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Follow Suit: Imitative governance, resource inclination, and regional innovation efficiency

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ABSTRACT

Influenced by traditional notions of solidarity, when a province's planning can be highly aligned with that of the central government, the province is perceived to be more collective and thus able to receive financial or resource favors from the central government. This consistency, as is often the case, reflected in doing the same thing as the central government. This situation may lead governors to ignore local economic performance and thus reduce regional innovation efficiency, as in the case of China's Great Leap Forward. Likewise, it is possible to get better resources (energy or capital) by demonstrating managerial submissiveness, thus improving the regional innovation efficiency. Therefore, to verify the relationship between imitative governance and regional innovation efficiency, we collected relevant data from 31 major provincial administrative units in China, calculated the degree of imitative governance between provincial government work reports and central government work reports through text similarity, as well as utilized the SBM-DEA model to evaluate regional innovation efficiency. Meanwhile, we provide a new explanation of the phenomenon from the perspective of resource inclination. Finally, the empirical results show that imitative governance promotes local innovation efficiency and is moderated by resource inclination.

KEYWORDS

Imitative governance; Text similarity; Resource inclination; SBM-DEA; Innovation efficiency

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1. Introduction

China, the world's largest socialist developing country, is often widely noted for its view of governance (one-party rule) that differs from Western ideals of democratic pluralism (Gore, 2019; Marquis and Qiao, 2020; Shih et al., 2012). Many scholars who advocate liberal democracy do not approve of the Chinese Communist Party's approach to governance, arguing that single-party governance would leave local people without freedom. At the same time, historical experience shows that the Communist Party of China (CPC) has likewise had some mistakes caused by excessive deference to unified opinion. However, as the general quality of the people improved, the regional governments gradually realized that they could not copy the central government's administrative methods, but should develop their local economies according to local conditions. On the one hand, studying the relevant policy documents of the central government provides direct access to valuable knowledge from the Party's central think-tank; on the other hand, considering one's development conditions is more conducive to localized development.

Thus, we can derive from this a study of the results of governance imitation. Given China's achievements in innovation since its reform and opening up, some people believe that this is all due to the leadership of the CPC. There is no denying the important role played by the CPC, but more credit should be given to the innovative contribution of the Chinese people as a whole in a stable environment. Therefore, we hope to be able to explain the contribution of the CPC to innovation in terms of how much "wisdom" the provincial government has gained from the CPC's work report, i.e., the imitative governance of the provincial government. In past studies, manual judgments of imitative governance have often been limited by the use of tools that bring in subjective emotions, making it difficult to judge the accuracy of conclusions. At the same time, recent research has looked at the impact of responsiveness on firm innovation (Giachetti and Li Pira, 2022) and the consequences of imitation innovation (Liu et al., 2021), but we would like to extend the more specific approach to the wider economic/management community. The contribution of this paper is to provide better technical support for the relationship between imitative governance and innovation efficiency while introducing the concept of resource inclination to analyze the mechanisms underlying the roles. Other scholars have done some valid research in related fields, and likewise there are scholars whose research paradigms in other fields are worthy of our consideration (Ding, 2021; Hu, 2023; Hu et al., 2023; Wang, 2023; Zor, 2023).

The paper is organized as follows. Section 2 provides succinct explanations of the relevant literature. Section 3 describes the employed methodology and reports the data. The estimation results are discussed in Section 4. Section 5 is the discussion and conclusion part of the article.

2. Theoretical derivation

The impact of imitative governance on innovation efficiency can be explained from two perspectives, namely managerial inertia and the resource-based view. Typically, managerial inertia is often used in corporate finance studies of public companies, as is the resource-based view. Here, we extend them to studies of government governance because government leaders, while having different goals than corporate leaders, may suffer from similar inertia. Resources also play an instrumental role in the development and construction of the province.

First, from the perspective of managerial inertia. Imitative governance is a management tool used by leaders in provincial governments. Governments that are less imitative in terms of policy similarity tend to be perceived as having a strong personality (less obedient); conversely, they are perceived as lacking personality (more obedient). We usually think of the former as having lower managerial inertia and the latter as having higher managerial inertia. Many studies have also shown that managerial inertia can be detrimental to the progress and growth of a company/society (Ataay, 2020; Bel et al., 2018; Mol and Kotabe, 2011; Shen et al., 2022). From the perspective of government managers, we can see that imitative governance has influenced the government's original decision-

making to some extent (Kim et al., 2018). Imitative governance, triggered by the inertia of government managers, can influence local attitudes toward innovation through direct participation in government governance, thus affecting innovation efficiency. There are two perspectives of innovation - input and output. On the input side, the provincial government may introduce some inappropriate resources due to imitative governance. Imagine an extreme example of introducing a large photovoltaic power industry in an area lacking sunlight. This would not necessarily promote innovation in the local photovoltaic industry, but it would receive subsidies from the state to support the new energy sector, which would increase gross domestic product (in the initial phase) and thus allow the governor to be promoted; On the output side, the governor's managerial inertia has led to an inability to keep even the incentives for innovation up to date, thus allowing talented people to abandon innovation for lack of funding. The reason for this result is the inability of local administrators to formalize the treatment of researchers. For example, the effect of a ten-dollar award for similar contributions in an economically developed region is not the same as in an economically backward region. Therefore, we suggest that imitative governance affects the efficiency of local innovation, both in terms of inputs and outputs.

Secondly, the resource-based view is the fundamental perspective that has profoundly shaped the trajectory of management scholarship (Ployhart, 2021). Resource inclination is a branch derived from a resource-based view (Barney et al., 2011; Chen et al., 2012; Kozlenkova et al., 2014), and the innovation of a province or enterprise cannot be separated from the aggregation of huge amounts of resources (Maiti et al., 2020). Therefore, we argue that resource tilting may have a moderating effect on the relationship between the two in the previous paragraph. From the provincial level, improving their innovation efficiency is inseparable from the acceptance and absorption of various resources, including capital and talent. Without external forces, it is difficult for provinces that naturally lack capital and talent to achieve a high level of innovation efficiency. However, with the visible hand of the state, resource propensity is generated. Resource inclination means that the state (central government) sends resources to some weakly innovative provinces to make them grow steadily while sending more resources to strongly innovative provinces to ensure that their innovation efficiency maintains high growth. This puts the country in a dilemma: should it send more resources to the provinces with stronger economic development to ensure innovation, or should it support the relatively weaker provinces as much as possible to ensure the quality of life of its people? Answer: For long-term governance, the central government will not only choose to allocate more resources to provinces with high-quality development to ensure the country's strength but also choose to allocate relatively more resources to provinces that are more obedient to governance.

3. Data and methodology

Based on the relationship to be verified that we mentioned earlier, we collected data from the statistical yearbooks of 31 major provincial administrative units in China. These data were obtained from the China Statistical Yearbook, China Energy Statistical Yearbook, China Stock Market & Accounting Research Database (CSMAR), and manual collation. We have manually compiled the annual government work reports of these 31 major provincial administrative units and the central government (China's State Council). The rest of each provincial administrative unit's economic or resource data are obtained from the Statistical Yearbook or CSMAR.

3.1. Imitative governance

Referring to the study of Cohen et al. (2020), we represent the imitative management between provincial administrative units and the central government by the similarity between government work reports (Cohen et al., 2020). We constructed two similarity indicators to determine the degree of imitative management: CSit and JSit. To show the difference between the three indicators more visually. First, we use Python's jieba library to split the text

to get the lists. The first indicator used to measure imitative governance is called Cosine Similarity (CS), we use the concatenation of the lists of two government work reports after word separation as the base vector, and vectorize the words of the work reports by determining whether they appear in the concurrent set. For example, we can split a paragraph into a vector. Then, for two vectors V1 and V2 of two passages, similarity can be calculated.

$$V^1 = [1,1,1,1,1,1], V^2 = [1,1,1,1,0,1] \quad (1)$$

Then we can calculate the CS between V^1 and V^2 by the formula of cosine similarity.

$$\mathrm{CS} = \frac{\mathrm{V}^2\mathrm{V}^3}{\|\mathrm{V}^2\| \times \|\mathrm{V}^3\|} = \frac{1\times1+1\times1+1\times0+0\times1+1\times0+0\times1+1\times0+0\times1}{\sqrt{1^2+1^2+1^2+0^2+1^2+0^2+1^2+0^2}\times\sqrt{1^2+1^2+0^2+1^2+0^2+1^2+0^2+1^2}}$$
$$= \frac{2}{\sqrt{25}} = 0.400 \quad (2)$$

The Second indicator is called Jaccard Similarity (JS), which is calculated in a relatively simple way by converting different texts into lists and expressing it by the quotient of the number of elements of the intersection set and the number of elements of the concurrent set.

Finally, the characteristics of the composition of these two indicators can be found. When they are used to measure the imitative governance of local governments, indicators show a positive relationship with imitative governance. These indicators directly measure the textual similarity between the local government work reports and the central government work reports, thus their relationship with imitative governance shows a positive correlation, i.e., the larger the value, the more obvious the imitation. In conclusion, we obtained two indicators to measure imitative governance, where higher values of CS and JS indicate more imitative governance. Equally, we can draw more intuitive conclusions from Figure 1.

3.2. Innovation efficiency

We are concerned that in recent years some researchers are keen to calculate different efficiencies by various DEA (Data Envelopment Analysis) models, while the SBM-DEA calculation method has been more widely accepted (Chang et al., 2013; Cong et al., 2021; Deng et al., 2016; Ji et al., 2021). DEA is a non-parametric, multi-factor productivity analysis tool for estimating the relative effectiveness of multiple inputs and outputs (Charnes et al., 1978). The non-parametric, multi-factor approach to productivity (efficiency) calculations means that the subjective cognitive errors associated with the artificial selection of factors can be eliminated (Ding et al., 2022). Therefore, it is a very logical way to calculate the efficiency, we only need to change the options of inputs and outputs to be able to calculate the innovation efficiency through programming (Du et al., 2021; Ouyang et al., 2020; Shuai and Fan, 2020; Wang et al., 2022). At the same time, more and more scholars have started to introduce some undesirable outputs in the efficiency calculation process to further enhance the credibility of the efficiency values. Thus, the non-radial SBM-DEA method has become a sought-after scientific research approach among scholars (Cong et al., 2021; Lin et al., 2020; Wang et al., 2019; Zhang et al., 2021).

Hence, we calculated the innovation efficiency in 31 provinces by using the SBM-DEA model. The input options we set are employment and capital, where the Chinese Statistical Yearbook does not disclose the annual fixed asset investment by province, so we calculated the fixed assets of each province in China between 2006 and 2020 by the perpetual inventory method (Chen et al., 2018; Shi et al., 2013; Wu et al., 2014). The output options we set are two, the first is desirable output (innovation), expressed as the natural logarithm of the number of patents, and the second is undesirable output (pollution), expressed through the natural logarithm of the total number of pollutants. The SBM-DEA as shown in Equation (3):

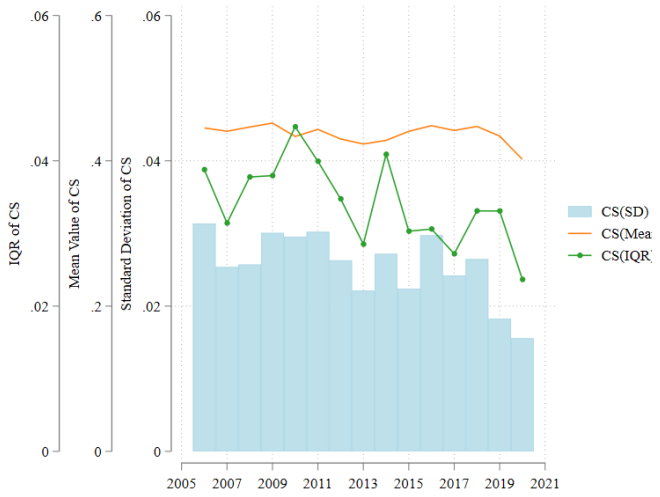

Figure 1a. The data structure of CS.

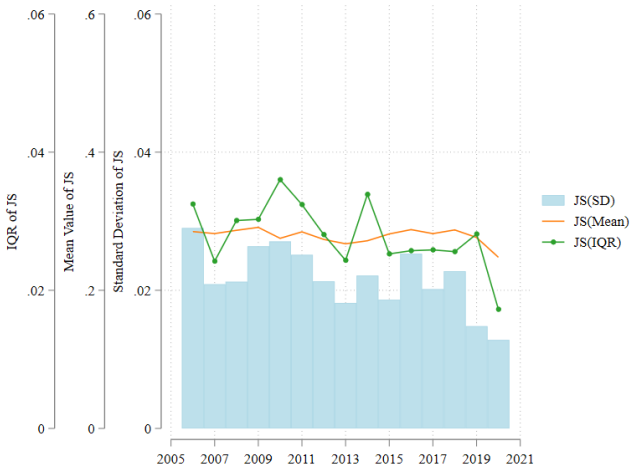

Figure 1b. The data structure of JS.

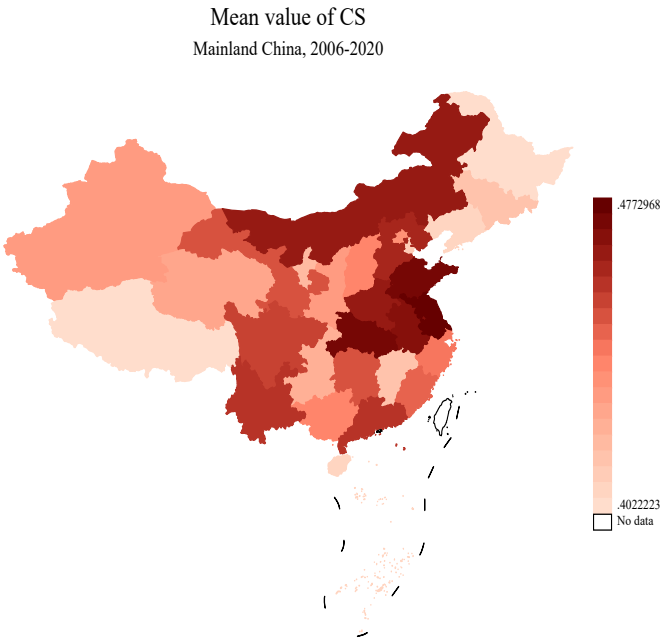

Figure 1c. Geographical distribution of CS (mean).

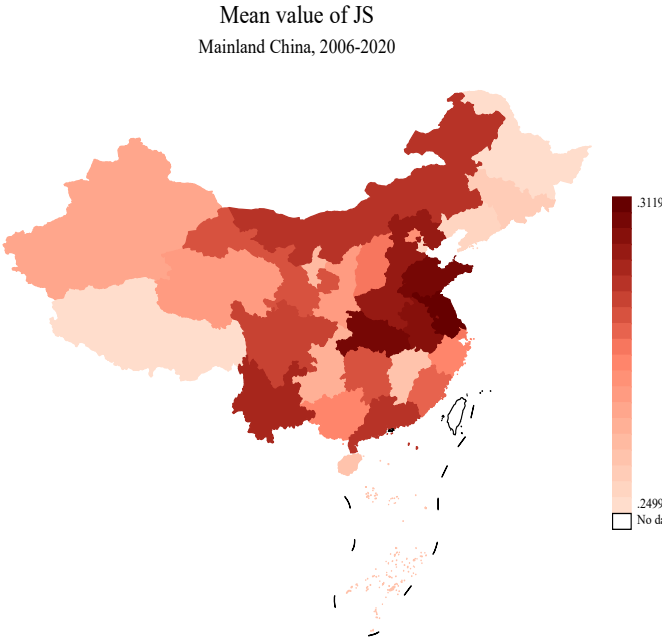

Figure 1d. Geographical distribution of JS (mean).

Figure 1. Geographical distribution of two kinds of imitative governances.

Notes: The audited version of the map used is from the Gaode open platform: https://lbs.amap.com/

$$\min INNO = \frac{1-\frac{1}{m}\sum_{i=1}^{m} s_i^- / x_{i0}}{1+\frac{1}{q_1+q_2}\left(\sum_{r=1}^{q_1} s_r^+ / y_{r0} + \sum_{t=1}^{q_2} s_t^{b-} / b_{t0}\right)} \text{ s.t.} \begin{cases} \sum_{j=1}^{n} \lambda_j x_j + s_i^- = x_0, i = 1,2,\dots m \\ \sum_{j=1}^{n} \lambda_j y_j - s_r^+ = y_0, r = 1,2,\dots q_1 \\ \sum_{j=1}^{n} \lambda_j b_j + s_b^- = b_0, b = 1,2,\dots q_2 \\ \lambda_j, s_i^-, s_r^+, s_b^- \geq 0, j = 1,2,\dots n \end{cases} \quad (3)$$

Among them, x0, y0, and b0 are input, output, and undesired output variables of the panel units (Decision-making Units) respectively. s-I, s+r, and s-b are the slackened variables of input, desirable output, and undesirable output respectively. m, q1, q2 is the number of indicators of input, desirable output, and undesirable output. λj is the strength variable. INNO represents the value of innovation efficiency.

After calculation, we can get the innovation efficiency values for 31 provinces in 2006-2020 are presented in Table 1 and Figure 2.

Table 1. Innovation Efficiency of different provinces from 2006 to 2020.

Province	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Anhui	0.676	0.685	0.710	0.752	0.785	0.853	0.862	0.856	0.829	0.826	0.828	0.820	0.861	0.855	0.890
Beijing	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Chongqing	0.794	0.765	0.753	0.775	0.798	0.819	0.832	0.832	0.808	0.834	0.841	0.819	0.831	0.817	0.820
Fujian	0.816	0.791	0.788	0.790	0.807	0.811	0.834	0.837	0.817	0.846	0.853	0.849	0.864	0.852	0.869
Gansu	0.652	0.642	0.638	0.631	0.648	0.666	0.695	0.696	0.699	0.712	0.710	0.748	0.773	0.780	0.795
Guangdong	1.000	1.000	1.000	0.955	0.951	0.927	0.926	0.896	0.891	0.896	0.903	1.000	1.000	1.000	1.000
Guangxi	0.641	0.633	0.645	0.635	0.634	0.650	0.658	0.666	0.681	0.697	0.704	0.709	0.725	0.729	0.751
Guizhou	0.693	0.691	0.690	0.679	0.694	0.691	0.733	0.732	0.746	0.759	0.728	0.739	0.768	0.783	0.796
Hainan	0.602	0.599	0.617	0.670	0.649	0.647	0.668	0.662	0.676	0.684	0.681	0.683	0.719	0.738	0.794
Hebei	0.716	0.706	0.705	0.697	0.701	0.703	0.717	0.710	0.714	0.736	0.741	0.755	0.782	0.786	0.812
Heilongjiang	0.777	0.756	0.760	0.737	0.729	0.790	0.827	0.792	0.756	0.762	0.757	0.765	0.772	0.761	0.781
Henan	0.728	0.717	0.741	0.727	0.734	0.741	0.755	0.737	0.741	0.755	0.761	0.771	0.796	0.810	0.825
Hubei	0.755	0.752	0.776	0.774	0.787	0.784	0.792	0.780	0.769	0.780	0.789	0.795	0.826	0.820	0.839
Hunan	0.778	0.735	0.740	0.738	0.757	0.761	0.781	0.757	0.758	0.763	0.765	0.778	0.796	0.798	0.819
Inner Mongolia	0.643	0.640	0.633	0.614	0.609	0.611	0.628	0.628	0.626	0.641	0.647	0.653	0.685	0.694	0.724
Jiangsu	0.857	0.868	0.908	0.955	0.970	1.000	1.000	0.949	0.912	0.910	0.898	0.894	0.909	0.906	0.929
Jiangxi	0.659	0.656	0.665	0.660	0.672	0.691	0.713	0.721	0.739	0.774	0.800	0.806	0.840	0.845	0.856
Jilin	0.747	0.724	0.722	0.696	0.684	0.691	0.694	0.676	0.678	0.690	0.708	0.716	0.727	0.734	0.758
Liaoning	0.832	0.808	0.815	0.792	0.792	0.790	0.781	0.752	0.733	0.745	0.750	0.755	0.778	0.786	0.806
Ningxia	0.609	0.577	0.667	0.682	0.668	0.596	0.623	0.639	0.649	0.658	0.696	0.757	0.763	0.754	0.768
Qinghai	0.481	0.560	0.562	0.596	0.529	0.611	0.591	0.560	0.573	0.635	0.635	0.641	0.747	0.714	0.647
Shaanxi	0.726	0.723	0.747	0.748	0.768	0.776	0.785	0.791	0.793	0.812	0.848	0.806	0.815	0.816	0.827
Shandong	0.835	0.827	0.841	0.832	0.829	0.834	0.840	0.810	0.798	0.805	0.802	0.806	0.821	0.824	0.849
Shanghai	1.000	1.000	1.000	1.000	1.000	0.935	0.922	0.895	0.881	0.877	0.881	0.893	0.907	0.906	0.939
Shanxi	0.671	0.674	0.687	0.693	0.695	0.693	0.713	0.705	0.694	0.697	0.699	0.714	0.739	0.755	0.790
Sichuan	0.769	0.763	0.795	0.805	0.821	0.799	0.823	0.801	0.797	0.803	0.814	0.812	0.818	0.802	0.806
Tianjin	0.881	0.891	0.904	0.870	0.875	0.814	0.832	0.836	0.822	0.838	0.840	0.842	0.855	0.842	1.000
Xinjiang	0.706	0.701	0.694	0.690	0.681	0.679	0.688	0.697	0.698	0.736	0.704	0.714	0.720	0.701	0.722
Tibet	0.508	0.455	0.491	0.613	0.480	0.495	0.499	0.469	0.460	0.496	0.529	0.577	0.640	0.677	0.717
Yunnan	0.678	0.674	0.665	0.676	0.670	0.664	0.679	0.669	0.678	0.693	0.689	0.712	0.739	0.736	0.741
Zhejiang	0.979	0.986	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.924	1.000	0.928	0.961
Mean	0.749	0.742	0.754	0.757	0.755	0.759	0.771	0.760	0.755	0.770	0.774	0.782	0.807	0.805	0.827

Based on the results of Table 1 and Figure 1, it is possible to judge to some extent the accuracy of the calculation of capital stock (reflected in innovation efficiency) in the previous section. Some of the provincial administrative units with significant resources in China, such as Beijing, Shanghai, Guangdong, Zhejiang, and Jiangsu, can be found to have innovation efficiency that exceeds that of other provinces. This is in line with the layout of China's economic development, which is mostly concentrated in the southern coastal areas. Although Beijing is not part of the coastal region, it also has more resources to allocate because of its special nature as capital, which makes it more efficient in innovation. Similarly, even in remote areas, such as Tibet and Xinjiang provinces, if their governors put enough effort into imitative governance, they will receive finance and resource assistance from the central government to improve their innovation efficiency.

3.3. Resource inclination

To measure the degree of resource skew, we convert the resource production and consumption into a standard coal quantity to enhance comparability, while using its ratio as a proxy variable for resource inclination. First, we need to explain the conversion method. Since China Energy Statistical Yearbook does not convert the production of energy into standard coal, we need to convert various resources into the production of standard coal first (Li et al., 2019). The conversion standard is shown in Table 2.

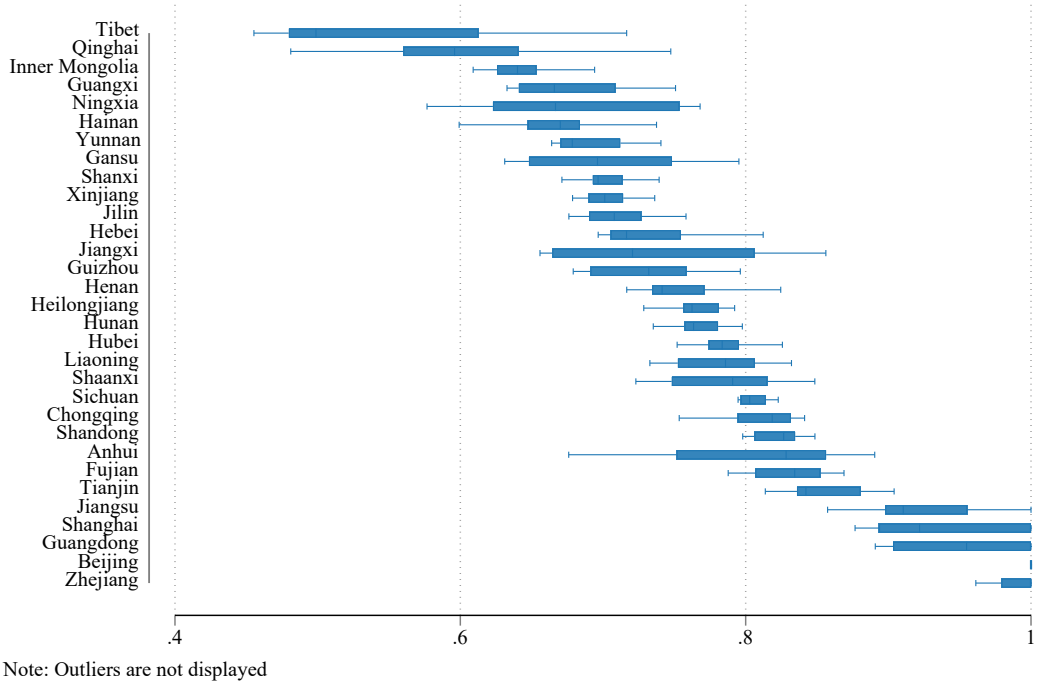

Figure 2. Innovation Efficiency of different provinces from 2006 to 2020.

To measure the degree of resource skew, we convert the resource production and consumption into a standard coal quantity to enhance comparability, while using its ratio as a proxy variable for resource inclination. First, we need to explain the conversion method. Since China Energy Statistical Yearbook does not convert the production of energy into standard coal, we need to convert various resources into the production of standard coal first (Li et al., 2019). The conversion standard is shown in Table 2.

Table 2. Standard coal coefficient.

Resource Types	Standard Coal Coefficient	Resource Types	Standard Coal Coefficient
raw coal	0.714	kerosene	1.471
coke	0.971	diesel oil	1.457
crude oil	1.429	natural gas	1.213
fuel oil	1.429	electricity	1.229
gasoline	1.471		

Source: 2019 Refinement to the 2006 IPCC National Greenhouse Gas Emission Inventory Guidelines.

After converting the various types of resources according to the standard coal coefficient, we can obtain the variable RI that we use to measure resource inclination, as shown in Equation (4).

$$RI = \frac{\sum_{r=1}^{R} Coef_r \times RC_r}{\sum_{r=1}^{R} Coef_r \times RP_r} \quad (4)$$

Among them, r denotes the number of resources in our data, and there are R resources in total. Coefr represents the conversion factor of the rth resource. RPr and RCr represent the total production and consumption of this resource, respectively. RI is the value of resource inclination, where a value above 1 indicates that the province has more resource skew, and a value below 1 indicates that the province lacks resource skew. The resource inclination by province is shown in Figure 3.

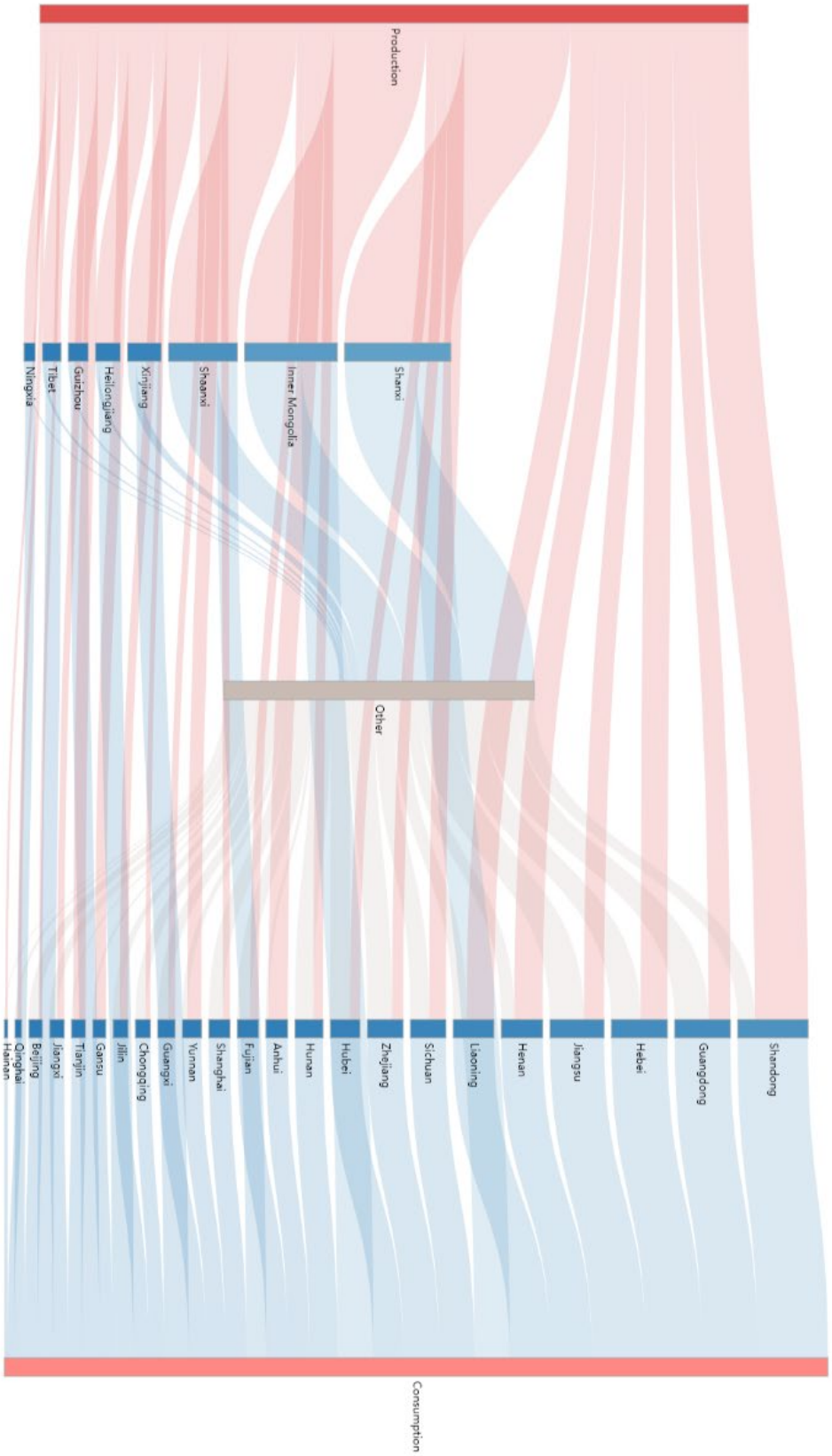

Figure 3. Resource flow.

Then, we can find according to the schematic diagram of resource flows in Figure 3: Some provinces provide a large amount of energy production, such as Shanxi, Shaanxi, and Inner Mongolia; some provinces consume a large amount of capacity, such as Shanghai, Beijing, and Shandong. The "Other" in the middle of the figure is used to indicate the method of tilting resources provided by the country, which can be the import and transfer of resources.

3.4. Regression model

Based on the above description and calculation of the main variables, we can find that in some more important strategic sites or provinces with more prominent economic development, the state will tend to provide them with more natural resources to guarantee their sustainable development. Similarly, when a province exhibits a high degree of uniformity, i.e., a relatively similar level of decision-making exists with the central government, then the central government has the incentive to provide resources to such a province. However, the aggregation of resources can better stimulate the efficiency of local innovation. So provincial governments also choose to express themselves to the central government in certain areas. Thus, we establish a potential association between imitative governance, resource tilting, and local innovation efficiency. Considering the need to control for some other province-level indicators, we have written the control variables used in Table 3.

Table 3. Control variables.

Variables	Definition	Symbol
Foreign direct investment	Natural logarithm of foreign direct investment in the statistical yearbook	FDI
Gross domestic product	Natural logarithm of gross domestic product in the statistical yearbook	GDP
Distance from the center of power	The average distance of provincial governments from ten major units of the Chinese State Council	DISTANE
Population growth rate	The natural growth rate of the population	GROWTH
Central government transfer payments	The proportion of central government transfer payments to the local annual fiscal budget	SUPPORT
Province-level fixed effect	Dummy variable for 31 provinces	PROVINCE
Year-level fixed effect	Dummy variable for 15 years	YEAR

Moreover, the advantage of using these control variables is that they help us to exclude some wrong conclusions, for example, among the control variables in the table above, we use some input variables that can represent labor and capital, respectively. Their inclusion in our regressions highlights the explanatory role of our main explanatory variable (imitative governance). The regression equation after adding these control variables is shown in Equation (5), and we also introduce the moderating variable of energy inclination to determine whether energy tilt can promote the effect of imitative governance on regional innovation efficiency (Equation (6)).

$$Y = \alpha_0 X + \sum Control + \beta + \gamma + \grave{o} \tag{5}$$

$$Y = \alpha_1 X \times M + \alpha_2 X + \alpha_3 M + \sum Control + \beta + \gamma + \grave{o} \tag{6}$$

Where Y represents the innovation efficiency (INNO) in different provinces and the data are presented in Table 1. X denotes the two metrics we computed to measure imitative governance, CS and JS, respectively. M denotes the moderating variable we use, i.e., resources inclination (RI). represents control variables other than province and year. corresponds to the regression coefficients of the different variables. β, γ, $\grave{o}$ denote constant, province-level

fixed effects, and year-level fixed effects in the regressions, respectively. Finally, our subsequent analysis will mainly focus on the performance of these three variables in the regressions.

4. Empirical results and analysis

4.1. Variable features

Typically, we need to analyze the specific data structure of each variable and use this to discuss their reasonableness and veracity. In the previous chapter, we gave the calculation of the main variables of interest and the regression models we will use. However, we are still missing the presentation of the data structure of the control variables. Immediately afterward, we present in Table 4 the descriptive statistics for all the variables used in this paper.

Table 4. Descriptive statistics.

	N	Mean	SD	Min	P25	P50	P75	Max	Skewness	Kurtosis
CS	465	0.437	0.028	0.350	0.419	0.439	0.457	0.524	-0.346	3.229
JS	465	0.279	0.024	0.188	0.264	0.281	0.295	0.355	-0.427	3.625
INNO	465	0.771	0.115	0.455	0.694	0.762	0.832	1.000	0.187	3.050
RI	465	1.984	1.250	0.218	1.065	1.709	2.751	8.704	1.335	6.700
FDI	465	12.512	1.908	6.888	11.569	13.101	13.957	15.091	-0.944	2.877
GDP	465	9.449	1.082	5.672	8.898	9.612	10.165	11.615	-0.797	3.720
DISTANCE	465	6.793	0.924	3.395	6.448	6.974	7.350	7.850	-1.880	7.080
GROWTH	465	5.233	2.888	-4.480	3.070	5.300	7.050	11.780	-0.112	2.747
SUPPORT	465	0.661	0.451	0.028	0.375	0.622	0.800	2.859	2.004	8.940

All data (N=465=31*15) in the above table constitute 15 years of data from 2006 to 2020 for 31 major provincial administrative units in China. It can be seen that the structure of these data is basically reasonable, and again, we can determine the correlation between the variables based on the correlation heatmap shown in Figure 4.

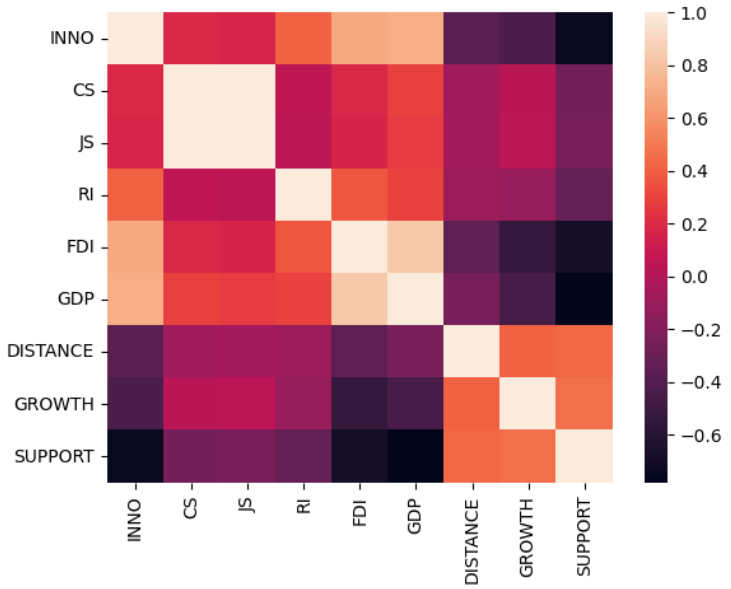

Figure 4. Correlation between variables.

According to Figure 4, we can find a positive relationship between imitative governance (CS and JS) and regional innovation efficiency (INNO), which can provide preliminary support for our conclusions. There are two

essential explanations on this point: 1. The central government's working guidance is very forward-looking, so by imitating its working methods, the provincial government can improve the efficiency of local technological innovation; 2. When the provincial government imitates the central government's working methods, the central government will assume that the region expresses a high degree of recognition of its work, thus it is inclined to provide more financial and resource support, which can improve the efficiency of local technological innovation. The first explanation is undoubtedly correct, as the central government brings together more economists, management experts, and policymakers than the provincial governments, and their think tanks have more expertise and more practical experience. The second explanation is what we focus on, and equally one of the marginal contributions of this paper, which is to discuss the relationship between resource skewing in imitative governance and regional innovation efficiency. In Figure 4 we can also see that the same resource bias has contributed to the efficiency of regional innovation. Although the correlation between imitative governance and innovation efficiency is higher in terms of correlation, we cannot ignore the effect of resource tilting on the increase in innovation efficiency.

4.2. Regression results

Furthermore, we use the model of Equations (11) and (12) to determine the direct and moderating effect of resource skewing between imitative governance and regional innovation efficiency and interpret the corresponding regression results.

Table 5. Regression results.

	(1) OLS-1	(2) Moderation-1	(3) OLS-2	(4) Moderation-2
CS	0.384***	0.427***		
	(4.46)	(5.03)		
CS×RI		0.270***		
		(4.56)		
JS			0.427***	0.470***
			(4.33)	(4.83)
JS×RI				0.307***
				(4.46)
RI		0.002		0.003
		(0.90)		(1.01)
FDI	0.006*	0.004	0.005*	0.004
	(1.80)	(1.30)	(1.74)	(1.22)
GDP	0.065***	0.070***	0.065***	0.071***
	(3.95)	(4.37)	(3.96)	(4.39)
DISTANCE	0.546***	0.512***	0.548***	0.513***
	(6.74)	(6.24)	(6.75)	(6.24)
GROWTH	-0.003	-0.002	-0.003	-0.002
	(-1.38)	(-1.12)	(-1.35)	(-1.12)
SUPPORT	-0.046***	-0.042***	-0.045***	-0.041***
	(-3.67)	(-3.42)	(-3.60)	(-3.37)
_cons	-3.709***	-3.530***	-3.674***	-3.484***
	(-7.49)	(-7.00)	(-7.43)	(-6.91)
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	465	465	465	465
R2	0.927	0.930	0.927	0.930
adj. R2	0.918	0.922	0.918	0.921

*Notes: t statistics in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.*

The regression results in Table 5 show that imitative governance leads to a significant increase in local innovation efficiency when the control variables are held constant, after excluding the effects of some other factors (excluding unobserved factors through province-level and year-level fixed effects). At the same time, resource propensity can enhance the role of imitative governance in improving innovation efficiency. The results here have the same interpretation as those we expressed in the correlation analysis, but are more prominent in supporting the second essential interpretation. That is when local governments engage in imitative governance of the central government: On the one hand, local governments gain innovation efficiency by learning from the wisdom of the central government; on the other hand, the central government will also support them with resources because it sees them expressing themselves to it. And the support of resources in turn promotes the innovation efficiency of local governments. Furthermore, according to Table 4, we can find that the range of variation of one standard deviation of RI is (1.984-1.250, 1.984+1.250). Combining the results of models (2) and (4) in Table 5, we can fit a plot of the moderating effect when RI increases/decreases by one standard deviation in Figure 5.

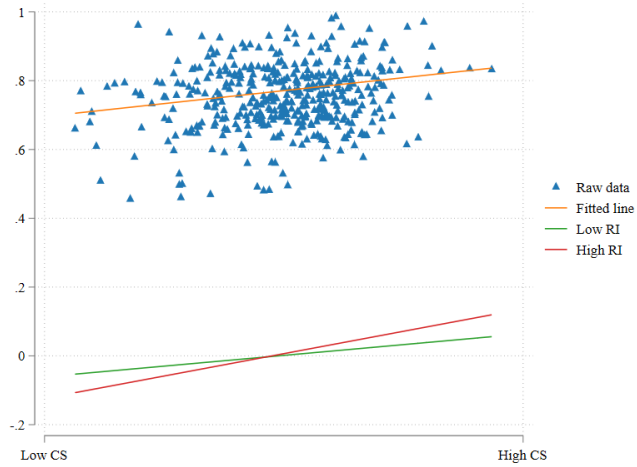

Figure 5a. Moderating effect of RI on CS.

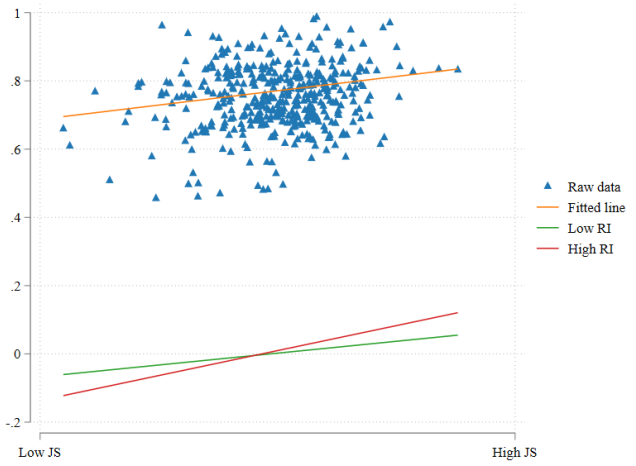

Figure 5b. Moderating effect of RI on JS.

Figure 5. Moderating effects.

5. Conclusion and Policy Implications

5.1. Discussion

This paper discusses the impact of the degree of similarity between Chinese provincial and central government work reports on local innovation efficiency. We introduce the concept of imitative governance and use textual analysis methods to calculate indicators of imitative governance intensity. Moreover, the main contribution of this paper is to provide better technical support for the relationship between imitative governance and innovation efficiency, while introducing the concept of resource inclination to analyze the mechanisms underlying the roles. Due to technical limitations, previous studies have tended to focus on policy responsiveness to assess the strength of local government support for central government decisions. Although other economic/political indicators have been assessed by text similarity in existing studies, there is a lack of research on policy text similarity, particularly in the context of imitative governance. At the same time, the lack of reference to imitative governance construction models makes it difficult to further explore the consequences of imitative governance. Policy responsiveness may be one approach to measuring imitative governance, but in general, it is still not a sufficiently clear expression of imitative governance and is not sufficiently granular. This paper pioneers the construction of proxy indicators for

imitative governance and discusses the implications of imitative governance for regional innovation efficiency. At the same time, given the classical resource-based view, we argue that local governments will also choose to express their subordination to the central government to gain access to more resources. Therefore, we quantify the moderating effect of resource flows between imitative governance and innovation efficiency through the concept of resource inclination. Finally, the content discussed in this paper is an area that has not been focused on or has received insufficient attention in the existing literature. By combing through the relevant literature, we have developed indicators related to the imitative governance of provincial governments, which will allow other scholars in similar fields to have more avenues to study the governance models of different national governments.

5.2. Conclusion and Policy Implications

This paper discusses the impact of imitative governance by provincial governments on local innovation efficiency and investigates the moderating effect of resource tilting in the impact path using data on Chinese provinces for a total of fifteen years from 2006 to 2020. The empirical results of this paper suggest that imitative governance contributes to local innovation efficiency and can explain this positive effect in two main ways. First, imitative governance is aimed at provincial governments learning and assimilating central government work reports to develop their economic development plans. In doing so, they often receive wisdom from the central think tank, which can broaden the vision of local governors and thus give them a clearer perception of development. This helped improve the efficiency of local innovation to some extent. Second, we argue that mimetic governance can capture more resource leverage by demonstrating subservience to the central government. The interpretation of this view can be traced back to the view of unity that has been promoted by the Chinese people from ancient times to the present. China is a country of many ethnic groups, and the authorities tend to offer more help to people who are loyal enough in exchange for their approval of the current model of governance. Thus, resource tilting can moderate the effect of imitative governance on the efficiency of local innovation.

Our research not only contributes to the field of management but also extends to the field of politics. In the management field, we can refine imitative governance to strategic competition between firms and study the strategic game between firms. In the political field, we can study the role of multiple ideologies in the governance of the state. Of course, there are certain limitations to our study that we hope future scholars will address. Namely, we can further distinguish the extent to which imitative governance involves learning from the wisdom of a central think tank and the extent to which it is simply a sign of submission to the authorities.

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Conflict of interest

All the authors claim that the manuscript is completely original. The authors also declare no conflict of interest.

Author contributions

We contributed fully to all sections of the article, such as, conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation,

visualization, writing–original draft, and writing–review & editing.

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