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Pupil-teacher Ratio as a Measure of School Quality of Vocational and Higher Education in the 9 Mainland Cities of the Greater Bay Area, 2015-2020

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Policy Brief**Pupil-teacher Ratio as a Measure
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Research on the educational landscape in the Greater Bay Area (GBA) is substantially relying on data availability in secondary vocational schools and vocational colleges across three districts. One of the major issues is the lack of statistics on vocational schools and colleges in Hong Kong and Macao, which makes calculating and comparing the pupil-teacher ratio in these jurisdictions challenging. Consequently, this analysis of the pupil-teacher ratio in secondary vocational schools and tertiary education (including vocational colleges) focuses primarily on the nine cities located in mainland China.

In secondary vocational schools, the GBA recorded an average pupil-teacher ratio of 18.7 in 2020. Although this number is marginally lower than the national average in mainland China, it lags considerably behind the ratios observed in other prominent regions such as Zhejiang (15.59), Jiangsu (14.35), Shanghai (13.11), and Beijing (8.04).

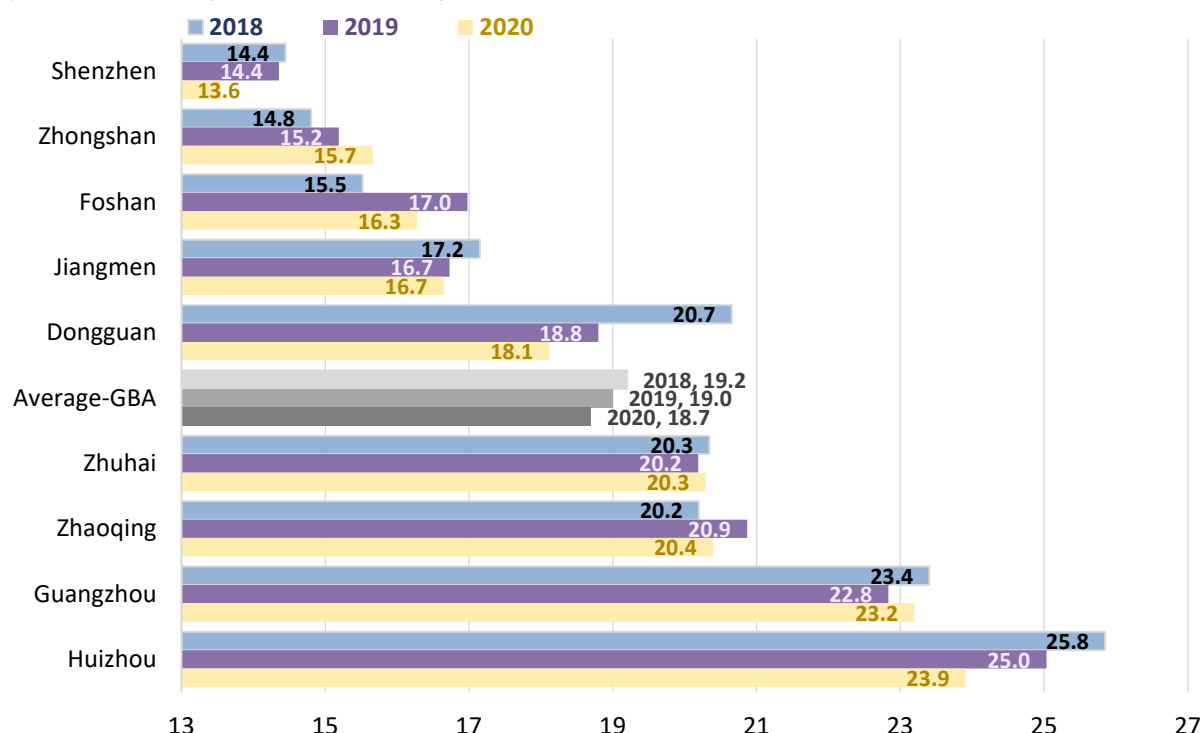
A further examination of the GBA reveals that the distribution of educational resources across cities varies considerably. Notably, cities in close proximity to industrial centres tend to have better pupil-teacher ratios. In 2020, Shenzhen recorded a pupil-teacher ratio of 13.6 in secondary vocational schools. Other cities with lower ratios than the average in GBA include Zhongshan (15.7), Foshan (16.7), Jiangmen (16.7), and Dongguan (18.1). In contrast, secondary vocational schools in cities such as Zhuhai, Zhaoqing, Guangzhou, and Huizhou are facing a severe teacher shortage. The situation is especially dire in Huizhou, which has the highest ratio of students to teachers among the 9 cities.

From 2018 to 2020, the pupil-teacher ratio has decreased in Shenzhen, Jiangmen, Dongguan, and Huizhou, while it has increased in secondary vocational schools in Zhongshan and Foshan, where teacher shortage is becoming increasingly severe.

In comparison to other cities in the GBA, Guangzhou has consistently had comparatively rich educational resources and a relatively low student-teacher ratio. By comparing the number of students enrolled in general and vocational high schools and the number of full-time teachers in 2020, the disparity in secondary vocational education resources between Guangzhou and Shenzhen may be found. Guangzhou, a city known for its educational resources, has reduced the number of secondary vocational colleges in recent years, but there are still 77 secondary vocational colleges in the city. Shenzhen, a city known for its scientific and technology innovation, has only 15 secondary vocational schools. Guangzhou is approximately 5 times larger

Pupil-teacher ratio of vocational schools in Shenzhen and Guangzhou is lower than other cities.

Pupil-teacher ratio of vocational schools from 2018 to 2020



INDICATOR: Pupil-teacher ratio the number of pupils per teacher, calculated by dividing the number of pupils enrolled in a given level of education by the number of teachers at that level. The ratio is often used to measure the quality of schooling and teacher resources in the region.

SOURCES: Statistics are collected from China Urban Yearbook (2019-2021).

than Shenzhen in terms of school sizes, which is in accordance with the disparity in student population (Guangzhou is 4.5 times larger than Shenzhen). However, the number of full-time teachers in Guangzhou is just 2.7 times that of Shenzhen. In comparison, Shenzhen has a modest student population but a comparatively abundant teaching pool. Guangzhou has a significant number of students and schools but not enough teachers. It is worth emphasizing that this difference is only obvious in secondary vocational schools, with no distinction in ordinary secondary schools.

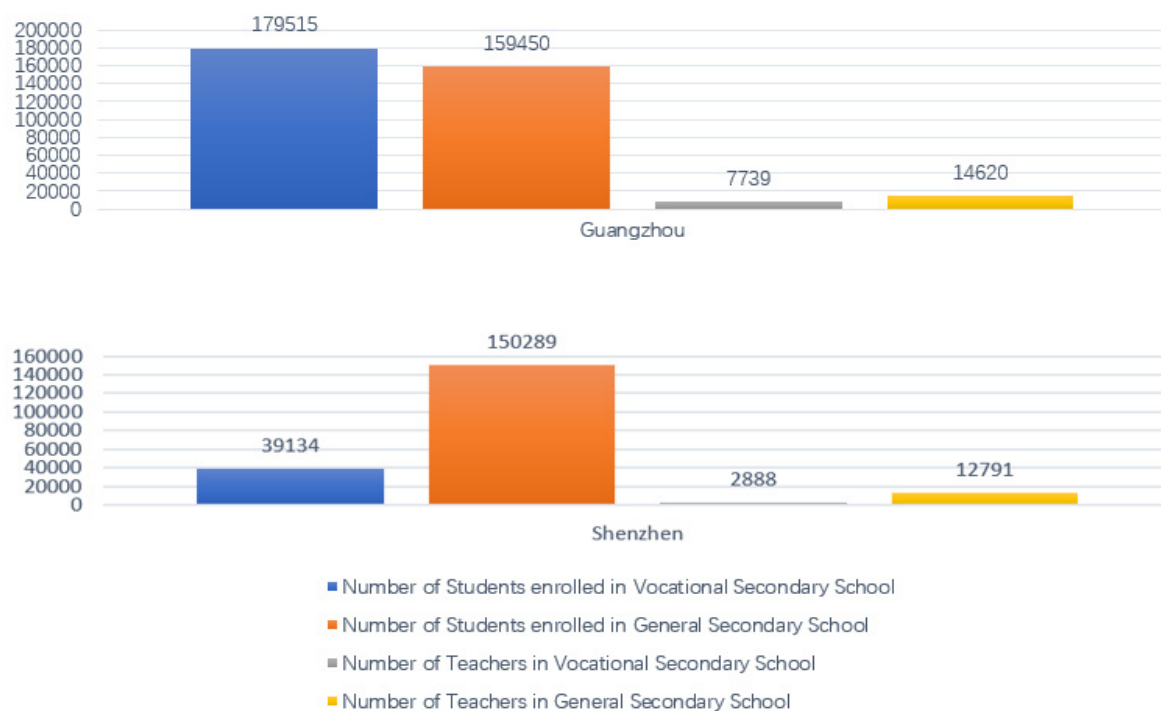
From 2016 to 2020, the pupil-teacher ratio in vocational schools in the Greater Bay Area (GBA) decreased on average annually. Shenzhen, Dongguan, and Huizhou display similar downward trends in their pupil-teacher ratios when compared to other typical cities in the region. Shenzhen, among these cities, has a relatively abundant supply of vocational education resources, with a decreasing pupil-to-teacher ratio over time.

By 2020, Dongguan's pupil-teacher ratio had decreased to 18.1, falling from 22.4 in 2016 to the ratio below the GBA average. Trends in the ratio of pupils to teachers in Huizhou are similar to those in Dongguan, with both cities exhibiting a higher ratio level.

During 2016 to 2020, the pupil-teacher ratio in Foshan's vocational schools has remained relatively stable, with a minor decline from 18.2 to 16.3. The pupil-teacher ratio in Guangzhou, on the other hand, has witnessed minor overall fluctuations. Despite the overall stability, there have been fluctuations in the ratio, with the ratio increasing to 25.8 in 2018.

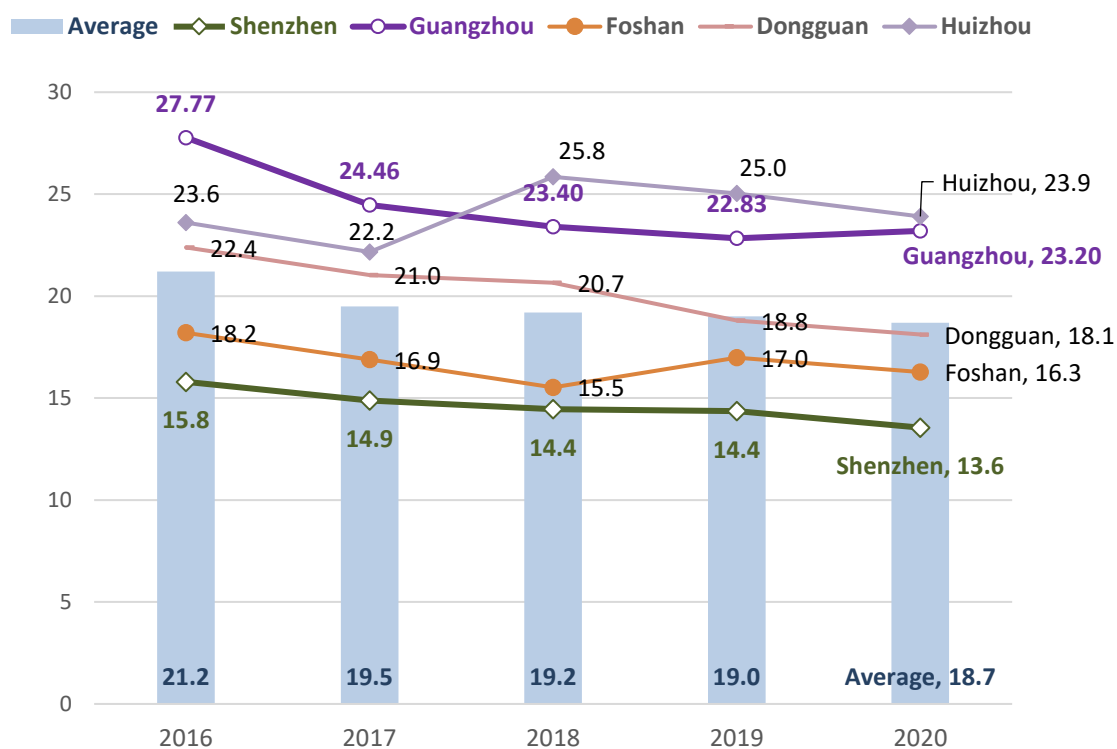
The Greater Bay Area (GBA) confronts a significant teacher shortage in the tertiary education phase, as evidenced by the high student-to-teacher ratio. In 2020, the average pupil-teacher ratio reached 25.3, which was significantly higher than the national average of 18.5. This number exceeds the ratio of Guangdong Province (18.88), Zhejiang (15.73), Jiangsu (16.25), Shanghai (16.25), and Beijing (16.47).

Comparison of the number of students enrolled and the number of full-time teachers in general and vocational secondary schools (V.S. Shenzhen in 2020)



Pupil-teacher ratio in vocational schools: A slight decrease

Pupil-teacher ratio of vocational schools from 2015 to 2020

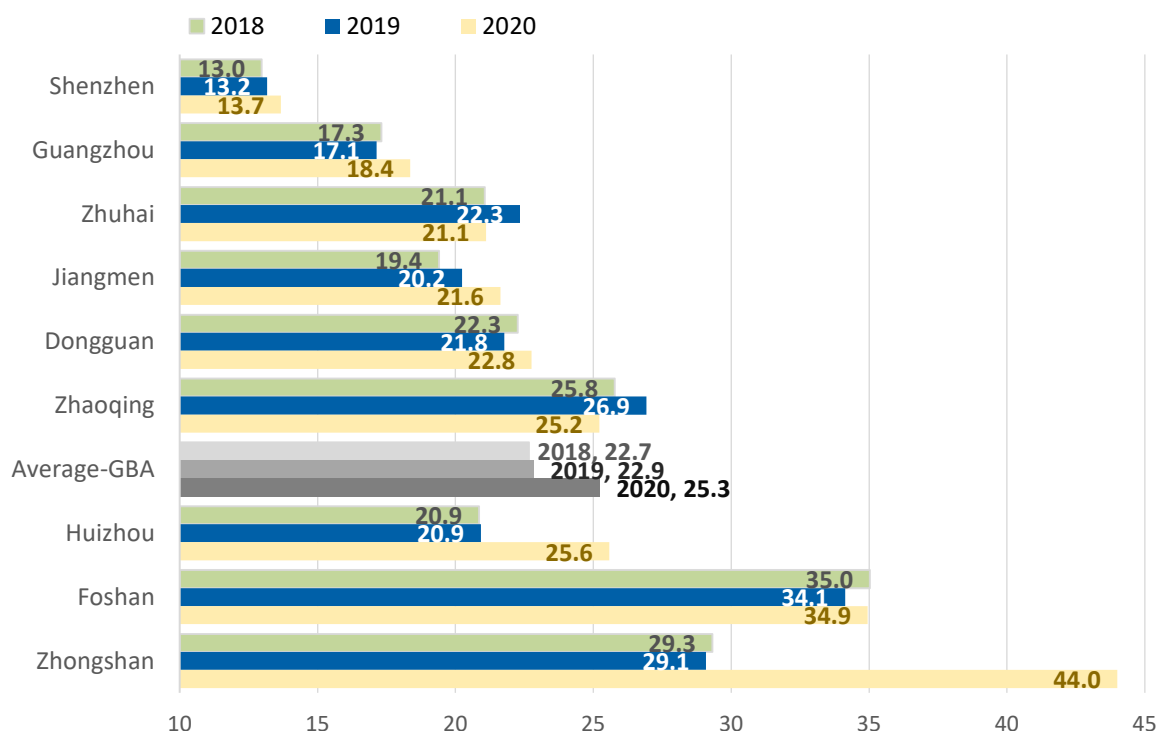


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SOURCES: Statistics are collected from China Urban Yearbook (2015-2021).

Pupil-teacher ratios in tertiary education vary across cities in the Greater Bay Area

Pupil-teacher ratio in tertiary education from 2018 to 2020



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SOURCES: Statistics are collected from China Urban Yearbook (2019-2021).

Shenzhen has the greatest pupil-teacher ratio among the nine mainland Chinese cities, with a ratio of 13.7 in 2020. This number exceeds those of China's other major cities and provinces. In recent years, the establishment of branch campuses from major universities in Shenzhen has attracted talent, effectively gathering qualified teachers to meet the requirements of local students.

Guangzhou ranks second in terms of pupil-teacher ratios, with its prestigious schools continuing to play a vital role in higher education. Despite a minor rise in the student-teacher ratio in 2020, this city will remain among the top nine.

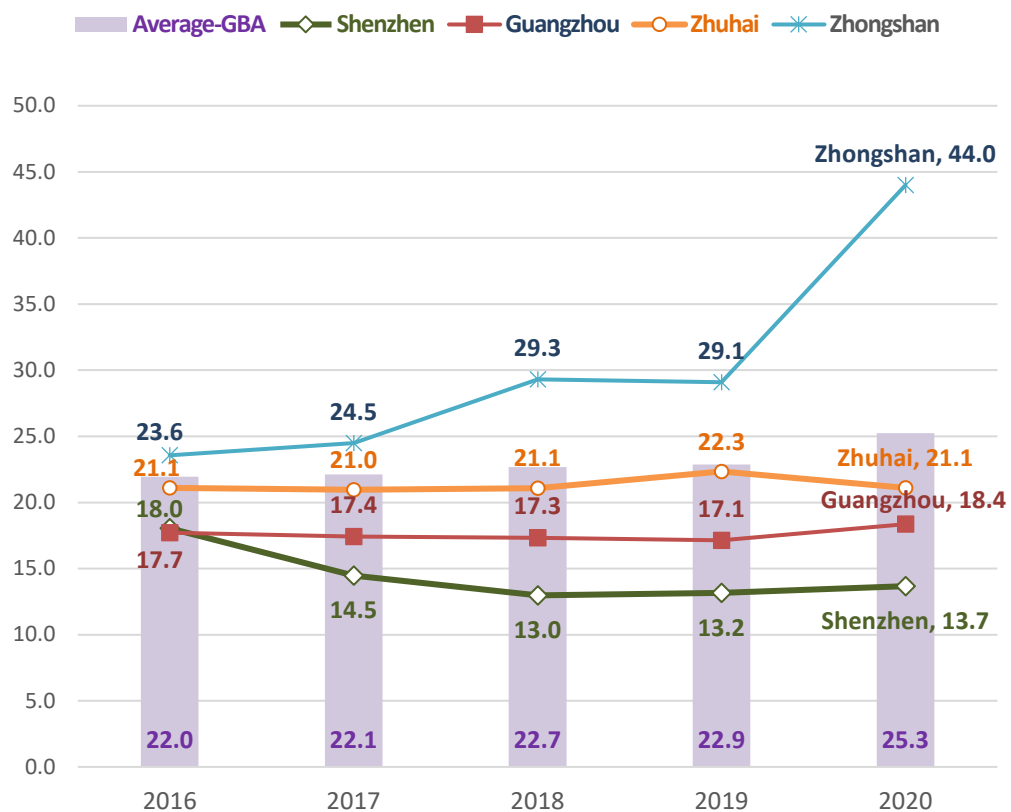
Zhuhai, Jiangmen, Dongguan, and Zhaoqing have higher pupil-teacher ratios than the GBA average, whereas Foshan and Zhongshan face a severe shortage of higher education talent. This deficit makes it difficult to support the development of native talent in higher education. Numerous changes occurred in Zhongshan in 2020, requiring further investigation.

Shenzhen's pupil-teacher ratio has continued to decline on the basis of a comparatively low average level, whereas Zhongshan's ratio has been increasing annually. Comparing the number of full-time teachers in Zhongshan from 2016 to 2020, the number was decreasing by nearly half. Meanwhile, the numbers of full-time teachers in Shenzhen, Foshan, and Dongguan increase dramatically. Therefore, migration and mobility may partially explain the loss of teachers in Zhongshan.

The above data presents the number of undergraduate students in GBA cities, illustrating the distribution of local higher education institutions and the enrolment situation of university students in the region. Foshan, Zhaoqing, Dongguan, and Shenzhen have all experienced a year-on-year increase in the number of undergraduate students. Among these cities, Foshan has the largest growth rate, with the number of students increasing from 50,000 in 2016 to 146,000 in 2020. Zhaoqing comes in second, with the number of students growing from 110,000

Pupil-teacher ratio in tertiary education in the Greater Bay Area: Differences across cities

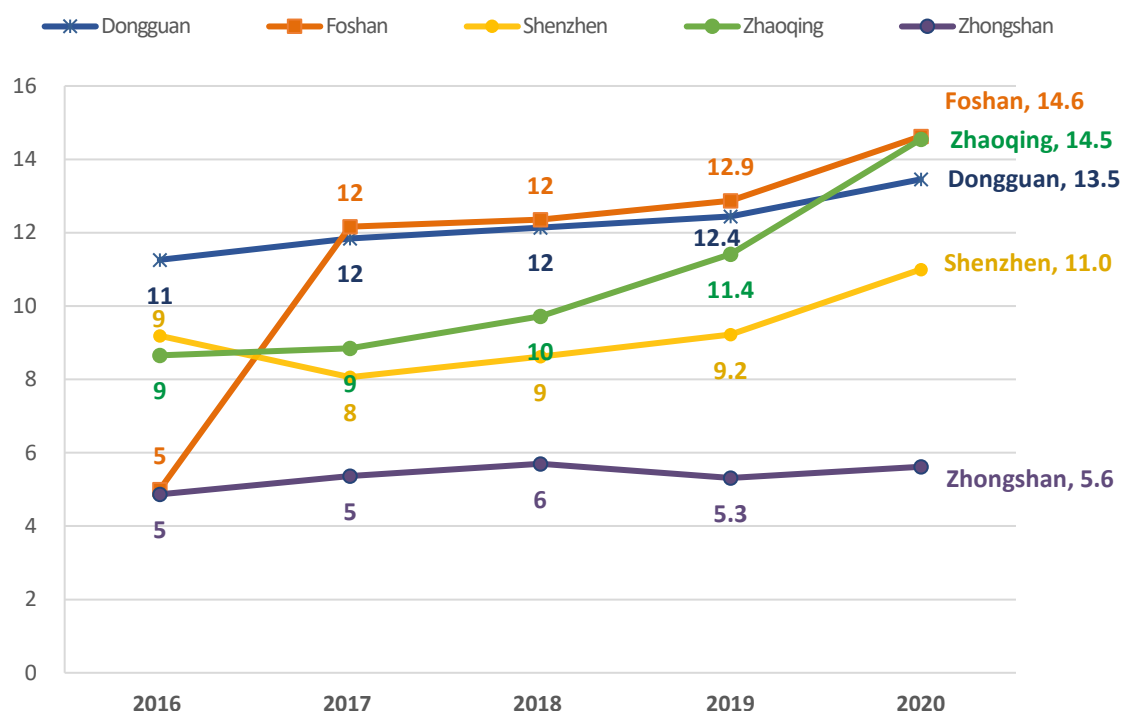
Pupil-teacher ratio in tertiary education from 2016 to 2020



INDICATOR: Pupil-teacher ratio the number of pupils per teacher, calculated by dividing the number of pupils enrolled in a given level of education by the number of teachers at that level. The ratio is often used to measure the quality of schooling and teacher resources in the region.

SOURCES: Statistics are collected from China Urban Yearbook (2014-2021).

Growth of undergraduate enrollment at universities or Colleges in GBA cities (in 10,000 person)



in 2016 to 145,000 in 2020. Dongguan has also experienced a yearly increase in student numbers from 2016 to 2020. In Shenzhen, there was a slight decline in 2017, with 80,000 students, before increasing to 110,000 students in 2020.

In contrast to the majority of cities experiencing a year-on-year increase, Zhongshan has seen relatively little growth in undergraduate student numbers over the five-year period. The number of students in Zhongshan has remained relatively stable, hovering around 50,000.

The number of full-time faculty members in higher education institutions demonstrates a trend similar to that of student enrolment. Shenzhen, Dongguan, and Foshan have all experienced a year-on-year increase in full-time faculty members. Among these cities, Shenzhen has the highest average number of full-time faculty, growing from 5,092 in 2016 to 8,847 in 2020. Foshan has witnessed the largest growth in the number of full-time faculty members, with the 2020 figure more than doubling that of 2016. In contrast, Dongguan

has experienced a lower growth rate. In 2016, its number of full-time faculty was on par with Shenzhen, but by 2020, a significant gap had emerged between the two cities.

Zhongshan faces a markedly different situation, with the number of full-time faculty members in its universities decreasing from 2,065 to 1,944 in 2018 and a further decrease to 1,277 in 2020. Consequently, this led to a substantial increase in Zhongshan's pupil-teacher ratio. Researchers believe that this situation may be related to public finance in Zhongshan city. Data from the Zhongshan City Yearbook indicated that in 2019, the city's public financial revenue experienced a considerable reduction compared to previous years, with a contraction exceeding 10%. Additionally, public financial expenditures in Zhongshan also witnessed a year-on-year decline from 2018 to 2020, with reductions of 3.8%, 6%, and 8.8% over the three-year period. Another possible explanation supporting this trend can be found in the yearbook data regarding the number of employees in non-private urban sectors. The data

suggests that there has been a slight decrease in the number of individuals employed in the field of education. This observation further underscores the challenges faced by the higher education sector in terms of faculty numbers and, consequently, the pupil-teacher ratio.

Policy Implications

The Greater Bay Area (GBA) experiences teacher shortage in tertiary education, as suggested by its relatively high student-to-teacher ratio. In 2020, the average pupil-teacher ratio reached 25.3 in GBA, which was substantially higher than the national average of 18.5. This national-GBA gap suggests the need for building a larger educator pool with qualified candidates in tertiary education.

Further, GBA experiences growth in the number of full-time faculty members to meet a growing undergraduate population in higher education institutions. While Shenzhen, Dongguan, and Foshan have increased a growing full-time faculty body, Zhongshan faces a steady decrease. These differences across cities merit further research on how different institutions address faculty recruitment and retention.



Research Consortium on Education Policy and Development in Greater Bay Area (ReCEPD)

is a nonprofit research consortium under The Hong Kong Institute of Educational Research (HKIER) at the Chinese University of Hong Kong. ReCEPD aims at fostering development of the Greater Bay Area (GBA) initiatives through collaborative activities with a strong focus on education policy issues. It uses evidence-based research to inform and improve policy and practice in education in GBA.

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