ISSN: 2710-0170

Forecasting the Scale of China's National College Entrance Examination (Gaokao) Registrations and New Employment Population Trends (2026-2030) Based on Demographic Structural Changes

Xianpu Wu

Shenzhen College of International Education, Shenzhen, 518043, China

Abstract

As the number of applicants for the 2025 National College Entrance Examination (Gaokao) registered its first decline in a decade, China's education and labor markets have reached a critical juncture in demographic transformation. This study utilizes birth data from 2008 to 2012, gross enrollment rates in senior secondary education, and historical data on further education and employment to construct a cohort-component forecasting model. The research predicts that Gaokao registrations from 2026 to 2030 will follow a fluctuating downward trend, maintaining a range between 12.6 million and 13 million. Meanwhile, the annual new employment population is expected to stabilize between 10.8 million and 11 million. This study aims to provide quantitative references for educational resource allocation and the macro-control of the future labor market.

Keywords

Gaokao registrations; Demographic Transformation; New employment population; Educational resources allocation; Macro-control of labor market.

1. Introduction

The Gaokao is not only the core of China's education system but also a pivotal mechanism for talent selection and social mobility. However, as China's population structure enters a period of profound adjustment, the education and labor markets are facing unprecedented shifts. In 2025, Gaokao registrations were recorded at 13.35 million, a decrease of 70,000 compared to 2024 [1]. This decline marks the end of an eight-year growth streak and represents a significant historical turning point.

This phenomenon is driven by the dual effects of a shrinking school-age population and the rising popularization of education. On one hand, the declining birth rate is beginning to impact the higher education sector. On the other hand, diversion effects—such as the integration of secondary vocational and undergraduate education, and the diversification of international education—have become increasingly prominent. Consequently, the traditional "scale expansion-oriented" model of resource allocation must transition toward a "precision adaptation-oriented" model [2].

Simultaneously, the labor market is experiencing significant shocks. China's working-age population is currently decreasing by approximately 8 million annually, creating rigid constraints on labor supply due to an aging society [3]. Meanwhile, technological changes are reshaping job structures. The "Future of Jobs Report 2025" predicts that while 170 million new jobs will be created globally by 2030, 92 million traditional roles will be displaced. Demand for frontline skilled labor is surging, while easily substitutable roles in administration and security are contracting [4].

Given the convergence of the "enrollment inflection point" and "employment transformation," historical experience alone is insufficient for future trend prediction. Therefore, this study

ISSN: 2710-0170

employs a quantitative model, utilizing birth data and annual education statistics, to forecast Gaokao registrations and the scale of new employment for 2026–2030.

2. Research Model and Data Description

2.1. Data sources

The basic data of this research are derived from the "China Statistical Yearbook" (birth population), the Ministry of Education's "National Statistical Bulletin on the Development of Education" (enrollment rate, number of graduates), and public data from the education examination institutes of some provinces and cities [3, 5].

2.2. Prediction Model Construction

The study adopts a school-age population projection method combined with a retention rate model.

2.2.1. Gaokao Registration Number Prediction Model

Let Gn be the number of Gaokao registrations in year n, based on the birth population Bn-18 18 years ago, the model is defined as follows:

$$G_n = B_{n-18} * R_{ger,n-3} * P_{participation}$$

Where:

$R_{ger,n-3}$: Gross enrollment rate at the senior high school level in year n-3 (predicted value)

$P_{participation}$: The ratio of senior high school graduates participating in Gaokao (i.e. Gaokao participation rate). Based on the back-test of historical data, this study sets this parameter to 85.43% [3].

2.2.2. New employment Population Prediction Model

The new employment population Jn consists of initial employment groups with different educational levels. Considering the legal working age and educational delay, the model is defined as:

$$J_n = J_{highschool} + J_{undergrad} + J_{master} + J_{PhD}$$

Specifically expanded as:

$$J_n = G_n * E_{hs} + B_{n-22} * R_{he} * E_{ug} + B_{n-25} * R_{ms} * E_{ms} + B_{n-29} * R_{PhD} * E_{PhD}$$

Note: E represents the employment rate at each stage, and R represents the enrollment/graduation conversion rate at each stage[4].

2.3. Prediction Results of Gaokao Registration Number in the Next Five Years

Based on the data of the number of births from 2008 to 2012 released by the National Bureau of Statistics (fluctuating between 15.919 million and 16.35 million) [5], combined with the assumption of a linear increase of 0.2% in the gross enrollment rate of senior high school every year, and the calculation results are shown in the table below:

Year	Corresponding Birth Year	Birth Population (10,000 people)	Predicted Gross Enrollment Rate of Senior High School	Predicted Gaokao Registration Number (10,000 people)	Trend
2026	2008	1608.0	92.4%	1269	Decline
2027	2009	1615.0	92.6%	1278	Slight Increase
2028	2010	1591.9	92.8%	1262	Trough
2029	2011	1604.0	93.0%	1274	Recovery

ISSN: 2710-0170

2030	2012	1635.0	93.2%	1302	Recovery

Gaokao registrations will move away from rapid growth into a "volatile plateau" phase. A periodic low of 12.62 million is expected in 2028 due to the 2010 birth trough. This confirms an 18-year lagged transmission effect of birth rates on education. However, by 2030, registrations should recover to 13.02 million, driven by the 2012 birth rebound and increased secondary school popularization.

2.4. Prediction Results of New Employment Population in the Next Five Years

Based on the assumptions of graduation scale and employment rate at different educational levels (the direct employment rate of senior high school graduates is about 17.94%, the employment rate of college graduates is about 81.23%, and those of masters and doctors are 94% and 98% respectively) 7, the prediction results are as follows:

- 2026 (J1): The new employment is expected to be 10.91 million.
- 2027 (J2): The new employment is expected to be 11.03 million.
- 2028 (J3): The new employment is expected to be 10.81 million.
- 2029 (J4): The new employment is expected to be 10.88 million.
- 2030 (J5): The new employment is expected to be 10.99 million.

Despite the fact that the number of Gaokao applicants fluctuates, the supply of new employment in the next five years will relatively remain stable, at around 10.9 million, benefiting from the rising rate of access to higher education (predicted average 61.21%) and the hysteresis effect of the expansion of graduates students enrollment. It indicates that the quantity supplied of labor force has not dropped dramatically, yet structural pressure (the increase in the proportion of highly educated talents) will expand continuously.

3. Data Analysis and Discussion

Based on the prediction model constructed in this study, the number of Gaokao registrations in the next five years (2026-2030) will not experience a cliff-like decline but will show a fluctuating characteristic of "gradual decline—bottoming out—recovery".

Short-term Trend (2026-2027): The predicted data show that the number of Gaokao registrations in 2026 and 2027 will be 12.69 million and 12.78 million respectively. Although this scale is lower than the peak in 2025, it still remains above 12 million, indicating that the demand for higher education will remain strong in the short term.

Cyclical Trough (2028): The prediction model shows that the number of Gaokao registrations will drop to a low of 12.62 million in 2028. Tracing back to the population data, the fresh graduates corresponding to this year were mainly born in 2010 (birth population of 15.919 million), which was the birth trough within the statistical cycle. This verifies that the birth rate has an obvious lagged transmission effect on the Gaokao scale (lagging about 18 years).

Rebound and Recovery (2029-2030): It is worth noting that the predicted number of Gaokao registrations in 2030 will recover to 13.02 million. This is mainly due to the rebound in the birth population in 2012 (16.35 million) and the expected increase in the gross enrollment rate of senior high school to 93.2%. This indicates that although the overall population trend is downward, the improvement of education popularization has partially offset the negative impact of population reduction, making the Gaokao scale remain at the ten-million level in the next five years.

According to the employment prediction model, the scale of new employment in the next five years is expected to fluctuate slightly between 10.81 million and 11.03 million, and the overall supply will remain stable. However, an in-depth analysis of the data structure reveals a significant characteristic of "upward shift in educational structure":

ISSN: 2710-0170

"Highly educated talents" become the main force of employment. In the model, the weight of college graduates (junior college, undergraduate, master, and doctor) in new employment continues to rise. Especially considering the steady growth of master's and doctoral graduation rates (the graduation rate of masters compared with the birth population is about 4.03%), the competition in the future employment market will be more concentrated in knowledge-intensive fields.

The model assumes that the proportion of senior high school graduates directly entering the employment market is about 17.94%. However, in reality, this group (about 2-3 million people per year) often faces the dilemma of mismatch between skills and market demand. With the increasing demand for frontline jobs such as express delivery and construction, if this part of the labor force chooses to continue their studies or is in a state of "delayed employment", the real economy may face a more severe problem of "difficulty in recruiting workers".

It notable that to calculate the "direct employment rate of senior high school graduates", the study uses the method: (number of Gaokao registrations - number of college admissions)/number of Gaokao registrations. This method assumes that all candidates who are in fact not admitted directly are entering the employment market, ignoring the pool effect of repeat students and the diversion effect of studying abroad. In fact, the existence of repeat students will smooth the fluctuations of the number of Gaokao registrations, while the return of overseas students will increase the supply pressure in the highly educated employment market. Thus, the actual intensity of employment competition may be slightly higher than the prediction of this model.

4. Conclusion and suggestions

Through an integrated analysis of birth population and educational enrollment data, this study provides a quantitative forecast of Gaokao registration numbers and the scale of the new employment population in China for the 2026–2030 period. The findings indicate that China's education and labor markets are moving away from an era of linear growth and entering a high-level plateau characterized by volatile fluctuations.

Over the next five years, Gaokao registrations are projected to fluctuate between 12.62 million and 13.02 million. Although a cyclical low of 12.62 million may occur in 2028 due to the 2010 birth trough, the candidate pool is unlikely to experience a precipitous decline. This resilience is sustained by the "enrollment expansion dividend," as the senior high school gross enrollment rate is expected to rise from 92.4% to 93.2%, keeping the registration scale firmly within the ten-million range. Also, the average annual new employment population is expected to remain relatively stable at approximately 10.92 million. While the working-age population is decreasing by about 8 million annually, the volume of labor supply is being effectively buffered in the short term by the extension of educational years—specifically through the expanded enrollment of master's and doctoral students.

In light of these forecasts, China will face dual challenges: the structural adjustment of enrollment sources and the adaptation of job roles. As registration growth plateaus, private universities and vocational colleges that rely solely on scale expansion may face an enrollment crisis. Meanwhile, competition for elite resources will shift from "entry access" to "the pursuit of high-quality education". Without strategic intervention, the structural contradiction of academic inflation coexisting with skill shortages will likely intensify.

Based on data prediction and situation analysis, this study puts forward the following three suggestions:

Transform Educational Evaluation from "Exam-Oriented" to "Person-Job Matching": Given that Gaokao registrations will consistently exceed 12 million, authorities should establish diverse pathways—such as integrated vocational-to-undergraduate programs—to alleviate the

ISSN: 2710-0170

pressure of singular examination competition. It is recommended to introduce career planning earlier in high school to guide students toward development paths aligned with market demand, rather than the indiscriminate pursuit of higher credentials.

Establish Flexible Mechanisms for Educational Resource Allocation: To prepare for the potential enrollment trough around 2028, universities should build flexibility into their five-year enrollment plans to avoid resource underutilization. Simultaneously, investment must be prioritized for high-demand fields such as STEM (Science, Technology, Engineering, and Mathematics), agriculture, and medicine to meet the requirements of future industrial upgrading.

Build a Comprehensive Employment Buffer System: The government should refine the "lifelong vocational training" system for both high school graduates entering the workforce directly (approx. 17.94%) and college graduates. It is imperative to prioritize digital skills training for job seekers to enhance labor adaptability, particularly as technological shifts threaten to displace 92 million traditional roles.

The next five years represent not the disappearance of the demographic dividend, but a critical transition toward a "talent dividend". Through precise forecasting and proactive strategic planning, China is well-positioned to navigate demographic shifts and achieve the dual objectives of becoming an educational powerhouse and maintaining employment stability.

References

[1] Ministry of Education of the People's Republic of China. National Statistical Bulletin on the Development of Education. http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/

[2] Huang Z, Wang T, Li X. The political dynamics of educational changes in China. Policy Futures in Education, 2015, 14(1): 24-41.

[3] National Bureau of Statistics. Employment Data. https://data.stats.gov.cn/easyquery.htm?cn=C01

[4] World Economic Forum. Future of Jobs Report 2025.

[5] National Bureau of Statistics. China Statistical Yearbook. Beijing: China Statistics Press, 1998-2023.