

Of Pandas and People:

National Parks and Rural-Urban Population Dynamics

The establishment of national parks in various parts of the world holds profound strategic significance for global biodiversity conservation, promoting ecological balance, and climate change mitigation. Unlike natural protected areas, national parks are established to protect large-scale natural ecosystems that possess exceptional ecological value, authenticity, and integrity (Wang, 2019). As such, they serve as the cornerstone of the system of natural protected areas. According to data from *the Protected Planet Report 2024*, there are currently over 6,600 national parks worldwide. As the world's largest developing country, China is actively initiating its national park system. In 2021, it inaugurated its first five national parks, including the Giant Panda National Park (GPNP), and identified 44 candidate areas for future expansion. As outlined in *the National Park Spatial Layout Plan*, by 2035, the Chinese government aims to establish the largest national park system in the world, covering approximately 1.1 million square kilometers, which will represent 10.3% of its terrestrial land area.

To expedite the development of national parks and mitigate the adverse effects of human activities on wildlife and their habitats, countries worldwide have adopted rigorous ecological regulations. Specifically, these regulations encompass enhancing land use control, restricting the scale of agricultural operation, curbing resource exploitation, raising industry entry barriers and so on. For example, the United States have imposed restrictions on the development of transportation infrastructure within national parks (Szabó and Ujhelyi, 2024), while China has revoked mining rights and halted cutting down bamboo and hunting in these areas (Wang, 2019; Zhang et al., 2020). Mexico has banned logging and overgrazing in its national parks (Valdez-Cepeda et al. 2021), and Brazil has enforced strict limits on economic activities such as soybean cultivation (Lima et al., 2020). Since many indigenous residents within national parks continue to rely on natural resources for their livelihoods, these measures may also alter farmers' livelihood strategies and reshape local population dynamics (Phongchiewboon et al., 2020; Abate 2023).

Currently, researchers remain divided on the impact of national parks on regional economic development and labor markets. Some studies suggest that national parks can stimulate local

employment and income growth by attracting tourists and encouraging business investments (Saayman and Saayman 2010; Zawilińska et al., 2021; Szabó and Ujhelyi, 2024). For example, the influx of visitors often boosts demand for tourism-related industries, such as hospitality, retail, and construction, creating new job opportunities (Rule et al. 2022). These findings indicate that national parks can act as catalysts for rural economic diversification and development.

Other scholars present contrasting views, arguing that protected areas may restrict livelihood opportunities for local households, reduce employment prospects, decrease traditional farming activities, and ultimately hinder rural economic growth (Schmitz et al. 2012; Ma et al., 2019; Villodre et al. 2023). For instance, Tan et al. (2025) point out that China's National Key Ecological Function Zones, established to protect biodiversity, have significantly increased labor costs and reduced job opportunities. Similarly, Baliaetti et al. (2024) demonstrate that natural reserves in India have substantially reshaped labor market structures, characterized by a decline in year-round employment, an increase in seasonal work, and a higher proportion of non-farm jobs.

Additionally, previous studies have found that the impact of national parks on regional economic development and labor markets varies widely across households, regions, and countries, depending on resource endowments, local characteristics, and levels of development (Saayman and Saayman, 2010; Robalino et al., 2017). For instance, in regions with limited resource endowments, the establishment of national parks may impose greater constraints on traditional agricultural activities (Zhou et al. 2024), whereas in areas with well-developed tourism infrastructure, their economic effects are more positive (Li et al. 2025). These findings underscore the heterogeneous nature of national parks' socioeconomic impacts, which are shaped by local contexts and resource availability.

Establishing natural protection areas also affects rural-urban population dynamics (Joppa, 2012). The classic push-pull theory suggests that rural-urban mobility is the result of the joint effects of rural push factors and urban pull factors (Harris and Todaro, 1970; Munshi and Rosenzweig, 2016; Jedwab et al., 2017). Rural push factors primarily include the lack of employment opportunities, low agricultural productivity, land degradation, and extreme natural disasters, which compel rural households to leave their homes and seek better livelihood

opportunities in urban areas (Munshi and Rosenzweig, 2016). On the other hand, urban pull factors include higher wage levels, greater availability of non-agricultural employment, more developed public infrastructure, and better social services, which attract rural populations to urban areas (Jedwab et al., 2017). In the context of national park construction, protected areas may push rural residents to migrate to urban areas, while also attracting indigenous residents to stay in rural areas or encouraging migrant workers to return if strong tourist activity is generated. Therefore, it needs further to be studied how these factors jointly shape rural-urban population dynamics in the case of the China's national park system.

This study examines the impact of national parks on rural-urban population dynamics and their underlying mechanisms, with a focus on the GPNP pilot program in China. Based on the Push-Pull Theory, we develop a theoretical analytical framework and employ a difference-in-differences (DID) approach to conduct an empirical analysis using county-level panel data from Sichuan Province (2013–2022) in China. We argue that the GPNP pilot program offers an ideal setting to explore the issue at hand. First, the pilot program represents a top-down reform initiated by the Chinese central government and can be viewed as a quasi-experiment, as we argue below. Second, the GPNP spans a vast area, encompasses a significant number of indigenous residents, and exhibits substantial variations in economic development levels.

This paper makes two key contributions to the literature. First, it reveals how national parks affect urban-rural population dynamics through ecological regulations that reduce agricultural productivity (push factor) and urban economic agglomeration (pull factor), providing direct evidence on drivers of urban-rural population mobility and the economic impacts of national parks. Second, unlike prior studies that emphasize shifts in labor across different sectors, this study examines the effects of national parks on spatial population distribution. It highlights heterogeneous impacts driven by market barriers and policy-induced constraints, identifies conditions for county-level urbanization, and enhances understanding of rural economic structural transformation.