Centralized Student Choice and Assignment Systems in Primary and Secondary Education in China

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Abstract

The adoption of Centralized Student Choice and Assignment Systems (CCAS) has been on the rise worldwide. Over the past two decades, major Chinese cities progressively established CCAS in primary and secondary school admissions. I have assembled a data set documenting the presence and attributes of CCAS in 2022 for 134 cities with populations exceeding one million. CCAS for high schools were introduced between 2003 and 2022, with a pronounced surge in adoption between 2010 and 2016. Among the 73 cities for which high school matching mechanisms were identified, the Chinese Parallel was employed by nearly 60 percent of these cities, while Boston and Deferred Acceptance each comprised 13 percent. Almost all CCAS for primary and middle school education were adopted around 2020, in response to the national policy synchronizing admissions between public and private schools. The coverage and variation of CCAS warrant more research on their optimal forms and welfare implications.

Keywords: Education Market, Labor, School Choice, Matching Mechanisms

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I Introduction

In education, a Centralized Student Choice and Assignment System (CCAS) is characterized by educational institutions with (at least partially) externally determined enrollments, applicant preference submissions to a centralized agency, and the agency's authority to issue a single offer based on specific criteria and allocation rules. Neilson (2019) documents the global rise of CCAS in primary, secondary, and tertiary education systems. Recent research investigates key CCAS features, such as establishment timelines, preference list formats, and assignment mechanisms, with a focus on promoting educational equity (Akbarpour et al., 2022; Arteaga et al., 2022; Kapor, Neilson and Zimmerman, 2020).

Worldwide adoption of CCAS underscores the importance of investigating optimal forms of CCAS under different socioeconomic circumstances. China, with its vast population (20% of the world), 291 million students, 18 million teachers, and effective governance, stands out as a critical research area (Ministry of Education of the PRC, 2022). It is susceptible to influential educational reforms and may provide insights applicable to other regions.

This paper is the first to identify the current presence and attributes of CCAS in Chinese secondary and primary education.[1] Previous research on admission systems in China has primarily centered around the college entrance exam (known as the Gaokao), the history of education policy, and optimal matching mechanisms in education markets.

The Gaokao, an annual nationwide examination administered at the provincial level, is the primary determinant of students' priority rankings in college admissions. Recent trends show its increasing dominance over other criteria in the ranking process. Graduates from high schools within a province compete for slots in universities and colleges across the country. China adopted a centralized tertiary education admission system in 1952 to address issues with a previously decentralized scheme, including a low enrollment-to-admissions ratio due to non-single assignments and unequal access to higher education across equally qualified individuals caused by a manipulable mechanism. On the other hand, successful regional centralization efforts by 73 universities in 1950 prepared for a national transition (Chen and Kesten, 2017; Yang, 2007). Chen and Kesten (2017, 2019) provide detailed descriptions of the system and document the trajectory of the Chinese college admission mechanism, emphasizing the shift from "sequential" to "parallel" mechanisms to reduce manipulation. Due to its longevity and scope, the tertiary admission system has been the only CCAS studied in China. There are a myriad of studies that scrutinize the sociological consequence of Gaokao from different vantage points (Liu, 2013; Gierczyk and Diao, 2021) and more that exploit the Gaokao data to estimate returns to elite higher education (Jia and Li, 2021) and other phenomena like intergenerational belief transmission (Roland and Yang, 2017). These studies, although not directly analyzing tertiary CCAS, provide detailed characterizations of the college admission system and

[1] In China, primary school lasts 6 years, middle school 3 years, and high school 3 years. Primary and middle school education are compulsory. The local Bureau of Education often addresses them using the same policy document. Therefore, this paper jointly discusses primary and middle school education. Secondary education includes middle and high school, which are also referred to as junior and senior secondary school. High schools follow a separate policy document. Basic education refers to 12 years of primary, middle, and high school education.

underscore the significance of CCAS research.

While there is substantial overview literature on various aspects of the Chinese education system, including its structure, key constituents (e.g., teachers, students, and curriculum), government institutions, and policies, little attention has been given to the admission processes at lower education levels (Guo, Huang and Zhang, 2019; OECD, 2016; Zhou, 2021). Notably, no study has examined the school-student matching mechanisms and typical procedures for Chinese parents to enroll children in primary, middle, or high schools. This paper addresses a research gap by analyzing the establishment of CCAS in major cities, contributing to a contemporary historical narrative of education policy shifts. It highlights the transition from a decentralized to a centralized system. For further historical context, see Zheng, Chengyue (2018) for a brief account of Chinese high school admission policy before 2010 and Tsang (2000) for a detailed history of education policies in China from 1949 to 2000.

In this study, I examine the local school admission policies of 134 major Chinese cities with populations exceeding 1 million in 2020. As of 2022, all 134 cities had implemented CCAS for high school admissions, while 114 had CCAS for primary and middle school (compulsory education) admissions. I collected cross-sectional data on the characteristics of these CCAS by aggregating information from municipal bureaus of education, local news, and blogs.

The adoption of CCAS for high school admissions took place between 2003 and 2022, with a notable surge between 2010 and 2016. Preliminary evidence suggests a correlation between higher gross regional product per capita or city population and earlier CCAS adoption. In contrast, the adoption of CCAS for primary and middle school occurred later, with the first transition in 2010 and the majority (105 out of 114) happening after 2019. This shift was primarily driven by a national policy that unified public and private school admissions, initially announced in 2018 and later reemphasized in 2019.

In the high school CCAS examined, most encompass both public and private schools, with a considerable variation in list lengths across cities. Among the 73 cities with documented mechanisms, nearly 60 percent primarily employ the Chinese Parallel (CP) mechanism, despite the proven stability and strategy-proofness of the Deferred Acceptance (DA) mechanism (Gale and Shapley, 1962; Roth, 1982; Abdulkadiroğlu and Sönmez, 2003; Chen and Sönmez, 2006; Ergin and Sönmez, 2006). Approximately 13 percent each use the Boston and DA mechanisms, while about 8 percent combine Serial Dictatorship (SD) and Boston. The remaining 7 percent allow students to adjust their preferences before a specified deadline or in real-time as information is updated. While minor variations exist in break-tie rules and priority groups across cities, they generally follow stable and predictable patterns on a larger scale.

To determine initial priority among students, household registry eligibility criteria are frequently employed. Furthermore, as a response to China's recent shift away from the "one-child policy," a new provision allows siblings to be considered together in the assignment process.

The case of primary and middle schools is different from that of high schools due to the nature of compulsory education. students seeking admission to public schools are often limited to expressing a single preference or

none at all. Those applying to private schools can specify their preference for one school. When the number of applicants to a particular private school is equal to or less than the available seats, all applicants gain admission. If the number exceeds the available seats, the school resorts to a random selection process to fill the seats. Cities vary in their policies regarding public and private school admissions. Some design the two tracks to be exclusive, some do not; among the latter, some require an indication of a preferred public school under all circumstances, some do not. To determine initial priority among students, household registry eligibility criteria are employed. Furthermore, in response to China's transition away from the one-child policy, a new provision allows siblings to be considered together in the assignment process.

The paper proceeds as follows. Section 2 details the data structure and data collection methods for the CCAS cross-section. Sections 3 and 4 provide descriptive statistics and a narrative for the gradual expansion of CCAS in high school and compulsory education in 21st-century China. Sections 5 and 6 summarize the attributes of current CCAS in 2022. Section 7 concludes. Standard policies and procedures of basic education enrollment are included in the appendix.

II Data

I have constructed a cross-sectional data set that captures the admissions policies of primary and secondary education systems across 134 major Chinese cities in 2022.[2] To maximize the population coverage of this study, cities were selected into the sample if their population exceeded one million in 2020.[3]

This data set identifies the presence of CCAS in each city, for both compulsory and high school education. It also documents attributes of existing CCAS, including participating institutions,[4] preference list lengths, application websites, the implementation year of the current CCAS, priority groups, and mechanisms (such as DA, CP, SD, and Boston). These variables will be explained in detail in the following paragraphs.

The determination of the existence of CCAS in a given city includes both city-level and sub-city district-level CCAS that cover both public and private schools, as well as city-level CCAS that exclusively cover public schools. Though these cases will be separately considered in subsequent analyses. The variable "participating institutions" pertains to the scope of the CCAS, specifically regarding its coverage of public schools, private schools, or both. "List lengths" denote the number of school choices that a student can include in their application on the centralized platform to express their preferences. The interpretation of list lengths may vary depending on the specific mechanisms employed.

The "application website" refers to the online platform where parents can access and submit their children's

[2] In rare instances when the policy document for 2022 was unavailable, I relied on policy documents from 2023 or 2021.

[3] Population data for cities were retrieved from the citypopulation website, which is based on the 2020 census. Two regions, the Wanzhou District of Chongqing and Changsha Xian of Changsha, have been intentionally omitted from the data set. This omission is attributed to the administrative statuses of these regions. Chongqing holds the status of a provincial-level municipality, with Wanzhou functioning as a sub-city region. Similarly, Changsha is categorized as a standard municipal-level municipality, making Changsha Xian a sub-city region. CCAS are typically organized at the level of municipalities, whose Chinese names conclude with "city" ("shi"), irrespective of whether the city holds provincial or municipal status.

[4] Public schools, private schools, or both.

required information and preference lists, if applicable. While this is typically a government website, certain entries in the data set redirect to external websites that aggregate links to the destination website. This can occur when the primary website cannot be located, when multiple application sites are available, or when the application method deviates from a traditional website to a WeChat official account or app.

In addition to these variables, the data set incorporates information about priority groups and mechanisms.[5] All of these variables are typically found in publicly available policy documents.[6] These documents are disseminated by the municipal Bureau of Education (BoE). In instances where official sources are lacking or provide insufficient detail, ministerial sources are supplemented with information from blogs and news sources. It is essential to underscore that these supplementary sources are deemed credible as they are primarily authored by educational institutions or individuals to guide local parents through the application procedures. Notably, there is a considerable degree of redundancy in content and phrasing across various unofficial sources. This phenomenon suggests prevalent internet plagiarism but also raises the likelihood that these materials originated from a limited set of sources, likely official government channels.

The identification of CCAS within China's compulsory education sector primarily relies on the examination of a city's regulations governing student applications across public and private schools. Key inquiries revolve around whether students have the option to apply to both types of institutions and whether the admissions processes in these two systems operate independently. To maximize information retrieval efficiency, my main search terms on Baidu center around these inquiries.[7] Narrowing search terms from the variable names down to questions regarding the relationship between private and public school application only is a valid simplification without information loss. This is due to the system's commitment to guarantee that eligible children secure a school seat and avoid being assigned to multiple public schools at any stage of the application process.

When it comes to high school admissions, the public-private school distinction becomes less important. Cities often sort high schools into fewer than eight batches. Students apply to each batch sequentially, and schools within a batch compete for students who apply to this batch. The majority of policy documents explicitly specify that students admitted in earlier batches are no longer eligible for consideration in subsequent batches. The application processes for both types of schools are frequently integrated into different batches of the same admission system. Sometimes public and private schools belong to the same batch.[8] Within-batch single assignment and the sequential design of batches together ensure the overall single assignments in a high school CCAS.

Identifying the CCAS implementation year poses is challenging. And the definitions of this attribute vary between high school and compulsory education due to differences in data availability and institutional specifics. In this research context:

For high schools, CCAS implementation year is defined as the year when a city transitions from a decentralized system to a centralized one, while aligning with the criteria outlined at the beginning of Section I. However,

[5]Please find the detailed description of these two variables in Section V

[6]They are often titled "Guiding Opinions on xxx City's Compulsory/High School Education Enrollment in 2022."

[7]Baidu is widely recognized as China's leading search engine, often referred to as "China's Google" (The Investopedia Team, 2023).

[8]For example, Tangshan.

conducting a comprehensive check of all these criteria for each individual city was not feasible due to limited historical information available online. To estimate the switch year, I primarily conducted searches using keywords that combined "centralized platform" with indicators of a transition, such as "initiated," "first time," or "started." This search approach yielded numerous local news reports that documented the establishment of a centralized online application platform. In cases where no such news reports were available, I employed a trial-and-error manual search approach. For high schools, I included additional year terms within the range of 2000-2022. The process continued until I identified a year when a centralized choice and assignment system was reported, and the previous year either lacked such a system or did not yield search results. In this way, I identified implementation years of high school CCAS for 129 out of 134 sampled cities.

However, this approach is limited by several implicit assumptions. First, I assume that the establishment of CCAS is synonymous with the adoption of an online centralized platform, which parents use to provide their children's profiles for verification, submit preference lists, and receive assignments. This substitution is unavoidable because only information regarding the latter is present, and that CCAS is a new concept. It is credible because for the cities that had enough information in the year of the switch, this assumption always held. Second, since the single assignment criterion was not explicitly verified during the search process, I also assume that the key features of CCAS have remained stable over time since the initial switch, thus justifying a system being recognized as CCAS at its inception because it functions as such presently. This assumption could not be checked because the granularity of policies details diminishes as I delve further into the past. Third, there is an overarching assumption that policies are executed as articulated in official documents. I am conducting interviews with local officials and school teachers to verify this. So far, evidence from Changsha supports this assumption.

For primary and middle school education, the CCAS implementation year is more precisely defined as the establishment date of the current CCAS, whereas I cannot claim that CCAS for high schools have remained the same since its recorded establishment date.[9]

III The Adoption of CCAS over Time: High School

Table A1 provides a summary of the names of the sampled cities, their population in 2020, and the years in which they established a CCAS in high school and compulsory education admissions. The adoption of high school CCAS exhibited a gradual trend spanning from 2003 to 2022. Using the method elaborated in Section II, I identified establishment dates for 129 out of 134 cities.[10] The five cities with missing data all have a below-median population. Taizhou, Cixi and Jiangyin are in the third quartile of the population distribution, while Changshu and Zhangjiagang are in the fourth quartile. Jiangyin, Changshu and Zhangjiagang are in Jiangsu Province, and Taizhou, Cixi are in Zhejiang Province. Both of these provinces have large populations and each

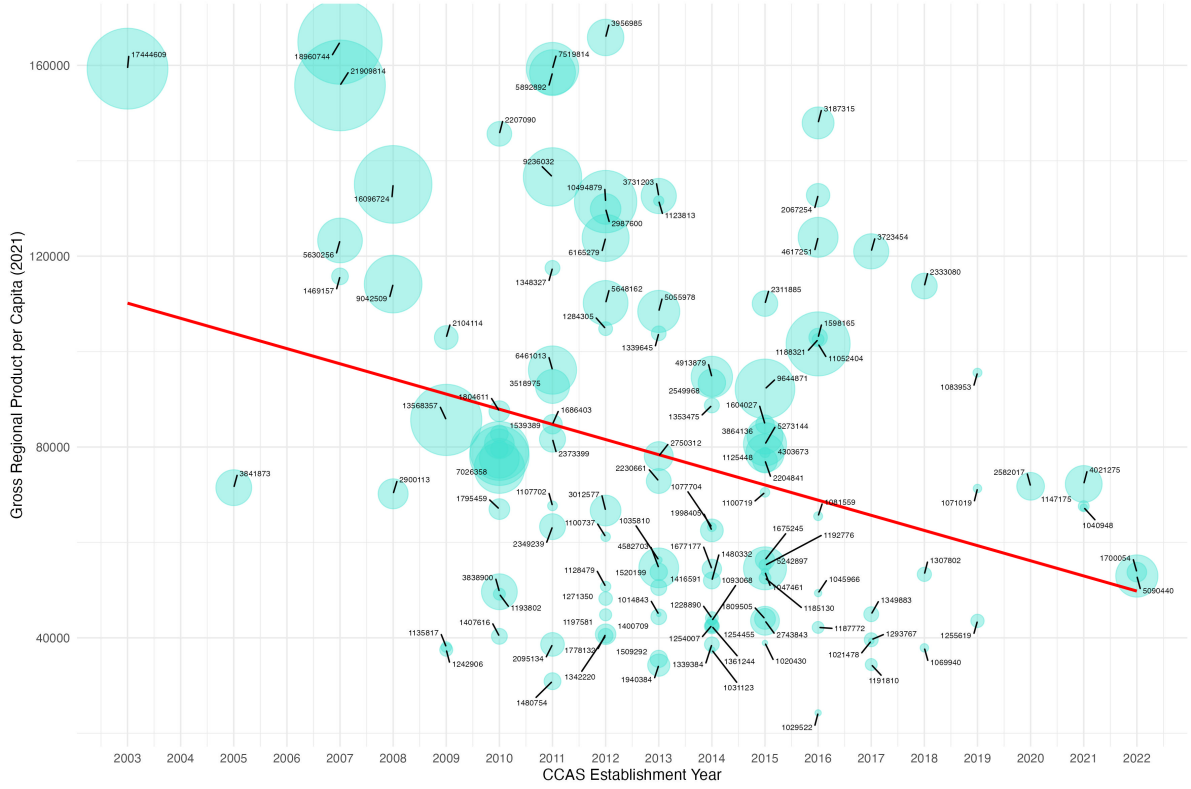
[9] It is often identified by an explicit statement in a government document or news page, "This year is the first year our city enforces a fully centralized admission scheme (and executes computer-generated random assignment)."

[10] However, as will be made clear in Section V, all 134 cities have a city-level CCAS for their high schools as of 2022.

has 17 and 11 cities whose population exceeded 1 million in 2020, respectively. Consequently, it is reasonably safe to assume that the omission of these cities does not introduce structural bias, as they can be roughly represented by neighboring cities sharing the same provincial government or similar geographical and cultural traits.

Figure 1 plots 129 cities' per capita Gross Regional Product (GRP) in 2021 against their high school CCAS establishment years. The GRP data are from the National Bureau of Statistics's China City Statistical Yearbook.[11] The size of each bubble is proportional to the city's population in 2020, which is annotated on the bubbles. The Ordinary Least Squares (OLS) regression line without controls is downward sloping, suggesting a potential negative relationship between GRP and CCAS establishment year. In other words, regions with higher levels of development may have adopted CCAS earlier. However, for a more robust exploration of valid predictors of CCAS adoption, a larger sample size and data on additional city characteristics beyond what the City Statistical Yearbook offers are necessary. Future research may address this issue.

Figure 1: CCAS Establishment Year (High School)



Notes: This figure plots 129 cities' per capita Gross Regional Product (GRP) in 2021 against their high school CCAS establishment years. The size of each bubble is proportional to the city's population in 2020, which is annotated on the bubbles. The red Ordinary Least Squares (OLS) regression line without controls is downward sloping, suggesting regions with higher levels of development may have adopted CCAS earlier.

Figure 2 illustrates the cumulative adoption of high school CCAS over time. Together with Figure 3, we see that 2010-2016 witnessed a significant upsurge in CCAS adoption among the largest cities in China. This period contrasts with the relatively slow progress observed from 2003 to 2009 and from 2017 to 2022. Guangdong's

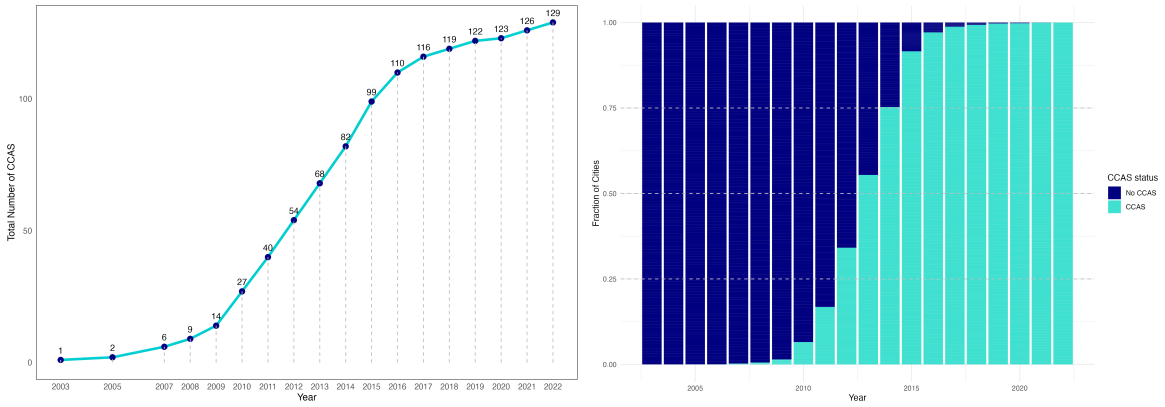
[11] Please refer to http://www.stats.gov.cn/sj/ndsj/2022/indexeh.htm. Note that data for 2022 are not yet available.

provincial capital, Shenzhen, established the first high school CCAS in China in 2003. Other cities in Guangdong and Fujian provinces swiftly followed suit, indicating the possibility of a policy spillover to nearby areas. Among the cities that adopted CCAS before 2010, Beijing, Shanghai, Changsha, and Chengdu were not geographically coterminous to Shenzhen but were among the most developed cities in China. Consequently, they were presumably well-equipped to be the next candidates for a transition to CCAS. New adoptions peaked in 2015. After 2018, there were sporadic adoptions of CCAS. As of 2023, not only all of these 129 cities, but also the five cities whose CCAS establishment dates are unavailable, have have implemented a city-level high school CCAS.

This partial explanation addresses the ”how” but leaves the ”why” of the surge in CCAS adoption from 2010 to 2016 unanswered. Further research examining other policies, as well as socioeconomic, technological, and institutional shifts over the past two decades, is required to provide a comprehensive explanation for the rise in high school CCAS adoption. The driving force behind the wave of CCAS adoption from 2010 to 2016 remains an open question. Given that CCAS adoption is largely associated with the establishment of an online platform where parents can submit children's information and preferences and receive notifications of the final school assignment results, one might surmise that technological feasibility played a significant role. China achieved full connectivity to the Internet in 1994, and efforts to use the Internet as a means of bridging the government and the general public have been ongoing since 1999 (Liu and Pan, 2017). More research is needed to evaluate the existence of technological barriers that could have hindered the establishment of CCAS. Many news reports announcing the transition to an online school choice platform emphasized the goal of simplifying the school choice process for parents. The government has labeled the adoption of a centralized school application platform to be a part of the government's systematic effort guided by the ideology to ”make things more convenient for the people” (”bian min”). While there may have been pressure from parents to improve the application process, no documentation supporting this notion has been found. This partially answers why CCAS have been established but not why there was a surge in 2010-2016. Further research on other policies and socioeconomic, technological, and institutional shifts in the past two decades is needed to provide a coherent explanation for the pattern of the rise of high school CCAS adoption.

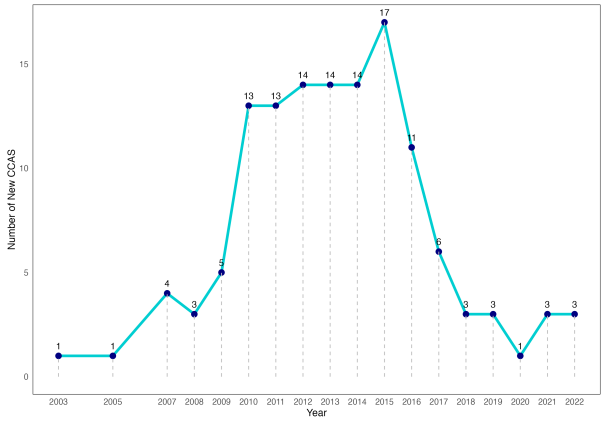
Figure 2: The Accumulation of High School CCAS over Time

(a) Number of City-Level CCAS (High School) by Year (b) Fraction of City-Level CCAS (High School) by Year



Notes: This figure describes the over time adoption of high school city-level CCAS among the 129 cities. Panel (a) presents the cumulative number of CCAS from 2003 to 2022. Panel (b) shows the fraction of cities with a CCAS versus those without a CCAS in each given year.

Figure 3: The Annual Count of New High School CCAS



Notes: This figure displays the annual count of newly adopted high school city-level CCAS among the 129 cities.

IV The Adoption of CCAS over Time: Primary and Middle School

The adoption of CCAS for primary and middle schools took a significantly different path compared to that for high schools. In 2018, China's Ministry of Education first suggested synchronized admission of private and public schools nation-wide in its annual guideline notice for basic education enrollment.[12] In 2019, the regulation was restated with an additional emphasis on its main objective of eliminating the any selection of students by schools within mandatory education.[13] The unification of public and private school admissions aimed to enhance the equitable distribution of educational resources and reduce the parents' stress when navigating the system.[14] Based on municipal policy documents, all sampled cities had implemented the synchronization policy by 2022.

[12] Please see http://www.moe.gov.cn/srcsite/A06/s3321/201802/t20180223_327619.*html*

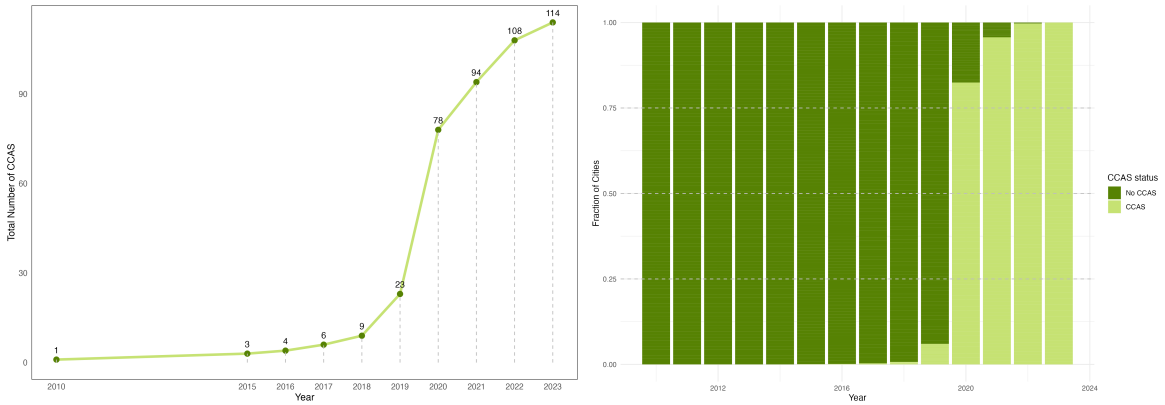
[13] Please see http://www.moe.gov.cn/srcsite/A06/s3321/201903/t20190326_375446.*html*

[14] My current senior thesis investigates to what extent these objectives have been achieved.

Figure 4: The Accumulation of Primary and Middle School CCAS over Time

(a) Number of City-Level CCAS (Primary and Middle School) by Year

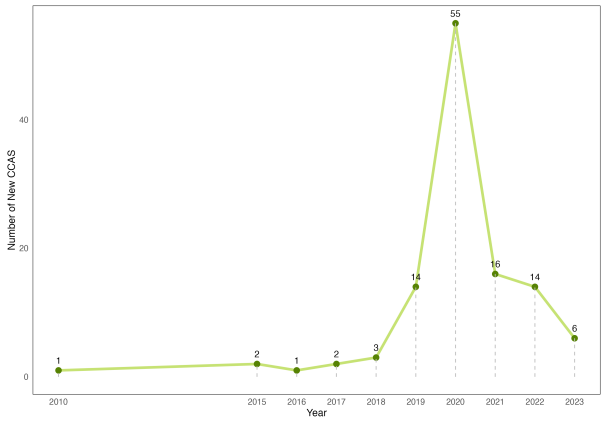
(b) Fraction of City-Level CCAS (Primary and Middle School) by Year



Notes: This figure describes the over time adoption of primary and middle school city-level CCAS among 114 cities. Panel (a) presents the cumulative number of CCAS from 2010 to 2023. Panel (b) shows the fraction of cities with a CCAS verses those without a CCAS in each given year.

Using the search method outlined in Section II, I was able to determine the city-level CCAS establishment year for 114 out of 134 cities. Figure 4 provides an overview of the adoption of city-level CCAS for primary and middle schools across these 114 cities over time. Panel (a) presents the cumulative number of CCAS from 2010 to 2023. Panel (b) illustrates the fraction of cities with a CCAS versus those without one in each year. The adoption of CCAS for compulsory education is notably concentrated in 2020, following the MoE's emphasis on its implementation in 2019. Overall, CCAS adoption at the compulsory education level tends to occur later than at the high school level, indicating a general pattern of centralization gradually "trickling down" different tiers of education, from tertiary to secondary to primary. Figure 5 plots the yearly adoption of CCAS. Nearly half of the sampled cities transitioned to CCAS in 2020, while a significant number did in 2019, 2021, and 2022. However, beyond this time frame, there were few instances of CCAS adoptions.

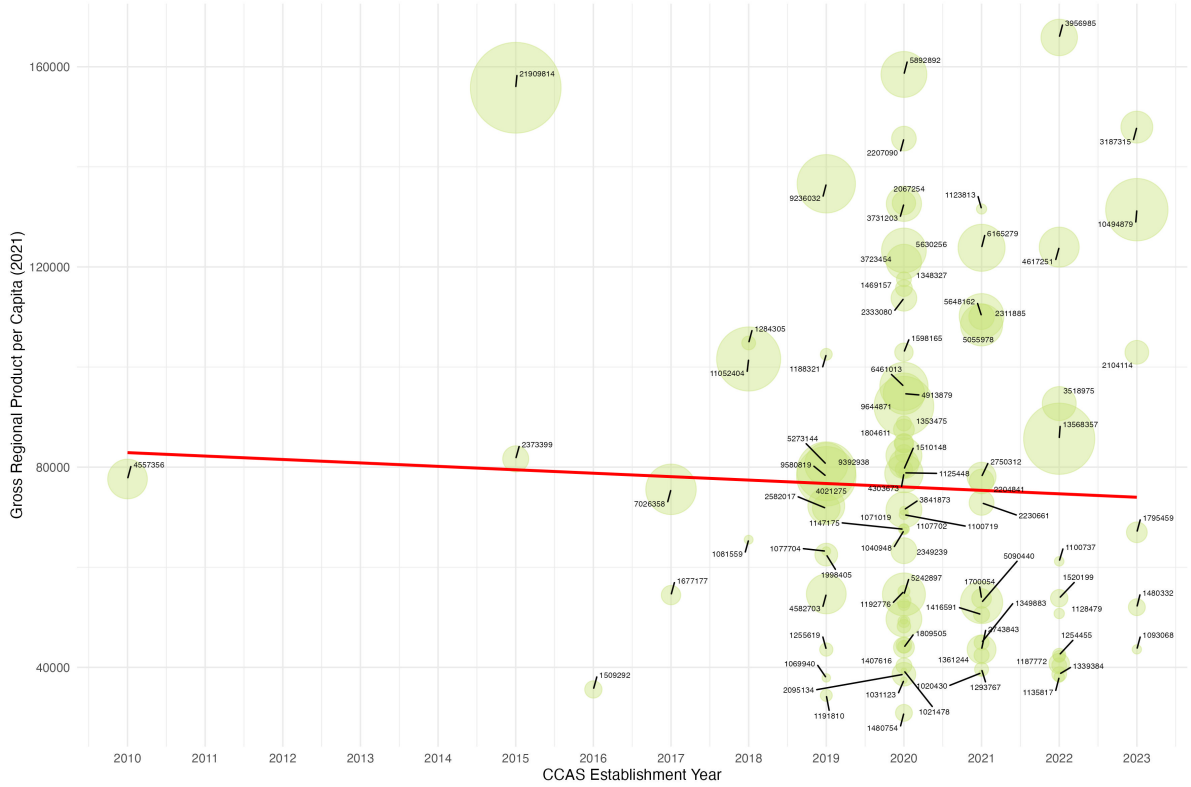
Figure 5: The Annual Count of New Primary and Middle School CCAS



Notes: This figure displays the annual count of newly adopted primary and middle school city-level CCAS among the 114 cities.

Figure 6 explores the potential correlation between the establishment year of mandatory education CCAS and city characteristics such as GRP per capita and population size. There is not a clear relationship between cities adopting CCAS earlier and having a higher GRP per capita or a larger population. This suggests that other factors may be influencing the varied adoption of CCAS despite the presence of a shared national policy. Further research is necessary to uncover the underlying reasons for this uneven adoption pattern.

Figure 6: CCAS Establishment Year (Primary and Middle School)



Notes: This figure plots 114 cities' per capita Gross Regional Product (GRP) in 2021 against their compulsory education CCAS establishment years. The size of each bubble is proportional to the city's population in 2020, which is annotated on the bubbles. The red Ordinary Least Squares (OLS) regression line without controls is flat, suggesting no correlation between regional development level and CCAS adoption time.

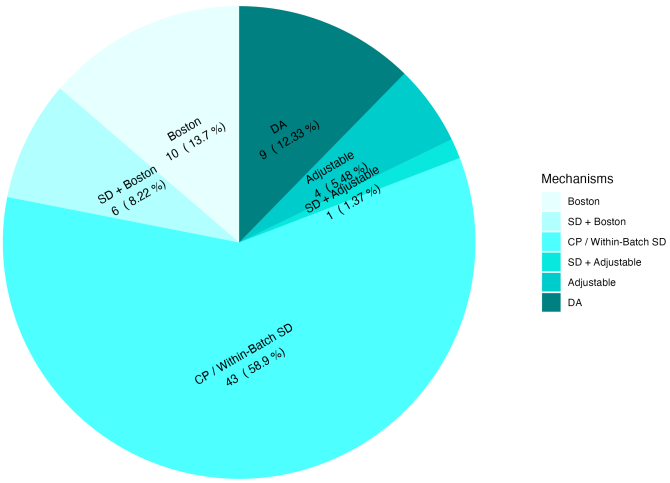
V Current CCAS: High School

After discussing the historical adoption trend of CCAS for high schools and mandatory education, I will now provide an overview of the characteristics of the existing CCAS in the cross-sectional data set I have compiled for 134 cities.

A Participating Institutions

While data regarding CCAS establishment dates are missing for 5 cities, it is evident that by 2022, all 134 cities have implemented a city-level CCAS for their high schools. Since high schools are also subject to the policy that "private and public schools admit together," the majority of existing CCAS cover both private and public schools.

Figure 7: The Distribution of Mechanisms among High School CCAS



Notes: This pie chart plots the distribution of mechanisms found among 73 cities' high school CCAS. The name of the mechanism, the absolute number of occurrences and the percentage are annotated on the graph.

There are a few exceptions, such as Guilin and Rizhao, where the CCAS operates at the city-public level, as private school admission has not yet been integrated into the same regulatory system. In these cases, students or parents must physically visit their preferred private school to apply, indicating a decentralized application process.

B List Length

List lengths for CCAS applications vary significantly among cities, with almost no two cities sharing the same list length. The number of batches varies from 2 to 15, and there is usually a maximum list length set for each batch. While some batches require students to indicate their preferences, others may not require this.

C Mechanisms

Figure 7 provides an overview of the distribution of different mechanisms among the 73 cities whose mechanisms I could infer.[15] Among the 73 cities, 43 predominantly employ the CP mechanism, which is equivalent to within-batch SD. Six cities explicitly use a combination of CP and Boston for different batches, and one city employs a combination of CP and allows for real-time adjustment to submitted preferences.

There are nine cities whose mechanisms seem to be DA with a threshold score: Zhengzhou, Luoyang, Nanyang, Xinxiang, Kaifeng, Pingdingshan, Shangqiu, Xinyang, Changsha. Except for Changsha, which is in

[15]Note that the discussion of mechanisms in this paper is preliminary and at most suggestive. More investigation is needed to ensure that these mechanisms on paper are implemented accordingly. Also, the mechanism for a given city is almost never clean-cut. That is, a city always employs a combination of various mechanisms. And the proportion of students admitted through each mechanism varies across cities. I only discuss the mechanism for "normal admissions" here. The 73 cities may not be representative of the population since the difficulty of retrieving mechanisms may correlate with other factors related to the mechanism itself.

Hunan province, all of these cities are from Henan province.[16] These nine cities admit students based on an "admission score line," which differs from the threshold score and can vary among high schools and different types of admission (independent admission, normal admission, and distributive admission being the most common types).[17]). This process resembles DA because the admission score line is determined through a recursive process that involves continuous assessment of school capacity, student scores, and the parallel preferences of students. Consequently, if a student with a higher score fails to secure their top-choice school, they may replace a student with a lower score who was initially accepted by their top-choice school. This replacement can occur when the former student's second-choice school aligns with the latter student's top choice in the school's admission queue.

There are four cities that enable students to make real-time adjustments to their preference choices based on up-to-date information regarding their current ranking and school capacity. In this case, students are limited to selecting only one school at a time, resulting in a list length of 1. These cities are Nanning, Guilin, Hohhot and Baotou. Zunyi follows a unique approach by combining within-batch SD with the option for adjustments, permitting up to three adjustments before the application deadline.

D Break-Tie Rules

The specific break-tie rules employed in these cities may vary in detail, but they typically involve evaluating a combination of subject scores and "comprehensive quality evaluation results." The latter metric is introduced to promote a shift toward "quality education" in China, as opposed to the traditional "exam-oriented education" approach. For instance, in Jieyang, when candidates have identical scores in the high school entrance examination (the Zhongkao), their ranking is determined based on the order of single subjects and scores in the following sequence: Chinese, Mathematics, English, Physics, Chemistry, Morality and the Rule of Law ("Politics"), History, Biology, Geography, and Physical Education. In Wurumqi, students with tied Zhongkao scores are sorted by, moving from one criterion to the next if the tie persists: comprehensive quality evaluation results, the number of A grades in each subject in the academic proficiency test for middle school graduates, physical examination grade, and the total score of the three core subjects: Chinese, Mathematics, and English.

E Priority Groups

Prioritized groups may have a higher initial ranking in the primary or middle school assignment process, or receive bonus scores that add to their Zhongkao scores. Priority group policies exhibit a high degree of uniformity across all cities, as they are subject to national regulations. These standard priority groups typically include children of

[16] Both Hunan and Henan are recognized for their strong performance in education, particularly in terms of student outcomes in the Gaokao. They also have a history of pioneering education reforms. Changsha, for instance, adopted a CCAS for its high school education in 2007, making it rank among the earliest 5 percent of adopters among the 129 cities examined in this study.

[17] Independent admission often applies to students with special talents in areas such as sports, music, dance, and the arts, constituting smaller than 10 percent of the admitted cohort. To improve educational equality, China has long been exploring the practice of distributing high school seats to middle schools, particularly those from disadvantaged backgrounds. In 2002, a ministerial document encouraged this policy. The goal is to eventually achieve 100 percent and make distributive admission the only means for admission. Most sampled cities have reached over 50 percent in 2022. However, there are variations in how distributed seats for a given middle school are allocated to students within that school. The effectiveness of this policy in improving educational equity in both the short and long term requires further study.

martyrs, children of eligible active servicemen, children of public security heroes and police officers who died on duty, children of national comprehensive fire rescue team members, and children of government-certified high-level talents. Occasionally, priority may also be extended to children of individuals who have made significant contributions to the local economy. Some cities have introduced new priority groups, such as children of medical personnel actively combating COVID-19 on the front lines, while many are reducing or eliminating bonus scores for children of minority ethnicity (excluding Han ethnicity).

VI Current CCAS: Primary and Middle School

Among the 134 cities studied, 114 have established a city-level CCAS for compulsory education, while 13 cities have only district-level CCAS. The latter includes either oversized cities like Shenzhen, Guangzhou, and Beijing, or cities on the smaller end that have not yet unified their admission system. One major city, Nanjing, lacks a CCAS due to non-single assignments, as students can be assigned both to a public school and a private school. In Xining, parents still need to enroll their children at school in person. Unfortunately, no indicative information was found for Nantong, Chaozhou, Jieyang, Changshu, Huzhou, and Zhaoqing regarding their CCAS status.

A Participating Institutions

All 114 cities with city-level CCAS include both private and public schools in their centralized admission system, aligning with the policy mandating synchronized public and private school admission mentioned in Section IV.

B Mechanisms and List Lengths

The 2019 ministerial document, which mandated synchronized public and private school admission, also specified the main mechanisms for both public and private school admissions.

For public schools, student assignments are primarily based on their residential addresses. Since 2014, the Ministry of Education has prohibited the use of tests as a means of selection, as outlined in the "Implementation Opinions of the Ministry of Education on Further Improving the Enrollment of Primary School Graduates in Junior High Schools Nearby and Test-Free."[18] Parents generally need to log in to the official portal, provide their children's personal information, family residential address, and scanned documents like house ownership certificates and household registers. These documents are used to determine a child's initial eligibility and priority on the roster. Parents either indicate one preferred school or are not required to submit a preference.

For private schools, students are often asked to indicate one preferred school. If the number of students applying to a particular private school is equal to or smaller than the number of available seats, all applicants are admitted. If the number of applicants exceeds the available seats, the school admits students randomly until all seats are filled. In comparison, public schools are usually not subject to a rigid capacity constraint. Variation

[18] Please see https://www.gov.cn/gongbao/content/2014/content$_2$679352.*htm*.

in implementation across cities primarily depends on how they coordinate the private school and public school systems. Some cities allow applications to both types of schools, while others require applicants to choose one. Some mandate that if a student applies to a private school, they must prove they have secured a seat in a public school as a fallback option. Additionally, some cities lower the priority of students in the public school applicant pool if they apply to private schools,[19] while others do not, or impose a time lag between the two processes.

The "private and public admit together" policy, coupled with the prohibition of any form of selection, was introduced to address issues related to private schools' practice of early admissions to secure the best students in advance. The underlying idea was that by eliminating the safety net of good public school options for wealthier parents, they would weigh the trade-off more carefully. Prior to this policy, affluent parents would often apply to private schools as a first choice and fall back on public schools if necessary, leading to the occupation of more opportunities than they needed (Jin, Wang and Huang, 2023). However, the extent to which this policy has achieved its goals warrants further research.

C Priority Groups

Given the universal nature of compulsory education, the priority groups are an extension of the eligibility criteria. The highest priority is typically accorded to children who meet the "three consistencies" criteria: their place of registration matches that of their parents (or grandparents or grandparents-in-law) and they reside together in the school district. Additionally, their registered residence should align with the house ownership certificate, which should have residential nature and purpose. The more these "three consistencies" are violated, the lower the initial priority of the child on the admission list.

Furthermore, the option to tie siblings together in the school assignment process so that they are assigned the same school has been introduced as a priority consideration, in response to China's transition away from the one-child policy.

VII Conclusion

This paper explores the school admission policies of 134 Chinese cities with populations exceeding 1 million in 2020. It compiles cross-sectional data on the presence and characteristics of CCAS for high school, middle school, and primary school admissions.

As of 2022, 134 of these cities have implemented CCAS for high school admission, while 114, CCAS for primary and middle school (compulsory education) admission. The adoption of CCAS for high school admission occurred between 2003 and 2022, with a notable surge between 2010 and 2016. Preliminary evidence suggests a correlation between higher gross regional product per capita or city population and earlier CCAS adoption, indicating more developed regions may be better equipped for and receptive to the implementation of CCAS.

[19] These individuals may fail to be admitted in the best public schools, but will be guaranteed a seat at a school due to the nature of compulsory education.

The establishment of CCAS for primary and middle school occurred later than that for high schools, with the first transition in 2010 and the majority (105 out of 114) occurring after 2019. This shift was primarily driven by a national policy aimed at unifying public and private school admission, initially announced in 2018 and reemphasized in 2019.

I then summarize the newly collected cross-sectional data set documenting the characteristics of existing CCAS. At the high school level, the majority of the CCAS cover both public and private schools. List lengths vary greatly across cities. Of the 73 cities whose mechanisms I document, more than half primarily employ the Chinese parallel (within-batch serial dictatorship) mechanism. Boston and DA each comprise about 13 percent. There are minor variations in break-tie rules and priority groups across cities, but they are stable and predictable on the larger scheme.

For primary and middle schools, cities approach the coordination between public school and private school admission differently. Students who wish to attend a public school are often required to submit one preference or none. Those who apply to private schools can indicate one desired school. If the number of students who apply to a given private school is smaller than or equal to the number of seats offered, all applicants are admitted; if greater, the school admits randomly until the seats are filled. In addition to using household registry eligibility criteria to decide the initial priority of students, a new option of tying siblings together in the assignment process is stated in response to China's recent effort to shift away from "one-child policy."

Building on the CCAS characteristic data set, I also constructed a panel data set of the 134 cities' relevant characteristics ranging from 2003 to 2022, using the National Bureau of Statistics's China City Statistical Yearbook, which has a rich set of city-level socioeconomic indices.[20] The next step is to correlate city characteristics with high school CCAS establishment dates and build a prediction model for a when a switch to CCAS might occur in a new city. This could guide policymakers in evaluating whether a city is ready for CCAS and implementing them if conditions permit. It is intuitively assumed here that CCAS increase transparency and decrease off-platform manipulations, thus benefiting underprivileged sub-populations (Akbarpour et al., 2022). But rigorous assessment of the assumption is beyond this paper.

Testing a logit model of the CCAS indicator and city characteristics results in coefficients that are significant but extremely close to zero, which is expected due to the small sample size and limited sets of explanatory variables. Future research may better address this question once data points from around the world are compiled.

[20]Please see http://www.stats.gov.cn/sj/ndsj/2022/indexeh.htm. Data for 2022 are not yet available.

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A Appendix

A.1 Tables and Figures

Table A1: Sampled Cities, Population, and CCAS Establishment Years

City Name (ENG)	Population in 2020	Primary and Middle School CCAS Establishment Year	High School CCAS Establishment Year
Shanghai	21,909,814	2015	2007
Beijing	18,960,744	District-level	2007
Shenzhen	17,444,609	District-level	2003
Guangzhou	16,096,724	District-level	2008
Chengdu	13,568,357	2022	2009
Tianjin	11,052,404	2018	2016
Wuhan	10,494,879	2023	2012
Dongguan	9,644,871	2020	2015
Chongqing	9,580,819	2019	2010
Xi'an	9,392,938	2019	2010
Hangzhou	9,236,032	2019	2011
Foshan	9,042,509	District-level	2008
Nanjing	7,519,814	No CCAS	2011
Shenyang	7,026,358	2017	2010
Zhengzhou	6,461,013	2020	2011
Qingdao	6,165,279	2021	2012
Suzhou	5,892,892	2020	2011
Jinan	5,648,162	2021	2012
Changsha	5,630,256	2020	2007
Kunming	5,273,144	2019	2015
Harbin	5,242,897	2020	2015
Shijiazhuang	5,090,440	2021	2022
Hefei	5,055,978	2021	2013
Dalian	4,913,879	2020	2014
Xiamen	4,617,251	2022	2016
Nanning	4,582,703	2019	2013
Changchun	4,557,356	2010	2010
Taiyuan	4,303,673	2020	2015

Continued on next page

Table A1 – continued from previous page

City Name (ENG)	Population in 2020	Primary and Middle School CCAS Establishment Year	High School CCAS Establishment Year
Guiyang	4,021,275	2019	2021
Wuxi	3,956,985	2022	2012
Urumqi	3,864,136	2020	2015
Zhongshan	3,841,873	2020	2005
Shantou	3,838,900	2020	2010
Ningbo	3,731,203	2020	2013
Fuzhou	3,723,454	2020	2017
Nanchang	3,518,975	2022	2011
Changzhou	3,187,315	2023	2016
Lanzhou	3,012,577	District-level	2012
Nantong	2,987,600	NA	2012
Huizhou	2,900,113	District-level	2008
Xuzhou	2,845,552	2020	2010
Zibo	2,750,312	2021	2013
Linyi	2,743,843	2021	2015
Wenzhou	2,582,017	2019	2020
Tangshan	2,549,968	District-level	2014
Hohhot	2,373,399	2015	2011
Haikou	2,349,239	2020	2011
Shaoxing	2,333,080	2020	2018
Yantai	2,311,885	2021	2015
Luoyang	2,230,661	2021	2013
Zhuhai	2,207,090	2020	2010
Liuzhou	2,204,841	2021	2015
Baotou	2,104,114	2023	2009
Handan	2,095,134	2020	2011
Yangzhou	2,067,254	2020	2016
Weifang	1,998,405	2019	2014
Baoding	1,940,384	District-level	2013
Datong	1,809,505	2020	2015
Huai'an	1,804,611	2020	2010

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Table A1 – continued from previous page

City Name (ENG)	Population in 2020	Primary and Middle School CCAS Establishment Year	High School CCAS Establishment Year
Jiangmen	1,795,459	2023	2010
Ganzhou	1,778,132	2022	2012
lining	1,700,054	2021	2022
Xiangyang	1,686,403	2020	2011
Xining	1,677,177	2017	2014
Zunyi	1,675,245	District-level	2015
Yinchuan	1,662,968	2020	2012
Kunshan	1,652,159	2019	2016
Daqing	1,604,027	2020	2015
Wuhu	1,598,165	2020	2016
Mianyang	1,549,499	2022	2011
Putian	1,539,389	2020	2010
Qinhuangdao	1,520,199	2022	2013
Zhuzhou	1,510,148	2020	2010
Jilin	1,509,292	2016	2013
Taizhou	1,485,502	2020	$\leq$ 2022
Yiwu	1,481,384	2020	2022
Xingtai	1,480,754	2020	2011
Anshan	1,480,332	2023	2014
Quanzhou	1,469,157	2020	2007
Cixi	1,457,510	2020	$\leq$ 2022
Tai'an	1,416,591	2021	2013
Jinjiang	1,416,151	2020	2009
Nanyang	1,407,616	2020	2010
Zhanjiang	1,400,709	2020	2013
Guilin	1,361,244	2021	2014
Yancheng	1,353,475	2020	2014
Zaozhuang	1,349,883	2021	2017
Taizhou	1,348,327	2020	2011
Shangrao	1,342,220	2022	2012
Weihai	1,339,645	District-level	2013

Continued on next page

Table A1 – continued from previous page

City Name (ENG)	Population in 2020	Primary and Middle School CCAS Establishment Year	High School CCAS Establishment Year
Zhangjiakou	1,339,384	2022	2014
Jiangyin	1,331,352	2020	$\leq$ 2022
Maoming	1,307,802	2020	2018
Heze	1,293,767	2021	2017
Yichang	1,284,305	2018	2012
Xinxiang	1,271,350	2020	2012
Huainan	1,255,619	2019	2019
Nanchong	1,254,455	2022	2014
Chaozhou	1,254,007	NA	2014
Jieyang	1,242,906	NA	2009
Changshu	1,230,599	NA	$\leq$ 2021
Fushun	1,228,890	2020	2014
Qingyuan	1,197,581	District-level	2012
Kaifeng	1,193,802	2020	2010
Xianyang	1,192,776	2020	2015
Fuyang	1,191,810	2019	2017
Jiaxing	1,188,321	2019	2016
Anyang	1,187,772	2022	2016
Hengyang	1,185,130	2020	2015
Rizhao	1,147,175	2020	2021
Dazhou	1,135,817	2022	2009
Luzhou	1,128,479	2022	2012
Yueyang	1,125,448	2020	2015
Zhenjiang	1,123,813	2021	2013
Baoji	1,107,702	2020	2011
Yibin	1,100,737	2022	2012
Changde	1,100,719	2020	2015
Chifeng	1,093,068	2023	2014
Huzhou	1,083,953	NA	2019
Suqian	1,081,559	2018	2016
Bengbu	1,077,704	2019	2014

Continued on next page

Table A1 – continued from previous page

City Name (ENG)	Population in 2020	Primary and Middle School CCAS Establishment Year	High School CCAS Establishment Year
Lianyungang	1,071,019	2020	2019
Lu'an	1,069,940	2019	2018
Zhangjiagang	1,055,893	2020	$\leq$ 2022
Changzhi	1,047,461	District-level	2015
Pingdingshan	1,045,966	2020	2016
Jinhua	1,040,948	2020	2021
Zhaoqing	1,035,810	NA	2013
Shangqiu	1,031,123	2020	2014
Qiqihar	1,029,522	District-level	2016
Jinzhou	1,021,478	2020	2017
Liaocheng	1,020,430	2021	2015
Xinyang	1,014,843	2020	2013
Yuyao	1,013,866	2020	2017

Notes: This table summarizes the names of the sampled cities, their population in 2020, and the years in which they established a CCAS in high school and compulsory education admission.

A.2 Standard Procedures of Basic Education Enrollment

High School

1. Eligibility

   Eligibility for high school application is linked to the eligibility criteria for signing up for the Zhongkao. To qualify, a student must "love their motherland, abide by the law, and have good conduct," have completed middle school, and maintain good physical health. There may be slight variations in the specific registered residence requirements across cities. Students who are already enrolled in high school education or its equivalent are not eligible to apply.

2. Admission Region

   Public high schools are permitted to admit students exclusively from their designated school district, as mandated by the government. However, exceptions may arise in cases of student enrollment imbalances in specific schools, allowing government intervention to redistribute students across affiliated areas. Private high schools and vocational schools, on the other hand, may have the flexibility to admit students from different parts of the city. That is, their designated "affiliated area" may be the entire city as opposed to a sub-city district.

3. Application Procedures

   (a) Students interested in attending high school must submit their preference list through the BoE's designated website. The timing of this submission varies among cities. Of the 39 cities for which I documented this variable, 26 require students to submit their preferences after receiving their Zhongkao scores, and 13 allow submissions either before the Zhongkao examination, or after Zhongkao but before the score announcement.

   Priority groups are allocated bonus scores that augment a student's Zhongkao score, resulting in a "modified score." This modified score serves as the primary basis for a student's final ranking in the applicant pool.

   (b) The Bureau of Education assigns each student to one high school based on a specific mechanism, detailed in Section V, subsection C.

   (c) The student ultimately decides whether to accept the assignment and attend the designated high school.

Primary and Middle School

1. Eligibility

   (a) The eligibility criteria for primary and middle (junior high) schools in a given city encompass several categories of children and adolescents, including:

      i. Children and adolescents with household registration in the city;[21]

      ii. Eligible accompanying children of the migrant population;

      iii. Children and adolescents eligible otherwise as stipulated by national, provincial, and municipal policies:

         A. Children and adolescents whose parents work in China's overseas agencies or are dispatched abroad for long-term business, or who work in the field geological survey department, so that the child or adolescent in the place their household registration lacks a caretaker, and they need to be taken care of by relatives or fostered in this city;

         B. Children of active servicemen of the city's garrison;

         C. Children and adolescents whose immediate family members or other legal guardians are registered in this city, but who are: children of martyrs, children of soldiers who died on duty, children of soldiers with disabilities of level 1 to 4, children of soldiers who have won second-class merit in peacetime or third-class merit in wartime or above; children of active-duty soldiers stationed in state-recognized difficult and remote areas and the Tibet Autonomous Region, islands of the third category or above as designated by the People's Liberation Army's

[21] This category accounts for the majority of cases, and further details may specify how applicants are ranked or initially prioritized in the school assignment system. Please see Section VI subsection C.

headquarter, or of active-duty soldiers who work in high-risk and high-danger positions such as aviation, submarines, aerospace, and nuclear-related positions;

D. Children and adolescents of high-level talents or innovative and entrepreneurial talents in accordance with specific local policies and verified by local government departments;

E. Children and adolescents who are registered in Hong Kong, Macao, Taiwan, or are of foreign nationalities residing in this city.

iv. The above-mentioned children and adolescents must also meet the following requirements:

- Primary school (including the primary school sector of nine-year schools, similar below): Children who were born between September 1, (current year - 7) to August 31, (current year - 6) and aged 6 or above, or children who have been approved by the urban or county (city) education administrative department to postpone their compulsory education.
- Middle school: Fresh primary school graduates.

2. Admission Region

Public primary schools primarily admit students based on school districts. They may also admit students directly from affiliated primary schools.

Private schools can only admit students within their "approved area." The private schools approved by the district and county education administrative departments can only admit students within that district, and the private schools that have leftover seats from the first round of admission can usually participate in a supplementary round of admission. Private schools approved by the city municipal education bureau should first enroll students within the district where the school is located. Those who have leftover seats from the enrollment within the district can apply for a supplementary round of admission that expands the admission region to the entire city with the approval of the city municipal education bureau.

3. Application Procedures

(a) Parents or students create an account and log in on the designated website.

(b) They must submit eligibility documents (such as registered address and house property ownership certificate) and personal information (including name, ID, age, and gender).

(c) Applicants may be required to submit a preference, with rules varying across cities. In some cases, this step may be optional. For example, when this city requires no preference indication for public primary schools, or when a given primary school's graduating cohort is automatically admitted to a middle school.

(d) Supplementary admission rounds may occur for students who have not yet been assigned to a school after the initial rounds of admission.

(e) After a specified date, parents or students can check their school assignment results on the website, and there may be an option to receive notification of the result through a text message.