

# School Governance Structure and Its Impact on Student Performance: A Comparative Study between Four Provinces of China and the PISA2015 High-Scored Countries/Economies

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**Abstract.** *Improving the school governance structure and establishing a modern school system are the current research focuses in elementary and middle school management. Through a comparative analysis of the school governance structure of four provinces and cities in China (Beijing-Shanghai-Jiangsu-Guangdong, BSJG) and PISA2015 high-scored countries/economies, we found that the school autonomy in seven major aspects including “teacher selection, teacher dismissal, evaluation policy, enrollment policy, textbook selection, curriculum content, and curriculum design” in BSJG schools was significantly lower than that of high-scored countries/economies. The average decision-making of BSJG principals and teachers in various affairs was also substantially lower than the high-scored countries/economies. The multilevel analysis found that the impact of school governance structure on student performance presented different patterns between BSJG and high-scored countries/economies. Therefore, China needs to (i) expand the autonomy of school management further and establish a new government-school relationship; (ii) give priority to curriculum management and ensure its autonomy in schools; (iii) improve the principal accountability system, and strengthen the principal’s power and responsibility in school management; (iv) strengthen democratic management, thereby promoting teachers’ participation in the decision-making of school affairs.*

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## Introduction

**G**OVERNANCE structure refers to the relationship between various interest groups in a public or private organization. It achieves the balance of relations by allocating power and operating mechanisms to ensure the organization's effective operation (Wang, 2007). In China, research on governance structure originated in the field of corporate management. After the "*Decision of the Central Government on Several Issues Concerning the Establishment of a Socialist Market Economic System*" was issued in the 1990s, many large and medium-sized state-owned enterprises were reorganized into corporate enterprises. And then the establishment of an effective corporate governance structure is the core of the corporate reform (Ma, 1994), so improving the corporate governance structure and establishing a modern corporate system have gradually become hot issues in the field of corporate management. With the strengthening of theoretical research, the improvement of legal policies, and the vigorous promotion of practice, a consensus has been reached on the ideal governance structure. It is believed that the ideal governance structure should be a relationship with clear responsibilities and rights, mutual restriction and balance, and mutual assistance based on clear property rights (Wu, 1996; Zheng & Wang, 2000; Yuan, 2000). However, in practice, due to various subjective and objective reasons, the governance structure of many companies is still far from the ideal state.

In elementary and middle school management, China has been implementing the principal accountability system since 1985. In May 1985, the "*Central Government's Decision on Educational System Reform*" required that "schools should gradually implement the principal accountability system, and schools with conditions should establish a small, prestigious school committee chaired by the principal as a review body. It is necessary to establish and improve the faculty representative assembly system with teachers as the main body and strengthen democratic management and supervision." (Central Government of China, 2017) The "*China Education Reform and Development Program*" issued by the Central Government and the State Council in 1993 pointed out the principal accountability system should be implemented in all elementary and middle schools. "The principal must fully implement the nation's educational policy and rely on faculty and staff to run the school." (Central Government of China, State Council, 2017) Since then, various related policy documents have been reiterated to adhere to and improve elementary and middle school principals' principal accountability system. Therefore, the principal accountability system outlines China's elementary and middle school governance structure's basic framework.

Compared with the principal accountability system under the party branch's leadership, the elementary and middle school government structure overcomes the non-separation of party and government, separation of powers and responsibilities, and the low quality and efficiency decision-making (Xiao, 1985). However, it needs to be pointed out that with the deepening of reforms; this governance structure has gradually exposed some urgent problems to be solved. It mainly includes (Chen, 2002; Feng, 2005; Chai, 2009): (i) the elementary and middle school principal is generally appointed

by the superior administrative department or the government and is responsible to the superior, so they must manage the school per the educational administrative department's regulations. The school lacks autonomy. The power of the principal is relatively limited. Moreover, it is difficult for the principal to be genuinely responsible for school affairs. (ii) In some schools' actual operations, the principal's power is too concentrated and lacks adequate supervision. Then "rule by the voice of one man alone" or "patriarchy" management appeared. (iii) The internal democratic management mechanism of some schools is not sound. The power of teachers, students, parents, and members of the public to participate in school governance is not fully protected. Their voices are blocked; thus, the school power relationship is unbalanced, and the school loses development vitality.

In recent years, with the release of the "*Outline of China's Medium and Long-term Educational Reform and Development Plan (2010-2020)*" (hereinafter referred to as the "*Outline of the Plan*"), we have promoted the separation of government and schools and the separation of management and running schools and expanded the autonomy of schools. Improving elementary and middle school principals' principal accountability system, restructuring the school governance structure, and establishing a modern school system has gradually become the research focus in elementary and middle school management. Many studies have centered on related topics such as principal accountability system, modern school system construction, separation of management and operation, expansion of school autonomy, and school governance structure. However, after an in-depth analysis, it is found that the existing research mostly adopts speculative research or a standardized research paradigm, lacking the support of empirical data and preliminary quantitative analysis. This has led to an in-depth analysis of the nature of the problem, the degree of performance and related factors, and the suggestions provided lack pertinence. What is the distribution of power in the management practice of elementary and middle schools in China? How much autonomy is the school running? How does this governance structure affect student performance? This study intends to use the extensive sample data of PISA2015 to compare the governance structure of Beijing-Shanghai-Jiangsu-Guangdong (BSJG) middle schools with high-scored countries/economies for quantitative analysis of its impact on student performance. It is hoped that some experience can be used to solve the problems that need to be solved and provide opinions and suggestions on the continuous improvement of the school governance structure and the construction of a modern school system in China.

## Methods

### *Data Sources*

The Program for International Student Assessment (PISA) is a multinational student ability evaluation project coordinated and implemented by the Organization for Economic Co-operation and Development (OECD). This project evaluates 15-year-old school students in participating countries/economies to see if they have the knowledge and skills required to enter society. The PISA test is implemented every three years.

The test content includes science, mathematics, and reading, but each assessment has a different focus. The focus of the PISA2015 test is scientific literacy. The OECD announced the test results of PISA2015 at the end of 2016, and at the same time, published the data, coding tables, and technical reports on the official website (<http://www.pisa.org/pisa>). This study selected BSJG data and high-scored countries/economies data from the PISA2015 student database and school database for in-depth analysis.

## **Participants**

Participants in this study included two groups of 15-year-old school students and school leaders. Schools include junior high schools, high schools, complete high schools, vocational high schools, etc. We collectively refer to the heads of all these schools as the principals. Participants are from BSJG and PISA2015, high-scored countries/economies. High-scored countries/economies refer to countries or economies where students' scores in science, mathematics, and reading are significantly higher than the average level of OECD countries in the PISA2015 test. These countries include Belgium, Denmark, Estonia, Finland, Germany, and Ireland, The Netherlands, Norway, Poland, Slovenia, Canada, Australia, New Zealand, Japan, South Korea, and partner countries/economies such as Singapore, Hong Kong, and Macau. BSJG and the countries mentioned above/economies had a coverage rate of more than 91.38% for 15-year-old students in the region, and the coverage rate of the principal sample was more than 78.57%.

## ***Variable Selection***

Our study first described the power distribution of major business decision-making in BSJG and PISA2015 high-scored countries/economies, aiming to reflect the outline of the school's governance structure, and then conducted a multilevel analysis using the scientific literacy test scores of 15-year-old students as the dependent variable. This is to observe the impact of governance structure on student development. The selected variables are as follows.

## **The Power Value of Principals, Teachers and Other Subjects in Determining Major School Affairs**

Who decides and is responsible for the school's significant affairs reflects the school's governance structure. In the PISA2015 school questionnaire, the principal was asked to answer who has the most power in major issues' decision-making process. The options were principals, teachers, school councils, local education bureaus, and the state. For the convenience of calculation and analysis, the school's total power was determined to be 100%, which was redistributed to each decision-making body based on the principal's answer. Take "determining course content" as an example. If a principal answered that only teachers had decision-making power, then teachers in this school had 100% decision-making power to determine the curriculum content and other subjects had 0%.

If the principal responded that the course's content was determined by the principal, teachers, and the school councils, then each subject was assigned a power value of 33% accordingly. Therefore, in each country/economy, as long as each subject's average power value is calculated, the outline of the schools' governance structure in that country/economy can be drawn.

## **Student Scientific Literacy Test Scores**

In this study, the scientific literacy test scores represent the level of student development. This is mainly because the main test area of PISA2015 was science. The scientific literacy test is well representative after rigorous design and reliability and validity analysis. The test scores were equalized and converted into an average score of 500 points in the PISA scientific literacy test of OECD countries in 2006 and a standard deviation of 100 points.

## **Individual Variables Affecting Students' Scientific Literacy Test Scores**

The PISA2015 student questionnaire collected sociodemographic variables and measured students' non-cognitive performance in terms of intrinsic motivation, beliefs, and participation. Based on the PISA questionnaire framework and related research findings, we selected the student's gender, grade, and PISA index of economic, social, and cultural status (ESCS) from the sociodemographic variables. In the non-cognitive performance, we selected the instrumental motivation that reflects students' external motivation and the variables of scientific pleasure and scientific self-efficacy that reflect the internal motivation of students. These non-cognitive variables were all measured by Likert scale as continuous variables and expressed in standard scores. In the multilevel analysis, the variables selected above were used as control variables to enter the regression analysis model.

## **Data Analysis**

First, SPSS20.0 was used to sort out and filter the data, get the sample data of China's four provinces and cities and PISA2015 high-scored countries/economies, and perform descriptive statistics and difference testing. Then HLM7.01 software was used to explore the impact of school governance structure on student performance through multilevel analysis.

## **Results**

### ***Power Distribution in School Governance Practice***

The distribution of power in the school's significant affairs' decision-making reflects the relationship between various stakeholders inside and outside the school and reflects the school's governance structure. The PISA2015 school questionnaire enumerated 12 significant issues such as teacher selection and dismissal, determination of teacher starting salary, teacher salary increase, proposed school budget, and decision on budget al-

location, and asked the principal who has the authority to make decisions on these matters in the school. Based on the principal's answer, we calculate the power distribution of BSJG and PISA2015 high-scored countries/economies schools in various decisions. The results are shown in **Table 1**.

The analysis of various subjects' power distribution found that: (1) BSJG principals have relatively limited decision-making power, and the principal accountability system is not fully functional. In BSJG, principals' average decision-making power in various affairs is 13.28%, while the average decision-making power of principals of PISA2015 high-scored countries/economies is 39.09%. After the difference test, the difference between the two reached a very significant level ( $T = 25.19$ ,  $p < 0.001$ ). In high-scored countries/economies, the principal had decision-making power in eight matters, including teacher selection, teacher dismissal, school budget, budget allocation, student discipline, student evaluation policy, student enrollment policy, and curriculum setting. Over 33% had dominant powers, but BSJG principals had no dominant powers in all 12 matters. (2) The decision-making power of BSJG teachers is relatively small. In BSJG, teachers' average decision-making power was 7.44%, which is significantly lower than in high-scored countries/economies ( $T = 19.13$ ,  $p < 0.001$ ). Teachers of high-scored countries/economies had dominant powers in selecting teaching materials, determining course content, and formulating student evaluation policies, but BSJG teachers had no dominant power in these matters. (3) BSJG school governance emphasizes collective decision-making, and the decision-making power of the school councils is relatively large. The BSJG School Councils had the supreme power in determining budget allocation, formulating student discipline, and student evaluation policies. The overall average decision-making power was 28.1%. This was not only higher than the decision-making power of the principals of the four provinces (cities) but also significantly higher than the decision-making power of the school council of high-scored countries/economies ( $T = -14.00$ ,  $p < 0.001$ ). (4) The local education bureau of BSJG has the dominant power in school affairs decisions. The supreme power of the BSJG Local Education Bureau is mainly manifested in the selection of teachers, the dismissal of teachers, the determination of teachers' starting salary, the determination of teachers' salary increase, the formulation of student enrollment policies, the selection of teaching materials, the determination of course content and the determination of course openings, etc. The average decision-making power in various matters was 46.27%. In comparison, the decision-making power of the local education bureau in high-scored countries/economies was only 19.03%, which only has the supreme power in determining the starting salary of teachers and determining the amount of teacher salary increase.

### ***A Comparative Analysis of the Dimensions of School Autonomy***

By adding the powers of the principal, teachers, and school council, the value obtained can reflect the school's degree of autonomy. The results are shown in **Table 2**. We found that the autonomy of BSJG schools is relatively low. The average autonomy of BSJG schools in various affairs is 48.8%, while the average autonomy of high-scored countries/economies schools is 68.5%. There is a statistically significant difference be-

**Table 1. Power Distribution of Various Entities in Major Affairs Decision-Making (%).**

	Four provinces (cities) in China				PISA2015 High-Scored Countries / Economy					
	Principal	Teacher	School Council	Local Education Bureau	Country	Principal	Teacher	School Council	Local Education Bureau	Country
Teacher selection	21.36	4.44	26.52	47.28	0.41	62.96	5.47	8.24	18.87	4.46
Teacher dismissal	13.19	1.36	21.01	61.90	2.54	47.29	0.84	11.85	32.45	7.57
Determine the starting salary of teachers	3.72	0.46	10.61	75.36	9.85	11.78	0.41	6.02	34.35	47.44
Determine the salary increase for teachers	4.80	0.84	17.70	65.98	10.68	13.37	0.58	6.42	33.40	46.23
Propose school budget	18.67	2.26	34.76	42.83	1.49	40.90	3.91	17.96	29.65	7.58
Determine budget allocation	25.49	4.71	56.65	12.46	0.68	62.37	8.98	20.09	7.32	1.25
Establish student discipline	21.63	18.85	49.04	8.36	2.12	43.98	30.91	15.13	6.83	3.15
Develop student evaluation policy	19.22	22.56	43.68	12.79	1.76	36.60	35.08	9.86	9.11	9.35
Formulate student admissions policies	13.05	3.11	24.49	58.94	0.41	68.23	6.87	6.30	12.07	6.52
Textbook selection	4.80	8.83	12.82	68.27	5.28	20.38	62.87	6.95	3.47	6.34
Determine course content	5.77	14.11	16.34	51.88	11.90	15.83	47.29	4.56	9.22	23.08
Determine course opening	9.74	7.14	20.13	49.63	13.35	44.53	25.80	10.88	6.70	12.08
Mean	13.28	7.44	28.10	46.27	4.92	39.09	19.03	10.34	16.92	14.61

tween the two. BSJG schools have more than 50% of the decision-making power in five matters, including teacher selection, school budget proposal, budget allocation, formulation of student discipline, and student evaluation policies. In high-scored countries/economies, in addition to determining the starting salary of teachers and determining the amount of salary increase for teachers, schools have more than 50% power in most affairs, and their autonomy was sufficient. The significance test of the difference in the ratio found that the autonomy of BSJG schools in seven significant issues, including teacher selection, teacher dismissal, evaluation policy, enrollment policy, selection of teaching materials, curriculum content, and curriculum establishment is very significantly lower than that of high-scored countries/economies. Among them, BSJG and high-scored countries/economies have the most considerable difference in autonomy in selecting textbooks, courses, and enrollment policies, with 63.7%, 44.2%, and 40.7%.



**Table 2. Analysis of School Autonomy in Major Affairs Decision-Making (%).**

	Four Provinces (Cities ) of China	High-Scored Countries/Economies	T	P-Value
Teacher Selection	52.3	76.7	9.1	0.000
Teacher Dismissal	35.6	60.0	8.5	0.000
Teacher Starting Salary	14.8	18.2	1.6	0.116
Teacher Salary Increase	14.8	18.2	1.6	0.116
School Budget	55.7	62.8	2.6	0.010
Budget Distribution	86.9	91.4	2.5	0.012
Student Discipline	89.5	90.0	0.4	0.723
Evaluation Policy	88.5	81.5	- 2.2	0.031
Enrollment Policy	40.7	81.4	14.9	0.000
Textbook Choose	26.5	90.2	26.5	0.000
Course Content	36.2	67.7	12.6	0.000
Course Open	37.0	81.2	19.3	0.000
Average Autonomy	48.8	68.5	16.4	0.000

Note: P value is accurate to three decimal places, 0.000 means P value is less than 0.0005.

The 12 significant issues listed in the PISA2015 questionnaire can be divided into three dimensions. The first is the resource allocation dimension, including teachers' appointment and dismissal, determining the starting salary and salary increase of teachers, proposing school budgets, and allocating budgets. The second is the dimension of course management, including course offerings, teaching materials selection, and course content determination. The third is student management's dimension, including the formulation of student evaluation policies, student enrollment policies, and discipline. Further, statistics on schools' autonomy in each country/economy were made according to the country-division dimension. The results are shown in **Table 3**.

It is demonstrated that: (i) High-scored countries/economies had relatively high school autonomy in the three dimensions. The exception was that the autonomy scores of Canada, Germany, and South Korea in resource allocation were lower than BSJG; Canada and Norway had lower autonomy in student management than BSJG. (ii) BSJG schools had the lowest autonomy in curriculum management, with a power value of only 33.33%, which was lower than all high-scored countries/economies. The average scores between the two were very significant, with a power value difference of 46.35%. (iii) In high-scored countries/economies, running a school in the dimension of resource allocation was lower than that of curriculum management and student management, while in BSJG, the autonomy of running a school in the dimension of resource allocation was relatively higher than that of course management. (iv) In the Netherlands, the three dimensions' autonomy received the highest scores, all of which scored more than 90%. New Zealand, Estonia, Denmark, Hong Kong (China), and Macau (China) also scored higher than 70% in all three dimensions. They could be classified as typical

**Table 3. Sub-Dimension Analysis of School Autonomy of Each Country/Economy (%).**

	Resource Allocation				Course Management				Student Management			
	Principal	Teacher	Sch. Council	Sch. Autonomy	Principal	Teacher	Sch. Council	Sch. Autonomy	Principal	Teacher	Sch. Council	Sch. Autonomy
Belgium	36.90	1.75	15.07	53.72	21.87	48.87	7.02	77.77	46.16	25.48	16.56	88.21
Denmark	53.42	3.67	14.25	71.34	28.10	46.65	10.44	85.20	52.88	19.03	16.27	88.18
Estonia	59.56	4.39	8.59	72.53	39.57	43.31	13.14	96.02	53.05	23.37	16.24	92.66
Finland	44.68	2.00	2.33	49.01	26.20	53.52	1.25	80.97	48.80	29.06	2.54	80.39
Germany	16.31	3.44	7.13	26.88	25.36	36.38	17.48	79.22	47.72	30.37	10.88	88.97
Ireland	24.22	0.88	25.01	50.12	20.82	52.89	11.18	84.88	38.42	21.95	35.31	95.68
Netherlands	63.44	4.75	24.47	92.67	35.17	57.72	4.52	97.41	71.54	21.61	6.14	99.29
Norway	52.73	1.44	2.53	56.71	33.93	39.99	1.16	75.09	39.12	19.44	6.72	65.29
Poland	50.54	1.35	1.04	52.93	30.12	50.49	5.34	85.95	44.50	41.72	9.73	95.95
Slovenia	45.26	1.79	13.26	60.31	13.23	43.79	7.62	64.63	35.98	33.87	5.80	75.65
Canada	29.20	2.67	7.60	39.47	25.15	28.17	2.12	55.44	43.53	14.59	5.53	63.65
Australia	46.73	4.58	8.35	59.65	24.00	57.23	1.99	83.23	56.07	26.96	5.03	88.07
new Zealand	47.08	4.60	22.73	74.41	22.30	71.59	2.25	96.15	56.93	20.29	14.30	91.53
Japan	28.19	1.52	16.61	46.32	62.72	27.62	2.19	92.54	81.86	15.67	1.28	98.81
Korea	18.34	6.30	7.69	32.33	26.16	54.96	14.27	95.39	55.48	28.58	6.90	90.97
Singapore	24.34	2.25	19.38	45.97	16.90	23.48	41.13	81.51	39.71	9.49	36.44	85.65
China Hong Kong	37.68	14.73	24.12	76.53	23.81	66.53	5.64	95.99	43.83	47.84	5.42	97.09
Macao, China	52.75	3.02	33.98	89.75	31.63	45.89	14.84	92.36	44.14	33.09	18.70	95.93
High score country average	39.71	3.39	11.69	54.79	26.94	45.31	7.43	79.68	49.65	24.24	10.45	84.35
Four provinces (cities) of China	14.56	2.35	28.06	44.97	6.81	10.07	16.45	33.33	17.82	14.86	39.16	71.85

high-autonomy countries/economies. (v) In Japan, the resource allocation dimension's autonomy score was low, equivalent to the BSJG level, but the autonomy score on the curriculum management and student management dimensions was relatively high, both more significant than 90%. Therefore, Japan is a country with low autonomy in resource allocation and high autonomy in curriculum and student management. Besides, Finland, Singapore, Germany, and South Korea also belong to this type.

## ***The Relationship between School Governance Structure and Student Performance***

Which one has the advantage of large or smaller school autonomy? To explore the impact of school governance structure on student performance, we conducted a multilevel analysis. The method is as follows: First, take the scientific literacy performance of 15-

year-old students in BSJG and PISA2015 high-scored countries/economies as the dependent variable, and divide the variables that affect the performance of students' scientific literacy into two layers. The first level was set as student-level variables, and the second level was school-level variables. After establishing the zero model without adding any predictor variables, we found that the BSJG inter-school variation was 5,770.10, the intra-school variation was 5,075.71, and the intra-class correlation coefficient 1 (ICC (1)) was 0.53. The inter-school variation of PISA2015 high-scored countries/economies was 3,481.17, the intra-school variation is 6,049.54, and the ICC (1) value was 0.37. The inter-school variation reached a significant level, indicating that the data has a nested structure and was suitable for multilevel analysis. Next, variables such as gender, grade, SECS, instrumental motivation, scientific pleasure, scientific self-efficacy, and other student-level variables were added to the model to establish a random coefficient model. Finally, under the premise of considering and overcoming multicollinearity, three variables, including resource allocation autonomy, the autonomy of curriculum management, and the autonomy of student management, which reflect the school's governance structure, were also added to the model to establish a complete model. The results are shown in **Table 4**.

In BSJG, the six variables of individual student level explained 9.91% of the intra-school variation and 41.03% of the inter-school variation; the three variables of the school-level governance structure explained 2.41% of the inter-school variation, reaching a very significant level. In PISA2015 high-scored countries/economies, the individual student level variable explained 13.01% of the intra-school variation and 21.77% of the inter-school variation, and the school level variable explained 1.54% of the inter-school variation, which also reached a very significant level. This indicated that after controlling several student-level variables, the school governance structure has a relatively small direct impact on student scientific literacy test scores, but it is still an essential factor that cannot be ignored. Also, there is still more than 97.5% of the variance that has not been explained in this model at the school level, implying that there are many inter-school variance variables that affect student performance, which need to be further studied.

On the impact of school governance structure variables, further analysis found that the impact of different dimensions of school autonomy on student performance presents different patterns in BSJG and high-scored countries/economies. Specifically: (i) Curriculum management autonomy had a significant positive predictive effect on students' scientific literacy test scores. In BSJG, every time the autonomy of school curriculum management increases by one standard deviation, the student's scientific literacy score would increase by 35.48 points, equivalent to a one-year educational experience. (ii) Student management autonomy had a significant predictive effect on students' scientific performance. Nevertheless, it is worth noting that in high-scored countries/economies, the predictive effect of student management autonomy was positive, whereas in BSJG, it was negative; that is, for every standard deviation of student management autonomy, student performance would drop by 42.54 points. (iii) The autono-

**Table 4. Two-Level Linear Regression Analysis Results of the Impact of School Governance Structure on Students' Scientific Literacy Test Scores.**

	Four Provinces (Cities) in China						High-Scored Countries/Economies					
	Zero Model		Stochastic Model		Complete Model		Zero Model		Stochastic Model		Complete Model	
	EV	SE	EV	SE	EV	SE	EV	SE	EV	SE	EV	SE
<b>Fixed Effect</b>												
Intercept	513.40 ***	6.46	485.51 ***	6.15	494.35 ***	14.49	517.16 ***	1.86	511.12 ***	2.35	469.37 ***	8.23
<b>Individual Level</b>												
Gender	-	-	13.81 ***	2.18	13.80 ***	2.18	-	-	5.58 ***	0.94	5.57 ***	1.02
Grade	-	-	39.03 ***	3.27	38.68 ***	3.25	-	-	33.53 **	1.24	33.64 **	1.24
SECS	-	-	5.21 ***	1.37	5.11 ***	1.37	-	-	14.89 ***	0.69	14.96 ***	0.69
Instrumental Motivation	-	-	-3.05	1.36	-3.01	1.60	-	-	-3.06 ***	0.49	-3.05 ***	0.49
Scientific Fun	-	-	13.20 ***	1.35	13.19 ***	1.36	-	-	17.91 ***	0.52	17.94 ***	0.52
Scientific Self-Efficacy	-	-	3.38**	1.07	3.38 **	1.07	-	-	6.83 **	0.43	6.84 **	0.43
<b>School Level</b>												
Resource Allocation Autonomy	-	-	-	-	33.40	19.49	-	-	-	-	8.42	6.34
Course Management Autonomy	-	-	-	-	35.48*	16.60	-	-	-	-	19.33*	9.72
Student Management Autonomy	-	-	-	-	-42.54*	20.12	-	-	-	-	23.49*	9.23
<b>Random Effect</b>												
School Variance	5,770.10 ***	75.96	3,402.39 ***	58.33	3,263.23 ***	57.12	3,481.17 ***	59.00	2,723.16 ***	52.18	2,669.60 ***	51.67
Intramural Variance	5,075.71	71.24	4,572.57	67.62	4,586.79	67.73	6,049.54	77.78	5,262.30	72.54	5,262.17	72.54
EV: Estimated Value; SE: Standard Error. *p < 0.05, **p < 0.01, ***p < 0.001.												

my of resource allocation was not significant in the model, and its impact on student performance was not statistically significant.

## Discussion and Recommendations

The multilevel analysis found that the governance structure has a significant impact on students' scientific literacy test scores, but the influence of school autonomy of different

dimensions on student performance presents different patterns. This shows that the relationship between governance structure and school effectiveness is not a simple linear relationship. Therefore, while we gradually clarify and expand schools' autonomy, we must also be clear that school autonomy is not the bigger, the better. How should the political-school relationship be handled? Which subjects' decision-making power should be expanded or appropriately restricted? How to coordinate the relationship between multiple subjects? These are issues that must be thoroughly considered and resolved in the reform of the school governance structure.

### ***Expand School Autonomy and Establish a New Political-School Relationship***

The relationship between government and school is the focus of the reform of the school's governance structure, but it is also a difficult point. The "Outline of the Plan" pointed out that it is necessary to continuously promote the separation of management and operation, and implement and expand school autonomy. It is proposed that "building a modern school system that runs schools according to law, independent management, democratic supervision, and social participation, to build up a new relationship between the government, schools, and society" (Ministry of Education, 2015). This policy reflects the international trend of school governance structure reform. In the past few decades, many Western countries have been promoting decentralization, giving schools more autonomy to meet their needs for education (OECD, 2016). Simultaneously, it also conforms to China's national conditions and is a real need to reform the governance structure in Chinese schools. It can effectively stimulate the vitality of the school and promote the independent development of the school. Based on the analysis of PISA2015 data, this study found that BSJG schools have more than 50% decision-making power in five matters: teacher selection, school budget proposal, budget allocation, student discipline formulation, and student evaluation policy formulation, indicating that it has a certain degree of autonomy right. However, the autonomy in the seven significant teacher selection issues, teacher dismissal, evaluation policy, enrollment policy, selection of teaching materials, course content, and course opening is significantly low. Among them, there was the most significant difference in autonomy with high-scored countries/economies in selecting teaching materials, curriculum, and enrollment policies. This demonstrated that, to a certain extent, BSJG still has much room for improving school governance structure and expanding school autonomy.

This finding is consistent with some previous related studies (Ye, 2010; Li & Xia, 2014) (Ye, 2010). In 2015, the "Several Opinions of the Ministry of Education on Further Promoting the Separation of Education Management, Management, and Evaluation, and Promoting the Transformation of Government Functions" (Education Politics Law [2015] No. 5) also clearly pointed out that at present, government management education still has the phenomenon of surpassing its position, absence, and dislocation. The independent development and self-discipline mechanism of the school is not yet sound (Education Ministry of China, 2016). In the future, to fully stimulate the vitality of schools, we must further promote the separation of management, operation, and

evaluation, clarify and guarantee school autonomy under the law, establish a new political-school relationship, and establish a modern school system. If the government wants to change its functions, it should, under the guidance of the new public management and new public service concepts, transform from a “paddler” to a “helmsman” and then to a “server” (Zhao, 2013). Reduce excessive administrative approval, inspection, and appraisal of schools, let alone arbitrarily intervene in the internal micro-affair management of schools, provide more generous space for school development, and create conditions to increase school autonomy, especially in the selection of teaching materials, curriculum, and enrollment policies and teacher recruitment.

Of course, we must also realize that the greater the autonomy is not necessarily, the better, and the expansion of school autonomy does not necessarily bring about changes in school effectiveness and student performance. As we have found that, in BSJG, the predictive effect of student management autonomy on student performance is negative; that is, the expansion of student management autonomy does not promote the growth of student performance. Therefore, while gradually expanding school autonomy, it is also necessary to improve the school’s autonomous management capabilities through management mechanisms such as training, supervision, and accountability, to achieve a dynamic balance and optimization between the government and the school.

### ***Give Priority to Curriculum Management to Ensure School Curriculum Management Autonomy***

Curriculum management is the most critical and dynamic part of the school governance system. From the perspective of the world’s curriculum reform trend, Western countries pay more attention to schools’ autonomy in curriculum management practice, so that the curriculum can fully respond to the needs of multiple stakeholders and effectively promote the development of students (Yang, 2003). However, due to the long-term tradition of centralized and unified curriculum management in China, schools have relatively little autonomy. Since implementing the new curriculum, China has begun to implement a three-level curriculum management policy, giving schools a certain degree of curriculum autonomy. Simultaneously, the textbook also implements an outline for multiple versions of textbooks, allowing schools to choose to use different versions of textbooks. However, the fact is that due to various factors such as the enrollment policy of the high school and college entrance examination, the management methods for the selection of textbooks, and the awareness and ability of school curriculum management, the school’s actual autonomy is still minimal. Our findings confirm this. Curriculum management autonomy has a significant positive predictive effect on student performance, but BSJG schools have very little autonomy in curriculum management, significantly different from high-scored countries/economies. There are respective 63.7%, 44.2%, and 31.5% differences in the decision-making of materials selection, course offerings, and course content. Therefore, to expand school autonomy, priority must be given to curriculum management autonomy.

To effectively protect the autonomy of school curriculum management, we need to pay attention to two aspects. On the one hand, China must revise and improve

relevant policies at the national level to strive for more generous space for school curriculum management autonomy. For example, the “Experimental Program of Compulsory Education Curriculum Setting” stipulates the types of courses and the number of hours schools should offer in grades 1-9. The sum of school-based courses, local courses, and comprehensive practical activity courses accounted for 16-20% of the 9-year total class hours. However, some provinces and cities have strengthened comprehensive practical activities, requiring that a certain number of hours be guaranteed for research studies or practical scientific activities. In some areas, local courses have been added, and individual courses that are of little value to student development are also included in the school curriculum, which, to certain degrees, takes up school-based curriculum time. Therefore, the plan needs to stipulate the proportion of school-based curriculum hours to protect the school curriculum’s autonomy effectively. The “Interim Measures for the Selection and Management of Elementary and Middle School Textbooks” and other related documents need to be revised and improved based on extensive comments. On the other hand, local education administrative departments should strengthen relevant training to improve school curriculum management awareness and curriculum leadership. Only achieve: (i) the school attaches importance to top-level design and curriculum leadership; (ii) according to relevant national policies, combined with school development prospects, educational philosophy, school characteristics, and student development needs, independently plan school curriculum; (iii) implement creatively National curriculum and local curriculum, as well as the rational development and implementation of school-based curriculum, can we realize the autonomy of curriculum management.

### ***Improve the Principal Accountability System and Strengthen the Principal’s Power and Responsibility in School Management***

We found that in BSJG, the average decision-making power of principals in various matters was 13.28%, while the average decision-making power of principals of PISA2015 high-scored countries/economies was 39.09%, and the difference between the two reached a very significant level. Besides, the decision-making power of the principals of BSJG in the three dimensions of resource allocation, curriculum management, and student management was significantly lower than that of all PISA2015 high-scored countries/economies. However, BSJG’s school council’s average decision-making power was 28.1%, which was significantly higher than in high-scored countries/economies. One is low, and the other is high; that is, the principal has low decision-making power, and the school council has high decision-making power. This, to a certain extent, shows that the four provinces (cities) of China place more emphasis on collective decision-making by the school council.

For a long time, China has been implementing a principal accountability system in elementary and middle schools. At the same time, schools are required to establish a school committee composed of principals, teachers, representatives of students

and parents, community representatives, and other relevant subjects, improve the faculty representative assembly system and establish a parent committee to strengthen democratic management school. This school's internal governance structure framework not only adheres to the principal accountability system but also emphasizes collective management, reflecting the principle of democratic centralism. However, it must be admitted that if the dialectical relationship between democracy and centralism cannot be handled properly, this kind of governance structure can easily lead to the dictatorship and monopoly of the principal in some schools. In contrast, it may also lead to the de facto no-one responsible situation, even called the collective responsibility. Compared with PISA2015 high-scored countries/economies, BSJG principals have poor decision-making, but the school council has high power. In its 2015 annual report, the OECD emphasized that principals with more power in school governance have relatively high student performance at their schools, mostly when student performance is tracked and analyzed or released to the public (OECD, 2016). In the future, we suggest that local education administrative departments appropriately expand principals' decision-making power, enhance principals' sense of responsibility, and improve their management efficiency. Researchers should also conduct an in-depth international comparative analysis and empirical research to provide reasonable and feasible policy recommendations for the practical improvement and promotion of the principal accountability system.

### ***Strengthen Democratic Management and Promote Teachers' Participation in School Affairs Decision-Making***

The participation of teachers not only reflects the democratic nature of the school's governance structure, but also affects teachers' job satisfaction, organization and work engagement, and personal performance to a large extent. Teacher participation in school management and decision-making has become the primary trend of elementary and middle school management (Chu, 2009). However, we found that the average decision-making power of BSJG teachers in major school affairs was only 7.44%, which was significantly lower than the average level of PISA2015 high-scored families/economies. Especially in the "student management" dimension, the decision-making power of BSJG teachers was not only lower than the average level of high-scored countries/economies but also lower than all their respective high-scored countries/economies. In the "course management" dimension, the decision-making power of BSJG teachers was only higher than that of Singapore but lower than that of the other 17 high-scored countries/economies. Several studies have confirmed this research result. Chen surveyed 731 elementary and middle school teachers in seven provinces (autonomous regions) in compulsory education from the teachers' perspective. When it comes to "important decisions related to teachers' work, teachers in our school have many opportunities to participate," 281 teachers mentioned that the situation was "somewhat inconsistent" in their schools. Another 64 teachers expressed "not at all," accounting for 47.2% of the total number of teachers interviewed (Chen, 2011). Zhao and Zhou analyzed the PISA2015 principal questionnaire and found that BSJG principals scored the lowest on the "teacher participation" dimension in the performance of various dimensions of lead-



ership. The frequency of various related leadership behaviors was generally lower than that of other high-scoring countries, especially in “giving employees the opportunity to participate in school decision-making.” The proportion of BSJG principals showing such behavior “at least once a month” was only 23.8%, while the proportion of other high-scored countries was between 66.7%-93.7% (Zhao & Zhou, 2017).

The low level of teacher participation has become an important issue that cannot be ignored in the governance structure of BSJG schools. Article 30 of the *Education Law of the People's Republic of China* states that “following relevant law, institutions shall ensure the participation of faculty and staff in democratic management and supervision through organizational forms such as faculty and staff congresses as the main body.” This is a clear stipulation in Chinese law for teachers to participate in school governance and provides a legal basis for teachers to participate. However, it must be acknowledged that these legal provisions are only provisions in principle, lacking operational rules for implementation, and failing to clarify the legal consequences and penalties after relevant entities violate this provision, making it challenging to implement teachers’ right to participate. In the future, in addition to strengthening and improving relevant legislation, schools need to clarify further the responsibilities, powers, obligations, ways, and means of teachers’ participation in school governance in the school’s “Articles” and related systems under the guidance of the legal framework and modern school governance concepts. This enables teachers to rely on laws and rules for their participation. Of course, more importantly, the school should learn from the corporate governance experience and establish a governance structure and organizational culture in which the rights and responsibilities of multiple stakeholders are clear and that both restrict and promote each other. Only when all subjects are concerned about school development and participate in school governance in an orderly manner based on equal consultation can the school develop healthily and sustainably.

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