

Does overweight lead to wage cuts: evidence from Russia

Заявка № 1294851

Short research summary:

This paper investigates Body-Mass-Index (BMI) influence on individual's earnings. The aim is to determine the weight-wage discrimination in Russian labour market, leading overweight and obese people to earn significantly less than employees with normal weight, keeping all other parameters unchanged. The study is performed on the data from The Russian Longitudinal Monitoring Survey (RLMS HSE) collected by the National Research University Higher School of Economics on both cross-sectional and panel datasets on individuals in the time interval from the year 2013 to 2022. The main issue to be resolved in the research was to construct valid instrument for BMI in order to break endogeneity in the relation between earnings and BMI, to obtain consistent estimates. The estimation results show that labour income is expected to fall by approximately 800 rubles or 2.5% per month with an increase in BMI by 1 point, *ceteris paribus*. We can conclude that overweight does lead to wage cuts in Russia.

Relevance:

In recent decades, obesity has been under great concern of the World Health Organization and governments' authorities due to its negative contribution to mortality rates, increasing number of chronic diseases and overall wellness of population. Another important adverse aspect of obesity is weight-wage discrimination in labour market. It causes overweight people to have lower chances to be employed and to earn smaller income based only on their weight parameter.

Numerous researches reveal that individuals with low socio-economic status and low income tend to consume products with high caloric density and to overeat, leading to overweight. Here reverse causality arises: on the one hand, individuals with upper-normal weight due to wage discrimination may have lower earnings, and, on the other hand, people with lower income tend to overeat systematically. The reverse causality problem, augmented with variables' omission, may cause potential endogeneity, which should be accounted for.

Methods:

To break potential endogeneity in the regressions of *earnings* on *BMI* and natural logarithm of *earnings* on *BMI* instrumental variables approach, proposed by [Lewbel\[1\]](#), was used.

Lewbel's heteroskedasticity based instrument can be applied when two conditions hold. Firstly, there should be no available strong exogenous instrument, which is the case for *BMI* as instrumented variable. Secondly, some assumptions proposed by Lewbel ought to hold, relying on tests and economic rationale. The core idea lies in using the property of heteroskedasticity of residuals in *BMI* equation on its exogenous determinants to construct artificial instrument for *BMI*. After the instrument for *BMI* is obtained, we perform standard Two-Step-Least-Squares (TSLS) estimation, where at the second step we get consistent estimate of *BMI* coefficient.

Also, we assume that labour income depends on *BMI* non-linearly and quadratic model specification with BMI^2 as additional regressor can be relevant. In his paper Lewbel proposes the extension to the initial algorithm to construct heteroskedasticity based instrument for the model with any two endogenous regressors instead of original one. So, in this paper quadratic models are additionally estimated.

Data:

The research is performed on the data from the Russian Longitudinal Monitoring Survey conducted by the National Research University Higher School of Economics for the years from 2013 to 2022. It includes 10 waves of cross-sectional data in the form of representative samples on individuals, who participated in the survey either once or multiple times. The panel data is collected by the RLMS as a repeated sample of individuals with split-panel for years 1994-

2022. This paper selected panel data only for the time horizon of 2013-2022 to make results comparable across two different types of datasets used.

Results:

The research highlights academic findings in the field of socio-economic consequences of obesity and weight discrimination, obtained on Western, predominantly American data. Despite its high social importance, this topic is poorly explored in Russian economic literature.

This paper contributes in the following way. Firstly, econometric analysis was conducted on Russian society data. It was found that individual's monthly earnings decrease by around 800 rubles (as in the prices of the year 2022) or 2.5% with each extra BMI point keeping everything else constant. Secondly, quadratic model specifications with two endogenous regressors (BMI^2 , BMI) instead of BMI only, previously never mentioned in academic literature, were estimated.

At this stage of research, we are not able to suggest, whether men or women are discriminated more for being overweight. Also, we do not dispose all needed data and technical instruments to definitely support non-linear effect of BMI on income. That's why, further research is needed to overcome current limitations and investigate other forms of weight discrimination in the Russian labour market.

References

- 1) Arthur Lewbel (2012) Using Heteroscedasticity to Identify and Estimate Mismeasured and Endogenous Regressor Models, *Journal of Business & Economic Statistics*, 30:1, 67-80.