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Cost-Benefit Analysis of Free Early Childhood Education Policy in Taixing

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Abstract: ***This study conducts a cost-benefit analysis of Taixing, Jiangsu, China's 2023–2024 free early childhood education policy, aiming to fill gaps in China's county-level related research. Guided by the Human Capital Theory and international experiences, it uses local official data to analyze policy costs, including government fiscal expenditure, infrastructure investment, guidance funds, and tuition-free subsidies, as well as policy benefits such as a 100% enrollment rate, alleviated household burdens, and promoted educational equity. Results show Taixing optimized its cost structure—shifting from 2023's focus on infrastructure to 2024's balanced investment in both "hardware" and "software," with government spending increasing by 60.06%—and achieved core goals, but faces challenges like imbalanced support allocation and insufficient investment in "software." The study offers recommendations on resource balance, long-term mechanisms, and other strategies to inform local policy optimization.***

Keywords: Free Early Childhood Education, Cost-Benefit Analysis, County-Level ECE Policy, Policy Optimization

1. Introduction

In the contemporary educational landscape, preschool education has emerged as a cornerstone for a child's holistic development and a crucial determinant of a nation's long - term human capital quality. It serves as the foundation upon which a child's cognitive, social, emotional, and physical skills are built, significantly influencing their future academic achievements and social adaptability. As the first formal stage of education, preschool education not only equips children with basic knowledge and skills but also nurtures their curiosity, creativity, and learning attitudes, laying a solid groundwork for their lifelong learning journey.

The importance of preschool education has been widely recognized globally. For instance, studies have shown that during a person's growth, education received in childhood has a very high return on investment to society, as high as 7% – 17%. It can lead to improved educational attainment, higher earnings potential, and enhanced social and economic mobility in adulthood. China is in a situation where the rapid development of the economy and society have led to an increased demand for high - quality preschool education. We have seen the Chinese government working towards developing preschool education. There has been several policies, such as the "Several Opinions of the State Council on Current Development of Preschool Education" which provides strong policy support for the expansion and improvement of preschool education resources.

Even with increased attention and investment, the issue of preschool education cost is still a major issue. The cost of preschool education is composed of multiple facets of cost: cost of facilities, payment of teaching staff, rather it is salary, hourly pay or per diem payment, the cost materials for teaching, payment for management and administration. The price of preschool education not only restricts families access and affordability to preschool education, however also affects the quality and sustainability of preschool education programs.

There are multiple dimensions to consider surrounding this topic however, the cost of preschool education continues to present so many problems that requires further investigation. In many situations, the relationship of cost and quality in preschool education is complicated. While costs may or may not lead to quality, in terms of having better quality buildings and more qualified personnel, this assumption only has minimal support in terms of academic literature. On the other hand, the issue of cost sharing, among a variety of entities has not be formally examined with as much rigor - and has direct implications for research to understand new and better ways to deliberately plan a cost-share to reduce costs for families and institutions providing preschool care and education.

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The current study hopes to address these research gaps, and provide a comprehensive review of research on preschool education cost. By analyzing cost-quality relations and the cost-sharing arrangements that currently exist, we hope to achieve actionable findings and quality policy recommendations to support the healthy development of preschool education in China. In so doing, we wish to carry out a theoretical investigation and an empirical investigation at the same time. With both investigations, we will be able to carry out a systematic study of the determinants of costs of preschool education; analyze the effectiveness of cost-sharing arrangements currently in place; provide feasible recommendations of allocation of preschool education costs; and improve efficiency and equity in preschool education cost allocation.

2. Literature Review

2.1 Conceptual Framework

Theodore Schultz and Gary Becker, two American economists, developed the Human Capital Theory (HCT) in the 1960s. High-quality human resources are the primary force behind economic and social progress, according to Schultz, and expenditures in human capital for education and population quality enhancement significantly impact humanity's chances for the future. Early childhood education is viewed by Human Capital Theory (HCT) as an investment in future worker productivity and skill. HCT has been widely applied to the study and design of early childhood education policies, including initiatives aimed at expanding access or reducing financial barriers.

Rolnick and Grunewald (2003) noted that the return on investment in early childhood development is remarkably high, which contributes to improved performance of public schools, a more educated workforce, and a reduction in crime rates.

Heckman (2006) made it abundantly evident that lifecycle skill development is a dynamic process and that early investment significantly affects later investment productivity. From an HCT standpoint, this viewpoint serves as the fundamental theoretical foundation for investments in early childhood education.

Reynolds et al. (2010) concentrated on finding cost-effective and successful programs and the components of such programs that work well for public policies. They underlined that long-term benefits and intervention synergy can be achieved through the mutual promotion and richness of children's early learning experiences, which can preserve continuity. Furthermore, this framework emphasizes the value of service complementarity: numerous programs are included in the service system, which should be complimentary rather than alternative or hierarchical, and successful programs are executed across age groups with a variety of services.

Attanasio et al. (2022) stated that children's early - life experiences were critical for their cognitive and socioemotional development, two key dimensions of human capital.

Fernandes (2024) pointed out that despite an attempt to align with the Capability Approach (CA) and the idea that "investing in children" was a social commitment to their development, this theory or perspective was fundamentally consistent with HCT because it only considered children's development from the standpoint of future adult laborers.

In summary, early childhood education is an investment with long-term social and financial benefits. This viewpoint also supports the case for government-funded or free preschool programs, which increase the wider advantages of human capital building while lowering financial barriers for families. Thus, it offers a strong foundation for weighing the advantages and disadvantages of free ECE policies.

2.2 Previous Studies on Early Childhood Education Policies

2.2.1 Western Countries

In a 25-year assessment of the Perry Preschool Program, Barnett (1993) demonstrated that the program's long-term economic advantages for both participants and society outweighed its expenses. In a cost-benefit analysis of Chicago's Child-Parent Center program, Reynolds et al. (2011) discovered that preschool, school-age, and extended programs all yielded benefits that outweighed costs, with the advantages being bigger for males, one-year participants, and kids from high-risk households.

Since 2010, free early childhood education has been extended in the UK. It started with 15 free hours for children aged 3 to 4 and then extended to underprivileged 2-year-olds. In 2017, it was extended to 30 free hours for working parents. Up to 570 free hours are being provided to children aged three to four each year, and extra subsidies like Universal Credit and tax credits lessen the financial burden on families (SPI Oxford, 2015).

Temple et al. (2015) examined programs that increased preschool access through private investor finance in Illinois and Utah. Governments paid back investors with anticipated cost savings if results were obtained, illustrating how cost-benefit analysis may direct the design of payments and program selection while permitting fiscal expansion.

The Spanish reform that lowered the starting age of public preschool from four to three was assessed by Van Huizen, Dumhs, and Plantenga (2019). A ratio above four, which indicates significant net societal benefits and supports additional investment in high-quality early education, was the result of their cost-benefit analysis.

2.2.2 Asian countries

Singapore: Tan (2007) reported that government investments—universal childcare subsidies, KiFAS, and teacher training—significantly reduce household preschool costs. Benefits include >95% preschool participation for ages 4–6, enhanced educational equity, lower societal costs from poor school readiness, and long-term support for labor market outcomes.

Malaysia: Husaina (2012) noted that free compulsory education, university subsidies, and student loans reduce family costs. ROI for secondary education reaches 32.6%, with societal gains such as lower fertility and dropout rates.

Japan: Akabayashi & Tanaka (2024) found preschool costs include direct investments and a 10% deadweight loss from tax financing. Benefits include 0.3–0.9 pp increase in male high school graduation per 1 pp rise in kindergarten

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enrollment; internal rates of return range 5.7–8.1%. Daycare centers show higher returns than kindergartens.

Vietnam: Baek et al. (2025) analyzed the “Learning Clubs” program; per capita cost $284 (2021) vs. lifetime wage gain $1,566, giving a benefit-cost ratio of 5.52, indicating low input and high return.

Given that early input has a major impact on later development, early childhood education is an important investment in future labor productivity. A fundamental foundation for cost-benefit analysis of early childhood education policies is provided by pertinent theories that estimate children's value from the viewpoint of future workers, even if they concentrate on the development of children. International references for policy evaluation are provided by certain Western and Asian nations that have implemented free or subsidized early childhood education programs, achieving a positive cost-benefit balance.

2.3 Research Gaps and Implications

Existing research, however, has flaws. In-depth studies that integrate local county data to apply theories and global experiences locally are lacking in analyses of China, as is attention to county-level policies pertaining to accurate benefit coverage and dynamic cost structure adjustment.

Subsequent analysis will use specific cost and benefit data of Taixing's free early childhood education policy to fill these gaps and verify the applicability of theories and international experiences in local county contexts.

3. Cost-Benefit Analysis

3.1 City Selection

This study examines Taixing City in Jiangsu Province. Three reasons support this choice. First, Taixing is a key county-level city in the Yangtze River Delta region. Its preschool education system ranks among the top nationally, making it highly representative. Second, data from 2023–2024 published by agencies like the Taixing Finance Bureau and Education Bureau are relatively complete and transparent. These meet the data requirements for cost-benefit analysis. Third, Taixing has been rated an outstanding county in Jiangsu’s student aid performance evaluation for 14 consecutive years. This reflects well-organized and highly reliable data management.

3.2 Costs

Table 1: Cost of Preschool Education in Taixing City (2023-2024)

Costs	*2023 (10,000 USD)*	*2024 (10,000 USD)*
Government fiscal expenditure	95.78	153.17
Infrastructure investment	431.39	315.17
Guiding funds	-	42.21
Tuition-free subsidy	Children in difficult circumstances and others are exempt from tuition and care fees when enrolling in public and public-benefit kindergartens	16.20

The RMB amounts in the table have been converted to U.S. dollars using the exchange rate on September 1, 2025 (1 USD = 7.1072 CNY), with all values rounded to two decimal places.

The cost structure shows clear optimization: In 2023, Taixing utilized approximately 957,800 US dollars in higher-level preschool education funds. Government expenditure reached approximately 1.5317 million US dollars in 2024. This represents a 60.06% year-on-year increase. Spending focused on new guidance funds and tuition waiver subsidies. These measures directly support two policy goals: improving education quality and assisting disadvantaged groups. Additionally, approximately 162,000 US dollars was allocated in 2024 for preschool tuition assistance. This funding reduces childcare costs for needy families. Previous years, including 2023, prioritized infrastructure investment. The introduction of "guidance funds" and specified "tuition waiver subsidies" in 2024 marks a policy shift. The focus moved from building infrastructure to enhancing software and providing targeted support.

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3.3 Benefits

Table 2: Benefits of Preschool Education in Taixing City (2023-2024)

Benefits:	*2023*	*2024*
Enrollment rate	100%	100%
The number of children in the kindergarten	18766	15701
Tuition-free subsidy(10,000 USD)	Children in difficult circumstances and others are exempt from tuition and care fees when enrolling in public and public-benefit kindergartens	16.20
Number of students receiving preschool education funding (Spring Semester)	-	1047
Preschool education subsidy amount (Spring Semester)	-	7.37 (10,000 USD)

The RMB amounts in the table have been converted to U.S. dollars using the exchange rate on September 1, 2025 (1 USD = 7.1072 CNY), with all values rounded to two decimal places.

Enrollment achieved full coverage, and educational access was effectively guaranteed. The enrollment rate remained at 100% from 2023 to 2024. This indicates that the higher infrastructure investment in 2023 successfully expanded seat availability. The basic goal of “enrolling all eligible children” was met. The inclusivity of educational opportunities was fully ensured.

The number of children in kindergartens declined, mainly due to demographic factors. The year-on-year decrease of 16.33% was not caused by insufficient policy effectiveness. It resulted from the broader trend of continuously declining birth rates in rural areas across the country. This change is not directly related to the effectiveness of the policy itself.

Household financial burdens were reduced. In 2024, support was explicitly provided to 1,047 preschool children. The funding amount reached approximately 73,660 US dollars in the spring semester. The per capita financial aid was about 70.36 US dollars. Based on an average annual fee of around 844.21 US dollars at public kindergartens in Taixing, supported families saved approximately 844.21 US dollars per year. This significantly eased the financial pressure of childcare for low-income households.

Social equity and equal educational opportunity were promoted. Groups such as disadvantaged children received full tuition exemptions. Kindergarten fee policies were also adjusted. These steps show a clear inclination toward supporting vulnerable groups. They help promote fairness in educational starting points. Newly added seats were mainly in inclusive kindergartens. This also helps more children, regardless of family background, access affordable and quality preschool education.

3.4 Assessment

1.Comprehensive Evaluation: The free preschool education policy in Taixing from 2023 to 2024 reached its goal of "controlling costs and focusing benefits." On the cost side, the structure was improved without increasing total spending. Funding shifted toward both hardware and software. On the benefits side, a 100% enrollment rate was maintained. Targeted aid reduced the burden on low-income families. Investments in teacher training and educational research also strengthened long-term quality. The policy proved well-targeted and effective.

2.Key Trade-offs:(1)Balancing universal and targeted support: Limited funds must be split between resources for all children and aid for disadvantaged groups. Both were addressed in 2024, but targeted assistance only reached 1,047 children. Expanding this coverage remains necessary.

(2)Balancing hardware and software: Software spending was much lower than hardware spending in 2024. Hardware is important, but software—teachers and teaching quality—directly affects learning outcomes. Increasing software investment is essential.

(3)Balancing fairness and efficiency: The policy excelled in fairness by helping vulnerable children enroll. However, no quantitative analysis measured how efficiently funds were used. Without assessing the real impact of aid on child development, there is a risk of focusing too much on spending and too little on results.

(4)Balancing short-term spending and long-term benefits: Current funding mainly supports short-term goals like enrollment and reducing costs. Long-term benefits, such as improved skills and knowledge, take 5–10 years to appear. A long-term budget plan is needed to avoid cutting funds when immediate results are not visible.

4. Conclusion

4.1Summary of key findings

With ongoing cost structure optimization, Taixing's free preschool education strategy from 2023 to 2024 has produced impressive achievements. Infrastructure investment in 2023 became less important than a concerted investment in "hardware" and "software" in 2024. With the addition of directing funds and tuition reduction subsidies, government fiscal expenditure rose by 60.06% annually, attaining a precise trend. The enrollment rate remained at 100%, and over 1,000 children received financial aid in the spring of 2024, significantly reducing the financial strain on low-income families and advancing educational justice. There was no direct link between the policy and the 16.33% year-over-year drop in kindergarten enrollment in 2024,

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which was caused by the declining rural birth rate. However, there are still issues with the strategy, including an imbalance between targeted and general support, a significant disparity in software and hardware investment, a lack of quantitative evaluation of fund efficiency, and a weak link between short-term costs and long-term gains.

4.2 Policy recommendations

4.2.1 Allocating resources in a balanced manner: Ensure that all children have access to school, broaden the scope of targeted aid for underprivileged populations, improve support criteria, and steer clear of unequal distribution.

4.2.2 Increase software investment: Currently, software investment is much lower than hardware investment. To improve the quality of education, more work needs to be done in the software sector, including establishing a system for assessing children's development.

4.2.3 Creating a long-term mechanism: Create a five- to ten-year plan, set aside specific funds for development monitoring, update development indicators on a regular basis, and ensure that policies are successful and in line with real-world circumstances.

4.2.4 Enhancing the evaluation system: To prevent a situation of "heavy expenditure, light effect," use metrics such as the cost-benefit ratio and the capital utilization efficiency coefficient, concentrate on the dynamic relationship between financial input and educational quality, and consider children's development.

4.3Limitations and suggestions for future research

4.3.1 Limitations of the Study

The limitations of this study are mainly reflected in three aspects： First of all, it lacks comprehensive data tracking and depends too much on statistical data from the education and finance departments, making it challenging to precisely measure the precise effects of policies on the long-term development of individual children. Second, the cost-benefit analysis time frame is too short to be accurate because this study can only observe the short-term advantages two years after policy implementation owing to the lagging effect of early childhood education on human capital. Finally, there is no comparative analysis that compares Nanjing's policies to those of other cities, both domestically and abroad, which limits their reference and promotion value by making it difficult to identify the advantages and gaps of these policies in terms of cost allocation, benefit output, and implementation paths.

4.3.2suggestions for future research

The combination of mixed methods, such as "questionnaire surveys, in-depth interviews, and administrative data matching", can yield multidimensional data for future research. These methods can then be incorporated into a single analytical framework to create a more comprehensive benefit model for an in-depth evaluation. Additionally, cross-regional and cross-national comparative studies should be conducted to extract transferable experiences for policy advancement.

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