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ABSTRACT

Reform of the Chinese state-owned enterprise (SOE) sector in the late 1990s produced massive layoffs (34 million employees) and marked the end of the "iron rice bowl" guarantee of employment security. An expanding international literature has documented the adverse health impacts of economic insecurity on adults but has usually neglected children. This paper uses the natural experiment of SOE reform in China to explore the causal relationship between increased parental economic insecurity and children's BMI Z-score. Using provincial and year-level layoff

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rates and income loss from the layoffs, we estimate a generalized differences-in-differences model with individual fixed effects and year fixed effects. For a medium-built 10-year-old boy, a 10%-point increase in expected parental economic loss from layoff (largest treatment effect) implies a gain of 4 kg. The counterfactual analysis suggests a 4.5%-point increase in overweight rate due to the reform. The weight gain persists for boys whose parents kept their jobs, indicating the importance of anxiety about potential losses, as well as the experience of actual loss. Quantile regressions suggest that boys who were relatively overweight were more severely affected by parental economic insecurity. Girls are not significantly affected. Accounting for intergenerational effects therefore increases the estimated public health costs of greater economic insecurity.

I. Introduction

Numerous studies have argued that economic insecurity has been on a gradual rise since the 1970s in many countries[3], with adverse implications include for family dissolution (Larson and Holman 1994), and individual health (Rohde et al. 2016, Watson, Osberg, and Phipps 2016, Tsutsumi et al. 2001). Yet rarely has economic insecurity surged as dramatically and influentially as in China during the late 1990s. After almost fifty years of unequivocal "Iron Rice Bowl" guarantees of job security, 34 million workers were laid off between 1995 and 2001 in the reform of State-Owned Enterprise (SOE), thereby massively heightening the insecurity of the 67 million continuing SOE employees[4]. The magnitude and speed of these changes was historically unprecedented.

An expanding literature has argued that greater economic insecurity increases weight gain in adults in developed countries (Smith et al. 2009, Offer, Pechey, and Ulijaszek 2010, Watson, Osberg, and Phipps 2016, Rohde, Tang, and Osberg 2017). However, disentangling the causal impacts of increased economic insecurity on health from other influences requires us to find a plausible exogenous change in economic insecurity. This paper argues that SOE reform in China was an unanticipated change for the 85 million employees affected, and a change in family circumstances that was exogenous for their children. In this paper, we therefore exploit the quasi-natural experiment of the SOE reform to examine the causal relationship between changes in economic insecurity and child outcomes.

[3] See, for example, Osberg and Sharpe (2009), D'Ambrosio and Rohde (2014), Blanchflower and Oswald (1999), Anderson and Pontusson (2007), Hacker et al. (2014).
[4] Based on the calculations of Giles, Park, and Cai (2006) using China Statistical Yearbook 2002, National Bureau of Statistics and China Labour and Social Security Yearbook 2002, Ministry of Labour.

Our innovations include: 1) examination of the intergenerational effects of economic insecurity; 2) counterfactual analysis suggesting that removal of the layoff policy would result in a 4.5%-point reduction in the probability of being overweight in affected children; 3) separation of the impacts of anticipation of job loss from the actual experience (we find evidence of weight gain for children whose parents were not actually laid off, highlighting the negative impact of anxiety solely from being worried about job loss); 4) examination of gender differences in types of child impacts (Body Mass Index Z-score increases for boys but not for girls); 5) testing whether already heavier children gain more weight (which suggests more negative consequences of overweight and obesity in children); 6) investigation of the health impacts of economic insecurity in an emerging economy, China.[5]

This paper uses total observed SOE layoffs at the provincial and year level as our measure of exogenous variation of economic insecurity[6]. We use non-SOE group as a control group as the policy change only applied to the SOE employees. Our generalized Differences-in-Differences (DinD) methodology (two-way fixed effects model) differences out unobserved pre-existing variations between the SOE (treatment group), and the non-SOE (control group); individual fixed effects and year fixed effects are used to tackle the omitted variable bias. Robustness checks control for specific provincial characteristics that could affect provinces differently overtime. Since there is a possibility that in general equilibrium,

[5] Liu and Zhao (2014) have examined self-reported job loss during the SOE layoffs and children's health. Our goals and methodology differ in that: 1) To avoid endogeneity, we use provincial and year level layoff policy as a proxy for economic insecurity; 2) We examine the impacts of "potential job loss" as well as actual job loss; 3) We use the generalized DinD approach which includes non-SOE as control; 4) We use quantile regression to examine the differences in weight gain for children who are already overweight.

[6] We suggest that because, in the Chinese context, the Hukou (national registration) system minimizes mobility by binding family to the birthplace, there is little reason to think that the possible migration response to SOE layoffs is quantitatively significant.

the non-SOE (control group) could have been affected by the SOE layoffs, we argue that this paper presents a lower-bound estimate of impacts. Finally, we employ quantile regressions to show that heavier boys gain more weight while thin boys lose weight from the layoffs.

Section II gives the brief background of the SOE reform and the exogeneity of layoff policy, followed by discussion of the mechanisms connecting health and economic insecurity in Section III. We describe data and key variables in Section IV, and identification in Section V. Section VI discusses the main findings. Robustness checks, heterogeneous effects and quantile regressions are presented in Section VII. Section VIII concludes.

II. Background

A. China State-Owned Enterprise Reform

During Mao Zedong's era, China was a planned economy. Jobs were assigned according to quotas decided by government and job candidates had little freedom to choose their employment. Lifelong employment of urban workers was provided by the government with benefits that include child care, health care, housing and pensions (Lee 2000). SOE employment, therefore, was considered an "iron rice bowl", with no economic insecurity.

Inefficiency in resource allocation and the lack of work incentives motivated a policy change to break the "iron rice bowl". SOE reform was carried out in stages: In 1995, a new labour law allowed the dismissal of no-fault workers. A new word, *Xia Gang* (Layoff), was thus invoked and used in the China Labour Statistical Yearbook (CLSY)[7]. The policy

[7] See (Department of Population and Employment Statistics and Department of Overall Planning and Wages) (1996, P410) Table 8-2 Surplus personnel in local enterprises by region (1995), Column "Persons going off sentry duty" in English or "Number of Xiagang workers" in Chinese.

started with "grasp the large and let go of the small" (*Zhua Da Fang Xiao*), meaning that the layoff was only allowed in small-sized enterprises.[8] In 1997, layoffs were further intensified by extending the new labour law to large-scale state-owned enterprises. From 1995 to 2001, SOE employment dropped from 113 million to 67 million, a 40% decrease[9]. According to the calculation of Giles, Park, and Cai (2006) using the China Urban Labour Survey, these layoffs caused the unemployment rate to surge to more than 10%, and labour force participation to decline by up to 8.9% in representative cities. The SOE reform introduced employment uncertainty for the first time since the establishment of the Communist Government in 1949 (Giles, Park, and Cai 2006).

Layoffs from state-owned enterprise reform were particularly harsh on SOE workers because: (1) The SOE sector in China had never witnessed employment uncertainty before this layoff policy, implying that workers typically had no job search experience or precautionary savings; hence workers were especially unprepared. Job losses were unanticipated and involuntary. (2) The social safety net was (and remains) under-developed in China. Little social assistance or job-search assistance was provided to the laid-off workers. (3) Laid-off workers were mostly older, unskilled, and female, which added to the challenges of re-employment. These disadvantages made the economic insecurity to which they were subjected particularly significant.

[8] A small-sized enterprise is defined specifically by industry according to its revenue and number of employees. More detail refers to National Bureau of Statistics of China website (*http://www.stats.gov.cn/english/classificationsmethods/Classifications/200210/t20021016_72368.html*).

[9] According to Giles et al. (2006), employment dropped by 67 million in the state-owned sector, among which 34 million were officially registered as *Xia Gang* (laidoff) during this period.

B. Exogeneity of layoff policy

This paper suggests that the quasi-natural experiment of SOE reform provides exogenous variation in economic insecurity. SOE reform had impacts of different intensity across province and year, which provides identifying variation by province and by year in measured economic insecurity.

Figure 1 presents the average layoff rate, the average percentage of income loss if laid off in the SOE by year and province. Figure 2 shows the map of sample provinces with expected economic loss in the SOE [= (*Probability of layoff)·(Financial loss if laid off)*] and the layoff peak years. The expected loss, probability of job loss (layoff rate), and the financial loss of laid-off workers varied across provinces and over time. For example, Liaoning in North Eastern China had a peak layoff rate of 16% and a financial loss of 84% if laid off in 1999; this generated a 13% (=16%·84%) expected value of economic loss for state-owned enterprise workers. Shandong had its highest layoff rate of 4% in 2000, accompanied by a 77% financial loss in the case of layoffs, thus a 3%(=4%·77%) expected value of economic loss for state-owned enterprise workers. These differences in timing and province in the layoff rate and financial loss provide identifying exogenous variation in parental economic insecurity.

We argue that the layoff policy for SOE employees in a given province and year is exogenous to individual families. In China, the Hukou, or the national household registration binds families to their birth place. Little across-province mobility is allowed to maintain the eligibility of children's schooling, social benefits, job opportunities, and local benefits. The new layoff policy had larger impacts in provinces with a high heavy-industry concentration, industry arrangements which were formed long prior to the reform based on

the strategic location, such as mineral deposits and gas fields. Even with the deterioration in job stability, income and benefits in the SOE sector, SOE workers still have little incentive or ability to move to the non-SOE since the average income and health care in the SOE is significantly higher, even after the state-sector reform. Thus, individuals are unlikely to respond to the risk of layoff by voluntary job mobility.

Section III. Mechanism of Health Effects of Economic Insecurity

Several recent articles have found a relationship between adult weight gain and economic insecurity. Offer, Pechey, and Ulijaszek (2010) use macro-level data from 11 developed countries over ten years and suggest the obesity epidemic is mainly contributed by social insecurity. Literature in psychology and neuroscience has linked stress to overeating (Greeno and Wing 1994), because anxiety and stress induce people to turn to "comfort food" that is high in calorie and fat (Dallman et al. 2003). Smith (2009) suggests that a biochemical mechanism of stress which can cause overeating is that like other animals, humans compensate for food uncertainty by overeating and storing body fat. The ability to store body fat is a functional survival instinct when the risk of starvation is present, and over millennia over-eating has been genetically "hard-wired" as a response to anxiety about future food availability. Although the risk of starvation is now minimal in affluent societies, economic uncertainties (such as a sudden risk of layoff from a previously secure job) now cause stress and anxiety. In the presence of such economic hazards, overeating can be seen

as a form of "self-medication" for stress—as the phrase "comfort foods" might suggest.[10]

Where, therefore, socioeconomic supports do not provide much protection against economic losses, people tend to gain more weight when economic stress increases. Conversely, when economic loss is well-insured by social programs, even though there is abundant calorie rich food, obesity prevalence is lower. Smith et al. (2009) use 12 years panel data from the United States National Longitudinal Survey of Youth and find that a 1%-point rise in the probability of becoming unemployed increases adult weight gain by 0.6 pounds, but the availability of a social safety net decreases the negative effect of economic insecurity. Using the Canadian Community Health Survey data, Watson, Osberg, and Phipps (2016) exploit unemployment insurance benefit cuts in the 1990s as an exogenous "natural experiment" variation in economic insecurity, and establish the causal relationship between economic insecurity and the BMI gain in adults. Rohde, Tang, and Osberg (2017) use the Household, Income and Labour Dynamics in Australia (HILDA) Survey and find that the economic insecurity and adult obesity form a self-sustaining vicious cycle.

In this paper, we look at intergenerational impacts and propose that greater economic insecurity of the family can have impacts on children because: 1) greater risk of loss of future SOE benefits (which include the pension entitlements of the parents) may increase in-kind precautionary savings of the family, in the form of "Fattening up the Little Emperor"; 2) uncertainty about the future may produce increases in parents' work hours to compensate for potential economic losses, thus reducing time investment and positive interactions with

[10] In the Chinese context, it is worth noting that parents in the state sector have higher income than those in the non-state sector (see Table 1). Therefore, parents are economically able to purchase calorie rich food.

the child;. 3) eating healthy takes time and energy, so because economic insecurity generates mental stress for the parents, stressed parents may make poorer nutrition choices, not deny the child access to "junk food" and be less likely to be able to enforce rules that keep their children eating healthy food and 4) intra-family contagion may directly cause child over-eating as children sense directly the heightened anxiety of their parents due to economic stress.

IV. Data

A. China Health and Nutrition Survey

This paper uses data from the China Nutrition and Health Survey (CHNS) conducted by the University of North Carolina, Chapel Hill and the Chinese Center for Disease Control and Prevention (CCDC). The CHNS is the only large-scale longitudinal household level survey in China (Popkin et al. 2010), consisting of 9 panels from 1989 to 2011 of more than 4000 households and 15,000 individuals. Data was collected at the community, household, and individual levels, and includes detailed information on economic, health, sociological, and demographic circumstances. Households were selected in both rural and urban areas in eight provinces: Liaoning, Shandong, Henan, Jiangsu, Hubei, Hunan, Guizhou, and Guangxi with multistage, random cluster design, stratified by income.

All household members were interviewed during the surveys, and children younger than 10-years-old were assisted by their parents. Special efforts were made to interview during the early morning or on weekends to avoid missing migrant workers or children who attend boarding school. The attrition rate at the household level was 10% from the previous cycle, and 31% from 1989 to 2006 (Popkin et al. 2010). Anthropometric measures, such as

height and weight, were taken on site by the CHNS interviewers who had seven days of training by the collaborating teams. Children were measured without shoes and with light clothes to the nearest 0.1 cm and 0.1 kg respectively during the interview (Yan et al. 2012).

The CHNS has several features that make it particularly suitable for our study. First, the longitudinal structure provides a comparison of the outcomes of the same child before, during and after the state-owned enterprise reform period. Second, the large sample size enables analysis based on provincial heterogeneity as well as differences between state and non-state enterprises. Third, the CHNS has data not only on a single household member, but also on parents, spouses, and children based on the person-specific interviews, making it ideal for examining the spill-over effects of economic insecurity. Fourth, the CHNS interview questions cover not only labour market outcomes, such as employment status, sectors, and earnings of both parents, but also the health outcomes of the child, and other demographic characteristics of the family. The extensive and in- depth information enables the inclusion of almost all control variables used in the related literature.

A supplementary dataset on layoffs comes from China labour statistical Yearbook produced by the National Bureau of Statistics of China. It reports the number of laid-off workers at year-end as well as the number of state-sector employees at the year-end by province from 1995 to 2005. These two variables allow estimates of the lay- off rate across provinces and over time. It also reports the off-post (laid-off) state sector workers' living subsidies and the on-post (on the job) state-owned enterprise workers' average wage by province which enables the average financial loss from SOE layoff to be calculated.

B. Child Weight Measures

World Health Organization (2000) and Cole et al. (2000) have documented the dramatic

increase in obesity prevalence in developed countries. In developing countries, malnutrition and infectious diseases are declining, while obesity, cardiovascular diseases, and Type 2 diabetes are rising (World Health Organization 2000). In 2011, 30% of Chinese adults and 11% of Chinese children were overweight (Yan et al. 2012). Child obesity not only leads to adult obesity (Reilly and Kelly 2011, Guo et al. 1994, Sørensen and Sonne-Holm 1988), but also chronic diseases, such as impaired glucose metabolism, hypertension, coronary arteries (Kavey et al. 2003). Child obesity is particularly linked to the development of Type 2 diabetes at a younger age (World Health Organization 2000), and can also adversely influence psychological wellbeing later in life (Friedman and Brownell 1995).

To account for rates of maturation and growth, we use the BMI Z-score (*BMIZ*) from the WHO growth standard (Onis 2006, Onis et al. 2007), which measures how many standard deviations the child is from the median BMI using the age- and gender-specific distribution and thereby reflects the different standards at each growth stage of children.[11]

C. Measures of Economic Insecurity

Our conception of economic insecurity is that it is driven by a perceived, unavoidable downside economic risk (Osberg 1998, 2015). We use three indicators for SOE employees, at the provincial and year level: 1) the probability of job loss (layoff rate), or the number of laid-off SOE workers divided by the total number of SOE workers; 2) the average financial loss if laid off, or the average percentage income drop for laid-off workers; 3) and expected economic loss in the SOE, which defined as $E(Loss) = Prob(Layoff) \cdot (Average\ Loss|Layoff)$,

[11] Observations that are over 5 standard deviations from the median are excluded in the sample according to WHO recommended outlier cut-offs.

the product of layoff rate and financial loss if laid off. [12]

D. SOE and Non-SOE (Treatment and Control Groups)

Our treatment group is children in families where parents were in the state sector (SOE) – if either parent answered the work unit type as "state enterprise or institute" prior to the SOE reform (in 1989 or the next available pre-reform cycle in 1991 and 1993), then the child is identified as being in the SOE treatment group. The rest of the children are in the control group (non-SOE).[13] Though not all SOE families were actually laid off, all the SOE employees experienced a change in their degree of economic insecurity due to the increased chances of being laid off. Therefore, the treatment of greater economic insecurity affected all SOE workers.

In the sample, 14% of fathers and 8% of mothers worked in the SOE before the reform. In total the SOE accounted for 15% of children. In Section 7.3, we also explore the variations in father versus mother in the SOE.

E. Sample

The sample for this study is children and adolescents 4 to 18 years-old in every cycle who entered the survey in 1989, 1991 and 1993 (pre-reform cycles). We only include the CHNS urban sample because SOE sector is in the urban area and the enormous disparity

[12] In the estimations, we use the most recent three years' average layoff rate and financial loss by provinces for three reasons. First, as the current economic situation is pending, parents likely form their economic expectations using information from the immediate past. Second, weight gain is a cumulative process, which takes a while to observe. Third, the 3-year average allows the inter- generational effects to be transmitted from parents to children. The average of the most recent two years and the lagged layoff rate were also tested, with highly consistent results.

[13] For children whose parents work in the collective sector (local government-owned enterprises), we include and exclude them in the analyses, with highly consistent results.

between rural and urban areas could potentially confound the treatment effects. The birth cohort of the sample is 1979 to 1993 and is observed in 1997, 2000, and 2004. There are 2,252 children and adolescents in the longitudinal sample and 3,566 observations in the pooled cross-sectional sample.[14]

Table 1 shows the mean and standard deviation of outcome variables, measures of economic insecurity, income, and household characteristics in the SOE compared to the non-SOE. Compared to the control group (non-SOE), the treatment group (SOE) has higher equivalent income, child's BMI Z-score, and larger household size.

V. Identification

A. Generalized DinD

To evaluate the causal effects of parental economic insecurity on child outcomes, we adopt a generalized DinD framework with individual and year fixed effects. The idea

[14] Given that the lay-off policy was introduced in 1995, adding the before-policy cycles 1989, 1991 and 1993 to the sample would also use before-and-after variation, as in a standard differences-in-differences estimation. However, the main variables of interests, the treatment intensity at the provincial and year level, are from the China Labour Statistical Year Book. From 1995 to 2004, the year book provides consistent information on "laid off workers". Prior to 1995, the term "surplus workers" were used to describe those who remain the labour contracts with the SOE but have no actual jobs. For consistency, we only include the years with the same layoff measurement. As the purpose of the paper is to compare the treatments of different intensity using the DinD, the pre- and post- periods are not necessarily required for this purpose. Also, the DID strategy would require that no other policy change affected the treatment group around 1995. SOE housing reform (which allowed SOE employees to purchase housing at a low price) was uniformly introduced in China in 1994 (Wang 2012), which puts this assumption in question. We therefore estimate the lay-off policy effect making use of its different intensity levels during 1997 to 2001 and using individual fixed effects to control pre-existing differences across individuals, such as that potentially caused by the SOE housing reform.

underlying the identification strategy is to compare not only the differences between the SOE and the non- SOE, but also variations in outcomes that result from different intensity of treatment, over time and across provinces, as indicated by differences in the expected value of income loss (defined as the layoff rate multiplied by the average income fall for laid-off workers).

The baseline regression model is:

$$(1) \qquad Y_{ipt} = \beta_1 SOE_{ip} E(Loss)_{pt} + \beta_2 E(Loss)_{pt} + \mathbf{W}_{ipt}\boldsymbol{\gamma} + \mathbf{X}_{pt}\boldsymbol{\delta} + d_t + \alpha_i + \varepsilon_{ipt}$$

in which Y_{ipt} is the BMI Z-score for child i in province p and year t. SOE_{ip} is a treatment group indicator. Economic insecurity is measured by expected value of economic loss, $E(Loss)$, which is the product of the layoff rate and the average financial loss of laid-off SOE workers for province p and year t. $\boldsymbol{W}_{ipt}$ is a vector of individual characteristics, includes log equivalent income and number of children in the family, parents' self-reported health, marital status of the mother, puberty onset of the child, and if grandparent(s) living in the same household. $\mathbf{X}_{pt}$ captures the time-variant provincial level characteristics such as provincial GDP per capita (we discuss the component of $\mathbf{X}_{pt}$ in details in Section 7.1) Year fixed effects, d_t , control for common trends that affected all individuals similarly. Individual fixed effects, α_i, control for pre-existing and time-invariant person-specific characteristics.

The first difference in the DinD strategy is the differences between high and low layoff intensity within the SOE. The second difference is the difference between the SOE sector and the non-SOE sector.

Our hypothesis is that provinces featuring a higher layoff rate have higher weight gains in the SOE treatment group. β_2 estimates the effect of expected economic loss that is common among both the treatment and the control groups. The parameter of interest, β_1, estimates the extra layoff effects only on the treatment group (those children with SOE parents). Under our hypothesis that greater economic insecurity causes weight gain in children, β_1 is expected to have a positive sign.

All regressions are estimated separately for girls and boys. We also present results for never lost job sample in section 8. To validate the generalized DinD, we address the following three assumptions:

1) Trends in the SOEs and non-SOEs would have been similar in the absence ofthe reform. To test this assumption, we use parallel trend testing in the next subsection.
2) SOE reform only affects the SOEs, not the non-SOEs. To satisfy this condition, we i) include the term $E(Loss)_{pt}$ to capture any common effects on both SOEs and non-SOEs, and the interaction of $SOE_{ip} \cdot E(Loss)_{pt}$ to capture any additional effects on the SOEs; ii) include non-SOE employment and GDP share in the robustness test section.
3) No other factors could be systematically correlated with both the intensity of the lay-off policy and SOE children's outcomes. To test this assumption, we control for confounding events during the reform periods in the robustness test section 7.1.

Standard errors are clustered at the province level to allow any within-province correlation. The number of provinces in the CHNS data is eight. As discussed in Cameron, Gelbach, and Miller (2008), a small number of cluster can lead to over-rejection of a null hypothesis. To address this issue, we present the usual cluster-robust estimates of standard errors but conduct statistical inference using the clustered wild bootstrap-t procedure suggested by Cameron,

Gelbach, and Miller (2008).

B. Parallel Trend

The panel differences-in-differences identification methodology assumes that the outcomes in the treatment group (SOE) and the control groups (non-SOE) would have been the same in the absence of treatment (in other words, follow parallel trends). Figure 3 presents father's and mother's employment rate, and child outcome variables for treatment and control groups over time. It shows that parents' employment rates start at a similar level in the SOE and non-SOE. The SOE employment rate becomes lower than the non-SOE during the reform period and remains similar trend after the reform. The average BMI Z-scores between SOE and non-SOE exhibit the same trends before the reform in 1993, diverge during the reform in 1997 and 2000, and converge after the reform in 2004.[15]

We further test the parallel trend by estimating the following model similar to Jacobson, LaLonde, and Sullivan (1993) :

$$Y_{ipt} = \sum_{t=1991}^{2006} \alpha_t d_t SOE_{ip} + \sum_{t=1991}^{2006} \gamma_t d_t + X_{it}\beta + \delta_i + e_{ipt} \quad (2)$$

The hypothesis is no significant difference between the outcomes of SOE and non- SOE children before the policy introduction. Figure 4 shows the parameter of interests, a_t. It demonstrates that before the introduction of the policy, treated and control are not significantly different, which means a similar trend. During the policy, the outcomes diverge, which means

[15] Note that for outcome variables, the data is available from 1989 to 2004, while the layoff rate is only available from 1995 to 2005. Therefore, the parallel trend can be generated using a broader time span, while the regression analyses are done using the data from 1997 to 2004.

that the SOE reform is the driving force for the difference. Therefore, we argue that no difference in pre-existing trends is found.

VI. Main Results

A. Baseline Estimation

In our data, the difference between the largest and the smallest treatment effect is the difference between Liaoning in 2000 (13% expected economic loss) and Shandong in 1997 (3% expected economic loss) – roughly 10% points. To illustrate the magnitude of estimated impacts, we use this 10%-point difference in expected economic loss together with β_1, the coefficient of $E(Loss)\cdot SOE$ (the additional effects on SOE from the non-SOE). Our numeric examples show how many standard deviations the outcome variables can be expected to change if layoffs increase by 10% points. An intuitive calculation is to ask, if a 10-year-old child was at the 50th percentile of the weight measures, how much change would be expected from a 10%-point increase in expected economic loss?

Table 2 reports estimates of the key variables of Equation 1, as income, child and household controls, provincial controls and year fixed effects are added. In the boy panel which reports estimates of BMI Z scores, β_1, the $E(Loss)\cdot SOE$ coefficient, is statistically significant and fairly consistent in size, with a range of 9.3 to 12, suggesting that the reform significantly increased the *BMIZ* in boys with SOE parents relative to boys with non-SOE parents. Our preferred estimate, using all controls, is reported in Column 4 and implies that a 10%-point change in expected economic loss will increase the *BMIZ* by 0.99 units of

BMIZ. For a 10-year-old boy at the median distribution (BMI=16.4kg/m^2,) this implies a shift to the 85th percentile (BMI=18.5kg/m^2,) and, if the boy is of median height, a weight increases from 31.1 to 35.1 kg[16].

B. Counterfactual Analysis

To report our results, we also compare the actual *BMIZ* distribution for boys in SOE families (which embody the impacts of SOE reform) with counterfactual estimates of the distribution of *BMIZ* if SOE reform had not occurred. Using our model, we estimate the SOE children's *BMIZ* without the SOE reform, that is, when E(Loss)=0, to obtain the counterfactual *BMIZ*. The difference between the real *BMIZ* and the counterfactual *BMIZ* is the reform effect.

To construct the counterfactual results, we:

1) predict $\widehat{BMIZ}_{ipt}|\boldsymbol{X_{ipt}}$ using the baseline model;

2) obtain person-specific random error term in the regression, u_i=$BMIZ_{ipt}$-$\widehat{BMIZ}_{ipt}$;

3) calculate the new $\widehat{BMIZ}_{0ipt}$ =($\widehat{BMIZ}_{ipt}|E(Loss)_{pt}$=0) +$u_i$.

Figure 5 presents the distribution of the *BMIZ* of SOE children, with and without SOE reform. We can see that the reform shifted the distribution of BMIZ to the right. In other words, children would have had smaller BMIZ if SOE reform had not occurred.

For the many children whose initial weight was relatively low, the health impacts of

[16] The calculations are based on the BMI-for-age Boys in 2007 WHO Reference, available at *http://www.who.int/growthref/who2007_bmi_for_age/en/*

additional weight may not be consequential but being overweight as a child has been shown to predict adult obesity, cardiovascular diseases, and type II diabetes. We calculate the change in the overweight rate using the real and counterfactual BMIZ, adopting the Cole (2000) threshold17 which adjusts for age and gender growth standards. The actual overweight rate is 8.25% for real *BMIZ* with SOE reform, which can be compared to 3.75% for counterfactual BMIZ without SOE reform – that is a 4.5%-point increase in overweight rate due to the SOE reform. We argue that increase in child overweight rate is a sizable and plausible effect.

C. Estimation on No Actual Job Loss Sample

An important issue for the analysis of economic insecurity is whether it is the anxiety regarding anticipated possible events or the actual experience of such events which is the source of stress. In the SOE reform in China some 54 million workers were suddenly exposed to a new risk, and presumably worried about possible job loss, but in the end did not actually lose their jobs. Hence, an important question is whether, and to what extent, an increase in economic insecurity affects health outcomes for those who in the end do not actually experience joblessness. We therefore split the SOE sample and re-estimate the 'worriers' about job loss separately from the 'actuals'. We note that once SOE workers are laid off, the feared event has happened, so uncertainty has been resolved, but we also expect to observe an income effect, since the laid off will lose wages. To disentangle the uncertainty effect from the income effect, we limit the sample to children whose parents in the SOE and non-SOE sectors who always have jobs at the time of the interview and who haven't changed

[17] One caveat is that Cole (2000) is not specifically constructed for Chinese children during the survey period. Therefore, we focus on the change in the overweight rates rather than the overweight rate.

their jobs since the last survey (856 children are excluded). By limiting the "always having a job" sample and employing the same generalized differences-in-differences model, our results isolate the effects of increased worrying about possible job loss.

Table 3 presents the results for Equation 1 and the "never lost job" sample. In the boy panel, *BMIZ* is still positively and statistically significantly affected by $E(Loss)\cdot SOE$, but the magnitude of impact is consistently larger than in Table 2 (ranging from 12.2 to 14.2). In our preferred specification (column 4), compared with the estimates using the full sample in Table 2, the effects of layoffs on boys' *BMIZ* is roughly a third larger: 13.1 compared to 9.9, which means a 10%-point increase in parents expected value of economic loss increases the median 10-year-old boy's *BMIZ* from 0 to 1.31. According to the WHO table, it corresponds weight gain from BMI 16.4kg/m^2, to 19.4kg/m^2. At median height there is a weight gain from 31.1 to 36.8kg. However, in the girl panel in Table 3, results are statistically insignificant.

We read these results as indicating that when Chinese parents start to worry about potential job loss, their sons' weight increases significantly. However, the larger impact on boys in the "never lost job" sample and the gender differences in impacts require discussion. We speculate that the income effects of actual job loss offset some of the anxiety effects of worrying about job loss. Parents who actually lost their jobs might have wanted to feed their "little emperors" more, but they were constrained by the decline in their income. For parents who did not lose their jobs, the anxiety effects on extra feeding of their sons are less limited by income – hence, a larger impact of increased insecurity is plausible.

While boys are more likely to gain weight, *BMIZ* for girls are not significantly affected. We speculate that the main issue is that in the Chinese context, gender differences

stem from different parent-child expectations and responses. In China, the under-developed nature of financial markets and the lack of a welfare state mean that family obligations remain individuals' main protection against economic insecurity (Cai et al. 2013). Zhou (2014) finds that sons in China share more financial responsibilities in taking care of elderly parents than daughters. The SOE reforms put both parents' short-term income and long-term pension benefits at risk. Parents who are more worried about their financial future may want to feed their sons first as an indirect channel of investing in their old-age support. Kong (2017) shows that when a Chinese family is under economic stress, the son's calorie intakes increase significantly (primarily from carbohydrates intake) compared to the daughters'. We thus argue that parents may project their economic anxiety into the dysfunctional feeding of "little emperors".

By contrast, daughters in Chinese families are considered "married off" to other households once they reach adulthood. Unlike boys, parents do not increase the amount of food they feed to the daughter in response to economic stress (Kong 2017). Girls' reactions to increased family stress may be to internalize stress, experienced through a change in anxiety levels, as Essex et al. (2003) found. It is also possible that parental financial stress leads to irrational and inconsistent parenting behavior and girls are more likely to develop anxiety and emotional disorder as a result (Kong and Phipps 2016).

VII. Further results

A. Robustness Check

The generalized DinD method rules out any province-year level factors that affect treatment and control group differently – a core assumption that one should test directly.

For example, if the Asian financial crisis in 1998 affected the coastal, more developed, provinces more heavily or if the expansion of Western fast food restaurants was greater in more populated provinces, this might differentially affect the SOE and non-SOE sectors and thereby bias our estimates of child obesity.

Our identification strategy also requires an assumption that the lay-off policy only affected the treated group, not the control group. One concern is that the lay-off policy may increase labour supply and therefore increase uncertainty/pressure to non-SOE employee.

To address these concerns, we add a rich set of province-year level characteristics to control for potential confounding factors. We control for birth rate, population, employment rate, percentage of GDP in the SOE and the non-SOE sector, urban disposable income, and average wage in the non-SOE sector at provincial and year level.

While the DinD estimates assume the control group (non-SOE) is constant, and our methodology is based on the difference of economic insecurity between the SOE and non-SOE, one could also argue that layoffs from the SOE could potentially affect the economic insecurity of workers in the non-SOE (which could attenuate our results). To investigate the effects of possible changes in economic insecurity of the non-SOE, we use employment rate of the non-SOE, which is a proxy for possibility of job loss in the non-SOE, and percentage of GDP share the non-SOE sector, which is a proxy for the financial loss in the non-SOE at the provincial and year level reported in the China labour statistical Yearbook. Figure 6 shows the employment rate and GDP share declined in the SOE sector and increased in the non-SOE sector. This suggests that as the economic insecurity in the state sector escalated, the economic insecurity in the non-SOEs started to decline, because of more employment

opportunities and greater aggregate income share. This implies that the gap we measured in our baseline model is in fact *smaller* than the actual decline of economic insecurity in the SOE – in other words, we underestimate the actual economic insecurity change for SOE employees, and the baseline DinD provides a lower bound estimation as shown in Figure 7.

Table 4 presents the estimates after controlling for the time-variant provincial characteristics: birth rate, population, and urban disposable income, employment in the non-SOE sector, and the average wage in the non-SOE sector. The results are consistent with the estimates in Tables 2.[18][19]

B. Economic Insecurity Decomposed

Because job loss has non-monetary dimensions, in addition to its financial impacts, it is of interest to decompose increased economic insecurity (expected economic loss) by separating the increased possibility of job loss and the severity of financial loss if laid off:

$$(3) \quad Y_{ipt} = \beta_1 SOE_{ip} \cdot LayoffRate_{pt} + \beta_2 SOE_{ip} \cdot FinancialLoss_{pt} + \beta_3 LayoffRate_{pt} + \beta_4 FinancialLoss_{pt} + \mathbf{W_{ipt}}\boldsymbol{\gamma} + \mathbf{X_{pt}}\,\boldsymbol{\delta} + \mathbf{d_t} + \alpha_i + \varepsilon_{ipt}$$

The variables of interest are $SOE_{ip} \cdot LayoffRate_{pt}$ (changes in layoff rate in SOE by province), and $SOE_{ip} \cdot FinancialLoss_{pt}$ (changes in financial loss in SOE if laid off). The

[18] Robustness checks are also done using layoff rate as the measure of economic insecurity. Results are significant and available upon request.

[19] We also examine the physical activity level. Children in the SOEs reported "Yes" to "Usually does physical exercises?" are approximately 10% more than children in the non-SOEs in all cycles of analysis.

coefficients β_1 and β_2 are expected to be positive. Indeed, if the impacts of unemployment were purely financial, the impacts of unemployment and an equal expected value change in unemployment benefits should be roughly similar in magnitude. In any event, both imply an increased expected value of economic loss is associated with a weight gain.

Table 5 shows regression results from Equation 2. In the boy panel, the coefficient of *LayoffRate·SOE* is mostly significant at the range of 8.6 to 10 using *BMIZ* as the dependent variable, while the coefficient of *FinancialLoss·SOE* is insignificant across all regressions. This result suggests the impact on boys' *BMIZ* arise mainly from the possibility of job loss, rather than the severity of financial loss of parents, if laid off. In the girl panel, *BMIZ* is not affected by the lay- offs.

Our finding that the probability of unemployment has the relatively larger impact is consistent with significant non-financial impacts of unemployment and much previous literature on wellbeing and health, for example, Di Tella, MacCulloch, and Oswald (2003), Cylus, Glymour, and Avendano (2015).

C. Paternal vs. Maternal Treatment

In the main model, we define the treatment group as at least one parent working in the SOE prior to the reform. We now test the paternal, maternal and double treatment effects by incorporating the interactions of *E*(*Loss*) and (1) father (2) mother and (3) both working at the SOE prior to the SOE reform separately.

Table 6 reports the estimates. In the boy panel, comparing columns 1-3, a 10%-point increase in *E*(*Loss*) increases 1.2 standard deviations of *BMIZ* from paternal treatment, is not statistically significant for maternal treatment, and is 1.8 standard deviations on *BMIZ* if

double treatments. No significance is found in the girl panel. We suggest that the much larger and clearer effects of increased economic insecurity from the father's side highlights father's main bread earner role in Chinese families. In our sample, 93% of fathers are working while 85% of mothers are working, but mother's average monthly salary is only 59% of father's.

D. Unconditional Quantile Regression

Since weight gain for thin people may have much less impact on health than a similarly sized weight gain for the already overweight, we ask whether increased parental economic insecurity results in higher weight gain in children who already are overweight. OLS results only estimate the average effects, but the weight gain caused by heightened economic insecurity is not necessarily constant. Rohde, Tang, and Osberg (2017) use quantile regressions on Australia panel data and find greater effects of economic insecurity on weight gain in the already overweight population, which implies that repeated stress has a cumulatively increasing impact. To investigate this, we employ a quantile regression on pooled cross-sectional sample. Our hypothesis is that a larger coefficient of $E(Loss)\cdot SOE$ is associated with a higher weight quantile.

We adopt the re-centered influence function proposed by Firpo, Fortin, and Lemieux (2009) to estimate unconditional quantile regressions.[20] Table 7 presents the

[20] More controls in pooled cross sections estimation include children's age, age squared, parents' age and level of education, number of children, and the province of residence are added to control for observed characteristics.

quantile estimates at each decile, using our preferred specification. For boys' *BMIZ*, the estimates of $E(Loss)\cdot SOE$ are positive and significant at q=0.6 ($\gamma_1 = 6.8$), q=0.7 ($\gamma_1 = 9.1$), and q=0.8 ($\gamma_1 = 10.1$), and not significant for those below 6th decile. The quantile regressions suggest that the layoff policy has larger effects on boys at higher quantiles, and boys at median and below are not significantly affected. Their girl counterparts do not present significant effects of $E(Loss)\cdot SOE$ in the quantile estimation (see Table 7).

Figure 8 shows the plot of the coefficient of $SOE_{ip}\cdot E(Loss)_p$ across all quantiles. The coefficient of $SOE_{ip}\cdot E(Loss)_p$ at the is trending upwards for boys, suggesting a larger weight gain on already heavier boys. The patterns for girls are not monotonic. The quantile regressions suggest that the effects of economic stress are not linear for boys, as it does not significantly affect underweight and normal weight boys but increases weight to already overweight or obese boys. These results thus suggest a more serious public health problem than the OLS estimation might imply.

VIII. Conclusion

This paper examines intergenerational effects of increased parental economic insecurity on children's weight gain. Using the natural experiment of the large-scale layoffs during the China's state-owned enterprise reform in the late 1990s, we calculate the expected economic loss using SOE layoff rates and average financial loss at provincial- and year-levels. Compared to children in the non-SOE (control group), children in the SOE (treatment group) experience different levels of changes in expected economic loss due to changes in layoff policy (treatment of different intensity). Exploiting this exogenous variation in changes in parental economic insecurity, we use a generalized differences-in-

differences methodology to examine the BMI Z-score (WHO standard). Using longitudinal data from the China Health and Nutrition Survey (CHNS), individual fixed effects and year fixed effects control for time-invariant unobservable and time-variant observables.

Compared to children with parents in the non-SOE sector, there are consistently significant increases in the *BMIZ* for boys. If the expected economic loss increases by 10% points (the difference between the highest and the lowest treatment effects of layoff policy at provincial- and year-levels) the *BMIZ* increases by 1 standard deviation, which is equivalent to a 35-percentile increase in BMI distribution, a 2.1 unit increase in BMI, or 4 kg in weight gain for a medium-built 10-year-old boy. The layoff rate and financial loss from the layoffs are used to examine the differential impact of economic insecurity. The layoff rate (that is, the probability of job loss) plays a greater role than the financial loss in the determination of children's weight change. We emphasize that the effects of potential job losses remain significant for boys, with a larger effect size, even when none of the parents actually in the end lost their job, highlighting the importance of anxiety about possible future events, in addition to realizations.

In this paper, the average financial loss of laid-off workers is calculated from the average living subsidies of laid-off workers compared to the average wage of on-post SOE workers in the province at the same period of time. This provides the closest approximation in the average income fall that a laid-off worker experiences, given data available. Giles, Park, and Cai (2006) indicate that the SOE reform also reduces the wage of the remaining SOE workers. However, there is no counterfactual data available on what the income in SOE would be without the layoffs. Therefore, the financial loss may be underestimated. Another limitation comes from the lack of reputable overweight standard specifically for

current Chinese children in existing literature. The BMI Z-scores provide an age-gender-specific reference for weight gain using international samples but are not customized specifically for Chinese children. Future research can be done when such thresholds are established.

This study suggests that layoff policy changes can have health consequences for the children in affected families. When performing economic reform, policy-makers should therefore take the intergenerational health effect into considerations for the cost-benefit analysis, as child obesity significantly increases public health costs. If parental job loss has a significant negative impact on child obesity, a higher public health cost may be associated with unemployment than previous studies have suggested. Our results also suggest that the benefits of an adequate social safety net are partly received by children. Adequate unemployment insurance benefits, effective job training programs, and accessible social assistance can help protect families against risks of economic loss, and thereby reduce the negative effects on children.

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Appendix I

The CHNS question asked (1989-1991, Variable B6):

In what type of work unit do you work?

1 state enterprise or institute

2 small collective

3 large collective

4 joint venture

5 individual or private

6 other

7 unknown

We identify the child in the treatment group if either parent answers 1 to the above question.

State-Owned Enterprises refer to non-corporation economic units where the entire as- sets are owned by the state and which have registered in accordance with the Regulation of the People's Republic of China on the Management of Registration of Corporate Enterprises. Excluded from this category are sole state-funded corporations in the limited liability corporations (National Bureau of Statistics of China 2002).

Laid-off workers: due to the production or operational difficulties of the state-sector enterprises, employees leave the job involuntarily, and do not work for other jobs in the same enterprise. They still remain the labour relation with the original enterprises (China Ministry of Labour and National Bureau of Statistics of China, 1997).

In this study, change in expected economic loss in the SOE is the reason for greater economic insecurity, which can be thought about in three ways: first, the possibility of being laid off (layoff rate), where

(5) $$LayoffRate_{pt} = \frac{Number\ of\ laid{-}off\ workers\ in\ state\ sector_{pt}}{Number\ of\ state\ sector\ workers_{pt}}$$

that is, the layoff rate is measured by the number of laid off workers divided by the total number of state sector workers in the province p and year t; second, the financial loss if laid off:

$$(6) \qquad FinancialLoss_{pt} = \frac{Average\ living\ subsidies\ of\ laidoff\ workers_{pt}}{Average\ wage\ rate\ of\ on-the-job\ workers\ in\ state\ sector_{pt}}$$

which is the average percentage income drops for laid-off workers in province p and year t; and third, the expected economic loss:

$$(7) \qquad E(Loss)_{pt} = LayoffRate_{pt} FinancialLoss_{pt}$$

which is the product of probability of layoff and financial loss in the event of job loss in province p and year t.

Appendix II

Table 1: Descriptive statistics by the non-SOE and the SOE.

Sector	Non-SOE						SOE					
Gender	Boy		Girl		Dif		Boy		Girl		Dif	
Variables	Mean	SD	Mean	SD	Mean	t-stat	Mean	SD	Mean	SD	Mean	t-stat
BMI Z-score	-0.46	1.13	-0.55	1.00	0.09*	(2.24)	-0.31	1.19	-0.33	1.05	0.02	(0.21)
LayoffRate	0.06	0.03	0.06	0.03	0.00	(0.08)	0.06	0.04	0.07	0.04	-0.01	(-1.72)
FinancialLoss	0.79	0.05	0.80	0.05	-0.00	(-1.56)	0.80	0.05	0.80	0.05	0.00	(0.21)
Equivalent Income	8398	7409	7740	6726	658.01*	(2.52)	10080	6398	11014	8584	-934	(-1.40)
Number of extra hh members	2.60	0.98	2.56	0.99	0.04	(1.10)	2.42	0.90	2.47	0.92	-0.05	(-0.68)
Child in puberty=1	0.68	0.47	0.41	0.49	0.27***	(15.31)	0.72	0.45	0.47	0.50	0.25***	(6.08)
Grandparent present=1	0.24	0.43	0.22	0.42	0.01	(0.95)	0.25	0.43	0.24	0.43	0.01	(0.30)
Mother is married	0.96	0.18	0.96	0.20	0.01	(0.90)	0.94	0.24	0.94	0.24	-0.00	(-0.10)
Father's health	2.86	0.69	2.85	0.68	0.01	(0.46)	2.89	0.63	2.94	0.64	-0.05	(-0.78)
Mother's health	2.77	0.68	2.77	0.67	-0.00	(-0.08)	2.80	0.64	2.82	0.68	-0.02	(-0.26)
Prov GDP per capita in 2009 yuan	7738	4120	7590	3930	147	(0.99)	7483	3729	7697	3929	-213	(-0.64)
Observations	1645		1315		2960		282		250		532	

Source: CHNS sample from 1997 to 2004, based on pooled cross-sections. Note: Equivalent income is household income after tax and transfer adjusted by square root of household size (the Luxembourg Income Study Equivalent Scale).
Number of extra household members are defined as household size minus number of parents minus number of children.

Table 2: Generalized Difference-in-Difference Estimates. Baseline Estimation with Full Sample.

	Boy				Girl			
BMI Z-score	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
E(Loss)*SOE	12.43***	11.25***	9.299**	9.859**	5.693	5.323	15.36	13.65
	(2.273)	(2.622)	(3.704)	(3.830)	(8.893)	(8.779)	(8.698)	(9.154)
	p=.0100	p= .00801	p= .08208	p= .0921	p= .529	p=.552	p= .0681	p=0.232
E(Loss)	-0.702	-0.140	1.721	4.224**	-3.440	-2.939*	-3.087*	-2.546
	(2.612)	(2.469)	(1.418)	(1.244)	(2.134)	(1.547)	(1.530)	(1.438)
Observations	1,875	1,845	1,471	1,471	1,518	1,490	1,188	1,188
R-squared	0.009	0.010	0.054	0.061	0.005	0.006	0.085	0.131
Number of children	1,176	1,170	1,018	1,018	1,007	998	864	864
Log equi income	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Child & HH controls	No	No	Yes	Yes	No	No	Yes	Yes
Prov GDP per capita and Year FE	No	No	No	Yes	No	No	No	Yes

Note: Robust standard errors clustered in provincial level in brackets. The p-values of Wild-t are calculated using the wild bootstrap-t procedure. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Generalized Difference-in-Difference Estimates with Individual Fixed Effects. Never Lose Job sample.

	Boy				Girl			
BMI Z-score	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
E(Loss)*SOE	14.19**	13.32**	12.21**	13.09***	0.565	0.606	9.211	6.741
	(5.718)	(5.164)	(3.510)	(3.667)	(9.497)	(8.988)	(13.26)	(13.76)
E(Loss)	-2.498	-1.578	0.444	6.082*	-1.397	-2.011	-0.499	1.855
	(3.646)	(3.600)	(2.774)	(2.746)	(2.988)	(3.128)	(2.354)	(2.077)
Observations	1,080	1,068	847	847	926	914	728	728
R-squared	0.010	0.009	0.108	0.141	0.001	0.007	0.169	0.204
Number of children	692	688	605	605	635	632	548	548
Log equi income	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Child & HH controls	No	No	Yes	Yes	No	No	Yes	Yes
Prov GDP per capita and Year FE	No	No	No	Yes	No	No	No	Yes

Note: Robust standard errors clustered in provincial level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Robustness Check with Provincial-Year Controls.

BMI Z-score	Boy (1)	Girl (2)
E(Loss)*SOE	10.26**	13.72
	(3.905)	(9.359)
E(Loss)	9.277***	-1.196
	(2.037)	(2.396)
Observations	1,471	1,188
R-squared	0.067	0.134
Number of children	1,018	864
Log equi income	Yes	Yes
Child & HH controls	Yes	Yes
Prov GDP per capita and Year FE	Yes	Yes
Provincial-year controls	Yes	Yes

Note: Robust standard errors clustered in provincial level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Generalized Difference-in-Difference Estimates with Individual Fixed Effects. Economic Insecurity. Decomposed with Full Sample.

	Boy				Girl			
BMI Z-score	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LayoffRate*SOE	10.06***	8.952**	8.285	8.634*	4.004	4.063	10.72	9.930
	(2.368)	(3.035)	(4.401)	(4.468)	(6.897)	(6.950)	(6.444)	(6.380)
FinancialLoss*SOE	2.379	1.747	2.708	2.634	-0.718	-0.0931	-0.638	-0.283
	(1.932)	(2.347)	(4.407)	(4.426)	(2.925)	(3.334)	(3.706)	(3.956)
LayoffRate	0.0594	0.653	0.836	3.296*	-2.628	-2.577*	-0.473	-1.846
	(2.309)	(2.099)	(1.359)	(1.534)	(1.575)	(1.098)	(0.732)	(1.201)
FinancialLoss	1.194	1.467	-1.813	-3.779***	-0.309	-0.884	4.510***	1.791
	(1.094)	(1.039)	(1.449)	(0.924)	(0.908)	(0.646)	(0.997)	(1.879)
Observations	1,875	1,845	1,471	1,471	1,518	1,490	1,188	1,188
R-squared	0.015	0.016	0.057	0.064	0.006	0.007	0.112	0.131
Number of children	1,176	1,170	1,018	1,018	1,007	998	864	864
Log equi income	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Child & HH controls	No	No	Yes	Yes	No	No	Yes	Yes
Prov GDP per capita and Year FE	No	No	No	Yes	No	No	No	Yes

Note: Robust standard errors clustered in provincial level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Heterogeneous Effects: Maternal, Paternal and Both treatment effects.

BMI Z-score	Boy			Girl		
	(1)	(2)	(3)	(4)	(5)	(6)
E(Loss)*FatherSOE	12.17**			13.14		
	(4.085)			(8.242)		
E(Loss)*MotherSOE		14.00			17.96	
		(8.586)			(13.69)	
E(Loss)*BothSOE			18.45*			15.88
			(8.094)			(12.26)
E(Loss)	8.918***	10.01***	9.560***	-1.156	-0.511	0.000200
	(1.867)	(2.254)	(2.259)	(2.406)	(2.354)	(2.279)
Observations	1,470	1,469	1,471	1,188	1,183	1,188
R-squared	0.069	0.067	0.068	0.134	0.131	0.131
Number of children	1,017	1,016	1,018	864	861	864
Log equi income	Yes	Yes	Yes	Yes	Yes	Yes
Child & HH controls	Yes	Yes	Yes	Yes	Yes	Yes
Prov GDP per capita and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Provincial-year controls	Yes	Yes	Yes	Yes	Yes	Yes

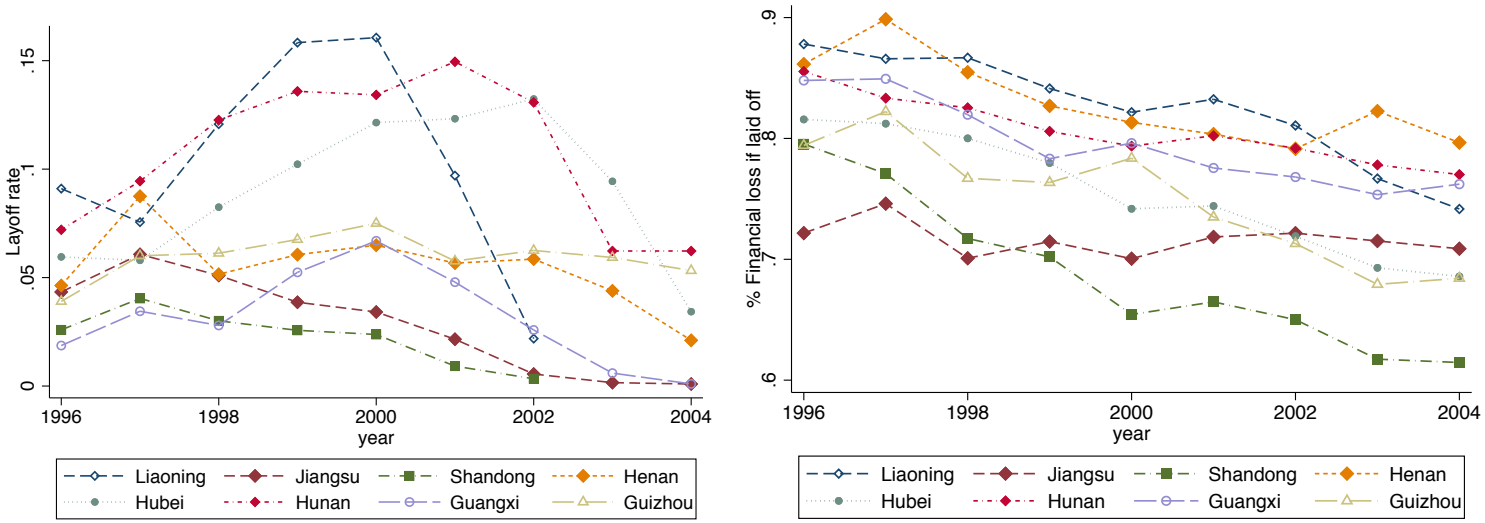
Note: Robust standard errors clustered in provincial level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Unconditional quantile regressions using pooled CHNS sample.

BMI Z-score	(1) q=.1	(2) q=.2	(3) q=.3	(4) q=.4	(5) q=.5	(6) q=.6	(7) q=.7	(8) q=.8	(9) q=.9
					Boy				
FinancialLoss*E(Loss)	-1.543	4.762	5.077	3.102	2.112	6.808*	9.113**	10.14**	7.399
	(4.418)	(3.858)	(3.426)	(3.370)	(3.331)	(3.476)	(3.872)	(5.113)	(6.703)
E(Loss)	-6.166	-7.623	-8.488*	-0.540	-4.241	-0.453	4.277	0.612	0.260
	(5.858)	(5.137)	(4.450)	(4.028)	(3.883)	(4.053)	(4.486)	(5.613)	(7.013)
Observations	1,471	1,471	1,471	1,471	1,471	1,471	1,471	1,471	1,471
R-squared	0.041	0.059	0.080	0.087	0.095	0.100	0.096	0.087	0.097
					Girl				
FinancialLoss*E(Loss)	-0.658	7.436	5.904	3.392	1.123	0.475	0.511	-2.314	0.0723
	(6.503)	(4.635)	(4.047)	(3.529)	(3.283)	(3.401)	(3.796)	(4.025)	(5.196)
E(Loss)	-10.13	-12.00**	-15.63***	-8.472**	-5.911	-5.150	-0.682	0.593	4.866
	(7.068)	(5.294)	(4.677)	(4.131)	(3.872)	(3.896)	(4.352)	(4.743)	(6.047)
Observations	1,191	1,191	1,191	1,191	1,191	1,191	1,191	1,191	1,191
R-squared	0.058	0.080	0.101	0.114	0.110	0.098	0.088	0.085	0.069
Log equi income	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Child & HH controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prov GDP per capita and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

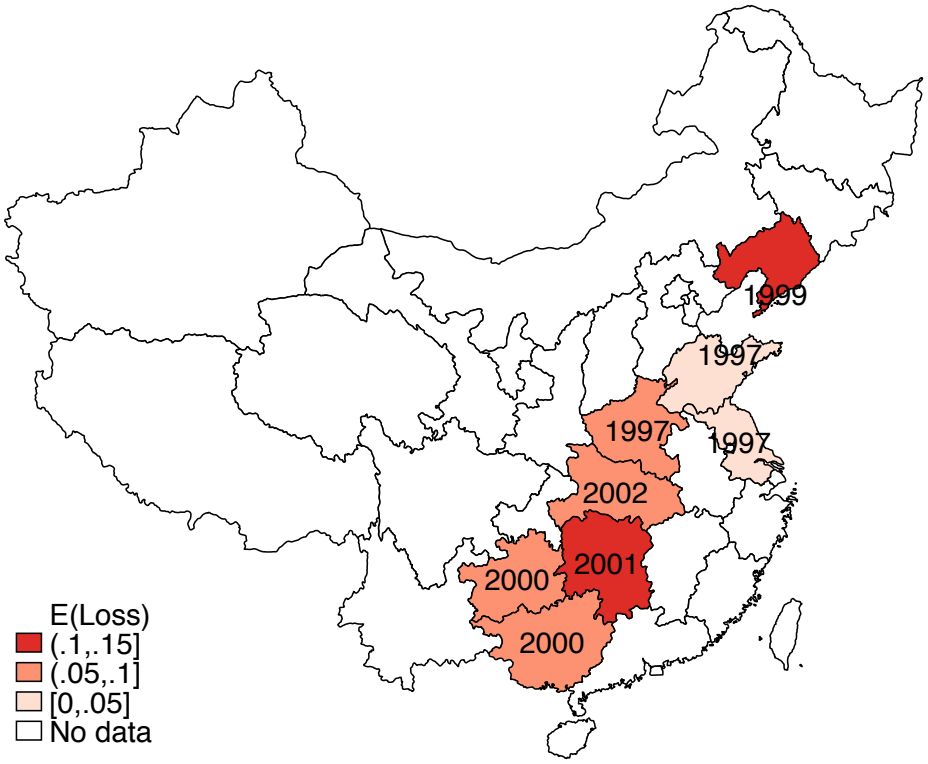
Note: Robust standard errors clustered in provincial level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Figure 1: Average Layoff rate and Average Percentage Income Loss by province and year.



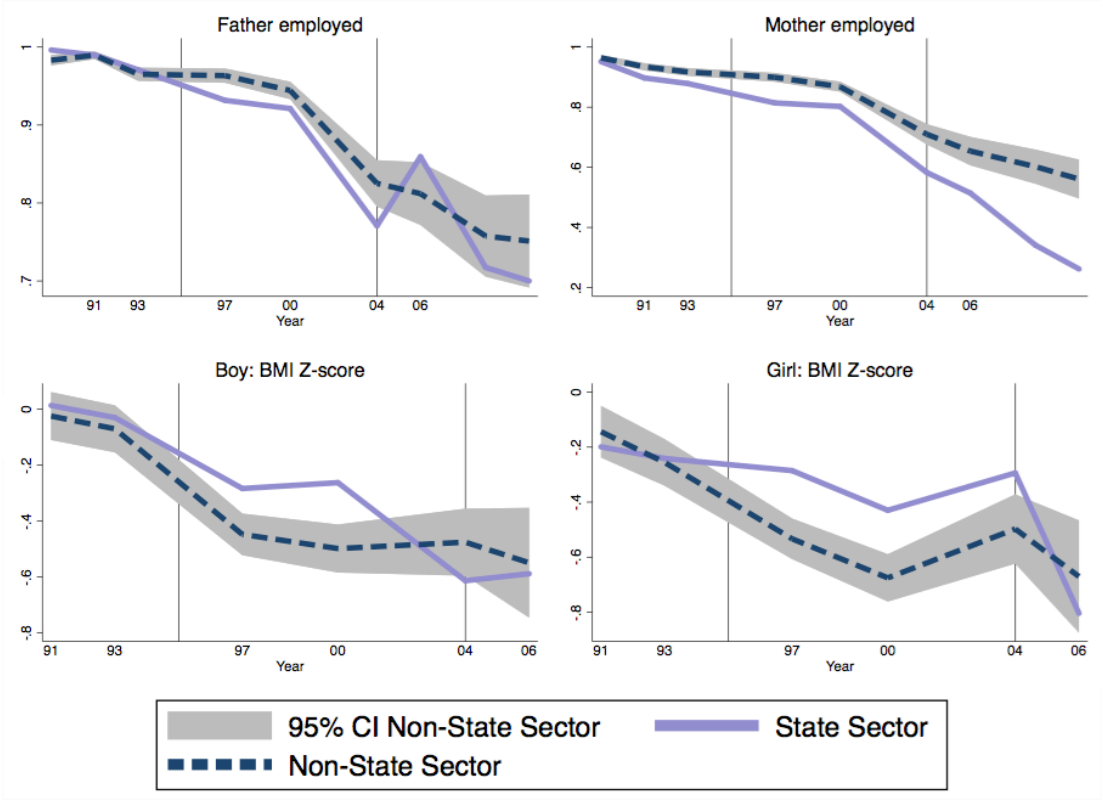
Data source: China Labour Statistical Yearbook.
Note: The layoff rate is defined as the number of SOE laid off workers at year end divided by the number of SOE workers at the year end. Annual financial loss is defined as one minus the off-post SOE worker living subsidy divided by average salary of on post SOE workers at provincial level.

Figure 2: Expected economic loss by layoff policy peak year in CHNS provinces.



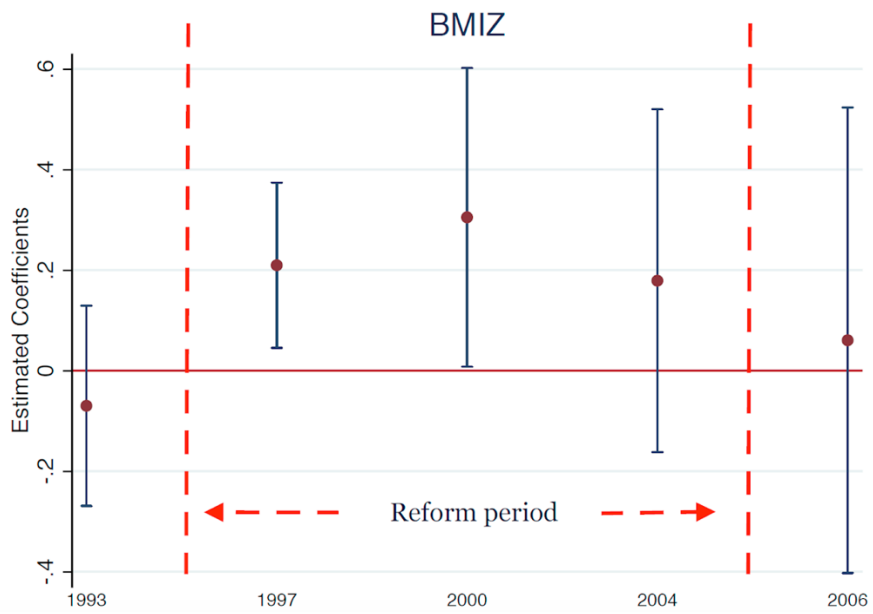
Data source: China Labour Statistical Yearbook.
Note: Expected economic loss in SOE is defined as provincial layoff rate times average financial loss from layoffs.

Figure 3: Parallel trend in child outcomes: SOE V.S. Non-SOE.



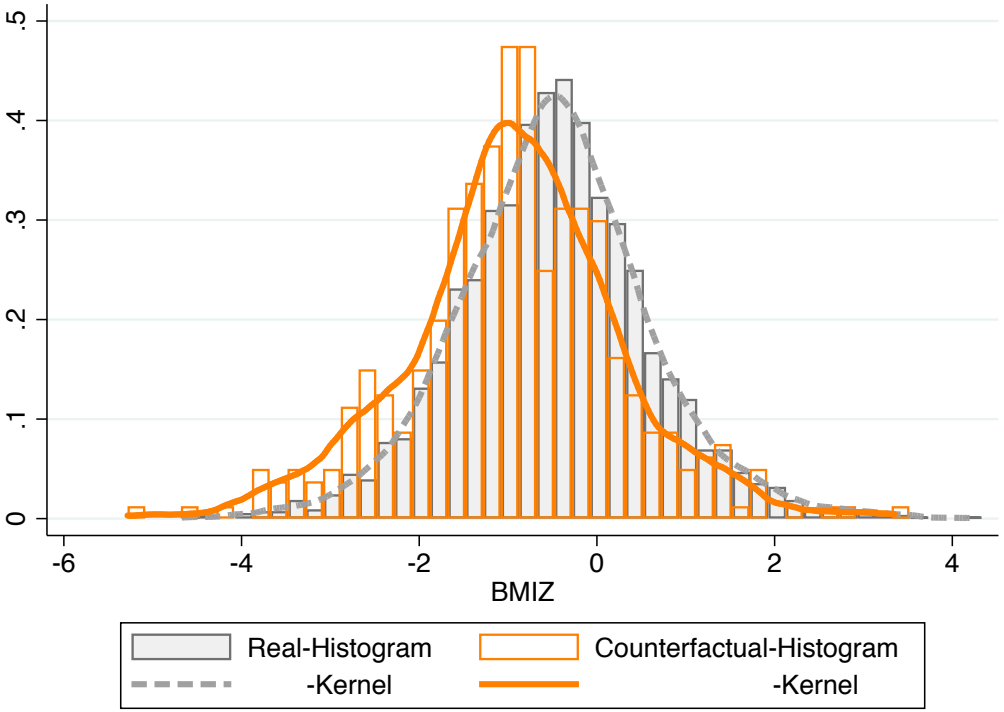
Note: The sample consists of all families with 0 to 19-year-old children in the SOE and non-SOE with the exclusion of collective sector from 1991 to 2006 for 8 provinces in CHNS dataset. The solid line represents the average of the outcome in the SOE; the grey area represents its 95% CI. The dash represents non-SOE, and its shaded area indicates the 95% CI. For all four outcomes, the SOE and the non-SOE present the same trend before the reform. The trends diverge during the reform and converge after the reform.

Figure 4: Parallel trend test: estimated coefficient α_t



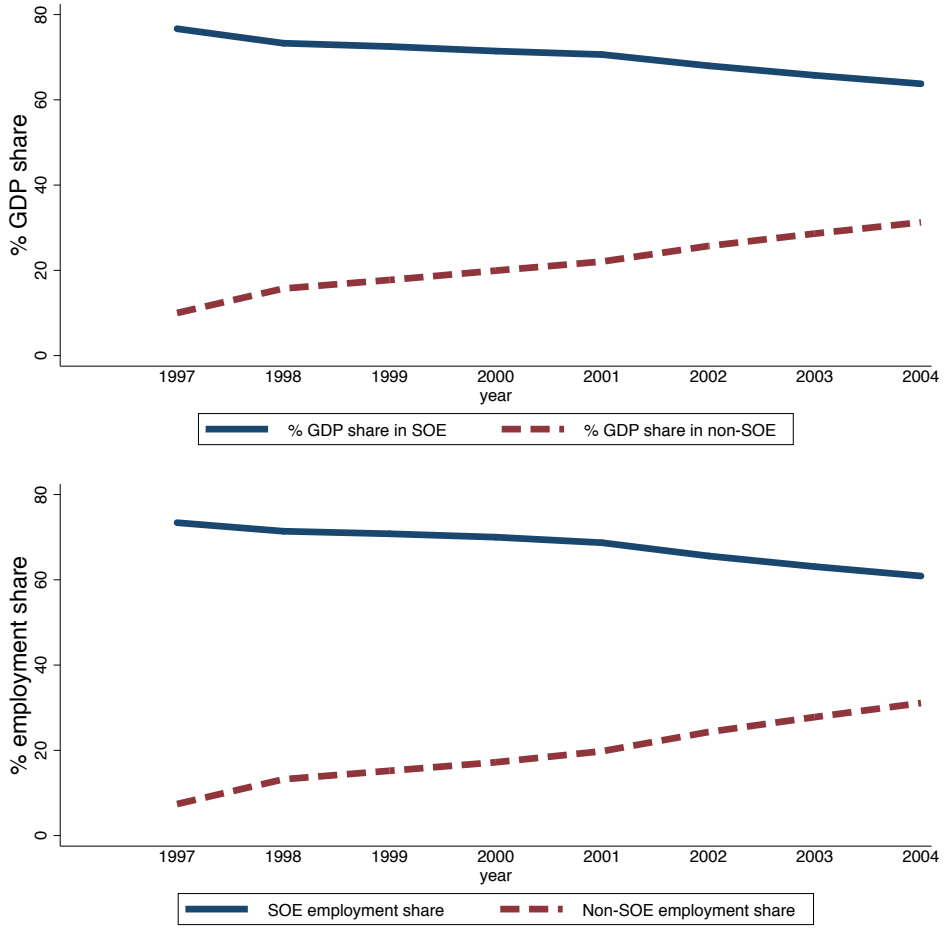
Note: *BMIZ* is regressed on year dummies interacted with SOE, controlling for individual controls and two-way fixed effects. The base year is 1991. The SOE-specific trend diverges during the reform period. Upper and lower confidence intervals are shown.

Figure 5. The *BMIZ* distribution in the SOE with and without the SOE reform



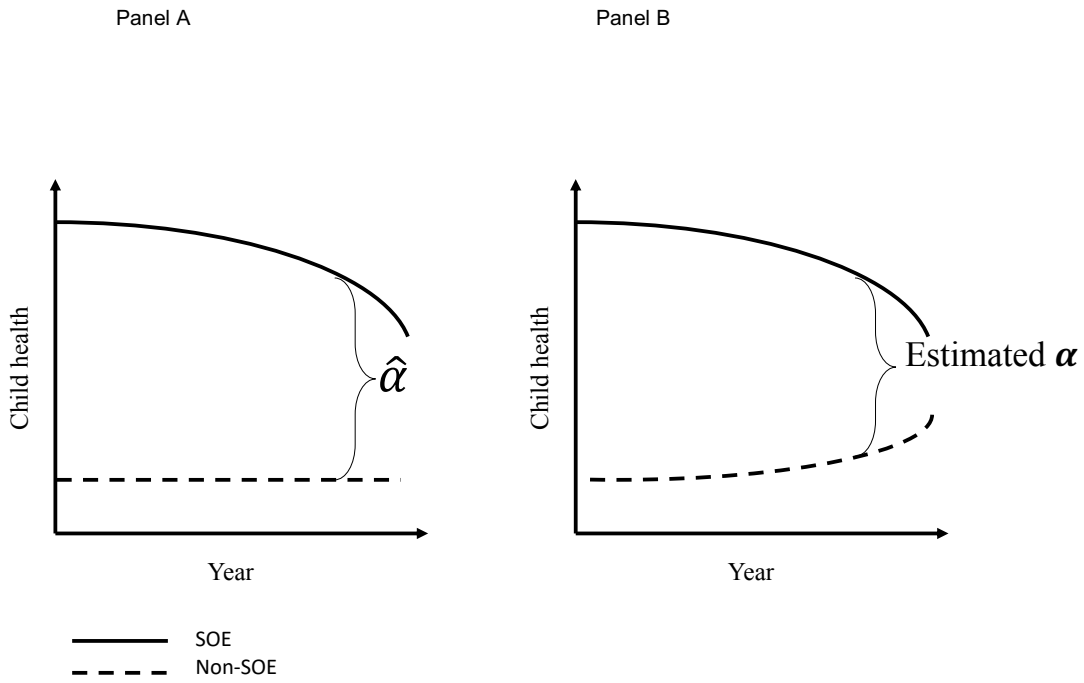
Sample size: 400 children who are in the SOE in the CHNS sample of analysis.

Figure 6: GDP and employment share in SOE VS non-SOE



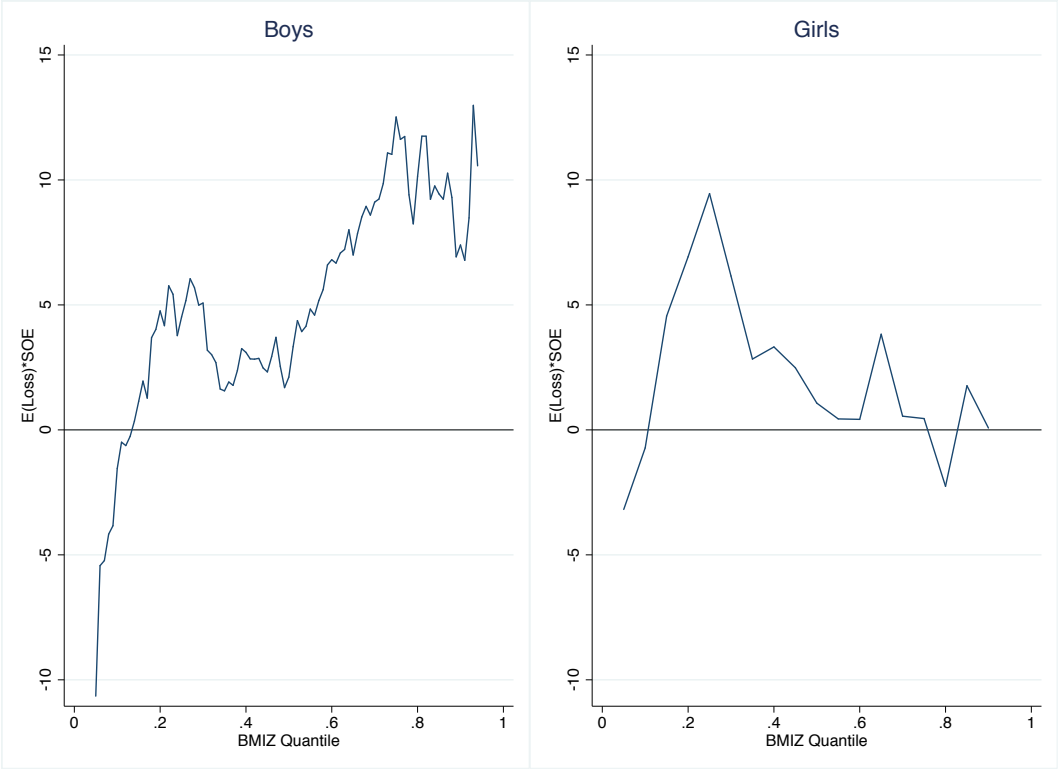
Data Source: China Labour Statistical Yearbook.
Note: The employment rate and GDP share declined in the SOE sector and increased in the non-SOE sector.

Figure 7: Lower bound estimation using DinD



Note: the gap we measured in the baseline model (Panel B) is in fact *smaller* than the actual decline of economic insecurity in the SOE (as the control group is increasing, not constant) shown as Panel A. Thus, we underestimate the actual economic insecurity change, and the baseline DinD provides a lower bound estimation.

Figure 8: The coefficient of *SOE·E*(*Loss*) on children's BMI Z-score over quantiles.



Note: The blue line indicates the coefficient of SOE*E(Loss) on the vertical axis with the corresponding quantile on the horizontal axis. Boys' weight gain increases with quantiles.