend the analysis by looking at the change in income caused by childbirth and at the change in consumption for new parents. The consequence of the decrease in income is felt more severely by low-income families who cannot rely on other assets to overcome these shortfalls. Therefore, this paper examines the methods households at different points in the income distribution use to cope with periods of financial distress caused by childbirth.

The results fail to show that there is a statistically significant shock to income caused by childbirth for low-income families. When there is a change in total income, these families rely on government assistance, especially Food Stamp benefits. Surprisingly, the value of unsecured debt decreases when there is a loss of income caused by childbirth. This result suggests that new parents try to avoid borrowing at high interest rates. Low-income families also adjust their food and housing consumption. The changes are statistically significant but small.

For families in the third and fourth quintiles, the results show a decrease in total income caused by childbirth. Because these households have higher total income before

childbirth, they might be able to afford unpaid maternity leave. Total income decreases by almost \$5,036; this represents seven percent of the total income before childbirth or four weeks of unpaid maternity leave. If these families have access to partial paid maternity leave, the length of parental leave might be longer. Families in the middle of the income distribution use their savings if there is a change in total income caused by childbirth. They dissave by \$100 for each \$1,000 drop in total income, and they adjust their food consumption. The value of unsecured debt for new parents in this income group is lower than the value of unsecured debt for families who do not welcome a newborn. At the same time, the results provide no evidence that there is a reduction in housing consumption or reliance on government support. The results do not provide any evidence that households at the highest point in the income distribution adjust their financial behavior.

The additional models examine the response to a shock in income caused by childbirth for married-couple households and single mother families. Married couples reduce their food and housing consumption very little if there is a change in total labor income. The estimates for total income are not statistically different than zero. The results show that single mother households increase their use of Food Stamps and TANF. This may provide evidence that single mothers use government assistance during maternity leave to replace the lost labor income or they may become eligible for these benefits for the first time after giving birth. Because the value of unsecured debt decreases and the savings increase, new mothers may take precautionary measures and prepare themselves for having children.

REFERENCES

- Arredondo, Ana Espinola, and Sunita Mondal. 2010. "The Effect of Parental Leave on Female Employment: Evidence from State Policies." Working Papers Series WP 2008-15, School of Economic Sciences, Washington State University.
- Bergemann, Annette and Regina Riphahn. 2011. "Female Labour Supply and Parental Leave Benefits – The Causal Effect of Paying Higher Transfers for a Shorter Period of Time." *Applied Economics Letters* 18 (1): 17-20.
- Bertrand, Marianne et al. 2004. "How Much Should We Trust Differences in Differences Estimates?" *The Quarterly Journal of Economics* 119 (1): 249-275.
- Blundell, Richard, Luigi Pistaferri, and Ian Preston. 2008. "Consumption Inequality and Partial Insurance." *American Economic Review* 98 (5): 1887-1921.
- Boushey, Heather. 2008. "Family Friendly Policies: Helping Mothers Make Ends Meet." *Review of Social Economy* 66 (1): 51-70.
- Cancian, Maria et al. 2005. "After the Revolution: Welfare Patterns Since TANF Implementation." *Social Work Research* 29 (4): 199-214.
- Dynan, Karen and Donald Kohn. 2007. *The Rise in U.S. Household Indebtedness: Causes and Consequences*. Finance and Economics Discussion Series, Federal Reserve Board, Washington, D.C.
- Eamon, Mary and Chi-Fang Wu. 2011. "Effects of Unemployment and Underemployment on Material Hardship in Single-Mother Families." *Children and Youth Services Review* 33: 233-241.
- Elliehausen, Gregory. 2010. *Implications of Behavioral Research for the Use and Regulation of Consumer Credit Products*. Finance and Economics Discussion Series, Federal Reserve Board, Washington, D.C.
- Engen, Eric and Jonathan Gruber. 2001. "Unemployment Insurance and Precautionary Savings." *Journal of Monetary Economics* 47: 545-579.

- Fass, Sarah. 2009. "Paid Leave in the States. A Critical Support for Low-Wage Workers and Their Families." The National Center for Children in Poverty, Mailman School of Public Health at Columbia University.
- Filer, Larry and Jonathan Fisher. 2005. "The Consumption Effect Associated with Filing for Personal Bankruptcy." *Southern Economic Journal* 71 (4): 837-854.
- Grant, Charles. 2010. "Evidence on the Insurance Effect of Bankruptcy Exemptions." *Journal of Banking and Finance* 34: 2247-2254.
- Grant, Jodi et al. 2005. "Expecting Better: A State-by-State Analysis of Parental Leave Programs." Washington DC: National Partnership for Women and Families. Retrieved May 29, 2011 (<http://www.nationalpartnership.org/site/DocServer/ParentalLeaveReportMay05.pdf?docID=1052>).
- Grinstein-Weiss, Michal, Yeong Hun Yeo, Min Zhan, and Pajarita Charles. 2008. "Asset Holding and Net Worth among Households with Children: Differences by Household Type." *Children and Youth Services Review* 30: 62-78.
- Gruber, Jonathan. 1997. "The Consumption Smoothing Benefits of Unemployment Insurance." *The American Economic Review* 87 (1): 192-205.
- Gruber, Jonathan. 2000. "Cash Welfare as a Consumption Smoothing Mechanism for Divorced Mothers." *Journal of Public Economics* 75: 157-182.
- Gruber, Jonathan. 2001. "The Wealth of the Unemployed." *Industrial and Labor Relations Review* 55(1): 79-94.
- Gundersen, Craig and James Ziliak. 2003. "The Role of Food Stamps in Consumption Stabilization." *The Journal of Human Resources* 38: 1051-1079.
- Heymann, Jody et al. 2007. "The Work, Family and Equity Index: How Does the United States Measure Up?" Montreal QC: McGill Institute for Health and Social Policy. Retrieved August 15, 2011 (<http://www.mcgill.ca/files/ihsp/WFEIFinal2007.pdf>).
- Hisnanick, John J. and Katherine G. Giefer. 2011. *Dynamics of Economic Well-Being: Fluctuations in the U.S. Income Distribution, 2004-2007*. Household Economic Studies, Current Population Reports, U.S. Census Bureau.
- Hurst, Erik and James Ziliak. 2006. "Do Welfare Asset Limits Affect Household Saving? Evidence from Welfare Reform." *The Journal of Human Resources* 41 (1): 46-71.

- Hynes, Richard, Eric Posner, and Anup Malani. 2004. "The Political Economy of Property Exemption Laws." *The Journal of Law and Economics* 47:19-43.
- Kalwij, Adriaan. 2003. "Consumption and Income around the Time of Births." *Review of Economics of the Household* 3: 75-89.
- Kim, Seong-Yong and Frank Stafford. 2000. "The Quality of PSID Income Data in the 1990's and Beyond." Technical Series Paper No. 00-03, Institute for Social Research, University of Michigan.
- Leibowitz, Arleen et al. 1992. "Employment of New Mothers and Child Care Choice: Differences by Children's Age." *Journal of Human Resources* 27 (1): 112-133.
- Lentz, Rasmus and Torben Tranaes. 2005. "Job Search and Savings: Wealth Effects and Duration Dependence." *Journal of Labor Economics* 23 (3): 467-489.
- Li, Geng et al. 2010. "New Expenditure Data in the PSID: Comparisons with the CE." *Monthly Labor Review* 133 (2): 20-30.
- Meyer, Bruce and James Sullivan. 2008. "Changes in the Consumption, Income and Well-Being of Single Mother Headed Families." *American Economic Review* 98 (5): 2221-2241.
- Meyer, Bruce and James Sullivan. 2010. "Further Results on Measuring the Well-Being of the Poor Using Income and Consumption." *Canadian Journal of Economics* 43 (3): 52-87.
- Mykerezi, Elton and Bradford Mills. 2010. "The Impact of Food Stamps Program Participation on Household Food Insecurity." *American Journal of Agricultural Economics* 92(5): 1379-1391.
- Ozawa, Martha and Yangwoo Lee. 2006. "The Net Worth of Female-Headed Households: A Comparison to Other Types of Households." *Family Relations* 55: 132-145.
- Ratcliffe, Caroline et al. 2007. "Assessing Asset Data on Low-Income Households: Current Availability and Options for Improvement." *Poor Finances: Assets and Low-Income Households Series*, Urban Institute, Washington DC.
- Sandfort, Jodi and Martha Hill. 1996. "Assisting Young, Unmarried Mothers to Become Self-Sufficient: The Effects of Different Types of Early Economic Support." *Journal of Marriage and Family* 58 (2): 311-326.

- Smith, James P. and Michael P. Ward. 1980. "Asset Accumulation and Family Size." *Demography* 17 (3): 243-260.
- Slater, Maya Rossin, Christopher J. Ruhm, and Jane Waldfogel. 2011. "The Effects of California's Paid Family Leave Program on Mothers' Leave-Taking and Subsequent Labor Market Outcomes." Working Paper No. 17715, NBER, Chicago, IL.
- Stride, Robin. 2010. "Finances Force Mums to Cut Maternity Leave." *Practice Nurse*, 40 (2): 31.
- Sullivan, James. 2008. "Borrowing during Unemployment; Unsecured Debt as a Safety Net." *The Journal of Human Resources* 43 (2): 383-412.
- Tanaka, Sakiko. 2005. "Parental Leave and Child Health across OECD Countries." *The Economic Journal* 115 (501): F7-F28.
- U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. 2011. *Women's Health USA 2011*. Rockville, MD: U.S. Department of Health and Human Services.
- Waldfogel, Jane. 2001. "Family and Medical Leave: Evidence from the 2000 Surveys." *Monthly Labor Review* 124 (9): 17-23.
- Watts, Patti. 1994. "How to Finance a Family Leave." *Executive Female* 17 (2): 63.
- White, Michelle. 2006. *Bankruptcy and Consumer Behavior: Theory and Evidence from the U.S.* The Economics of Consumer Credit, MIT Press.
- White, Michelle. 2007. "Bankruptcy Reform and Credit Cards." *Journal of Economic Perspectives* 21 (4): 175-200.

TABLES

Table 1: Descriptive Statistics for Income by Income Distribution
 *For families who have a newborn between 1999 and 2009

	First and Second Quintile		Third and Fourth Quintile			Fifth Quintile			
	Years with no birth	Years with birth	Difference	Years with no birth	Years with birth	Difference	Years with no birth	Years with birth	Difference
	A	B	B - A	C	D	D - C	E	F	F - E
Total Income	39,760.97 (1,807.253)	37,062.72 (1,807.442)	-2,698.25 (2,555.975)	74,613.25 (1,560.834)	67,683.51 (2,202.992)	-6,929.74**	138,126.30 (5,982.285)	136,996.60 (7,634.077)	-1,129.70 (9,698.807)
Δ Total Income	5,598.97 (1,474.763)	4,730.58 (1,395.078)	-868.39 (2,030.066)	6,413.71 (1,390.289)	606.30 (2,088.356)	-5,807.41**	2,457.14 (4,312.642)	9,701.81 (6,901.467)	7,244.67 (8,138.128)
Total Labor Income	33,847.09 (1,309.214)	32,399.45 (1,821.409)	-1,447.64 (2,243.117)	69,706.41 (1,479.071)	62,982.58 (2,256.945)	-6,723.83**	125,139.50 (5,765.011)	125,510.40 (6,651.619)	370.90 (8,802.238)
Δ Total Labor Income	4,198.99 (856.572)	3,400.19 (1,410.309)	-798.80 (1,650.056)	6,134.43 (1,152.590)	667.00 (1,890.217)	-5,467.43**	1,182.79 (4,217.345)	12,857.50 (4,996.496)	11,674.71* (6,538.423)
No. of Obs.	610	294		716	288		250	100	

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 2: Descriptive Statistics for Consumption, Government Assistance, Savings, and Unsecured Debt by Income Distribution
 *For families who have a newborn between 1999 and 2009

	First and Second Quintile			Third and Fourth Quintile			Fifth Quintile		
	Years with no birth	Years with birth	Difference	Years with no birth	Years with birth	Difference	Years with no birth	Years with birth	Difference
	A	B	B - A	C	D	D - C	E	F	F - E
Housing Consumption	7,340.96 (450.983)	7,848.28 (501.276)	507.32 (674.287)	12,057.05 (396.433)	10,830.51 (599.878)	-1,226.54* (719.036)	17,717.71 (709.820)	17,960.99 (1,062.065)	243.28 (1,277.429)
Δ Housing Consumption	786.61 (389.655)	1,743.30 (464.017)	956.69 (605.923)	956.25 (352.941)	520.07 (377.496)	-436.18 (516.789)	98.94 (492.880)	1,667.89 (964.080)	1,568.95 (1,082.765)
Food Consumption	5,614.13 (233.287)	5,165.35 (291.114)	-448.78 (373.055)	7,593.31 (156.491)	7,061.49 (215.199)	-531.82** (266.083)	9,811.15 (284.603)	9,420.49 (403.519)	-390.66 (493.788)
Δ Food Consumption	202.32 (199.604)	125.15 (257.759)	-77.18 (326.008)	279.15 (131.108)	236.93 (226.489)	-42.22 (261.699)	575.90 (250.847)	360.69 (404.941)	-215.22 (476.342)
Food Stamp Benefits	1,074.12 (128.789)	1,157.33 (150.398)	83.21 (198.006)	61.20 (17.479)	166.52 (71.627)	105.32 (73.729)	N/A	N/A	N/A
Δ Food Stamp Benefits	45.98 (100.454)	557.94 (128.799)	511.96** (163.341)	12.46 (17.553)	127.25 (64.004)	114.80* (66.367)	N/A	N/A	N/A
TANF	158.40 (45.907)	366.45 (120.610)	208.05 (129.051)	8.13 (3.786)	59.49 (58.985)	51.36 (59.106)	N/A	N/A	N/A
Δ TANF	-80.71 (67.305)	190.22 (148.924)	270.93* (163.427)	3.65 (3.422)	57.18 (59.050)	53.53 (59.149)	N/A	N/A	N/A
Savings	3,652.84 (695.628)	5,569.08 (2,813.042)	1,916.24 (2,897.776)	8,254.77 (710.704)	7,489.12 (985.653)	-765.65 (1,215.159)	32,728.05 (5,249.295)	21,874.74 (4,200.502)	-10,853.31 (6,723.044)
Δ Savings	-444.66 (835.228)	2,204.01 (2,045.142)	2,648.66 (2,209.120)	968.31 (639.805)	683.64 (801.658)	-284.67 (1,025.674)	11,514.15 (4,914.385)	-9,350.40 (9,562.970)	-20,864.55* (10,751.817)
Unsecured Debt Value	8,605.08 (997.451)	8,860.51 (1,515.279)	255.43 (1,814.106)	12,712.49 (996.381)	10,484.54 (1,026.063)	-2,227.95 (1,430.238)	12,712.69 (1,830.708)	12,627.31 (2,283.953)	-85.38 (2,927.103)
Δ Unsecured Debt Value	1,201.82 (691.810)	1,833.23 (1,084.800)	631.41 (1,286.620)	698.36 (591.081)	-317.32 (836.295)	-1,015.68 (1,024.093)	1,190.97 (1,530.738)	-317.78 (1,686.541)	-1,508.75 (2,277.626)
No. of Obs.	516	252		639	258		232	93	

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 3: Descriptive Statistics for Income by Type of Household

	Families who have newborn children between 1999 and 2009								Difference
	Years when no child is born				Year when the child is born				
	Married Couples	Single Mothers	Married Couples	Single Mothers	Married Couples	Single Mothers	Married Couples	Single Mothers	
	A	B	C	D	C - A	D - B			
Total Income	81,312.55 (2,001.030)	20,274.12 (1,331.584)	76,264.87 (2,671.575)	19,617.45 (1,850.116)	-5,047.68 (3,337.879)	-656.67 (2,279.484)			
Δ Total Income	5,917.77 (1,290.857)	-25.41 (1,752.949)	4,598.55 (1,807.632)	-1,652.63 (4,047.297)	-1,319.21 (2,221.226)	-1,627.22 (4,410.606)			
Father's Labor Income	50,716.10 (1,632.966)		46,882.71 (1,656.836)		-3,833.39* (2,326.303)				
Δ Father's Labor Income	3,243.48 (782.794)		4,296.03 (1,134.229)		1,052.55 (1,378.130)				
Mother's Labor Income	23,703.58 (968.274)	13,844.56 (1,165.445)	23,501.93 (1,527.379)	13,394.33 (1,868.392)	-201.65 (1,808.436)	-450.23 (2,202.079)			
Δ Mother's Labor Income	1,616.88 (809.394)	1,076.54 (1,314.713)	88.61 (974.526)	645.38 (2,299.663)	-1,528.27 (1,266.814)	-431.15 (2,648.947)			
No. of Obs.	1,315	261	543	139					

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 4: Descriptive Statistics for Consumption, Savings, Government Assistance, and Unsecured Debt by Type of Household

	Families who have newborn children between 1999 and 2009						Difference
	Years when no child is born			Year when the child is born			
	Married Couples	Single Mothers	Single Mothers	Married Couples	Single Mothers	Single Mothers	
	A	B	C	D	C - A	D - B	
Housing Consumption	12,363.16 (322.530)	4,613.78 (435.715)	11,925.61 (456.350)	5,331.24 (617.877)	-437.55 (558.820)	717.46 (756.056)	
Δ Housing Consumption	769.47 (249.394)	280.87 (508.054)	1,232.88 (336.717)	737.45 (492.558)	463.41 (419.018)	456.58 (707.624)	
Food Consumption	7,801.60 (130.317)	3,259.31 (318.734)	7,385.21 (175.953)	2,860.94 (309.122)	-416.40* (218.956)	-398.37 (444.014)	
Δ Food Consumption	319.05 (109.990)	270.35 (267.821)	305.78 (172.134)	-394.46 (353.288)	-13.27 (204.274)	-664.80 (443.329)	
Food Stamp Benefits	190.15 (31.939)	2,351.04 (278.906)	235.09 (51.484)	2,309.21 (253.850)	44.94 (60.586)	-41.82 (377.132)	
Δ Food Stamp Benefits	29.01 (33.823)	-36.57 (151.123)	120.44 (49.306)	1,238.00 (228.807)	91.43 (59.792)	1,274.57** (274.209)	
TANF	19.48 (12.959)	427.35 (105.758)	34.07 (26.264)	1,048.10 (312.811)	14.59 (29.287)	620.75* (330.205)	
Δ TANF	8.04 (14.400)	-364.20 (192.761)	-1.68 (41.711)	782.52 (336.827)	-9.72 (44.127)	1,146.72** (388.084)	
Savings	12,759.29 (1,313.177)	1,190.22 (535.534)	10,607.40 (1,552.340)	1,804.34 (1,185.570)	-2,151.89 (2,033.272)	614.11 (1,300.912)	
Δ Savings	2,924.02 (1,193.527)	-114.33 (305.571)	-888.50 (2,281.999)	819.69 (578.169)	-3,812.52 (2,575.272)	934.02 (653.952)	
Unsecured Debt Value	12,076.31 (740.870)	4,163.84 (958.435)	11,204.30 (926.455)	3,878.54 (1,134.570)	-872.01 (1,186.257)	-285.31 (1,485.209)	
Δ Unsecured Debt Value	941.39 (514.076)	1,165.01 (778.421)	664.39 (698.184)	-1,126.06 (1,122.823)	-277.00 (867.026)	-2,291.07* (1,366.262)	
No. of Obs.	1,164	223	483	120			

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 5: Preliminary Results for Equation 1

Independent Var.	First & Second	Third & Fourth	Fifth Quintile
	Quintile	Quintile	
Dependent Var.	Birth	Birth	Birth
Change in total income	-908.94	-5,036.36**	8,691.57
	(1,526.003)	(1,791.629)	(6,773.907)
	[4,816]	[4,863]	[1,883]
Change in total labor income	-1,014.67	-4,537.33**	10,757.74**
	(1,300.640)	(1,478.715)	(5,329.001)
	[4,823]	[4,876]	[1,925]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. The results are weighted. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 6: Preliminary Results for Equation 1

Dependent Var.	Independent Var.	Married Couples	Single Mothers
		Birth	Birth
Change in total income		-457.31	-4,042.73
		(1,852.119)	(4,362.479)
		[7,596]	[3,970]
Change in total labor income		-169.67	-2,422.83
		(1,718.573)	(2,926.827)
		[7,653]	[3,975]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. The results are weighted. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 7: Estimates for Change in Total Family Income by Income Distribution

Dependent Variable	Change in Unsecured Debt	Change in Savings	Change in Food Consumption	Change in Housing Consumption
Change in total income (λ_1)	4.44 (25.081)	72.41** (20.381)	11.86* (6.195)	2.22 (5.984)
Change in total income*Birth (λ_2)	121.49 (77.920)	-21.45 (102.412)	38.33* (19.979)	33.97* (20.149)
Birth	358.95 (996.778)	2,452.95 (1,946.390)	-93.44 (284.910)	980.07 (583.985)
$\lambda_1 + \lambda_2$	125.93* (73.666)	50.97 (97.360)	50.18** (19.885)	36.20* (20.571)
	[4,233]	[4,036]	[4,208]	[4,197]
Change in total income (λ_1)	-15.55* (8.685)	59.95** (21.057)	4.82 (2.952)	3.47 (5.286)
Change in total income*Birth (λ_2)	-2.76 (31.630)	40.43 (44.242)	11.80 (8.719)	28.28 (20.586)
Birth	-1,564.63** (715.284)	396.02 (855.556)	88.75 (264.027)	-132.03 (294.771)
$\lambda_1 + \lambda_2$	-18.30 (29.686)	100.38** (38.898)	16.62* (8.662)	31.75 (19.916)
	[4,208]	[3,992]	[4,264]	[4,262]
Change in total income (λ_1)	-5.31 (19.057)	76.37** (27.658)	3.68 (2.275)	-0.55 (6.256)
Change in total income*Birth (λ_2)	-17.26 (35.212)	14.84 (93.891)	0.66 (7.751)	27.16 (31.894)
Birth	-1,479.78 (2,153.675)	-2,747.58 (9,656.511)	-136.29 (496.489)	-113.33 (904.533)
$\lambda_1 + \lambda_2$	-22.57 (32.968)	91.21 (104.010)	4.34 (7.579)	26.61 (31.116)
	[1,692]	[1,586]	[1,704]	[1,709]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Results are weighted. Total Income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

Table 7A: Estimates for Change in Total Labor Income by Income Distribution

Dependent Variable		Change in Food Stamp Benefits	Change in TANF Benefits
First & Second Quintile	Change in total labor income (λ_1)	-5.81** (1.680)	-3.54* (1.794)
	Change in total labor income*Birth (λ_2)	-2.84 (5.167)	3.11 (8.058)
	Birth	518.39** (123.565)	218.45 (198.430)
	$\lambda_1 + \lambda_2$	-8.66* (5.021)	-0.43 (8.795)
		[4,219]	[4,324]
Third & Fourth Quintile	Change in total labor income (λ_1)	-1.68** (0.539)	-0.24 (0.193)
	Change in total labor income*Birth (λ_2)	-1.92 (2.191)	-0.90 (1.167)
	Birth	40.49 (75.806)	50.28 (59.841)
	$\lambda_1 + \lambda_2$	-3.60* (1.978)	-1.14 (1.116)
		[4,308]	[4,316]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Results are weighted. Total Labor Income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

Table 8: Estimates for Change in Total Labor Income by Income Distribution

Dependent Variable	Change in Unsecured Debt	Change in Savings	Change in Food Consumption	Change in Housing Consumption
Change in total labor income (λ_1)	-44.46* (24.960)	67.02** (23.887)	18.34** (4.651)	3.77 (7.249)
Change in total labor income*Birth (λ_2)	142.80 (96.089)	-139.59 (92.693)	30.43 (18.999)	0.74 (25.030)
Birth	404.23 (990.371)	2,832.68 (2,363.263)	2.84 (294.454)	1,172.09* (641.953)
$\lambda_1 + \lambda_2$	98.34 (90.288)	-72.57 (90.533)	48.76** (19.855)	4.51 (25.016)
	[4,239]	[4,042]	[4,214]	[4,203]
Change in total labor income (λ_1)	-22.71** (11.277)	79.71** (28.008)	10.84* (5.708)	12.67** (6.275)
Change in total labor income*Birth (λ_2)	2.76 (33.096)	34.18 (46.936)	8.73 (9.712)	29.45 (21.898)
Birth	-1,588.67** (712.627)	457.59 (886.305)	95.67 (278.317)	-89.87 (283.096)
$\lambda_1 + \lambda_2$	-19.94 (29.432)	113.90** (40.680)	19.56* (8.677)	42.12* (21.026)
	[4,220]	[4,002]	[4,277]	[4,275]
Change in total labor income (λ_1)	-7.46 (21.351)	73.22** (25.285)	-0.45 (2.926)	-1.44 (7.165)
Change in total labor income*Birth (λ_2)	-43.38 (48.592)	-13.53 (166.534)	8.64 (10.141)	61.87 (45.227)
Birth	-523.10 (2,029.435)	-2,711.90 (10,034.680)	-349.84 (518.403)	-666.48 (917.942)
$\lambda_1 + \lambda_2$	-50.84 (48.340)	59.70 (173.547)	8.19 (10.354)	60.43 (44.311)
	[1,729]	[1,622]	[1,743]	[1,749]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Results are weighted. Total Labor Income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

Table 9: Estimates for Change in Total Family Income by Type of Household

Dependent Variable	Change in Unsecured Debt		Change in Savings		Change in Food Consumption		Change in Housing Consumption	
Married Couples	Change in total income (λ_1)	-8.84 (15.290)	71.67** (17.368)	3.03 (1.821)	0.20 (5.182)			
	Change in total income*Birth (λ_2)	5.99 (27.687)	24.46 (57.188)	9.65 (6.536)	28.70 (21.804)			
	Birth	-276.43 (697.185)	18.56 (2,579.272)	62.72 (209.966)	355.79 (363.950)			
	$\lambda_1 + \lambda_2$	-2.84 (23.829)	96.13 (60.372)	12.68* (6.341)	28.90 (21.307)			
Single Mother Families	Change in total income (λ_1)	-5.65 (14.110)	88.69 (60.888)	11.67* (6.857)	13.24* (7.867)			
	Change in total income*Birth (λ_2)	-13.89 (26.957)	-87.16* (45.401)	19.98 (13.589)	1.04 (11.896)			
	Birth	-1,947.04* (1,063.902)	1,455.97* (778.221)	-650.16* (354.132)	21.21 (427.772)			
	$\lambda_1 + \lambda_2$	-19.54 (17.622)	1.53 (26.360)	31.65** (14.231)	14.28 (8.928)			
		[3,570]	[3,416]	[3,541]	[3,548]			

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Number of observations is presented in brackets. Results are weighted. Total income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 9A: Estimates for Change in Total Labor Income by Type of Household

Dependent Variable		Change in Food Stamp	Change in TANF
		Benefits	Benefits
Married Couples	Change in total labor income (λ_1)	-0.59** (0.180)	-0.15 (0.117)
	Change in total labor income*Birth (λ_2)	-1.27 (0.800)	-0.15 (0.151)
	Birth	69.64* (36.532)	-14.89 (17.454)
	$\lambda_1 + \lambda_2$	-1.86** (0.835)	-0.30 (0.195)
		[6,723]	[6,769]
Single Mother Families	Change in total labor income (λ_1)	-4.02** (1.678)	-2.73** (1.300)
	Change in total labor income*Birth (λ_2)	-18.89 (13.276)	6.85 (46.189)
	Birth	1,194.68** (214.868)	862.87* (436.427)
	$\lambda_1 + \lambda_2$	-22.91* (12.749)	4.12 (46.701)
		[3,567]	[3,634]

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Results are weighted. Total Labor Income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 10: Estimates for Change in Total Labor Income by Type of Household

Dependent Variable	Change in Unsecured Debt		Change in Savings		Change in Food Consumption		Change in Housing Consumption	
Married Couples	Change in total labor income (λ_1)	-13.34 (17.838)	70.54** (20.381)	1.18 (2.484)	2.46 (5.529)			
	Change in total labor income*Birth (λ_2)	-2.47 (35.566)	-7.15 (70.156)	16.05** (6.754)	40.92 (24.849)			
	Birth	-132.38 (696.007)	32.69 (2,623.703)	-10.28 (208.064)	307.18 (368.713)			
	$\lambda_1 + \lambda_2$	-15.80 (29.615)	63.39 (76.104)	17.23** (6.411)	43.38* (23.680)			
Single Mother Families	Change in total labor income (λ_1)	-17.69 (18.469)	119.46* (64.414)	19.29** (4.131)	12.50 (9.471)			
	Change in total labor income*Birth (λ_2)	-53.92 (112.088)	-78.71 (61.573)	-5.43 (19.666)	-47.80* (28.250)			
	Birth	-1,865.63* (1,115.850)	1,557.20** (735.522)	-579.68 (373.284)	60.98 (407.846)			
	$\lambda_1 + \lambda_2$	-71.60 (102.988)	40.75 (52.744)	13.85 (19.043)	-35.30 (25.204)			
		[3,573]	[3,419]	[3,544]	[3,557]			

Note: Standard errors are presented in parentheses. Number of observations is presented in brackets. Results are weighted. Total Labor Income is expressed in thousands. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

CHAPTER 2

THE EFFECT OF PAID MATERNITY LEAVE ON PARTICIPATION IN GOVERNMENT ASSISTANCE PROGRAMS

2.1 INTRODUCTION

The United States is the only industrialized country without a federal law mandating paid maternity leave (Heymann & McNeill, 2012). The Family and Medical Leave Act (FMLA) enacted in 1993 provides new mothers with up to 12 weeks of unpaid maternity leave but leaves wage replacement to the employer or the state. Five states (Rhode Island, California, New Jersey, New York, and Hawaii) enacted programs that offer paid maternity leave through Temporary Disability Insurance (TDI), and California was the first state to pass paid parental leave legislation in 2004, followed by New Jersey in 2009 (Fass, 2009).

According to the Department of Labor, in 2011, 11 percent of private employees and 17 percent of public employees had access to paid maternity leave (Houser & Vartanian, 2012). When paid maternity leave is not available, and unpaid maternity leave is used, families must find other resources to replace lost income. According to Dube & Kaplan (2002), 11 percent of employees who use unpaid leave rely on public assistance. Research has also shown that government assistance is used to smooth consumption by women who become single mothers due to divorce (Gruber, 2000) or by families who experience health or economic problems (Purtell et al., 2012).

This paper examines how paid and unpaid maternity leave affects participation in three government assistance programs: Temporary Assistance for Needy Families (TANF), Food Stamps, and Special Supplemental Nutrition Program for Women, Infants and Children (WIC). This research uses state-mandated TDI as a measure of paid maternity leave to estimate whether access to paid leave before and after childbirth causes a decrease in reliance on government assistance programs. My hypothesis is that a lack of paid maternity leave (especially for low-wage jobs) leads to increased use of government assistance.

The results show that families with access to TDI are less likely to rely on public assistance when they have a newborn child. The probabilities of participation in Food Stamps and TANF are lower for families who reside in states that mandate TDI compared with families who reside in states without mandated TDI. The benefits received from the TANF program also decrease when the family has a newborn and TDI is mandated. There is no statistically significant difference for WIC. Because TDI is used as a measure

of paid maternity leave, the results imply that paid maternity leave reduces the reliance on government assistance programs.

The paper is organized as follows. Section 2 provides a short overview of paid maternity leave policies and reviews the literature regarding maternity leave. Section 3 describes the data and outlines the research methodology. The results are presented in Section 4. I conclude in Section 5.

2.2 BACKGROUND

2.2.1 OVERVIEW OF PARENTAL LEAVE POLICIES

At the federal level, there are two major laws that address maternity leave. The first law, the Pregnancy Discrimination Act (PDA), enacted in 1978, establishes that pregnancy must be treated as any other temporary disability and that employers cannot discriminate against pregnant employees. The second law, the Family and Medical Leave Act (FMLA), enacted in 1993, provides up to 12 weeks of unpaid maternity leave if the employee has worked for the employer at least 12 months, at least 1,250 hours over the past 12 months, and at a location where the company employs 50 or more employees within 75 miles (U.S. Department of Labor). According to the U.S. Department of Labor,

in 2000, almost 60 percent of private-sector employees were covered under the FMLA, and taking care of a newborn was the second most common reason for using the FMLA.¹ Because the law does not provide any wage replacement, more than 50 percent of the employees who received partial or no pay said it was difficult to find resources to cover their needs during the leave.

At the state level, many states extended the federal FMLA. They have reduced the number of employees required for employer coverage, reduced the number of work hours required to be covered by law, or expanded the family definition (Grant et al., 2005; Arredondo & Mondal, 2010). Even before the FMLA was enacted, five states had implemented TDI. TDI provides employees with paid leave for non-work related injuries. Even though TDI was not created for maternity leave, it offers paid leave for disabilities related to pregnancy, before and after childbirth. The PDA provided the necessary foundation for TDI to become a form of paid maternity leave. The first state to enact TDI was Rhode Island, followed by California, New Jersey, New York, and Hawaii. Table 1 presents a brief summary of the TDI characteristics for each of the five states. TDI varies from state to state, but it provides partial wage replacement for pregnant women and new mothers, serving the same purpose as a paid parental leave policy. The only exception is that it does not apply to and cannot be used by new fathers.

The only states that offer Paid Family Leave are California (starting in 2004) and New Jersey (starting in 2009). The programs in both states are built on TDI, relaxing the requirement of one's own disability to include paid work leave to take care of a family member (Dube & Kaplan, 2002). In California, a new mother can use TDI and afterwards

¹ The most common reason was employee's own health.

extend her paid maternity leave under the Paid Family Leave program (Fass, 2009). The programs are funded by employees through a payroll tax (Appelbaum & Milkman, 2011). The main caveat of the programs is that they do not offer job protection. New parents can receive this benefit under the FMLA, but those who are not covered by the FMLA are left in an “awkward position” (Fass, 2009). They can receive partial wage replacement, but they do not have job security.

2.2.2 LITERATURE REVIEW

Prior research examines the effects of maternity leave legislation in general on women’s labor force participation and wages and on their children’s outcomes. In Canada and Europe, research shows the effect of paid maternity leave, in particular. In the U.S., research shows that the FMLA increases the number of women who return to their prechild jobs after giving birth (Baum, 2003). The expansion of the FMLA leads to higher women's employment (Arredondo & Mondal, 2010), and it increases time on leave (Han, Ruhm & Waldfogel, 2009a). Waldfogel (1999) also shows that the implementation of the FMLA led to an increase in leave-taking, but it did not have an effect on employment and earnings. However, Han and Waldfogel (2003) argue that unpaid parental leave policies have a limited impact, their results depending on variable definition and model specification.

A survey of employers shows that the Paid Family Leave program “has been a non-event for California businesses” (Applebaum & Milkman, 2011). The survey also finds that the employees in low-quality jobs are the ones who benefit the most and that men are taking advantage of paid family leave in order to bond with their children. The Paid Family Leave program is also linked to an increase in the use of maternity leave, especially by mothers with low income (Slater, Ruhm & Waldfogel, 2011). Dube & Kaplan (2002) employ a mathematical exercise using information from the Department of Labor survey and from the Statistical Abstract of California to calculate the savings to the State of California generated by the passage of the Paid Family Leave program. They conclude that the state can save more than \$23 million annually by reducing usage of public assistance. Hanratty & Trzcinski (2009) argue that an increase in paid maternity leave period in Canada causes new mothers to delay their return to work, but it does not affect the mother’s return to work after an extended period. They also provide evidence that benefits are higher for better educated, married women. In Austria, an increase in paid, protected parental leave decreases employment and wages on the short run (Lalive & Zweimuller, 2009).

In addition to the effect of parental leave on mothers' labor outcomes, research investigates the effect of paid parental leave on children’s outcomes such as education and development. In Canada, the increase in paid maternity leave leads to improved cognitive development for children at age four and five (Haeck, 2011), but it shows no change in development for children younger than one year (Baker & Milligan, 2010). Dustmann & Schonberg (2008), using policy reform in Germany, find that the extension of unpaid maternity leave from 18 months to 36 months does not have a significant

impact on children's high school attendance. The extension of paid maternity leave from two to six months does not considerably increase children's labor market outcomes. Studying the relationship between paid and unpaid maternity leave and children's high school dropout rate and wages in Norway, Carneiro et al. (2011) show that a longer period of maternity leave decreases the high school dropout rate by 2.7 percentage points and increases wages by 5 percentage points, with larger effects for low-educated mothers.

Houser & Vartanian (2012) are the only ones to investigate the relationship between paid maternity leave and public assistance. Using the National Longitudinal Survey of Youth, 1997 Panel, they conclude that families who use paid family leave are less likely to rely on public assistance in the year following a child's birth. There are three major differences between their study and this paper. First, Houser & Vartanian use employer-provided paid leave, while this paper uses TDI, which is state-mandated paid leave. Using paid maternity leave provided by employers is more susceptible to selection bias and multicollinearity. Women will prefer to work for an employer who offers paid maternity leave, if they anticipate having a child. Because employer-provided paid leave is often an attribute of better paid jobs, women who have access to paid maternity leave do not qualify for government assistance programs.

Second, Houser & Vartanian study the relationship between government assistance and maternity leave in the year after a child's birth. I do not consider government assistance as a mechanism to supplement income in the year after a child's birth, but instead in the year of a child's birth, as a modality to replace paid maternity leave when it is not available. The advantage of using the simultaneous relationship is that this approach includes public assistance utilized before the child's birth. New

mothers may take leave from their job before they give birth, especially during the last month of pregnancy. According to Laughlin (2011), almost 20 percent of women stop working two months or more before giving birth. Third, the sample used by Houser & Vartanian includes only women ages 30 and under. According to the Centers for Disease Control and Prevention (2012), more than 35 percent of childbirths are to women aged 30 and over. This paper includes women ages 45 and under to account for more childbirths.

2.3 DATA AND METHODOLOGY

2.3.1 DATA

The PSID is a longitudinal survey that started in 1968 with a sample of roughly 5,000 households. Currently, it is the longest nationally representative panel survey. The data were collected annually until 1997 and biennially after 1997. The sample size has continued to increase because the PSID follows the initial families and their split-offs. The PSID collects economic and demographic data at the family and individual level. This paper uses the last six waves from 1999 to 2009. Because government assistance programs were modified in 1996 by welfare reform (the Personal Responsibility and Work Opportunity Reconciliation Act of 1996), I do not use the 1997 wave and any wave

prior to that year. The PSID is suitable for this analysis because it provides high-quality data on household income (Kim & Stafford, 2000), transfer income (Duncan & Hill, 1989), and low-income households (Ratcliffe et al., 2007).

The PSID's main questionnaire offers information about government assistance program participation and benefits received. The survey asks whether any income from TANF was received during the previous year and, if so, how much it was. It also specifies in which months of the previous year the income was received. The benefit amount is available only for the entire year. The same approach is followed for the Food Stamp program. The PSID also asks whether anyone in the household received food through the WIC program during the previous year. This is a polar question, and the value of the benefit is not available. Using these data, I alternately employ for my analysis five dependent variables: three dummy variables that take the value of one if the household received TANF, Food Stamp, or WIC benefits, the value of TANF benefits, and the value of Food Stamp benefits. Dollar amounts are adjusted to eliminate outliers² and are expressed in 2004 dollars.

The PSID also offers data about households' state of residence. This information allows me to create a dummy variable that takes the value of one if the household resides in one of the five states that offers TDI: California, New Jersey, New York, Rhode Island, and Hawaii. I also create a dummy variable that takes the value of one if the family has a childbirth during a given year. The dummy variable for childbirth and the

² I exclude households who received more than \$20,000 in TANF benefits, households who received more than \$20,000 in Food Stamp benefits, and observations with labor income higher than \$500,000.

dummy variable for state of residency represent the main explanatory variables in this paper.

The PSID does not provide data about maternity leave. The advantage of using state-mandated legislation is threefold. First, selection bias is mitigated. Women who anticipate having a child, or are already pregnant, may select jobs that offer paid maternity leave. Second, women who have better paid jobs are more likely to have paid maternity leave offered by their employers (Boushey, 2008). The high correlation between paid maternity leave and mothers' characteristics may cause multicollinearity and bias the results. Third, many low-income mothers who are more likely to rely on government assistance do not have access to vacation days or paid sick days to serve as paid maternity leave (Grant et al., 2005). For these women, state mandated policies are most beneficial. Also, women with higher income may not qualify for means-tested programs, leaving a small sample of women who have paid maternity leave and qualify for government assistance at the same time.

Another issue that can bias the results is the correlation between paid maternity leave provided by employers and TDI. If more women in states that have TDI also have more employer-provided paid maternity leave, the decrease in government assistance reliance may be driven by the employer-provided paid maternity leave and not by TDI. In Appendix 1, I present a short comparison between new mothers who reside in states with TDI and mothers who reside in states without TDI. According to Boushey & Glynn (2012), more educated, older, and white women are more likely to have employer-provided paid maternity leave. In my sample, the difference in education level between mothers in states with TDI and mothers in states without TDI is not statistically

significant: both categories of women have around one year of college. Seventy-seven percent of women in states without TDI are white, compared to 62 percent of women in states with TDI. This difference can only understate the magnitude of the results, because more women in states without TDI are more likely to have paid maternity leave provided by employers. New mothers in states without TDI are younger than their counterparts in states with TDI. Even though this difference is statistically significant, it is not economically significant (almost two years), so it is less likely to cause a problem for my analysis.

The sample consists of households residing in the U.S. with women aged 18 – 45 years at the time of the interview. The age restriction is imposed to limit the sample to women who are more likely to have a child and be affected by TDI legislation. I do not impose any restriction for fathers' ages. By eliminating households that reside outside the U.S., I also exclude families from Puerto Rico. Puerto Rico provides TDI, but it is not included because of its different political status.³ The sample is also restricted to families who have a newborn between 1999 and 2009.

³ Puerto Rico is an unincorporated territory of the U.S., seeking its political independence.

2.3.2 EMPIRICAL MODEL

This paper uses a difference-in-difference (DD) strategy to compare the effects of childbirth on the use of government assistance programs in states with TDI relative to states without TDI. The same DD approach is used by Han et al. (2009a), Slater et al. (2011), Arredondo & Modal (2010), and Han et al. (2009b) to study the effect of parental leave policies on labor market outcomes. The model used for this analysis takes the form:

$$Y_{ist} = \alpha + \lambda_1 \text{Birth}_{ist} + \lambda_2 \text{TDI}_{ist} \times \text{Birth}_{ist} + \lambda_3 \text{TDI}_{ist} + \beta_x X_{ist} + \beta_s S + \beta_t T + \epsilon_{ist}, \quad (1)$$

where i represents the household, t the year, and s the state of residency.

The treatment group consists of households residing in one of the five states that offer TDI and have a newborn during a given year. The control group is represented by families who reside in one of the remaining states and have a newborn. This child is not necessarily the first child. Y_{ist} alternately represents one of the variables: participation in the Food Stamp, TANF, and WIC programs, value of Food Stamp benefits, and value of TANF benefits.⁴

Birth_{ist} is a dummy variable that takes the value of 1 if there is a childbirth in the family. TDI_{ist} is also a dummy variable that takes the value of 1 if the family resides in

⁴ Additional models that use differenced variables (e.g. change in participation in Food Stamps, TANF and WIC) are considered. There are several benefits of using the differenced variables instead of using their levels. First, it removes autocorrelation and makes the variables stationary. Second, it removes initial differences (if any) in government programs among states. The results of these models are not qualitatively different than the results presented in this paper.

Rhode Island, California, New Jersey, New York, or Hawaii. λ_1 represents the effect of childbirths on program participation, and λ_2 represents the effect of childbirth on programs' usage in the presence of paid parental leave. The interaction coefficient is of primary interest representing the differential impact of childbirth on government assistance participation or benefits if there is a state mandated form of paid parental leave. λ_3 captures the initial difference between states with a form of paid parental policy and states with no paid parental leave in the absence of childbirth.

X_{ist} is a vector of independent variables that includes household, head of household, and wife characteristics such as age, education, the number of children, race, marital status, the change in labor income for the husband and wife, the employment status of the head, the employment status of the wife, a dummy variable showing whether the family has a car, and a dummy variable showing whether the family owns (or is buying) a house.

S and T are state fixed effects and year fixed effects. These control for both time invariant state specific characteristics and aggregate time trends. It is important to address the heterogeneity among states because local conditions and state characteristics may affect the legislation regarding government assistance and parental leave policies. Time trends control for changes at national level during the length of the sample. The error term is represented by ε_{ist} . Because the DD methodology may lead to serially correlated standard errors and overstated coefficients' significance (Bertrand et al., 2004), I cluster the standard errors by state.

When analyzing the effect of paid maternity policies on government assistance, the exact month of birth may pose problems. For example, if the mother gives birth in

December, she will use paid or unpaid maternity leave during the next year, and most likely she will rely on government assistance at the beginning of the next year. Because I have biennially data for most of my variables, I am not able to capture the effect of program participation in the next calendar year. For mothers who give birth in December, the only effect that will show in my results is the one of maternity leave used before giving birth.⁵ A similar situation emerges for mothers who give birth in January. My results will not show the effect of using maternity leave before giving birth. This possibility will have a smaller effect on my estimates because if the mother starts using government assistance programs, she will remain on the programs even after giving birth. Both situations would most likely understate the results because in both scenarios the data will show no change in programs' usage when in fact there is a change but at a later date.

The PSID asks about the participation in the Food Stamp program during the previous year and two years ago. This approach offers continuous information with no gaps in data. In order to address the issues mentioned in the previous paragraph, I estimate additional models where the dependent variables are dummies that take the value of one if the household is using Food Stamps in the month when the child is born and in each of the six subsequent months.⁶

I also build dummy variables that take the value of one if the household is using the program for each of the first six months after the child is born (inclusive of previous

⁵ If I eliminate from the sample mothers who give birth in December, the results are qualitatively similar.

⁶ The dependent variable is $Y_{\{t\}}$ for $t = 0$ to 6, where t is the month after the child is born. For example, for a child born in March, a dummy variable accounting for the use of the Food Stamp program two months after the childbirth equals one if the family uses the program in May.

months).⁷ This specification tries to capture the effects of paid maternity leave on the length of program's usage. My hypothesis is that in states that offer TDI as a form of paid maternity leave, new mothers are more likely to use the Food Stamp program for a shorter time period after childbirth. These additional models' specifications remain the same as in Equation 1. For the TANF and the WIC programs, the information is available only for every other year. Therefore, the same analysis is not possible for these two programs.

Another potential issue is the introduction of the Paid Family Leave program in California. Because it potentially extends paid family leave provided by TDI, my estimates do not show exclusively the effect of TDI but also the effects of Paid Family Leave. Therefore, this paper examines the effect of two forms of paid maternity leave policy (not only TDI) on the participation in government assistance programs.

2.3.3 DESCRIPTIVE STATISTICS

Figure 1 presents the evolution of TANF benefits between 1998 and 2008. These data are provided by the United States Department of Agriculture, the Office of Research and Analysis.⁸ They represent the actual expenses incurred by states for the specified period. The average benefit per household received during this period has declined. The

⁷ For example, for a child born in March, the dummy variable "Still on FS after two months" takes the value of one if the family uses the program in March, April, and May.

⁸ Available at <http://www.fns.usda.gov/ora/MENU/Published/snap/snapPartHH.htm>

trend for states that offer TDI is not different than the trend for the remainder of the U.S., but the residents of the five states that offer TDI receive almost 40 percent more in TANF benefits than the residents of the remaining states. For both categories of states, states that have TDI policies and states without TDI policies, the average benefit declines by around 27 percent from 1998 to 2008. At the state level, the TANF programs are designed in accordance with rules imposed at the federal level, but they otherwise differ from state to state. Each state has the responsibility to set income limits, requirements, and maximum benefit levels. For example, the income eligibility limit in California is higher than the limit in most of the other states (National Center for Children in Poverty). The same is true for the maximum benefit.

Figure 2 presents the average monthly Food Stamp benefit per household. These data are also provided by the United States Department of Agriculture, the Office of Research and Analysis. The evolution is again comparable between the two categories of states. In 1998, the benefits received in states with TDI are four percent lower than benefits received in states without TDI. In 2008, there is only a two percent difference. The non-TDI state trend has more inflection points while the trend for the five TDI states is smoother. The benefit amounts are more similar for the Food Stamp program than for TANF because of the program's design. The Food Stamp program's limits and requirements are established at the federal level, and they do not vary by state. Because the Food Stamp program has similar trends in states with and without TDI, the results are less likely to be biased by differences between program's characteristics in the two types of states. The same observation holds for the TANF program.

In Table 2, I divide my sample into states with TDI and states without TDI and show descriptive statistics for key variables. On average, home and car ownerships are six and four percentage points higher in states that do not have TDI. California and New York have very expensive housing markets, with housing price-earnings ratios much higher than the remainder of the U.S. (Max, 2005; Woolsey, 2007; Leonhardt, 2005), especially for the period of my sample before the housing bubble burst. In the subsample of states that offer TDI, most observations come from these two states.

Total labor income is 23 percent lower in states without TDI, resulting in lower total family income. Because the TANF program has different income eligibility criteria for each state, a higher total income in these states does not necessarily mean lower participation in this program. In fact, descriptive statistics show that the use of the TANF program is not statistically different in states with TDI compared with states without TDI. The higher labor income and consequently total income may affect participation in Food Stamp program, since it has the same income limit for all states. Even though total income is higher, participation and amount of Food Stamps received depends on family's net income. Net income is calculated by subtracting different deductions from total income. One important deduction is the "shelter deduction." The shelter deduction allows families to deduct housing expenses that exceed half of the family's income. According to the United States Department of Agriculture, in 2008, more people are using the shelter deduction in New York (84% of people using Food Stamps), New Jersey (76%), California (80%), and Rhode Island (77%) than the national average (71%). The average monthly shelter expense is also higher for these states than the U.S. average. On average, three percentage points fewer people are using Food Stamp program in states with TDI

than in states without TDI. Even though the difference is not large, it is statistically significant at the five percent level. The reverse is true for participation in the WIC program, with a difference of three percentage points. The average food stamp allotment is lower in states with TDI, while the value of TANF benefits is higher. These differences are in accordance with actual data shown in Figure 1 and Figure 2.

Table 3 provides descriptive statistics for dependent variables for households who have a newborn between 1999 and 2009. Columns A, B, and C show the difference between TANF, Food Stamps, and WIC usage for years when households in states without TDI have a new child and years when there is no childbirth in the family. Food Stamps participation goes up by seven percentage points (64 percent) in the year of childbirth. The increase is statistically and economically significant. The same is true for participation in the TANF program. The changes in Food Stamp and TANF benefits show the same trend. Both values go up in years when the family has a newborn. The difference of \$193 in Food Stamp benefits is statistically significant and represents almost half of the average value of Food Stamp benefits for a household who resides in states without TDI. Participation in the WIC program is three times higher in years with a childbirth. These changes emphasize the usage of government assistance in the year of childbirth, possibly as a replacement of paid maternity leave.

Columns D, E, and F show the same differences but for states that provide TDI. For all dependent variables, the descriptive statistics do not show any statistically significant change when there is a childbirth in the family. The only exception is participation in the WIC program, which increases by 22 percentage points. In contrast with states that do not offer TDI and show an increase in usage of government assistance,

the five states that offer TDI do not provide any evidence for a differential use of government assistance when there is a childbirth in the family. This suggests that the availability of a form of paid maternity leave decreases the need for social welfare. Because some of the states fund the TDI programs through employees' contributions, this form of paid maternity leave might help the families and, at the same time, represent a source of savings for the states' budgets.

2.4 RESULTS

Table 4 presents the main results for the five dependent variables. Because the focus of the paper is the differential effects of childbirth on participation in government assistance programs in states with or without a form of paid maternity leave, I report only the coefficients of interest, λ_1 and λ_2 . The coefficients show there is no statistically significant increase in use of Food Stamp benefits in states without TDI. The differential effect of giving birth for families who reside in states with TDI compared with families who reside in states without TDI suggests that the effect of giving birth on Food Stamps usage is lower for households who have access to TDI as a form of paid maternity leave. However, the estimate is not statistically significant. Adding λ_1 and λ_2 together, one can find the net effect of giving birth on change in Food Stamp benefits for families in states

with TDI. This estimate also shows that there is no significant increase in the value of Food Stamp benefits for residents of the five states with mandated TDI.

When the value of TANF benefits is the dependent variable, the estimate suggests that families who don't have state-mandated TDI and have a new child receive \$56 more in TANF benefits. The coefficient for the interaction term is statistically significant at the five percent level. The negative sign implies that households in California, New Jersey, New York, Hawaii, and Rhode Island do not rely as much on the TANF program as households in the remaining states when they have a childbirth in the family. The results indicate that having access to TDI helps families with new children so that they do not rely on public assistance and do not increase usage of TANF benefits. The net effect of giving birth on TANF benefits received by households in the five states is negative, showing that even though families in these states have a new child, they continue to reduce reliance on government assistance.

Column 3 presents coefficients for the model that has Food Stamps participation as the dependent variable. The results are OLS estimates, but logit models generate qualitatively similar results. A childbirth in the family increases participation in the Food Stamp program by four percentage points in states without mandated paid maternity leave as proxied by TDI. This is a significant increase considering that the overall participation in the program is on average 12 percent. The estimate for the interaction term implies that the effect of childbirth on Food Stamp program participation is different in states with TDI. The estimated coefficient of three percentage points is statistically significant at the five percent level. The difference between Food Stamps participation in states with and without TDI is also economically significant. The increase in Food Stamps participation

is 75 percent lower in states with TDI compared with states without TDI. The net effect of giving birth on program participation in states with TDI is one percentage point.

When participation in TANF is considered, the results again suggest that the use of government assistance is lower in states that mandate TDI. State-mandated TDI reduces the reliance on the program as shown by the interaction term that is statistically significant and has a negative sign. If childbirth determines a two percentage point increase in participation in the absence of TDI, childbirth determines lower participation rates in states that mandate TDI. Furthermore, families who can benefit of TDI reduce participation in TANF by one percentage point. The estimate for the net effect is statistically significant.

The results for participation in the WIC program, presented in Column 5, show no difference between states that mandate TDI and states that do not mandate TDI. The participation rate increases by 22 percentage points when the family has a new child in states without TDI. The WIC program is designed for low-income pregnant or breastfeeding women and for women with young children (up to five years). Because it specifically targets families around childbirth time, the effect of giving birth on participation rates is expected to be high. The participation rate increases for families residing in states with TDI too, by 20 percentage points.

TDI is available only to working mothers. Therefore, I estimate the same models on a sample including only families where the mother is working. The results are similar to the results presented in Table 4. Because this additional criterion of sample selection (working mother) reduces the number of observations, and because the results are not qualitatively different, I decided to present the results for the entire sample.

Table 5 presents the probability of using Food Stamps during the month of childbirth and in the subsequent six months after that (exclusive of previous months). The results show that families residing in states that mandate TDI have a lower probability of using Food Stamps in the month when they have a new child. The difference of nine percentage points suggests that TDI may be used as paid maternity leave and may help new parents avoid public assistance. For the first or second month after childbirth, the difference between states with mandated TDI and states without TDI persists. In the third or fourth month after the childbirth, however, there is no difference between the two types of states. Most of the observations in the subsample of families who reside in states with TDI are from New York and California. New York offers 26 weeks of TDI benefits that can be used any time during pregnancy or after the child is born, and California offers six weeks of TDI benefits and an additional 6 weeks of Paid Parental Leave. This suggests that after three months in California and six months in New York, paid time off from work provided by TDI and/or Paid Parental Leave becomes unavailable. This may be one of the reasons the difference between states with and without TDI extends up to the third month. Starting with the fifth month, the results show that families who have a newborn and reside in states with TDI increase their reliance on the Food Stamp program. During the fifth or sixth month after the child is born, their participation in the program is six and five percentage points higher compared with families in states without mandated TDI. This suggests that TDI can help new parents postpone the use of government assistance programs.

Table 6 shows the probability of remaining on Food Stamps for each of the six months after the child is born (inclusive of previous months). These models try to study

the effect of TDI on the length of participation in the Food Stamp program. New parents who can use TDI could stop using the Food Stamp program sooner compared with new parents who do not have access to TDI. The results suggest that TDI may help new parents get out of the Food Stamp program sooner. For example, the probability of continuing to receive food stamps after two months is seven percentage points lower in states with TDI. Starting with the third month after the child is born, there is no difference between states with TDI and states without TDI. The results are similar to the results presented in Table 5.

Table 7 presents the main results for the main dependent variables but only using a subsample of married couples. Paid or unpaid maternity leave should have a larger impact on single parents than on married couples. Married couples have the possibility of relying on a different stream of income (e.g. father's income) when there is no type of paid maternity leave, while single mothers do not have this option. The estimates in the first column show that there is no difference between states with mandated TDI and states without TDI. The interaction coefficient is not statistically significant. When only married couples are considered and there is a childbirth in the family, the value of Food Stamp benefits decreases for households who reside in both types of states. This suggests that families with newborns do not rely on Food Stamps, but, on the contrary, they reduce reliance on the program. The \$52 coefficient represents 13 percent of the average value for households in states without TDI. The net effect of \$52 is statistically significant and shows that married couples who can use TDI do not rely on the TANF program and can use it less when there is a new child in the family.

The results for WIC participation show that having a child increases the use of the program in both types of states. Because this program is designed for families with young children, the increase in participation related to birth is expected. The remaining estimates are not statistically significant. This suggests that there is no difference in use of government assistance programs between families with newborns in states with or without TDI. It also suggests that having a baby does not increase participation in government assistance programs for married couples.

Table 8 summarizes estimates for the single-woman household sample. The results show a higher reliance on government assistance for these families. The amount of Food Stamp benefits is also higher because single mother families have lower income. According to U.S. Department of Agriculture (2009), in 2008, 31 percent of families participating in the Food Stamp program were headed by single parents while only 14 percent were married couples with children. Column 1 shows that single mothers who don't live in states with TDI receive almost \$300 more in Food Stamp benefits when they give birth. The negative and statistically significant interaction coefficient suggests that TDI may be used as a form of paid maternity leave and may help these families avoid relying on public assistance. Mothers who can use TDI do not rely on the Food Stamp program, as shown by the insignificant net effect. Similar results are obtained for the TANF program. The interaction coefficient implies that single new mothers who can take advantage of TDI respond differently than new mothers in states that do not mandate TDI, and the net effect suggests that single new mothers with access to TDI get off the TANF program.

The changes in participation rates in the Food Stamp, TANF, and WIC programs are also different for new mothers depending on their state of residence. While childbirth increases the Food Stamps participation rate in states without TDI by 13 percentage points, it does not have a significant effect in states with TDI. The difference of 11 percentage points is statistically significant. The participation rate in TANF is also lower for mothers who live in one of the five states that mandate TDI. Single mothers who do not have access to state mandated TDI increase the use of the WIC program by 52 percentage points, and their counterparts who reside in states with mandated TDI experience an increase of 45 percentage points.

The results for married couples or single-woman households are based on small size samples. Out of the 280 observations that live in states that mandate TDI and have a child, 201 are married couples and 79 are single-woman households. Therefore, the findings are just suggestive and further research is needed. Paid maternity leave may be more beneficial and important for single mothers than for married couples.

2.5 CONCLUSION

This paper studies the effect of TDI as a form of paid maternity leave on the usage of three types of government assistance programs: Food Stamps, TANF, and WIC. Because no paid maternity leave is mandated at the federal level, I exploit differences

among states to examine this effect. Currently in the U.S., there are two states that offer paid parental leave: California and New Jersey. Five states (California, New York, New Jersey, Rhode Island, and Miami) mandate TDI. TDI can be used by pregnant or new mothers as a form of paid maternity leave. All other states do not mandate any form of paid maternity leave, leaving paid leave decisions to employers. Paid maternity leave provided by the employer is more likely to be correlated with education, age, and race. Therefore, exogenous state level policies provide a useful tool to study the effect of paid maternity leave on the use of government assistance.

Families who use unpaid maternity leave must find other financial resources to replace lost income. One of them can be government assistance. This paper analyzes whether any form of state-mandated paid maternity leave would help new parents avoid using public assistance. I exploit state mandated TDI policies and use a difference-in-difference strategy to compare the usage of government assistance programs by families who reside in states with TDI with families who reside in states without TDI.

The results provide evidence that paid maternity leave as proxied by TDI helps new parents reduce reliance on government assistance before or after childbirth. Even though the Food Stamps participation rate increases when there is childbirth in the family, the increase is smaller in states that mandate TDI. The difference is statistically significant and economically noteworthy. The participation rate is 75 percent lower in states that mandate TDI. While there is no evidence that childbirth increases participation rate in states without TDI for which the net effect is not statistically different than zero, TANF participation rate decreases for households in states with TDI by one percentage point. Considering that average participation rate for families who do not have newborns

in states with TDI is two percent, a decrease of one percentage point represents a reduction by half. The results for TANF benefits are similar, showing a reduction in program reliance. The only program for which TDI does not make a difference is WIC. Additional models suggest that TDI makes a difference in the use of public assistance in the first three months after childbirth. The length of the difference can be explained by TDI's design; specifically, TDI can be used for a limited time after childbirth.

The results for married couples and single mothers show that family composition makes a difference in government assistance programs' participation when families have a new child. For married couples, the estimates suggest that there is no difference between families who reside in states without TDI and families who reside in states with mandated TDI. On the other side, the results for single-mother households show that these families can benefit more from TDI. For example, in states without TDI, the increase in Food Stamp benefits is positive and statistically significant; while in states with TDI, the net effect is not statistically different than zero. Moreover, the increase in Food Stamp program participation is 11 percentage points lower in states that mandate TDI. These results must be approached with caution because of small-size samples.

REFERENCES

- Appelbaum, Eileen and Ruth Milkman. 2011. "Paid Family Leave Pays Off in California." *Harvard Business Review*. Available at: <http://blogs.hbr.org/research/2011/01/paid-family-leave-pays-off-in.html>.
- Arredondo, Ana Espinola and Sunita Mondal. 2010. "The Effect of Parental Leave on Female Employment: Evidence from State Policies." Working Papers Series WP 2008-15, School of Economic Sciences, Washington State University.
- Baker, Michael and Kevin Milligan. 2010. "Evidence from Maternity Leave Expansions of the Impact of Maternal Care on Early Child Development." *Journal of Human Resources* 45 (1): 1-32.
- Baum, Charles. 2003. "The Effects of Maternity Leave Legislation on Mothers' Labor Supply after Childbirth." *Southern Economic Journal* 69 (4): 772-799.
- Bertrand, Marianne et al. 2004. "How much Should We Trust Differences in Differences Estimates?" *The Quarterly Journal of Economics* 119 (1): 249-275.
- Boushey, Heather. 2008. "Family Friendly Policies: Helping Mothers Make Ends Meet." *Review of Social Economy* 66 (1): 51-70.
- Boushey, Heather and Sarah Jane Glynn. 2012. "The Effects of Paid Family and Medical Leave on Employment Stability and Economic Security." Center for American Progress: Washington, DC.
- Carneiro, Pedro, Katrine Løken, and Kjell Salvanes. 2011. "A Flying Start? Maternity Leave Benefits and Long Run Outcomes of Children." Discussion Paper No. 5793, IZA. (Available at: <http://ssrn.com/abstract=1872741>).
- Centers for Disease Control and Prevention. 2012. *Three Decades of Twin Births in the United States, 1980–2009*. NCHS Data Brief No 80. (Available at: <http://www.cdc.gov/nchs/data/databriefs/db80.pdf>).
- Dube, Arindrajit and Ethan Kaplan. 2002. "Paid Family Leave in California: An Analysis of Costs and Benefits." Retrieved April 21, 2012 (<http://www.paidfamilyleave.org/pdf/dube.pdf>).

- Duncan, Greg J. and Daniel H. Hill. 1989. "Assessing the Quality of Household Panel Data: The Case of the Panel Study of Income Dynamics." *Journal of Business & Economic Statistics* 7 (4): 441-452.
- Dustmann, Christian and Uta Schönberg. 2008. "The Effect of Expansions in Maternity Leave Coverage on Children's Long-Term Outcomes." Discussion Paper No. 3605, IZA. (Available at: SSRN: <http://ssrn.com/abstract=1214910>).
- Fass, Sarah. 2009. "Paid Leave in the States. A Critical Support for Low-Wage Workers and Their Families." The National Center for Children in Poverty, Mailman School of Public Health at Columbia University.
- Grant, Jodi et al. 2005. "Expecting Better: A State-by-State Analysis of Parental Leave Programs." Washington DC: National Partnership for Women and Families. Retrieved May 29, 2011 (<http://www.nationalpartnership.org/site/DocServer/ParentalLeaveReportMay05.pdf?docID=1052>).
- Gruber, Jonathan. 2000. "Cash Welfare as a Consumption Smoothing Mechanism for Divorced Mothers." *Journal of Public Economics* 75: 157-182.
- Han, Wen-Jui and Jane Waldfogel. 2003. "Parental Leave: The Impact of Recent Legislation on Parents' Leave Taking." *Demography* 40(1): 191-200.
- Han, Wen-Jui, Christopher J. Ruhm, and Jane Waldfogel. 2009a. "Parental Leave Policies and Parents' Employment and Leave-Taking." *Journal of Policy Analysis and Management* 28 (1): 29-54.
- Han, Wen-Jui, Christopher J. Ruhm, Jane Waldfogel, and Elizabeth Washbrook. 2009b. "Public Policies and Women's Employment after Childbearing." Working Paper No. 14660, NBER, Chicago, IL.
- Haeck, Catherine. 2011. "Increased Paid Maternity Leave and Children's Development Measured at Age Four to Five: An Empirical Analysis." Available at SSRN: <http://ssrn.com/abstract=1886189>.
- Hanratty, Maria and Eileen Trzcinski. 2009. "Who Benefits from Paid Family Leave? Impact of Expansions in Canadian Paid Family Leave on Maternal Employment and Transfer Income." *Journal of Population Economics* 22 (3): 693-711.
- Heymann, Jody and Kristen McNeill. 2012. "Families at Work: What We Know About Conditions Globally." Prepared for the United Nations Department of Economic and Social Affairs, Division for Social Policy and Development, United Nations Expert Group Meeting, May 15-17, 2012, New York, NY.

- Houser, Linda and Thomas P. Vartanian. 2012. "Pay Matters: The Positive Economic Impacts of Paid Family Leave for Families, Businesses and the Public." Center for Women at Work, Rutgers, New Brunswick, NJ.
- Kim, Seong-Yong and Frank Stafford. 2000. "The Quality of PSID Income Data in the 1990's and Beyond." Technical Series Paper No. 00-03, Institute for Social Research, University of Michigan.
- Lalive, Rafael and Josef Zweimüller. 2009. "How Does Parental Leave Affect Fertility and Return to Work? Evidence from Two Natural Experiments." *The Quarterly Journal of Economics* 124 (3): 1363-1402.
- Leonhardt, David. 2005. "Is Your House Overvalued?" *The New York Times*, May 28. Retrieved January 21, 2012 (<http://www.nytimes.com/2005/05/28/business/28home.html?pagewanted=all>).
- Laughlin, Lynda. 2011. *Maternity Leave and Employment Patterns of First-Time Mothers: 1961 - 2008*. Household Economic Studies, U.S. Census Bureau.
- Max, Sarah. 2005. "Why Rent Matters." *CNN Money*, April 7. Retrieved January 21, 2012 (http://money.cnn.com/2005/04/05/real_estate/rentprices/).
- National Center for Children in Poverty. (http://www.nccp.org/profiles/index_36.html)
- Purtell, Kelly M., Elizabeth T. Gershoff, and Lawrence Aber. 2012. "Low Income Families' Utilization of the Federal "Safety Net": Individual and State-Level Predictors of TANF and Food Stamp Receipt." *Children and Youth Services Review* 34: 713-724.
- Ratcliffe, Caroline et al. 2007. "Assessing Asset Data on Low-Income Households: Current Availability and Options for Improvement." *Poor Finances: Assets and Low-Income Households Series*, Urban Institute, Washington DC.
- Slater, Maya Rossin, Christopher J. Ruhm, and Jane Waldfogel. 2011. "The Effects of California's Paid Family Leave Program on Mothers' Leave-Taking and Subsequent Labor Market Outcomes." Working Paper No. 17715, NBER, Chicago, IL.
- U.S. Department of Agriculture. Food and Nutrition Service. 2009. *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2008*. Alexandria, VA: Office of Research and Analysis.
- Waldfogel, Jane. 1999. "The Impact of the Family and Medical Leave Act." *Journal of Policy Analysis and Management* 18(2): 281-302.

Woolsey, Matt. 2007. "America's Most Overpriced Real Estate Markets." *Forbes*, May 4. Retrieved January 21, 2012 (http://www.forbes.com/2007/05/03/market-housing-overpriced-forbeslife-cx_mw_0504overpriced.html).

TABLES

Table 1: Overview of TDI state policies

State	Enacted in	Period	Benefits	Funded by	Contribution rate
California ¹	1946	up to four weeks before the expected delivery date and up to six weeks after the actual delivery	55% of average weekly; weekly benefits range from \$50 to a maximum of \$1011	employees / optionally by employers	1% up to \$955.85
New York ²	1949	up to 26 weeks of benefits / disability can occur at any time during pregnancy	50% of her average weekly wages; up to \$170 per week	employer or jointly by the employer and the employee	
New Jersey ³	1948	up to four weeks before the expected delivery date and up to six weeks after the actual delivery date	two-thirds of average weekly wage up to \$572	employer and employee	for employee the max disability insurance deduction is \$60.60; for employer rates vary
Rhode Island ⁴	1942	up to four weeks before the expected delivery date and up to six weeks after the actual delivery	4.62% of the wages paid in the highest quarter of your Base Period; effective 7/1/12, \$69.00 is the minimum and \$736.00 is the maximum benefit rate; this does not include dependency allowance	employees	1.2% up to \$720 per year
Hawaii ⁵	1969	up to 26 weeks	58% of the average weekly wage up to \$524 weekly	employer; the employer and employee	

¹Info from State of California Employment Development Department <http://www.edd.ca.gov/disability/>

²Info from <http://ww3.nysif.com/DisabilityBenefits.aspx>; https://www.nationalbenefitlife.com/public/nationalbenefitlife/sdi_dbf_faq.html

³Info from <http://lwd.dol.state.nj.us/labor>

⁴Info from <http://www.dlt.state.ri.us/>

⁵Info from <http://hawaii.gov/labor/dcd>

Table 2: Descriptive statistics for entire sample

	States without TDI	States with TDI	Difference
	A	B	B - A
Age of head	32.38 (0.190)	34.54 (0.252)	2.16** (0.316)
Age of wife ¹	31.32 (0.129)	33.68 (0.233)	2.36** (0.266)
Children	1.66 (0.023)	1.82 (0.047)	0.16** (0.052)
Own house	0.61 (0.008)	0.54 (0.017)	-0.06** (0.019)
Own car	0.93 (0.005)	0.89 (0.011)	-0.04** (0.012)
Married	0.71 (0.008)	0.78 (0.015)	0.07** (0.017)
Total labor income	58,966.70 (921.786)	77,035.34 (2,521.122)	18,068.64** (2,684.352)
Participate in Food Stamp program	0.13 (0.006)	0.10 (0.010)	-0.03** (0.012)
Participate in TANF program	0.02 (0.002)	0.02 (0.005)	0.004 (0.005)
Participate in WIC program	0.17 (0.006)	0.19 (0.013)	0.03* (0.014)
Value of food stamps received ²	407.72 (22.786)	328.44 (39.290)	-79.28* (45.419)
Value of TANF benefits received ³	73.00 (10.879)	139.01 (32.304)	66.01* (34.087)
No. of Obs.	5,423	1,020	

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. ¹Only married couples are included in the descriptive statistics. ²The descriptive statistics are based on 5,368 observations for states without TDI and 1,010 for states with TDI. ³Descriptive statistics are based on 5,416 observations for states without TDI and 1,019 for states with TDI. To test the difference of two means, I use the T-test.

Table 3: Descriptive statistics by TDI and childbirth

	States without TDI			States with TDI			DD F - C
	Birth=0 A	Birth=1 B	Difference C = B - A	Birth=0 D	Birth=1 E	Difference F = E - F	
Participate in Food Stamp program	0.11 (0.006) [3,852]	0.18 (0.012) [1,571]	0.07** (0.013)	0.09 (0.012) [740]	0.12 (0.021) [280]	0.03 (0.024)	-0.04 (0.027)
Participate in TANF program	0.01 (0.002) [3,852]	0.04 (0.007) [1,571]	0.03** (0.007)	0.02 (0.005) [740]	0.02 (0.008) [280]	0.001 (0.010)	-0.03** (0.012)
Value of food stamps received	357.82 (25.915) [3,820]	550.68 (47.109) [1,548]	192.86** (53.767)	302.73 (45.391) [733]	406.21 (78.577) [277]	103.49 (90.745)	-89.37 (105.478)
Value of TANF benefits received	44.58 (8.818) [3,850]	154.05 (33.202) [1,566]	109.47** (34.353)	142.00 (39.705) [739]	129.97 (49.929) [280]	-12.03 (63.791)	-121.50 (72.453)
Participate in WIC program	0.10 (0.006) [3,852]	0.35 (0.015) [1,571]	0.25** (0.016)	0.14 (0.013) [740]	0.36 (0.032) [280]	0.22** (0.034)	-0.03 (0.038)

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. Number of observations are presented in brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 4: Difference-in-Difference Estimates for the Entire Sample

Dependent Variable	Food Stamp Benefits	TANF Benefits	Participation in Food Stamp Program	Participation in TANF Program	Participation in WIC Program
Birth (λ_1)	46.91 (35.660)	55.57 (38.706)	0.04** (0.010)	0.02 (0.007)	0.22** (0.022)
TDI*Birth (λ_2)	-33.80 (42.277)	-106.12** (34.672)	-0.03** (0.012)	-0.03** (0.007)	-0.02 (0.031)
$\lambda_1 + \lambda_2$	13.10 (21.229)	-50.55** (22.046)	0.01* (0.007)	-0.01* (0.002)	0.20** (0.022)
No of Obs.	6,378	6,435	6,443	6,443	6,443

Note: Standard errors are presented in parentheses. Results are weighted. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

Table 5: Participation in the Food Stamp Program Estimates

Independent Var.	States with TDI
Dependent Var.	
Participation in the month of childbirth	-0.09** (0.017) [1,780]
Participation in month 1 after childbirth	-0.08** (0.017) [1,741]
Participation in month 2 after childbirth	-0.04** (0.017) [1,764]
Participation in month 3 after childbirth	0.001 (0.017) [1,778]
Participation in month 4 after childbirth	0.01 (0.016) [1,772]
Participation in month 5 after childbirth	0.06** (0.017) [1,802]
Participation in month 6 after childbirth	0.05** (0.020) [1,802]

Note: Coefficients are estimated by logit models. Marginal effects are presented. Standard errors are presented in parentheses. Numbers of observations are presented in brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 6: Participation in the Food Stamp Program Estimates

Independent Var.	States with TDI
Dependent Var.	
Still on FS after 1 month	-0.09** (0.018) [1,739]
Still on FS after 2 months	-0.07** (0.019) [1,739]
Still on FS after 3 months	-0.005 (0.023) [1,739]
Still on FS after 4 months	-0.002 (0.022) [1,739]
Still on FS after 5 months	0.04 (0.025) [1,739]
Still on FS after 6 months	0.04 (0.024) [1,739]

Note: Coefficients are estimated by logit models. Marginal effects are presented. Standard errors are presented in parentheses. Numbers of observations are presented in brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 7: Difference-in-Difference Estimates for Married Couples

Dependent Variable	Food Stamp Benefits	TANF Benefits	Participation in Food Stamp Program	Participation in TANF Program	Participation in WIC Program
Birth (λ_1)	-52.17** (24.818)	5.42 (17.147)	0.00 (0.007)	0.00 (0.003)	0.10** (0.018)
TDI*Birth (λ_2)	0.45 (32.505)	18.43 (30.445)	0.00 (0.007)	0.00 (0.003)	0.01 (0.038)
$\lambda_1 + \lambda_2$	-51.72** (15.135)	23.85 (18.732)	-0.01 (0.005)	0.00 (0.001)	0.11** (0.030)
No of Obs.	4,236	4,256	4,259	4,259	4,259

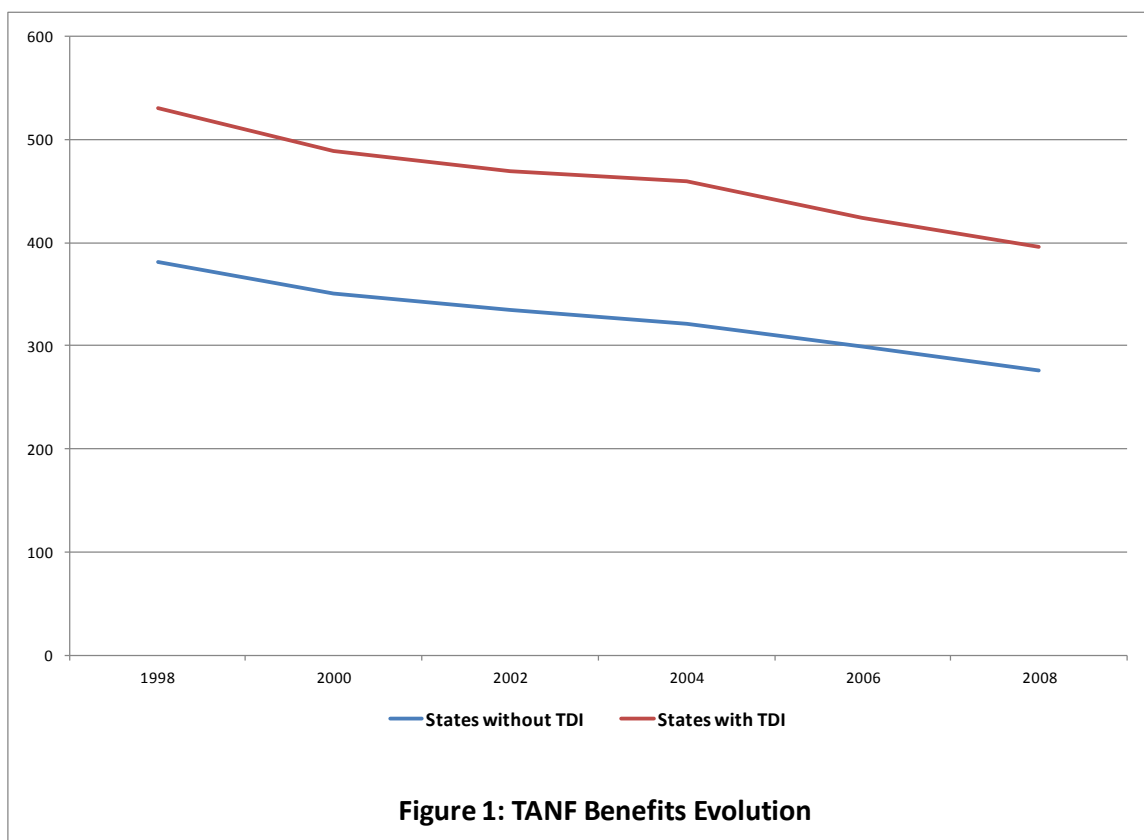
Note: Standard errors are presented in parentheses. Results are weighted. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

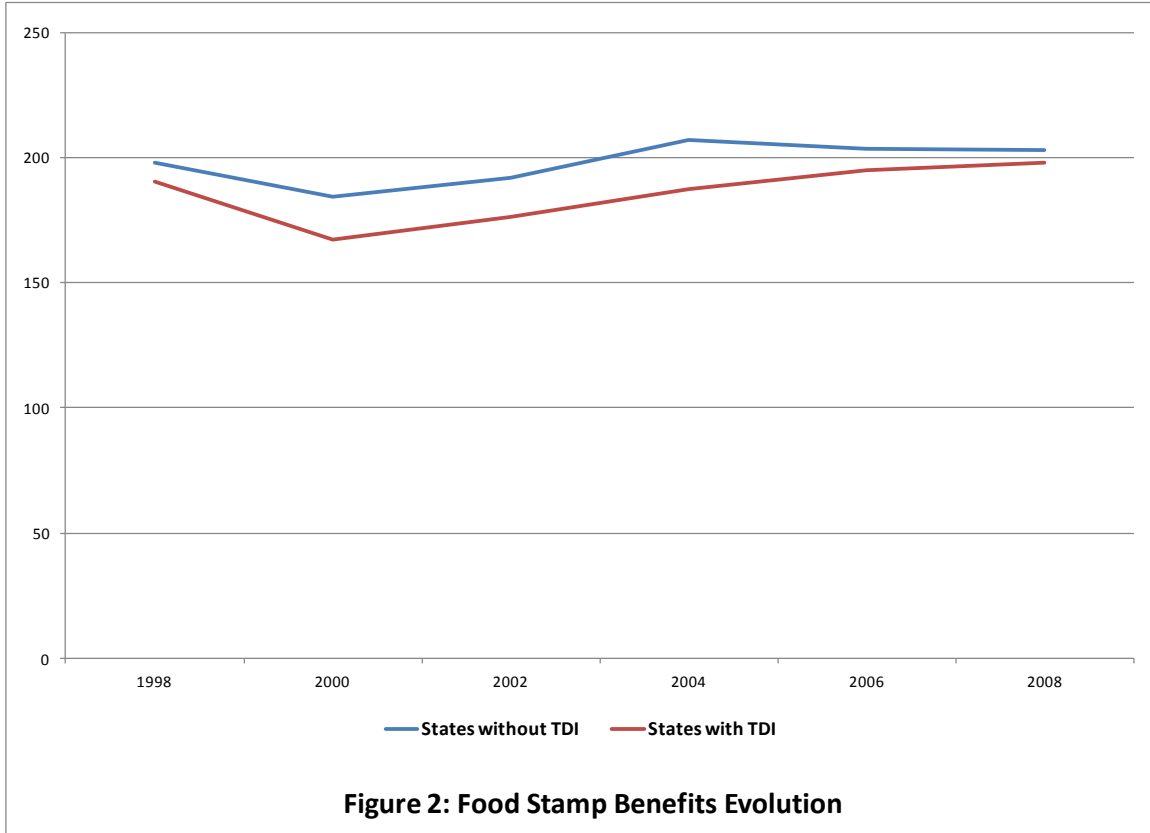
Table 8: Difference-in-Difference Estimates for Single Mother Families

Dependent Variable	Participation in Food Stamp Program		Participation in TANF Program		Participation in WIC Program	
	Food Stamp Benefits	TANF Benefits	Stamp Program	Program	Program	Program
Birth (λ_1)	291.98** (137.241)	199.45 (161.063)	0.13** (0.026)	0.08** (0.031)	0.52** (0.029)	
TDI*Birth (λ_2)	-390.16** (170.572)	-562.03** (132.886)	-0.11** (0.032)	-0.12** (0.028)	-0.07 (0.078)	
$\lambda_1 + \lambda_2$	-98.18375 (94.594)	-362.57** (159.101)	0.02 (0.020)	-0.04** (0.014)	0.45** (0.074)	
No of Obs.	2,142	2,179	2,184	2,184	2,184	

Note: Standard errors are presented in parentheses. Results are weighted. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. The Wald test is performed to test for $\lambda_1 + \lambda_2$ significance.

FIGURES





APPENDIX

Appendix 1: Differences between mothers in states without TDI and mothers in states with TDI

	States without TDI	States with TDI	Difference
	A	B	A - B
Mothers' age	29.06 (0.196)	30.74 (0.401)	-1.68** (0.446)
Mothers' education	13.24 (0.086)	13.11 (0.198)	0.13 (0.216)
Mothers' race (white)	0.77 (0.013)	0.62 (0.033)	0.14** (0.035)
No. of Obs.	1,571	280	

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

CHAPTER 3

THE EFFECT OF BEHAVIOR PROBLEMS ON UNSECURED DEBT USE

3.1 INTRODUCTION

The Great Recession has revived the attention given to household debt and credit. Relaxed lending standards, new types of adjustable-rate mortgages, and low interest rates are factors that led to the financial crisis (Mian & Sufi, 2010; Verick & Islam, 2010; Taylor, 2009). As a consequence, the level of mortgages as part of household debt has been one of the most discussed issues. At the same time, credit card debt and borrowing behavior in general have made the headlines. The worry that “if we end up overleveraging ourselves again, it’s going to be the same thing repeated in a few years” (White, 2011) is more relevant than ever. According to the Federal Reserve Bank of New

York (2013), hereinafter FRBNY, the value of credit card debt reached \$866 billion at the end of 2008, representing 7 percent of total household debt. From 2000 to 2008, credit card debt increased by 50 percent, and the number of credit card accounts increased by 14 percent (FRBNY, 2013). Even though these numbers are not trivial by themselves, they become even more significant when the level of financial obligations (mortgage and credit card payments) to total income is considered. According to Norris (2012), in 2007, this ratio reached 14 percent, the highest level in the last decades.

Credit card debt among young adults has also received attention in recent years. As they start to become financially independent, young adults are more at risk of poor money-management decisions. In their transition to adulthood, young people are more inclined to risky behavior (Nelson & Barry, 2005). Previous research shows that young adults borrow more and repay their credit card debt more slowly (Jiang & Dunn, 2013), and college students use credit cards to buy things they cannot afford and pay only the minimum payment (Schor, 1998 in Pirog & Roberts, 2007). Sallie Mae (2009) reports that 82 percent of students do not pay off their credit card each month and incur finance charges. Another cause of concern for young adults is borrowing money to pursue higher education. While credit card debt experienced a decline during the Great Recession, student loans continued to rise. According to FRBNY (2013), from 2003 to 2011, student loans increased by 260 percent, and this number continues to grow. Student loans combined with credit card debt can represent a serious burden for younger generations later in their lives.

The consequences of high indebtedness for young adults are multiple. First, credit card debt has been linked to bankruptcy (McMurtrie, 1999). In 2010, more than 15

percent of bankruptcy filings were by those aged 25-34 (Institute for Financial Literacy, 2010). Second, students with higher debt are more likely to work additional hours to pay their credit cards, have lower grades, and drop out from college (McMurtrie, 1999). Manning and the Consumer Federation of America (1999) found that credit cards lead to higher levels of stress, anxiety and suicide (Mannix, 1999). Norvilitis et al. (2006) suggest that college students with higher levels of credit card debt are more likely to report greater stress and decreased financial well-being.

Considering the multiple consequences credit card and student debt can have on young adults immediately or later in their lives, it is important to determine the factors that lead to high indebtedness. Even though most research focuses on economic causes, non-economic factors such as personality and behavior cannot be ignored. On the one hand, personality is the unique combination of characteristics of each individual, and these characteristics will determine his actions (Kamphaus et al., 2005; Kleinmuntz, 1967). Larsen & Buss (2001) define personality as a collection of traits that do not substantially change over time and that determine how individuals react. On the other hand, behavior is what people do, “the range of human responses that are observable with the naked eye” (Martin, 1988; Kamphaus et al., 2005). Leikas et al. (2012) consider that behavior is “the topic of interest...something that really matters.” Examining personality and behavior together, Back et al. (2009) study the effect of personality on actual behavior and conclude that personality can predict how people react. Roberts (2006) designs a framework that starts with genes, personality traits, motives and values, abilities, and memories and ends with observed behavior. Using backward induction, he

uses this framework to determine personality traits (cited in Almlund et al., 2011). This also suggests that personality is one of the factors that affect behavior.

This paper is the first to examine the effect of behavior problems on credit card debt and student debt among young adults. The review of literature that studies the effect of personality on credit card use is presented in Section 2. The reason this paper considers behavior problems instead of personality is that behavior is easier to observe. Parents can monitor how their children act and determine whether they manifest behavior problems such as withdrawn or aggressive behaviors. If behavior problems are related to high level of indebtedness, parents can more carefully advise their children about the risk of using unsecured debt. For example, Credit Card Act of 2009 requires anyone under the age of 21 to have a cosigner (parent or guardian) or to show proof of income in order to qualify for a credit card. Parents who have children with behavior problems can take the necessary cautions before cosigning and avoid enabling access to unsecured credit.

The results show that behavior problems, in general, do not predict credit card ownership, intensive credit card use, student loans, and high level of indebtedness. Internalizing behavior problems are associated with a lower probability of having carryover balances and a drop in unsecured debt. Higher behavior problem scores are linked to a decrease in the probability of having student loans and a drop in the student loan balance. The results also show that families' use of unsecured debt influences young adults' financial behavior. When the family has unsecured debt, the likelihood that the child uses credit cards and the balances on these credit cards are higher.

The paper is organized as follows: Section 2 reviews the literature regarding the effect of personality and behavior on the use of debt; Section 3 describes the data sets and

the methodology used for the analysis and presents the descriptive statistics of the sample; Section 4 presents the results; and Section 5 concludes the paper.

3.2 LITERATURE REVIEW

The literature has mainly studied indebtedness from an economic perspective, considering life-cycle household determinants and market conditions (e.g., Dynan & Kohn, 2007; Johnson & Li, 2007). Even though factors such as interest rates, access to credit, family income, and consumption are important, personality and behavior can also play a role in credit card use. Considering economic, social, personality and behavioral components together, one can get a better understanding of debt financing decisions.

Research suggests that some personality characteristics may determine borrowing behavior, but a consensus has not been reached. For example, Nyhus & Webley (2001) show that emotional stability, introversion, and agreeableness reduce debt, while autonomy increases the likelihood of having debt. For this analysis, they use a sample of 1,266 persons interviewed by the CentER Saving Survey (a Dutch data set) and a hierarchical multiple regression. The strategy is to gradually introduce income, demographic, and personality variables into the models and to observe the explained variance in saving or borrowing behavior. On the other hand, using a sample of 254 students from private universities in New Jersey and Texas, Pirog & Roberts (2007)

suggest that students who are introverted are more likely to misuse credit cards, and they cite three reasons: “credit cards may be a tool to create excitement, ... [and] to achieve a higher social profile, ... and introverted students may be more prone to use the Internet.”

To study some of the factors that influence credit card debt, Norvilitis et al. (2003) use a sample of 227 college students in the northeastern United States. Students are interviewed about the number of credit cards, financial well-being, attitudes toward money and debt, and their personality. The study fails to demonstrate that external locus of control, impulsiveness, and positive attitudes toward debt will lead to higher credit card debt. Nevertheless, the authors point out some of the study’s limitations that can influence the results such as missing answers and personality and attitude measures. Using an original data set involving 2,000 households in Italy, Cosma & Pattarin (2012) find that fatalistic individuals (with an external locus of control) are less likely to use consumer credit. Important to notice is the difference between the direct and indirect effect of locus of control on debt. Locus of control may not have a direct effect on level of debt, but it affects the attitudes toward debt that, in turn, are linked to debt (Davies & Lea, 1995; Norvilitis et al., 2003).

Another investigated characteristic is materialism. Watson (2003) investigates whether or not materialistic people are more likely to have higher levels of debt, and he concludes that materialism plays a very important role in debt accumulation. This study relies on a sample of 322 households from Pennsylvania. Ponchio & Aranha (2008) study low-income families and conclude that materialists are more likely to have debt. The same conclusion is reached by Donnelly et al. (2012), who show that materialists manage their money less, leading to higher credit card debt.

Expectations and impulsiveness also play an important role in debt accumulation. Brown et al. (2005) show that optimistic financial expectations have a positive effect on debt at the individual and the family level. They use the 1995 and 2000 waves of the British Household Panel Survey, a longitudinal and nationally representative survey. This paper uses a random effects tobit model and acknowledges the problem of reverse causality between debt and optimistic expectations. In order to solve this problem, the authors replace current expectations with their lagged values. These also have a statistically significant effect on debt.

Using a convenience sample of 628 undergraduate students from Southern California, Brougham et al. (2011) suggest that college students who focus on the present and disregard the future are impulsive buyers. Therefore, they are more likely to misuse credit cards. Wang and Xiao (2009) also use a sample of college students at a state university in the U.S., but they fail to provide evidence that impulsiveness is linked to credit card debt. However, they successfully link compulsive buying to credit card debt.

Research shows that rational behavior is not always employed by consumers when making financing decisions (Elliehausen, 2010). Considering that high levels of revolving debt, especially credit card debt, have a negative impact on young adults, and that high levels of household leverage (the ratio of debt to disposable income) can be considered one of the factors that triggered the last recession (Glick & Lansing, 2010), understanding the factors that affect the borrowing decisions is more important than ever. The easiest way to help young adults make sound financial decisions is through financial planning education. Knowing the factors that lead to high levels of indebtedness can

make teaching personal financial planning more effective because it can focus on particular areas of risk.

This paper adds to the literature in different ways. First, it considers behavior problems as a potential determinant of credit card debt. Second, it addresses the endogeneity between debt and behavior. The behavior variables are based on responses provided by caregivers several years before the value of debt is recorded. Third, using caregivers' answers, the paper mitigates false answer problems. Caregivers are more likely to give honest answers than the young adults themselves. According to Almlund et al. (2011), individuals may try to "exaggerate their strengths and downplay their weaknesses" or portray themselves as "virtuous." Fourth, behavior changes over time, and this paper addresses this problem. Lastly, previous research uses small samples and individual questionnaires. This paper uses a national representative longitudinal data set.

3.3 DATA AND METHODOLOGY

3.3.1 DATA

This paper uses data from the main questionnaire of the Panel Study of Income Dynamics (PSID) and two of its supplements: the Child Development Supplement

(CDS), and the Transition into Adulthood Study (TA). The PSID is a nationally representative longitudinal survey that started in 1968. It collects economic and demographic information about every member of the interviewed family, but it focuses on the head of the household and spouse. Children of the participating families are considered sample members, and they are followed by the PSID when they start their own households. Until then, additional information about children is provided by the CDS. The CDS started in 1997, and it has two subsequent waves in 2002 and 2007. The CDS gathers developmental data for some of the children of the families followed by the PSID.¹ Because the CDS interviews only children under 18, and many young adults do not set up their households until later, there is a potential gap in interviews between sample members turning 18 and establishing their own households.

The TA study was developed to provide a link between the CDS and the core PSID and bridge the gap. Participants in the TA supplement are too old to be included in the CDS but are not independent to be included in the PSID. The TA collects demographic, employment, education, health, personal characteristics, and responsibilities information. Three waves are currently available: 2005, 2007, and 2009. This paper uses the 2002 wave of the CDS and the 2007 wave of the TA. On one side, this combination provides enough observations, and on the other side, the elapsed time is not too long. The sample includes young adults (surveyed by the TA) with ages between 18 and 25 years. As imposed by the TA study selection criteria, the members have graduated from high school and have participated in the CDS.

¹ Eighty-eight percent of families provided information about their children in 1997, and 91 percent of those were interviewed again in 2002.

The main explanatory variable of this paper is the Behavior Problems Index (BPI). The BPI is part of the CDS, and it is constructed using a set of 30 questions which ask about children between 3 and 18 years of age and are answered by primary caregivers.² This index relies on a scale developed by Peterson and Zill from the Achenbach Behavior Problems Checklist (Peterson & Zill, 1986; Achenbach & Edelbrock, 1981). A higher score represents a higher level of behavior problems. Behavior problems include sudden changes in mood, cheating, anxiousness, bullying, worrying, and feeling worthless or inferior. The CDS also provides two additional scores for two subscales: Externalizing and Internalizing. The Internalizing score measures withdrawn or sad behavior and includes 14 questions, while the Externalizing score measures aggressive behavior and includes 17 questions. When a caregiver's answer to one of the questions is "sometimes true" or "often true," a score of one is recorded. Final scores for Total, Internalizing, and Externalizing indexes are the sum of individual items. Table 1 presents the questions on which Total, Externalizing, and Internalizing scores are built (Child Development Supplement, User Guide). Because the children are followed later under the TA, I can use this variable as an indicator of behavior problems.

The BPI has been used in economics research to study the effect of different factors such as participation in the Head Start program (Currie & Neidell, 2007) and welfare programs (Levine, Zimmerman, 2005), family's income (Blau, 1999), and homeownership (Haurin et al., 2002; Holupka & Newman, 2012) on children's behavior. McGee (2011) uses the index as a measure of noncognitive skills to examine education and labor market outcomes for youth with learning disabilities.

² In this analysis, the BPI is the only variable provided by the CDS.

The dependent variables are provided by the TA study and are as follows: whether the individual has a credit card in his own name, whether the individual has a carryover balance, whether the individual has student loans, the amount of unsecured debt, and the value of student loans. Unsecured debt includes credit card debt, student loans, medical and legal bills, and loans from relatives. Because the value of student loans is known, I subtract it from the total value of unsecured debt. Therefore, unsecured debt includes only credit card debt, loans from relatives, and medical and legal bills.

The reason this paper uses the PSID and its supplements is twofold. First, the TA study collects various information about young adults such as education, employment, living arrangements, and money management. More importantly, the value of unsecured debt is provided. To my knowledge, this data set is the only one that provides both the BPI and the value of unsecured debt. Second, the young adults included in the TA sample also have an interview completed at the household level. This makes it possible for me to include different individual and family characteristics.

3.3.2 EMPIRICAL MODEL

The goal of the paper is to examine whether behavior problems are a predictor of high levels of unsecured debt for young adults. The structural equation is as follows:

$$Y_{is} = \alpha + \beta_1 \text{Behavior_Problems}_{is} + \beta_x X_{is} + \beta_s S + \epsilon_{is}, \quad (1)$$

where Y_{is} represents either the value of unsecured debt, whether the individual has a credit card in his own name, whether the individual has carryover balances, whether the individual has student loans, the value of student loans, or the ratio of unsecured debt to income. X is a vector of individual and family characteristics. These include age, gender, race, education, marital status, whether the individual works, whether he is a student, whether he owns a car, family's total income, and family's value of unsecured debt. I also include a variable, whether the individual has a checking or a savings account, because credit history can help qualify for credit cards. S represents state fixed effects and ϵ_{is} is the error term. The coefficient of interest is β_1 .

There are several problems that may bias the results. First, there may be a feedback relationship between behavior problems and unsecured debt. For example, the individual does not have behavior problems because he does not have too much debt, and/or the individual does not have debt because he does not have behavior problems. Using BPI that relies on answers given several years before the value of unsecured debt is recorded addresses this problem. Thus, the model becomes the following:

$$Y_{is} = \alpha + \beta_1 \text{BPI}_{is} + \beta_x X_{is} + \beta_s S + \epsilon_{is}. \quad (2)$$

BPI alternately takes the value of total, internalizing, and externalizing scores.

Another source of endogeneity can be an omitted variable. Unobserved characteristics in the error term can be correlated with one of the independent variables and with the dependent variable. Therefore, the main assumption that the error term is uncorrelated with the regressors is violated, and the coefficients are not valid. This paper tries to mitigate this problem by including various characteristics at the individual and the family level. Because the main PSID interview provides data about the individual's family, I utilize these as well. This approach intends to reduce the unobserved characteristics left in the error term. Third, the BPI is determined based on answers provided by the main caregiver. This solves the problem of "faking" (Almlund, 2011). Persons may alter their answers if they believe their answers can change the final outcome.

Using a previously recorded index of behavior problems solves the reverse causality issue, but it can only shed light on the predictive role of behavior problems in the use of unsecured debt. Personality traits are mostly responsible for one's behavior (Funder, 2001), and researchers agree that personality traits are not constant over time (Borghans et al., 2008; Almlund et al., 2011). Therefore, behavior most likely will change with age. The instability of behavior constitutes another potential problem. In an attempt to identify the causal effect of behavior on unsecured debt, I follow an approach similar to Osborne (2000), adjusting the BPI score for age. The first step is to use the regression

$$BPI_{is} = \lambda_1 age_{is} + v_{is}. \quad (3)$$

The second step is to use in Equation 2 the residuals from Equation 3 as a replacement for the original BPI score.

3.3.3 DESCRIPTIVE STATISTICS

Table 2 presents descriptive statistics for the entire sample and two subgroups: young adults who have credit cards in their name and young adults who do not have credit cards. The average age of the sample is 20 years with a slightly higher average for young adults who have a credit card. In the subgroup of young adults with credit cards, the majority is held by women; while in the other subgroup, the situation is reversed, and men represent 53 percent of the subsample. In general, the PSID considers that young adults have set up their own households when they start living in a different housing unit (but have not moved to college or other institutions such as prison) and are financially independent. Therefore, young adults can be married, have children, or work and still be included in the TA study. In the entire sample, five percent of individuals are married and 13 percent have children.

Working and/or being a student is important for credit card ownership. On one hand, earned income leads to a higher probability of being approved for a credit card. On the other hand, credit card companies target students because of their future higher

earnings potential (Warwick & Mansfield, 2000). Many times, credit companies waive the requirements, do not check the ability to repay, and offer incentives and gifts to students (Hawkins, 2012). As a result, one would expect that the likelihood of having a credit card is higher for students or young adults who are working. Table 2 shows that 57 percent of the young adults who have a credit card are students, while only 47 percent of those who do not have a credit card are students. It also shows that 62 percent of young adults with credit cards are working compared with 50 percent of young adults without credit cards.

The descriptive statistics also show that 50 percent of the sample is living with parents. Considering only the young adults with credit cards, the ratio is 40 percent. Combining this information with the previous discussed issues (working and being a student) shows that individuals who own credit cards are more likely to be financially independent. Not surprisingly, when asked about financial responsibility, more than 70 percent of young adults with credit cards answered that they are completely responsible for managing their money.

Table 3 presents descriptive statistics for the dependent variables. It shows that 40 percent of the young adults in the sample have at least one credit card in their names, and 39 percent have a carryover balance. Because more than half of the young adults included in the sample are students and because student loans have been growing at an alarming rate in the last decade, this paper also focuses on student debt. Twenty-seven percent of the young adults have student loans. It is important to notice that carryover balances do not refer only to credit cards; they also include other forms of unsecured debt such as student loans, loans from relatives, and medical bills. Therefore, all young adults who have student loans have a carryover balance.

Very important is the level of indebtedness. Descriptive statistics show that the average balance for unsecured debt is \$527.^{3,4} This number does not include student loans. Not presented in Table 3, the average amount of unsecured debt is \$2,416 if I consider only young individuals who have unsecured debt. The student loan average is \$2,984 for the entire sample and \$11,630 for young adults who have student loan balances. Considering that the average age for the sample is 20 years, many individuals are still students liable to continue accruing educational debt. The FRBNY (2013) reveals that the average value of student loans among 25-year-olds (the upper limit of my sample) is \$20,326.

The value of unsecured or student debt by itself is informative, but it is also important to consider this value in relationship with income. For my sample, unsecured debt represents 12 percent of income.⁵ This value also includes young adults with no unsecured debt. If only individuals with unsecured debt are considered, the ratio increases to 51 percent. This means that young adults would spend 51 percent of their annual income to pay off current credit card debt, medical and legal bills.

Figures 1, 2, and 3 present the distribution of BPI total, internalizing, and externalizing scores. The BPI total score is based on 30 questions asked about children's behaviors, and a higher score implies more behavior problems. Figure 1 shows that almost 70 percent of the sample has a score of ten or less than ten, and only five percent has a score higher than 22. The externalizing score is based on 17 questions and also has a right skewed distribution. Almost 85 percent of the sample has ten or fewer behavior

³ All dollar variables are expressed in 2007 dollars.

⁴ Debt does not include the debt of other family members.

⁵ Income does not include the income of other family members.

problems related to aggressiveness. The internalizing score is based on 14 questions. As seen in Figure 3, 24 percent of the sample does not show any internal or withdrawn behavior problems. One question is included in both internalizing and externalizing scores.

Table 4 presents the weighted average for the behavior problem scores of different subgroups. The descriptive statistics show that young adults who have a credit card have on average fewer behavior problems than their counterparts who do not have a credit card. On average, the total BPI score is two points lower, meaning that caregivers answered “yes” to two fewer questions. The difference mostly comes from the externalizing component that is 1.37 points lower. All of these differences are statistically significant. Even though one would expect that behavior problems lead to poor financial management, the descriptive statistics do not support this hypothesis. For example, impulsiveness was previously linked to credit card ownership and inappropriate use of credit cards. Impulsiveness is an external behavioral problem included in the externalizing score.

The descriptive statistics also show that young adults with carryover balances have fewer behavior problems. This is counterintuitive and does not support the hypothesis that early behavior problems can predict later debt problems. One possible reason for lower behavior problem scores for young individuals with credit cards is that owning a credit card is not necessarily bad. Young adults could experience financial problems only if they misuse credit cards. Another explanation can be the indirect effect of behavior problems. For example, young adults with behavior problems may have lower education levels or employment difficulties (low-paid jobs, unemployment) that

can prevent them from obtaining a credit card in the first place. The largest difference in behavior problem scores is between young adults with and without student loans. Individuals who do not have student loans have, on average, scores lower by three points. Research has linked behavioral problems with academic problems such as school drop-out (see Darney et al., 2013). This means that young adults who experienced behavior problems are less likely to go to college and need a student loan.

3.4 RESULTS

Table 5 shows the coefficient of interest from different specifications for the entire sample. The total BPI score does not have a statistically significant effect on whether the individual owns a credit card or not.⁶ Childhood behavior problems are not predictors of owning a credit card during young adulthood. The results are similar for unsecured debt balance. If the BPI Total score increases by one unit, meaning that the individual has one additional behavior problem, the probability of having carryover balances and the probability of having student loans each decreases by one percentage point, and the student loan balance falls by \$77 or three percent of the average balance. The change seems small when one unit change is considered, but one standard deviation increase in the BPI is associated with a decrease of \$506 in student loans, or 17 percent of

⁶ The results do not qualitatively change if I do not adjust BPI for age or if I adjust BPI for age and age squared.

the average student loan balance. These coefficients have a negative sign, which contradicts the hypothesis that behavior problems lead to debt problems. At the same time, it may be the result of the indirect effect of behavior problems. As shown by previous research, having behavior problems reduces the likelihood of going to college and therefore the need for student loans.⁷

When the BPI Externalizing score is considered, the results are not very different. Because this score measures problems such as impulsiveness, misbehaving, or getting in trouble, one would expect the inappropriate use of credit cards to be more common with high score values, but the results do not support this assumption. Externalizing behavior problems are associated with a reduced likelihood of having student loans and of high student loan balances. The BPI Internalizing score yields similar results. One standard deviation increase in the BPI Internalizing score is associated with a decrease of \$112 in unsecured debt balance. This represents 21 percent of the average unsecured debt balance, suggesting that young adults with withdrawn or sad behavior are less likely to use their credit cards. These young adults are also less likely to have a carryover balance. Considering that 25 percent of the sample does not exhibit internalizing behavior problems and that the remaining 75 percent of the sample has on average four internalizing behavior problems, the latter group is eight percentage points less likely to have student loans than the former, and their student loan balances are on average \$552 lower than the balances owned by the former group.

⁷ Appendix 1 presents the results for a selection of survey items included in the BPI. To be included, the survey item must have a statistically significant effect on at least one of the dependent variables. These results provide additional information about individual effect of different behavior problems on credit card use. Considering each behavior problem individually is useful, if one is interested in a particular behavior.

The level of indebtedness is also considered. One can determine whether the use of unsecured debt is irresponsible or not by analyzing the ratio of unsecured debt to total income. The results show that behavior problems do not predict debt problems during young adulthood. Even though Table 5 includes only the coefficient for the independent variable of interest (behavior problems), there are several other noteworthy coefficients. Females are nine percentage points more likely to have credit cards, and for every one-year increase in age, the predicted probability of owning a credit card increases by four percentage points. Working increases the probability of owning a credit card by ten percentage points.

The young adults included in the sample may or may not live with their parents. Table 6 presents the results for young adults who do not live with their parents. The reason this paper studies this subsample is twofold. First, because they do not live with their parents, their unsecured debt balance is not included in the family's total value of unsecured debt. This gives the opportunity to include whether the family has unsecured debt or not as an independent variable. This approach tries to observe the effect of families' financial behaviors on their children's behaviors. Second, these young adults are not considered completely independent even though they do not live with their parents. They are more likely to mimic their parents' behaviors and learn to make financial decisions from them.

When considering the main independent variable (the behavior problems index), Table 6 shows that the results for the selected subgroup are similar with the results for the entire sample. Behavior problems do not increase the probability of having a credit card and carryover balance, and they also do not predict higher unsecured debt. The

probability of having student loans and the value of student loans decrease when the behavior problem score increases. The level of indebtedness is not affected by the behavior index score.

More important in this analysis are the coefficients for whether the family has unsecured debt. These coefficients are not only statistically significant, but they also have economic significance. These results show that families' attitudes toward unsecured debt proxied by the dummy variable, whether the family has unsecured debt, play an important role in young adults' borrowing behavior. When families have unsecured debt, the probability that young adults have at least a credit card in their own name increases by 13 percentage points, and the probability of having carryover balances increases by 25 percentage points. The value of unsecured debt also increases by \$531. This value is close to the average value of unsecured debt owned by young adults in the entire sample and young adults in the selected subsample.

Young adults with parents who have unsecured debt are also more likely to have student loans. The probability of having a student loan increases by 21 percentage points, and the value of student loans rises by \$1,976. Considering that the average balance of student loans for this subsample is \$4,683, this increase represents 42 percent of the subsample's average. The results are consistent when the BPI Internalizing and the BPI Externalizing scores are used. These numbers are statistically significant, and they indicate that parents' use of unsecured debt has an important influence on children's behavior. This may be preliminary evidence that young adults learn to use unsecured debt from their parents, and the environment is very important in teaching personal finance.

Table 7 presents the results for young adults who are financially responsible. The TA study defines the financial responsibility variable based on the responses to four questions: how much responsibility for earning a living, paying rent, paying bills, and managing money.⁸ For this analysis, I consider an individual to be financially responsible if he answered that he is responsible most of the time or always to all of these questions. The TA study includes young adults who are financially responsible, as well as young adults who are not. Analyzing the subgroup of young adults who assume financial responsibility most of the time can provide additional information. If a young individual relies on his family to pay his bills and rent and to manage his money, the decision to use unsecured debt may not be entirely his.

Table 7 shows that childhood behavior problems do not predict an increase in the likelihood of using credit cards or having a carryover balance. The probability of having student loans is one percentage point lower if there is one additional behavior problem. The student loan balance decreases by \$596 (20 percent of the average balance) when the behavior problems score increases by one standard deviation. When the BPI Internalizing score is used, the results suggests that young individuals who experience behaviors such as withdrawal, fearfulness, confusion, or depression are less likely to have carryover balances. The probability of having carryover balances decreases by two percentage points when the score increases by one unit. The remaining results are similar to previous specifications.

⁸ For example, one of the questions is “How much responsibility do you currently take for managing your money?” and the answers range from “Somebody else does this for me all the time” to “I am completely responsible for this all the time.”

3.5 CONCLUSION

High levels of debt owned by households in the United States have led to a careful examination of borrowing behavior. Understanding what factors influence financial decisions and unsecured debt use can help teach personal financial planning and avoid irresponsible borrowing. Research has mostly focused on economic determinants, but recent papers emphasize the importance of personality characteristics and behavior as potential factors that affect unsecured debt. This paper studies the effect of behavior problems on credit card and student debt for young adults. If individuals exhibit behavior problems, and behavior problems are linked to credit card use and high unsecured debt balances, parents can properly advise their children about the risks of using unsecured debt before irresponsible decisions are made.

Owning a credit card cannot be considered a problem by itself. It may become a problem if there is a substantial carryover balance or if the value of debt is too high. To address these issues this paper considers not only whether young adults have credit cards, but also whether they have carryover balances and their amount of unsecured debt. Because recently the value of student loans has reached alarming levels and because many experts are afraid that student loans can trigger the next financial crisis, I also include two additional variables: whether the individual has student loans and the value of student loans. This paper uses the Behavioral Problems Index and its two subscales provided by the PSID to measure behavior problems.

The results show that behavior problems do not predict higher probabilities of owning a credit card or higher amounts of unsecured debt. Young adults with internalizing behavior problems are less likely to have carryover balances, and their unsecured debt is lower. One standard deviation increase in the BPI Internalizing score is associated with a reduction of \$112 in unsecured debt (21 percent of the average balance). Behavior problems may have an indirect effect on unsecured debt use. For example, young adults who manifest behavior problems before they turn 18 may have lower education levels and lower-paid jobs. This can affect their ability to qualify for a credit card. In all three specifications (using the BPI total, Internalizing, or Externalizing scores), higher scores are linked with lower probabilities of having student loans and lower student loan balances. These results can be influenced by the indirect effect of behavior problems on student loans. First, research has linked behavior problems to low educational achievement. Second, if the young adult does not go to college, there is no need for student loans. When different subsamples are used, the results are not different.

This paper also considers the effect of parents' borrowing behavior on children's use of credit card and student loans. Young adults included in this analysis do not live with their parents, but they are not entirely financially independent.⁹ From this reason, they are more likely to copy their parents' financial behavior and learn how to make financial decisions from them. The results show that young adults with parents who have unsecured debt are more likely to have credit cards, carryover balances, and higher unsecured debt values. If a higher probability of having credit cards does not always signal debt problems, a higher probability of having carryover balances is the first

⁹ This subsample is used only for additional models that study the impact of parental behavior.

indicator. The magnitude of the coefficients is also noteworthy. The probability of having carryover balances increases by 25 percentage points and the value of unsecured debt by \$521 (close to the average unsecured debt value of the sample). This can be considered evidence that parents' behaviors can influence young adults' borrowing decisions.

The increase in probability of using unsecured debt for young adults whose parents have unsecured debt can be determined by different factors. First, it may be that young adults observe their parents' behaviors and imitate them. Second, parents who have a positive attitude toward credit cards are more likely to support their children in getting a credit card and are willing to cosign if necessary. Third, these young adults may more easily qualify for a credit card because of income levels or credit history. Regardless of these reasons, the effect of parents' borrowing behaviors on young adults' unsecured debt use is not negligible and must be taken into consideration when providing financial education to young adults.

REFERENCES

- Achenbach, Thomas and Craig Edelbrock. 1981. "Behavioral Problems and Competencies Reported by Parents of Normal and Disturbed Children Aged Four Through Sixteen." *Monographs of the Society for Research in Child Development* 46 (1): 1-82.
- Almlund, Mathilde, Angela Lee Duckworth, James Heckman, and Tim D. Kautz. 2011. "Personality Psychology and Economics." Working Paper No. 16822, NBER, Chicago, IL.
- Back, Mitja D., Stefan C. Schmukle, and Boris Egloff. 2009. "Predicting Actual Behavior from the Explicit and Implicit Self-Concept of Personality." *Journal of Personality and Social Psychology* 97 (3): 533-548.
- Blau, David. 1999. "The Effect of Income on Child Development." *The Review of Economics and Statistics* 81(2): 261-276.
- Borghans, Lex, Angela Lee Duckworth, James Heckman, and Bas ter Weel. 2008. "The Economics and Psychology of Personality Traits." *Journal of Human Resources* 43(4): 972-1059.
- Brougham, Ruby, Joy Jacobs-Lawson, Douglas Hershey, and Kathleen Trujillo. 2011. "Who Pays Your Debt? An Important Question for Understanding Compulsive Buying among American College Students." *International Journal of Consumer Studies* 35: 79-85.
- Brown, Sarah, Gaia Garino, Karl Taylor, and Stephen Price. 2005. "Debt and Financial Expectations: An Individual and Household Level Analysis." *Economic Inquiry* 43 (1): 100-120.
- Cosma, Stefano and Francesco Pattarin. 2012. "Attitudes, Personality Factors and Household Debt Decisions: A Study of Consumer Credit." Working Papers, No. 31, CEFIN, Modena, Italy.
- Currie, Janet and Matthew Neidell. 2007. "Getting Inside the "Black Box" of Head Start Quality: What Matters and What Doesn't." *Economics of Education Review* 26(1): 83-99.

- Darney, Dana, Wendy Reinke, Keith Herman, Melissa Stormont, and Nicholas Ialongo. 2013. "Children with Co-Occurring Academic and Behavior Problems in First Grade: Distal Outcomes in Twelfth Grade." *Journal of School Psychology* 51: 117-128.
- Davies, Emma and Stephen Lea. 1995. "Student Attitudes to Student Debt." *Journal of Economic Psychology* 16 (4): 663-679.
- Donnelly, Grant, Ravi Iyer, and Ryan Howell. 2012. "The Big Five Personality Traits, Material Values, and Financial Well-Being of Self-Described Money Managers." *Journal of Economic Psychology* 33: 1129-1142.
- Dynan, Karen and Donald Kohn. 2007. *The Rise in U.S. Household Indebtedness: Causes and Consequences*. Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C.
- Eliehausen, Gregory. 2010. *Implications of Behavioral Research for the Use and Regulation of Consumer Credit Products*. Finance and Economics Discussion Series, Federal Reserve Board, Washington, D.C.
- Federal Reserve Bank of New York. 2013. *Household Debt and Credit Card Report*. New York, NY. (Available at: <http://www.newyorkfed.org/householdcredit>).
- Funder, David. 2001. "Personality." *Annual Review of Psychology* 52: 197-221.
- Glick, Reuven and Kevin Lansing. 2010. "Global Household Leverage, House Prices, and Consumption." *FRBSF Economic Letter*, January. Retrieved May 21, 2012. (<http://www.frbsf.org/publications/economics/letter/2010/el2010-01.html>).
- Haurin, Donald R., Toby L. Parcel, and R. Jean Haurin. 2002. "Does Homeownership Affect Child Outcomes?" *Real Estate Economics* 30(4): 635-666.
- Hawkins, Jim. 2012. "Credit Card Companies Still Heavily Targeting College Students Despite Strict Regulations." University of Houston Law Center, Houston, TX.
- Holupka, Scott and Sandra J. Newman. 2012. "The Effects of Homeownership on Children's Outcomes: Real Effects or Self-Selection?" *Real Estate Economics* 40(3): 566-602.
- Institute for Financial Literacy. 2010. "Annual Consumer Bankruptcy Demographics Report." Retrieved May 21, 2012 (http://www.financiallit.org/PDF/2010_Demographics_Report.pdf).

- Jiang, Sarah and Lucia Dunn. 2013. "New Evidence on Credit Card Borrowing and Repayment Patterns." *Economic Inquiry* 51 (1): 394-407.
- Johnson, Kathleen and Geng Li. 2007. *Do High Debt Payments Hinder Household Consumption Smoothing?* Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C.
- Kamphaus, Randy and Paul J. Frick. 2005. "Clinical Assessment of Child and Adolescent Personality and Behavior." New York: Springer Science + Business Media.
- Kleinmuntz, Benjamin. 1967. *Personality Measurement: An introduction*. Homewood, IL: Dorsey Press.
- Larsen, Randy J. and David M Buss. 2001. *Personality Psychology: Domains of Knowledge About Human Nature*. New York: McGraw-Hill Higher Education.
- Leikas, Sointu, Jan-Erik Lönnqvist, and Markku Verkasalo. 2012. "Persons, Situations, and Behaviors: Consistency and Variability of Different Behaviors in Four Interpersonal Situations." *Journal of Personality and Social Psychology* 103 (6): 1007–1022.
- Levine, Phillip B. and David J. Zimmerman. 2005. "Children's Welfare Exposure and Subsequent Development." *Journal of Public Economics* 89(1): 31-56.
- Manning, Robert. 1999. *Credit Cards on Campus: Costs and Consequences of Student Debt*. Washington D.C: Consumer Federation of America.
- Mannix, Margaret. 1999. "The Credit Card Binge; College Students are Engaging in Some Risky Spending." U.S. News, August 29. Retrieved May 21, 2012 (http://www.usnews.com/usnews/edu/articles/990906/archive_001825.htm)
- Martin, Roy. 1988. *Assessment of Personality and Behavior Problems Infancy through Adolescence*. New York: Guilford Press.
- McGee, Andrew. 2011. "Skills, Standards, and Disabilities: How Youth with Learning Disabilities Fare in High School and Beyond." *Economics of Education Review* 30(1): 109-129.
- McMurtie, Beth. 1999. "Study Documents the Extent of Students' Credit-Card." *Chronicle of Higher Education* 45(41): 44.
- Mian, Atif and Amir Sufi. 2010. "The Great Recession: Lessons from Microeconomic Data." *The American Economic Review* 100 (2): 51-56.

- Nelson, Larry and Carolyn Barry. 2005. "Distinguishing Features of Emerging Adulthood: The Role of Self-Classification as an Adult." *Journal of Adolescent Research* 20 (2): 24-262.
- Norris, Floyd. 2012. "Debt Burden Lifting, Consumers Open Wallets a Crack." *The New York Times*, April 19. Retrieved May 21, 2012. (http://www.nytimes.com/2012/04/20/business/not-exactly-a-miracle-but-us-debt-levels-are-falling.html?_r=0).
- Norvilitis, Jill, Bernard Szablicki, and Sandy Wilson. 2003. "Factors Influencing Levels of Credit-Card Debt in College Students." *Journal of Applied Social Psychology* 33 (5): 935-947.
- Norvilitis, Jill et al. 2006. "Personality Factors, Money Attitudes, Financial Knowledge, and Credit-Card Debt in College Students." *Journal of Applied Social Psychology* 36 (5): 1395-1413.
- Nyhus, Ellen and Paul Webley. 2001. "The Role of Personality in Household Saving and Borrowing Behaviour." *European Journal of Personality* 15: S85-S103.
- Osborne, Melissa. 2000. "The Power of Personality: Labor Market Rewards and the Transmission of Earnings." PhD Dissertation, Department of Economics, University of Massachusetts, Amherst, MA.
- Peterson, James and Nicholas Zill. 1986. "Marital Disruption, Parent-Child Relationships, and Behavior Problems in Children." *Journal of Marriage and Family* 48 (2): 295-307.
- Pirog, Stephen and James, Roberts. 2007. "Personality and Credit Card Misuse among College Students: The Mediating Role of Impulsiveness." *Journal of marketing Theory and Practice* 15(1): 65-77.
- Ponchio, Mateus and Francisco Aranha. 2008. "Materialism as a Predictor Variable of Low Income Consumer Behavior when Entering into Installment Plan Agreements." *Journal of Consumer Behavior* 7: 21-34.
- Roberts, Brent W. 2006. "Personality Development and Organizational Behavior." *Research on Organizational Behavior* 27: 1- 41.
- Sallie Mae. 2009. *How Undergraduate Students Use Credit Cards*. Sallie Mae's National Study of Usage Rates and Trends.
- Schor, Juliet. 1998. *The Overspent American: Upscaling, Downshifting and the New Consumer*. New York: Basic Books.

- Taylor, John. 2009. "The Financial Crisis and the Policy Responses: An Empirical Analysis of What Went Wrong." Working Paper No. 14631, NBER, Chicago, IL.
- Verick, Sher and Iyanatul Islam. 2010. "The Great Recession of 2008-2009: Causes, Consequences and Policy Responses." Discussion Paper No. 4934, IZA. (Available at <http://ftp.iza.org/dp4934.pdf>).
- Wang, Jeff and Jing Xiao. 2009. "Buying Behavior, Social Support and Credit Card Indebtedness of College Students." *International Journal of Consumer Studies* 33: 2-10.
- Warwick, Jacquelyn and Phylis Mansfield. 2000. "Credit Card Consumers: College Students' Knowledge and Attitude." *Journal of Consumer Marketing* 17 (7): 617-626.
- Watson, John. 2003. "The Relationship of Materialism to Spending Tendencies, Saving, and Debt." *Journal of Economic Psychology* 24: 723-739.
- White, Martha. 2011. "\$54 Billion Closer to our Next Financial Crisis." *Time*, September 14. Retrieved May 21, 2012. (<http://business.time.com/2011/09/14/54-billion-closer-to-our-next-financial-crisis/>).

TABLES

Table 1. Survey Items in the Behavior Problems Index*

	External	Internal	Total
He/She has sudden changes in mood or feeling	X		X
He/She cheats or tells lies	X		X
He/She argues too much	X		X
He/She has difficulty concentrating, cannot pay attention for long	X		X
He/She bullies or is cruel or mean to others	X		X
He/She is disobedient	X		X
He/She does not seem to feel sorry after he/she misbehaves	X		X
He/She is impulsive, or acts without thinking	X		X
He/She is restless or overly active, cannot sit still	X		X
He/She is stubborn, sullen, or irritable	X		X
He/She has a very strong temper and loses it easily	X		X
He/She breaks things on purpose or deliberately destroys his/her own or another's things	X		X
He/She demands a lot of attention	X		X
He/She hangs around with kids who get into trouble	X		X
He/She is disobedient at school	X		X
He/She has trouble getting along with teachers	X		X
He/She feels or complains that no one loves him/her		X	X
He/She is rather high strung, tense and nervous		X	X
He/She is too fearful or anxious		X	X
He/She is easily confused, seems to be in a fog		X	X
He/She feels worthless or inferior		X	X
He/She is not liked by other people his/her age		X	X
He/She has a lot of difficulty getting his/her mind off certain thought		X	X
He/She is unhappy, sad or depressed		X	X
He/She is withdrawn, does not get involved with others		X	X
He/She cries too much		X	X
He/She is too dependent on others		X	X
He/She feels others are out to get him/her		X	X
He/She worries too much		X	X
He/She has trouble getting along with other people his/her age	X	X	X

* Table available at http://psidonline.isr.umich.edu/CDS/cdsii_userGd.pdf

Table 2: Descriptive statistics (main independent variables)

	Entire Sample	Have Credit Card	Do not Have Credit Card
Age	19.84 (0.070)	20.26 (0.105)	19.56 (0.088)
Female	0.52 (0.022)	0.58 (0.034)	0.47 (0.028)
Married	0.05 (0.009)	0.05 (0.014)	0.05 (0.012)
Have Children	0.13 (0.014)	0.11 (0.019)	0.14 (0.019)
Working	0.55 (0.022)	0.62 (0.033)	0.50 (0.028)
Student	0.51 (0.022)	0.57 (0.034)	0.47 (0.028)
Education	12.34 (0.063)	12.76 (0.093)	12.07 (0.081)
Living with Parents	0.50 (0.022)	0.40 (0.033)	0.57 (0.028)
From Single-Mother Family	0.26 (0.019)	0.23 (0.027)	0.28 (0.026)
No. of Obs.	941	347	594

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses.

Table 3: Descriptive statistics (Dependent variables)

Have Credit Card	0.40 (0.021) [941]
Have Carryover Balance	0.39 (0.021) [941]
Unsecured Debt*	526.60 (68.203) [921]
Have Student Loans	0.27 (0.019) [941]
Student Loans Balance	2,984.28 (320.662) [929]
Unsecured Debt/Income Ratio**	0.12 (0.025) [681]

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. Number of observations are presented in square brackets.

*Unsecured Debt value does not include student loans.

Table 4: Descriptive statistics for BPI scores

	Have Credit Card	Do not Have Credit Card	Difference	Have Carryover Balance	Do not Have Carryover Balance	Difference	Have Student Loans	Do not Have Student Loans	Difference
Behavior Problems Total Score	7.40 (0.432)	9.26 (0.397)	-1.86** (0.586)	7.22 (0.420)	9.36 (0.400)	-2.13** (0.580)	5.98 (0.418)	9.45 (0.363)	-3.47** (0.554)
Behavior Problems Externalizing Score	4.59 (0.277)	5.95 (0.253)	-1.37** (0.375)	4.70 (0.276)	5.87 (0.256)	-1.16** (0.377)	3.78 (0.265)	6.01 (0.234)	-2.23** (0.354)
Behavior Problems Internalizing Score	2.94 (0.205)	3.50 (0.196)	-0.56** (0.284)	2.64 (0.186)	3.68 (0.200)	-1.04** (0.274)	2.29 (0.205)	3.63 (0.177)	-1.34** (0.271)
No. of Obs.	347	594		380	561		262	679	

Note: The descriptive statistics are weighted. Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level. To test the difference of two means, I use the T-test.

Table 5: Results (Entire Sample)

Independent Var. Dependent Var.	Behavior Problems Total Score	Behavior Problems Externalizing Score	Behavior Problems Internalizing Score
	Model 1	Model 2	Model 3
Have Credit Card	-0.002 (0.003) [917]	-0.005 (0.004) [917]	-0.001 (0.006) [917]
Have Carryover Balance	-0.01** (0.003) [921]	-0.005 (0.004) [921]	-0.02** (0.006) [921]
Unsecured Debt	-4.93 (8.711) [921]	9.22 (15.220) [921]	-34.78* (18.326) [921]
Have Student Loan	-0.01** (0.003) [913]	-0.02** (0.004) [913]	-0.02** (0.005) [913]
Student Loan Balance	-76.90** (31.372) [929]	-112.86** (50.845) [929]	-137.86** (64.541) [929]
Unsecured Debt/Income Ratio	0.004 (0.005) [681]	0.02 (0.013) [681]	-0.02* (0.009) [681]

Note: Marginal effects for dichotomous dependent variables are estimated by probit models. Standard errors are presented in parentheses. Number of observations are presented in square brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 6: Results (Live-Without-Parents Sample)

Dependent Var.	Independent Var.			Model 1			Model 2			Model 3		
	Behavior Problems Total Score	Parents have unsecured debt	Behavior Problems Externalizing Score	Behavior Problems Externalizing Score	Parents have unsecured debt	Behavior Problems Internalizing Score	Behavior Problems Internalizing Score	Parents have unsecured debt	Behavior Problems Internalizing Score	Behavior Problems Internalizing Score	Parents have unsecured debt	
Have Credit Card	-0.005 (0.004)	0.13** (0.055)	-0.004 (0.007)	-0.004 (0.007)	0.13** (0.055)	-0.01 (0.009)	-0.01 (0.009)	0.13** (0.055)	-0.01 (0.009)	-0.01 (0.009)	0.13** (0.055)	
Have Carryover Balance	-0.003 (0.004)	0.25** (0.054)	0.001 (0.007)	0.001 (0.007)	0.25** (0.054)	-0.01 (0.009)	-0.01 (0.009)	0.25** (0.054)	-0.01 (0.009)	-0.01 (0.009)	0.26** (0.054)	
Unsecured Debt	-17.02 (13.841)	530.53** (154.441)	-8.95 (23.425)	-8.95 (23.425)	525.54** (153.651)	-52.80* (27.681)	-52.80* (27.681)	536.29** (155.140)	-52.80* (27.681)	-52.80* (27.681)	536.29** (155.140)	
Have Student Loan	-0.01** (0.004)	0.21** (0.050)	-0.02** (0.007)	-0.02** (0.007)	0.21** (0.050)	-0.02* (0.009)	-0.02* (0.009)	0.21** (0.050)	-0.02* (0.009)	-0.02* (0.009)	0.21** (0.050)	
Student Loan Balance	-107.94* (62.610)	1,976.37** (764.910)	-171.76* (101.218)	-171.76* (101.218)	1,956.97** (764.884)	-187.65 (134.107)	-187.65 (134.107)	1,983.00** (767.888)	-187.65 (134.107)	-187.65 (134.107)	1,983.00** (767.888)	
Unsecured Debt/Income Ratio	-0.01 (0.005)	0.11 (0.081)	-0.001 (0.008)	-0.001 (0.008)	0.11 (0.078)	-0.02 (0.022)	-0.02 (0.022)	0.11 (0.078)	-0.02 (0.022)	-0.02 (0.022)	0.11 (0.081)	

Note: Marginal effects for dichotomous dependent variables are estimated by probit models. Standard errors are presented in parentheses. Number of observations are presented in square brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

Table 7: Results (Financial-Responsible Sample)

Independent Var. Dependent Var.	Behavior Problems	Behavior Problems	Behavior Problems
	Total Score	Externalizing Score	Internalizing Score
	Model 1	Model 2	Model 3
Have Credit Card	0.002 (0.003) [580]	-0.0004 (0.005) [580]	0.01 (0.007) [580]
Have Carryover Balance	-0.004 (0.003) [604]	-0.001 (0.005) [604]	-0.02** (0.007) [604]
Unsecured Debt	-4.41 (12.485) [604]	20.248 (21.009) [604]	-53.02* (29.027) [604]
Have Student Loan	-0.01** (0.003) [583]	-0.02** (0.005) [583]	-0.02** (0.007) [583]
Student Loan Balance	-90.60** (38.134) [609]	-124.31* (64.044) [609]	-182.36** (73.861) [609]
Unsecured Debt/Income Ratio	-0.001 (0.004) [471]	0.01 (0.006) [471]	-0.01 (0.009) [471]

Note: Marginal effects for dichotomous dependent variables are estimated by probit models. Standard errors are presented in parentheses. Number of observations are presented in square brackets. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.

FIGURES

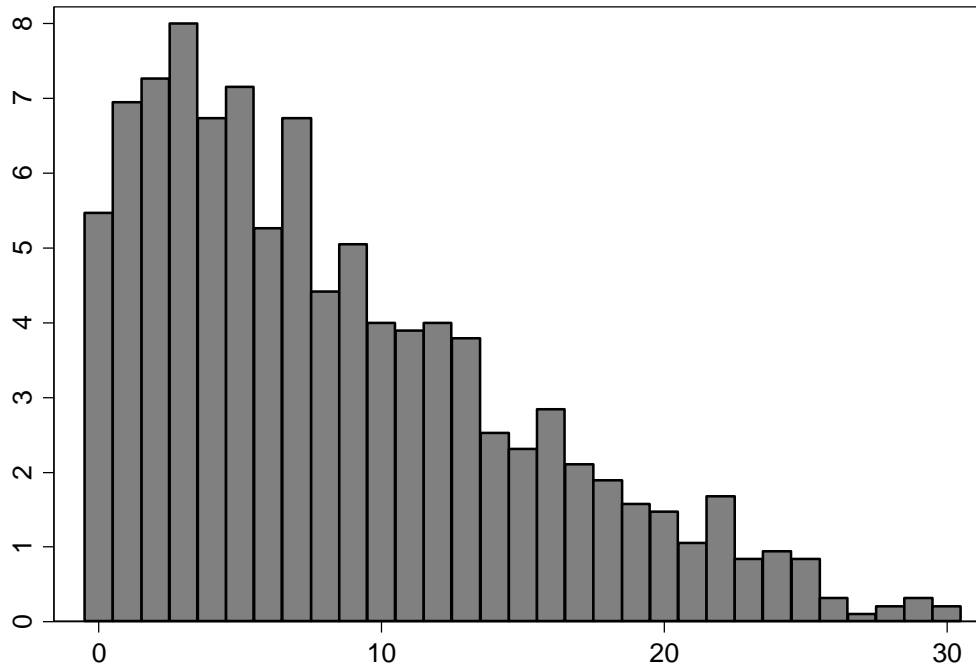
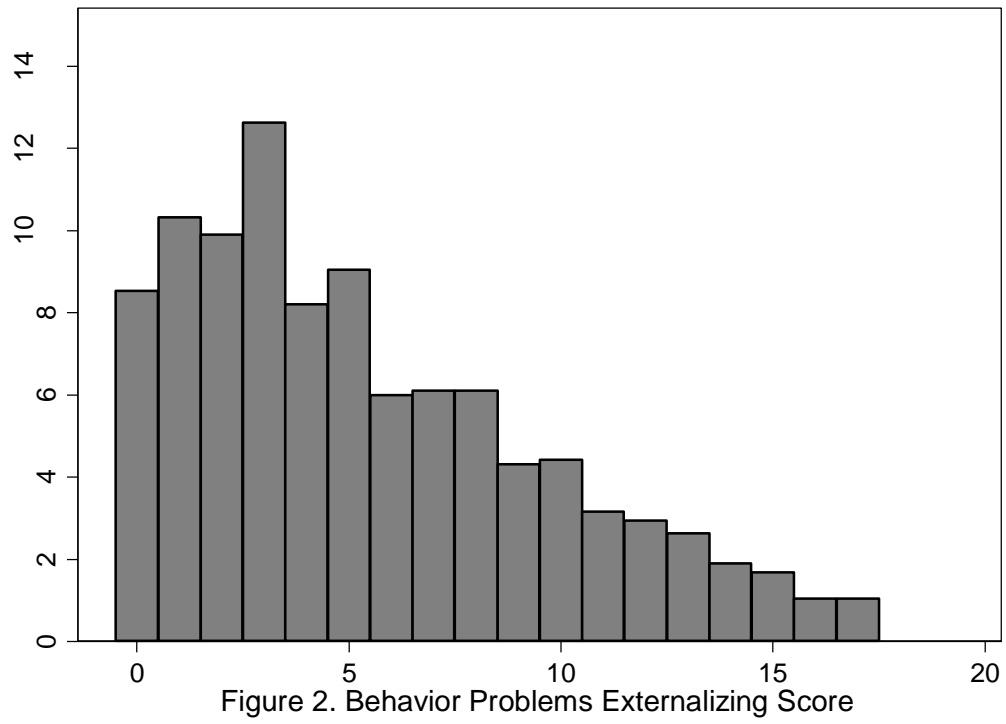


Figure 1. Behavior Problems Total Score



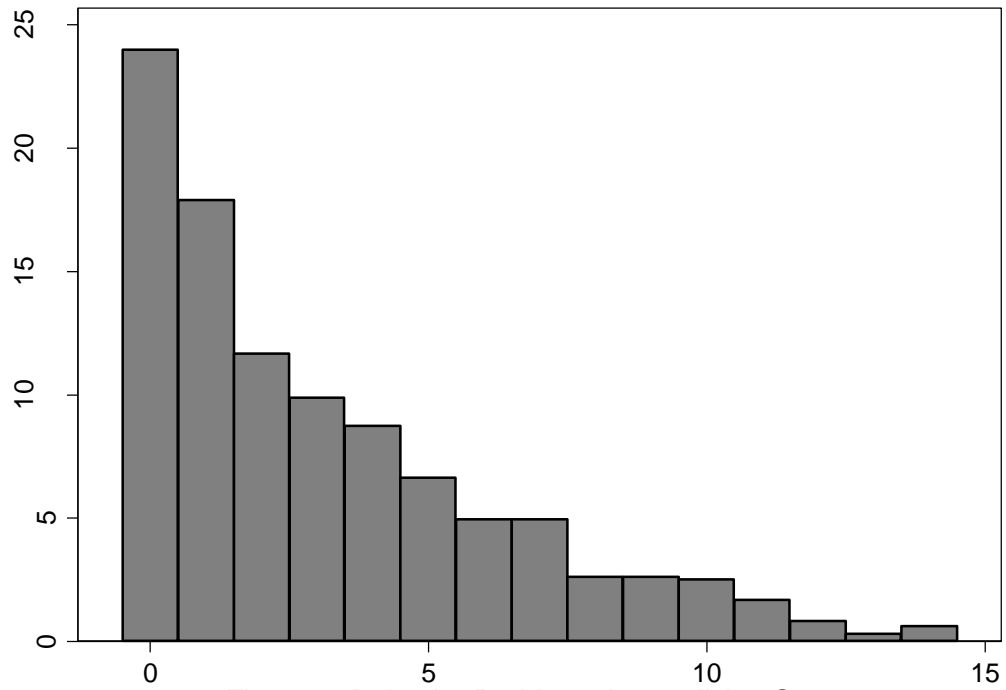


Figure 3. Behavior Problems Internalizing Score

APPENDIX

Appendix 1: Results (Survey Items)

	Have Credit Card	Unsecured Debt	Have Carryover Balance
He/She has sudden changes in mood or feeling.	-0.02 (0.039)	-322.08 (239.168)	-0.11** (0.041)
He/She is rather high strung, tense and nervous.	0.008 (0.037)	22.78 (158.562)	-0.07* (0.036)
He/She is too fearful or anxious.	0.009 (0.037)	107.02 (162.558)	-0.08** (0.037)
He/She has difficulty concentrating for long.	-0.08** (0.037)	-125.21 (153.456)	-0.06 (0.038)
He/She is easily confused, seems to be in a fog.	-0.06 (0.042)	-240.78 (164.293)	-0.08* (0.044)
He/She bullies or is cruel or mean to others.	-0.08** (0.042)	-62.39 (160.050)	0.007 (0.046)
He/She does not seem to feel sorry after misbehaves.	-0.10** (0.037)	109.52 (206.664)	-0.06 (0.039)
He/She has difficulty getting his/her mind off certain thoughts.	-0.05 (0.035)	-423.49** (156.547)	-0.11** (0.035)
He/She is restless or overly active, cannot sit still.	0.07* (0.041)	484.78** (220.378)	0.10** (0.042)
He/She is stubborn, sullen, or irritable.	-0.06** (0.035)	73.67 (193.300)	-0.07* (0.036)
He/She has a very strong temper and loses it easily.	-0.04 (0.036)	48.87 (170.438)	-0.08** (0.036)
He/She is withdrawn, does not get involved with others.	-0.01 (0.048)	-528.73** (115.197)	-0.14** (0.044)
He/She cries too much.	-0.09 (0.066)	-581.66** (151.381)	-0.06 (0.070)
He/She is too dependent on others.	-0.005 (0.044)	-183.15 (158.370)	-0.08** (0.042)
He/She feels others are out to get (him/her).	0.05 (0.061)	-368.74** (166.247)	-0.07 (0.055)
No. of Observations	917	921	921

Note: Standard errors are presented in parentheses. ** denotes significance at the 0.05 level. * denotes significance at the 0.10 level.