



# Effects of physical activity on earnings in the Brazilian labor market<sup>☆</sup>

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## Abstract

This article investigates the effects of physical activity on earnings in the Brazilian labor market, analyzing workers aged between 30 and 50 years. To that end, quantile regression was applied to analyze microdata from the 2008 National Household Sample Survey (PNAD). The results showed that workers who engage in regular physical exercise exhibit better social and economic conditions compared to sedentary individuals. Sedentary lifestyles are typically more common among female employees than their male counterparts and this is reflected in earnings in the labor market. The impact of physical activity on wages varied from 15.0 to 31.0% and was greater among the highest quantiles. The lowest salaries were recorded among non-white sedentary women.

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## 1. Introduction

The growing numbers of obese and overweight people in Brazilian and global populations have caused concern among policymakers and researchers. This has contributed to an increase in research highlighting the role of economic factors in relation to obesity, sport participation and healthy lifestyle choices, as addressed by [Brown and Roberts \(2011\)](#), [Chau et al. \(2008\)](#) and [Vaughan et al. \(2008\)](#).

Despite the importance of physical activity and healthy lifestyle choices highlighted by the growing literature on participation in sporting activities, discussion about the consequences of these activities in the labor market is still recent, as reported by [Lechner \(2009\)](#) and [Kosteas \(2012\)](#). However, according to [Downward and Riordan \(2007\)](#), [Kosteas \(2011\)](#) and [Gidlow et al. \(2006\)](#), discussion regarding the economic determinants of engaging in physical activity and its impact on the labor market is still new and there are scarce literature.

For illustrative purposes, we conducted a literature search on the PUBMED database using the terms “physical activity” and “economics”. We found in this search more than 28,000 articles that investigate adult participation in

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physical activities.<sup>1</sup> However, we found, only 49 articles published between 1980 and 2013 that exploring the economics aspects in the sport participation.

The discussion about sport participation stems from research into the effect of human capital and obesity on individual earnings. [Baum and Ford \(2004\)](#), [Cawley \(2004\)](#), [Register and Williams \(1990\)](#), [Loh \(1989\)](#) and [Caliendo and Gehrsitz \(2014\)](#) showed that obese employees are penalized by the job market, earning between 5.5 and 24% less than their non-obese counterparts. Wage penalties caused by obesity are higher for women. The authors report that obese people receive lower salaries because they are less productive due to obesity-related health problems. Moreover, [Hamermesh and Biddle \(1994\)](#) showed that people who consider themselves physically attractive earn between 5 and 10% more than others. Much like attractive and slim individuals, tall people are also paid higher wages, according to [Schultz \(2002\)](#). Two studies, one conducted by [Lechner \(2009\)](#) in Germany and the other by [Kosteas \(2012\)](#) in the United States, showed that sedentary individuals earn 5–10% less than those who practice some type of sport.

In this context, the present study aims to investigate the effects of physical activity on earnings in the Brazilian labor market, analyzing workers aged between 30 and 50 years. The goal is to broaden the evidence regarding the results already found in order to confirm them using an econometric model. It is important to note the significance of investigating wage differences between those engaging in physical activity and sedentary employees, given the absence of such research in Brazil. Furthermore, the evidence found may contribute to public knowledge of the benefits of physical activity in the labor market, as well as encourage individuals to adopt a more active lifestyle.

The article also contributes by measuring the effects of physical activity on wage gains. In addition to demonstrating the impact of schooling on salary, the econometric results also indicate that white workers residing in urban centers who engaged in physical activity tend to command higher wages in the job market. Lower wage returns from physical activity are recorded for women, particularly non-white females. On the other hand, more active and therefore healthier employees are typically more productive and, as such, may have higher incomes.

The present study is divided into five sections, including this introduction. Section 2 contains a brief theoretical review of Grossman's human capital model and empirical studies, while Section 3 addresses methodological aspects and estimates the econometric model. Section 4 contains an analysis of results and the conclusions are laid out in Section 5.

## 2. The influence of human capital and health capital on physical activity

Different theories and models have been used to study physical activity and vary according to areas of knowledge. In the economic arena, most of the models used to study determinants in sporting activity take a theoretical and empirical stance toward the choice between leisure and work, as well as use of time and [Grossman's \(1972\)](#) approach to the formation of health capital.<sup>2</sup> However, the effects of health on the labor market are studied using either human or health capital theory. The human capital theory, advocated by Gary Becker, Jacob Mincer, and Theodore Schultz, suggests that education and training improve workers' skills and increase their productivity, consequently raising their future income throughout their careers. In addition, salaries are determined by the productivity of each employee and measured according to the time individuals invested in education and training. [Schultz \(1961\)](#) addresses human capital from a broader perspective, incorporating the knowledge, skills and physique of workers. The relationship between health and salary was first addressed by [Schultz \(1961\)](#), [Mushkin \(1962\)](#), [Grossman \(1972\)](#), [Grossman and Benham \(1974\)](#) and [Luft \(1975\)](#).

[Grossman \(1972\)](#) expanded the concept of human capital presented by [Becker \(1962, 1964, 1965\)](#), compiling a model of demand for health in which consumption choices throughout life are viewed as an investment problem, where the consumer can choose between investing in their own health or other assets. In this model, health can be considered a commodity that plays a direct role in the utility function of individuals, as well as an investment good that leads to fewer sick days. Grossman demonstrated that the formation of capital health determines the amount of time people can

<sup>1</sup> Physical activities ensure better mental functions, as demonstrated by [Ettner \(1996\)](#), [Hillman et al. \(2008\)](#), [Gomez-Pinilla \(2008\)](#), [Lindwall and Hüllyä \(2013\)](#) and [Tomprowski \(2003\)](#), and improved psychological conditions, in the view of [Folkins and Sime \(1981\)](#), [Spence et al. \(2005\)](#), and increase social capital, that is, social abilities, as addressed by [Aguilera and Bernabé \(2005\)](#) and [Eccles et al. \(2003\)](#).

<sup>2</sup> Studies in this regard include those conducted by [Becker \(1964\)](#), [Gronaur \(1974\)](#), [Kosteas \(2012\)](#), [Lechner \(2009\)](#), [Farrel and Shields \(2002\)](#), [Downward and Riordan \(2007\)](#), [Ebert and Smith \(2010\)](#), [Humphreys and Ruseski \(2010\)](#) and [Ruseski et al. \(2011\)](#) inter alia.

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