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# Is body mass human capital in sumo? Outcome of globalization and formation of human capital in Japan



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### ABSTRACT

**Yamamura, Eiji**—Is body mass human capital in sumo? Outcome of globalization and formation of human capital in Japan

Sumo wrestling is a traditional fighting sport in Japan and has been popular since the 18th century (the Edo period). Using a data set for all sumo wrestlers in the post-World War II period, this paper investigates how wrestlers' body mass index (BMI) is associated with their win rate and absence rate. Further, the effect of BMI is compared between an early period (before the emergence of foreign wrestlers) and later period (after the emergence of foreign wrestlers). After accounting for endogenous bias using instrumental variables, the key findings are that (1) there is no positive relationship between the BMI and win rate in either the early or later period and (2) there is a positive relationship between the BMI and absence rate in the later period but not in the early period. From the findings in this paper, I make the argument that an increase in the number of immigrants with human capital different from that of domestic labor leads the domestic labor to obtain human capital that does not match its characteristics, thereby reducing its performance. *J. Japanese Int. Economies* **31** (2014) 53–71. Department of Economics, Seinan Gakuin University, 6-2-92 Nishijin, Sawara-ku, Fukuoka 814-8511, Japan.

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## 1. Introduction

Sumo wrestling is a traditional fighting sport in Japan and has been popular since the 18th century. Following World War II, sumo, like other professional sports, such as football (Berlinschi et al., 2013) and baseball (Schmidt and Berri, 2005), has become globalized. In 1968, Takamiyama became the first non-Asian to reach the top division (*makuuchi*)<sup>1</sup> in sumo. Twenty-five years later, in 1993, Akebono became the first foreign-born *Yokozuna* (the highest rank in the top division). Both Takamiyama and Akebono were born in the United States. Since the retirement of Takanohana in 2003, there has been no domestic Japanese *Yokozuna*. In 2012, 7.5% of sumo wrestlers were officially listed as foreigners, and 33% of wrestlers in the top division were foreigners.<sup>2</sup> Following these drastic changes, sumo has become an international sport in the 21st century.

Differences in the labor quality of sumo wrestlers might be due to technical skill and physical strength. Sumo does not have weight categories, and hence, an increase in body mass might result in higher performance. Hence, the body mass might be considered as human capital in the sumo labor market.<sup>3</sup> Furthermore, foreign wrestlers, especially those born in the United States, have a great advantage in terms of body mass. "Upon their initiation into the sumo world, foreign wrestlers are already equipped with a physique equivalent to that of wrestlers in the top division. They have trained in American football or basketball, and have been excellent players" (Nakajima, 2003, 62). In other words, these foreign wrestlers were not obese even though their body mass was extremely high. As a consequence, competitive pressure increased, giving domestic sumo wrestlers a great incentive to increase body mass.<sup>4</sup> On the other hand, extra weight seems to increase injury, which hampers the wrestler's performance. This is the negative effect of body mass. Wrestlers are thought to train to obtain an optimum body mass that trades off these positive and negative effects. However, in 2000, the average body fat ratio was 38.4%, which is far higher than ideal for an athlete (Nakajima, 2003, 59).<sup>5</sup> "The upper weight limit of a Japanese wrestler with consideration of muscular strength was estimated to be 180 kg. That is, it is not appropriate from the viewpoint of exercise that a wrestler's weight exceeds 180 kg" (Nakajima, 2003, 60). However, after the emergence of Takamiyama, there have been 18 wrestlers weighing in excess of 180 kg. The inflow of foreign wrestlers has led Japanese wrestlers to misestimate the optimum body mass.

Previous works on sumo (Duggan and Levitt, 2002; West, 2004) have focused on the norm or the rule shared in the closed sumo world. However, the sumo world has been under the influence of globalization and thus affected by an inflow of foreign-born labor. It is worth investigating the effect of the increasing number of foreign wrestlers on human capital accumulation of domestic wrestlers to explore the impact of immigrants in the labor market. Many works have investigated an individual's physical characteristics (or sporting activities) and their outcomes in the labor market (e.g., Lechner, 2009; Rooth, 2011). However, these works did not take international labor mobility into account. The sumo world is generally characterized as having been closed to strangers and so was not influenced from the outside until after World War II. That is, Japanese wrestlers are thought to have shared and behaved according to a social norm. On the other hand, the critical influence of international labor mobility has been observed in other professional sports (Schmidt and Berri, 2005; Berlinschi et al., 2013). Naturally, the question arises whether globalization affects the behavior of sumo wrestlers.

<sup>1</sup> There are six divisions in sumo: *Makuuchi* (maximum of 42 wrestlers), *jūryō* (fixed at 28 wrestlers), *Makushita* (fixed at 120 wrestlers), *Sandanme* (fixed at 200 wrestlers), *Jonidan* (approximately 230 wrestlers), and *Jonokuchi* (approximately 80 wrestlers). In total, there are approximately 730 wrestlers attending each tournament. Wrestlers enter sumo in the lowest division, *Jonokuchi*, and ability permitting, work their way up to the top division.

<sup>2</sup> In response to the increasing numbers of foreign wrestlers, in 1992, the Japan Sumo Association began regulating the inflow of foreign wrestlers (Nakajima, 2003, 120).

<sup>3</sup> To put it more precisely, through traditional training, the type of physique required for sumo wrestling can be considered as human capital specific to sumo (Nakajima, 2003, 63–66). However, owing to the limited data and difficulty of measuring physique, this paper uses the body mass index.

<sup>4</sup> It was pointed out that there have been rigged sumo matches (Duggan and Levitt, 2002; Hori and Iwamoto, 2013). This inevitably impedes fair and open competition. However, most matches have not been rigged, resulting in competitive pressure.

<sup>5</sup> The ideal body fat ratio is 10% and 13% for a soccer player and American football player, respectively.

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