Does educational attainment induce healthy weight in Korea?
An Instrumental Variable Approach

Introduction

Obesity has gained increasing attention as a strong risk factor of morbidity and mortality associated with many diseases such as diabetes, stroke, cancers and hypertension (Jia and Lubetkin 2010). Obesity has emerged as a global epidemic as around 1.5 billion adults worldwide are estimated to be overweight or obese and is increasingly prevalent in places where obesity was rarely a problem in the past (Popkin and Gordon-Larsen 2004). More and more people take advantage of technologies reducing physical activities at work and home and consume high-calorie and low-nutrient-dense foods (Caballero 2002). Individuals who do not have enough knowledge and economic resources to manage obesogenic environments are more likely to gain excessive weight. Many countries have been worried not only about the increasing rate of obesity, but also about socioeconomic inequality in obesity across the population which may harm overall well-being (Sassi et al. 2009a).

Education is a popular measurement of socioeconomic status directly and indirectly associated with health outcomes including obesity. Many studies found that educational attainment is persistently related with obesity although the pattern varies by gender and contexts (Baum II and Ruhm 2009). The link between education and obesity may reflect a causal relationship such that education induces healthy weight. First, education increases productivity. With fixed inputs better educated people can produce better health outcomes than less educated people (Kemptner, Jürges and Reinhold 2011). Education also fosters knowledge and abilities to make healthier choices and integrate them into consistent lifestyles (Kenkel, Lillard and Mathios 2006, Mirowsky and Ross 2003). For instance, educated people are more likely to be aware of negative consequences of obesity and practice efficient allocation of calorie intake and expenditure (Dalle Grave et al. 2010). Furthermore, through education people obtain higher income, better social environments and interpersonal relationships which benefit health (Ross and Mirowsky 1995). However, it may not necessarily mean that there is a causal effect of education on health outcomes such as obesity. A strong correlation between education and obesity can be derived from unobserved factors affecting both educational attainment and weight such as “health endowments” (e.g. inherited genetic traits and family backgrounds) and “time preference rate” referring to the rate at which people invest current time and money for future benefit (Kemptner, Jürges and Reinhold 2011). Individuals who grow up in wealthier households are more likely to gain better educational attainment as well as healthier lifestyles themselves, which are known to protect them from being obese. People having a “time preference” for the future than the present are likely to invest more in education as well as in health and thus create a significant relationship between education and healthy weight even if education does not have a causal effect (Arendt 2005, Becker and Mulligan 1997). To test whether there is a causal effect of education on health recent studies have used an instrumental variable approach yet the results are not consistent (Chou et al. 2007, Cutler and Lleras-Muney 2006, Eide and Showalter 2011). If we can demonstrate that schooling has a causal protective effect on obesity, policies inducing people to invest in education should be effective to tackle recent increasing trend of obesity. Despite of its importance, there is a lack of studies on the relationship between education and obesity reflects causality (Webbink, Martin and Visscher 2010).

The macro-level social context shapes the relationship between education and obesity (McLaren 2007, Peytremann-Bridevaux, Faeh and Santos-Eggimann 2007). Rapid economic, social and cultural transitions contribute to developing dynamic patterns of socioeconomic gradients in obesity (Monteiro, Conde and Popkin 2001). During the early stage of economic development, only individuals who have more resources are able to access to high fat and sugar foods as well as technologies reducing physical activities (e.g. automobiles). As economic development goes, high calorie foods and vehicles are becoming more common and socioeconomic inequality in energy intake and expenditure flattens out. People from all classes are exposed to obesogenic environment while social awareness of obesity is still low. In this situation, having proper knowledge about nutritional management and physical fitness is increasingly important to prevent obesity and related diseases. In other words, education plays a more crucial role in shaping social disparities in obesity in newly developed countries (Monteiro, Conde and Popkin 2001). The effect of education on obesity may differ by gender and it is often found to be stronger for women since economic development brings more chances of education to women who were traditionally discriminated against men (Cohen et al. 2013) and norms idealizing westernized features such as slimness disproportionately impacts on women (Schafer and Kwon 2012).

Representing countries that have experienced rapid transitions in economic development and rise in obesity during the last few decades, Korea provides an interesting case in which we can gain some additional insights into how the education-obesity relationship may be contingent on a specific context. Korea shows a particularly pronounced gender difference in the correlation between body weight and educational attainment. Obesity prevalence among Korean females stayed stable between 1998 and 2005, while there has been a 9% increase in the overweight prevalence and a 2% increase in the obesity prevalence among males. Moreover, better-educated males are more likely to be obese while better-educated females are much less likely to be obese (Park et al. 2008, Sassi et al. 2009b).

Current study evaluates the nature of the relation between education and obesity measured by body mass index (BMI) and waist circumference (WC)[1] using a survey of Korean adult population. It examines how education influences an individual's diet, drinking habit[2], and physical activities which directly affect obesity. Despite of its importance, the link between education and proximal causes has not been systematically examined especially in countries experiencing economic and nutritional transitions (Sassi et al. 2009a). Educational attainment may have a protective effect on BMI and WC through higher income and better social atmosphere. The study also considers household income as a potential mechanism through which education induces healthy body weight. Second, the study extends previous research addressing causality issues of education using an instrumental variable (IV) regression. The method uses natural experiments such as exogenous changes in schooling policies to address endogeneity of education. I use a 'High School Equalization Policy (1974)' as an instrument, which contributes to a dramatic growth in the number of high schools during the mid-1970s in Korea (Park, Behrman and Choi 2013). An increase in the high school availability is a "good source of an individuals' education completion variation" across cohorts (Park and Kang 2008). Using this approach I estimate the causal effect of years of schooling on long-term BMI/WC and proximal causes of them. Finally this study investigates possible gender differences in the ways in which education affects obesity. Although some studies found gender variations in a causal relationship between education and body weight in the US and other Western European countries (Atella and Kopinska 2014, Kemptner, Jürges and Reinhold 2011), these findings may not be applicable in contexts like Korea, where more traditional divisions of labor prevail and, although the situation is changing, women often have had limited access to higher education (Chung 1994).

To sum up, this paper contributes to the existing research by focusing on (1) the association between education and obesity as well as education and potential causes of obesity in Korea, (2) whether there is a significant causal effect of education by using an instrumental variable of high school availability and (3) whether the mechanisms through which education affects obesity differ among men and women using a nationally representative survey data collected in Korea from 2008 to 2012.

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[1] Many studies argued that the central obesity measured by the WC is a better marker to predict obesity related diseases such as coronary heart disease and diabetes. Ashwell, M, P Gunn and S Gibson. 2012. "Waist-to-Height Ratio Is a Better Screening Tool Than Waist Circumference and Bmi for Adult Cardiometabolic Risk Factors: Systematic Review and Meta-Analysis." *Obesity Reviews* 13(3):275-86, Smith Jr, Sidney C and David Haslam. 2006. "Abdominal Obesity, Waist Circumference and Cardiometabolic Risk: Awareness among Primary Care Physicians, the General Population and Patients at Risk–the Shape of the Nations Survey*." *Current Medical Research and Opinion®* 23(1):29-47, Welborn, TA and SS Dhaliwal. 2007. "Preferred Clinical Measures of Central Obesity for Predicting Mortality." *European journal of clinical nutrition* 61(12):1373-79..

[2] Heavy drinking promotes obesity since alcohol is an energy-dense, yet nutritionally poor, food source and induces people to be inactive. Drewnowski, Adam and SE Specter. 2004. "Poverty and Obesity: The Role of Energy Density and Energy Costs." *The American journal of clinical nutrition* 79(1):6-16.".

1974 Education Equalization Policy and Educational Expansion in Korea

In 1974, Korea implemented a leveling policy which randomly assigns middle school graduates to high schools through a lottery system based on their residential districts not the scores of entrance exams. Even private schools could not select their own students (Park, Byun and Kim 2011). After this policy was in effect a rapid expansion of high school education has occurred in Korea (Park and Kang 2008). For example, the advancement rate to high school from middle school had increased by 4.6 % from 1970 to 1975 and sharply by 10 % from 1975 to 1980. To meet the growth of societal demand for education Korean government built more institutions and converted vocational schools into academic high schools (Park and Kang 2008, Park, Byun and Kim 2011). During 1973 to 1975, the number of academic high schools over the country rapidly increased by 48% (KEDI) and the number of high schools including vocational track increased by 18%. Fig. 1 shows such a dramatic increase in high school availability in terms of the number of high schools in Korea[3]. Dramatic increase in the number of high schools let post-treatment cohorts (i.e. the students enter the school after 1974) have better accessibility to higher educations. More students started to consider not only going on to high school but also to college. Educational expansion introduced by the leveling policy is "external" to the individual's own behaviors, and thus is not likely to be correlated with the individual's health decisions. In this context a variation in educational availability across cohorts introduced by policy reform is considered to be a valid instrumental variable in many countries (Clark and Royer 2010, Park and Kang 2008). I restrict sample to those who graduated from middle school between 1965 and 1984 using a 20-year window for main analysis. Students before 1965 were deleted since available data do not exist. People entered the high school after 1985 were dropped to reduce unobserved heterogeneity caused by age differences and control for potential confounders due to the other policy reforms. Additional analyses (not reported here) using narrower window of analysis show that findings are generally consistent with the 20-year window reported in this paper.

Data

This study is based on the Korean National Health and Nutrition Examination Survey (KNHANES) conducted in 2008–2012. KNHANES is a cross-sectional survey based on stratified, multistage probability sample of Korean households, representing the civilian, non-institutionalized population (Ko and Kim 2012). It collects data through a health interview, a survey of health behaviors and a nutritional and health examination by doctors following a standardized protocol. All anthropometric data were collected in a specially equipped mobile examination center. The study analyzed Korean adults aged 40–63 years at the time of interview who entered the high school from 1965 to 1984. Of these 12,532 individuals, I excluded 687 individuals who had missing information on the anthropometric variables and 1,495 on the energy intake variable. Respondents reporting an inadequately low or high daily energy intake were also excluded (n=157, <500 kcal/day or >5400 kcal/day for men, <500 kcal/day or >3500 kcal/day for women). 315 missing information from the other explanatory variables were dropped. 1 person is additionally deleted because of pregnancy. The final sample consists of 9,878 persons including 3,963 males and 5,915 females. The study also merged the information on the year of middle school graduation with the total number of academic and vocational high schools per 1000 middle school graduates that is available in an administrative database of the Korean Educational Development Institute (KEDI).

Variables

The outcome variables, BMI and WC were measured and provided by medical professionals. Another outcome variable, energy intake was reported using the 24-hour dietary recall method which collected information on food consumption of an interviewee during the last 24 hour. Each food item

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[3] Regional differences in educational expansion measured by the number of high school were not significant in Korea. The number of middle school graduates migrating from small cities to large cities to proceed to high school has decreased significantly after 1974's leveling policy. Kang, Changhui, Cheolsung Park and Myoung-Jae Lee. 2007. "Effects of Ability Mixing in High School on Adulthood Earnings: Quasiexperimental Evidence from South Korea." *Journal of Population Economics* 20(2):269-97.

was assigned the amount of kilocalories and nutritional proportion it contains. More specifically, I use proportionate energy intakes from carbohydrate, protein, and fat per a day. The data provide information on various aspects of physical activities and sedentary habits. Respondents self-rated the intensities of their physical activities based on their on-the-job activities, leisure activities, and household chores. They also reported frequency of those physical activities per a week. Each physical activity should be continued more than 10 minutes at a time. The type of physical activities is classified into: intensive activities, moderate activities, and walking. In addition to this participants were asked how many days they spend for their muscle and flexible work out such as yoga per a week. To combine the multiple dimensions of various types of physical activity the study uses a factor analysis and creates a comprehensive index of energy expenditure. Drinking habit is measured based on the monthly frequency of heavy risk drinking. Heavy risk drinking was defined when a man drinks more than 5 cups of beer (> 330 ml × 5) or 8 cups of soju (> 50 ml × 8) per a drinking day and a woman drinks more than 3 cups of beer (> 330 ml × 3) or 5 cups of soju (> 50 ml × 5) (Chung, Lim and Lee 2012). In terms of education, the KNHNES data contain information on individual schooling attainment expressed in terms of the highest degree completed. I construct a variable which indicates the years of education completed based on this data. The analysis includes pure exogenous controls: age, and a quadratic age term of the individuals.

Methods

To examine the associations between education and BMI and WC, I estimated ordinary regression models. The continuous outcomes were log-transformed to meet requirements on normality. All models were estimated separately for men and women since previous studies reported huge gender differences in the relationship between SES and body weight (Brunello, Fabbri and Fort 2013). To examine whether there is a causal effect of education on body weight I adopt an IV analysis based on the two-stage least squares (2SLS). In the first stage of the IV analyses, the years of education is regressed on an instrument, the availability of high schools per 1000 middle school graduates and exogenous control variables. In the second stage, the outcomes (log(BMI), log(WC), and potential pathways affecting obesity) are regressed on the predicted values from the first-stage regression. I assume that educational expansion is independent of any unobserved determinants of obesity in the second stage equation. Computed analyses were based on cohort-clustered bootstrapped standard errors (Atella and Kopinska 2014). The models were restricted to the exogenous controls and exclude indicators of other SES and health behaviors which are potentially endogenous as strongly related with education (Arendt 2005). Models were estimated using STATA 11.

Preliminary Results

Table 1 provides sample characteristics and Tables 2 and 3 provide the results from the OLS and IV regression models. As seen in Table 1, about 40% of the sample was male with a mean age of 51 years. There were significant gender differences in own educational attainment between the respondents. Men were significantly more likely to have higher than university education (31.2%) than women (16.7%), whereas women were more likely to have only lower secondary education or below (46.4%) than men (32.2%). As we can see in Table 1, men were significantly more likely to be obese (39.6%) than women (32.9%) and men were more likely to have central obesity than women (29.1% vs. 27.4%). These results are consistent with prior findings of a gender difference in obesity in Korea (Noh et al. 2014, Oh 2011). Compared to men women have lower levels of energy intake and devote less time to all types of physical activities except for walking. Women are likely to consume more energy from carbohydrate than men while consume less proportion of protein and fat than men. Men are much more likely to be involved in heavy risk drinking than women. Men who reported that he heavily drinks more than once a week is 39.4% but the proportion of women who heavily drink more than once a week is only 6.9%. Traditionally in Korea, men tend to place high value on drinking gathering as an extension of formal work while stigmatize women’s drinking (Kim et al. 2002). There is not a significant gender difference in household income.

Table 2 presents the first-stage coefficients of an IV regression. The effect of the educational expansion was stronger for females’ further educational attainment than that of males, with the estimates equal to 6.38 and 5.44, respectively. For both genders, the estimated value of the F-statistic is big enough satisfying the Staiger and Stock (1997)'s rule of thumb, which means that the instrument can be assumed to be strong. According to the OLS results in table 3, education is statistically significantly associated with body weight and waist circumference for both men and women in Korea after controlling for age. However the direction is opposite. Men who are better educated are significantly more likely to be obese. On the other hand, women who are better educated are significantly less likely to be obese. Education is positively related with energy intake for both men and women. Better educated men and women are more likely to consume protein and fat but much less level of carbohydrate. People with better educational attainment seem to be more physically active. Education is also negatively associated with frequency of heavy risk drinking for both men and women.

Results from the IV regressions show that education reduces BMI and WC for women (Table 4). On the other hand, education does not have a statistically significant causal effect on men's BMI and less effect on men's WC compared to that of women. According to IV estimates, one additional year of education causes around 0.01 % decrease in BMI and 0.02% decrease in WC for women ($p<.05$). As for men, one additional year of education reduces WC by .01% but it does not have a statistically significant causal impact on BMI. This result is consistent with previous findings from different countries (Atella and Kopinska 2014, Brunello, Fabbri and Fort 2013) and suggests that increased accessibility to higher education benefits socially disadvantaged group i.e. females by encouraging school attendance as well as reducing school inequalities. Without increasing accessibility to high school, women were more likely to be less educated than men. In the 1960s son preference was strong in Korea and many women frequently gave up entering high school if they have brothers who need to go to college. Thus actual returns to additional chances of education are higher for women. Better education induces individuals to intake more energy while the magnitude of effect is much bigger for men than women. Education especially let women obtain more calories from protein and fat and less calories from carbohydrate. Many of medical studies from Korea found that a reduced intake of carbohydrates and carbohydrate snacks help to prevent obesity and obesity related diseases (Choi et al. 2012, Kim et al. 2008, Song et al. 2014). A diet containing high protein is known to be beneficial for the management of metabolic syndrome by boosting insulin sensitivity as well as body muscles (Campbell et al. 2008, Larsen et al. 2010). Given that Koreans traditionally live in rice, it makes sense that education fosters knowledge to choose more balanced nutrition rather than simply reduce calorie intake. Education is likely to reduce physical activities, which is different from the result from OLS. In other words, education encourages sedentary lifestyles for both men and women and this effect is bigger for women. This result can be explained by the argument of Kemptner (2011) that education reduces "the likelihood of being in a physically demanding job" and increases the accessibility to labor-saving technologies. The effect is stronger for women who are traditionally more physically inactive than men. This pattern can usually be observed in transitional societies where benefit of technology is limited to the people with higher SES (Popkin, Adair and Ng 2012). In addition, Korean high school system has not considered physical education (PE) as an important part of formal education and reduced the number of PE classes since it is not a crucial factor of college entrance exam (Bae 2000). Education does not have a significant causal effect on heavy drinking for men and women. A reasonable conjecture is that in Korean society frequent drinking is culturally allowed (and in some cases even encouraged) especially for men as heavy drinking can be a positive "social lubricants" as well as a way of vindicating manhood (Park and Kang 2008, Sharpe et al. 2001). A research on alcohol consumption among Koreans shows that Koreans seem to underestimate the negative consequences of drinking (Lee et al. 2007a). In this context, having more years of education is negligibly responsible for promoting the lifelong awareness of abstaining from alcohol for men. As reported in the table 4, education has a stronger causal effect on the earnings of females than men which is in accordance with a study of Brunello et.al (2013) addressing that there is higher economic returns to education for females than males. Education can increase household income by increasing the probability of employment and finding a spousal with higher SES (Park and Smits 2005). People with higher income can access to healthier foods, neighborhoods and better health care service which affect body weight (Drewnowski and Darmon 2005). In this sense, this evidence suggests that a plausible reason of the stronger protective effect of educational attainment on obesity among women is its stronger impact on women's earning.

Next Step

I will test whether the effect of education varies across distribution of the BMI and WC among men and women using probit and IV probit models given that BMI and WC over the cut-off are particularly harmful for health. In further analysis, I will also examine the indirect and direct pathways through which education impact on BMI and WC using OLS regressions including younger generations who underwent different social circumstances from older cohorts.

Table1. Distribution of characteristics, the 2008-2012 Korean National Health and Nutrition Examination Survey (KNHNES), Males and Females of 1949-1968 cohorts (% or mean and standard deviation)

Characteristic	Total (N=9,878)	Male (N=3,963)	Female (N=5,915)	p-value[1]
Body Mass Index[4]	24.1 (3.1)	24.3 (2.9)	24.0 (3.2)	0.00
Normal	64.4	60.4	67.1	0.00
Obesity	35.6	39.6	32.9	
Waist Circumference	82.1 (9.1)	85.5 (8.1)	79.9 (9.0)	0.00
Normal	71.9	70.9	72.6	0.06
Obesity	28.1	29.1	27.4	
Age	51.3 (6.0)	51.5 (6.1)	51.2 (5.9)	0.02
Educational attainment (years)	11.1 (3.7)	11.9 (3.7)	10.5 (3.6)	0.00
Lower secondary/below	40.7	32.2	46.4	0.00
Upper secondary	36.8	36.6	36.9	
University	15.1	20.3	11.6	
Graduate school	7.5	11.0	5.1	
Daily kilocalorie intake	2014.8 (626.8)	2379.9 (647.6)	1764.0 (469.3)	0.00
Carbohydrate (%)	68.2 (12.8)	64.0 (14.0)	71.0 (11.1)	0.00
Fat (%)	15.8 (7.6)	16.2 (7.4)	15.6 (7.7)	0.00
Protein (%)	14.3 (3.9)	14.4 (3.9)	14.2 (3.9)	0.02
Index of physical activities[2]	0.0 (1.4)	0.2 (1.5)	-0.2 (1.3)	0.00
Frequency of physical activities				
Intensive physical activities[3]	1.1 (1.8)	1.3 (1.9)	0.9 (1.7)	0.00
Moderate physical activities[3]	1.5 (2.2)	1.6 (2.1)	1.5 (2.2)	0.02
Walking[3]	4.0 (2.6)	4.0 (2.6)	4.0 (2.5)	0.79
Work out for flexibility[3]	1.9 (1.9)	2.0 (2.0)	1.8 (1.9)	0.00
Work out for muscle[3]	0.9 (1.5)	1.3 (1.7)	0.6 (1.3)	0.00
Frequency of heavy risk drinking				
Never	52.9	29.9	68.2	0.00
Less than once a month	15.3	14.1	16.1	
Once a month	12.0	16.7	8.8	
Once a week	14.3	27.4	5.6	
Every day	5.6	12.0	1.4	
Monthly household income	455.7	470.7	445.6	0.28

1. P-value refers to the difference in the distribution of the explanatory variable between males and females
2. Index is derived from the factor analysis using varimax rotation
3. Weekly frequency of each physical activity was provided

[4] BMI and WC are recoded into dummy variables to indicate whether a respondent is obese using cutoffs for Asian and Pacific Island populations as defined by the World Health Organization (WHO). General obesity is defined when BMI is more than 25 kg/m^2 and central obesity is defined when WC is larger than 90 cm for men and 85 cm for women. Lee, Sang Yeoup, Hye Soon Park, Dae Jung Kim, Jee Hye Han, Seon Mee Kim, Guem Joo Cho, Dae Young Kim, Hyuk Sang Kwon, Sung Rae Kim and Chang Beom Lee. 2007b. "Appropriate Waist Circumference Cutoff Points for Central Obesity in Korean Adults." *Diabetes research and clinical practice* 75(1):72-80..

Table 2. First-Stage Effects of Educational Expansion on Years of Educational Attainment

Characteristic	Males	Females
Educational Expansion	5.436** (0.9)	6.384** (0.8)
Age	-0.122 (0.2)	-0.260 (0.1)
Age^2	0.001 (0.0)	0.002(0.0)
F-test for instrument weakness	35.86	66.13
Observations	3,963	5,915

Standard errors are in parentheses.
*p < .05; **p < .01

Table 3. Results from Ordinary Least Squares (OLS) Regressions

	Male (N=3,963)	Female (N=5,915)
1) Body mass index (BMI)		
Years of educational attainment	0.003**	-0.007**
	(0.00)	(0.00)
Constant	3.117**	3.308**
2) Waist Circumference (WC)		
Years of educational attainment	0.002**	-0.007**
	(0.00)	(0.00)
Constant	4.346**	4.517**
3) Daily kilocalorie intake		
Years of educational attainment	9.739**	17.909**
	(3.68)	(2.23)
Constant	750.27	1,754.90**
4) % Carbohydrate		
Years of educational attainment	-0.333**	-0.507**
	(0.06)	(0.04)
Constant	98.687 **	69.585**
5) % Fat		
Years of educational attainment	0.388**	0.527**
	(0.03)	(0.03)
Constant	26.359**	19.265**
6) %Protein		
Years of educational attainment	0.167**	0.174**
	(0.02)	(0.02)
Constant	9.210**	9.118**
7) Physical activities		
Years of educational attainment	0.043**	0.026**
	(0.01)	(0.01)
Constant	-0.936	-6.077**
8) Frequency of heavy risk drinking		
Years of educational attainment	-0.038**	-0.032**
	(0.01)	(0.00)
Constant	1.065	1.875**
9) Monthly household income		
Years of educational attainment	0.350**	0.446**
	(0.05)	(0.05)
Constant	-36.72**	-28.231*

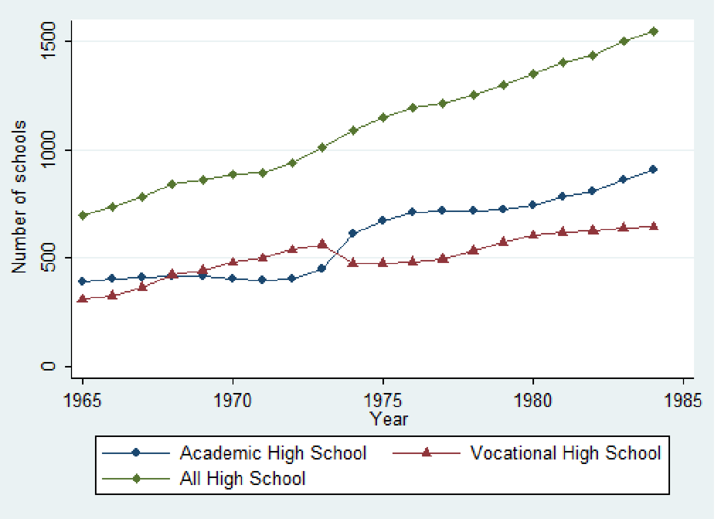
Notes: I control for quadratic polynomial in age. Standard errors are in parentheses.
*p < .05; **p < .01

Table 4. Results from Instrumental Variable (IV) Regressions

	Male (N=3,963)	Female (N=5,915)
1) Body mass index (BMI)		
Years of educational attainment	-0.005	-0.007*
	(0.01)	(0.00)
Constant	3.357**	3.295**
2) Waist Circumference (WC)		
Years of educational attainment	-0.010*	-0.018**
	(0.01)	(0.00)
Constant	4.688**	4.887**
3) Daily kilocalorie intake		
Years of educational attainment	239.769**	93.767**
	(55.55)	(17.21)
Constant	-6,204.21**	-873.745
4) % Carbohydrate		
Years of educational attainment	-2.628**	-2.433**
	(0.76)	(0.47)
Constant	168.054**	136.345**
5) % Fat		
Years of educational attainment	1.793**	2.084**
	(0.29)	(0.25)
Constant	-16.134	-34.671**
6) %Protein		
Years of educational attainment	-0.015	0.422**
	(0.18)	(0.14)
Constant	14.704	0.521
7) Physical activities		
Years of educational attainment	-0.315**	-0.324**
	(0.10)	(0.05)
Constant	9.897**	6.038*
8) Frequency of heavy risk drinking		
Years of educational attainment	-0.141	-0.008
	(0.08)	(0.03)
Constant	4.192	1.038
9) Monthly household income		
Years of educational attainment	1.686**	2.326 **
	(0.51)	(0.46)
Constant	-77.096**	-93.359**

Notes: I control for quadratic polynomial in age. Standard errors are in parentheses.
*p < .05; **p < .01

Figure1. The Number of High Schools in Korea
Source: Database of the Korean Educational Development Institute (KEDI)



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