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EDITORIAL

Food economics and policies: Challenges and approaches toward better nutrition and safer food in China

China has achieved unprecedented successes in feeding the 1.3 billion population in the past few decades. Per capita occupation of grain and milk increased from 316.6 and 1 kg in 1978 to 445.7 and 26.85 kg in 2016, respectively. Per capita meat occupation also reached 61.9 kg in 2016 from nearly nothing at the beginning of the reform and opening (NBSC 1979–2018). With these successes in agricultural production, the quality of food consumption has also improved significantly. Although food remains the largest household expenditure, the Engel coefficient, an average ratio of food expenditure over income, has declined from 67.7% in 1978 to 29.33% in 2017 (NBSC 1979–2018). In addition, the enriched food consumption has generated remarkable human welfare improvement. A newborn boy in 1970 could expect to live to age 63, but by 2015, that same boy could expect to live to 73.64 years (WHO 2001, 2016). In 2010, the underweight rate for children less than 5 years old, a commonly used proxy for health status, was 3.6% compared with 74% in 1990. Such improvements are ascribed to the market-oriented pricing reform of agricultural commodities, the household responsibility system, and a series of other technological progresses, institutional innovations and market reforms.

Yet, new challenges have occurred in the recent decade. Particularly, the increasing prevalence of obesity and chronic diseases has become a serious public concern in China (Popkin *et al.* 2012; Du *et al.* 2014; Gordon-Larsen *et al.* 2014; Yuan *et al.* 2019). A recent article in *The Lancet* shows that China has passed the United States to become the frontrunner in the absolute number of obese citizens (NCD-RisC 2016). In 2014, China's men and women contributed 16.3 and 12.4%, respectively, to global obesity. Although these numbers did not consider China's huge population base, they reflect a sharp increase from 1975 when only 2.1% of men and 2.5% of women were obese (NCD-RisC 2016), but with a high prevalence of undernutrition. It is unbelievable that in just 40 years China has transitioned from a country in which parents worried about where their children's next meal would come from to one where overweight has become one of the top public concerns.

Another challenge is related to food safety. The globally well-publicized melamine-contaminated baby formula scandal disclosed in 2008 was a milestone triggering public concerns about Chinese food safety. That desperate Chinese parents seeking baby formula outside the country was often listed on the top in both international and domestic news media. The series of food safety issues involving meat, eggs, and other fresh vegetables following the baby formula scandal further put Chinese consumers at the peak of panic. Facing the challenges, the Chinese government and the entire agricultural and food industries carried out a series of active measures to ensure food safety, including significantly enhancing laws and regulations, tremendously investing in R&D for food safety detection and new technology implementation, and so forth. These active measures have largely strengthened and improved China's food safety environment, but there is certainly still a long way to go to win back consumers' confidence in domestic food and food products.

It is no doubt that technological progress played critical roles and will continue to play the role in the future in curving these challenges. Yet, establishing an efficient food system with healthier, more nutritious, and safer food needs a better understanding of the economic behaviors of all agents in the market. This is particularly important for food-related policymaking in many emerging economies like China where the coexistence of undernutrition, deficiency of micronutrients, and overweight and obesity is a common challenge to the society and individual households. Though

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related literature has shed light on these issues, this special combination provides more frontier research updates and more pieces of evidence.

We start this summary by asking a fundamental question: do improvements in living standards lead to the increase in obesity? To answer this question, Zhao and Zheng (2019) employ the neoclassic theory of economics in obesity and China Health and Nutrition Survey (CHNS) data to empirically estimate the impact of income, often a most powerful driver, on adults' body mass indices (BMIs). The results of their study indicate that the income had a significant and inverted U-shaped impact on weight for both urban and rural males, while the effect is negative for urban but positive for rural females. These findings suggest a continuing growth of overweight and obesity prevalence in China for both urban and rural male and rural female adults with further income growth in the near future. The turning point without any intervention is unlikely to appear in a foreseeable period. Measures stimulating physical activities to burn the over intakes of nutrients could be effective in mitigating the rising burden both for individual adults and the society.

The main findings from Zhao and Zheng (2019) are further confirmed by Ren *et al.* (2019) who use a different method and more indicators reflecting overweight initiation, cessation, and termination. Their results show that body weight and the likelihood of overweight commencement are concavely associated with income, while the likelihood of overweight discontinuance posts a convex relation with income. This finding suggests that low-income people in China are less likely to be overweight than their counterparts in many developed countries. Heterogeneous effects by gender and between urban and rural are also discussed in their study.

This session also includes two papers that focus on the health and nutrient intake issues for two specific population groups. Liu *et al.* (2019) try to build up a linkage between nutrient intake and primary students' mental performance. Using a randomized controlled trial involving 6 044 fourth and fifth graders in rural Northwestern China, their results show that a nutrition subsidy provided significantly improved students' mental health status as measured by anxiety scale. However, the add-on incentive provided to school principals could almost entirely offset the beneficial impact of the nutrition subsidy. Therefore, to improve students' mental health in rural China, direct subsidies, such as low-priced school meals, and correct incentives tied closely to students' mental health outcomes should be considered simultaneously.

Min *et al.* (2019) move their focus to left-behind family members' food consumption and nutrient intake in remote areas of Southwestern China. Based on household survey data collected from 611 smallholder rubber farmers in Xishuangbanna Dai Autonomous Prefecture, they find that the migration of family members contributes to improving household net income, whereas it negatively affects left-behind family members' consumption of grain and pork. These results suggest that, in some remote areas such as in Southwestern China, rising income may not automatically translate into a structural change in food consumption and better nutrient intake that was observed in other regions or countries. Future research should pay more attention to reveal the reasons and mechanisms behind this stickiness.

The rest of this column selects three studies that examine food safety related issues. The first one is by Li *et al.* (2019) which studies Chinese consumers' confidence in domestic dairy products. Since the infant formula scandal in 2008, dairy products have been on a hot-pot of public criticism and always in the center of food safety related discussions. The Chinese government and the entire dairy industry have made tremendous efforts to improve the safety level and to bring consumers back to the market. Results from surveying consumers in Beijing, Tianjin and Shijiazhuang, however, are not that optimistic as expected. The safety of domestically produced infant formulas is still heavily doubted (Li *et al.* 2019), despite that quality certification, being produced organically, and being fully traceable can positively affect consumers' confidence in these products.

However, whether being traceable can enhance consumer's confidence in food safety and reshape their risk attitudes towards domestically produced food products as expected may depend on individual exposure to social media and the various relationships he/she has with the cultural environment he/she is embedded in. In the study by Yan *et al.* (2019), researchers employ an analytical framework based on the social embeddedness theory to reveal the impact of consumers' social activities on their risk perception. The results of quantile regression models show that interpersonal relationships, organizational relationships, and social relationships have significant impacts on consumer's risk perception at different quantile levels.

In addition to enhance consumer's risk perception of food safety, food traceability can also promote a firm's performance. Using a dataset of 216 food manufacturing firms in China, Song *et al.* (2019) reveal the existence of the association between food traceability information sharing and corporate performance. The fundamental mechanism is that food traceability information sharing can enhance a firm's operational and marketing capabilities, and further contribute to its profitability. This hypothesis is verified by using hierarchical regressions and bootstrapping methods. They also show that operations and marketing capabilities translate the interactive impacts of environmental turbulence and traceability information sharing into firm performance.

Moreover, this study demonstrates for the first time that at both high and medium levels of environmental turbulence, food traceability information sharing strengthens operations and marketing capabilities, consequently contributing to firm performance.

It has been a long time since the entire Chinese academia gave dominated priority to agricultural production when a higher yield was needed to meet the growing food demand. Yet, this situation has gradually changed with the 13-year-in-a-row yield increase of three major grains (corn, wheat and rice) by 2016. The continuously rising income and upgrading consumer taste for healthier, safer and better-quality food are posing substantial challenges to China's traditional agricultural production system. They are also exerting considerable pressure on individual households and the society in handling the rising overweight and obesity problems. Studies combined in this column shed more light on understanding these issues from the perspective of food demand which was commonly ignored, and thus will serve as a starting point for more future research.

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