Three Essays about Health and Welfare

by

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To My Deceased Father and Big Uncle

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Abstract

My dissertation is comprised of three separate essays that investigate health and welfare issues, both in China and US. The first essay provides insights into the net effects of increasing women's bargaining power on the health outcomes of their children. Using Chinese longitudinal data in the 1990s, I find evidence in favor of women's empowerment: children in families where the mother was head of household or made more purchasing decision had better Body Mass Index (BMI) than their counterparts whose mother had less power. The second essay explores the health consequences of computer use in internet cafés compared with usage at home only or in both settings. Using Chinese longitudinal data in the mid 2000s, I find suggestive evidence that adolescents and youth using computers in internet cafés are more likely to smoke and to self-report poor health status, and to consume a higher share of fat in their daily diets. The health disparities between computer users in internet cafés and other settings are significant. The third essay examines changing levels of Unemployment Insurance (UI) eligibility and benefits receipt among low-educated single mothers who entered unemployment between 1990 and 2005, and changing participation in cash welfare and the Food Stamp Program (FSP). Using the Survey of Income and Program Participation (SIPP), the study shows that low-educated single mothers who enter unemployment experience an increase in UI eligibility but not an increase in UI benefits receipt, when compared to low-educated, single, childless women who enter unemployment. The proportion of this population accessing benefits from at least one of these programs remains similar across the study period.

Chapter 1
Introduction

My dissertation is comprised of three separate essays that investigate health and welfare issues. Each essay makes use of micro-level datasets to identify benefits and problems with broad interests.

Chapter 2 is the first paper which is titled "Family Bargaining, Women's Power and Its Impact on Child Health in China." Using Chinese longitudinal data, this paper provides insights into the net effects of increasing women's bargaining power on the health outcomes of their children. Although prior studies find some evidence that gendered differences in intra-household bargaining power over household resource allocation affect children's well-being, many of them operationalize differential bargaining power in terms of discrepant spousal attributes such as differences in age, education, earned income, unearned income, and inheritance. I contribute to the literature both theoretically and empirically. Theoretically, I apply a collective model of household behavior to examine the effects of an increase in mother's bargaining power on child quality. Empirically, I construct two unique measurements: mother as head of the household, and mother as the decision-maker in purchasing household durable. There is a potential problem of endogeneity here. Health outcomes could be both causes and consequences of various explanatory variables. To deal with this potential endogeneity, I explore one source of exogenous variation as an instrument for the women's power variables. The instrument is whether local cadres are given economic rewards to implement family planning policy. There are two channels through which this cadre evaluation system can affect women's power at home. On the one hand, the one-child policy causes a large divergence between the ideal number of children and the actual number of children, which make husbands increasingly reliant on their wives as source of old-age support due to wives' specialization in household production. On the

other hand, the greater desire for offspring by husbands motivates them to compromise on household issues in order to obtain cooperation from wives in the fertility decision and in failing to comply with the one-child policy. Using the China Health and Nutrition Survey (CHNS) data in the 1990s, I find evidence in favor of women's empowerment: children in families where the mother was head of household or made more purchasing decision had better Body Mass Index (BMI) than their counterparts whose mother had less power.

Chapter 3 is the second paper which is titled "Computer and Internet Café Usage: A Study of Their Adverse Health Effect on Chinese Adolescent and Youth". This chapter investigates the health consequences of computer use in internet cafés compared with usage at home only or in both settings. As computer access has become easier in China, questions have been asked about its implications for the health of adolescents and youths. Although computer use may generate similar health consequences as other screen-based sedentary activities such as television watching by displacing physical activity and increasing calorie consumption, computer use may also impact health in more complicated ways, including exposure to unhealthy online information about violence and pornography; negative peer effects in internet cafés; and lack of sleep due to overindulgence in computer games and chat rooms. Using longitudinal data from the China Health and Nutrition Survey (CHNS) in the mid 2000s, I find suggestive evidence that adolescents and youth using computers in internet cafés are more likely to smoke and to self-report poor health status, and to consume a higher share of fat in their daily diets. The health disparities between computer users in internet cafés and other settings are significant.

Chapter 4 is the third paper which is titled "Unemployment Insurance and Low-Educated, Single, Working Mothers before and after Welfare Reform" and co-authored with Luke Shaefer. Using the Survey of Income and Program Participation, this study examines changing levels of Unemployment Insurance (UI) eligibility and benefits receipt among low-educated single mothers who entered unemployment between 1990 and 2005. It also examines changing participation in cash welfare and the Food Stamp Program (FSP). Data from 1990-94 and 2001-5 show that low-educated single mothers

who enter unemployment experience an increase in UI eligibility but not an increase in UI benefits receipt, when compared to low-educated, single, childless women who enter unemployment. Because of declining cash assistance receipt during 2001-5, UI becomes a more common income support for this population than cash assistance. Further, the probability of accessing the FSP increases among low-educated, single mothers who enter unemployment in 2001-5. As a result, the proportion of this population accessing benefits from at least one of these programs remains similar across the study period.

Chapter 2

Family Bargaining, Women's Power and Its Impact on Child Health in China

2.1 Introduction

This paper examines the net effect of raising mothers' bargaining power over household resource allocation on children's health in China.

There is no issue of male-female bargaining power if the household is viewed as a single decision-maker. However, the literature generally rejects the unitary model of household decision-making (Thomas 1990, 1994; Hoddinott and Haddad 1995; Browning and Chiappori 1998). Alternatively, bargaining theory pioneered by Manser and Brown (1980) and McElroy and Horney (1981), and collective models by Chiappori (1988, 1992) consider individual preferences inside the households, and intra-household distribution of resources. A number of studies have found that women's empowerment has positive effects on household resource allocation, especially in terms of benefiting their children. I provide a detailed discussion of this line of literature in section 2.

I contribute to the existing literature both theoretically and empirically. In theory, I apply a collective model of household behavior to find out the association between women's power and child quality. The model generates some clear theoretical predictions. If mother has positive reservation utility, measured by her headship status or her active participation in the purchasing process of durable goods, raising mother's power will increase child quality.

Empirically, I use the instrumental variable approach to deal with the potential endogeneity of women's power measurements. There are at least three sources of endogeneity in the relationship between mother's power and child outcomes. One is the maternal heterogeneity (or ability bias). If the mother having high socio-economic status tends to be more powerful in family bargaining, she more likely invests in her preferred family affairs such as child human capital. Although some observable characteristics can

be controlled in the regression, estimates are still biased with unobservable characteristics. For instance, high ability women can bring more resources to the marriage through a high level of social capital and extensive social networks, which may simultaneously enhance their power and their capacities to invest more on children in ways unobservable by econometricians. This case would lead to an overestimate of the impact of mothers' power on child outcomes. The second concern is the heterogeneity in the quality of children. Women having high quality children tend to gain more respect from husband and parent in-laws, and therefore to have more voice in family issues. In this case, the reverse causality is a threat to consistency. The third concern involves social norms or custom-based gender discrimination. In societies with patrilocal marriage and patrilineal kinship and inheritance, women are limited to the domestic sphere and have less bargaining power. In the meantime, these regions tend to have stronger preferences for sons and to allocate more resources to sons. In this situation, mother's power measurement would be negatively correlated with child outcomes, and the ordinal least squares (OLS) estimates will have negative signs and be underestimated. All these selection dynamics may cause the OLS estimate to be biased and inconsistent. Therefore, the central task for the empirical study is to identify sources of women's power which vary exogenously. That is, I need an instrument which is strongly correlated with women's bargaining power within the family but not with their decision to invest in child health.

I explore one source of exogenous variation as an instrument for the women's power variables. The instrument is whether local cadres are given economic rewards to implement family planning policy. There are at least two reasons that this incentive scheme can affect women's power at home. On the one hand, the one-child policy causes a large divergence between the ideal number of children and the actual number of children, which makes husbands reliant primarily on wives as old-age support due to wives' specialization in household production. On the other hand, the greater desire for offspring by husbands motivates them to compromise on household issues in order to obtain cooperation from wife in the fertility decision and in failing to comply with the one-child policy.

I use two measurements to proxy for women's power: women as head of household and women as decision-makers in purchasing household durable goods. Using the China Health and Nutrition Survey (CHNS) data in the 1990s, I find supportive evidence in favor of women's empowerment: children in families where the mother had more control over household resources had better Body Mass Index (BMI).

The reminder of this paper is organized as follows. Section 2 presents the literature review. Section 3 provides the background information of China's one-child policy and the instrumental variable. Section 4 is the theoretical framework. Section 5 describes the data, measurement, and summary statistics. Section 6 presents the empirical strategy and results. Section 7 conducts robustness check. Section 8 concludes and makes policy implications.

2.2 Related Literature

This paper relates to three branches of the development economics literature. First, it is related to the literature testing intra-household resource allocation, and household consumption and production decisions in general. Second, it is related to the empowerment-development literature that specifically examines spousal cooperation, women's bargaining power, and its impact on children's outcome. Third, it is related to literature on population policies that dramatically change fertility, child bearing and family dynamics.

2.2.1 Intra-household resource allocation model

The literature has established four types of models regarding intra-household resource allocation: the unitary model (or common preference model); the collective household model; the cooperative bargaining model; and the non-cooperative model. The unitary model, which assumes all members of the household have identical and homothetic utility functions, and the household acts as a single unit, has been widely rejected empirically in both developed and developing countries (Behrman 1997; Haddad, Hoddinott & Alderman 1997).

The most common testable hypotheses associated with this model are to predict that exogenous sources of income such as non-labor income should be spent in the same

manner regardless of which spouse receives it, and it should affect labor supply similarly regardless of who receives it. For example, Schultz (1990) uses data from Thailand to test whether unearned income affects wife and husband differently. He finds strong evidence that the unearned income of women affects their labor supply, but finds that this association doesn't exist for men. Thomas also (1990) rejects the common preference model using survey data on family health and nutrition in Brazil, finding that the maternal income effect is much bigger on these five child health outcomes: calorie and protein intakes, child survival rate, and anthropometric indicators. Quisumbing and Maluccio (2003) similarly suggest that the unitary household model is not a good approximation of household behavior. By using assets at marriage as indicators of bargaining power and applying a single methodological framework to four countries with diverse social and economic conditions, they find that more assets brought to the marriage by women relative to men increase education expenditure shares in Bangladesh and South Africa, while in Ethiopia it is men's relative asset value that increases the expenditure shares on education.

The remaining three models have attempted to disaggregate the household utility function, and incorporate the heterogeneous preferences of individual family members into household allocation decisions. The collective model, proposed by Chiappori (1988; 1992), assumes that household allocations obey a Pareto-efficient sharing rule, and the household utility function can be represented by a linear combination of all members' utility functions. The weight in front of each member's utility function reflects his/her relative power in the household. The cooperative bargaining model, developed by Manser and Brown (1980), and McElroy and Horney (1981), assumes that couples pool their incomes, allocate them jointly, and share pure public goods. They solve a Nash bargaining problem in which couples' threat points are their respective utilities for dissolving the marriage. However, some authors have suggested that divorce may not be the appropriate threat point (Lundberg and Pollak, 1993). The non-cooperative model assumes that households do not pool their income, and that each individual makes consumption and production decisions based on his own labor and non-labor resources.

The testable prediction from these three models is whether a Pareto efficient outcome is attained in the household. Empirical evidence is mixed. Using French data, Bourguignon et al (1993) find results that marginal propensities to consume out of total income are the same across goods, which consolidates the prediction that a Pareto efficient consumption outcome can be obtained. In contrast, Udry's finding (1996) is inconsistent with Pareto efficiency. By using agricultural data from Burkina Faso, he discovers that the crop yields vary between wives' plots and husbands' plots, and a reallocation of labor and fertilizer from husbands' plots to wives' plots can increase the total output. Thus, evidence is inconclusive regarding the issue whether households attain Pareto efficient outcomes. If many households currently stay in the situation of non-Pareto efficient outcomes, policies promoting Pareto improvements will enhance family welfare.

2.2.2 Development-empowerment relationship and its impact on child human capital

The gender gap is persistent in the home, in the labor market and in a number of domains around the world. Many factors contribute to this gender inequality, such as poverty, segregation, and discriminative social norms. It has been widely recognized that developmental policies toward improving women's earning capacity and expanding women's opportunity can reduce their unequal treatment in the household. Since women are primary caregivers of children, their higher decision power will translate into better child outcomes. Many studies of development policies have found evidence to support this. Qian (2008) investigates the effect of post-Mao agricultural reform on the number of missing women and survival rate for children in China. She looks into tea production regions where women have a comparative advantage over men in the production of tea due to the smaller stature of tea trees, and finds that an increase in this sex-specific female income can translate into an increase in the survival rate for girls while increasing the relative income of males worsens the survival rate for girls. Impact evaluations of conditional cash transfer programs such as Mexican government's successful PROGRESA, provide even stronger evidence. Schultz (2001) finds that PROGRESA

educational grants offered to poor mothers in rural Mexico can increase the school enrollment rates for their children in grades three through nine.

A bulk of literature on the Old Age Pension (OAP) program in South Africa has shown that children living in extended families benefit from the pensions received by their grandmothers. Case and Deaton (1998) highlight the behavior effects of pension income and state that female-headed households spend substantially less on alcohol and tobacco. Duflo (2000) evaluates the effect of pension transfers on children's nutritional status and finds that the height-for-age z-scores of younger girls are increased by 1.16 standard deviation, and the weight-for-height z-scores by 1.19 standard deviation. The effect is not significant for boys, suggesting that pension income received by grandmothers eventually leads to better nutrition for girls. Hamoudi and Thomas's analysis of South Africa's pension income (2005) is consistent with the previous findings that the gender of pension recipients and the gender of the child play a role in terms of measuring the size of effects. All these creative studies on OAP are based on the assumption that pension has no impact on the unmeasured characteristics of children who reside with their grandmothers. We should accept this assumption only with great caution, since children's nutrition intake tends to be systematically different between pension eligible and non-eligible households.

A direct command of extra resources caused by policy changes is not the only channel to increase women's power in the household. Rangel (2006) has found evidence that a shift in property rights can affect outcomes for children even when not altering the total amount of household resources. Using a legal change in alimony rights in Brazil as a proxy for an exogenous redistribution of family bargaining power in favor of women, he discovers that women's higher decision power affects the level of investment in schooling of children, particularly for older girls.

Although direct control of monetary resources can contribute to a rise in bargaining power, desirable characteristics such as higher education can also increase women's power at home, which eventually benefits their children. Thomas et al (1991) find that maternal education can raise Brazilian children's height by increasing mothers' access to information, measured by indicators of reading newspapers, watching TV and

listening to the radio. Using household survey data from the United States, Brazil, and Ghana, Thomas (1994) discovers that the impact of parental education on child height is dependent on the gender of parent and the gender of child. The bigger effect of maternal education on daughter's height is explained by the technological differences in child rearing and parental differences in gender preference. Using Brazilian data, Lam and Duryea (1999) also find strong effects of women's schooling on children's schooling and survival rate. All these findings suggest that policies targeted towards women can generate immediate consequences, either causing an increased decision-making role for women in the household or causing an improvement in child human capital. There is strong evidence that women tend to shift greater shares of household expenditure toward children if they are able to control a bigger share of household resources.

We should bear in mind that these findings are not intended to deny men's positive roles in the family. Actually, Edmonds (2004) finds that adolescents aged 13 to 17 are more likely to enroll in school when they live with a pension eligible man than an eligible woman in South Africa.

2.2.3 Population policies, fertility and child outcome

The third strand of literature is related to population policies that change fertility and family dynamics. Under the pressure of resource constraints and attempts to implement sustainable development, many developing countries have highlighted the integration of population policy with development policy in the past decades, and population control has been perceived as an effective way of improving average human capital, especially in populous countries such as China, India, Brazil, Indonesia, Pakistan, and Bangladesh. There are two types of policy interventions in family planning aimed at benefiting women and their families. One is voluntary population policy, which uses incentives and opportunities to influence individual decisions about the timing and quantity of child birth. Most conditional transfer programs work in this way. In Bangladesh, a conditional cash transfer program is in place for girls contingent on their enrolling in secondary school and not getting married before the legal age of eighteen. In Mexico, the anti-poverty program PROGRESA combines cash transfers with financial incentives that encourage families to invest in children's health and education. Poor

mothers in rural marginalized areas are eligible to receive cash transfers if they participate in growth monitoring and nutrition supplements programs; attend education programs about health and hygiene; enroll their children in schools; and obtain recommended vaccinations for family members. Similar incentive-based welfare programs like PROGRESA are being implemented in other Latin America countries. Since such conditional transfer programs increase the amount of resources women can manipulate, they will change the power structure within the household and subsequently affect child human capital.

The other type of population policy is China's one-child policy which adopts a birth quota to control population growth. Since China is a traditionally patriarchal society with a strong preference toward male children, such a mandatory policy may have differential effects across individuals and disproportionately affect less-educated rural couples who heavily rely on sons for old-age support. I will have a thorough discussion of the implementation of the one-child policy in next section.

2.3 Background

In this section, I provide some background information about China's one-child policy and discuss reasons why the cadre evaluation system is a valid instrumental variable for women's power measurement.

China's one-child policy stands out as the strictest and the largest social experiment in the world thus far. The one-child policy was formally started in 1979, and has since affected the lives of every Chinese household. The policy initially stipulated that each couple could have only one child except under special circumstances such as one or both of the couple are minorities; both spouses are single children; spouses engage in dangerous industries such as mining; or a first-born child is handicapped. Under these rules, women are given birth quotas, and households are penalized for above-quota births. Local cadres (including village cadres) are given economic incentives to enforce the policy in order to meet the goal of reducing the fertility rate. This nationwide campaign was accompanied by a large-scaled sex-selective abortion, sterilization, and female infant abandonment in the early 1980s (Greenhalgh 1985). To curb these negative social

consequences, the central government amended the policy in 1984 under the name "Document 7". This produced two changes. First, rural couples were now allowed to have a second birth if the first child is a girl. Second, family planning responsibility was decentralized from the central to local governments, allowing for regional variation in the strictness of family planning policies. I use the regional and temporal variation in local cadres' implementation of family planning responsibility systems as an instrument for measuring women's power. I will discuss shortly how this implementation system acts as a force to modify women's power in the family.

The family planning responsibility system is operated at all levels of governments. The central government sets population targets and directions; the State Family Planning Commission, a bureaucratic division of the central government, is responsible for translating it into doable policies and guidelines, and communicates them to their counterparts at the provincial levels. Local family planning cadres are probably the most important level of bureaucracy involved with the day-to-day implementation of these policies. Local cadres, hired at the county, township or village level, work closely with local residents, and can adjust implementation according to local conditions within birth control quotas set by the upper administration. A strict cadre evaluation system is in place, which assesses local cadres by their performance and ability to meet quotas on a regular basis, and their job tenure, promotion and salaries are all related to their performance outcome. At the operational level, they adapt a variety of policy enforcement methods according to local conditions. These methods range from moral persuasion; provision of certain conceptive methods (such as Norplant or IUDs); and follow-up reproductive health services to women to the use of more coercive methods such as heavy fines, female sterilization, and forced abortion for couples with unauthorized births. Recently, the one-child policy has been implemented with less coercive methods and couples are provided with financial rewards if they are willing to stop at one child. Such policy adjustments may be caused by a shift in social norms so that rural couples now accept smaller families. They may also be by-products of the one-child policy such as dwindling numbers of children, huge old-age dependency ratios, and

imbalanced male-female sex ratios, along with other negative social impacts such as rising crime (Edlund et al 2007).

I use the cadre evaluation system as an instrument for women's decision power in the household. There are at least two channels through which this policy instrument can modify family dynamics. First, the cadre evaluation system does not take into account the availability of formal old-age support in particular regions, and the large divergence between the ideal number of children and the actual number of children may cause men to increasingly rely on their spouses as primary caregivers for old age. The pension system only operates for the urban population, and rural couples largely rely on children, especially sons, for old-age support. If local cadres are given large economic incentives to implement birth control, they may promote more oppressive contraceptive methods such as forced abortion and female sterilization in order to meet the goal. As a consequence of stricter enforcement, couples will have fewer numbers of children. The discrepancy between the ideal and actual number of children may alter traditional old-age support patterns, causing husbands to recognize the necessity of using wives as old-age support due to women's specialization in household production. The forced adjustment in old age support plays a positive role to increase women's decision-making power in the household.

Second, the greater desire for offspring by husbands motivates them to compromise on household issues in order to obtain cooperation from wife in the fertility decision and in failing to comply with the one-child policy. The literature has provided some evidence that there is significant difference in fertility preferences between husbands and wives. Using household data from the Malaysia Family Life Survey, Rasul (2008) finds that, among Malays and Chinese couples, husbands desire significantly more children than their wives. This disagreement on fertility preferences is largely driven by husbands' desire for more sons. The CHNS dataset doesn't ask questions related to couples' fertility preferences, and I can not test the degree of conflict over fertility preferences within Chinese couples. However, since patriarchal attitudes are also rooted in Chinese society, it is very likely that husbands desire more sons than wives, and that non-compliance with one-child policy is greater within these families.

There are large variations across the country regarding the ease of implementing birth control policy. In those areas with stronger preferences for male children and for larger families, local cadres will confront greater resistance and disobedience from couples. Therefore, they have to be remunerated by upper administration to enforce the policy. Table 3 shows that neighborhoods with cadre evaluation system in place are systematically different than neighborhoods without that policy. On average, neighborhoods implementing the policy have 15 percent more residents and are 16 kilometers more distant from the provincial capital than neighborhoods without implementing the policy. In addition, those areas are characterized by relatively poorer development indicators: female unskilled workers earn less; roads in the neighborhood are less likely to be paved; and primary schools and middle schools are more distant from the neighborhood. There is no significant difference between wages of male unskilled workers in these two areas. Since wives' decisions for fertility and collaboration for compliance with the birth policy is so crucial for families living in those remote populous areas, husbands have to make concessions on family issues and behave in more cooperative manner.

My identification assumption is that conditional on family and individual characteristics, this cadre evaluation system is unlikely to directly affect children human capital except through its effects on their mothers' intra-household bargaining power.

2.4 Theoretical Framework

2.4.1 Set-up and first order conditions

This section presents a collective household model to assess the effect of mothers' bargaining power on child quality in general. Women's bargaining position in the household is determined by her reservation utility and her preference for child quality.

Consider one household with two working-age parents and one child, with each parent caring about his/her private consumption, leisure, as well as their child's quality. Child quality is a household public good and producing child quality involves some costs. To simplify the model, I make two assumptions. First, there is no tradeoff between child quality and quantity. The utility from multiple children is simply the duplication of utility

from one child. This assumption is less strict in the Chinese context since couples are subject to fertility regulations caused by the one-child policy. Second, the individual utility function is separable between the child quality and the private goods that involve consumption and leisure. According to Chiappori and Ekeland (1999), when there is a public good, identification can be achieved under the separability hypothesis.

Let the utility U_i of each parent i (where $i=f$, m denoting father and mother respectively) be a function of own consumption goods C_i, own leisure l_i, and child quality Q. Specifically, the utility function for each parent i is separable in private goods (C_i, l_i) and child quality Q as below:

$$U_i = U(C_i, l_i, Q) = \log C_i + \alpha_i \log l_i + \beta_i \log Q \qquad (1)$$

where α_i is parent i's preference for own leisure relative to own consumption; β_i is parent i's preference for child quality relative to own consumption. It is worth mentioning that parental preference α_m *and* α_f may differ between mother and father. The two parents jointly consume the public good Q. The prices of mother's composite good and father's composite good are denoted as p_m *and* p_f, respectively. The child quality Q can not be purchased directly from the market, but is produced by some convex cost function $c(Q)$ with increasing marginal cost. That is, both the first order derivative and the second order derivative of $c(Q)$ are positive: $c_q>0$ and $c_{qq}>0$.

In a collective model of household, I characterize the constrained programming problem by maximizing father's own utility subject to mother's utility no less than some positive reservation value, and budget constraint. The optimal choice for variables (C_f^*, C_m^*, l_f^*, l_m^*, Q^*) is the solution of the following maximization problem:

$$\begin{cases} \max \quad U_f = \log C_f + \alpha_f \log l_f + \beta_f \log Q \\ s.t. \quad U_m \geq \overline{U}_m \\ \qquad U_m = \log C_m + \alpha_m \log l_m + \beta_m \log Q \\ \qquad p_m C_m + p_f C_f + c(Q) \leq Y + M \\ \qquad Y = w_m H_m + w_f H_f \\ \qquad H_m + l_m = 1 \\ \qquad H_f + l_f = 1 \end{cases} \qquad (2)$$

where $\overline{U}_m$ is mother's reservation utility. The total household monetary spending should be no more than total wage earnings *Y* and non-labor income *M*. *Y* comes from two parents' wage earnings. w_m is mother's wage rate, and w_f is father's wage rate. H_m is mother's labor supply, and H_f is father's labor supply. In case of one parent not working, w_m or w_f is their respective shadow wage. Each parent has time endowment 1, split between working and caring for child. After setting up the Lagrangian function, I get the following First Order Conditions (F.O.C.s) that can be employed in the identification of the parameters of interest (see proofs in Appendix).

$$F.O.C.s \quad \Leftrightarrow \quad \begin{cases} \mu = \dfrac{1}{p_f C_f} \\ \lambda = \dfrac{p_m C_m}{p_f C_f} \\ \dfrac{l_f}{C_f} = \dfrac{\alpha_f p_f}{w_f} \\ \dfrac{l_m}{C_m} = \dfrac{\alpha_m p_m}{w_m} \\ \beta_f p_f C_f + \beta_m p_m C_m = c_q Q \end{cases} \tag{3}$$

2.4.2 Applying the Implicit Function Theorem

My goal is to obtain the effect of mother's bargaining power $\overline{U}_M$ on child quality *Q*, namely, the sign of $\dfrac{\partial Q}{\partial \overline{U}_m}$. The implicit function theorem is the ideal tool to be employed in identifying the relationship between the variable *Q* and the parameter $\overline{U}_M$. According to the first order condition for the child quality *Q*, I define the function *F(.)*:

$$Define \quad F(Q, \quad \overline{U}_m) = \beta_f p_f C_f + \beta_m p_m C_m - c_q Q$$

After taking derivatives over Q and $\overline{U}_M$, respectively, I obtain the following equation indicating the effect of mother's bargaining power on the child quality(see proof in Appendix); namely

$$\frac{\partial Q}{\partial \overline{U}_m} = -\frac{\frac{\partial F}{\partial \overline{U}_m}}{\frac{\partial F}{\partial Q}} = -\frac{(\beta_m - \beta_f) p_m C_m}{-(\beta_m - \beta_f)\frac{\beta_m p_m C_m}{Q} - (\beta_f + 1)c_q - c_{qq}Q} \tag{4}$$

Clearly,

$$sign\left(\frac{\partial Q}{\partial \overline{U}_m}\right) = sign\left(\beta_m - \beta_f\right) \tag{5}$$

The above condition suggests that an increase in mother's reservation utility can increase the child quality if the mother's reservation utility is positive, and the mother's preference for the child quality is stronger than the father's ($\beta_m > \beta_f$). Since I use the value of reservation utility to represent mother's bargaining position in the household resource allocation, the above discussion directly leads to the following proposition:

Proposition 1 *Suppose the cost function of the child quality is twice differentiable and the marginal cost is increasing; and the mother's reservation utility is positive. Then, in equilibrium, if mother cares more about the child than father does, an increase in mother's bargaining power in the household will increase the child quality.*

This piece of theoretical prediction regarding the relationship between bargaining power and child quality puts forward the importance of raising mother's power in the household domain. This is particularly relevant in the developing world where there is persistent gender discrimination in the household and patriarchal attitudes value the social status of men over women. There are at least two ways to increase mothers' reservation utility value. One is directly related to mothers' earning capacity, including channels to increase their wage rate, working hours or opportunities to participate in employment-related activities, or opportunities to obtain non-labor incomes from transfers (empowering them with the right to inheritance or welfare receipts). The other is related to distributional factors which don't affect the household budget set but influence the intra-household decision process substantially. These factors can include spouses' relative attributes in educational attainment, health status, occupation, and other

socioeconomic indicators. The following empirical analysis provides evidence that, when mothers have positive reservation utility, an increase in mothers' power will increase child quality.

It is worth mentioning that the above proposition only holds when the mother's reservation utility is positive. When her reservation utility equals zero, no conclusion can be reached. The possibility is that the mother is entirely powerless in the household, and the husband has absolute power to decide child quality. In this case, child quality is completely determined by husband's characteristics and wife plays no role in determining child quality. In the appendix, I provide some evidence that, when the mother has zero reservation utility (measured by her non-participation in the purchasing decision), her attributes are unrelated to child quality.

2.5 Data, Measurements and Summary Statistics

2.5.1 Data and Measurements

The empirical analysis is based on longitudinal household survey data from the 1991 and 1993 waves of Chinese Health and Nutrition Survey (CHNS), administered by the Population Center at the University of North Carolina at Chapel Hill. Although the most recent CHNS dataset is wave 2006, the questions about home-asset decision-makers were no longer included in surveys after 1997. Therefore, I only use two earlier waves of data in my study. By using a multistage random cluster process, this survey draws its sample of approximately 4400 household with 16000 individuals each wave from eight provinces in China, including two rich eastern coastal provinces, four middle-income provinces and two poor inland provinces. The survey expands to nine provinces since the wave of 2000. Within each province, the provincial city, one low-income city and four rural sites are randomly selected with a total number of 24 communities. The survey includes a wide range of information on health, nutrition, and daily activity for each person residing in the household. In particular, it records fertility and marital history for each married women, which allows me to control household characteristics. The restricted community-level dataset provides useful information on the demographic and economic conditions of each community, ranging from commodity price, infrastructure,

revenues and expenditures, family planning, and policy implementation. I have gained full access to this restricted dataset after fulfilling the requirements of the data administrative center.

I focus on the nutrition and health status of children aged 2-15 years old. Since my definition of women's power is reflected in her bargaining with her spouse, I only include those children with both parents' information available in the survey. The Body Mass Index (BMI), calculated by the ratio of weight over the square of height (km/m^2), is used as the dependent variable. I adopt it for two reasons. First, the literature has well documented that the BMI, an anthropometric indicator, can serve a good proxy for the short-run nutritional status of children, both low BMI and high BMI serving as early indicators of future health problems and later productivity (Sen 1990; Strauss and Thomas 1998; Fogel 1998). Second, the BMI is less vulnerable to measurement error than other well-being indicators since its calculation is only based on two simple measures: height and weight. Based on the BMI, I also create two dichotomous variables, namely underweight and overweight, with a value of 1 indicating a bad health outcome. Since children have different growth pattern than adults, I adopt the age-gender specific cutoff values created by Cole et al (2000, 2007) (see Table A3), who use six international surveys from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and the United States to generate an internationally comparable prevalence rates of thinness and fatness in children and adolescents. I drop those outliers with a BMI value less than 10 or more than 50.

The key variable of interest is women's power status at home. I create two measurements. One is an indicator of mother's headship in the household, and the other is an indicator of mother as the decision-maker for purchasing household durable goods. The CHNS's definition of household head is consistent with the standard definition of headship in China. Head is recognized as the household member who plays a decisive role in family issues, either the major economic provider or owner of the house, and is listed in the *hukou* register. The *hukou* system, or Chinese household registration system, divides Chinese citizens into urban residents and rural residents. This urban-rural divide outlines an individual's rights to entitlements with a rural *hukou* linked with a plot of

farmland and a site for building own house while a urban *hukou* linked with much more favorable welfare such as subsidized housing, public education, pension insurance, employment and work safeguard. Since its inception in 1958 as a developmental policy targeting heavy industrialization, the *hukou* system has transformed Chinese society dramatically and been increasingly recognized as a barrier to further development. Each household is distributed with one *hukou* register booklet which lists information of all relevant household members with one as head of household. The CHNS sample shows that 6.5 percent of children live in mother-headed household. By taking account for the possibility that enumerators mistakenly assign wife as head of household simply because husband was not at home during the interview time, I checked whether wives switched their headship status between two waves. I find that 96.5 percent of women held the same type of headship in both waves; only 1.4 percent of women, totally 26 women, switched from head to non-head from 1991 to 1993. Therefore, the misclassification of headship is not an issue in my study.

The second power measure is based on women's role in purchasing household durable goods. The survey contains questions such as "*who in your household decided to buy this item?"* There are twelve total items in the list, including radio/ tape recorder, VCR, black-white TV, color TV, washing machine, refrigerator, big wall clock, microwave oven, sewing machine, electric fan, camera, electric rice cooker, and pressure cooker. It can be seen that telephone and computer was not even included in the list at that time. As for the types of decision-makers, the survey includes four categories: husband decides, wife decides, husband and wife jointly decide, and other members decide. I create a composite index to proxy women's decision power in two steps. In the first step, for each women living in household *j* and owning asset *k (k=1,2,…12)*, I create a categorical variable $WOMENROLE_{jk}$ as defined below:

$$WOMENROLE_{jk} = \begin{cases} 0 & if \quad husband \quad decides \quad alone \\ 0.5 & if \quad couple \quad jo\,\text{int}\,ly \quad decides \\ 1 & if \quad wife \quad decides \quad alone \end{cases} \tag{6}$$

The value 0.5 is obtained by taking the expectation of 0 and 1. When couples claim that they make joint decision, we can not observe the underlying decision making process. It

may be 50-50, or 90-10 or 20-80 split, so on and so forth. I can only impose strong assumption that the joint decision is equivalent to 50-50 split.

In the second step, I construct a continuous variable $WOMENSHARE_j$ as the weighted average share of total household asset values which women decide to buy. See below:

$$WOMENSHARE_j = \frac{\sum_{k=1}^{12} womenrole_{jk} * assetvalue_{jk}}{\sum_{k=1}^{12} assetvalue_{jk}} \quad (7)$$

For instance, given that household *j* only owns four assets: color TV, fridge, washing machine, and camera with each asset valued at 3000, 1800, 450, 580 respectively, the couple make a joint decision on the purchase of TV and fridge while the woman alone decides to buy the washing machine and husband alone decides to buy the camera, the wife's share would be calculated as following:

$$e.g.\quad WOMENSHARE_j = \frac{\begin{array}{l} womenrole(colorTV) * assetvalue(colorTV) \\ + womenrole(fridge) * assetvalue(fridge) \\ + womenrole(washingmachine) * assetvalue(washingmachine) \\ + womenrole(camera) * assetvalue(camera) \end{array}}{\begin{array}{l} assetvalue(colorTV) + assetvalue(fridge) \\ + assetvalue(washingmachine) \\ + assetvalue(camera) \end{array}}$$

$$= \frac{0.5*3000 + 0.5*1800 + 1*450 + 0*580}{3000 + 1800 + 450 + 580} = 0.489$$

Her share equals .489 implying that she makes decision to buy 48.9 percent of total assets in her household, and her husband makes decision on the remaining 51.1 percent. I calculate this share for each household. Figure 1 presents the distribution of *womenshare* variable with a range of 0-1. As is shown in the histogram, nearly 45 percent of households make the purchasing decision jointly. Women in 22 percent of households are completely powerless and their husbands behave as a dictator. In the remaining households where women have at least some positive decision power, men are more powerful in nearly 21.6 percent of households and women are more powerful only in 11.3

percent of households out of the sample. The graph is heavily left skewed indicating that husbands still dominate the decision making process in the household and wives have less power in general.

Based on the distribution of *womenshare* variable, I create a dichotomous variable *womenmorepower* to be used in the estimation equation.

$$WOMENMOREPOWER_{jk} = \begin{cases} 0 & if \quad 0 < womenshare < 0.5 \\ 1 & if \quad 0.5 < womenshare \leq 1 \end{cases} \tag{8}$$

I make two sample restrictions. First, since the theoretical prediction only holds when the mother has some positive reservation utility, I exclude those households with men behaving as a dictator and women being completely powerless (*womenshare* equals to 0). Second, I exclude those households with couples making joint decisions. The final sample only includes households in which men make more decisions (*womenshare* is less than 0.5) or women make more decisions (*womenshare* is greater than 0.5).

Figure 2 and Table 1 describe the composition of household durable goods. I divide the entire set of goods into four types: clothing production and maintenance; food preparation and storage; non-entertainment electric goods and entertainment electric goods. The clothing production and maintenance category includes two goods: sewing machine and washing machines. Here, wives make the highest share of decisions: 22% and 16%, respectively. The food preparation and storage category includes three goods: refrigerators, electric rice cookers and pressure cookers. Here, wives make the second highest share of decisions. The non-entertainment category includes electric fans and big wall clocks; and the entertainment category includes color TVs, black/white TVs, radio/tape recorders, VCRs and cameras. Here, wives are least likely to make purchasing decisions, and the decision share is only about 6 percent. Table 1 provides additional information about the goods composition. It can be seen that in the early 1990s, camera and VCR belong to luxury goods and the majority of the households don't own them.

Three sets of variables are used as predictors of women's power in the first stage regression of IV estimation, or as predictors of child health outcome in the IV-2SLS regression. The first set of variables are child characteristics-age and gender. The second set of variables measure mothers' individual attributes relative to those of fathers,

including whether the mother is better educated; whether the mother currently works while the father does not; whether mother is official cadre while father not, whether mother is minority while father not, whether the mother self-reports health as excellent or good while the father does not; whether the mother does household chores while the father does not; and whether the mother has lower wage than the father. Since a large fraction of women's wage information is missing, I replace those missing values as zero. In the meantime, I create a dummy variable with 1 indicating those women with missing wage information, and 0 for others. By doing so, I am able to include more observations into the analysis. The father-mother age difference and their respective BMI values are included as measurements of parental endowed attributes. These relative characteristics of mothers may reflect her comparative advantages in the spousal relationship. The third set of variables are household-level characteristics, including parents' marital status, residency location, total number of own children in the household, household size, living arrangement with parent-in-laws and household gross income. The Appendix Table A2 explains these measurements in detail.

2.5.2 Descriptive statistics about mother's headship (*headship*)

It is a mystery why women are head of household when men are present in the household. What predicts women's decision power in the household? Table 2a describes summary statistics about characteristics of children and their parents by the type of headship. Female-headed households account for 5.2 percent of total sample. Children living in mother- headed households tend to have higher BMI value, and to be a little bit older. Their mothers' relative attributes differ sharply between these two types of households. Female heads seem to be more able than their spouses. In female headed households, women tend to have higher socioeconomic status as shown by better educational attainment; more active participation in the labor market; greater likelihood of holding an official position; more time spent on household chores; less likelihood of being a minority. In terms of household characteristics, female heads have higher household gross income and smaller family size; are more likely to live in urban sites; and are less likely to co-reside with parent-in-laws. Unlike the living arrangements in the United States where the number female-headed household is almost equivalent to the

number of unmarried single women households, the majority of female heads in China are married (95 percent in this sample). These results imply that women with relatively higher socioeconomic status are more likely to take the role of headship in China. One thing worth mentioning here is that female headship is more likely in cases where wives are younger than their husbands, which is in contrast with the typical impression that older husbands play a dominant role in the household affairs.

2.5.3 Descriptive statistics about mother as decision-maker (*womenmorepower*)

Table 2b summarizes the characteristics of children and their parents according to mothers' decision-making power. Out of 1054 observations, 34.2 percent of children live in households with mother having more purchasing power. Children in these cases tend to have higher BMI value. Their mothers are more likely to have a formal job, do housework, and be healthier. They live in smaller households with fewer children, and less likely to live with parents in-laws. These characteristics are more or less similar to those obtained from the headship sample. One big difference is that households in which women have more power tend to be poorer. The possible reason is that women have more power in purchasing those low-valued goods such as sewing machine, and much less power in purchasing those high-valued goods such as color TV. The households owning low-valued goods are generally poorer than their counterparts owning high-valued goods.

2.6 Estimation Strategy and results

If mother's power measurement is randomly assigned across households, we could use OLS to estimate the following specification:

$$Childhealth_{ijt} = \alpha_0 + \alpha_1 Motherpower_{ijt} + \alpha_2 t + X_{ijt}\beta + \varepsilon_{ijt} \quad (9)$$

where $Childhealth_{ijt}$ is an outcome for child i in household j at time t $(t=0,1)$. I will run three separate regressions with these three different dependent variables, namely the logarithm of BMI, underweight, or overweight. $Motherpower_{ijt}$ is the key variable of interest for the mother of child i in household j at time t, represented by two measurements- *Headship* or *Womenmorepower*. My main focus is on the estimate of α_1 and I expect $\alpha_1>0$. X_{ijt} includes all three sets of controls: children's age and gender, their mothers' relative attributes in comparison to those of fathers', and household-level

characteristics. ε_{ijt} captures the idiosyncratic errors. However, mother's power status is unlikely to be randomly assigned and selection on observables or unobservables is possible. Therefore, the coefficient on *Motherpower*, α_1 need not represent the causal impact of mother's power on child outcome variables. I need to isolate a source of variation in mother's power that is exogenous with respect to child outcomes. The instrumental variable I adopt is the local cadre evaluation system: whether local cadres are given economic awards to implement family planning policy. I hypothesize that households living in communities with cadre evaluation system in place will see an increase in women's power at the domestic sphere.

The first stage regression equation can simply be written as below:

$$Motherpower_{ijt} = \lambda_0 + \lambda_1 Cadre_{jt} + X_{ijt}\beta + \psi_{ijt} \quad (10)$$

where $Cadre_{jt}$ is an indicator whether the local community adopts the cadre evaluation system. The predicted value of *Motherpower* from the first stage, *PredMotherpower* is used in the second stage regression:

$$Childhealth_{ijt} = \alpha_0 + \alpha_1 \Pr edMotherpower_{ijt} + X_{ijt}\beta + \varepsilon_{ijt} \quad (11)$$

To be a good instrument, the *Cadre* variable only affects the child outcome variable via the endogenous *Motherpower* variable, and not through any other channels. In the section of Robustness Check, I provide some evidence against potential violations of this exclusion restriction.

2.6.1 Health Consequences of Mother Being Head (IV)

The first stage estimates are presented in Table 4a. As expected, women living in places where local cadres are given economic rewards to implement family planning policy have a higher probability of being heads of household. The coefficient on the c*adre* variable without adding controls is .013 and statistically significant. The coefficient is increased to .019 after adding controls, and it remains statistically significant. It is always mysterious what predicts women's headship in a family when the couple co-reside. The estimated coefficients provide some suggestive evidence on factors contributing to headship. First, a wife who has higher socioeconomic status (SES) than husband is more likely to be head of household. These SES indicators include better educational attainment, holding an official position, not being a minority, and doing more

housework. This doesn't imply that females in female-headed households are more able than those in male headed households: It simply indicates that female heads tend to be more able than their spouses. Household-level factors such as being married, living in urban sites and not living with parents-in-laws all increase women's likelihood of becoming head of household.

Table 4b presents the second stage IV estimates. I list OLS and IV results by pairs for convenience of comparison. In my preferred specification (Column 2,4,6), the IV estimates indicate that children whose mothers are head of household enjoy higher BMI and a higher probability of becoming overweight, and these two coefficient estimates are both statistically significant. The IV coefficient estimate is not statistically significantly different from zero in the underweight regression. Among the coefficient estimates of all covariates, the estimates on both parents' BMI are big and statistically significant, presenting strong evidence of intergenerational similarity in terms of weight status and underlying diet habits. Consistent with the literature, household income has a significant effect on child nutrition status. The Hausman test for endogeneity (F-statistic) clearly indicates that OLS estimates are inconsistent for my model.

2.6.2 Health Consequences of Mother Being Decision-maker (IV)

For the endogenous decision-maker variable, the first stage estimates are presented in Table 5a. Consistent with findings derived from the headship sample, women living in areas with cadre evaluation system in place tend to have a higher probability of making decisions in purchasing household durable goods. The coefficient on the *cadre* variable is .061 without controls and .087 with controls, both being statistically significant. Again, in contrast with the usual impression that older husbands tend to dominate family issues, the evidence here shows that wives with older husbands have more decision power. Although coefficient estimates on other covariates are not statistically significant, most of them have the expected sign. Living in a large household has a negative and statistically significant impact on women's decision power.

To analyze the effect of women's decision-making status on their children's health, I regress the three health outcomes on the power measurement, respectively. Table 5b presents both OLS and IV regression estimates. As in the first stage regressions,

I control for provincial fixed effects, time trend and a vector of control variables in all regressions. The IV estimates is positive and statistically significantly different from zero only in the BMI equation. The IV estimates in both overweight and underweight equations are not statistically different from zero.

Overall, the findings from these two power measurements are consistent. Children in families where their mothers have more control over household resources have better BMI.

2.7 Robustness Checks

In this section, I present several different pieces of evidence to verify the empirical validity of my findings.

2.7.1 Composition of household goods

As discussed above, women's decision making status varies a lot among different types of household durable goods. Women tend to make more decisions when purchasing low-valued goods, and make fewer decisions when buying high-valued goods. I divide the twelve goods in the sample into two broad categories: female-type goods vs. male-type goods. The female-type goods are those goods closely related to housework production, including sewing machine, washing machine, refrigerator, electric rice cooker and pressure cooker. In contrast, the male-type goods are those goods mainly for entertainment and non-essential usage, including color TV, black/white TV, radio/tape recorder, VCR, camera, electric fan and big wall clock. Panel A of Table 6 presents the estimation results. Despite the fact that women make more purchasing decisions in female-type goods, raising their power does not necessarily have an effect on their children's quality. Instead, it is when women make more buying decision in male-type goods that it contributes to their children's nutrition status.

2.7.2 Decision-making status measured by the total number of goods (non-monetary)

The variable *womenmorepower* is constructed by using information about women's decision role and the monetary value of each household goods. The empirical work reveals the relevance of pecuniary value and decision power. One possible concern

is whether the quantity of household goods plays a role in the decision power equation. Based on the *womenrole* variable, I construct an index: $womenquantity = \frac{1}{N}\sum_{i=1}^{N} womenrole_i$, indicating the fraction of total number of household goods women make decision. This index is irrelevant to monetary value of goods. Surprisingly, the coefficient estimate is not statistically significant (Table 6, Panel B), which highlights the relative importance of quality over quantity in defining women's decision power.

2.7.3 Sample selection issues

The current sample includes all children aged 2-15 years old in both urban and rural areas. The immediate concern is whether the empirical findings hold for subsamples such as urban vs. rural, girls vs. boys, one-child families vs. multiple-child families.

First, empirical studies have found that the one-child policy is stricter in urban sites than in rural sites (Zhang and Spencer 1992). Violation of birth quotas in cities can cause a lost in promotions or bonuses, or even a job. Thus, the higher degree of compliance with the one-child policy in cities makes the work of family planning cadres easier. In sharp contrast, villagers are not employed by any formal work units and their compliance with one child policy is closely associated with the strictness of the policy implementation. Lack of pension systems for old-age support and stronger preferences for sons makes many rural couples have above-quota births. The CHNS sample shows that more than 45 percent of urban households have only one child while the ratio is only 14 percent among rural households. I perform the same estimations using the rural and urban subsamples separately. Panel A of Table 7 documents the results. The IV coefficient for logarithm of BMI in the rural sample is large but statistically insignificant while the analogous IV coefficient in the urban sample is positive and statistically significant.

Second, separate estimations are performed among female and male child subsamples. Panel B of Table 7 shows that the estimates for girls are strong and statistically significant while they are insignificant for boys. Moreover, the results that mother's power status may affect girls more than boys are consistent with existing

literature that it matters who controls and receives the household resources (Thomas 1994).

Third, I conduct separate estimation for one-child families versus multiple-child families. Compared with children without siblings, children with siblings tend to have better nutrition status (Panel C, Table 7). This doesn't say that children in single-child families are not well fed by their mothers. Instead, this result may reflect that in one-child families, the child is pickier about food and has easier access to a wider range of snacks.

2.7.4 Inclusions of community-level variables

Although the inclusion of provincial fixed effects as well as a wide range of control variables in the regression can account for observable heterogeneity, the community-level heterogeneity could still affect the major findings. For instance, the level of local economic development may affect both the adoption of the cadre evaluation system and child health. In general, the economic rewards to cadres are paid out of local revenues. If wealthier communities are more likely to reward cadres for their implementation of family planning policy, and wealthier households spend more on their children, then the estimated impact of mother's power on child health will be biased upwards. To inspect the extent to which local economic situations might bias the results, I include two additional controls in the regression. One is average per capita income, and the other is an indicator of having electricity power cutoff at least one day per week. These two variables capture the overall income and infrastructure advancement at the local level. It turns out the coefficients on these two controls are very small and statistically insignificant, and the coefficient on women's power measurements remain the same. (In order to save space, results are not reported here.)

2.8 Conclusion and Policy Implications

This paper develops and tests a simple model of household bargaining to address the association between women's decision power and child outcome. The model generates a clear theoretical prediction that, when the mother has stronger preference over child quality than the father does and mother's reservation utility value is positive, an increase in mother's bargaining power can benefit the child. I test the model using

household data from China going back to early 1990s. The empirical evidence is consistent with the theory: women who are heads of household or the primary decision-makers in purchasing household durable goods tend to have children with better body mass index.

From the theoretical perspective, the model in this paper underlines the importance of jointly using parental preferences for child quality and reservation utility as a proxy for mother's decision position in the household. The empirical work reveals that the types of decisions matter. First, it is the quality of household goods rather than the quantity that contributes to women's greater power status and children's better nutrition status. Women making more purchasing decisions over those high-valued goods are more likely to spend in ways that benefit their children. Second, total monetary value rather than the total number of household goods matters for the child quality.

Both theoretical predictions and empirical findings emphasize the importance of raising mothers' power in the household domain. This is particularly relevant for developing countries where there is persistent gender inequality in households. Two types of policy interventions are feasible. One is related to a direct impact on women's earning capacity: an increase in wage rate, an expansion in employment opportunities, or a boost in receiving non-labor income through inheritance or welfare transfer. The other is to increase women's human capital stock, which can modify the distributional process in the household in favor of children while maintaining the household budget unchanged.

The last thing worth mentioning is that my findings come from a sample where couples have unequal power over household resources- either husbands enjoy more power or wives enjoy more power. The model can not predict the child's wellbeing in a framework where spouses cooperate and have equal power.

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Figure 2.1: Distribution of Women Decision Power Measurement

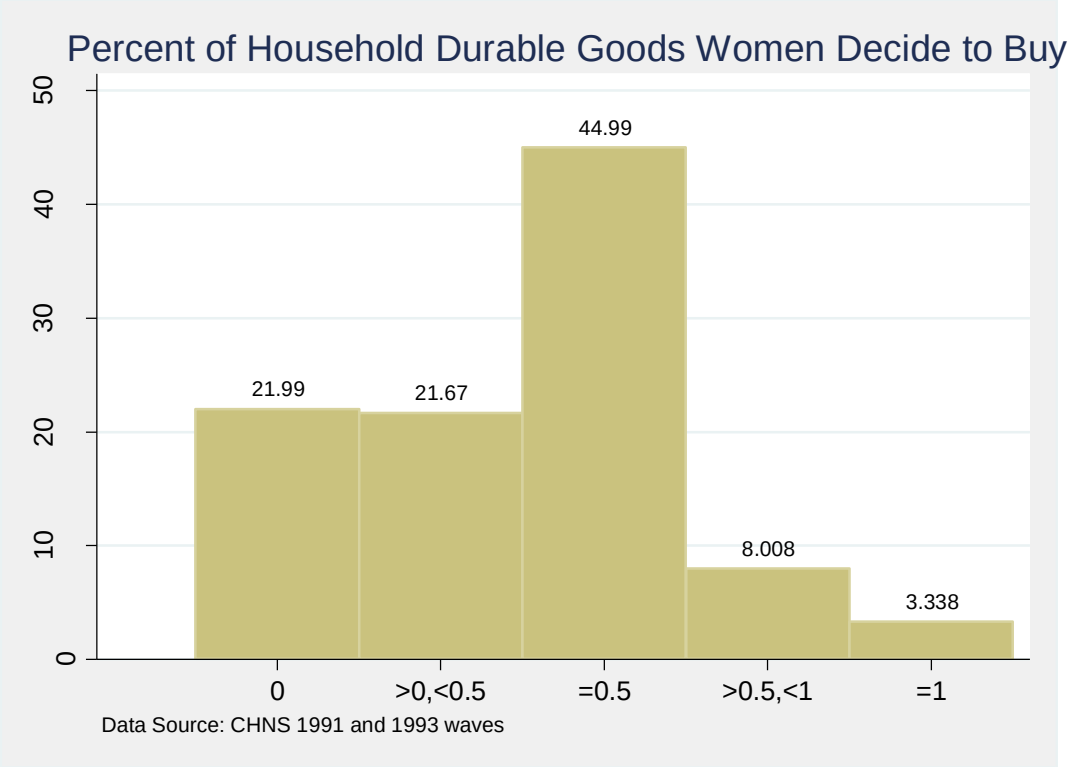
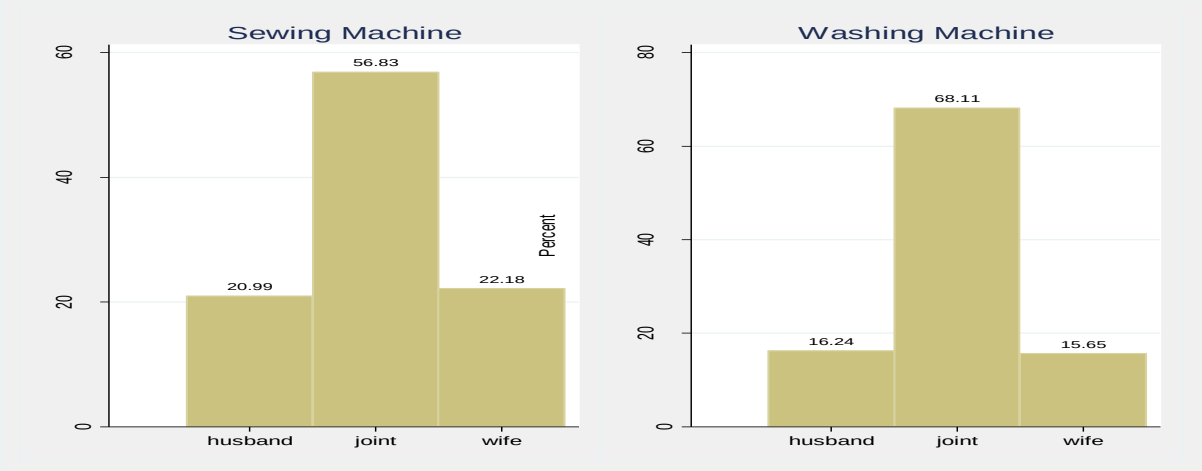
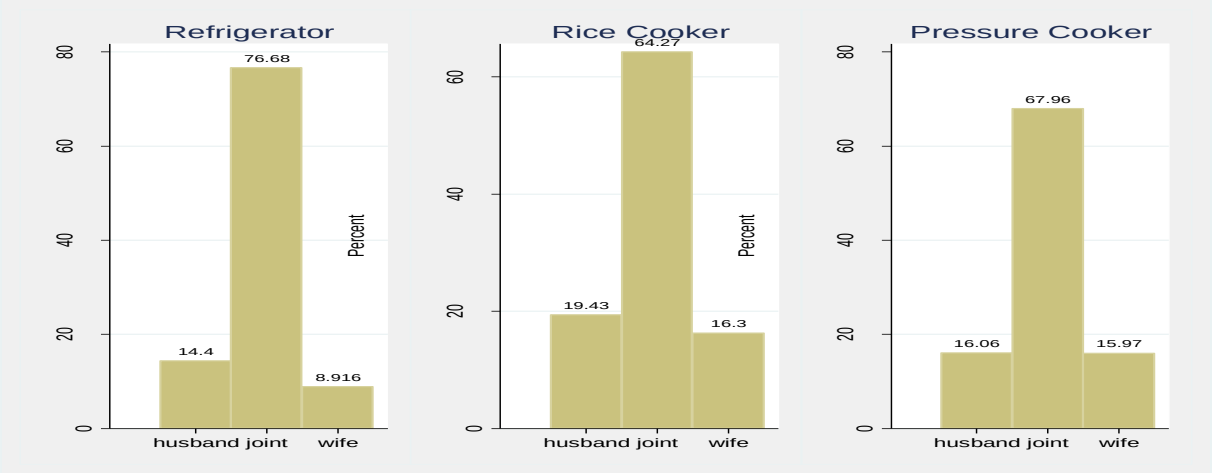


Figure 2.2: Distribution of Three Types of Household Decision Making in Durable Goods Purchases

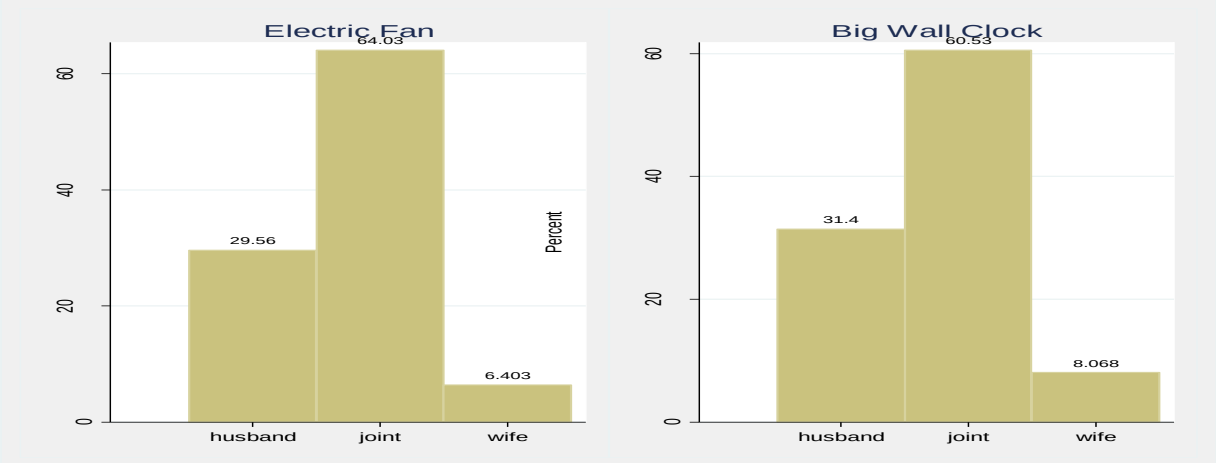
Panel A: Clothing Production and Maintenance



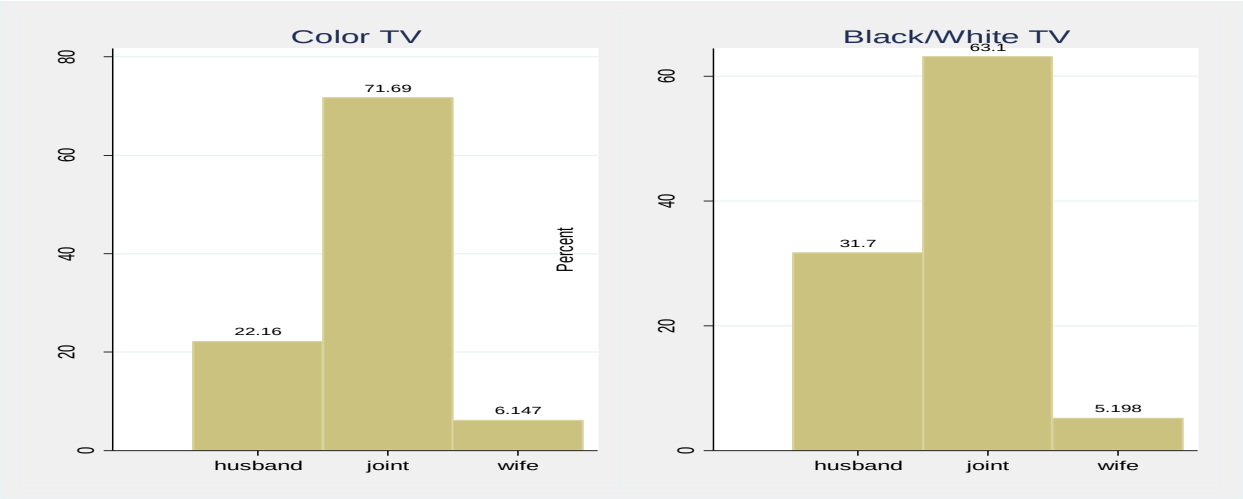
Panel B: Food Preparation and Storage



Panel C: Non-entertainment Electric



Panel D: Entertainment Electronics



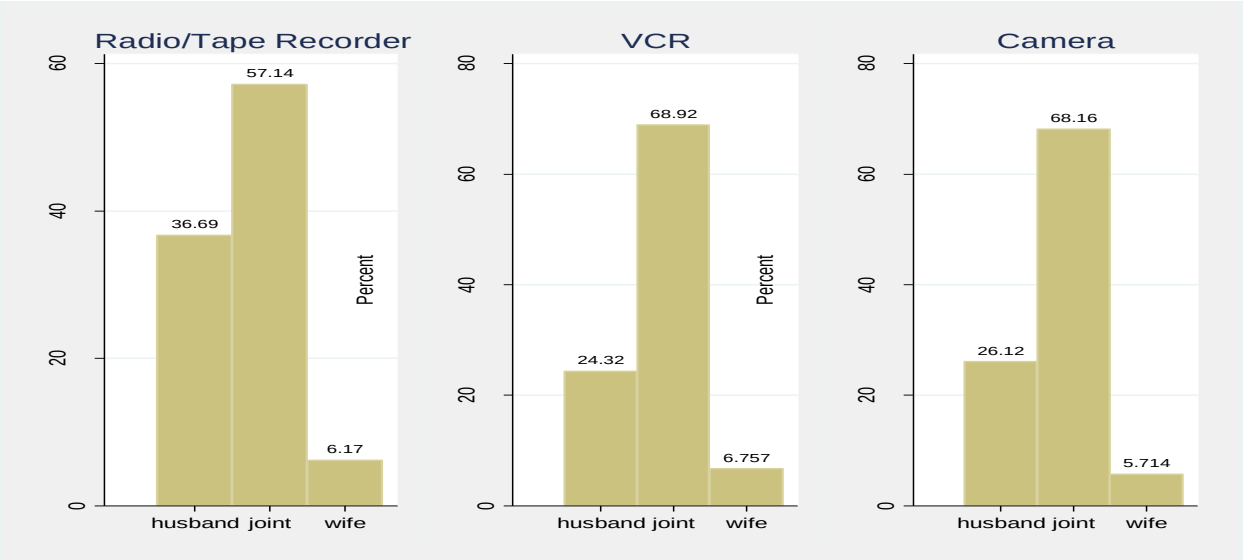


Table 2.1: Summary Statistics of Household Decision Making

(Subsample: women have some power)

	Joint decide (%)	Husband decide (%)	Wife decide (%)	Total observation N
	(1)	(2)	(3)	(4)
Sewing machine	56.8	21.0	22.2	715
Washing machine	68.1	16.2	15.7	432
Refrigerator	76.7	14.4	8.9	231
Rice cooker	64.3	19.4	16.3	300
Pressure cooker	68.0	16.0	16.0	311
Electric fan	64.0	29.6	6.4	831
Big wall clock	60.5	31.4	8.1	430
Color TV	71.7	22.2	6.1	335
Black/White TV	63.1	31.7	5.2	617
Radio/Tape recorder	57.1	36.7	6.2	515
VCR	68.9	24.3	6.8	40
Camera	68.2	26.1	5.7	80

Table 2.2a: Descriptive statistics by **Mother's Headship**

	All Children (1)	Children (Headed by Father) (2)	Children (Headed by Mother) (3)	T-test (p-value) (4)=(2)-(3)
Dependent Variable				
BMI	16.372	16.166	16.487	.038
Underweight	.223	.221	.255	.353
Overweight	.087	.062	.089	.048
Independent variable				
Child Characteristics				
child Age	8.642	8.582	9.748	.000
girls (%)	.477	.476	.504	.383
Mother's Relative Attributes				
mother better educated than father	.135	.128	.248	.000
mother work while father not	.010	.009	.026	.005
mother cadre while father not	.011	.009	.046	.000
father's age – mother's age	1.733	1.711	2.149	.019
mother minority while father not	.058	.061	.000	.000
mother better health than father	.044	.043	.065	.085
mother do house chores while father not	.541	.528	.782	.000
mother's BMI	21.776	21.732	22.579	.000
father's BMI	21.621	21.601	21.988	.015
Household Characteristics				
mother married	.996	.996	1	.296
live in urban site	.214	.206	.363	.000
live with parent-in-laws	.482	.496	.237	.000
# of children	2.261	2.267	2.142	.038
household size	4.819	4.831	4.600	
household gross income(Chinese $)	5905.95	5873.44	6501.12	.071
N	4731	4486	245	

Note: Standard error clustered by community id; Age 2-15, Pooled 1991-1993 CHNS data.

Table 2.2b: Descriptive statistics by **Mother's Decision-making Power**

(Subsample: women have some power)

	All Children (1)	Children (father more power) (2)	Children (mother more power) (3)	T-test (p-value) (4)= (2)-(3)
Dependent Variable				
BMI	16.524	16.337	16.935	.013
Underweight	.221	.229	.202	.517
Overweight	.105	.094	.128	.270
Independent variable				
Child Characteristics				
child Age	8.554	8.476	8.706	.346
girls (%)	.483	.486	.475	.720
Mother's Relative Attributes				
mother better educated than father	.142	.145	.135	.648
mother work while father not	.008	.002	.016	.042
mother cadre while father not	.019	.018	.020	.820
Father' age - mother's age	1.847	1.754	2.025	.128
mother minority while father not	.057	.042	.086	.002
mother better health than father	.044	.033	.066	.009
mother do house chores while father not	.628	.604	.676	.017
mother's BMI	22.061	22.040	22.101	.735
father's BMI	21.973	22.012	21.897	.477
Household Characteristics				
mother married	.996	.996	.995	.780
live in urban site	.302	.315	.286	.305
live with parent-in-laws	.495	.517	.451	.035
# of children	2.115	2.138	2.068	.226
household size	4.737	4.865	4.490	.000
household gross income(Chinese $)	6502.604	6863.377	5812.35	.003
N	1054	694	360	

Note: Standard error clustered by community id; Age 2-15, Pooled 1991-1993 CHNS data

Table 2.3: Summary Statistics of Community-Level Characteristics by Instrumental Variable

Panel A: Headship Sample

	Overall	Cadre Evaluation System (No)	Cadre Evaluation System (Yes)	t-test
	(1)	(2)	(3)	(4)=(2)-(3)
Population size in the neighborhood	2553.30	2294.21	2645.44	.01
Daily wage of ordinary male workers	5.77	5.60	5.83	.18
Daily wage of ordinary female workers	4.52	5.05	4.33	.00
Daily wage of driver	287.21	287.98	286.93	.84
Distance to provincial capital	228.80	217.03	233.03	.00
Distance to countyseat	16.61	15.76	16.97	.02
Distance to primary school	1.54	1.32	1.61	.01
Distance to middle school	2.75	2.42	2.86	.00
Whether neighborhood road is paved	.44	.48	.43	.01
# hours electricity available (day)	21.32	21.20	21.36	.37
N communities	181	49	132	

Panel B: Decision-making Sample

	Overall	Cadre Evaluation System (No)	Cadre Evaluation System (Yes)	t-test
	(1)	(2)	(3)	(4)=(2)-(3)
Population size in the neighborhood	2444.82	2301.64	2501.92	.26
Daily wage of ordinary male workers	5.61	5.66	5.58	.70
Daily wage of ordinary female workers	4.88	5.84	4.49	.00
Daily wage of driver	288.48	293.21	286.67	.56
Distance to provincial capital	230.06	233.75	228.56	.58
Distance to countyseat	16.64	15.46	17.22	.11
Distance to primary school	1.76	1.42	1.84	.14
Distance to middle school	2.47	2.93	2.31	.01
Whether neighborhood road is paved	.52	.55	.51	.17
# hours electricity available (day)	21.71	20.85	22.05	.00
N communities	146	43	146	

Table 2.4a: First Stage Regression of the IV-Estimations

Dependent variable: Mother's Headship

	(1)	(1)
Instrumental variable		
Cadre Evaluation System	**0.013***	**0.019****
	(0.006)	**(0.007)**
Mother's Relative Attributes		
Mother better educated than father		0.040***
		(0.012)
Mother work while father not		0.061
		(0.050)
Mother cadre while father not		0.113*
		(0.053)
Father's age-Mother's age		-0.000
		(0.001)
Mother minority while father not		-0.055***
		(0.005)
Mother better health while father not		0.017
		(0.018)
Mother do housework while father not		0.039***
		(0.006)
Logarithm of mother's BMI		0.093**
		(0.033)
Logarithm of father's BMI		0.025
		(0.034)
Mother lower wage than father		0.043**
		(0.016)
Mother's wage is missing		-0.005
		(0.012)
Household Characteristics		
Married		0.039***
		(0.012)
Live in urban site		0.024*
		(0.009)
Living with parent-in-laws		-0.041***
		(0.006)
Total number of children		0.001
		(0.004)
Household size		-0.001
		(0.003)
Logarithm of household income		-0.168
		(0.089)
Constant		0.279
		(0.410)
Provincial Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
F-statistics	14.60	9.79
p-value	0.00	0.00
N	4731	4731
R-squared	0.022	0.068

Note: Robust standard errors in parentheses (*** p<0.001, ** p<0.01, * p<0.05); Sample is limited to women who have children aged 2-15 years old in pooled waves 1991-1993.

Table 2.4b: Impact of Mother's Headship Status on Child Outcome (IV vs. OLS)

Dependent variables: Child Health

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	IV	OLS	IV
	Log(BMI)	Log(BMI)	Over weight	Over weight	Under weight	Under Weight
Endogenous variable						
Mother as Head	-0.009	**0.580***	-0.020	**1.729****	0.018	**-1.118**
	(0.007)	**(0.255)**	(0.015)	**(0.660)**	(0.028)	**(0.734)**
Mother's Relative Attributes						
Mother better educated than father	-0.003	-0.029*	0.000	-0.076*	0.034	0.082*
	(0.005)	(0.014)	(0.012)	(0.037)	(0.018)	(0.038)
Mother work while father not	0.020	0.003	0.029	-0.026	-0.050	-0.015
	(0.017)	(0.032)	(0.045)	(0.097)	(0.058)	(0.079)
Mother cadre while father not	0.010	-0.052	0.052	-0.127	0.051	0.177
	(0.022)	(0.050)	(0.044)	(0.126)	(0.058)	(0.117)
Father's age - mother's age	-0.001	-0.001	-0.000	-0.001	0.003	0.004
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Mother minority while father not	-0.010	0.019	0.000	0.097*	0.047	-0.003
	(0.008)	(0.016)	(0.016)	(0.038)	(0.027)	(0.049)
Mother better health while father not	-0.006	-0.021	0.038	-0.004	0.025	0.058
	(0.009)	(0.017)	(0.022)	(0.043)	(0.031)	(0.044)
Mother do housework while father not	0.001	-0.024*	0.001	-0.071*	-0.008	0.036
	(0.004)	(0.012)	(0.008)	(0.030)	(0.013)	(0.034)
Logarithm of mother's BMI	0.150***	0.103**	0.135***	-0.012	-0.447***	-0.355***
	(0.015)	(0.032)	(0.034)	(0.085)	(0.052)	(0.087)
Logarithm of father's BMI	0.153***	0.131***	0.172***	0.105	-0.431***	-0.406***
	(0.018)	(0.029)	(0.039)	(0.077)	(0.057)	(0.078)
Mother lower wage than father	-0.010	-0.035*	0.006	-0.066	0.008	0.056
	(0.007)	(0.016)	(0.017)	(0.044)	(0.024)	(0.044)
Mother's wage is missing	-0.007	-0.009	0.018	0.012	0.017	0.016
	(0.007)	(0.010)	(0.015)	(0.027)	(0.022)	(0.026)
Child Characteristics						
Age	-0.044***	-0.045***	-0.020***	-0.020*	0.023**	0.022*
	(0.002)	(0.003)	(0.005)	(0.008)	(0.007)	(0.009)
Age sq	0.003***	0.003***	0.000	0.000	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Female	-0.007	-0.011*	-0.002	-0.012	0.045***	0.053***
	(0.003)	(0.005)	(0.008)	(0.014)	(0.012)	(0.015)
Household Characteristics						
Married	-0.020	-0.033	-0.069	-0.101	0.037	0.085

	(0.024)	(0.021)	(0.090)	(0.076)	(0.089)	(0.099)
Live in urban site	-0.006	-0.021*	-0.004	-0.050*	0.052***	0.084***
	(0.005)	(0.009)	(0.011)	(0.023)	(0.015)	(0.025)
Living with parents in-laws	-0.002	0.019	-0.008	0.055*	-0.009	-0.049
	(0.004)	(0.010)	(0.008)	(0.026)	(0.012)	(0.029)
Total number of children	-0.000	0.005	0.007	0.020	0.020*	0.010
	(0.003)	(0.004)	(0.007)	(0.011)	(0.008)	(0.011)
Household size	0.002	0.002	0.001	0.002	-0.007	-0.008
	(0.002)	(0.002)	(0.004)	(0.006)	(0.006)	(0.006)
Logarithm of household income	0.047*	0.098*	0.121*	0.274	0.026	-0.046
	(0.023)	(0.045)	(0.050)	(0.152)	(0.082)	(0.135)
Constant	1.792***	1.819***	-1.194***	-1.120	2.578***	2.445***
	(0.126)	(0.254)	(0.275)	(0.699)	(0.443)	(0.617)
Provincial Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	28.29	21.41	10.38	11.52	13.25	9.83
p-value	0.000	.000	0.000	.000	0.000	.000
N	4731	4731	4731	4731	4731	4731
R-squared	0.28		0.069		0.067	

Note: Robust standard errors in parentheses;
*** p<0.001, ** p<0.01, * p<0.05

Table 2.5a: First Stage Regression of the IV-Estimations
Dependent variable: Mother's Decision-maker
(subsample: women have some power)

	(1)	(2)
Instrumental variable		
Cadre Evaluation System	**0.061***	**0.087****
	(0.026)	**(0.030)**
Mother's Relative Attributes		
Mother better educated than father		-0.018
		(0.041)
Mother work while father not		0.098
		(0.184)
Mother cadre while father not		-0.083
		(0.102)
Father's age-mother's age		0.011*
		(0.005)
Mother minority while father not		0.103
		(0.062)
Mother better health while father not		0.065
		(0.064)
Mother do housework while father not		0.046
		(0.032)
Logarithm of mother's BMI		0.145
		(0.118)
Logarithm of father's BMI		-0.021
		(0.124)
Mother lower wage than father		0.093
		(0.049)
Mother's wage is missing		0.037
		(0.047)
Household Characteristics		
Married		0.006
		(0.203)
Live in urban site		-0.065
		(0.036)
Living with parent-in-laws		-0.014
		(0.029)
Total number of children		-0.004
		(0.019)
Household size		-0.022*
		(0.010)
Logarithm of household income		-0.469*
		(0.224)
Constant	0.422***	0.726
	(0.040)	(1.016)
Provincial Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
F-statistics	7.62	5.14
p-value	0.00	0.00
N	1,054	1,054
R-squared	0.037	0.075

Notes: Robust standard errors in parentheses (***p<0.001, **p<0.01, *p<0.05); Sample is limited to women who have children aged 2-15 in the pooled waves 1991 and 1993.

Table 2.5b: Impact of Mother's **Decision-making Status** on Child Outcome (IV vs.OLS)

Dependent variables: Child Health

(*Subsample:* ***women have some power***)

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	OLS	IV	OLS	IV
	Log(BMI)	Log(BMI)	Over weight	Over weight	Under weight	Under Weight
Endogenous variable						
Mother as Decision - maker	-0.002	**0.184***	-0.011	0.374	-0.016	-0.432
	(0.008)	**(0.088)**	(0.019)	(0.211)	(0.028)	(0.318)
Mother's Relative Attributes						
Mother better educated than father	0.003	-0.002	-0.005	-0.009	0.010	0.024
	(0.011)	(0.014)	(0.029)	(0.030)	(0.038)	(0.041)
Mother work while father not	0.042	0.018	0.110	0.060	0.114	0.161
	(0.045)	(0.059)	(0.116)	(0.148)	(0.138)	(0.172)
Mother cadre while father not	-0.037	-0.036	-0.029	-0.012	0.264***	0.314*
	(0.039)	(0.054)	(0.054)	(0.080)	(0.070)	(0.132)
Father's age-mother's age	-0.001	-0.003	-0.006	-0.010*	0.001	0.006
	(0.001)	(0.002)	(0.003)	(0.004)	(0.005)	(0.006)
Mother minority while father not	-0.019	-0.053*	0.001	-0.037	0.095	0.226**
	(0.019)	(0.024)	(0.038)	(0.052)	(0.074)	(0.078)
Mother better health while Father not	-0.026	-0.042*	0.002	-0.028	0.106	0.143*
	(0.016)	(0.021)	(0.033)	(0.047)	(0.066)	(0.070)
Mother do housework while father not	-0.005	-0.014	-0.001	-0.022	-0.014	0.003
	(0.010)	(0.011)	(0.022)	(0.024)	(0.031)	(0.034)
Logarithm of mother's BMI	0.154***	0.132***	0.186**	0.138	-0.405***	-0.322**
	(0.032)	(0.039)	(0.070)	(0.086)	(0.108)	(0.125)
Logarithm of father's BMI	0.195***	0.208***	0.302***	0.355***	-0.419***	-0.404**
	(0.034)	(0.042)	(0.086)	(0.095)	(0.109)	(0.128)
Mother lower wage than father	0.009	-0.011	0.026	-0.010	-0.048	-0.012
	(0.014)	(0.019)	(0.032)	(0.042)	(0.041)	(0.060)
Mother's wage is missing	0.008	-0.000	0.043	0.016	-0.016	-0.009
	(0.014)	(0.015)	(0.033)	(0.032)	(0.043)	(0.051)
Child Characteristics						
Age	-0.042***	-0.037***	-0.006	0.003	0.007	-0.012
	(0.005)	(0.006)	(0.012)	(0.013)	(0.018)	(0.019)
Age sq	0.003***	0.003***	-0.000	-0.001	-0.000	0.001
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.016*	-0.010	-0.017	-0.006	0.081**	0.059*
	(0.007)	(0.009)	(0.016)	(0.021)	(0.027)	(0.029)
Household Characteristics						
Married	0.067**	0.007	0.088	-0.044	-0.361*	-0.248

	(0.023)	(0.040)	(0.078)	(0.108)	(0.178)	(0.199)
Live in urban site	-0.017	-0.007	-0.028	-0.012	0.070*	0.042
	(0.012)	(0.013)	(0.027)	(0.030)	(0.035)	(0.039)
Living with parents in-laws	-0.014	-0.013	-0.035	-0.024	-0.011	-0.010
	(0.008)	(0.009)	(0.022)	(0.021)	(0.029)	(0.029)
Total number of children	-0.004	-0.003	-0.013	-0.008	0.040*	0.040*
	(0.007)	(0.007)	(0.016)	(0.015)	(0.017)	(0.020)
Household size	0.004	0.009*	0.013	0.022*	-0.020*	-0.033*
	(0.003)	(0.005)	(0.010)	(0.011)	(0.009)	(0.015)
Logarithm of household income	0.161**	0.114	0.317*	0.259	-0.325	-0.172
	(0.058)	(0.074)	(0.132)	(0.161)	(0.230)	(0.250)
Constant	1.035**	1.203**	-2.874***	-2.740**	4.499***	3.712**
	(0.333)	(0.379)	(0.769)	(0.865)	(1.150)	(1.244)
Provincial Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	19.81	15.89	5.33	5.11	6.61	4.72
p-value	0.000	0.000	0.000	0.000	0.000	0.000
N	1,054	1,054	1,054	1,054	1,054	1,054
R-squared	0.318		0.083		0.093	

Notes: Robust standard errors in parentheses (*** p<0.001, ** p<0.01, * p<0.05); Sample is limited to women who have children aged 2-15 in the pooled waves 1991 and 1993.

Table 2.6: Robustness Check of Decision-Making Measurement

Panel A: **Female-Type** Goods vs. **Male-Type** Goods Subsamples

	(1)	(2)
	Female-Type Goods	**Male-Type Goods**
	IV	IV
	Log(BMI)	Log(BMI)
Endogenous variable		
Mother as Decision-maker	0.126	**0.253***
	(0.309)	**(0.125)**
Controls	Yes	Yes
Provincial Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
N	625	714

Notes: *significant at 5%; **significant at 1%; Robust standard errors in parentheses; Sample is limited to women who have children aged 2-15 in the pooled waves 1991 and 1993.

Panel B: **Wives make more purchasing decision than husbands** in terms of the total number of household durable goods.

	IV
	Log(BMI)
Endogenous variable	
Mother as Decision-maker	0.017
	(0.060)
Controls	Yes
Provincial Fixed Effects	Yes
Year Fixed Effects	Yes
N	825

Notes: *significant at 5%; **significant at 1%; Robust standard errors in parentheses; Sample is limited to women who have children aged 2-15 in the pooled waves 1991 and 1993.

Table 2.7: Various Sample Selections

Panel A: **Rural vs. Urban** Subsamples

	(1)	(2)
	Rural	**Urban**
	IV	IV
	Log(BMI)	Log(BMI)
Endogenous variable		
Mother as Head	0.978	**0.323***
	(0.770)	**(0.161)**
N	3718	1027
Mother as Decision-maker	0.090	0.309
	(0.074)	(0.394)
N	738	326
Controls	Yes	Yes
Provincial Fixed Effects	Yes	Yes
Year Fixed Effect	Yes	Yes

*significant at 5%; **significant at 1%;

Panel B: **Girls vs. Boys** Subsamples

	(1)	(2)
	Girls	Boys
	IV	IV
	Log(BMI)	Log(BMI)
Endogenous variable		
Mother as Head	**0.416***	1.071
	(0.212)	(0.966)
N	2262	2469
Mother as Decision-maker	**0.192***	0.127
	(0.092)	(0.129)
N	520	534
Controls	Yes	Yes
Provincial Fixed Effects	Yes	Yes
Year Fixed Effect	Yes	Yes

*significant at 5%; **significant at 1%;

Panel C: **One-child** Household vs. **Multiple-children** Household Subsamples

	(1)	(2)
	One-Child	**Multiple-Children**
	IV	IV
	Log(BMI)	Log(BMI)
Endogenous variable		
Mother as Head	0.224	**0.639***
	(0.904)	**(0.265)**
N	1010	3721
Mother as Decision-maker	-0.053	**0.210***
	(0.644)	**(0.090)**
N	280	774
Controls	Yes	Yes
Provincial Fixed Effects	Yes	Yes
Year Fixed Effect	Yes	Yes

*significant at 5%; **significant at 1%;

Appendix:

1, Proof of first order conditions (F.O.C.s) (equation (3)).

The household is treated as a single unit maximizing a linear combination of two parents' utility function. I set up the Lagrangian method as below:

$$\begin{aligned} L &= \log C_f + \alpha_f \log l_f + \beta_f \log Q \\ &+ \lambda[\log C_m + \alpha_m \log l_m + \beta_m \log Q - \overline{U}_M] \\ &+ \mu[(1-l_m)w_m + (1-l_f)w_f - p_m C_m - p_f C_f - c(Q)] \end{aligned}$$

$F.O.C.s \quad are:$

$$\frac{\partial L}{\partial C_f} = 0 \quad \Rightarrow \quad \mu p_f = \frac{1}{C_f} \quad \Rightarrow \quad \mu = \frac{1}{p_f C_f} \qquad (A.1)$$

$$\frac{\partial L}{\partial C_m} = 0 \quad \Rightarrow \quad \mu p_m = \frac{\lambda}{C_m} \quad \Rightarrow \quad \lambda = \frac{p_m C_m}{p_f C_f} \qquad (A.2)$$

$$\frac{\partial L}{\partial l_f} = 0 \quad \Rightarrow \quad \frac{\alpha_f}{l_f} = \mu w_f \quad \Rightarrow \quad \frac{l_f}{C_f} = \frac{\alpha_f p_f}{w_f} \qquad (A.3)$$

$$\frac{\partial L}{\partial l_m} = 0 \quad \Rightarrow \quad \frac{\lambda \alpha_m}{l_m} = \mu w_m \quad \Rightarrow \quad \frac{l_m}{C_m} = \frac{\alpha_m p_m}{w_m} \qquad (A.4)$$

$$\frac{\partial L}{\partial Q} = 0 \quad \Rightarrow \quad \frac{\beta_f}{Q} + \frac{\lambda \beta_m}{Q} = \mu c_q \quad \Rightarrow \quad \beta_f p_f C_f + \beta_m p_m C_m = c_q Q \qquad (A.5)$$

$$F.O.C.s \quad \Leftrightarrow \quad \begin{cases} \mu = \dfrac{1}{p_f C_f} \\ \lambda = \dfrac{p_m C_m}{p_f C_f} \\ \dfrac{l_f}{C_f} = \dfrac{\alpha_f p_f}{w_f} \\ \dfrac{l_m}{C_m} = \dfrac{\alpha_m p_m}{w_m} \\ \beta_f p_f C_f + \beta_m p_m C_m = c_q Q \end{cases}$$

Done.

2, Proof of equation (4).

By using the first order condition for the child quality Q, I define

$$F(Q,\quad \bar{U}_m) = \beta_f p_f C_f + \beta_m p_m C_m - c_q Q$$

$$= \beta_f p_f \frac{Y + M - c(Q) - p_m C_m}{p_f} + \beta_m p_m C_m - c_q Q \qquad \leftarrow (\textit{substituted by the budget constraint})$$

$$= \beta_f p_f \frac{Y + M - c(Q) - p_m \exp[\bar{U}_m - \alpha_m \log l_m - \beta_m \log Q]}{p_f} + \beta_m p_m \exp[\bar{U}_m - \alpha_m \log l_m - \beta_m \log Q] - c_q Q$$

$$\leftarrow (\textit{substituted by another constraint})$$

Then, take derivative with respect to mother's reservation utility $\bar{U}_m$ to get

$$\frac{\partial Q}{\partial \bar{U}_m} = -\frac{\frac{\partial F}{\partial \bar{U}_m}}{\frac{\partial F}{\partial Q}}$$

$$= -\frac{\beta_m p_m C_m + \beta_f p_f (-\frac{p_m}{p_f}) C_m}{\beta_f p_f (-\frac{c_q}{p_f} - \frac{p_m}{p_f} C_m (-\frac{\beta_m}{Q})) + \beta_m p_m C_m (-\frac{\beta_m}{Q}) - c_{qq} Q - c_q}$$

$$= -\frac{(\beta_m - \beta_f) p_m C_m}{-(\beta_m - \beta_f) \frac{\beta_m p_m C_m}{Q} - (\beta_f + 1) c_q - c_{qq} Q}$$

End of proof.

Table 2.A1: Impact of Father's **Decision-making Status** on Child Outcome (only OLS)
Dependent variables: Child Health
(*Subsample:* ***women are completely powerless***)

	(1)	(2)
	OLS	OLS
	Log(BMI)	Log(BMI)
Endogenous variable		
Husband is dictator	0.014**	0.013*
	(0.005)	(0.006)
Mother's Relative Attributes		
Mother better educated than father		0.001
		(0.007)
Mother work while father not		0.039
		(0.023)
Mother cadre while father not		0.013
		(0.022)
Father's age-mother's age		-0.000
		(0.001)
Mother minority while father not		-0.012
		(0.015)
Mother better health while Father not		-0.010
		(0.012)
Mother do housework while father not		0.001
		(0.006)
Logarithm of mother's BMI		0.165***
		(0.020)
Logarithm of father's BMI		0.144***
		(0.027)
Mother lower wage than father		-0.004
		(0.009)
Mother's wage is missing		-0.004
		(0.009)
Child Characteristics	Yes	Yes
Household Characteristics	Yes	Yes
Provincial Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Constant	2.786***	1.608***
	(0.006)	(0.187)
F-statistics	35.71	35.43
p-value	0.000	0.000
N	3,422	3,422
R-squared	0.063	0.295

Notes: Robust standard errors in parentheses (*** p<0.001, ** p<0.01, * p<0.05); Sample is limited to women who have children aged 2-15 in the pooled waves 1991 and 1993.

Table 2.A2: Variable Measurements

Dependent Variable	
BMI	Weight in kilograms/height in meters squared
Underweight	1=underweight; 0 otherwise
Overweight	1=overweight; 0 otherwise
Independent variable	
Child Characteristics	
Child Age	Age in years
Girls (%)	1=female; 0 otherwise
Mother's Relative Attributes	
Wife Better Educated	1=wife has more education than husband; 0 otherwise
Wife Work While Husband Not	1=wife currently work and husband not; 0 otherwise
Wife Cadre While Husband Not	1=wife is cadre and husband isn't; 0 otherwise
Husband-Wife Age Difference	husband's age –wife's age (in years)
Wife Minority While Husband Not	1=wife is minority and husband isn't; 0 otherwise
Wife Better Health	1=wife's self-reported health is excellent or good, and husband's self-reported health is fair or poor; 0 otherwise
Wife Do House Chores	1=wife does household chores (buy food or cook food) and husband doesn't; 0 otherwise
Wife's BMI	Wife's weight/sq of height
Husband's BMI	Husband's weight/sq of height
Household Characteristics	
Wife Married	1=wife is married, 0=never married/divorced/ widowed/separated
Live in Urban Site	1=urban neighborhoods or county town neighborhoods; 0=suburban neighborhoods or villages
Live with In-Laws	1=wife live with parents-in-laws; 0 otherwise
# of Children	Total number of own children in the household
Household Size	Total number of people residing in the household
Household Gross Income(Chinese $)	Household gross income in Chinese currency
Household have Only One Child(%)	Dichotomous

Note: Pooled 1991-1993 CHNS data.

Table 2.A3: Age-Gender Specific International Cutoff points for BMI for Thinness and Fatness
(Averaging data from Brazil, Netherlands, Great Britain, Hong Kong, Singapore, and US)

	Thinness		Overweight	
	Boys	Girls	Boys	Girls
Age (years)				
2.0	15.14	14.83	18.41	18.02
2.5	14.92	14.63	18.13	17.76
3.0	14.74	14.47	17.89	17.56
3.5	14.57	14.32	17.69	17.40
4.0	14.43	14.19	17.55	17.28
4.5	14.31	14.06	17.47	17.19
5.0	14.21	13.94	17.42	17.15
5.5	14.13	13.86	17.45	17.20
6.0	14.07	13.82	17.55	17.34
6.5	14.04	13.82	17.71	17.53
7.0	14.04	13.86	17.92	17.75
7.5	14.08	13.93	18.16	18.03
8.0	14.15	14.02	18.44	18.35
8.5	14.24	14.14	18.76	18.69
9.0	14.35	14.28	19.10	19.07
9.5	14.49	14.43	19.46	19.45
10.0	14.64	14.61	19.84	19.86
10.5	14.80	14.81	20.20	20.29
11.0	14.97	15.05	20.55	20.74
11.5	15.16	15.32	20.89	21.20
12.0	15.35	15.62	21.22	21.68
12.5	15.58	15.93	21.56	22.14
13.0	15.84	16.26	21.91	22.58
13.5	16.12	16.57	22.27	22.98
14.0	16.41	16.88	22.62	23.34
14.5	16.69	17.18	22.96	23.66
15.0	16.98	17.45	23.29	23.94
15.5	17.26	17.69	23.60	24.17
16.0	17.54	17.91	23.90	24.37
16.5	17.80	18.09	24.19	24.54
17.0	18.05	18.25	24.46	24.70
17.5	18.28	18.38	24.73	24.85
18.0	18.50	18.50	25.00	25.00

Source: Tim J Cole, Katherine M Flegal, Dasha Nicholls, Alan A Jackson (2000; 2007)

Chapter 3

Computer and Internet Café Usage: A Study of Their Adverse Health Effect on Chinese Adolescents and Youth

3.1 Introduction

This paper examines the association between computer use, internet café usage and health behaviors and health outcomes among a group of Chinese adolescents and youths, using data from recent longitudinal surveys. The six health indicators are smoking, drinking, obesity, overweight, underweight and self-reported poor health status.

It has been widely recognized that the diffusion of technology, particularly by the widespread use of computers in the workplace, plays a crucial role in national economic growth and development (Autor, Katz and Krueger 1998; Autor, Levy and Murnane 2003). However, the evidence of its impact on the development of youth and adolescents is mixed. Using data from the 2001 Current Population Survey (CPS) computer use supplement, Fairlie (2005) found an association between home computer access and higher likelihood of enrollment in school. Using the 1988 National Educational Longitudinal Survey (NELS-88), Attewell and Battle (1999) showed a positive impact of home computer use on students' math and reading scores. In contrast, Fuchs and Woessmann (2004) found that home computers had a negative effect on math and reading scores after controlling for observable characteristics of students, families and schools. Malamud and Pop-Eleches (2010) conducted a field experiment in Romania in which vouchers for the purchase of home computers were provided to low-income children. Their findings were mixed: students that won vouchers received lower school grades in math, English, and Romanian, but higher scores in tests of computer use. Finally, Angrist and Lavy (2002) found no effect from computer use on math test scores in Israeli schools. However, none of the above studies examined the potential effects of computer use on health.

Computer use in China is quite different from its counterparts in industrialized countries. Since relatively few Chinese owned computers at home in the early 2000s, most youths aged 15-30 years old went to internet cafés to get online and to play games. As a result of an apparently alarming rise in the number of youths spending time in internet cafés and playing online games, governments at all levels initiated regulations to curb illegal internet cafés and to censor unhealthy online information. However, driven by high profits, many illegal internet cafés still operated, attracting young customers by lowering internet costs and increasing hours of operation. Despite extensive media coverage and concern by parents about the adverse effects of extensive internet use, citing negatives such as sleep deprivation, malnutrition, and social isolation, no well-designed research study has attempted to conduct a causal analysis of internet café usage and its impact on youth health.

My research contributes to the literature in at least three ways. First of all, I will use fixed effects method to deal with the problem of endogeneity, a problem that commonly occurs in studies using more conventional statistical approaches such as Ordinary Least Squares (OLS). I explain these problems in more depth in the Methods section. Second, I specifically examine the role of internet cafés and attempt to find out how this particular environment affects youth health. There are two potential explanations for possible adverse health outcomes: physical inactivity and poor dietary intake. Extended screen hours and reduced nutrition associated with internet café usage would then lead to worse health outcomes. Third, my study based on this Chinese sample may inspire new rigorous studies to examine the effect of internet café use on youth in other developing countries. I address the potential causal impact of internet café usage on health using two waves of the 2004-2006 China Health and Nutrition Survey (CHNS) dataset.

The paper proceeds as follows. Section 2 provides the background information about computer use, internet café usage and their potential impacts on youth. Section 3 attempts to set out the conceptual framework for understanding the association between computer use and health. Section 4 describes the dataset, the major measurements, along with summary statistics. Section 5 introduces the empirical framework and discussion of

potential endogeneity. Section 6 describes the major research findings and potential mechanisms. Section 7 makes concluding remarks and lays out some policy implications.

3.2 Background

In this section, I discuss three issues. First, how are the effects of youth computer use different than the effects of television watching? Second, is youth computer use associated with higher rates of smoking and drinking? Third, how is computer use related to nutrition status?

3.2.1 Comparing the health consequences between computer use and television watching

Although both computer use and TV watching are sedentary activities and both decrease time spent being physically active, their relationship with health does not appear to be identical. Prior research has documented the ways in which television viewing affects weight status (Janssen et al. 2004; Sisson et al. 2010). While watching TV, viewers may increase their caloric intake by snacking; select and consume low-nutrient, high-calorie foods such as instant noodles or soda pop that are shown in advertisements; and refrain from the physical activities which are essential to lose weight or maintain a normal weight.

In contrast, computer use may affect the youth health in different ways. First, parents have less control over the locations where youth access computers. In my pooled sample, the home computer ownership rate is only 15 percent. The urban-rural divide is obvious, with 30% of urban households having computers versus only 10% among rural households. Due to the relatively low rates of access to home computers, the internet café has become the primary setting for computer access. Without parental supervision, youth health could be worsened in internet cafés if they eat more unhealthy food, or eat irregularly; or adopt unhealthy behaviors such as smoking, drinking, and internet gambling. Internet café users also risk extensive exposure to secondhand smoke. In sharp contrast, watching TV is more likely to occur at home and therefore can potentially be regulated by parents or other adults in the household.

Second, negative peer effects can be quite strong in the internet café. The majority of internet café users in China are adolescents who come from middle- or low-income families since upper-income families have computers at home for their children. If frequent internet café users engage in unhealthy behaviors such as smoking and drinking, other youth are likely to mimic them and to learn an unhealthy lifestyle from observing negative behaviors in the environment.

Third, the positive effects of the information available on the internet are countered by the availability of unhealthy information that can be accessed despite some internet cafés' installations of 'purifiers'. In China, by contrast, TV contents can be more easily regulated and censored.

Fourth, computer users sit in front of the screen for long periods. This leads to increased fat accumulation and causes physical strains. As a result, users are at risk of gaining weight and experiencing generally poor health. In contrast, it is not necessary to sit in order to watch TV. People can even do household chores, and exercise while watching TV since TV doesn't require operation of mouse.

Fifth, computer use can occur at any time of the day. Since most internet cafés operate 24 hours a day, have restrooms and sell junk foods, users can stay overnight. Even when using home computers, users can have opportunity to stay up late. Lack of sleep is associated with health difficulties such as weight gain or loss, hypertension, and stress and anxiety. In contrast, most TV programs in China end at midnight, reducing the effects of television viewing on sleep.

3.2.2 Smoking and drinking among youth

Widespread smoking has been a big public health problem in China for a number of years (Lam et al., 1997). This issue is particularly vital in the case of adolescents and youth since their early exposure to smoking may produce a lifelong nicotine addiction. Since adolescents are still in the habit formation stage, they can learn the new behavior quickly by observing the behavior of others, especially friends and peers. Even if participants in internet café don't smoke themselves, the risk of exposure to secondhand smoke increases along with long hours of physical inactivity in internet café. Consequently, smoking and inactivity become double health hazards.

Similarly, alcohol use has increasingly become a serious problem in China. According to WHO studies (2000), 82.6 percent of Chinese males aged 15-65 drink alcohol. It is also well documented that drinking alcohol is one of the contributing factors to chronic diseases and accidental injuries. The growth of internet cafés has increased access to alcohol for youth, so that it has become a common beverage among the younger generation. In addition to the easy access of alcoholic beverages, the peer pressure encourages drinking among youth as they try to assimilate into a new group. Behaviors such as drinking alcohol and smoking cigarettes are often interconnected and tend to become lifelong habits. More details will be presented in the descriptive statistics section.

3.2.3 Obesity, overweight and underweight

As China is experiencing rapid economic growth and dramatic transformation, young adults are modifying their diet by consuming more fast food and foods high in calories; by drinking more soda/pop; and by spending more time using computers, which all contribute to an unhealthy lifestyle. In this paper, I use body mass index (BMI), an anthropometric indicator of short-run nutrition status, as another dependent variable. I investigate both obesity and malnutrition since they represent two opposite extremes on the spectrum of body fat distribution, and both can be measured in terms of weight and height.

There is increasing evidence suggesting that obesity has become a global epidemic and a primary public health concern in many countries (WHO 2000). The growing recognition of the social and economic consequence of childhood obesity has stimulated extensive studies across disciplines. Obese children have been reported to suffer a higher risk of poor health (Hannon et al. 2005) and morbidity (Reither et al. 2009). Obesity itself has been discovered to track from childhood to adulthood (Freedman et al. 2005) and can cause functional limitations in the late life (Himes 2000). Other than causing poor physical health, obesity is also found to be a major source of social stigma (Puhl and Heuer 2009) and to lower the probability of marriage (Averett and Korenman 1999).

There are many measures of fatness and obesity such as Body Mass Index (BMI), skinfold thickness, and waist circumference, with each having own strength and

weakness. Among them, BMI is the most frequently used measurement, particularly in population surveys, due to its straightforward calculation as a simple ratio of weight in kilograms divided by height in squared meters (kg/m^2). The past decade has seen a significant increase in overweight or obesity among children and adolescents. For example, Johnston and O'Malley (2003) used the Monitoring the Future Study (MTF) data and found that BMI had risen at all grade levels for both boys and girls in the mid of 1990s, except that eighth grade girls showed little change over time. The increase in the prevalence of overweight was most substantial among the twelfth graders whose prevalence rate almost tripled in the period between 1986 and 2002.

The natural question to ask is why BMI has increased so much recently and what factors may be contributing to this phenomenon. Chaloupka and Johnston (2007) provide a conceptual model that identifies four sources of determinants: behavioral, individual, social and environmental factors. The behavioral factors point to individuals' daily food consumption and physical activity. The individual factors examine genetic traits and socioeconomic characteristics. The social factors focus on family and peer influences. The environmental factors suggest that a wide range of variables including locations such as neighborhoods, schools, and local markets; the media; and public policies all play a role in the rise in obesity observed in many countries, both developed and developing ones. Using data from the MTF survey and with multivariate analyses, Delva et al (2007) find evidence that an unhealthy weight is associated with a concurrent reduction in physical exercises and consumption of green vegetables, and an increase in sedentary activities such as TV watching. The level of severity varies across different racial and ethnicity groups with Hispanic boys and African American girls disproportionately having a higher prevalence of obesity. Examining community-level factors, Powell et al (2007) found that access to chain supermarkets contributed to a decline in adolescent obesity whereas living in a neighborhood with a higher proportion of low-income residents is associated with higher obesity rates.

China is no exception from to this international trend. The increasing number of overweight and obese children in China has recently become concern since economic reform and social change has considerably transformed the population's dietary habits,

increased tolerance for higher body weights, and decreased physical activity. Evaluating the prevalence of metabolic syndrome in a group of obese children aged 7-16 in an eastern coastal province of China, Fu et al (2007) find that obesity is strongly associated with metabolic abnormalities. Using a cross-sectional sample of Chinese children aged 6-13 years old in Hong Kong, Sung and his colleagues (2007) show that overweight is correlated with cardiovascular risk factors in childhood which can track into adulthood.

In contrast to overweight and obesity, undernourishment is another health concern. Failure to consume adequate energy to meet basic growth needs can have long-lasting effects such as stunting and developmental deficits (WHO, 2002), and low labor productivity (Dasgupta and Ray 1986).

3.3 Conceptual Framework

In this section, I propose two ways in which computer use in internet cafés can affect health outcomes among Chinese youth.

First are the lifestyle effects of this use. The advancement of information technology has made computers penetrate into almost every part of our daily life, including study, work, play, shop and other activities. The direct consequence of heavy computer use is to displace more vigorous physical activities and reduce daily energy expenditure. It has become common knowledge that regular physical activities have plenty of health benefits, including reduced risk of heart diseases, arthritis, cognitive impairment, depression, and anxiety. However, the sedentary lifestyle associated with heavy computer use could generate significant health outcomes. Leon et al (2007) provide empirical evidence about the amount of weekly computer use and the changes in habitual spinal postures among Australian adolescents. Studies by DeMattia et al (2007) report a strong association between the computer use and high prevalence of obesity among adolescents. Other researchers have established that adolescent obesity is a strong predictor of cardiovascular danger in adulthood and later life (Gunnell et al, 1998). In the following discussion, I will present some empirical evidence about how these mechanisms play a role in determining adolescents' health.

Second, heavy computer use in cafes may encourage the formation of social networks that promote negative behavior. Studies have found that adolescents attempt to disassociate from their parents and spend more time with their peers in their teenage years (Voorhees et al., 2005). The formation of adolescent peer groups could be caused by many different factors: attending the same class, living in the same neighborhood, being relatives or family connections, or having the same opinions or behaviors. As a result of spending time together, individuals tend to imitate their behaviors based upon their peers - playing the same sports and games, eating the same types of food, visiting the same websites, and sharing many other habits. The shared behaviors between an individual and peers may directly or indirectly affect his/her health status. Unsupervised adolescents in internet cafés may imitate the behavior of their peers by eating instant noodles; smoking heavily; drinking alcoholic beverages; continuously playing computer games; and surfing the same internet web pages. Most of these shared behaviors appear to be detrimental to health, and are more likely to occur in the café setting. In sharp contrast, adolescents not visiting internet cafés may have healthier behaviors since parents can restrict bad behaviors and support good ones. A more extensive discussion will be presented in the following section.

3.4 Data and Summary Statistics

3.4.1 Data Description and Major Measurements

To study the relationship between internet café usage and youth health outcomes, I will use the 2004 and 2006 waves of the China Health and Nutrition Survey (CHNS), administered by the Population Center at the University of North Carolina at Chapel Hill. The CHNS is a longitudinal survey with a sample of approximately 4,400 households with 16,000 individuals drawn to represent nine provinces, including two rich coastal provinces, five middle-income provinces and two poor interior provinces. The provincial city, one low-income city and four rural sites are randomly selected in each province. The survey includes a wide range of information on health, nutrition, daily activities for each person residing in the household. The restricted community-level dataset provides useful information on commodity price, health facility, administrative structure, relevant

national policy implementation, and neighborhood/village demographic composition and economic development. After fulfilling the requirements set by the data administrative center, I have gained access to this restricted community dataset.

I limit the sample to adolescents and youth aged 15-30 years old at any wave. The panel is unbalanced, and there is high attrition rate. Table 1 presents the data structure of the key explanatory variables and all dependent variables. Column (1) describes the characteristics of those respondents who only appear once in the first wave of 2004. Column (2) introduces those who only appear once in the second wave of 2006. Column (3) explains the characteristics of those who stay in both waves. Column (4) distinguishes those observations that appear at both waves, and categorizes these individuals into three types: *stayers* who don't change their computer use status in both periods; *enterers* who switch from not using to using a computer; *leavers* who use computer only in the first period. The panel estimation will rely on those *enterers* and *leavers*.

A few things stand out in this table. First, the incidence of computer use in aggregate increased over time from 22.11% in 2004 to 42.01% in 2006, and the trend remains even after breaking down the settings into café only, both café and home, and home only. Nearly 50 percent of the individuals access the computer in internet cafés only. In aggregate, *enterers* account for 11.4% of the stay-in-both-wave sample, *leavers* make up 3.4% of the sample and *stayers* comprise the remaining 85.3%. Overall, there are more *enterers* than *leavers* for each type of computer users.

Second, Table 1 also reports the data structure for the dependent variables. The prevalence of smoking and drinking both increase over time, from 34.64% to 42.94% and from 38.60% to 49.38%, respectively. For those observations that appear in both waves, 10.88% of individuals start smoking in the second wave and 6.87% of them stop smoking in the second wave. Similarly, there are higher fractions of individuals who start drinking (17.68%) and stop drinking (7.79%) in the second wave. The asymmetric trend between changes from no to yes and changes from yes to no may reflect the increasing acceptance of smoking and drinking among Chinese youth.

Changes also occur in three other variables. The rate of youth obesity and overweight is increasing and the rate of underweight is decreasing over the two periods. It also seems that there is a decline in the self-reported poor health status.

3.4.2 Major Measurements

Health Behavior and Health Outcome Measures. I have six health indicators. (1) Two indicators measure health behaviors: whether smoking cigarettes and drinking alcoholic beverage at the time of the interview. This analysis is limited to the male subsample since less than 10 percent of females report smoking or drinking. (2) Another three dichotomous indicators, namely obesity, overweight and underweight, are measured by the Body Mass Index (BMI) with a value of 1 indicating a bad health outcome. For youth over 18 years old, obesity is defined as 1 with a BMI over 30.0 kg/m^2, overweight with a BMI of 25.0-29.9 kg/m^2, and underweight with a BMI below 18.5 kg/m^2. For adolescents 15-17 years old, their body weight distribution is different than that of adults, so is the definition of obesity, overweight and underweight. I will therefore use the age-gender specific cutoff values created by Cole et al (2000; 2007), who use six international surveys from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and the United States to generate an internationally comparable prevalence rates of underweight and overweight among children[1]. (3) The last indicator, namely self-reported poor health status, is based on the survey question "*how would you describe your health compared to that of other people your age?*" Youth are classified as poor health if they report poor or fair health status.

Computer Use and Internet Café Usage Measures. In aggregate, the subject is asked whether use computer and how much time is spent on it during a typical day Mon-Fri, and a typical day Sat-Sun. Based on the time use data, I construct a continuous computer use variable with zero indicating no computer access and positive number indicating the

[1] For boys, the cutoffs for underweight are 16.98 kg/m^2(15 yrs old), 17.54 kg/m2(16 yrs old), and 18.05 kg/m^2(17 yrs old); the cutoffs for overweight are 23.29 kg/m^2(15 yrs old), 23.90 kg/m^2(16 yrs old), and 24.46 kg/m^2(17 yrs old); the cutoffs for obesity are 28.30 kg/m^2(15 yrs old), 28.88 kg/m^2(16 yrs old), and 29.41 kg/m^2(17 yrs old). For girls, the cutoffs for underweight are 17.45 kg/m^2(15 yrs old), 17.91 kg/m^2(16 yrs old), and 18.25 kg/m^2(17 yrs old); the cutoffs for overweight are 23.94 kg/m^2(15 yrs old), 24.37 kg/m^2(16 yrs old), 24.70 kg/m^2(17 yrs old); the cutoffs for obesity are 29.11 kg/m^2(15 yrs old), 29.43 kg/m^2(16 yrs old), and 29.69 kg/m^2(17 yrs old).

total weekly hours (5*weekday+2*weekend). I conduct graphic analysis of the distribution of this aggregated computer use.

The focus of the paper is to explore whether computer use in internet café affects youth health. Therefore, I distinguish three different types of computer users: in café only, at home only, both in café and at home. This classification is easily done for the second wave since the subjects are asked where they can access the internet. The possible responses are "internet café," "at home," "at friend's or relative's home," and "in school." Combined with the survey question whether the household owns computer, I define the following three categories. (1) Users in café only are those individuals who only get access to internet in café and don't own computer at home. (2) Users at home only are those who access the internet at home-based setting: at home, at friend's or relative's home, or in school. A small number of individuals who report no internet access but own home computers are also included in this category. (3) Users both in café and at home are those individuals who have access to the internet both in café and home-based settings (friend's home, relative's home or school).

The classification of those three types of computer users for the first wave is different since the survey question is designed differently in the early wave. (1) Subjects are categorized into "in café only" if they can access the internet only in cafés and don't own a computer at home. (2) Subjects are categorized into "at home only" if they can access the internet at home only. Those individuals who report home computer ownership and no internet connection are also included in this category. (3) Subjects are categorized into "both in café and at home" if they report access to the internet in both in cafés and on their own computers at home.

There is concern about the measurement error in the internet café usage variable. Youth are interviewed with their parents present, which may lead to underreports of time spent in cafés, which have a negative reputation in China. The extent of underreporting may vary by user type. (1) If café users with positive hours systematically underreport their actual use hours in both waves, my estimates will be considered as the lower bound of true estimates. (2) Zero-use reporting is an extreme of underreporting. In the case of marginal users who report no usage in both waves while they actually visit cafés, this

underreporting won't cause problems since "no-changers" have no impact on fixed effects estimation. (3) When marginal users report some positive hours in one wave but zero hours in the other wave, this underreporting may bias the fixed effect estimates because this type of "changer" is spurious. Table 1 presents that 12.19% of the total café users switch their types across two waves with *enters* accounting for 7.14% and *leavers* for 5.05%. Based on these numbers, the third type of misreporting will possibly account for a very small percentage of my sample, and a few cases won't bias the overall fixed effects estimation.

Personal Characteristics. The socio-demographic variables include age, age squared, female dummy, educational categories, minority status, and indicators of whether the individual is currently in school, is working now, and is married. I create four levels of educational attainment: 1=elementary or below, 2=middle school, 3=high school, 4=college or above.

In the conceptual framework, I propose two potential explanations to link the relationship between computer use and health outcomes - lifestyle effects and social network effects. Accordingly, I include two types of variable to approximate these two mechanisms. (1) Screen-based media hours: a continuous time use variable summarizing the total hours spent in three sedentary activities such as watching TV, DVDs, and video games in a typical week. If computer use leads to unpleasant health outcomes, I want to test whether this linkage is through an increase in screen time. Does computer substitute or complement the TV-based screen hours? (2) Four variables measure individual food energy intake on a daily base – the natural logarithm of total calorie consumption, the share of carbohydrate, the share of fat, and the share of protein in total calorie. The original data only include the total grams consumed in carbohydrates, fat, and protein each day, and I transform those grams into the percentage of calories in a typical diet that comes from a certain component. For example, the percentage of calories coming from fat is calculated by multiplying grams of fat by 9 calories per gram and then dividing total calories. The multiplier for carbohydrate is 4, so is protein. I will examine whether there is an association between various composition of food intakes and computer use. If youth

in cafés tend to mimic each other by eating the same type of food, snacks and drinks, I expect a distinct pattern between café users and non-users.

Household-level Characteristics. Three variables from the household survey are included. They are: (1) a dummy for living in urban site, (2) a continuous variable measuring household size, (3) the log value of household gross income per capita.

Community-level Characteristics. Two variables from the community survey are included: a dummy whether having fast food restaurant in the neighborhood, and a dummy whether access to cable TV. It is well documented that fast food and TV advertisements are two important factors influencing people's diet and eating habits. The province dummies are included to control for the time-invariant characteristics at the provincial level.

It is worth mentioning that the CHNS data don't have sampling weights. Unlike many other longitudinal datasets such as Panel Study of Income Dynamics (PSID) which provides the sampling weights for national estimates, the CHNS doesn't present such weights due to initial restrictions from Chinese authorities. Although the weighted results are generally preferred to the un-weighted ones for inference about the population of interest, the analysis without population weights still suggests good estimation. There are three reasons. First, the CHNS is a large national survey covering nine provinces with different levels of economic and developmental indicators. This wide geographic coverage enables the CHNS to express the enormous heterogeneity in various social, economic, and behavioral statuses across the country for analysis. Second, the longitudinal design of the CHNS captures those dramatic changes both spatially and temporally. Third, a multistage and random cluster sampling procedure assures its representativeness. A weighted sampling scheme was used to randomly select four counties and two cities in each province based on their income level. Villages within each county and neighborhoods within each city are also randomly selected. Then, twenty households from each community are randomly selected for interviews. This multistage and random sampling covers a range of economic and demographic circumstances, being

representative nationally. Therefore, the results without population weights still generate reasonable insights for the target population I am interested in.

3.4.3 Summary Statistics

Two graphs in Figure 1 show the distribution of computer use for adolescents and youth who are 15-30 years old at any wave. The top panel shows the average weekly use hours by age. The pattern is clear that youth in the age range 17-24 appears to be the most intense computer users, and they on average spend 5 hours in front of computer screen every week. Males on average spend one more hour on computer regardless of age. The lower panel shows the participation rate of using computer across different ages. It also confirms that youth aged 17-24 use computers more frequent. More than 30 percent of youth 17-24 yrs old report having access to a computer, while less than 25 percent of youth 25+ years old have this access, and the same is the true for younger youth aged 15-16 yrs old. The incidence of computer use is also greater among males regardless of age. On average, males tend to use computer more frequently and to spend more hours on it than female regardless of age.

As illustrated in Figure 2, the average weekly screen-based media use hours are different among three settings. Three types of media hours are compared in the graph: TV hours, DVD and video hours, and computer use hours. Café users spend the longest time watching TV (15 hours/wk), followed by home users and both users (12 hours/wk vs. 11.5 hours/wk). Café users also spend the longest time watching DVDs and playing video games (9 hours/wk). The survey questionnaire provides no clue as to where the individuals watch DVDs and play video games. They could be displayed on TV screen or computer monitor. Interestingly, both users turn out to be the most intense computer users, spending nearly 19 hours on computers every week. Café users spend 12 hours on computers every week versus home users who spend 11.5 hours/wk.

Based on the average weekly hours of computer use, the subjects are categorized into three groups: “light users (<=7 hours/wk)”, “moderate users (between 7.01 and 28 hours/wk)”, and “heavy users (over 28 hours/wk)” of the computer. Figure 3 describes the distribution of computer use hours by location and frequency. Among all café users,

43.67% are classified as light, 47.38% as moderate and 8.95% as heavy. The distribution of home users is very similar with that of café users. In contrast, a greater proportion of users in both settings belong to moderate and heavy categories (53.62% vs. 22.22%). Seemingly, youth who can access to computers in multiple sources (both in café and at home) turn out to be the most intense users.

Table 2 provides an overview of the community-level characteristics between computer users and non users. Their communities vary along every dimension, including geographic, demographic and economic heterogeneity. In the pooled sample, computer users reside in 159 communities versus non users, who reside in 207 communities. Apparently, computer users live in nicer neighborhoods/villages with larger population sizes and areas, higher wage rates for ordinary workers and drivers. These areas are closer to schools and have a higher fraction of paved road and lower incidence of electricity cutoff. In terms of internet service and fast food restaurants, the two most important factors related to computer access, there is considerable variability across these two types of communities. 72% of communities where computer users dwell have internet cafés whereas the corresponding figure for communities with inactive computer users is only 33%. With regard to the prevalence of fast food restaurant, it is 30% among user communities versus only 10% among non-user communities.

Summary statistics are shown in Table 3a and 3b. Table 3a is the male subsample for the analysis of smoking and drinking. There are total 1521 person-year observations for smoking analysis and 1524 observations for drinking analysis. Computer users have higher prevalence rates of drinking and lower rates of smoking compared with non-users. Among the total male subsample, 33 percent of youth use computers in a typical week, including one half in internet cafés only, one fourth at home only, and another one fourth in both settings. The average computer use time among male youth 15-30 years old is 5.38 hours/wk. For the user subsample, the average time spent in front of computer monitor is as high as 16.74 hours/wk. Computer users tend to be younger; are less likely to be minorities; are more likely to be high school or college graduates; and are more likely to live in urban areas with smaller household size and higher per-capita household income. The communities where computer users reside are more accessible to fast food

restaurants and cable TV. Apparently, computer users spend more hours engaging in screen-based sedentary activities such as watching TV, DVDs and videogames. The total screen hours (TV + DVD + video game) for computer users are 17.75 hours/wk compared with 16.35 hours/wk for non-users. In terms of the various components of food energy intakes, computer users tend to consume food with higher fat and protein, and lower carbohydrate.

Table 3b reports the whole sample for the analysis of obesity, overweight, underweight and self-reported poor health status. Computer users on average have lower obesity rates but significantly higher rates of underweight and self-reported poor health. Among all the youth aged 15-30, 28 percent use computers in a typical week, including 1/2 in café only, 1/4 at home only, and another ¼ in both settings. The general characteristics for the personal, household, and community variables are very similar to those in the male subsample.

3.5 Empirical Framework

This section will present all the analyses I employed to explore the association between computer use and health outcomes among adolescents and youth.

The basic empirical specification is:

$$Health_{ihjt} = \alpha_0 + \alpha_1 ComputerUse_{ihjt} + \beta X_{ihjt} + \alpha_2 province + \tau_t + \mu_i + \delta_{ihjt} \qquad (1)$$

Where the dependent variable $Health_{ihjt}$ is dichotomous with a value of 1 if the youth *i* in the household *h* and community *j* at time *t* is under certain health condition, and with a value of zero otherwise. I have six health indicators, namely smoking, drinking, obesity, overweight, underweight and self-reporting poor health. For each of these six indicators, a value of one represents a bad health outcome for the individual. I will run six separate regressions with these six different binary dependent variables. The key variable of interest is $ComputerUse_{ihjt}$, which measures the computer use situation of person *i* in household *h* and community *j* at time *t*. The coefficient α_1 is the estimate of the health effect of computer use. X_{ihjt} includes a set of covariates, including individual's age, age square, gender, educational status, minority status, whether in school, whether working, urban residency, household size, logarithm of per capita household gross income,

community-level fast food restaurant indicator and cable TV indicator. *Province* is a set of provincial dummies, controlling for the location-specific fixed effects which may affect health outcomes both directly and indirectly. τ_t is an indicator for time trend, which will incorporate the national trends affecting youth health, such as school education in diet habit, advertisement on body shape image, and other macro-level factors. μ_i is individual-level fixed effect which accounts for the time-invariant unobserved individual characteristics. δ_{ihjt} captures the idiosyncratic errors. For all the specifications, I estimate the coefficients with heteroscedasticity robust standard errors clustered at the community level. The advantage using the clustered robust standard errors is that they do not change the point estimates of the coefficients but often generate larger standard errors. As a result, the likelihood for an estimate being statistically significant is reduced and we can have more accurate results.

To test whether the health effects are persistent and robust, I use all the possible specifications, including pooled ordinary least square (OLS), and fixed effects (FE). I will discuss these models in details. The consistency of OLS model requires the error term to be *i.i.d*. (independent and identically distributed), which is often violated in the real world. The FE model holds constant the average effects of each individual, and can control for the average differences across individuals in any observable or unobservable predictors. In general, the FE model produces more reliable point estimates and I will primarily rely on the fixed effects estimates for interpretation.

As discussed earlier, I am especially interested in exploring the health effect of computer use in internet cafés, where parental supervision is missing. Thus, I distinguish computer use into three types - in café only, at home only, and in both settings. It is expected that computer use in internet café produces the most serious health consequences. I revise the equation (1) as below:

$$Health_{ihjt} = \alpha_0 + \alpha_1 Computer\_cafe_{ihjt} + \alpha_2 Computer\_both_{ihjt} + \alpha_3 Computer\_home_{ihjt} + \beta X_{ihjt} + \alpha_4 province + \tau_t + \mu_i + \delta_{ihjt} \quad (2)$$

Where $computer\_café_{ihjt}$ is computer use hours only in cafés, $computer\_home_{ihjt}$ is computer use hours only at home-based setting, and $computer\_both_{ihjt}$ is computer use hours in both settings. α_1 is the parameter of interest.

3.6 Results

3.6.1 Impacts of Computer Use on Youth Health

Table 4 presents the effect of computer use on the likelihood of smoking and drinking among males 15-30 years old in three settings. In the two models on the left with smoking as the outcome variable, computer use appears to increase the probability of smoking. The estimate for the café use is 0.004 in OLS model and 0.008 in FE model, all being positive and statistically significant, whereas the FE estimates for computer use at home and both settings are all insignificant. The FE estimate specifies that each hour of computer access in internet café can increase the probability of smoking by 0.8 percentage points. The OLS regression coefficient is underestimated by half in magnitude, suggesting that the bias is driven by unobservable traits of the café user. Given the average computer use hours shown in Figure 2[2], the café-only computer access can lead to an increase in the probability of smoking by 9.46% on a weekly base.

Still in Table 4, the two regressions on the right are the various estimates on the drinking behavior. None of the coefficients for café use is statistically significant compared with both OLS and FE coefficients for home use having statistical significance. This distinct pattern for drinking behavior between café users and non-café users may reflect social norms that Chinese households tolerate alcoholic beverages at home.

The coefficient estimates of control variables are stable across specifications, both in terms of the signs and magnitudes. Age is a strong predictor for smoking and drinking behavior, and age effects turn out to be non-linear and quadratic. Compared with the reference group (elementary education or below), youth with higher educational attainment have a lower incidence of smoking and drinking. Household size and residency location don't affect health behavior. Income is positively associated with

[2] Figure 2, the average computer use hours per week is 11.84 hours for café only, 18.89 hours for both settings, and 11.27 hours for home only, respectively.

drinking alcohol and the OLS coefficient estimate is statistically significant. None of the two community-level variables appear to have effects on smoking and drinking. Provincial dummies are included in the regressions but the coefficients are not shown here in order to save space. Only two out of eight provincial dummies are statistically significant. It turns out that the two provinces are the most populous administrative regions in China.

Next, I turn to the regression results for the outcome of obesity, overweight, underweight and self-reported poor health, which may reflect the actual physical health of individuals. Table 5 finds a lack of association between BMI-based indicators and computer use except that home computer use predicts a positive incidence of overweight. With self-reported poor health as the health outcome, both the OLS and FE coefficient estimates for computer use in café are statistically significant, indicating that café is not a pleasant environment for youth health. Café users have a rate of self-reported poor health status 0.7 percent higher than computer users in other settings. With the average weekly café use hours equal to 11.84, the FE estimate predicts that going to internet café can raise the rate of self-reported poor health by the probability of 8.3%.

3.6.2 Mechanisms: Screen Based Sedentary Activity and Dietary Energy Intake

Results from reduced-form models have suggested that computer use in internet café has adverse health consequence in terms of smoking and self-reported poor health. There is no association between computer use and obesity/underweight regardless of the environment. The home-only computer access, not café-only access, predicts a prevalence of overweight. To help explain these results, I turn to time use and dietary energy intake data. Specially, I want to test whether the computer effect on health is caused by long hours of screen time, or through changes in youth's dietary energy intake.

The three panels of Table 6 report the regression results after I replace the dependent variable in equation (2) with total screen-based media hours. I define two different variations of screen time: (1) the total hours watching TV in Panel A; (2) the sum of total hours watching TV, DVD, and video games in Panel B. Based on the hypothesis from the conceptual model in Section 3, the computer may change users'

lifestyle by increasing their screen-based physical inactivity hours. Panel A of Table 6 shows the OLS effect of café use on watching TV, indicative that each hour of café use can raise the TV viewing time by 0.07 hours (4.2 minutes). This association disappears in the FE model. Panel B of Table 6 displays that both OLS and FE estimates are positive and statistically significant at the 0.05 level, with each hour of café use increasing the total screen time (TV + DVD + video) by 0.17 hours (10.3 minutes). These results may reflect that computer use in café may be complementary to the aggregated effect of these three types of screen-based physical inactivity.

As mentioned in Section 4, I cannot resolve the double counting problem when counting hours playing DVD and video game. It is possible that viewers watch DVD and play video games either on TV screen or on computer monitor. The questionnaires don't provide enough information to identify the exact location of these activities. My analysis is based on the assumption that hours displaying DVD and video are independent of hours watching TV and using computer. Therefore, my findings here should be interpreted with caution.

Since longer computer hours in café are accompanied by longer hours of watching TV, DVD and video, I am curious whether computer hours in café reduce the total physical activity hours (dance, track, swim, badminton, volleyball, soccer, basketball, table tennis, etc). Panel A (Table 7) reports the regression coefficients in the equation with total physical activity hours as the dependent variable. Surprisingly, there is no association between computer use in café and total physical activity hours. Since the time endowment is fixed for each individual, I further explore the relationship between total physical activity hours and total computer hours/TV hours/screen time in order to discover the structure of time use among these adolescents and youth. The OLS estimate in Panel B (Table 7) presents a positive association between total computer use hours and total physical activity hours, namely that every computer use hour can increase the total physical activity hour by 2 minutes. The OLS estimate in Panel C (Table 7) shows a negative association between watching TV and total physical activity, with each television viewing hour leading to a reduction in physical hours by 2 minutes. Apparently, these two OLS estimates take the opposite signs and so offset each other, indicating that

computer use and television watching together may have little impact on total physical activity hours. However, this relationship doesn't exist in the FE model. Panel D (Table 7) reports a lack of association between total screen-based media hours (TV + DVD + video + computer) and total physical time, possibly due to individuals allocating time to different kinds of screen-based activities.

Table 8 shows the effect of computer use on daily dietary intakes. Each time, I replace the dependent variable in equations (2) with one of the four food intake variables – the natural logarithm of total daily calorie consumption, the share of carbohydrate, the share of fat, and the share of protein in total calorie. There is no clear pattern between computer use and daily calorie consumption/carbohydrate/protein regardless of the location getting access to computer. However, café use predicts a positive incidence of fat consumption. The result in the fixed effect regression shows that each café hour can increase the share of fat in daily food consumption by 15%. The FE estimate is informative in terms of understanding different dietary intakes associated with computer use.

Lastly, I don't have enough information to conclude that one regression result is more reliable than others. However, if both the sign and magnitudes from OLS//FE models are stable and robust, I can rely on the fixed effects estimates for the final interpretation.

3.7 Conclusion and Discussion

This paper explores the relationship between computer use in internet cafés and health outcomes among adolescents and youth by using the longitudinal dataset created by the China Health and Nutrition Survey. Results from the fixed effects regressions suggest that every hour spent in internet cafés can increase the likelihood of smoking by roughly 0.8 percent, and the probability of self-reported poor health by 0.7 percent. On a weekly basis, these two effects magnify to become 9.46% and 8.3%, respectively. Such relationships don't exist for computer access at home or in both settings. In addition, computer access in cafés seems to transform patterns of food consumption, causing a 15 percent increase in the share of fat to total calorie consumption. There is no association

between computer use and obesity/underweight regardless of the environment. Computer use at home turns out to be a strong predictor for overweight.

I propose two types of mechanisms to explain the observable association between computer use in cafés and various adverse health outcomes. One is lifestyle effects. Here I test the hypothesis that computer use in café is a strong predictor of sedentary screen hours. With the potential double counting problem, my findings for this result should be interpreted with caution. Both the OLS/FE coefficient estimates suggest that computer use in cafés is positively associated with longer screen viewing hours (TV + DVD + video), whereas there is no such relationship among users in other settings. However, both television viewing and computer use have no impact on total physical activity hours. Youth engage in many activities every day. It is possible that the dynamics among computer use, television watching and physical activity is accompanied by a modification of the time allocated to other activities such as reading, walking and sleeping.

The other mechanism is that of social network effects. Peer effects in internet café environments are everywhere- watching the same webpage, playing the same computer games, smoking simultaneously, eating the same food and drinking the same beverage. With the detailed information about daily dietary intakes available, I test the hypothesis whether computer use in café is strongly associated with distinct eating habits among café users and other types of users. The regression results confirm that café users consume food with a higher fraction of fat content. This lack of nutrition may be the possible reason for poor health. Combining results from different health regressions, it is possible that the poor health among café users is caused by smoking (or second-hand smoking) and eating high-fat food.

The empirical results from the FE estimation should be viewed as suggestive. Since the FE estimation predicts the association between changes in the key independent variables and changes in health outcomes net of observed and unobserved invariable characteristics of the computer user, it is an improvement over the classic OLS model. However, it should be borne in mind that FE estimates do not resolve all of the causality problems associated with observable data. For instance, if youth who are physically weak are more prone to screen-based activities, my analysis will suffer from the bias of reverse

causality, namely that pre-existing differences in health outcomes may produce different propensities to use computers. An ideal instrumental variable approach would be a solution.

My study has three implications for global health policy. First, lack of parental supervision is not good for adolescents' health, and an increase in parental involvement in after-school activities is crucial. Good educational materials on the perils of uncontrolled internet café usage should be widely distributed and studied. Since many Chinese parents in the rural communities travel away from home and work as migrant workers in the cities, this issue becomes more severe for those who remain in rural areas. Second, effective policies should be in place to help internet cafes to become health-promoting environments. In many parts of the country, those illegal internet cafés lure customers by offering low prices and twenty-four hour access. Heavy fines are not the only solution to eliminating these poorly-operated cafés. The more constructive strategy is to enact effective policies on internet café operation that can be implemented on a daily basis. One example might be a nationwide campaign to restrict smoking inside internet cafés. Third, my study highlights the need for joint efforts to establish effective health policy to reduce negative health outcomes. Parents, school teachers and internet café operators are not the only stakeholders.

Despite these caveats, my research can make a contribution to the literature by documenting how computer access in internet cafés affects youth health in the global context. Extensive internet use is a phenomenon not only in China, but also in many emerging markets such as India, Brazil, Mexico, South Africa, among others. Although there are country-specific policies in place regulating internet cafés, the policy implications derived from this study of Chinese youth shed light on problems and possibilities that are common to many developing nations.

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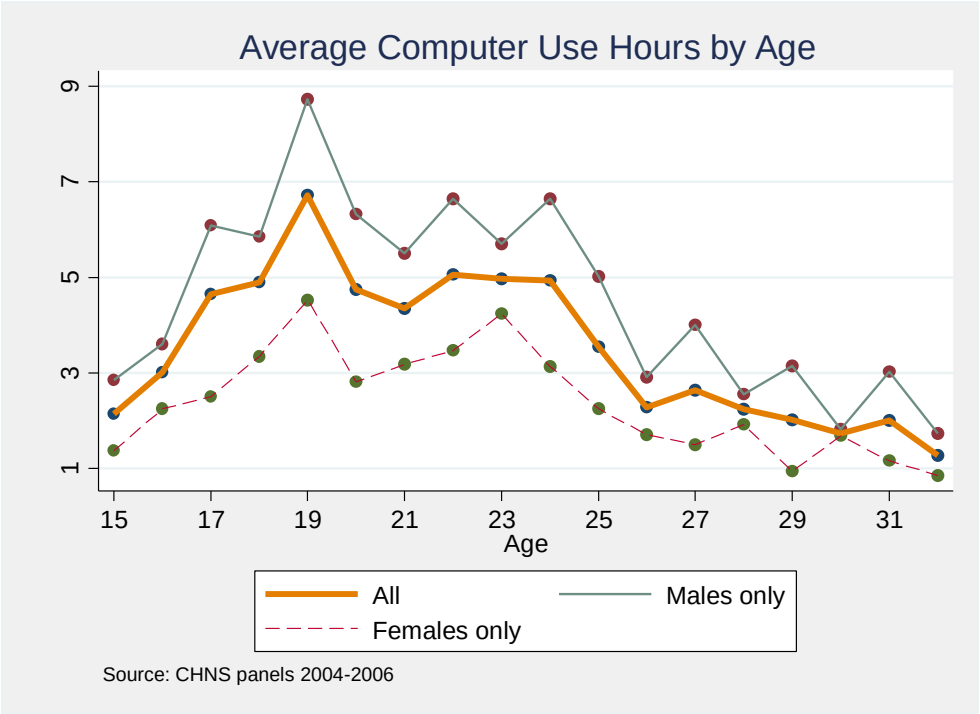
Figure 3.1: Distribution of Computer Use by Age (Hours vs. Frequency)
Panel A: Average Computer Use Hours by Age



Panel B: Percentage of Computer Usage by Age

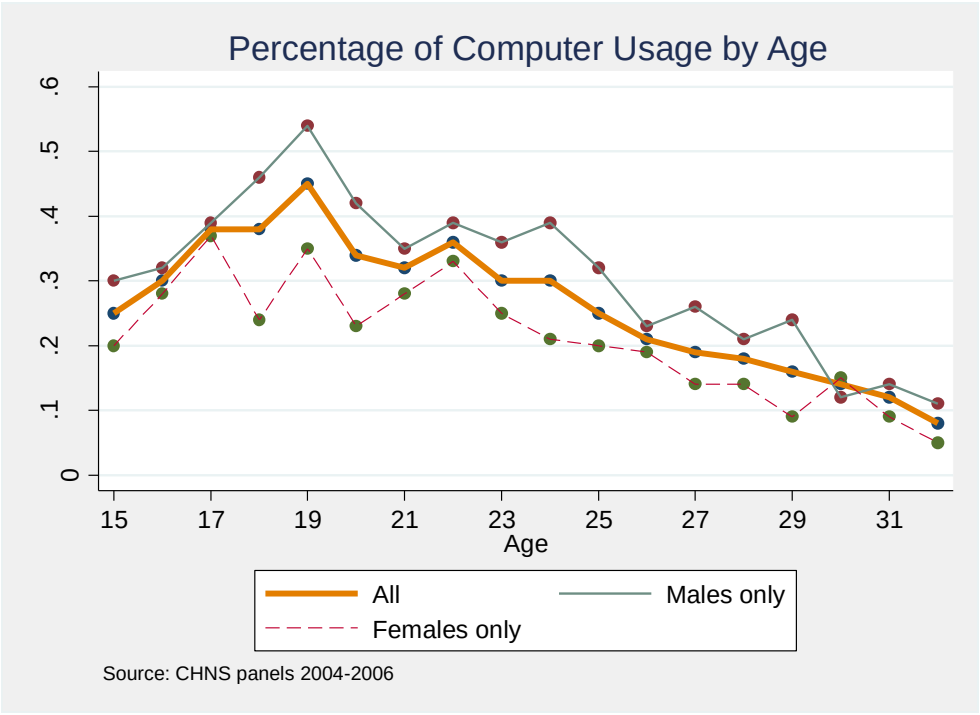


Figure 3.2: Average Screen-Based Media Use Hours by Location

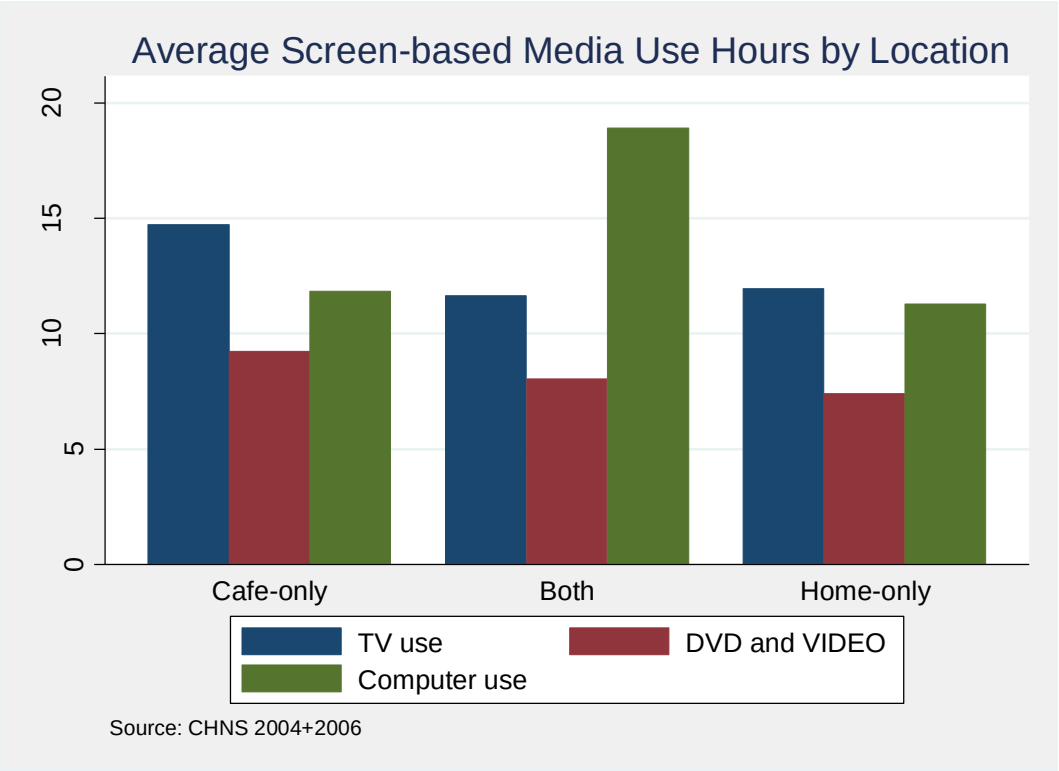


Figure 3.3: Distribution of Computer Use Hours by Location and Frequency

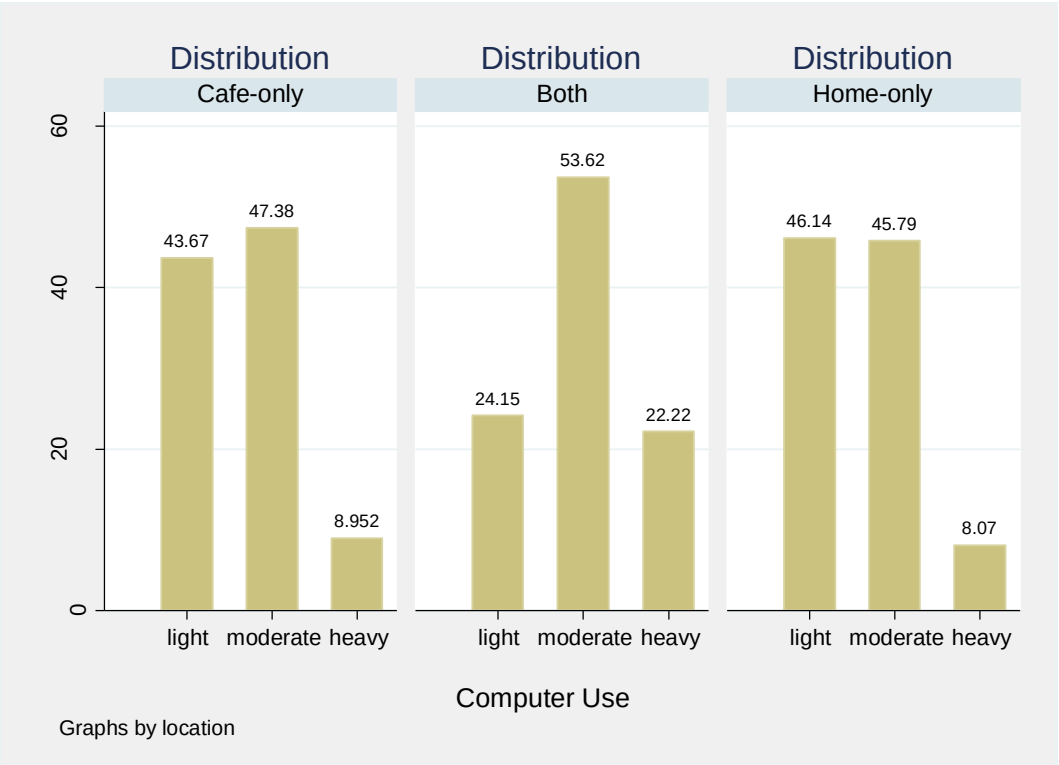


Table 3.1: Data Structure

Variable list	2004only		2006only		Stay in Both waves		Stay in Both waves		
	(1)		(2)		(3)		(4)		
	%(status ==1)	N	%(status ==1)	N	%(status ==1)	N	No change of status(%)	No→Yes (%)	Yes→No (%)
							Stayer	Enterer	Leaver
Computer use 0/1	22.11	909	42.01	607	28.85	766	85.25	11.36	3.39
Computer in café 0/1	10.89	909	18.28	607	12.53	766	87.82	7.14	5.05
Computer use both in café and at home	3.63	909	10.54	607	6.40	766	92.32	4.85	2.83
Computer at home 0/1	7.59	909	13.18	607	9.92	766	88.10	7.89	4.00
Smoking 0/1	34.64	485	42.94	326	38.17	524	82.25	10.88	6.87
Drinking 0/1	38.60	487	49.38	324	45.82	526	74.52	17.68	7.79
Obesity 0/1	3.10	871	3.38	650	3.27	888	96.73	1.91	1.35
Overweight 0/1	8.84	871	13.69	650	11.04	888	88.74	5.41	5.86
Underweight 0/1	12.86	871	10.46	650	12.27	888	87.05	5.52	7.43
Poor health 0/1	20.48	913	18.74	651	23.21	1034	69.63	14.70	15.67

Table 3.2: Summary Statistics of Community-level Characteristics by Computer Use

	Overall	Using Computer	Not Using Computer	t-test (p-value)
Variable list	(1)	(2)	(3)	(4)=(2)-(3)
Population of neighborhood	3671.51	5082.99	2928.29	.00
# of household in neighborhood	1028.24	1499.03	846.30	.00
Area of neighborhood (sq.km)	17.43	20.27	15.91	.30
Daily wage of ordinary male workers (yuan)	26.34	29.26	25.18	.00
Daily wage of ordinary female workers (yuan)	20.85	24.10	19.54	.00
Monthly wage of driver (yuan)	1161.03	1309.07	1100.49	.00
Distance to primary school(km)	1.26	.95	1.40	.00
Distance to middle school(km)	2.24	1.58	2.47	.00
Distance to high school(km)	6.44	3.80	7.32	.00
Whether road is paved?	.68	.79	.64	.00
Whether electricity cutoff sometime during the week?	.14	.09	.16	.00
Whether there is internet service in the neighborhood?	.51	.72	.43	.00
Whether there is internet café in the neighborhood?	.42	.67	.33	.00
Whether there is fast food restaurant in the neighborhood?	.16	.30	.10	.00
N communities	366	159	207	

Table 3.3a- Summary Statistics for Variables Used in the Health Behavior Outcome Regression (Only Males Aged 15-30 yrs old)
Y=smoking /Y=drinking

	All		Using Computer		Not Using Computer	
Variable List	N	Mean	N	Mean	N	Mean
Ys:						
0/1 smoking	1521	.39	499	.38	1022	.41
0/1 drinking	1524	.44	498	.46	1026	.43
Computer-related variables						
0/1 Computer use	1527	.33	500	1.00	1027	0
0/1 Computer use in café	1527	.16	500	.50	1027	0
0/1 Computer use in both locations	1527	.08	500	.23	1027	0
0/1 Computer use at home	1527	.09	500	.27	1027	0
Screen-based Media Use Hours						
Avg computer use hrs/wk	1527	5.38	500	16.74	1027	0
Avg TV hrs/wk	1369	14.29	459	14.13	910	14.38
Avg DVD+Video hrs/wk	456	9.07	218	9.61	238	8.58
Avg TV+DVD+Video hrs/wk	1369	16.83	459	17.75	910	16.35
Food Energy Intake						
Calorie/day	1515	2321.57	495	2318.01	1020	2323.30
Share of Carbohydrate (%)	1515	61.03	495	56.02	1020	63.46
Share of Fat (%)	1515	26.80	495	30.94	1020	24.80
Share of Protein (%)	1515	12.16	495	13.03	1020	11.74
Xs:						
Age	1527	23.18	500	21.86	1027	23.83
Age squared	1527	565.73	500	501.05	1027	597.23
Male	1527	1.00	500	1.00	1027	1.00
Minority	1527	.13	500	.06	1027	.16
Educ: elementary or below	1524	.10	500	.02	1024	.13
Educ: lower secondary school	1524	.51	500	.31	1024	.61
Educ: high school or equivalent	1524	.32	500	.47	1024	.24
Educ: bachelor or above	1524	.08	500	.20	1024	.02
Urban	1527	.24	500	.43	1027	.15
Household size	1508	4.23	495	3.90	1013	4.39
HH income gross (CPI-adjusted)	1506	29330.16	495	37482.93	1011	25338.45
HH income per person (CPI-adjusted)	1508	6436.14	495	9321.65	1013	5026.14
Community-whether fast food restaurant?	1517	.16	500	.28	1017	.09
Community-whether cable TV?	1522	.68	499	.85	1023	.59

Table 3.3b- Summary Statistics for Variables Used in the Health Outcome Regression (Both Males and Females Aged 15-30)
Y=obesity/Y=overweight/Y=underweight/Y=poor health

	All		Using Computer		Not Using Computer	
Variable List	N	Mean	N	Mean	N	Mean
Ys:						
0/1 obesity	2650	.03	758	.03	1892	.04
0/1 overweight	2650	.11	758	.11	1892	.11
0/1 underweight	2650	.12	758	.18	1892	.10
0/1 poor health	2924	.22	812	.23	2112	.21
Computer-related variables						
0/1 Computer use	2943	.28	817	1.00	2126	0
0/1 Computer use in café	2943	.13	817	.46	2126	0
0/1 Computer use in both locations	2943	.06	817	.22	2126	0
0/1 Computer use at home	2943	.09	817	.33	2126	0
Screen-based Media Use Hours						
Avg computer use hrs/wk	2928	4.05	802	14.80	2126	0
Avg TV hrs/wk	2656	14.43	760	13.78	1896	14.70
Avg DVD+Video hrs/wk	714	8.45	314	8.80	400	8.18
Avg TV+DVD+Video hrs/wk	2656	16.69	760	17.39	1896	16.41
Food Energy Intake						
Calorie/day	2885	2140.69	802	2148.43	2083	2137.71
Share of Carbohydrate (%)	2883	60.19	801	54.87	2082	62.24
Share of Fat (%)	2883	27.59	801	31.85	2082	25.95
Share of Protein (%)	2883	12.21	801	13.28	2082	11.81
Xs:						
Age	2943	23.54	817	21.94	2126	24.15
Age squared	2943	581.94	817	505.24	2126	611.42
Male	2943	.52	817	.62	2126	.48
Minority	2943	.13	817	.06	2126	.15
Educ: elementary or below	2938	.12	817	.01	2121	.16
Educ: lower secondary school	2938	.49	817	.27	2121	.58
Educ: high school or equivalent	2938	.30	817	.46	2121	.24
Educ: bachelor or above	2938	.09	817	.27	2121	.02
Urban	2943	.24	817	.44	2126	.17
Household size	2909	4.32	809	3.91	2100	4.48
HH income gross (CPI-adjusted)	2906	29025.98	809	37799.81	2097	25641.13
HH income per person (CPI-adjusted)	2909	6294.82	809	9551.36	2100	5040.29
Community-whether fast food restaurant?	2918	.16	815	.30	2103	.10
Community-whether cable TV?	2929	.68	814	.87	2115	.60

Table 3.4: Estimating the Relationship between Computer Use (in Internet Café vs. NOT in Internet Café) and the Probability of Smoking and/ or Drinking among Adolescents and Youths.
(Only Males Aged 15-30; CHNS 2004-2006)

	Y= Smoking		**Y= Drinking**	
Variables	OLS	FE	OLS	FE
Computer hrs/wk in café only	0.004	0.008	0.002	-0.003
	(0.001)**	(0.002)**	(0.001)	(0.004)
Computer hrs/wk both in café and at home	0.004	0.005	0.001	0.001
	(0.002)*	(0.004)	(0.002)	(0.003)
Computer hrs/wk at home only	0.002	0.006	0.005	0.010
	(0.002)	(0.003)	(0.002)**	(0.004)*
Total screen hours (TV+DVD+VIDEO)	-0.001	-0.001	0.003	0.002
	(0.001)	(0.001)	(0.001)**	(0.001)
Age	0.111	0.005	0.100	0.212
	(0.031)**	(0.078)	(0.032)**	(0.097)*
Age squared	-0.002	-0.000	-0.002	-0.003
	(0.001)**	(0.001)	(0.001)*	(0.002)
Minority	-0.001		0.148	
	(0.049)		(0.050)**	
Marital status	0.026	0.161	0.097	-0.026
	(0.043)	(0.114)	(0.044)*	(0.101)
Whether in school?	-0.186	-0.135	-0.006	-0.005
	(0.042)**	(0.095)	(0.046)	(0.106)
Whether working?	0.037	0.169	0.076	0.004
	(0.041)	(0.057)**	(0.039)	(0.072)
Education: middle school	-0.070	-0.175	0.070	-0.176
	(0.049)	(0.246)	(0.044)	(0.137)
Education: high school or equivalent	-0.128	-0.281	0.031	-0.402
	(0.054)*	(0.274)	(0.052)	(0.184)*
Education: bachelor or above	-0.190	-0.254	0.027	-0.467
	(0.073)*	(0.326)	(0.070)	(0.214)*
Household size	0.008	-0.050	-0.010	-0.020
	(0.012)	(0.033)	(0.012)	(0.033)
Log(income)	0.013	-0.033	0.018	0.008
	(0.008)	(0.019)	(0.008)*	(0.022)
Urban site	-0.007		0.017	
	(0.035)		(0.042)	
Community-any fastfood	0.109	0.103	0.086	0.068
	(0.042)*	(0.076)	(0.051)	(0.092)
Community-cable TV	-0.011	-0.011	-0.035	-0.079
	(0.031)	(0.041)	(0.034)	(0.062)
year2006	-0.014		0.049	
	(0.023)		(0.026)	
Provincial dummies	YES	NO	YES	NO
Constant	-1.081	0.840	-1.307	-2.376
	(0.371)**	(0.979)	(0.390)**	(1.200)*
Observations	1375	1375	1355	1355
R-squared	0.21	0.12	0.17	0.09
# of persons		1095		1086
F-test $\beta_{café}=\beta_{home}$: P-value	.0005	.0047	.0321	.0228

Robust standard errors in brackets * significant at 5%; ** significant at 1%

Table 3.5: Estimating the Relationship between Computer Use and the Probability of Being Obese, Overweight, Underweight or Being in Self-Reported Poor Health among Adolescents and Youths.
(Both Males and Females Aged 15-30; CHNS 2004-2006)

Panel A		
	Y=Obesity	
Variables	OLS	FE
Computer hrs/wk in café only	0.000	0.002
	(0.001)	(0.002)
Computer hrs/wk both in café and at home	0.001	0.001
	(0.001)	(0.001)
Computer hrs/wk at home only	-0.000	0.000
	(0.001)	(0.000)
Controls	YES	YES
Panel B		
	Y=Overweight	
Variables	OLS	FE
Computer hrs/wk in café only	-0.000	0.001
	(0.001)	(0.001)
Computer hrs/wk both in café and at home	0.002	0.002
	(0.001)	(0.001)
Computer hrs/wk at home only	0.001	0.006
	(0.001)	(0.003)*
Controls	YES	YES
Panel C		
	Y=Underweight	
Variables	OLS	FE
Computer hrs/wk in café only	0.001	0.003
	(0.001)	(0.002)
Computer hrs/wk both in café and at home	-0.002	-0.003
	(0.001)**	(0.002)
Computer hrs/wk at home only	0.001	0.002
	(0.001)	(0.002)
Controls	YES	YES
Panel D		
	Y=Poor health	
Variables	OLS	FE
Computer hrs/wk in café only	0.003	0.007
	(0.001)*	(0.002)**
Computer hrs/wk both in café and at home	-0.002	-0.002
	(0.001)	(0.003)
Computer hrs/wk at home only	0.000	0.001
	(0.001)	(0.003)
Controls	YES	YES
Observations	2608	2608
R-squared	0.03	0.04
# of person		2077

Robust standard errors in brackets
* significant at 5%; ** significant at 1%

Table 3.6: Mechanism (1) - Estimating the Relationship between Computer Use and Screen-Based Media Hours
(Both Males and Females Aged 15-30, CHNS 2004-2006)

Panel A: Y=total hours of watching TV (1 items)

	Y=total(TV)	
Variables	OLS	FE
Computer hrs/wk in café only	0.073	-0.069
	(0.028)**	(0.064)
Computer hrs/wk both in café and at home	-0.016	-0.014
	(0.029)	(0.052)
Computer hrs/wk at home only	0.101	0.020
	(0.056)	(0.058)
Controls	YES	YES
Observations	2569	2569
R-squared	0.14	0.05
# of person		2056

Panel B: Y=total hours of watching TV, DVD, and VIDEO GAME (3 items)

	Y=total(TV + DVD + VIDEO)	
Variables	OLS	FE
Computer hrs/wk in café only	0.171	0.166
	(0.047)**	(0.080)*
Computer hrs/wk both in café and at home	-0.001	0.056
	(0.037)	(0.074)
Computer hrs/wk at home only	0.050	0.117
	(0.040)	(0.084)
Controls	YES	YES
Observations	2619	2619
R-squared	0.13	0.05
# of person		2085

Robust standard errors in brackets; * significant at 5%; ** significant at 1%

Table 3.7: Estimating the Relationship between Screen-Based Media Hours and Physical Activity Hours
(Both Males and Females Aged 15-30, CHNS 2004-2006)

Panel A: Y=total physical activity hours

Variables	OLS	FE
Computer hrs/wk in café only	0.066	0.007
	(0.035)	(0.028)
Computer hrs/wk both in café and at home	0.011	0.027
	(0.014)	(0.030)
Computer hrs/wk at home only	0.043	-0.022
	(0.034)	(0.021)
Controls	YES	YES
Observations	2507	2507
R-squared	0.20	0.11
# of person		1969

Panel B: Y=total physical activity hours

Variables	OLS	FE
Total Computer Hours Per Week	0.031	0.025
	(0.010)**	(0.019)
Controls	YES	YES
Observations	2507	2507
R-squared	0.30	0.11
# of person		1969

Panel C: Y=total physical activity hours

Variables	OLS	FE
Total TV Hours Per Week	-0.026	-0.006
	(0.008)**	(0.011)
Controls	YES	YES
Observations	2596	2596
R-squared	0.30	0.12
# of person		2030

Panel D: Y=total physical activity hours

Variables	OLS	FE
Total Screen Hours Per Week (TV+DVD+VIDEO+COMPUTER)	0.007	0.002
	(0.005)	(0.011)
Controls	YES	YES
Observations	2611	2611
R-squared	0.30	0.10
# of person		2040

Robust standard errors in brackets
* significant at 5%; ** significant at 1%

Table 3.8: Mechanism (2) – Estimating the Relationship between Computer Use and Food Energy Intake
(Both Males and Females Aged 15-30, CHNS 2004-2006)

Panel A:	**Y= Log(Calorie/day)**	
Variables	OLS	FE
Computer hrs/wk in café only	-0.000	0.001
	(0.001)	(0.002)
Computer hrs/wk both in café and at home	0.000	-0.003
	(0.001)	(0.002)
Computer hrs/wk at home only	-0.001	0.002
	(0.001)	(0.002)
Controls	YES	YES

Panel B:	**Y= Share of Carbohydrates in total calories**	
Computer hrs/wk in café only	-0.055	-0.026
	(0.034)	(0.052)
Computer hrs/wk both in café and at home	0.010	0.234
	(0.037)	(0.072)**
Computer hrs/wk at home only	-0.061	0.002
	(0.033)	(0.097)
Controls	YES	YES

Panel C:	**Y= Share of Fat in total calories**	
Computer hrs/wk in café only	0.078	0.151
	(0.033)*	(0.049)**
Computer hrs/wk both in Café and at home	-0.025	-0.122
	(0.036)	(0.056)*
Computer hrs/wk at home only	0.061	-0.069
	(0.032)	(0.114)
Controls	YES	YES

Panel D:	**Y= Share of Protein in total calories**	
Computer hrs/wk in café only	0.004	-0.019
	(0.009)	(0.021)
Computer hrs/wk both in Café and at home	0.031	0.003
	(0.010)**	(0.018)
Computer hrs/wk at home only	0.017	-0.027
	(0.011)	(0.029)
Controls	YES	YES
Observations	2785	2785
R-squared	0.14	0.04
# of person		2198

Robust standard errors in brackets
* significant at 5%; ** significant at 1%

Chapter 4

Unemployment Insurance and Low-Educated, Single, Working Mothers before and after Welfare Reform

4.1 Introduction

During the 1990s, low-educated single mothers left cash welfare and increased their labor force participation at unprecedented rates (Blank, 2006). Several factors contributed to these dramatic changes: the 1996 welfare reform, the expansion of the Earned Income Tax Credit (EITC), and the economic expansion of the late 1990s (Ellwood, 2000; Meyer & Rosenbaum, 2001). An important question is the extent to which increased work effort by low-educated, single mothers, and their subsequent experience of job loss, caused increases in the rate at which they receive unemployment insurance (UI).

The purpose of UI is to protect against the loss of income during involuntary unemployment. However, literature finds that low-wage workers often experience difficulties accessing the program (Vroman 1998; Levine, 2006; Wenger 2006; Shaefer 2010). The current study examines UI use patterns among low-educated, single, working mothers who enter a spell of unemployment. It explores the extent to which those patterns changed in the years after enactment of the 1996 welfare reform. It also examines changes in the use of two other major income support programs: cash welfare and the Food Stamp Program (FSP, now called the Supplemental Nutrition Assistance Program, or SNAP). This study asks whether the growth in labor force participation among low-educated, single mothers since the early 1990s is accompanied by growth in UI eligibility and receipt among this population. It further asks whether the relative importance of three major income support programs (UI, the FSP, and cash welfare) changed for single mothers who enter a spell of unemployment.

Most of the ensuing analyses compare UI program participation outcomes for low-educated, single mothers with those for low-educated, single, childless women. The comparison is a rough control for competing explanatory factors that similarly affect both groups of women. Use of the comparison helps the study to evaluate whether any change in the UI participation of single mothers might be attributed to welfare reform and to changes in related social welfare policies, rather than to other trends (Eissa and Liebman 1996; Meyer and Rosenbaum 2001; Meyer & Sullivan 2004).

4.2 Background & Contribution

Most research on UI benefits receipt by vulnerable workers explores the importance of one or more of three key factors: monetary eligibility, non-monetary eligibility, and take-up of benefits (Bassi and McMurrer 1997; Levine, 2006; O'Leary & Kline, 2008; Vroman 2009; Shaefer 2010). Each of these factors is believed to be a barrier to receiving UI benefits.

The requirements for monetary eligibility vary from one state to another. Generally, workers must earn a state-specific minimum of $1000-$3000 over 4 quarters (referred to as the base period) from any qualifying employer in order to be eligible for UI benefits. Many states also limit UI eligibility to those workers whose earnings exceed a minimum level within a single quarter, referred to as a high-quarter requirement. Until recently, the standard base period used by most states was the first 4 of the previous 5 completed quarters, and thus, earnings from the most recent completed quarter were excluded from eligibility calculations. By excluding earnings from the quarter of job loss and the most recent completed quarter, the standard base period results in long lags between the point of job loss and the earnings that can be included in eligibility calculations. A growing number of states have adopted alternative base periods, which allow workers to include earnings from their most recent completed quarter in the calculation of eligibility.[1] The goal of an alternative base period is to increase the likelihood that low-wage workers (who often have short or sporadic work histories) will meet monetary eligibility requirements (Boushey and Wenger 2006; Wenger 2006).

[1] Many of these states adopted an alternative base period in response to monetary incentives included in the UI Modernization Act, which was part of the American Recovery and Reinvestment Act (ARRA) of 2009 (123 Stat. 115).

Some recent studies find, however, that rates of monetary eligibility are already high among vulnerable workers (Rangarajan, Razafindrakoto, and Corson 2002; Rangarajan and Razafindrakoto 2004; O'Leary and Kline 2008; Shaefer 2010). Such findings suggest that monetary eligibility is not the primary factor driving low levels of UI receipt among vulnerable populations.

Several nonmonetary requirements limit eligibility to receive UI benefits. Most of these relate to the circumstances surrounding a worker's job separation. Such circumstances include the reason for job loss and also professed availability for future employment. To be eligible to receive UI benefits, workers typically must leave employment due to layoff, plant closing, or some other involuntary reason, and the separation must not be a result of a voluntary quit or discharge by the employer for work. In a few states, workers who do not meet nonmonetary requirements initially may later become eligible. Further, some states have provisions that allow workers to maintain eligibility if they quit voluntarily but are able to show that they have a good cause for doing so. Examples of good-cause reasons include leaving employment to care for an ill or disabled family member, to escape domestic violence, and to accompany a spouse who relocates for employment. A number of studies suggest that nonmonetary requirements may be a greater barrier to UI access than monetary requirements for vulnerable workers (Holzer 2000; Rangarajan et al. 2002; Rangarajan and Razafindrakoto 2004; O'Leary & Kline, 2008; Shaefer 2010). Across these studies, workers had low rates of nonmonetary ineligibility. Low rates of nonmonetary ineligibility may be due in part to the characteristics of the industries in which jobs for these workers are clustered. Low-wage workers are disproportionately employed in industries that tend to avoid formal lay-offs (U.S. General Accounting Office 2000; Lambert 2008).

Take-up is another factor that may affect receipt of UI benefits. Vulnerable unemployed workers who are eligible for UI may be less likely to take up UI benefits than eligible unemployed workers who are more advantaged. Using data from the 2001 panel of the Survey of Income and Program Participation (SIPP), H. Luke Shaefer (2010) finds that eligible workers in the lowest wage quintile are less likely to participate in UI than are higher-paid eligible workers. Analyzing supplements from the U.S. Census Bureau's Current Population Survey (CPS), Stephen Wandner and Andrew Stettner

(2000) report that more than half of the unemployed do not file for UI. The most common reason cited is perceived ineligibility.

Low-educated Single Mothers, Labor Force Participation, and UI Participation

Labor force participation increased substantially among single mothers in the 1990s. Most studies conclude that this was due to a combination of reasons, including the 1996 welfare reform, expansions of the EITC, increases to the minimum wage, and the booming economy of the 1990s (Dickert, Houser, and Scholz 1995; Eissa and Liebman 1996; Ellwood 2000; Meyer and Rosenbaum 2001; Hotz and Scholz 2003; Blank 2006; Dahl, DeLeire and Schwabish 2009). The EITC expansions and the 1996 welfare reform fundamentally changed anti-poverty policy by raising the benefits of work while ending the entitlement to cash assistance.

These changes also led to a dramatic decline in the number of single-mother families receiving cash assistance. Caseloads of cash assistance through Aid to Families with Dependent Children (AFDC) and then Temporary Assistance for Needy Families (TANF) declined from 11.7 million individuals in 1990 to 4.5 million in 2005 (U.S. Department of Health and Human Services, Administration for Children and Families n.d.). What is unknown is whether single mothers entering a spell of unemployment experienced growing access to UI during this period. In facing unemployment spells before welfare reform and the broad changes of the 1990s, did low-educated, single mothers use cash assistance instead of UI? If so, have policy changes prompted low-educated, single mothers to stop using cash assistance at such times? Most important, if access to cash assistance declined for single mothers entering a spell of unemployment during the study period (1990-2005), did their probability of accessing UI increase?

Julia Isaacs (2005) uses CPS data to document growth in UI receipt among low-income, single, female household heads with related resident children during the early recession years of 2001-2003. She finds that the growth in the proportion of this population accessing UI exceeds the increase in participation rates during the recession of the early 1990s, and she concludes that this growth partially explains why TANF caseloads declined during the 2001 recession. However, she does not specifically examine the UI participation rates of single mothers entering a spell of unemployment,

nor does she use a comparison group to rule out the importance of other factors apart from the major social policy changes.

In a study that analyzes recent administrative data from four major states, Christopher O'Leary and Kenneth Kline (2008) examine UI use by individuals who left TANF for employment, lost a job and then applied for UI. They find that 90 percent of these individuals are monetarily eligible for UI. However, welfare leavers in these states are far less likely than other applicants to meet nonmonetary eligibility requirements. The authors attribute the difference between the groups to higher rates of voluntary job quits and dismissals among the job leavers. Two other studies find that a large majority of former welfare recipients meet monetary eligibility requirements; both find that nonmonetary requirements are a greater eligibility barrier than the monetary requirements (Rangarajan et al. 2002; Rangarajan and Razafindrakoto 2004). These studies examine relatively short periods of time and do not use nationally representative samples.

Heather Boushey and Jeffrey Wenger (2006) use data from the 1993 and 1996 panels of the SIPP. They find that women ages 18-64 who left welfare and reported earnings during the SIPP panel in which they participated were less likely to meet monetary requirements in the late 1990s than they were in the early 1990s. However, Boushey and Wenger (2006) do not look at the probability of UI receipt or use a comparison group approach. Further, although examining recent welfare leavers offers important information, it is also important to examine the broader sample of single mothers, not just recent welfare recipients, because the population of welfare leavers has undergone large compositional changes over time (Meyer and Sullivan 2004).[2] These selection effects may impact estimates in important ways.

Contribution of the Current Study

To the authors' knowledge, the current study is the first to look at changes in both UI benefits receipt and UI eligibility using a nationally representative longitudinal sample of low-educated, single mothers at the point that they entered a spell of unemployment during 1990-2005. This period includes the 1996 welfare reform, the major EITC expansions, two recessions, and two economic expansions of varying sizes. This study

[2] A single mother who received cash assistance in the early 1990s may have never received benefits in the post-reform era. On the other hand, the same woman who left welfare post-reform may have never left during the early 1990s.

frame is used to allow comparison of a pre-reform period (1990-94) and post-reform period (2001-5) that are roughly comparable. Both included a mild recession and some expansionary years. The study frame does not allow for the evaluations of UI eligibility reforms included in the American Recovery and Reinvestment Act of 2009 (see footnote 1). Adequate data are not yet available to allow this. The authors also believe that this is the first study to examine changes in UI use relative to those in two major income support programs: cash welfare (AFDC and TANF), and the FSP.

Two hypotheses guide this study. First, single mothers entering a spell of unemployment in the post-welfare reform period are hypothesized to experience relative increases in eligibility for and receipt of UI benefits over mothers entering a spell before welfare reform. These increases should be spurred by increasing labor force participation and declining access to cash welfare (Holzer 2000; Isaacs 2005). Second, declines in cash assistance since welfare reform are hypothesized to diminish the probability that single, unemployed mothers access any safety net program in the post reform period.

4.3 Data and Methods

This study uses data from the SIPP. Collected by the U.S. Census Bureau, SIPP data offer a longitudinal representation of the civilian non-institutionalized population in the United States. The survey selects a nationally-representative sample by clustering addresses within cities and counties. Clustering is based on population counts from the most recent decennial census. Interviews are conducted every four months and gather data about each individual in the interview subject's household for each intervening month. These data include information on demographics, income sources, public assistance program participation, household and family structure, jobs, and work history (Westat and Mathematica Policy Research 2001). A recent analysis compares eight major nationally representative surveys that measure income and program participation. The results suggest that the SIPP does a superior job of measuring the income of low-income households and public program participation (Czajka & Denmead, 2008).[3]

[3] Despite the SIPP's relative strength in measuring program participation, Meyer et al. (2009) find that the survey still suffers from under-reporting of public program benefits receipt and the amount of benefits. While this presents a limitation to our work, we believe that it highlights one of the strengths of relying on

The current analyses pool data from the 1990, 1991, 1992, 1993, 1996, 2001, and 2004 SIPP panels to create a sample that provides data from the start of 1990 through the end of 2005. These data include short gaps in 1995 and 2000 (between SIPP panels). The 1990-93 panels were typically 2 years long and overlap. Later panels were 3-4 years long, and do not overlap. All analyses use person-month weights. Standard errors are clustered to account for the use of multiple observations for each respondent. A few small states are not uniquely identifiable in the 2001 and older panels. As is common with SIPP studies, the current analyses drop observations from these states, because respondents cannot be matched with state program eligibility rules (Gruber and Simon 2008).

The study population is single mothers, age 22-55, who reside with minor children and have a high school degree or less education at the time of survey.[4] The comparison group is composed of similarly-educated, single, childless women in the same age range. Most analyses compare the relative outcomes of these two groups across time. This makes sense because the two populations experience similar dynamic in the labor market but are differentially affected by welfare reform and other policy changes. The comparison of low-educated, single mothers with low-educated, single, childless women may enable these analyses to control for external factors that lead to changes in program participation and eligibility but that are not unique to single mothers (Eissa and Liebman 1996; Meyer and Rosenbaum 2001; Meyer and Sullivan 2004).

Identifying Job Separations in the SIPP

Most analyses in this paper examine workers at the point when they enter a spell of unemployment. A respondent is considered to enter such a spell if she is employed and working during month *t-1* and is not working but seeking work in month *t*. A respondent is considered to transition out of the labor force if she works in month *t-1* but is not working and not seeking work in month *t.* (The guidelines are adapted from official definitions used by the U.S. Bureau of Labor Statistics n.d.). These categorizations are fairly stable during the months after job loss. If these restrictions are imposed, the current sample includes 48,566 person-year observations of low-educated, single women (22,717

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a comparison population, as it is unlikely that rates of under-reporting for single mothers and single childless women differ systematically over time.

[4] We take marital status and education at time t, the point at which they enter a spell of unemployment. We explore the importance of a recent marital separation in the sensitivity analysis section.

single mothers and 25,849 single, childless women). There are 4,411 person-month observations in which low-educated, single women go from working in *t-1* to not working but seeking work in month *t* (2,316 single mothers and 2,095 single, childless women).[5] Some of these 4,411 observations may represent respondents who experience multiple transitions during a panel.

Table 1 compares demographic attributes for low-educated, single mothers with those for low-educated, single, childless women. The table displays reported characteristics for two periods: the pre-reform years (1990-1994) and the post-reform years (2001-5). In the post reform period, single mothers are less likely to be black than in the pre reform period, and single, childless women in the post reform period are more likely to be nonwhite than in the pre reform period. Single mothers in the post reform period are also more likely to be high school graduates than in the pre reform period. Thus, race and education will be important control variables in multivariate analyses. Between the pre- and post-reform periods, reported employment among single, childless women declined by 6.1 percentage points, but it increased among single mothers by 12.0 percentage points. Thus, the difference in rates of labor force participation between the two groups changed by 18.1 percentage points from the pre reform period to the post reform period.

Estimating UI Participation and Eligibility

Participation in UI. A respondent is considered to participate in UI if she reported receiving a cash benefit from a state UI program during the first 3 months after a job separation (the authors explored the use of 2-, 4-, and 5- month lagged variables, but none substantively changes the results). This 3-month lagged variable is necessary because considerable time can elapse between job loss and benefits receipt. Workers may be laid off and waiting to be called back, or they may explore other employment options before turning to UI. Also, many state programs impose a 1-week waiting period on workers after eligibility determination.

Monetary eligibility. The SIPP includes monthly data on earnings. To measure monetary eligibility requirements for each state and year in these data, the study draws on

[5] For some analyses of transitions across months in the SIPP, there would be concern that imputation might lead to a false transition. However, labor market variables in the SIPP are imputed by taking the respondent's previous month's values, so in this case imputation would not cause such a transition.

annual comparisons of state program laws. These comparisons are provided by the U.S. Department of Labor, and merged with the SIPP data for each state by year (U.S. Department of Labor, Employment and Training Administration n.d.). To estimate monetary eligibility, each worker's wages are run through a simulation that compares her earnings over one year with her state's minimum base period and high quarter (if applicable) requirements for that year. The three months directly preceding the employment separation were omitted so that the analyzed period mirrors the period that states would typically exclude in assessing UI eligibility (if it were assessed) before adoption of alternative base periods. Although this 3-month period does not coincide exactly with the worker's official base period, it is a close approximation. The analyses therefore include data on earnings from work for the 15 months before the employment separation but use data for only 12 of those months. To estimate monetary eligibility, the analysis is restricted to workers in the sample for five or more months before employment separation [6]. A worker is considered to meet her state's monetary requirements if her earnings in the simulated based period and high-quarter earnings were at or above her state's minimum requirements.

Non-monetary eligibility. Initial non-monetary eligibility requirements related to employment separations also vary by state, but they are often generalized in studies of nationally representative microdata (Levine 2006; Shaefer 2010). For this study, a respondent is considered to meet initial non-monetary requirements if the unemployment spell begins because the worker "lost a job or was laid off" (Levine 2006, 375). The respondent is considered ineligible if she leaves a position because of a voluntary quit or is discharged for misconduct or other performance issues. Because of difficulties with the time frame (person-month observations), responses on this measure are available for only 2,850 out of 4,411 transition observations. To ensure that this does not bias the results, all descriptive and regression estimates are run in analyses restricted to this smaller sub-sample. These results prove substantively similar. Another concern is that some respondents may choose not to self-report discharge or performance issues. This means

[6] This may lead to an upward bias in eligibility due to nonrandom attrition (workers who are most likely not to meet these requirements may be most likely to leave the SIPP sample early). However, this bias is likely similar for mothers and childless women within panels, so it should not strongly affect relative comparisons.

that estimates from the SIPP may somewhat overestimate non-monetary eligibility. However, many of those who are discharged are likely to report a voluntary quit instead. If so, the respondent would still be coded as non-monetarily ineligible. Thus, the bias is likely small.

An important limitation of this method is that it will code as ineligible some workers who meet some state provisions that allow voluntary job separations for good-cause reasons (discussed above). Unfortunately, the complexity of state rules makes it is impossible to account adequately for this in nationally representative estimates using survey microdata (Levine 2006; Shaefer 2010).

To facilitate interpretation, the analyses in both descriptive and multivariate models cluster the years into three period dummy variables: pre-reform (1990-1994), reform implementation (1996-1999), and post-reform (2001-5). The years 1995 and 2000 are omitted from all analyses because of breaks in the SIPP panels. Clustering the analyses into three periods does not substantively change the findings. The pre-reform (1990-94) and post-reform (2001-5) periods provide particularly useful comparison periods, as both included a mild recession and some expansionary years. The reform implementation period (1996-99) is quite anomalous because it occurred during an economic boom, and states implemented TANF programs at different times after the 1996 reform. Thus, the analyses focus on comparing outcomes in the pre-reform period with those in the post-reform period.

Multivariate Method

The multivariate analyses use an approach that is similar to the one employed by Bruce Meyer and Dan Rosenbaum (2001) and Meyer and Sullivan (2004). The sample is restricted to low-educated, single mothers and low-educated, single, childless women in the same age range (22-55). The relative outcomes of these two groups are compared because the women in these groups face similar conditions in the labor market. The baseline specification is:

$$UI_{i,j,t+n} = X\beta_{i,j,t} + \phi period_{i,j,t} + \lambda(\text{sin}glemother_{i,j,t} * period_{i,j,t}) + \varepsilon_{i,j,t}$$

The dependent variables, UI, in most model are dichotomous outcomes for receipt of or eligibility for UI benefits; *X* is a vector of individual and environmental characteristics taken at time *t*. The period term includes three dummies variables

indicating whether the observations belong to the pre reform, reform implementation, or post reform period. The term single mother × period interacts single motherhood with the period dummies.

Receipt of UI is coded as 1 if individual *i* in state *j* reports UI benefits in month *t* (the month of job separation), *t+1* (the month after month *t*), or *t+2* (the second month after month *t*); no UI receipt is coded as 0. Eligibility for UI (both monetary and non-monetary) is estimated for respondents only in month *t*. As to independent variables, X include race (white, black, other), ethnicity (Hispanic origin =1; otherwise 0), age (in dummy categories for ages 22-30, 31-40, 41-50, or 51-55), marital status (never married, divorced, separated, or widowed), whether the respondent lives in a metropolitan statistical area (MSA, as defined by the U.S. Census Bureau), education (high school graduate=1; 0 otherwise), the state-month unemployment rate (drawn from publicly available tables prepared by the U.S. Bureau of Labor Statistics n.d.), and state fixed effects.[7]

Each model includes a series of terms that measure single motherhood's interactions with period dummy variables. The interaction terms represent the relative difference in the probability of the outcome between the comparison group (low-educated, single, childless women) and the treatment group (low-educated, single mothers). The estimated effect size, calculated by subtracting the point estimate for the post-reform term (single mother ×post-reform) from the point estimate for the pre-reform term (single mother × pre-reform), shows the relative change in outcome between the two periods. The statistical significance of the difference between these point estimates is tested with linear restrictions. The p-values for these tests are reported for all models.

Linear probability (LP) models are used because the interpretation of interactions is straightforward. In contrast, the "interaction effect in nonlinear models [probit or logit models] does not equal the marginal effect of the interaction term, can be of opposite sign, and its statistical significance is not calculated by standard software" (Ai and Norton 2003, 123). Thus, even if probit or logit specifications are generally preferable for

[7] In sensitivity analyses we run alternative models that account for a recent divorce or separation, long-term labor force attachment, industry, household headship. We run models using region fixed effects rather than state. We also run models 1) restricting our models to job losers and 2) broadening our models to all respondents who go from working to not working. While some of these do change the point estimates slightly, they do not change our interpretation of the results.

models with dichotomous outcomes, a linear probability approach is more appropriate here.

4.4 Results

Descriptive results

Table 2 compares UI participation and eligibility outcomes for low-educated, single mothers with those for low-educated, single, childless women. The proportion of low-educated, single mothers (column 1) and single, childless women (column 2) who enter a spell of unemployment and access UI cash benefits are reported by period. Column 3 reports the differences between these two groups for each outcome and period (column 1 – column 2), associated standard errors are shown in parentheses.[8]

The proportion of single mothers entering a spell of unemployment and reporting UI receipt fell over the three time periods: from 28.8 percent in the pre reform years (1990-94) to 21.4 percent in the post reform years (2001-5). Single, childless women report a similar drop in UI receipt (from 31.4 to 25.9 percent), so the difference in outcomes between the two groups remains virtually the same across the three time periods, changing by a statistically non-significant 1.9 percentage points from the pre reform period to the post reform period. Contrary to the hypothesis, these estimates suggest that single mothers experiencing a spell of unemployment did not improve their relative probability of accessing UI benefits upon entering that spell.

Table 2 next reports on monetary eligibility rates for single mothers and single, childless women over the three study periods.[9] Over the three periods, rates of monetary eligibility improve among single mothers. Among sampled single mothers, 72.6 percent are estimated to reach monetary eligibility during the pre reform period, and 76.9 percent are eligible during the post reform period. The monetary eligibility rates of single, childless women are estimated to go from 86.1 percent in the pre reform period to 83.6 percent in the post reform period. Therefore, the change in the relative probability of meeting monetary eligibility requirements from the pre reform period to the post reform

[8] Standard errors of the differences use the form for standard errors for the difference between two large and independent random samples, which generates wider standard errors than some alternative measures.
[9] Our estimates of both monetary and non-monetary eligibility are quite similar to existing estimates for similar although not identical populations and study periods (Kaye, 1997; Rangarajan & Razafindrakoto, 2004; Rangarajan et al., 2002).

period is estimated to be larger (in increase of 4.3 percentage points) among single mothers than among single, childless women (whose probability declines by 2.5 percentage points), and the difference in the change for the two groups is a statistically significant (at $p<.10$) 6.8 percentage points.

The table next tracks non-monetary eligibility across the three time periods. As expected, rates of non-monetary eligibility are far lower than rates of monetary eligibility across both groups of low-educated single women. Among the sampled single mothers, 40.2 percent are estimated to be non-monetarily eligible during the pre-reform period, and 38.7 percent apparently meet these requirements in the post-reform period. By contrast, the rate of non-monetary eligibility is estimated to drop by 9.7 percentage points among their single, childless counterparts (from 46.1 to 36.4 percent being non-monetarily eligible). The change between the pre- and post-reform period in the probability of meeting non-monetary eligibility requirements is estimated to be smaller among single mothers (a decline of 1.5 points) than among single, childless women (a statistically significant decline of 9.7 points), and the difference in the change between the two groups is estimated to be a statistically significant 8.2 percentage points. Thus, in terms of both monetary and non-monetary eligibility, eligibility rates among single mothers improved relative to those among single, childless women. Specifically, single mothers are estimated to have greater gains in monetary eligibility, and although non-monetary eligibility is estimated to decline for both groups, the decline is smaller among single mothers.

Table 2 next reports on the proportion of sampled single mothers and single, childless women who access cash welfare (AFDC or TANF) or the FSP, upon entering a spell of unemployment. As would be expected, the proportion of single mothers accessing these programs is higher in all periods than the proportion of single, childless women accessing them. As would further be expected, the proportion of single mothers accessing cash welfare drops considerably, from 30.8 to 14.8 percent. However, the proportion accessing the FSP stays relatively constant across the study period, going from 53.6 percent in the pre reform period to 54.2 percent in the post reform period. Patterns of use of these programs will be discussed in more detail later on.

Finally, table 2 reports the mean UI benefit amount received by sampled single mothers who received UI benefits (amounts adjusted to 1996 dollars). From the pre reform to the post reform period, benefit amounts remain relatively stable for single mothers; they report receiving $504 in the pre reform period and $503 in the post reform period. Single, childless women who received any UI benefits reportedly received a statistically significant increase between these two periods, from $501 to $639. Thus, the change in single mothers' benefit amounts (an average decline of $1) is estimated to be less than the change in benefits received by single, childless women (an average increase of $138), and the relative difference (a decline of $139) is substantial and statistically significant. From the pre reform period to the post reform period, single mothers accessing UI appear to lose ground to single, childless women in terms of the benefits received.

Multivariate Results

Table 3 reports results from a series of regression models that test the descriptive relations discussed above. Note that the terms for the interaction between single motherhood and the time period represent the estimated relative difference between single mothers and single, childless women in each period. These estimates control for other factors included in the models. The effect of interest is the difference between the point estimates for the pre-reform (single mother × pre-reform) and post-reform (single mother × post-reform) interaction terms. The test of linear restrictions determines whether these point estimates are statistically significantly different from each other.

The estimated relations involving other covariates are consistent with findings from previous studies. Results suggest that older workers are more likely to obtain UI benefits and to meet both monetary and non-monetary eligibility requirements than are younger workers. High school graduates are estimated to be more likely to obtain benefits and to be monetarily eligible than are those without a high school degree. Compared with non-union workers, union members are 8.1 percentage points more likely to obtain benefits and 5.5 percentage points more likely to be monetarily eligible. Very few of the racial and ethnic point estimates are statistically significant. Blacks were 6.4 percentage points less likely than their white counterparts to meet monetary eligibility requirements but no less likely to report receiving UI benefits. Hispanic respondents are estimated to

be 8.3 percentage points more likely to be non-monetarily eligible than are their non-Hispanic counterparts.

Table 3's first column reports results from a model predicting respondents' receipt of UI benefits. Results from the three interactions suggest that single mothers do not differ to a statistically significant degree from single, childless women on receipt of UI benefits during the pre reform, reform implementation, and post reform periods. Moreover, none of the interaction terms is statistically significantly different from another. These results support the descriptive finding that single mothers experiencing a spell of unemployment do not improve their probability of obtaining UI benefits in 2001-5 relative to the probability for single, childless women.

The table also reports results from models with dichotomous outcomes for monetary eligibility and non-monetary eligibility. Estimates for the pre reform period suggest that single mothers are 11.6 percentage points less likely than similar childless women to meet monetary eligibility requirements (the difference between groups is statistically significant), but mothers in the post reform period are estimated to be 4.0 percentage points less likely than their counterparts to meet those requirements, and the difference is not statistically significant. The estimated change in monetary eligibility from one period to the other represents a relative improvement of 7.6 percentage points, and the difference is statistically significant at the $p<.05$ level. Results from the monetary eligibility model control for other measured factors and are consistent with the descriptive findings that the rates of monetary eligibility improved among single mothers relative to single, childless women.

Non-monetary eligibility results from the pre reform period suggest that single mothers are .032 percentage points less likely to meet these criteria than are single, childless women, but single mothers are 5.9 percentage points more likely to meet the non-monetary requirements in the post reform period. Although the parameter estimates are not statistically significant, the test of linear restrictions for these terms yields a statistically significant *p-value* of .063. These findings support the conclusion that, relative to non-monetary eligibility rates of single, childless women, those of single mothers improved from the pre- to the post-reform period. Finally, in the model that examines the amount of UI benefits received (if any), sampled single mothers go from

receiving $29.50 more than single, childless women in the pre reform period to $93.95 less in the post reform period. While these point estimates are not significant, the difference between them is significant at the p<.10 level.

Changing participation in other public programs over time

Two other forms of support that low-educated, single mothers may access when entering a spell of unemployment are cash welfare and the FSP. Cash welfare was the primary target of the 1996 welfare reform, so the major changes leading to declines in cash assistance (AFDC and TANF) caseloads affected low-educated, single mother particularly. With a caseload of 25.7 million individuals in 2005, the FSP served more individuals than TANF (4.5 million), UI (7.9 million) and even the EITC (22.8 million; Scholz, Moffitt, and Cowen 2009).

Figure 1 plots the annual rates at which these programs' benefits are received by low-educated, single mothers entering a spell of unemployment. Between 1990 and 1993, the rates at which single mothers entering a spell of unemployment received UI benefits were nearly identical to those at which they received AFDC benefits. Rates of AFDC receipt peaked in 1994 for sampled single mothers, and participation in cash assistance declined over the next decade.

As Figure 1 illustrates, the rate of UI benefits receipt among sampled single mothers also dropped during the reform implementation years (1996-99). This is to be expected for two reasons. First, employment separations during economic expansions are more often a result of voluntary quits or discharge than during economic contractions. Thus, the proportion of the unemployed who are eligible for UI benefits typically goes down during expansions. Second, during expansions, workers are more likely to return to employment without accessing UI because of a greater availability of jobs. As the economy entered the 2001 recession, however, the rate of UI receipt eclipsed that for cash welfare receipt. In 2002, for example, 15.7 percent of sampled single mothers received TANF benefits, but 21.4 percent received UI benefits. Since 2002, the percentage of single mothers receiving TANF has shrunk even further, but the percentage receiving UI stayed above the proportion receiving cash welfare in every year.

As the figure suggests, receipt of FSP benefits is far more common than receipt of either UI or cash welfare. Receipt of food stamps grew in the early 1990s, declined

during the reform implementation period (1996-99), and then rose substantially during the post reform period. In 2001, 51 percent of sampled single mothers reported receiving food stamps, and 64 percent did so in 2005.

Column 5 of table 3 examines the probability that sampled respondents receive benefits from one or more of these three programs during the study period. In results from multivariate analyses that control for other measured factors, during both the pre reform and the post reform periods, the probability that a single mother will be served by at least one of these programs is estimated to be approximately 25 percentage points higher than the probability that a single childless women will be served by at least one of these programs. This is despite the precipitous decline in the probability of receiving cash assistance. Across all three periods, sampled single mothers seem to benefit from an extra layer of safety net protection in the form of cash assistance and FSP benefits. The results suggest that they benefit more from this than do sampled, single, childless women.

4.5 Sensitivity Analyses

A series of alternative models were estimated to assess the robustness of the multivariate findings. All results are available from the authors upon request. Models added (potentially endogenous) industry variables because the industry in which an individual works has a strong effect on her UI eligibility and the probability that she will receive benefits. Results from estimates of the interaction between single motherhood and the time period point estimates are quite similar in these models. This may reflect that single mothers and single, childless women are clustered in the same industries. Models also were restricted to household heads because single mothers who cohabit with partners may have access to resources not enjoyed by household heads. The results also are substantively similar. Other models accounted for a recent marital status change and long-term labor force attachment. The results remain substantively similar. In models restricted to long-term workers, the results on non-monetary eligibility move in the same direction but become statistically insignificant.

Still other models assessed the importance of changing patterns of re-employment; perhaps single mothers in the post-reform period are likely to go back to work faster than single, childless women in that period. There is some evidence that

single mothers increase their likelihood of returning to employment relative to single, childless women from the pre reform to the post reform period. This may have an impact on the probability of UI receipt during a spell of unemployment. Additional models were run restricted to the population of involuntary job losers (who, by definition, meet non-monetary eligibility requirements) and restricted to a sample of single women who transitioned from work to not working. This sample is broader than the one employed in the main models and includes women who may not be seeking work (seeking work is a prerequisite of accessing UI). These alternative samples led to some changes in the point estimates for the key interaction terms, but the relative changes between periods are substantively similar to those in the main model estimates. Among involuntary job losers, the change in monetary eligibility between sampled single mothers and single, childless women between the pre reform and post reform period becomes smaller and statistically insignificant but moves in the same direction as the results in table 3.

4.6 Discussion

The analyses have a number of limitations. Underreporting of benefits is a concern in household surveys (Meyer et al. 2009). The SIPP generally achieves higher reporting rates than similar household surveys, but because underreporting rates in a single survey can vary across years and especially panels, reporting problems complicate comparisons of annual participation rates. Also, changes in UI participation over time may be tied to certain other factors (e.g., broad labor market changes) and may not be related to the social policy changes experienced by single mothers. These concerns highlight the advantages of focusing on relative comparisons of low-educated, single mothers to low-educated, single, childless women over time. Such comparisons may mitigate concerns about under-reporting.

As with all studies that use household survey microdata, this study is limited in its ability to accurately model monetary and non-monetary eligibility. However, the empirical benefit of using data from a household survey such as the SIPP, even when doing so requires making some assumptions, is that these data enable one to examine a nationally representative population over a long period. Currently, such an examination is not possible if one uses administrative data. Also, few (if any) sources of administrative

data include information on family composition or education level, key variables in the current study (Levine, 2006). The current estimates of monetary and non-monetary eligibility are consistent with other studies that use other data sources to examine similar populations (Rangarajan et al. 2002; Rangarajan & Razafindrakoto 2004).

Despite such limitations, this article offers a number of findings that could be useful in examining policy. The study finds that, across the study period, there is no increase in the rate of UI benefits receipt for single mothers relative to that for single, childless women, even though the rate of eligibility in the post reform period among single mothers improves in comparison to their single, childless counterparts from the pre reform to the post reform period. Further research should pursue this further; if rates of eligibility have improved, why has receipt not? The results suggest that, because receipt of cash assistance declined, however, UI is now a more common income support than cash assistance for low-educated, single mothers who enter unemployment.

Although the importance of cash welfare diminished over the study period, the FSP has grown in importance. Roughly three-fifths of low-educated, single mothers entering a spell of unemployment used FSP benefits in 2004-5. Upon entering a spell of unemployment, most low-educated, single mothers use at least one of the three programs studied here, and they are far more likely to get some form of aid than similarly educated single, childless women. One possible explanation for why UI receipt did not improve is that eligibility for FSP reduces the motivation to apply for UI, especially when individuals may be uncertain of their eligibility for UI.

Some recent policy efforts to boost the UI participation rates of vulnerable workers focus on reforming UI eligibility rules. The current results lead to the conclusion that reforming eligibility requirements may not, in and of itself, substantively increase benefits receipt. Although rates of both monetary and non-monetary eligibility improved for single mothers relative to those for single, childless women, single mothers see no relative improvement in the rate of benefits receipt. This may be due to a lack of knowledge about the program, a lack of understanding of a complex bureaucratic process, a lack of need for benefits (as a result of expanded access to the FSP), or a quick transition back to work. Future research should explore these possibilities. A few studies find that individuals fail to apply for UI mainly because they believe that they are

ineligible (Wandner and Stettner 2000; Vroman 2009). If this is the case, a public information campaign may be needed to raise awareness of possible eligibility in order to increase take-up rates of eligible low-educated workers.

To the extent that eligibility criteria act as a barrier to UI receipt for this population, non-monetary requirements seem to be a greater barrier than monetary requirements. However, reforming non-monetary requirements involves issues of moral hazard; making UI benefits available to individuals who quit their job would provide incentives to do so. Some might argue that low rates of non-monetary eligibility result from personal characteristics of low-educated, single working mothers, who may not have the skills necessary to maintain employment. If this were accurate, the best way to increase UI receipt would be to strengthen job training programs for low-skilled workers. Because low-educated, single mothers access UI benefits at rates that are comparable to low-educated, single, childless women, such a campaign might benefit all low-educated workers.

Two things call this individual-level interpretation into question, though. First, the historical purpose of UI monetary eligibility rates has been to determine whether a worker has sufficient labor force attachment to merit access to UI benefits. As the current study suggests, most working, single mothers who fall into unemployment meet these thresholds and, thus, have substantial attachment to the labor force. Second, low levels of non-monetary eligibility are highly associated with the industries in which single mothers are clustered (U.S. General Accounting Office 2000). These industries avoid formal lay-offs, utilizing changes in work hours and other methods that can often cause a worker to quit (Lambert 2008).

Thus, policymakers are left with a dilemma. Liberalizing non-monetary eligibility limits may weaken the UI system by marginalizing its status as social insurance. By not liberalizing, however, policy makers may leave low-educated workers with substantial labor force attachment out of the UI system. How might policy makers begin to address this? A first step would be to examine the non-monetary eligibility rules of U.S. states with more liberal non-monetary eligibility requirements. The requirements of other Western industrial nations might also be examined, many of which limit non-monetary ineligibility to a few weeks or months instead of the unemployment spell duration (Storey

and Neisner 1997). Although the optimal policy prescriptions may not be clear at this point in time, policymakers must consider how these requirements might be re-shaped if UI is to serve as effective social insurance for low-educated workers with substantial labor force attachment in the twenty-first Century.

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Figure 4.1: Program Participation of Single Mothers Entering into Unemployment

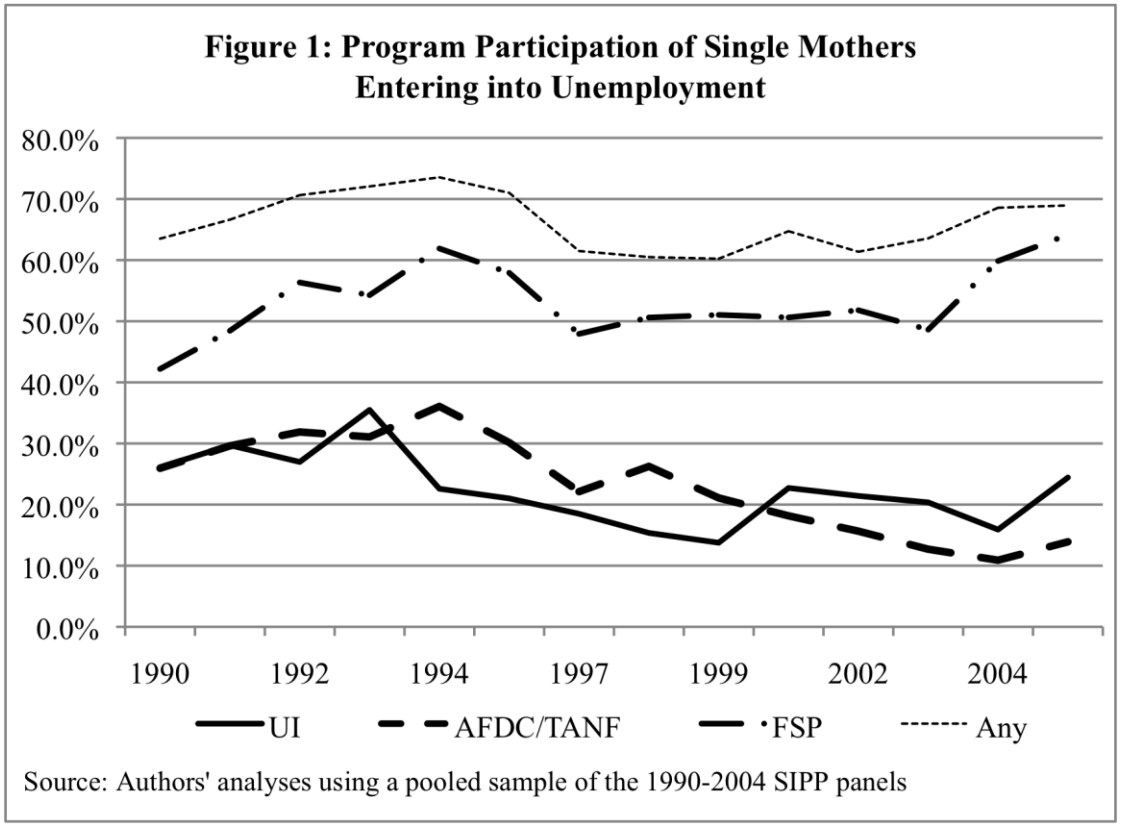

Table 4.1: Characteristics of Low-educated, Single Women Ages 22-55 (Pre- and Post-Reform)

	Single Mothers		Single Childless Women	
	Pre-Reform (1990-94)	Post-Reform (2001-5)	Pre-Reform (1990-94)	Post-Reform (2001-5)
Race and Ethnicity				
White	.609	.636	.762	.721
Black	.361	.312	.214	.229
Other race	.030	.052	.025	.050
Hispanic Origin	.177	.156	.115	.112
Age	33.5	34.4	38.8	40.4
Employed	.510	.630	.700	.639
Education:				
Less than high school degree	.382	.328	.286	.265
High school graduate	.618	.672	.714	.735
N	9,358	7,000	10,793	8,037

Source: Authors' calculations from a pooled sample of the Survey of Income and Program Participation.
Note: Results are means. All estimates are weighted.

Table 4.2: Public Program Participation and Eligibility of Low-Educated, Single Women Entering Unemployment, Ages 22-55

	Mothers (1)	Childless Women (2)	Difference (1-2)
UI Participation:			
Pre-reform period	.288	.314	-.026
	(.018)	(.018)	(.025)
Reform period	.173*	.210*	-.037
	(.017)	(.020)	(.026)
Post-reform period	.214*	.259*	-.045
	(.018)	(.020)	(.027)
Monetary Eligibility for UI:			
Pre-reform period	.726	.861	-.137
	(.021)	(.014)	(.025)
Reform period	.744	.865	-.121
	(.022)	(.020)	(.030)
Post-reform period	.769*	.836	-.067+
	(.019)	(.020)	(.028)
Non-monetary Eligibility for UI:			
Pre-reform period	.402	.461	-.059
	(.025)	(.025)	(.035)
Reform period	.346	.348*	-.002
	(.025)	(.030)	(.039)
Post-reform period	.387	.364*	.023+
	(.023)	(.028)	(.036)
Cash welfare participation:			
Pre-reform period	.308	.039	.269
	(.019)	(.007)	(.020)
Reform Period	.251*	.045	.206*
	(.021)	(.009)	(.023)
Post-reform period	.148*	.035	.113*
	(.014)	(.008)	(.016)
FSP participation:			
Pre reform period	.536	.137	.399
	(.021)	(.013)	(.025)
Reform Period	.521	.152	.369
	(.024)	(.018)	(.030)
Post-reform period	.542	.169	.373
	(.021)	(.017)	(.027)
UI benefits, if any, received (1996$):			
Pre-reform period	504	501	3
	(23)	(18)	(29)
Reform period	451	468	-17
	(27)	(33)	(43)
Post-reform period	503	639*	-136*
	(29)	(49)	(57)

Source: Authors' calculations from a pooled sample of the 1990-2004 panels of the Survey of Income and Program Participation.

Note: UI=unemployment insurance; cash welfare = Aid to Families with Dependent Children or Temporary Assistance for Needy Families; FSP= Food Stamp Program (now Supplemental Nutrition Assistance Program); pre-reform period= 1990-94; reform period= 1996-99; post-reform period = 2001-5. Standard errors are presented in parentheses and clustered by respondent. All estimates are weighted.

+ Statistically significantly different from same-column estimate for 1990-94 by .10 level.

*Statistically significantly different from same-column estimate for 1990-94 by .05 level or above.

Table 4.3: OLS Models: Public Program Participation and Eligibility of Low-educated, Single Women, Ages 22-55

	UI Receipt	Monetary Eligibility	Non-monetary Eligibility	UI Amount, if received	Participation UI, TANF, or FSP
	(1)	(2)	(3)	(4)	(5)
Single mother × pre-reform (1990-94)	-0.00382	-0.116**	-0.0317	29.50	0.250**
	(0.0249)	(0.0250)	(0.0346)	(31.03)	(0.0270)
Single mother × reform (1996-99)	0.0172	-0.0837**	0.0496	11.00	0.286**
	(0.0263)	(0.0298)	(0.0389)	(44.75)	(0.0329)
Single mother × post-reform (2001-5)	-0.0120	-0.0396	0.0592	-93.95	0.246**
	(0.0269)	(0.0282)	(0.0368)	(60.27)	(0.0308)
P-value from tests of linear restriction: Ho: single mother ×pre – single mother ×post =0					
	.818	.035*	.063^{+}	.053^{+}	.921
Other Variables					
Age					
22-30 (reference)	---	---	---	---	---
31-40	0.111**	0.0660**	0.0466^{+}	48.04	0.0401^{+}
	(0.0189)	(0.0203)	(0.0261)	(30.98)	(0.0207)
41-50	0.127**	0.0823**	0.0878**	70.87^{+}	0.0577*
	(0.0245)	(0.0229)	(0.0317)	(37.57)	(0.0269)
51-55	0.200**	0.0775**	0.227**	6.737	0.105**
	(0.0382)	(0.0300)	(0.0509)	(51.23)	(0.0402)
Race					
White	---	---	---	---	---
Black	0.00681	-0.0644**	-0.00455	-64.53^{+}	0.188**
	(0.0187)	(0.0205)	(0.0268)	(37.50)	(0.0218)
Other	0.00284	-0.0286	0.0708	-20.20	0.0284
	(0.0465)	(0.0415)	(0.0562)	(48.67)	(0.0488)
Hispanic origin	0.0326	0.0139	0.0827*	11.59	0.0276
	(0.0263)	(0.0258)	(0.0378)	(32.50)	(0.0288)
High school graduate	0.0520**	0.0634**	-0.0129	22.97	-0.0371*
	(0.0169)	(0.0175)	(0.0224)	(24.35)	(0.0184)
Marital Status					
Never married (reference)	---		---	---	---
Widowed	-0.0112	-0.00695	0.0585	-79.95	-0.0732
	(0.0444)	(0.0393)	(0.0578)	(52.14)	(0.0477)
Divorced	0.0233	0.0298	0.00149	-.291	-0.000720
	(0.0204)	(0.0201)	(0.0276)	(27.76)	(0.0220)
Separated	-0.0279	-0.0391	-0.0186	-30.05	0.0123
	(0.0245)	(0.0272)	(0.0336)	(35.22)	(0.0275)
MSA resident	-0.0546*	0.0311	-0.0136	62.93*	-0.0583*
	(0.0220)	(0.0232)	(0.0295)	(26.78)	(0.0233)
Current student	-0.0482	-0.0397	-0.0731	5.996	0.00215
	(0.0298)	(0.0394)	(0.0468)	(62.07)	(0.0347)
Union member	0.0814*	0.0546^{+}	0.0480	48.47	0.0918*
	(0.0399)	(0.0321)	(0.0467)	(41.48)	(0.0376)
State-month unemployment rate	0.0205*	0.00391	0.0152	-15.05	0.0262**
	(0.00873)	(0.00907)	(0.0119)	(12.85)	(0.00919)
Time Period					
Pre-reform period	---		---	---	---

Reform period	-0.0685*	0.0100	-0.0801^{+}	-75.58^{+}	-0.0398
	(0.0325)	(0.0317)	(0.0440)	(45.38)	(0.0355)
Post-reform period	-0.0343	-0.0217	-0.0848*	112.5*	-0.00693
	(0.0293)	(0.0282)	(0.0388)	(49.50)	(0.0323)
Observations	4,409	3,395	2,850	1,098	4,409
R-square	.09	.07	.07	.09	.13

Source: Authors' calculations from a pooled sample of the 1990-2004 panels of the Survey of Income and Program Participation.

Note: UI=unemployment insurance; MSA= metropolitan statistical area. All models include state fixed effects. Robust standard errors are presented in parentheses and clustered by respondent. + p<.10; *p< .05; ** p<.01

Chapter 5

Conclusion

My dissertation is comprised of three separate essays that investigate health and welfare issues, both in China and US. The first essay provides insights into the net effects of increasing women's bargaining power on the health outcomes of their children. Using Chinese longitudinal data in the 1990s, I find evidence in favor of women's empowerment: children in families where the mother was head of household or made more purchasing decision had better Body Mass Index (BMI) than their counterparts whose mother had less power. The second essay explores the health consequences of computer use in internet cafés compared with usage at home only or in both settings. Using Chinese longitudinal data in the mid 2000s, I find suggestive evidence that adolescents and youth using computers in internet cafés are more likely to smoke and to self-report poor health status, and to consume a higher share of fat in their daily diets. The health disparities between computer users in internet cafés and other settings are significant. The third essay examines changing levels of Unemployment Insurance (UI) eligibility and benefits receipt among low-educated single mothers who entered unemployment between 1990 and 2005, and changing participation in cash welfare and the Food Stamp Program (FSP). Using the Survey of Income and Program Participation (SIPP), the study shows that low-educated single mothers who enter unemployment experience an increase in UI eligibility but not an increase in UI benefits receipt, when compared to low-educated, single, childless women who enter unemployment. The proportion of this population accessing benefits from at least one of these programs remains similar across the study period.