The Effect of Unemployment on Body Weight

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Ritgerð þessi er 30 eininga lokaverkefni til MS prófs við Hagfræðideild, Félagsvísindasvið Háskóla Íslands.

Formáli

Þessi rannsókn er lokaritgerð til meistaragráðu í Heilsuhagfræði við Háskóla Íslands. Hún er metin til 30 ETCS eininga. Leiðbeinandi minn er Tinna Laufey Ásgeirsdóttir, doktor í hagfræði og lektor við hagfræðideild Háskóla Íslands. Ég vil þakka henni kærlega fyrir góða leiðsögn og gagnlegar ábendingar.

Stefán Hrafn Jónsson hjá Lýðheilsustöð fær jafnframt þakkir fyrir að veita mér aðgang að gögnum úr könnuninni „Heilsa og líðan Íslendinga" sem gerð var 2007 og 2009. Könnunin er viðamikil spurningalistakönnun á heilsu, líðan og velferð fullorðinna Íslendinga og er unnin af Lýðheilsustöð í samstarfi við Krabbameinsfélag Íslands, Landlæknisembættið, Landspítalann og Vinnueftirlitið, auk sérfræðinga hjá Háskóla Íslands, Háskólanum á Akureyri og Háskólanum í Reykjavík.

Abstract

INTRODUCTION: A positive relationship between economic status and health has been established although causal pathways and mediators are not fully understood. The results of studies on the relationship between unemployment and body weight show a positive relationship between BMI and unemployment at the individual level, while aggregate unemployment is negatively related to a populations BMI. The aim of this study was to examine the relationship between unemployment and changes in body weight following the Icelandic economic collapse of 2008.

METHODS: The analysis relies on a health and lifestyle survey *"Heilsa og líðan"* carried out by The Public Health Institute of Iceland in the years 2007 and 2009. The sample is a stratified random sample of 9.807 Icelanders between the age of 18 and 79. The net response rate in 2007 was 60.8%. In 2009 the response rate was 69.3% of those who participated in the former wave. Thus, a total of 42.1% of the original sample took part in the survey for both years. A linear regression was used when estimating the relationship between job loss and changes in body weight. Mental health was explored as mediator. In total, three models were estimated.

RESULTS: Point estimates indicate that both men and women gain less weight in the event of a job loss. The coefficients of job loss were statistically significant for women in model one otherwise they were not statistically significant in any model. The mediation analysis does not show a relationship between mental health and job loss.

DISCUSSION: The relationship between job loss and body weight following the economic crisis was inconsistent with ex ante expectations. The results from all three models were inconsistent with results from other studies where job loss has been found to increase body weight. However, body weight has been shown to be procyclical, and the fact that the data used are gathered during a severe economic downturn, might set these current results apart from others.

Útdráttur

INNGANGUR: Samband efnahagsástands og heilsu hefur verið rannsakað töluvert. Það sem þarf eru rannsóknir sem skoða orsakasambönd og miðlunaráhrif. Niðurstöður rannsókna á sambandi milli atvinnuleysis og líkamsþyngdar á einstaklingsgrunni sýna jákvætt samband þar á milli. Hins vegar eru neikvæð tengsl á milli heildaratvinnuleysis og þyngdar samfélaga. Markmið þessarar rannsóknar var að rannsaka sambandið milli atvinnumissis og þyngdarbreytinga í kjölfar íslensku efnahagskreppunnar 2008.

AÐFERÐ: Greiningin byggir á heilsu og lífstílskönnuninni „Heilsa og líðan" sem framkvæmd var af Lýðheilsustöð árin 2007 og 2009. Gagnasettið er lagskipt, handahófskennt úrtak 9.807 Íslendinga á aldrinum 18 til 79 ára. Svörun árið 2007 var 60,8%. Árið 2009 var svörunin 69,3% af þeim sem höfðu svarað árið 2007. Alls 42,1% af upprunalega úrtakinu tóku því þátt í könnuninni bæði árin. Línuleg aðhvarfsgreining var notuð til að meta tengslin milli atvinnumissis og þyngdarbreytinga. Auk þess var gerð miðlunargreining þar sem hlutverk andlegrar heilsu í sambandinu var skoðað. Greiningin samanstendur af mati á þremur líkönum.

NIÐURSTÖÐUR: Samkvæmt punktmati þyngjast karlar og konur minna í kjölfar atvinnumissis. Stuðlarnir við atvinnumissi voru tölfræðilega marktækir fyrir konur í líkani eitt annars voru þeir ekki tölfræðilega marktækir í neinu líkananna. Miðlunargreiningin sýnir ekki tengsl milli andlegrar heilsu og atvinnumissis.

UMRÆÐUR: Sambandið milli atvinnumissis og holdafars í kjölfar efnahagskreppunar var ekki í samræmi við væntingar. Niðurstöður allra þriggja líkananna voru ólíkar niðurstöðum fyrri rannsókna sem sýnt hafa fram á að atvinnumissir veldur aukningu á líkamsþyngd. Hugsanleg orsök óvæntra niðurstaðna er sú að þeim gögnum, sem hér eru notuð, var safnað í miklum efnahagslegum samdrætti og rannsóknir hafa sýnt að holdafar samfélags standi í neikvæðu sambandi við atvinnustig þess.

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1 Introduction

The main determinants of health include the social and economic environment, the physical environment, and the person's individual characteristics and behaviors (Lalonde, 1981; WHO, 2011). People can improve their health via healthy lifestyle but there are environmental components that can affect lifestyle choices, the economic environment for example. But why could job loss have an affect on body weight?

There are many hypotheses regarding the possible effects of recession and unemployment on health related activities and outcomes. First, in economic downturns the opportunity cost of leisure time decreases as individuals work less or become unemployed. As a consequence, more time can be spent on health-preserving activities. More time is available for cooking low-calorie quality meals at home and fewer visits are made to fast food restaurants. Also, there is more time to exercise and spend quality time with your family, which reduces body weight and gives a calm state of mind (Neumayer, 2004; Gerdtham & Ruhm, 2002).

Second, unemployment can be detrimental to the individual's standard of living and financial resources. Restricted financial resources may lead to either poor nutrition, that is if prices for healthy food (fruits, vegetables etc) are high or good nutrition, because unhealthy food and fast food is too expensive. So, the prices of food have an affect on people's choice whether to eat healthy or not. It may as well lead to restricted access to the gym and for necessary medical health care. Unemployed people do not only lose materially, they also potentially lose access to social networks, self-esteem, self-confidence, a scheduled life structure, a sense of identity and possibly a purpose for their lives. Deteriorating mental health, because of a job loss, may have an effect on body weight. Depressed individuals may not bother to cook and buy instead pre-cooked food or fast food or may not bother to eat at all (Economou, Nikolaou & Theodossiou, 2008; Neumayer, 2004; Montgomery, Cook, Bartley & Wadsworth, 1998).

Third, the stress, anxiety and psychological hardship connected to job loss or fear of job loss are detrimental to health as affected individuals resort to medication, alcohol and other drugs to alleviate their stress and hardship. Whilst individuals might resort to increased usage of tobacco, alcohol, medication and drugs in times of economic downturn, they might equally well resort to the same means of seeming relief to cope with job-related stress during periods of economic expansions (Montgomery et al., 1998; Neumayer, 2004). The problem is that the rate of obesity is on the rise and therefore necessary and interesting to research every factor contributing to a changed body weight, such as unemployment.

Obesity is one of the greatest public health challenges of the 21st century. Its prevalence has tripled in many countries of the WHO European Region since the 1980s, and the number of those affected continues to rise. The problem with obesity and overweight was once only considered a problem in wealthy countries but is now on the rise in low and middle income countries as well. This is due to a number of factors, including a global shift in diet towards increased energy, fat, salt and sugar intake, and a trend towards decreased physical activity due to the sedentary nature of modern work and transportation (WHO, 2007). Iceland is no exception to the rise in obesity. The Public Health Institute of Iceland reports marked increases in BMI. In 1990 the proportion of obese men was 7.2% but had increased to 18.7% by 2007. For women the proportion rose from 9.5% to 21.3% for the same period (Valdimarsdóttir et al., 2009). By using data from The Public Health Institute of Iceland the change in BMI can be calculated up till year 2009. The proportion of obese men rose 0.22% from 2007 to 2009 and 0.43% for women for the same time period. So the proportion of obesity from 1990 to 2009 is 11.72% for men and 12.23% for women. It should be noted that this calculation is not age adjusted therefore, this increase in obesity between 2007 and 2009 may in part be caused by the fact that the participants are two years older.

The health consequences of obesity are many and varied, in addition to causing various physical disabilities and psychological problems, excess weight drastically increases a person's risk of developing a number of noncommunicable diseases, including diabetes, cardiovascular diseases, musculoskeletal disorders and cancer. Of all illnesses, adult-onset diabetes is the most closely associated with obesity, with more than 50% of cases attributable to overweight. Research indicates that slimming to a healthy weight and maintaining it could prevent diabetes, cardiovascular diseases and some types of cancer (Colman, 2001; WHO, 2007).

The cost of obesity for societies is high, as the resulting disabilities and diseases create burdens for families and health systems, and will continue to rise with increased prevalence of obesity. The cost of obesity for a society is divided between direct and indirect costs. Direct costs are for example; personal health care, hospital care, physician services, and medications. Indirect costs involve lost productivity, such as absenteeism or obesity-related disabilities (WHO, 2007). Although obese individuals bear part of the cost themselves in the form of lower wages and lower employment levels, the cost is also substantial for a society since Western governments are responsible for a wide variety of income replacements (Ásgeirsdóttir, 2011). Studies indicate that the direct health-care cost of obesity and related

health problems constitutes about 2-6% of national health expenditures. The variation in these figures results mostly from different estimation methods, obesity definitions and different health-care systems (WHO, 2007; Wolf & Colditz, 1998).

The effect of economic status on health and lifestyle has been widely researched (Economou et al., 2008; Gerdtham & Ruhm, 2002; Gonzalez & Quast, 2009; Graham, Chang, & Evans, 1992; Kaestner & Xu, 2010; Neumayer, 2004; Ruhm, 2000, 2003, 2005; Ruhm & Black, 2001; Tapia Granados, 2005). Furthermore, the relationship between obesity and employment status has been viewed considerably, independent from economic status (Ásgeirsdóttir, 2011; Atella, Pace & Vuri, 2008; Averett & Korenman, 1996; Brunello & D'Hombres, 2007; Cawley, 2000, 2004; Cawley, Han & Norton, 2009; Greve, 2008; Johansson, Böckerman, Kiiskinen & Heliövaara, 2009; Morris, 2007; Pagan & Davila, 1997; Register & Williams, 1990; Sarlio-Lahteenkorva & Lahelma, 1999; Villar & Quintana-Domeque, 2009). This research is thus a part of two strands of literature. On one hand it relates to the relationship between body weight and labor-market outcomes, and on the other hand it sheds light on the mechanisms behind business cycle effects on health.

The question asked when examining the relationship between body weight and job loss is whether job-loss related differences in weight changes exist after controlling for traditional characteristics, such as age, education, number of children, marital status and differences in family income. Mental health is explored as a potential mediator of the relationship as job loss can notably affect psychological well being. The survey data used to find the effect of unemployment on body weight were collected by The Public Health Institute of Iceland in 2007 and 2009, providing measurements before and after the Icelandic economic collapse of 2008.

The existing literature is reviewed in the following section. Then in section three a description of the data used in this study is provided. Methods and results can be found in section four and five. Finally, in the last section concluding remarks and a discussion of the results can be found.

2 Literature Review

Job loss is an inevitable feature of a well-functioning market economy, but may have severe consequences for those losing their jobs. Among the adverse consequences are not only immediate and lasting earnings losses but as one of the more stressful life events, job loss is also believed to severly affect health. At the individual level, studies have particularly shown that unemployment is associated with deterioration of (mental) health (Korpi, 2001; Turner, 1995; Gallo, Bradley, Siegel & Kasl, 2000).

By using two longitudinal samples from America Burgard, Brand and House (2005) obtained results suggesting that, even after adjustment for extensive social background characteristics, mental ability, early career working conditions, and baseline health measures, involuntary job loss is associated with significant decline in overall self-rated health and worsening of depressive symptoms.

A comparative study of the relationship between unemployment and self-reported health in 23 European countries was made. The study found that the relationship between unemployment and health is consistent across all 23 European countries with the unemployed in each country reporting worse self-reported health than the employed. These results suggest that even though the levels of social protection offered to the unemployed vary by the institutional setting and welfare state regime, a relationship exists between unemployment and poorer self-rated health in all countries (Bambra & Eikemo, 2009).

Stronger evidence for the negative impact on health because of job loss comes from factory closure studies, because when an entire organization closes it is less likely that specific characteristics of a particular worker are responsible for the job loss. Beale and Nethercott (1985) used factory closure to examine the effect of job loss on health. The results show a significant increase in the number of times that both men and women employees consult their doctors when subjected to compulsory redundancy. This increase was both shown by their spouses and when all the individuals studied were integrated into their family units. An important finding was that the increase in morbidity began two years before redundancy, at the time when it became apparent to the employees that their economic futures were not secure. The results suggest that the threat of redundancy is a stress factor which is equal to, if not greater than, the actual event.

Researches that use aggregate unemployment to examine the relationship between unemployment and health show different results than research at the individual level. Those

results imply that health improves in a recession. Gerdtham & Ruhm (2002) used aggregated data to examine the relationship between macroeconomic conditions and fatalities for 23 OECD countries. Their result show that 1 percentage point decrease in the national unemployment rate is estimated to raise deaths from cardiovascular disease, influenza/pneumonia, liver disease, motor vehicle fatalities and other accidents by 0.4, 1.1, 1.8, 2.1 and 0.8%, respectively. These results lend support to the hypothesis that physical health deteriorates when labor-market conditions improve.

Ruhm (2003) examines how health status and medical-care utilization fluctuate with state macroeconomic conditions. His conclusion is that most aspects of health worsen when the economy temporarily improves. A 1 percentage point fall in aggregate unemployment is estimated to raise the prevalence of medical problems, acute morbidities, restricted-activity days, bed-days, ischemic heart disease, and intervertebral disk disorders by 1.5, 3.9, 1.2, 1.6, 4.3 and 8.7%, respectively. These results remain true even with the protective effect of higher incomes and possible increase in the use of medical care. It is worth mentioning that the positive health effects of economic contractions need not be restricted to or concentrated among those becoming newly unemployed. Instead, job loss could induce stress that counteracts other beneficial effects, raising the possibility that jobless individuals get sick even while average health improves. Similarly, there is no reason to believe that all facets of health respond in the same way. For instance, increased stress provides one reason why mental health might deteriorate despite gains in physical well-being (Ruhm, 2003). Charles and DeCicca (2008) found evidence of reduced mental health among African-American men and lower mental health among less educated males using aggregate data for unemployment.

The relation between unemployment and mortality has been the subject of several studies. The majority of these studies, where unemployment and health was investigated at the individual level, provided consistent evidence that unemployment has a positive effect on mortality rates, i.e. an increase in unemployment increases mortality. High unemployment rates not only threaten social and economic cohesion, through their negative financial consequences on individuals, but are also a risk factor for population health as this is reflected by mortality rates (Martikainen, Mäki & Jäntti, 2007; Voss, Nylén, Floderus, Diderichsen & Terry, 2004; Gerdtham & Johannesson, 2003).

Sullivan & Wachter (2009) researched the relationship between job displacement and mortality by using administrative data on employment histories for male workers from

Pennsylvania in the 1970s and 1980s. They found that job displacement increases mortality. Indeed, they found that for high-seniority male workers, mortality rates in the year after displacement were 50-100% higher than would otherwise have been expected. The estimated impact of displacement on annual mortality rates declined substantially over time, but appears to converge to a 10-15% increase in the annual death hazard rate. If such increases were sustained indefinitely, they would imply a loss in life expectancy of 1.0-1.5 years for a middle aged worker.

The relationship between unemployment and mortality was researched among Finnish men. The results show a relative excess mortality of unemployed men in Finland, which can not be fully explained by demographic, social and health variables preceding unemployment. The results also indicate that the effects of unemployment on mortality were even greater for long term unemployment (Martikainen, 1990). Moser, Fox & Jones (1984) found similar results for men in England and Whales.

Relative mortality in the period 1970-80 was studied among Danish men and women who were unemployed and employed on the day of the 1970 census. The results show a significantly increased death rate (40-50%) among the unemployed after adjusting for occupation, housing category, geographical region, and marital state. Analysis of five main causes of death showed increased mortality from all causes, but especially from suicide or accidents. In areas where the local unemployment rate was comparatively high the relative mortality among the unemployed was lower (Iversen, Andersen, Andersen, Christoffersen & Keiding, 1987).

A Swedish study examined the causal effect of job loss (as a consequence of an establishment closure) on overall and cause-specific mortality. The results show that overall mortality risk for men was increased by 44% during the first four years following job loss. No effect was found for women, in short or long run. The short-run excess mortality was mainly attributed to increased risk of suicides and alcohol-related causes of death. For both sexes, the increase in suicides was about twofold, while the increase in alcohol-related causes of death was somewhat less (Eliason & Storrie, 2007).

However, recently, using US data, Ruhm (2000, 2003) has shown that recessions are beneficial to population health since mortality rates decline with increasing unemployment rates. He argued that in recession health improves as individuals both improve their dietary habits and reduce lifestyle habits detrimental to health such as smoking and drinking. He

(among others) uses aggregate unemployment within the community to explore the relationship. The results are somewhat inconsistent with findings on the relation between employment status of individuals and mortality. His study documents a strong inverse relationship between within-state fluctuations in unemployment and most types of mortality. The preferred specifications suggest that a 1 percentage point rise in joblessness is associated with a 0.5% decrease in the total death rate.

The relationship between business cycle fluctuations and health in Canada has also been investigated. Ariizumi & Schirle (2011) suggest that the procyclical pattern in mortality rates is not consistent across countries, although, there is some procyclical pattern to the mortality rates of middle-aged Canadians. The affected age groups are different from the U.S., with individuals in their 30s most affected rather than individuals in their 20s. The results, however, do not contradict the suggestion by Ruhm (2000) and others that individuals tend to take on behaviours that are harmful to their health when economic conditions are good.

Researchers in Germany extended and improved upon Ruhm's (2000) original analysis and analysed the effect of unemployment and economic growth rates on mortality in the states of Germany over the period 1980-2000. They found consistent and robust evidence that recessions lower aggregate mortality rates for all age groups taken together as well as all specific age groups. All in all, this research found confirmation for Ruhm's general results for German states; recessions tend to lower mortality rates (Neumayer, 2004).

Economou et al. (2008) investigated the effects of national unemployment rates on overall age and cause-specific mortality rates in a panel sample of 13 European Union countries, to see if Ruhm's (2000) results can be replicated using European data. Unlike Ruhm's study for the USA, the results do not uncover a strong negative association between national unemployment rates and mortality levels. In contrast, the evidence appears to support the view that economic downturns harm the health for the European countries. However, the models that closely replicate Ruhm's study for Europe reveal a negative relationship between aggregate unemployment and mortality, although statistically insignificant in most cases. Importantly, the relationship in question reverses when additional demographics, health prevention and lifestyle factors are included in the regressions, indicating that short term economic fluctuations may affect health through their effect on lifestyle and other factors (Economou et al., 2008).

Similar relationships have been examined, based on weight condition. Researches show that economic status has an impact on weight. They show that people generally lose weight in economic downturns and gain weight during booms. Again this is inconsistent with studies that examine similar relationships at individual level where the results show that unemployed individuals are heavier than the employed.

Ruhm (2000) examines body weight in particular. His research shows that people are more likely to be in the ideal weight during recessions rather than in a boom. 1 percentage increase in aggregate unemployment causes the average BMI factor to decrease by 0.016 percentage points. 1 percentage increase in aggregate unemployment lowers the expected risk of being underweight, overweight and obese by 0.06, 0.17 and 0.21 percentage point, respectively. It is noteworthy that these results show that risk of obesity will reduce the most and the odds of being underweight will reduce as well, despite the reduction in mean BMI factor. The reasons which are most likely to explain these conclusions are that people have more time to exercise and cook more nutritious meals. Ruhm (2005) finds the same results, i.e. 1 percentage increase in aggregate unemployment reduces the odds of obesity by about 0.07 percentage points. Again, chances for weight loss are highest for people with severe obesity and relatively high risk of early death.

A British research investigated the relationship of individual unemployment with smoking, alcohol consumption and obesity in young British men between the ages of 16 and 33 years. Two unemployment variables were used; the first comprised the total number of months of unemployment and the second identified recent unemployment. The results imply that over three years of unemployment is associated with a fall in the BMI. Additionally, there was no clear evidence that unemployment of less than three years was associated with a low BMI. Futhermore, neither recent unemployment nor the amount of unemployment were significantly associated with a high BMI (Montgomery et al., 1998).

Individual unemployment and its association with health-relevant actions have been researched in Germany. German micro-census data was used to investigate the smoking behavior of unemployed individuals and their BMI. Results from an ordinary least squares regression shows that even when socioeconomic and demographic characteristics are being controlled for, unemployment is significantly related to a respondent's BMI. That is, being unemployed is associated with an increase of 0.37 BMI units compared to employed respondents. Respondents who are unemployed for 4 years or more show even stronger

relationship, were they have on average a BMI which is 0.36 units higher compared to the reference category (1-5 months of unemployment) (Schunck & Rogge, 2010).

A Finnish study was made to determine associations between lifestyle and five employment trajectories, i.e. stable, unstable, upward, downward and chronic unemployment. The changes in lifestyles were researched with a general linear model. The conclusion of the study shows that weight gain does not slow down during unemployment. However, when the labor market is deteriorating it involves a risk of weight gain in men. Furthermore, chronic unemployment causes weight gain for women (Virtanen et al., 2008).

Charles & DeCicca (2008) examined the relationship between local labor market conditions and several measures of health and health behaviors. They found evidence of procyclical relationship for weight-related health, i.e. worsening labor market conditions lead to weight gains.

Morris, Cook & Shaper (1992) assessed the effect of unemployment and early retirement on cigarette smoking, alcohol consumption, and body weight in middle aged British men. Loss of employment was not associated with increased smoking or drinking but was associated with an increased likelihood of gaining weight.

As can be seen from this extensive literature the BMI increases if unemployment at the individual level is used in a research, meanwhile BMI decreases when aggregate unemployment is used. Furthermore, unemployment and economic recessions have been researched individually but not combined. Overall, the literature suggests that while some individuals face hardships during recessions those effects on health are dwarfed by the effects of behavioural and other changes that are health improving when looking at the population as a whole. Therefore, lack of consensus as to the effects of economic activity on health and health behaviors warrants further studies that identify the causal mechanisms through which changes in economic activity may affect health and health behaviors. This research utilized individual data to investigate the relationship between BMI and job loss during recession.

3   Data

The analysis relies on a health and lifestyle survey "Heilsa og líðan" carried out by The Public Health Institute of Iceland in 2007 and 2009. The survey contained questions about health, illnesses, use of drugs, smoking and drinking, dental care, diet, height and weight, accidents, exercise, sleep, quality of life and other lifestyle related issues as well as demographics and work related factors such as income and employment. A stratified random sample of 9.807 Icelanders between the age of 18 and 79 was drawn and 9.711 individuals received the questionnaire in 2007. The 2009 version of the questionnaire was sent to all those that participated in the 2007 survey. The net-response rate in 2007 was 60.8%. In 2009 the response rate was 69.3%, which correspond to 42.1% of the original sample responded the questionnaires in both 2007 and 2009 (Jónsson, Guðlaugsson, Gylfason & Guðmundsdóttir, 2011). Summary statistics for variables used in the analysis can be found in table 1.

3.1   Description of variables

BMI:

Body weight was measured using the Body Mass Index (BMI), a crude measure of obesity in adults, a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is generally considered obese. A person with a BMI between 25 and 30 is considered overweight. Those with BMI below 18.5 are considered underweight, optimal BMI is considered to lie between 18.5 and 25. BMI provides a useful measure of overweight and obesity as it is the same for both sexes and for all ages of adults, it is easily obtained and thus available for use in large samples without considerable cost. However, it should be considered a rough guide as it does not take into account the different constitution of people. It does not, for example, identify the difference between muscle mass and fat, therefore, a slim, muscular person can be categorized as overweight according to the index (WHO, 2007). BMI was calculated for 2009 and 2007, BMI 2007 was subtracted from BMI 2009 and the difference used in the regressions. As can be seen from table 1, BMI increases between waves for both genders.

Job loss:

The variable job loss was collected from a question which was added to the 2009 survey, which stated whether people had lost their job following the economic crisis in October 2008. Job loss is a binary variable indicating whether a respondent lost a job during the economic crisis.

Background characteristics:

The control variables consist of questions about gender, age, marital status, number of children and birthyear of the youngest child. Gender is a binary variable indicating whether a respondent is male or female. Available answers for marital status were single, relationship, cohabiting, married, divorced or widowed. The relationship variable for 2007 is a dummy variable were married is used as a benchmark. The reason for using marital status from 2007 and not 2009 is to control for changes in marital status that can contribute to weight changes. More precisely, marital status from 2009 is not used because changes in marital status that occur alongside job loss can have greater effect on either weight gain or weight loss. Finally, the birthyear of the youngest child was used to find if a respondent had a child younger than four years old in either or both years. Dummy variables were created for the difference from 2009 to 2007 and used like that in the regression.

Education:

The educational variable was derived from questions about the highest level of educational degree each individual has completed. The available answers were finished elementary school, high school, vocational school or training, technical graduate degree, undergraduate degree, masters degree, PhD or other. Answers from 2009 are used in the regression rather than 2007 since education remains fairly stable for a period of two years. The response rate for education variable was increased by adding data from 2007 for those who did not answer in 2009. Dummy variables for education were used in the regression were the variable high school was used as a benchmark.

Family income:

Monthly family income was reported in fourteen categories in the survey. To make the family income variable continuous the median was found for each category. Data for family income in 2007 was set to 2009 price level by multiplying it by the inflation between 2007 and 2009 (Statice, n.d.). The difference for family income between 2009 and 2007 was found and the difference used in the regression. But since family income is measured in kr the effects on BMI changes will be very low. Therefore the variable was scaled to million kr.

Mental health:

The measurement for mental health was a four-level self-assessed health variable (SAH), where individuals estimated their own health ranging from "poor" mental health to "very good" mental health. The difference for mental health between 2009 and 2007 was found and mental health made as a binary variable indicating whether a respondent experienced a decline in mental health after the economic crisis or not.

Table 1: Summary Statistics

| | | 2007 | | | | | 2009 | | |
| | | Males | | Females | | | Males | | Females |
Variable	N	Mean (S.D.)	N	Mean (S.D.)	N	Mean (S.D.)	N	Mean (S.D.)
BMI	1.837	27.280 (3.748)	2.078	27.200 (5.210)	1.843	27.409 (3.782)	2.088	27.344 (5.241)
BMI<18.5 thin	1.837	0.002 (0.047)	2.078	0.005 (0.073)	1.843	0.003 (0.052)	2.088	0.005 (0.072)
18.5-25 BMI optimal	1.837	0.275 (0.447)	2.078	0.380 (0.486)	1.843	0.260 (0.439)	2.088	0.363 (0.481)
25-30 BMI overweight	1.837	0.517 (0.500)	2.078	0.363 (0.481)	1.843	0.530 (0.499)	2.088	0.377 (0.485)
BMI>30 obese	1.837	0.205 (0.404)	2.078	0.252 (0.434)	1.843	0.207 (0.405)	2.088	0.255 (0.436)
Age	1.899	54.742 (15.532)	2.174	51.829 (16.573)	1.903	56.724 (15.549)	2.179	53.820 (16.587)
1 if lost a job					1.525	0.050 (0.219)	1.664	0.043 (0.202)
Elementary school					1.684	0.095 (0.293)	2.139	0.217 (0.413)
High school					1.684	0.058 (0.234)	2.139	0.082 (0.275)
Vocational school					1.684	0.119 (0.324)	2.139	0.021 (0.142)
Tech. grad.					1.684	0.030 (0.171)	2.139	0.008 (0.091)
Undergrad.					1.684	0.095 (0.293)	2.139	0.194 (0.396)
Masters					1.684	0.072 (0.258)	2.139	0.057 (0.229)
Ph.D					1.684	0.011 (0.103)	2.139	0.006 (0.075)
Number of children	1.896	2.570 (1.636)	2.170	2.546 (1.624)	1.902	2.619 (1.612)	2.175	2.589 (1.565)
Youngest child	1.606	23.613 (13.726)	1.900	23.339 (14.440)	1.629	25.191 (14.137)	1.933	24.733 (15.056)
1 if single	1.900	0.096 (0.295)	2.173	0.097 (0.296)	1.865	0.087 (0.282)	2.134	0.086 (0.281)
1 if relationship	1.900	0.034 (0.180)	2.173	0.040 (0.196)	1.865	0.036 (0.187)	2.134	0.043 (0.203)
1 if cohabiting	1.900	0.131 (0.337)	2.173	0.151 (0.359)	1.865	0.117 (0.322)	2.134	0.138 (0.345)
1 if married	1.900	0.678 (0.467)	2.173	0.576 (0.494)	1.865	0.689 (0.463)	2.134	0.579 (0.494)
1 if divorced	1.900	0.045 (0.208)	2.173	0.065 (0.247)	1.865	0.051 (0.220)	2.134	0.071 (0.256)
1 if widowed	1.900	0.026 (0.159)	2.173	0.081 (0.272)	1.865	0.029 (0.169)	2.134	0.093 (0.291)

Family income	1.774	491.163	1.952	436.835	1.773	507.870	1.951	440.299
		(343.714)		(334.324)		(353.137)		(339.254)
Very good mental health	1.871	0.358 (0.479)	2.159	0.341 (0.474)	1.863	0.348 (0.476)	2.142	0.321 (0.467)
Good mental health	1.871	0.466 (0.499)	2.159	0.486 (0.500)	1.863	0.458 (0.498)	2.142	0.501 (0.500)
Fair mental health	1.871	0.159 (0.366)	2.159	0.154 (0.361)	1.863	0.177 (0.382)	2.142	0.161 (0.368)
Poor mental health	1.871	0.017 (0.128)	2.159	0.019 (0.135)	1.863	0.016 (0.124)	2.142	0.016 (0.127)
Differences (2009-2007)								
BMI changes					1.804	0.126 (1.408)	2.034	0.169 (1.869)
Changes in family income:								
More family income					1.270	0.198 (0.399)	1.373	0.175 (0.379)
Less family income					1.270	0.368 (0.482)	1.373	0.393 (0.489)
Same family income					1.270	0.434 (0.496	1.373	0.432 (0.496)
Changes in youngest child:								
Child under 4 '09					1.610	0.014 (0.119)	1.904	0.016 (0.127)
Child under 4 '07					1.610	0.037 (0.189)	1.904	0.040 (0.197)
Child under 4 '07 & '09					1.610	0.067 (0.249)	1.904	0.093 (0.289)
No child under 4 '07 & '09					1.610	0.882 (0.323)	1.904	0.852 (0.356)

4   Methods

Three models are estimated in this paper. The dependent variable is weight changes between waves in all cases. The first model contains the job loss variable, age, age squared, education, marital status, number of children and children under four years. The second model is based on model one but includes the difference in family income. At last, in model three, a mediation analysis is conducted to find the mediation effect of worse mental health. All three models are estimated with linear regression models using the statistical software Stata 11.0 (StataCorp, 2009). Since both weight management and labor-market behavior differ substantially between men and women, all estimations are separated by gender (Atella et al., 2008; Ásgeirsdóttir, 2011; Greve, 2008; Lundborg, Bolin Höjgård & Lindgren, 2007). All model estimations are presented side by side for comparison in tables 2 and 3 for men and women, respectively.

Sample weights are applied to all estimations because the sample is not completely random. It consists of relatively older individuals than the population census and relatively more people that live outside the capital region due to oversampling in those groups. Therefore, all the regressions are weighted with consideration to sampling method and attrition.

The relationship between job loss and BMI changes is assumed to be of the following form:

$$\Delta BMI_i = \beta U_i + \alpha X_i + \varepsilon_i$$

ΔBMI_i is a vector of the differences in individual's BMI between years. β is a scalar of the coefficient associated with U_i, but U_i is an indicator variable measuring the probability for individual i of having lost a job following the economic crisis. α is a vector of parameters, X_i is a matrix of the individual's background characteristics; age, age squared, gender, education 2009, marital status from 2007, number of children, number of children under four years old, differences in family income and mental health. All these variables are included based on theory and customary practice, except for family income and mental health. The X_i matrix has different background characteristics in each of the three models. Finally, ε_i is the individual specific error term.

The mediation model is estimated to possibly identify and explicate the mechanism that underlies the relationship between job loss and body weight changes by including a third explanatory variable, worse mental health (the mediator variable). The mediational model

hypothesizes that job loss causes a change in the mediator variable (in this case worse mental health), which in turn causes changes in BMI. The variable worse mental health, then, serves to clarify the nature of the relationship between BMI changes and job loss (MacKinnon, 2008). For regression of model three, model one is used as a benchmark and then worse mental health is added to the regression to see the effect of worse mental health as a mediator.

5   Results

Multicollinearity was checked by calculating the variance inflation factor (VIF). VIF measures the impact of collinearity among the X's in a regression model on the precision of estimation. It expresses the degree to which collinearity among the predictors degrades the precision of an estimate. VIF is defined as; $VIF(\beta_j)=1/(1-R_j^2)$, j=1,…,p, where p is the number of predictor variables. Generally a VIF value greater than 10 is of concern (Heij, Boer, Franses, Kloek & Dijk, 2004). It is evident that multicollinearity exists between age and its squared term, were the value of VIF ranged from 77 to 86. All other variables have VIF value under the suggested limits of 10, with the highest value being 1.92 for the dummy variables children under four years in both years and undergraduate degree. So there is no severe multicollinearity in the model except for the variables that enter the model as second order polynomials, which is normal. The results for the VIF test can be found in Appendix A.

The Breusch-Pagan/Cook-Weisberg test is a good way to test for heteroskedasticity. It tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. Since sampling weights are used in this analysis it is no longer possible to use Breusch-Pagan/Cook-Weisberg test to test for heteroskedasticity. By applying sampling weights to an analysis it automatically corrects for heteroskedasticity by applying robust errors associated with the marginal effects. The error term was graphed to make sure there was no heteroskedasticity. The inspection of the error term did not reveal anything abnormal (Heij et al., 2004).

The first model estimates the effect of job loss, age, age squared, number of children, education, marital status and children less than four years of age on BMI changes. An investigation of the results reveals a relationship between job loss and lowered body weight for both genders. As noted before, the summary statistics for BMI (in table 1) reveal an increase in BMI between waves for both men and women. Therefore, these results imply that the experience of job loss slows down weight gain. Point estimates indicate that women who experience job loss have a less BMI increase by 0.47 points than their counterparts. That reflects a weight differential of 1.30 kg for women at the mean height of 1.67 meters. For men, the point estimates indicate that job loss is associated with a less BMI increase by 0.23 points than their counterparts. That equates to a weight differential of 0.73 kg for men at the mean height of 1.80 meters. The p-value for job loss for women is statistically significant at 5%. This is not true for men, but even tough the p-value for job loss is not statistically

significant it is rather low. Results for all three models are in table 2 for men and table 3 women.

BMI changes do not vary much with age. Age does show a small decrease in the BMI increase for both genders. The differential is 0.09 kg for women and 0.33 kg for men. Age is statistically significant for men at 5% but not statistically significant for women.

The education variable indicates that women with high education are more likely to gain less weight in the event of job loss than the benchmark, high school, and those with less education than the benchmark are more likely to gain more weight. The educational levels that are most significant with a less BMI increase for women are; PhD, undergraduate degree and technical graduate degree which accounts for 1.57 kg, 0.47 kg and 1.92 kg decrease in the BMI increase, respectively. The p-values for those variables are all quite low but are not statistically significant except for PhD which is statistically significant at the 5% level. For men it is only masters and undergraduate degree that are associated with a decrease in the BMI increase, suggesting that high education does slow down weight gain, but not higher than masters. PhD, undergraduate degree, vocational school and elementary school coefficients have the lowest p-value of all educational variables for men, though not statistically significant, and the most weight differential. Those four variables account for 0.88 kg, -0.77 kg, 0.47 kg and 0.63 kg differential in BMI, respectively.

The number of children variable is not statistically significant for either gender, but the p-value is quite low. So one could speculate that there is a relationship between the number of children an individual has and his body weight. An increase in the number of children raises the BMI increase for both genders or 0.20 kg differential for both women and men.

It is interesting to see that if a woman has a child under four years in 2007, 2009 or both years it will reduce the BMI increase but the opposite is true for men (although not for 2007). For women, having a child under four years in 2007 reduces body weight increase by 0.81 kg, 0.26 kg if owns a child under four years in 2009 and 1.09 kg if owns a child under four years in both years. For men it reflects a differential in body weight by -0.33 kg, 1.29 kg and 0.61 kg, respectively. It is evident that it is necessary to control for these variables in the regression, especially for females, due to the effects that children have on labor-market behavior as well as weight. Further evidence of this can be found in Appendix B.

Women who are single, cohabiting or widowed have a higher BMI increase in the event of job loss by 0.22, 0.10 and 0.05 points, respectively, rather than the benchmark, that is those who are married. That amounts to 0.61 kg, 0.28 kg and 0.14 kg differential in body weight, respectively. Meanwhile, women who are in a relationship or divorced experience a less BMI increase in the event of job loss, as apposed to married women. The differential in BMI amounts to 1.48 kg and 0.31 kg, respectively. None of the p-values for marital status is statistically significant for women, but the p-value for relationship is quite low. Men who are single, divorced or widowed and experience job loss have higher BMI increase than those who are married. This reflects a differential of 0.29 kg, 1.10 kg and 0.39 kg, respectively. Being in a relationship or cohabiting causes a decrease in the BMI increase for men in the event of job loss rather than for married men. The differential in body weight is 2.11 kg and 0.81 kg, respectively. None of the coefficients are statistically significant but the p-values for relationship, cohabiting and divorced are quite low. It seems it does matter for body weight changes whether a man is alone or with a partner. Because men who are alone (single, divorced or widowed) experience a higher increase in body weight, meanwhile men who have a partner (in a relationship or cohabiting) experience a less increase in body weight.

In the second model, the differences in family income between 2009 and 2007 are added to the regression. Family income does have great effect on BMI change for men and it is statistically significant. For women, on the other hand, the effects are very small and the p-value is very high which indicates that there is a minimum relationship between family income and BMI changes for women. A million kr increase in family income increases the BMI increase by 0.74 points for men. That is equal to 2.39 kg weight differential. For women, a million kr increase in family income is associated with a very small increase in BMI change by 0.03 points or 0.07 kg.

The results from model one is used as a benchmark for the mediation analysis and then worse mental health is added to the model to find the mediation affect of worse mental health on BMI changes. For men, the coefficient for job loss in model one is -0.2262284 (0.73 kg) and increases to -0.2363217 (0.77 kg) in the mediation model. The difference is therefore -0.0100933 (-0.04 kg). For women, the coefficient for job loss was -0.4661774 (1.30 kg) in model one and decreases to -0.4534826 (1.26 kg) in the mediation model. The difference is 0.0126948 (0.04 kg). As can be seen the coefficients for job loss remain fairly constant through the mediation analysis. Therefore, in both cases the variability in the job loss coefficient is not explainable through the decline in mental health. Even tough the effects of worse mental health as a mediator are not very great other mediator variables might show larger effects.

Table 2: linear regressions and mediation analysis for men

Dependent variable: BMI changes	Model one			Model two			Model three		
	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S. E.	P>|t|
1 if lost a job	-0.226	0.214	0.290	-0.180	0.210	0.392	-0.236	0.213	0.267
Age	-0.102	0.048	0.034	-0.085	0.048	0.077	-0.104	0.048	0.031
Age squared	0.001	0.0004	0.045	0.001	0.0004	0.101	0.001	0.0004	0.039
1 if PhD	0.273	0.212	0.198	0.227	0.221	0.305	0.285	0.219	0.194
1 if masters	-0.135	0.173	0.436	-0.120	0.170	0.481	-0.129	0.175	0.460
1 if undergraduate	-0.237	0.150	0.114	-0.218	0.153	0.154	-0.236	0.151	0.118
1 if technical grad.	0.170	0.229	0.459	0.252	0.231	0.277	0.185	0.231	0.423
1 if vocational sch.	0.146	0.127	0.251	0.192	0.131	0.143	0.174	0.129	0.177
1 if elementary sch.	0.193	0.156	0.217	0.259	0.159	0.103	0.231	0.159	0.146
Number of children	0.063	0.041	0.125	0.071	0.042	0.091	0.065	0.041	0.119
Child under 4 '09	0.398	0.299	0.184	0.447	0.309	0.149	0.331	0.301	0.272
Child under 4 '07	-0.103	0.262	0.693	-0.115	0.259	0.656	-0.096	0.259	0.713
Child under 4 ' 09 & '07	0.188	0.224	0.401	0.192	0.228	0.401	0.182	0.225	0.419
1 if single	0.097	0.384	0.800	0.227	0.340	0.433	0.157	0.387	0.685
1 if relationship	-0.653	0.579	0.260	-0.342	0.609	0.574	-0.705	0.612	0.250
1 if cohabiting	-0.251	0.156	0.107	-0.252	0.152	0.098	-0.264	0.157	0.093
1 if divorced	0.339	0.276	0.220	0.300	0.274	0.274	0.355	0.294	0.227
1 if widowed	0.120	0.316	0.705	-0.056	0.306	0.856	0.112	0.318	0.724
Family income				0.736	0.207	0.000			
1 if worse mental health							-0.178	0.116	0.124
N		1.211			1.133			1.172	
R-squared		0.0466			0.0696			0.0506	

Benchmark for education is finishing high school, benchmark for children under four is having no children under four in both years and benchmark for marital status is being married. Family income is scaled down by 1.000.000 kr.

Table 3: Linear regressions and mediation analysis for women

Dependent variable: BMI changes	Model one			Model two			Model three		
	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S. E.	P>|t|
1 if lost a job	-0.466	0.211	0.028	-0.522	0.232	0.025	-0.453	0.209	0.030
Age	-0.035	0.038	0.361	-0.056	0.040	0.162	-0.032	0.039	0.410
Age squared	0.0001	0.0004	0.760	0.0003	0.0004	0.399	0.0001	0.0004	0.856
1 if PhD	-0.562	0.256	0.028	-0.558	0.257	0.030	-0.630	0.267	0.019
1 if masters	0.019	0.203	0.927	0.039	0.210	0.854	-0.042	0.202	0.836
1 if undergraduate	-0.170	0.157	0.278	-0.162	0.167	0.332	-0.234	0.155	0.130
1 if technical grad.	-0.690	0.946	0.466	-0.640	0.947	0.499	-0.735	0.946	0.437
1 if vocational sch.	0.097	0.362	0.789	0.176	0.384	0.648	0.042	0.371	0.910
1 if elementary sch.	0.044	0.150	0.771	0.036	0.163	0.824	-0.002	0.146	0.990
Number of children	0.070	0.051	0.170	0.072	0.056	0.199	0.076	0.052	0.148
Child under 4 '09	-0.095	0.400	0.813	-0.238	0.414	0.566	-0.101	0.405	0.803
Child under 4 '07	-0.289	0.283	0.308	-0.379	0.293	0.197	-0.236	0.285	0.407
Child under 4 ' 09 & '07	-0.389	0.243	0.110	-0.431	0.257	0.094	-0.391	0.246	0.111
1 if single	0.219	0.261	0.401	0.168	0.277	0.544	0.222	0.270	0.409
1 if relationship	-0.520	0.333	0.119	-0.352	0.347	0.310	-0.539	0.328	0.101
1 if cohabiting	0.101	0.162	0.533	0.072	0.173	0.677	0.078	0.163	0.633
1 if divorced	-0.149	0.256	0.562	-0.257	0.267	0.337	-0.165	0.254	0.517
1 if widowed	0.044	0.223	0.842	0.068	0.243	0.781	0.102	0.228	0.654
Family income				0.026	0.223	0.907			
1 if worse mental health							-0.214	0.145	0.141
N		1.352			1.192			1.326	
R-squared		0.0235			0.0239			0.0273	

Benchmark for education is finishing high school, benchmark for children under four is having no children under four in both years and benchmark for marital status is being married. Family income is scaled down by 1.000.000 kr.

6 Discussion

The current study has examined the relationship between unemployment and body weight in Iceland. The data used originates from a health and lifestyle survey carried out by The Public Health Institute of Iceland, in 2007 and 2009. The main results suggest that there is a relationship between job loss and BMI change for Icelandic men and women. As can be seen in model one the experience of job loss slows down weight gain for both males and females. The second model shows that family income does have great effects on a higher BMI increase for men and is statistically significant. Meanwhile, family income has close to zero effect on BMI change for women. These results suggest that there is a positive relationship between income and high calorie food consumption, at least for men.

The mediation analysis of worse mental health does not show a relationship between worse mental health and job loss. That is the variability in the job loss coefficient is not explainable through the decline in mental health for both genders. This is inconsistent with results from other studies that use unemployment at the individual level because they have shown that unemployment is associated with deterioration in mental health. Even though there is not a relationship between worse mental health and job loss there is an association between recession and worse mental health. Mental health does decline a little during the recession as can be seen from table 1. Wich is consistent with Ruhm's (2003) hypothesis that increased stress because of a recession is one reason why mental health might deteriorate despite gains in physical well-being. Further research is needed to examine other mediators, for example, prices of food, exercise, diet etc.

All three models show a less BMI increase in the event of job loss which is inconsistent with results from other studies. Other studies, when using individual data, imply that job loss is associated with a higher BMI. It is interesting to see why job loss is causing less BMI increase. The reason for this difference may be explained by the lower opportunity cost of leisure time during unemployment. Then more time can be spent exercising and cooking nutritious meals. It can also be explained by the restricted financial resources which may lead to healthy food consumption because unhealthy food and fast food is too expensive. Price of healthy food might be the explanation in the case of Iceland because even tough healthy food is quite expensive fast food is even more expensive.

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Appendix A

Table 4: VIF

	VIF
1 if lost a job	1.02
Age	86.48
Age squared	77.70
Gender	1.24
1 if single	1.07
1 if relationship	1.02
1 if cohabiting	1.26
1 if divorced	1.04
1 if widowed	1.14
Number of children	1.26
1 if child under 4 in '07	1.25
1 if child under 4 in '09	1.16
1 if child under 4 in '07 & '09	1.92
1 if elementary school	1.73
1 if vocational school	1.61
1 if technical graduate degree	1.12
1 if undergraduate degree	1.92
1 if masters	1.25
1 if PhD	1.03
1 if more family income	1.24
1 if worse mental health	1.02
Mean VIF	8.95

Appendix B

By doing a mediation analysis of children under four years it is easy to see the effect it has on BMI changes. The benchmark model for the mediation analysis is model four, which is model one except for the variable number of children under four years. Then number of children under four years is added to the model to find the mediation affect of the variable on BMI changes.

For men, the coefficient for job loss in model four is -0.317993 (1.03 kg) and decreases to -0.2262284 (0.73 kg) in the mediation model. The difference is therefore 0.0917709 (0.30 kg). This means that number of children under four years causes this decrease in BMI change but not job loss so by including the number of children under four years in the regression job loss has lower effect on BMI changes.

For women, the coefficient for job loss was -0.0618738 (0.17 kg) in model four and rises to -0.4661774 (1.30 kg) in the mediation model. The difference is -0.4043036 (-1.13 kg), which means that number of children under four years increases the effects of job loss on lowering BMI. That means that women who have children under four years after job loss lose more weight than women who have no children under four years in the event of a job loss. The results for the mediation analysis can be found in table 5.

Table 5: Mediation analysis for number of children under four years

Dependent variable: BMI changes	Model four Males			Mediation analysis Males			Model four Females			Mediation analysis Females		
	dy/dx	Robust S. E.	P>|t|	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S.E.	P>|t|	dy/dx	Robust S. E.	P>|t|
1 if lost a job	-0.318	0.244	0.192	-0.226	0.214	0.290	-0.062	0.221	0.779	-0.466	0.211	0.028
Age	-0.070	0.024	0.003	-0.102	0.048	0.034	0.025	0.027	0.356	-0.035	0.038	0.361
Age squared	0.001	0.0002	0.013	0.001	0.0004	0.045	-0.0004	0.0003	0.168	0.0001	0.0004	0.760
1 if PhD	0.084	0.207	0.686	0.273	0.212	0.198	0.127	0.453	0.779	-0.562	0.256	0.028
1 if masters	-0.349	0.181	0.054	-0.135	0.173	0.436	-0.221	0.227	0.331	0.019	0.203	0.927
1 if undergraduate	-0.342	0.167	0.041	-0.237	0.150	0.114	-0.066	0.150	0.659	-0.170	0.157	0.278
1 if technical grad.	-0.191	0.213	0.371	0.170	0.229	0.459	-0.272	0.796	0.732	-0.690	0.946	0.466
1 if vocational sch.	-0.0005	0.125	0.997	0.146	0.127	0.251	0.080	0.326	0.807	0.097	0.362	0.789
1 if elementary sch.	0.119	0.160	0.456	0.193	0.156	0.217	0.065	0.149	0.661	0.044	0.150	0.771
Number of children	0.029	0.038	0.444	0.063	0.041	0.125	0.035	0.048	0.470	0.070	0.051	0.170
1 if single	-0.121	0.182	0.506	0.097	0.384	0.800	0.263	0.227	0.246	0.219	0.261	0.401
1 if relationship	-0.026	0.265	0.922	-0.653	0.579	0.260	0.132	0.276	0.631	-0.520	0.333	0.119
1 if cohabiting	-0.259	0.142	0.067	-0.251	0.156	0.107	0.182	0.162	0.260	0.101	0.162	0.533
1 if divorced	0.261	0.259	0.314	0.339	0.276	0.220	-0.099	0.263	0.708	-0.149	0.256	0.562
1 if widowed	0.095	0.288	0.741	0.120	0.316	0.705	0.042	0.216	0.847	0.044	0.223	0.842
Child under 4 '09				0.398	0.299	0.184				-0.095	0.400	0.813
Child under 4 '07				-0.103	0.262	0.693				-0.289	0.283	0.308
Child under 4 ' 09 & '07				0.188	0.224	0.401				-0.389	0.243	0.110
N	1.448			1.211			1.576			1.352		
R-squared	0.0546			0.0466			0.0102			0.0235		

Benchmark for education is finishing high school, benchmark for children under four is having no children under four in both years and benchmark for marital status is being married.