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THOUGHT LEADERSHIP BRIEF

Human Capital Shapes the India-China Demographic Race

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KEY POINTS

- As India surpasses China in population size, questions arise as to whether this demographic shift will lead India to overtake China economically.
- China's current apparent demographic travails will not necessarily threaten its leading status for most of the next half century given India's disadvantage in educational attainment and low female labor force participation.
- India's continuing population growth could potentially become an economic advantage, but only if the country makes investments in education and efforts in reducing gender inequality in labor force participation.
- The demographic race between these two giants will be determined according to human capital development rather than simply by total population size.

ISSUE

Demography is defined as the scientific study of changing population size and structures. In terms of total population size, the race between the world's "demographic billionaires" is over as India surpassed China as the most populous country in 2023 and will likely remain so for the rest of the twenty-first century and beyond. China's population decline and rapid aging appear to present an existential threat to the continuation of its economic success story. However, total size, age and sex are just a few of the many dimensions of demographic change important to a country's economic standing (Golley & Tyers, 2012; Lutz et al., 2014). A country's economy, and therefore its overall geopolitical power, depends more on the number of workers and their productivity, than on gross population numbers alone (Jones, 2016). In a paper recently published in PRPR, we reassess the demographic race between India and China by looking more closely at the composition of the population, in particular the size of the labor force and its human capital.

Reference:
This brief is based on the research published in Population Research and Policy Review, Vol.44 No.4, for the full paper, please visit : https://link.springer.com/article/10.1007/s11113-025-09966-y

ASSESSMENT

We forecast the labor force (LF) and the productivity-weighted labor force (PWLF) as an indicator that takes into account both the educational composition of the labor force and the overall quality of the education system, for China and India from 2020 to 2100. The demographic dynamics of India and China represent a critical inflection point in global economic development. Understanding the nuances of their demographic race is thus critical not only for these nations but also for international policymakers, investors, and institutions navigating an increasingly multipolar world. By introducing a PWLF measure that captures the qualitative dimensions of human capital, we aim to offer a more sophisticated lens through which to examine the future economic potential of these emerging economies.

Figure 1. Age Pyramids by Education and Labor Force Participation, China and India, 2020

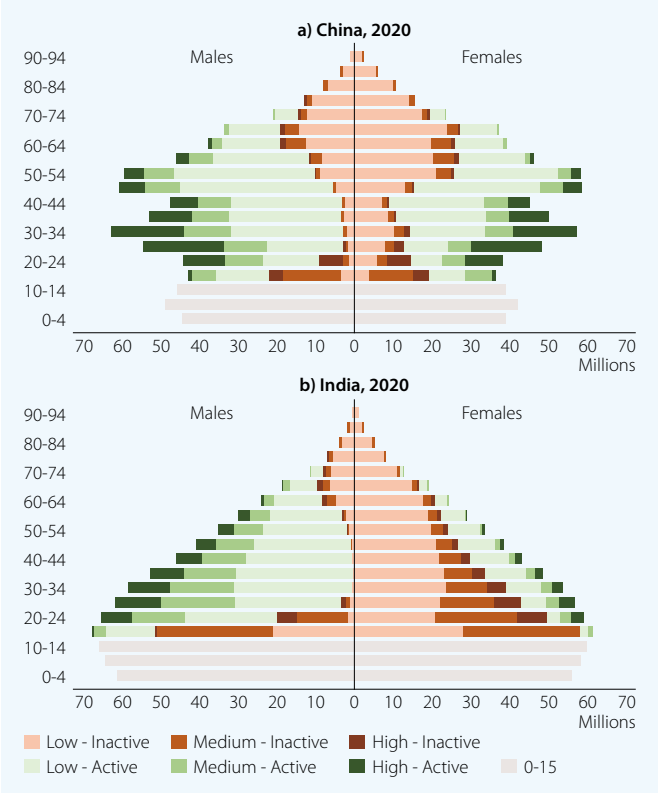

Figure 1 shows the age, sex, education, and labor force pyramids for China and India in 2020 and highlights the heterogeneity in the population composition of both countries. The Indian population is much younger; but has a much higher proportion with no education or only basic education, particularly among women. In contrast, China has invested heavily in universal primary and secondary education for girls and boys (Wang, 2003; Wu & Marois, 2024). A low level of education of women in India has led to slower fertility decline, and a resultant younger and growing population (Wittgenstein Centre for Demography and Global Human Capital, 2023). Female labor force participation in India is much lower than in China. In fact, it is among the lowest in the world (World Bank, 2025). This is true at all ages and levels of education, despite a fertility rate that is now slightly below replacement level (United Nations, 2024).

Although India has surpassed China in terms of total population size, it is projected to catch up with China in terms of the working-age population, defined as being 20-64 years old, before 2030 This outcome was anticipated in demographic projections from the 1990s, given that India's fertility decline occurred later and was less abrupt than China's. That being said, not all individuals in the working-age population participate in the labor market, a factor particularly true for women in India.

Figure 2. Projected Labor Force Size According to Three Scenarios, China and India, 2020-2100

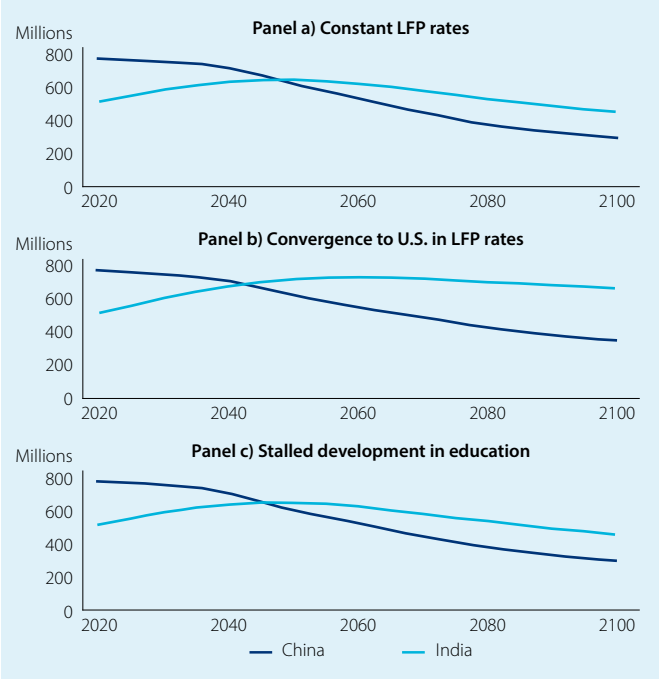

Figure 2, Panel a) Constant LFP rates=no change in labor force participation rates by age, sex, and education; Panel b) Convergence to U.S. in LFP rates=labor force participation rates by age, sex, and education converge to those of the United States by 2100; Panel c) Stalled development in education=no further improvement in enrollment rates and in the quality of education, no change in labor force participation rates.

Under the assumption of constant labor force participation (LFP) rates, India is projected to reach the same labor force size as China between 2040 and 2050 (Fig. 2a). After this point, India's advantage will largely depend on how its female labor force participation rate evolves. By 2100, if India's LFP rates reach the level of the United States, its labor force could be twice the size of China's. However, if LFP rates remain constant, India's labor force would be about 50% larger than China's. The scenario of stalled development in education (Fig. 2c) has only a limited effect on labor force size, as its lower participation rates among middle-aged women with low education are offset by higher participation among older workers aged 60 and above, particularly men.

In contrast, China has less potential for labor force growth through increased participation, as female labor force participation is already much higher than in India. However, labor force size alone does not fully capture a country's productive capacity, as workers contribute differently to economic output based on education and skills. To capture these differences, Figure 3 presents PWLF projections under three scenarios.

Figure 3. Projected Productivity-Weighted Labor Force Size (PWLF) According to Three Scenarios, China and India, 2020-2100

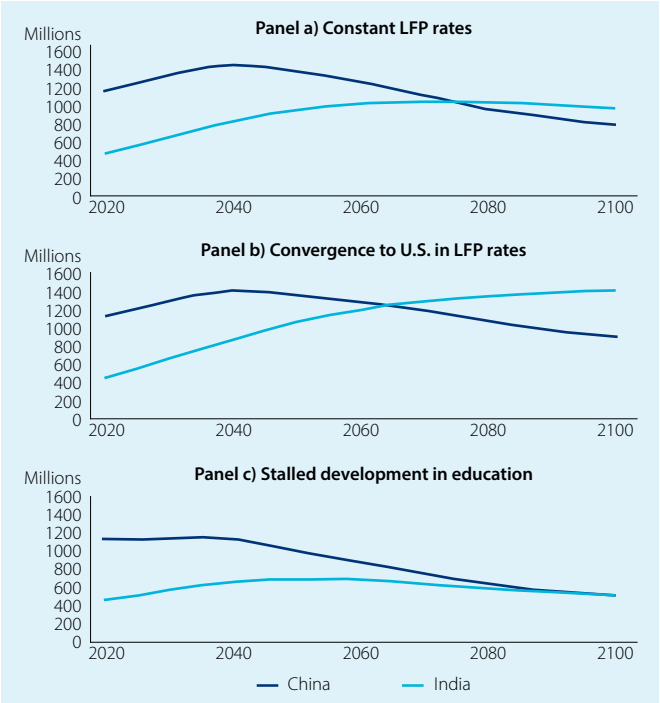

Figure 3 Panel a) Constant LFP rates=no change in labor force participation rates by age, sex, and education; Panel b) Convergence to U.S. in LFP rates=labor force participation rates by age, sex, and education converge to those of the United States by 2100; Panel c) Stalled development in education=no further improvement in enrollment rates and in the quality of education, no change in labor force participation rates.

These projections highlight a more complex long-term competition between India and China. Due to differences in education levels and female labor force participation, China's PWLF is expected to remain more than twice as large as India's for the next two decades. After that, India's ability to integrate women into the labor force will be a key factor in its economic trajectory. If India does not make progress in education and female labor force participation (Fig. 3c), it may never catch up with China in terms of PWLF, especially if China maintains the pace of its past progress in education. On the other hand, if India successfully integrates more women into the labor market and continues to expand educational attainment, it could surpass China's PWLF much earlier (Fig. 3b), and its advantage would become significantly more pronounced by the end of the century. In China, the future trend of the PWLF will depend on continued improvements in education. If China maintains rapid progress in education as observed in recent years – assumed in both the constant LFP and Convergence to U.S. scenarios – its PWLF will first increase and then gradually decline. However, under the stalled development in education scenario, China's PWLF would decline at a similar rate to its working-age population or labor force size, shrinking by slightly more than 50% by the end of the century. This highlights the crucial role of education in maintaining China's economic strength despite demographic changes.

CONCLUSION

By taking into account labor force participation and education, China's current apparent demographic travails will not necessarily threaten its leading status relative to India for most of the next half century. By the same rationale, the rapid change in India's productivity weighted labor force strongly indicates that the country could occupy an economically leading role in the last-third of the current century. India's continuing population growth and enormous youth population could eventually become an economic advantage, but only if the country makes substantial investments in education and efforts in reducing gender inequality in labor force participation. To address these challenges, India has introduced several policies aimed at expanding educational access and improving workforce inclusion. For example, the National Education Policy 2020 emphasizes gender-inclusive schooling, the Mahila Shakti Kendra scheme supports skill development for rural women, and reforms such as the amended Maternity Benefit Act seek to reduce workforce dropout among mothers. However, progress remains uneven due to gaps in implementation (Drèze & Sen, 2013), persistent cultural norms (Afridi et al., 2018), and lack of formal job creation (Mehrotra & Parida, 2019). Boosting female education and labor force participation will be critical in determining not only when India can catch up to China economically but also how predominant India's position will be by the end of the century.

Meanwhile, China is actively addressing its aging workforce through increasing productivity, industrial automation, gradual increases in the retirement age (Zhang et al., 2023) as well as demographic initiatives such as healthy ageing, poverty reduction and trying to increase the fertility rate through various family policy interventions and pronatalist incentives. China is likely to remain the dominant economic power for the coming decades due to more favorable labor force and education structures. China's higher levels of human capital and sizable working-age population mean it will maintain a much larger productivity-weighted labor force over the next 50 years.

In sum, the key to economic success over the remainder of this century is likely to be based on what people can do and are doing rather than by how many there are. By this logic, the economic future of the European Union, the United States, and other traditional and emerging markets should not be underestimated relative to China and India. Economic and social success is grounded in investment in people – investment in health, education, income protection, poverty reduction, and promoting a productive, inclusive labor market. This message is important for policy planners focused on political demography and shifting geopolitical positions and alignments.

Reference:
The Demographic Race between India and China. / Marois, Guillaume; Gietel-Basten, Stuart; Lutz, Wolfgang. In: Population Research and Policy Review, Vol. 44, No. 4, 44, 08.2025.

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A leading academic in the field of population and sustainable development, Lutz was among the UN-appointed scientists who authored the Global Sustainable Development Report 2019: The Future is Now. He has received numerous prestigious awards, including the Wittgenstein Prize, two ERC Advanced Grants, the Mattei Dogan Award (IUSSP), the Science Prize of the Austrian Research Association, and the 2024 Yidan Prize for his contributions to the theory and practice of education.

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Lutz has authored over 300 scientific articles and book chapters, and wrote or edited 27 books and special issues on population forecasting, education as a standard demographic dimension, and population-development-environment interactions.

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