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The impact of body size on employment in Australia

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Certificate of Originality

I hereby declare that this submission is my own work and that, to the best of my knowledge and confidence, it contains no material previously published or written by another person nor material which to a substantial extent has been submitted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

Kang Hyun Yoon

Disclaimers

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR).

The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the MIAESR.

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Introduction

This paper re-examines the impact of two size aspects (i.e. height and weight) on the Australian workers; whether an assessment shows that obesity and height can influence the employment probabilities of Australia's workers. A univariate probit model is adopted to analyse the impact of body size by using the household-based panel study; the Household, Income and Labour Dynamics in Australia (HILDA) Survey, which consists of information about economic and subjective well-being, labour market dynamics and family dynamics in Australia.

In this paper, there will be 4 different specifications that are estimated separately for male and female: the relationship between Height and Employment, the relationship between BMI categories and Employment, the relationship between BMI scores and Employment, and the relationship between BMI scores & Height, and Employment. There are two simulations: before controlling for health status and after controlling for health status. The former does not control for an ill-health problem due to obesity whereas the latter one does. Simulation results show that (a) height has a positive but has a statistically insignificant effect on employment (b) overweight male workers have some advantage on employment (c) non-normal weight female workers have a lower employment probability (d) we can see that higher BMI scores seem to give more employment probabilities for male workers while female workers with higher BMI scores would be disadvantaged.

From the news article from Sydney Morning Herald[1], we found some interesting relationships between body size and wages from the research done in Leigh and Kortt (2009). There is a height premium with an additional 10 cm of height being associated with a 3% increase in hourly wages for men[2]. Interestingly, there is no relationship between weight and wages.

[1] Ellie Harvey, "It pays to be tall, but weight is no earning barrier, study reveals"
[2] Leigh and Kortt (2009)

With these fascinating results, we also come up with a new question. Would there be any relationship between body size and employment? If you are taller, would you have more chance of being employed? If you are obese, what is going to happen to your job?

Our study is aiming to measure the impact of body size on employment in order to find the precise influence of body size on the Australian workers' earnings. As far as we know, there is no past study of the relationship between body size and employment in Australia.

The following paper has been written at an advanced level within this field, it requires a sound understanding of the health economics and other economic materials, in order to be digested. This paper has explained the model and data, outcomes, and made a few critical discussions.

Literature Review

Obesity is one of the imminent health problems. According to WHO (1998), obesity is a rapidly growing health problem that affects an increasing number of countries worldwide. Thus, there are many papers defining the relationship between obesity and some socioeconomic variables.

As obesity is a major concern worldwide, many countries have done empirical studies on the relationship between hourly wage and BMI. Recent literature has studied the relationship between wages and two aspects of body size (i.e. BMI and Height) found by Leigh and Kortt (2009). It is the first time that body size and hourly wage rate relationships have been estimated in Australia.[3] Their study suggests that there is no relationship between weight and wages, even though they expected some penalty for being overweight or obese. There are height premiums for men and women (statistically insignificant).

[3] Leigh and Kortt (2009)

However, would an individual's earnings only be affected by a change in dollar amount of hourly wage? Income can be influenced by many factors, not just hourly wage rate. What about employment probabilities? If there is a negative impact of obesity on employment, it will also lower earnings even though higher BMI does not decrease hourly wages. For example, obesity could cause a worker; to have a non-attractive appearance or to have an ill-health problem due to obesity, which might lead them to earn lower wages.

Thus, this paper initiated this study to measure the impact of obesity and height on employment in order to find the precise influence of obesity on the Australian's earnings. For the analysis of size aspects on employment, we need to use a probit model. It can have only two binary outcomes which we will denote as 1 and 0.

There are many empirical studies which found that body size is influential on an individual's employment. For example, Johansson et al. (2007)[4] found the relationship between overweight and wages, using indicators of individual body composition other than BMI: body fat weight and waist circumference. The study is based on the Health 2000 population survey dataset. This dataset has been collected in order to give a comprehensive overview of the health and functional ability of the Finnish population. In their empirical research, they have limited the focus to individuals between 30 and 65, working full time, and are wage and salary earners. In this study, they assumed that a full-time worker works at least 30 hours per week.

In this study, they applied univariate probit models to find impacts of body size on employment probabilities for women and men. For females, the overall picture is that all measures of fatness or weight have a negative impact on employment probability. For men, the situation is noticeably different from the former case – all measure of weight or fatness seems considerably less significant for men than for women. Indeed, the only thing that matters except for height is fat weight, which has a negative and statistically significant effect on employment probability. A possible explanation of this is that fat

[4] Johansson & Böckerman & Kiiskinen & Heliövaara (2009), "Obesity and labour market success in Finland: The difference between having a high BMI and being fat," *Economics and Human Biology*, Elsevier, vol. 7(1), pages 36-45, March

weight is the measure which is strongly correlated with ill health after controlling for height, and ill health is negatively associated with employment probabilities.

Lastly, Morris (2007)[5] examines the impact of obesity on employment by using 3 approaches: a univariate probit model, propensity score matching, and IV regression using a recursive bivariate probit model. The study applied these models to the pooled dataset collected from two rounds (1997 &1998) of the Health Survey for England.

The findings show that obesity is statistically significant and has a negative impact on employment in both males and females. In males, the endogeneity of obesity is not statistically significant and it does not affect employment much. In females, the endogeneity of obesity has not taken into account and it will lead to underestimation of the negative impact of obesity on employment.

Methodology

In this paper, the study is examining the potential impact of body size on employment in Australia. In order to do this, the univariate probit model will be used. Our proposed model is:

$$Y_i = \alpha + \beta_1 H_i + \beta_2 BMI_i + \beta_3 X_i + \beta_4 S_i + \varepsilon_i \qquad (1)$$

Where: Y: *employment variable*

ε: *an error term*

H: *the height of an individual*

BMI: *Body Mass Index of an individual*

X: *Exogenous demographic controls*

S: *Health status controls*

[5] Morris (2007), "The impact of obesity on employment," *Labour Economics*, Elsevier, vol. 14(3), pages 413-433, June

As we can see from equation (1), Y is a binary variable which indicates whether an individual is employed or not: where the response variable takes 1 if the individual is employed and 0 otherwise. Where ε is an error term, H is the height measure for each individual (i), BMI is the body mass index. X is a vector of exogenous demographic controls such as: age, age2, born overseas, Indigenous, father's occupational status, work experience, education, and a wave indicator. Lastly, S is a vector of health status controls: physical functioning, role physical, bodily pain, and general health.

The coefficients from the univariate probit model are difficult to interpret because they measure the change in the unobservable Y_i associated with a change in one of the explanatory variables. A more useful measure is what we call the marginal effects (2).

$$ME = \frac{\partial P(Y_i)}{\partial x_{ji}} = \frac{\partial \Phi(\alpha + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \varepsilon_i)}{\partial x_{ji}} \quad (2)$$

Where: Φ' is the cumulative distribution function(cdf) of a standard normal random variable

$$= \Phi'(\alpha + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \varepsilon_i)\beta_j$$

x_{1i}: corresponds to H_i

x_{2i}: corresponds to BMI_i

x_{3i}: corresponds to X_i

x_{4i}: corresponds to S_i

The univariate probit model is most popular specification for a binary response model which could be appropriate to use if we can assume there is no correlation between the error terms in size variables and employment. In this study, we use a univariate probit model and assume that there is no correlation between error terms in dependent and independent variables.

In Morris (2007), the paper pointed out that univariate probit model is only appropriate to use when the independent variables (i.e. Height, obesity, and BMI) conditional on the covariates are independent of employment (i.e. independent variables do not depend on employment). If this assumption does hold and independent variables are endogenous then the conditional independence assumption is violated and the univariate probit model is biased and an unreliable estimate of the causal effect of size on employment.

Hence, Morris (2007) also applied the bivariate probit model to overcome this setback. The bivariate probit model is appropriate to adopt when the conditional independence assumption is violated. In this paper, he found that the prevalence of obesity has a positive and insignificant effect on employment in males and a negative and significant effect in females. This implies that the bivariate model could overcome this specification bias and it is an appropriate probit model to compute estimates in females.

Data

This study is based on the HILDA dataset the household-based panel study; the Household, Income and Labour Dynamics in Australia (HILDA) Survey, which consists of information about economic and subjective well–being, labour market dynamics and family dynamics in Australia. HILDA is the largest survey dataset available in Australia which includes broad information on standard health measures and also contains broad information of both employed and unemployed individuals, which provides us with an opportunity to examine the impact of body size on employment. This is why we make use of this distinctive dataset for this study.

Mostly, for the categorical measure of BMI in the previous research, indicator variables were included for underweight ($BMI < 18.5$), overweight ($25 \leq BMI < 30$), and obese ($BMI \geq 30$)

In this study, we restrict our sample to respondents aged 25-54, dropping those respondents who are not employed, self-employed, enrolled in full-time degree, or who did not answer the SF-36 health survey. We also drop pregnant women from the sample. Wage observations below half the federal minimum wage (i.e. $6.35) are dropped, since we regard these as questionably low. Our sample will be based on respondents in the 2006 and 2007 waves of the HILDA survey, because they are the only waves to have collected self-reported height and weight data.

In this paper, we also control for past job experience, education, and father's occupational status when a respondent was 14. We assigned the number of the highest year of completed schooling depends on their qualifications: masters/doctorate = 17 years; graduate diploma/certificate = 16 years; bachelor degree = 15 years; diploma = 12 years; certificate& year 12 = 12 years; and year 11 = 11 years[6]. For the years spent in paid work, they are also collected from the HILDA dataset.

As we can see from Table I, we report the summary statistics for the 7105 samples in total. In our sample, 58.8% are overweight or obese. The height of the tallest person in our sample is 213cm whereas the shortest is 123cm. For the weight samples; the heaviest is 220kg whereas the lightest is 28kg. The average body size is: 170.6cm of height and 78.43kg of weight. The average BMI is 26.88, which implies that persons in our sample are overweight in general.

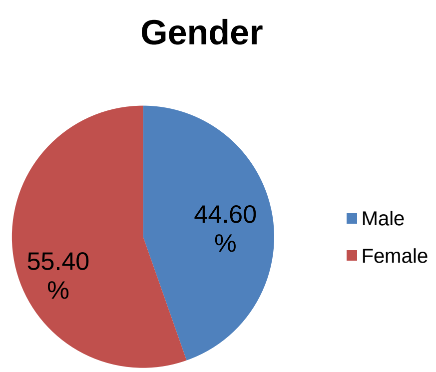
In Table II, we report the summary statistics for the 3169 males in our sample. In our sample, 67.4% are overweight or obese. The height of the tallest male in our sample is 213cm whereas the shortest is 140cm. For the weight samples; the heaviest is 220kg whereas the lightest is 40kg. The average body size is: 178.3cm of height and 86.58kg of weight. The average BMI is 27.24, which implies that males in our sample are generally overweight.

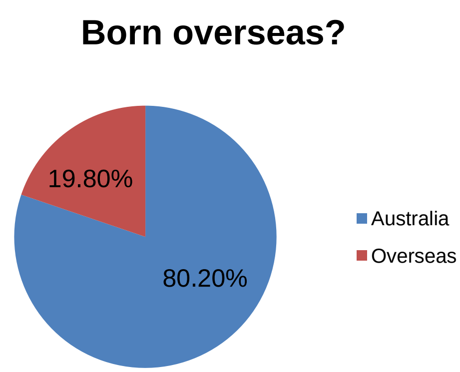
In Table III, we report the summary statistics for the 3936 females in our sample. In our sample, 67.4% are overweight or obese. The height of the tallest female in our sample is

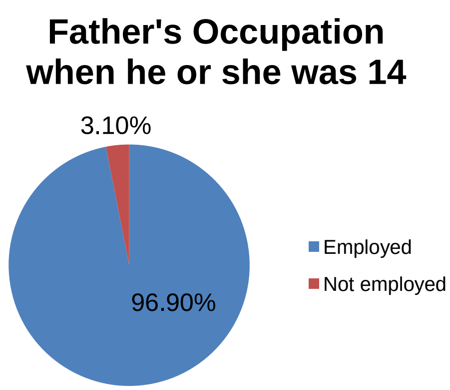
[6] Leigh and Kortt (2009)

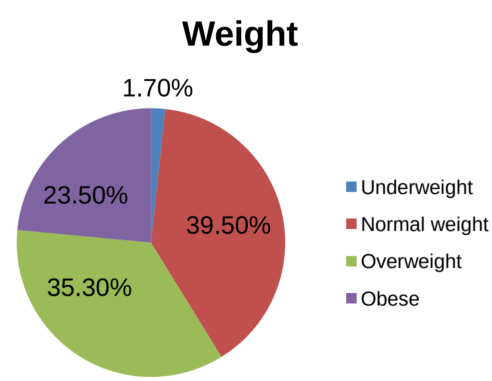
203cm whereas the shortest is 123cm. For the weight samples; the heaviest is 163kg whereas the lightest is 28kg. The average body size is: 164.4cm of height and 71.88kg of weight. The average BMI is 26.60, which implies that females in our sample are generally overweight.

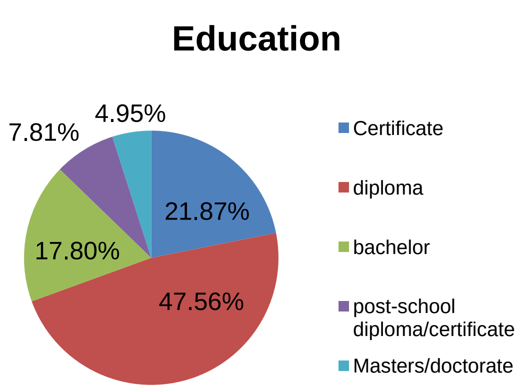
***Summary Statistics: Graphs for the whole sample set**

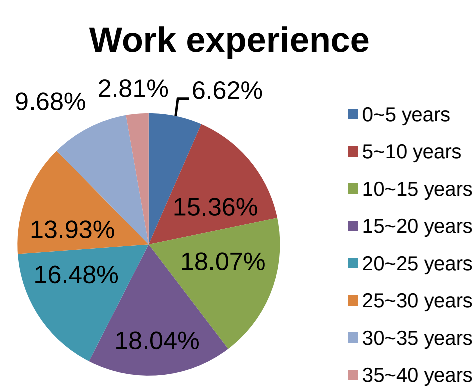












Results

Table IV to V present results for the impact of the body size on employment of the Australian individual. Here, we tried to use the same measures of body sizes in Leigh and Kortt (2009). It is useful to do so in order to combine the impact of the body sizes on: hourly wages (from Leigh and Kortt (2009)) and employment (from this paper). By doing so we can find a precise impact of the body sizes on the Australian's earning. For example, Leigh and Kortt (2009) found that workers with higher BMI scores do not seem to earn lower wages. However, what if there is a negative impact of higher BMI on their employment? Such change would affect their earnings in Australia.

In table IV, the overall picture is that most of the measures of weight have a negative association with employment probability whereas there are a few cases of height advantage on employment. For height (column 1), an additional 10 cm of height is associated with a 2.8% increase in employment probability (statistically insignificant[7]). Interestingly, when we separate the measures by gender, we found that the height advantages on employment probabilities are statistically insignificant for the both: there is an additional 10 cm of height is associated with a 0.13% increase in employment probability for men whereas there is an additional 10 cm of height is associated with a 1.7% increase in employment probability for women.

From summary statistics in table I, II and III, we know that men are taller than women on average: 178.3cm and 164.4cm, respectively. Therefore, for men, they are also more likely employed than women: 90.8% and 73.4% respectively. This is why there is a statistically significant height advantage when we did not control for the respondent's gender. However, after we control for gender, there are height advantages on employment probability but not statistically significant at the 5% level. These results are similar after controlling for physical health status (Table V): physical functioning, role-physical, bodily pain, and general health.

For BMI categories (column 2), there are mainly negative impacts on employment

[7] At the 5% level

probabilities. For persons, underweight and obese workers have 14% and 2.46% (respectively) less chance to be employed whereas the coefficient on overweight is statistically insignificant. For male, underweight workers have 16.45% less chance to be employed and overweight workers are 1.86% more likely to be employed while the coefficient on obese worker is statistically insignificant. One interpretation of this is that overweight workers are more physically productive than underweight workers (because overweight workers could be stronger), which allows them to be more competitive against underweight workers. For female, underweight (9.9%) and obese workers (5.9%) are less likely to get a job while the coefficient on overweight workers is negative but statistically insignificant. One interpretation could be that the hiring of female workers might be more likely to be dependent on their appearance.

After controlling for physical health status (Table V), most of the coefficients with employment probabilities are statistically insignificant. For persons, underweight workers generally have fewer probabilities to be employed by 11.14%. For males, overweight worker are 2.2% are more likely to be employed. However, it seems like there is no influence from BMI categories on employment probabilities.

In column 3, the coefficient on the BMI score is always statistically insignificant before controlling for physical health status. However, after controlling for physical health status, the coefficient on BMI score for persons and males become statistically significant; 0.18% more employment probabilities for the both cases. The coefficient on BMI for females is still negative and statistically insignificant after controlling for physical health status. From this, we can see that higher BMI score seems to give men more chance to be employed.

After controlling for health status, in other words, controlling for an ill-health problem due to obesity, higher BMI leads to a higher employment probability for males. Men are more exposed to heavy physical work than female workers. Thus, this explains why the coefficient on BMI for female would be statistically insignificant at the 5% level.

Lastly, in column 4, we include both height and BMI score in the univariate probit regression. The coefficients are very similar to the previous specifications[8]. Before controlling the health status, the coefficients on height and BMI score are statistically insignificant except the coefficient on height for persons. However, after controlling the health status, we can see that there is a positive association between body size indicators for persons (i.e. height and BMI score) and height. They are also statistically significant at the 5% level. After controlling for an ill-health problem due to obesity, higher BMI causes higher employment probabilities for male, by approximately 0.18%.

As you can see from Table VI, our results from this study are mostly consistent with the previous studies: Johansson et al. (2007) and Morris (2007). The coefficients on height for both male and female are consistent with Johansson et al. (2007) but not with the statistical significance. We could not compare our result with Morris (2007) as he did not look at the relationship between employment and height.

The coefficients on BMI scores for female are consistent with other studies. However, for male in Johansson et al. (2007), higher BMI scores seem to increase employment probabilities but it is statistically insignificant. In Morris (2007), higher BMI scores decreases employment probabilities and it is statistically significant. In our research, we found that there is a positive association between BMI and employment. Its statistically significance varies, depending on whether we control the health status or not. Therefore, we believe that our study is very consistent and found some interesting relationships between BMI scores and employment.

In order to evaluate our results, we have done some tests to detect a specification error; we perform a model specification link test for single-equation models. In a link test, there are two variables, the variable of prediction (hat) and the variable of squared prediction (hat^2). The variable hat should be a statistically significant predictor, since it is the predicted value from the model. This will be the case unless the model is completely misspecified. On the other hand, if our model is specified correctly, the squared predictions should not have much explanatory power. Therefore, if hat^2 is

[8] Refers to column 1 & 2

significant, then the link test is significant. This usually means that either we have omitted relevant variable(s) or our link function is not correctly specified.

As we can see from table VII and VIII, for person the both variables are significant which implies that there are omitted variables or the model is misspecified. However, after dividing the whole dataset by gender, the variable of prediction (hat) is statistically significant and the variable of squared prediction is statistically insignificant. These results imply that the model is specified correctly and there are no omitted variables after controlling for gender. This also tells us that the results from specifications for male and female are well specified and we should focus more on the results from these specifications, not the one for persons.

To demonstrate where the results are robust to other dataset or not, Table IX and X did the same process from above with a different dataset. Here, we restrict the respondent's age range to 30~40 years old. By comparing the results from Table IV and V with Table IX and X, there were some changes in the signs of coefficients. However, most of coefficients did not change in term of statistically significance level at 5%. Hence, we could say that our results from our statistical method, a univariate probit model, are robust.

Conclusion

In this paper, a univariate probit model applied to the HILDA dataset, to analyse the impact of body size on the Australian worker's employment. We have done various specifications, specification tests and robustness tests. To sum up, this paper found that:

1. There is a height premium, but not statistically significant
2. For males, higher BMI scores increases their employment probability. To be specific, overweight workers are more likely to be employed while underweight workers are less likely employed.
3. For females, higher BMI scores decrease their employment probability. Underweight, overweight, and obese workers are less likely to be employed.

To answer whether the body size (i.e. height and weight) have any impact on the Australian worker's earning; this paper contributes to provide more aspects to consider.

***Combining the results from this paper and Leigh and Kortt (2009)**

BMI score

	For male	**For female**
Leigh and Kortt (2009)	Positive*	Negative
In this paper	Positive+	Negative+
The impact on earnings	***Positive correlation***	***Negative correlation or no change***

Height

	For male	**For female**
Leigh and Kortt (2009)	Height Premium*	Height Premium
In this paper	Positive	Positive
The impact on earnings	***Positive correlation***	***Positive correlation***

*results are statistically significant at the 5% level
+results can be different (i.e. statistically significant or statistically insignificant), depending on whether or not we control for the health status

By combining the outcomes from the both paper, as you can see from the above, we can see the impact of body sizes on the Australian's earning. It is interesting to find that there is no penalty to being overweight or obese on earnings for males.

There are a few limitations in our analysis. Firstly, there are not many independent variables to explain the dependent variable. Although the specification tests prove that the models are well-specified, including more relevant variables might enhance our results and we could come up with a better and clearer answer. Moreover, one of the major concerns is a reverse causality. For example, employment probability also can affect an individual's BMI or weight. To overcome this endogeneity problem, with more time, we could research and review more literature on this problem.

If there were less resource and time constraints, then many potential extensions would be feasible. One of them is adopting a bivariate probit model, instead of using a univariate probit model. In Morris (2007), he also applied the bivariate probit model to overcome the endogeneity problem with the conditional independence assumption. In our study, we assume that the conditional independence assumption holds no matter what.

However, in reality, it might not be true. In Morris (2007), he found that the endogeneity of obesity does significantly affect the estimation of the negative impact of obesity on employment of females. If this is true and we use a univariate probit model, we will underestimate the impact of obesity on employment. The bivariate probit model is an appropriate model to use when the conditional independence assumption is violated.

For any policy suggestions, from the results we have now, being overweight is acceptable as long as he or she is not close to being obese. For example, men who go to the gym often they are likely to be normal or overweight. The Australian Government should encourage people to exercise more; such as by subsidizing the gym membership, in order to improve their strength and stamina. This will also lead to an increase in each individual’s productivity. From our results, an increase in productivity will improve our employment rate in Australia.

References

Ellie Harvey, “It pays to be tall, but weight is no earning barrier, study reveals” Sydney Morning Herald, viewed 25 September 2009 http://www.smh.com.au/national/it-pays-to-be-tall-but-weight-is-no-earnings-barrier-study-reveals-20090517-b7et.html

Johansson et al. (2009), "Obesity and labour market success in Finland: The difference between having a high BMI and being fat," *Economics and Human Biology*, Elsevier, vol. 7(1), pages 36-45, March

Leigh, A. and Kortt, M. (2009) “Does Size Matter in Australia?”, *Economic Record*

Morris (2007), "The impact of obesity on employment," *Labour Economics*, Elsevier, vol. 14(3), pages 413-433, June

Appendix

Table I: Summary statistics (Persons)

(Observations = 7105)	**Mean**	**SD**	**MIN**	**MAX**
Employment	0.812	0.391	0	1
Age	40.15	8.322	25	54
Bornovs	0.802	0.399	0	1
Indigenous	0.016	0.125	0	1
Father	0.969	0.172	0	1
Height (cm)	170.6	10.36	123	213
Weight (kg)	78.43	17.86	28	220
BMI	26.88	5.440	12.12	81.25
Underweight	0.017	0.129	0	1
Normal weight	0.395	0.489	0	1
Overweight	0.353	0.478	0	1
Obese	0.235	0.424	0	1

Table II: Summary statistics (Male)

(Observations = 3169)	**Mean**	**SD**	**MIN**	**MAX**
Employment	0.908	0.288	0	1
Age	40.00	8.402	25	54
Bornovs	0.813	0.390	0	1
Indigenous	0.015	0.120	0	1
Father	0.972	0.164	0	1
Height (cm)	178.3	7.744	140	213
Weight (kg)	86.58	15.66	40	220
BMI	27.24	4.644	13.06	81.25
Underweight	0.008	0.090	0	1
Normal weight	0.319	0.466	0	1
Overweight	0.440	0.496	0	1
Obese	0.234	0.423	0	1

Table III: Summary statistics (Female)

(Observations = 3936)	**Mean**	**SD**	**MIN**	**MAX**
Employment	0.734	0.442	0	1
Age	40.28	8.256	25	54
Bornovs	0.793	0.405	0	1
Indigenous	0.017	0.128	0	1
Father	0.968	0.178	0	1
Height (cm)	164.4	7.730	123	203
Weight (kg)	71.88	16.80	28	163
BMI	26.60	5.990	12.12	61.26
Underweight	0.024	0.153	0	1
Normal weight	0.457	0.498	0	1
Overweight	0.283	0.450	0	1
Obese	0.237	0.425	0	1

Table IV: Employment and body size[9]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Height (cm)	0.0028*			0.0028*
	[0.0004]			[0.0004]
BMI			-0.0001	0.0002
			[0.0008]	[0.0008]
Underweight		-0.1403*		
		[0.0432]		
Obese		-0.0246*		
		[0.0122]		
Overweight		0.0136		
		[0.0104]		
Observation	7105	7105	7105	7105
Pseudo R^2	0.232	0.230	0.226	0.232
Male				
Height (cm)	0.00013			0.0002
	[0.0005]			[0.0005]
BMI			0.0010	0.0010
			[0.0008]	[0.0008]
Underweight		-0.1645*		
		[0.0844]		
Obese		-0.0053		
		[0.0105]		
Overweight		0.0186*		
		[0.0088]		
Observation	3169	3169	3169	3169
Pseudo R^2	0.309	0.318	0.310	0.310
Female				
Height (cm)	0.0017			0.0015
	[0.0009]			[0.0009]
BMI			-0.0021	-0.0019
			[0.0012]	[0.0012]
Underweight		-0.0991*		
		[0.0519]		
Obese		-0.0590*		
		[0.0199]		
Overweight		-0.0271		
		[0.0180]		
Observation	3936	3936	3936	3936
Pseudo R^2	0.193	0.195	0.193	0.194

*results are statistically significant at the 5% level

9 All regressions control for age, age^2, indicator variables for whether the respondent is Indigenous and whether the respondent was born overseas, the ANU occupational status of the respondent's father at the time when he or she was 14, years of paid work experience, and years of education. [Leigh and Kortt (2009)]

Table V: Employment and body size, controlling for health status[10]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Height (cm)	0.0028*			0.0029*
	[0.0004]			[0.0004]
BMI			0.0018*	0.0021*
			[0.0008]	[0.0008]
Underweight		-0.1114*		
		[0.0417]		
Obese		0.0017		
		[0.0116]		
Overweight		0.0176		
		[0.0101]		
Observation	7105	7105	7105	7105
Pseudo R^2	0.270	0.266	0.264	0.271

Male				
Height (cm)	5.71e-07			0.00012
	[0.0004]			[0.0004]
BMI			0.0018*	0.00183*
			[0.0007]	[0.0007]
Underweight		-0.0789		
		[0.0675]		
Obese		0.0108		
		[0.0084]		
Overweight		0.0220*		
		[0.0080]		
Observation	3169	3169	3169	3169
Pseudo R^2	0.382	0.388	0.385	0.385

Female				
Height (cm)	0.0017			0.0017
	[0.0009]			[0.0009]
BMI			-0.00006	0.0002
			[0.00125]	[0.0013]
Underweight		-0.0929		
		[0.0521]		
Obese		-0.0302		
		[0.0198]		
Overweight		-0.0233		
		[0.0179]		
Observation	3936	3936	3936	3936
Pseudo R^2	0.216	0.217	0.215	0.216

*results are statistically significant at the 5% level

[10] All regressions control for age, age^2, indicator variables for whether the respondent was born overseas and whether the respondent is Indigenous, the ANU occupational status of the respondent's father at the time when eh or she was aged 14, years of paid work experience, and years of education. Physical health status is proxied by four SF-36 indices: physical functioning, role-physical, bodily pain, and general health. [Leigh and Kortt (2009)]

Table VI: Comparison report with previous studies of Body size and Employment

BMI score	**The impact on employment probability**	
	For male	**For female**
Johansson et al. (2007)	Positive	Negative*
Morris (2007)	Negative*	Negative*
In this paper	Positive+	Negative+

Height	**The impact on employment probability**	
	For male	**For female**
Johansson (2007)	Positive*	Positive*
Morris (2007)	N/A	N/A
In this paper	Positive	Positive

*results are statistically significant at the 5% level
+results can be different (i.e. statistically significant or statistically insignificant), depending on whether or not we control for the health status

Table VII: Specification tests without controlling for health status[11]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Hat	0.1944*	0.1984*	0.1994*	0.1938*
	[0.0089]	[0.0089]	[0.0090]	[0.0089]
Hat^2	0.0165*	0.0161*	0.0155*	0.0163*
	[0.0049]	[0.0050]	[0.0051]	[0.0048]
Observation	7105	7105	7105	7105
Pseudo R^2	0.271	0.267	0.266	0.272
Male				
Hat	0.0918*	0.0946*	0.0905*	0.0905*
	[0.0099]	[0.0106]	[0.0098]	[0.0098]
Hat^2	0.0053	0.0032	0.0056	0.0056
	[0.0033]	[0.0035]	[0.0033]	[0.0033]
Observation	3169	3169	3169	3169
Pseudo R^2	0.310	0.318	0.311	0.311
Female				
Hat	0.3119*	0.3117*	0.3134*	0.3122*
	[0.0164]	[0.0164]	[0.0165]	[0.0164]
Hat^2	-0.0083*	-0.0084	-0.0098	-0.0086
	[0.0123]	[0.0123]	[0.0124]	[0.0123]
Observation	3936	3936	3936	3936
Pseudo R^2	0.193	0.195	0.193	0.194

*results are statistically significant at the 5% level

[11] All regressions control for age, age^2, indicator variables for whether the respondent was born overseas and whether the respondent is Indigenous, the ANU occupational status of the respondent's father at the time when eh or she was aged 14, years of paid work experience, and years of education. [Leigh and Kortt (2009)]

Table VIII: Specification tests with controlling for health status[12]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Hat	0.1944*	0.1984*	0.1994*	0.1938*
	[0.0089]	[0.0089]	[0.0090]	[0.0089]
Hat^2	0.0165*	0.0161*	0.0155*	0.0163*
	[0.0049]	[0.0050]	[0.0051]	[0.0048]
Observation	7105	7105	7105	7105
Pseudo R^2	0.271	0.267	0.266	0.272
Male				
Hat	0.1040*	0.1027*	0.1023*	0.1024*
	[0.0125]	[0.0127]	[0.0126]	[0.0125]
Hat^2	-0.0048	-0.0048	-0.0045	-0.0046
	[0.0039]	[0.0038]	[0.0038]	[0.0038]
Observation	3169	3169	3169	3169
Pseudo R^2	0.383	0.389	0.386	0.386
Female				
Hat	0.3023*	0.3019*	0.3033*	0.3023*
	[0.0154]	[0.0154]	[0.0155]	[0.0154]
Hat^2	-0.0018*	-0.0015	-0.0027	-0.0018
	[0.0112]	[0.0112]	[0.0113]	[0.0112]
Observation	3936	3936	3936	3936
Pseudo R^2	0.216	0.217	0.215	0.216

*results are statistically significant at the 5% level

[12] All regressions control for age, age^2, indicator variables for whether the respondent was born overseas and whether the respondent is Indigenous, the ANU occupational status of the respondent's father at the time when eh or she was aged 14, years of paid work experience, and years of education. Physical health status is proxied by four SF-36 indices: physical functioning, role-physical, bodily pain, and general health. [Leigh and Kortt (2009)]

Table IX: Employment and body size[13] [Robustness Test]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Height (cm)	0.0042*			0.0048*
	[0.0007]			[0.0014]
BMI			0.0045*	0.0043*
			[0.0014]	[0.0007]
Underweight		-0.0651		
		[0.0691]		
Obese		0.0416*		
		[0.0181]		
Overweight		0.0384*		
		[0.0165]		
Observation	2586	2586	2586	2586
Pseudo R^2	0.247	0.237	0.237	0.251
Male				
Height (cm)	-0.0010			0.0013
	[0.0006]			[0.0011]
BMI			0.0015	-0.0009
			[0.0011]	[0.0006]
Underweight		-0.0001		
		[0.0521]		
Obese		0.0063		
		[0.0115]		
Overweight		0.0205		
		[0.0110]		
Observation	1136	1136	1136	1136
Pseudo R^2	0.282	0.284	0.281	0.285
Female				
Height (cm)	0.0012			0.0015
	[0.0016]			[0.0016]
BMI			0.0035	0.0037
			[0.0022]	[0.0023]
Underweight		-0.0378		
		[0.0887]		
Obese		0.0387		
		[0.0328]		
Overweight		-0.0207		
		[0.0312		
Observation	1438	1438	1438	1438
Pseudo R^2	0.192	0.194	0.193	0.194

*results are statistically significant at the 5% level

[13] All regressions control for age, age^2, indicator variables for whether the respondent was born overseas and whether the respondent is Indigenous, the ANU occupational status of the respondent's father at the time when eh or she was aged 14, years of paid work experience, and years of education. Restricting sample age range: 30~40 years. [Leigh and Kortt (2009)]

Table X: Employment and body size, controlling for health status[14] [Robustness Test]

Persons	**[1]**	**[2]**	**[3]**	**[4]**
Height (cm)	0.0042*			0.0044 *
	[0.0007]			[0.0007]
BMI			0.0045*	0.0049 *
			[0.0014]	[0.0014]
Underweight		-0.0552		
		[0.0684]		
Obese		0.0416 *		
		[0.0184]		
Overweight		0.0368 *		
		[0.0165]		
Observation	2586	2586	2586	2586
Pseudo R^2	0.262	0.252	0.252	0.267
Male				
Height (cm)	-0.0009			-0.0007
	[0.0006]			[0.0006]
BMI			0.0023*	0.0020
			[0.0011]	[0.0011]
Underweight		0.0128		
		[0.0344]		
Obese		0.0146		
		[0.0096]		
Overweight		0.0232*		
		[0.0104]		
Observation	1136	1136	1136	1136
Pseudo R^2	0.322	0.326	0.326	0.329
Female				
Height (cm)	0.0017			0.0020
	[0.0016]			[0.0016]
BMI			0.0029	0.0033
			[0.0023]	[0.0023]
Underweight		-0.0412		
		[0.0898]		
Obese		0.0303		
		[0.0339]		
Overweight		-0.0218		
		[0.0313]		
Observation	1438	1438	1438	1438
Pseudo R^2	0.201	0.202	0.202	0.203

*results are statistically significant at the 5% level

[14] All regressions control for age, age^2, indicator variables for whether the respondent was born overseas and whether the respondent is Indigenous, the ANU occupational status of the respondent's father at the time when eh or she was aged 14, years of paid work experience, and years of education. Physical health status is proxied by four SF-36 indices: physical functioning, role-physical, bodily pain, and general health. Restricting sample age range: 30~40 years. [Leigh and Kortt (2009)]