Research on How the Yangtze River Delta's Integration Policy Affects the Modernization of the Area's Industrial Structure

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Abstract. As Chinese society enters a new phase, the nation encourages coordinated social development by implementing the regional integration program. The regional integration of the Yangtze River Delta is demonstrating its significant influence as one of the key policies. The purpose of this research is to investigate how the regional integration policy has affected the Yangtze River Delta's upgrading of its industrial structure, and solve the corresponding policy optimization problems, and during the experiment, the issues of regional variations that are absent from the current body of study were investigate. This research examines the beneficial effects of ongoing enhancement and the growth of regional integration policies in the Yangtze River Delta on the level of industrial structure optimization which use pertinent panel data of pertinent cities from 2015 to 2022 and upgrade by using the difference-difference method. Because of the empirical test results, pertinent recommendations for policy are made.

Keywords: Regional integration, industrial structure upgrading, Yangtze River Delta demonstration zone.

1. Introduction

China's economy has entered a new era today, and encouraging the modernization of the industrial structure has inevitably grown to be crucial to raising the standard of China's economic development and increasing the effectiveness of China's economic growth. According to the report of the 19th National Congress of the Communist Party of China, the main task of national economic building is now to strengthen the reform of the economic system and mechanisms and speed up the upgrading of the industrial structure by releasing the dividend of pertinent policies and systems. To better understand how the Yangtze River Delta integration strategy influences the modernization of the industrial structure, this study will use the Yangtze River Delta as its research target.

Many theoretical research has been conducted on the impact of regional integration policies on the upgrading of industrial structures; nevertheless, most of these studies have concentrated on the implications of regional integration on the vitality of economic development. According to some research, Li believes that local governments will actively strengthen regional division of labor and cooperation based on the common strategic goal, to achieve the goal of improving regional total factor productivity [1]. However, other researchers, like Chen, who used the Pearl River Delta as an example, discovered that regional integration strategy has an impact on identity governance. As a result of the interaction between government intervention and integration policy, the manufacturing industry's level of rationalization can be improved while its advanced level is decreased [2].

In addition, it can be seen from numerous literatures that different research experts have different approaches to measuring industrial structure upgrading. For instance, Xu measured the degree of elevation of the regional industrial structure using the method of giving values to various industries [3]. Some other studies, such as Ju, pointed out that with the change of factor endowment, the industry presents a hump-like dynamic development, labor-intensive industries are gradually replaced by capital-intensive industries, and the overall production function changes internally, thus promoting economic growth [4].

2. Current Policy Situation

2.1. Status of Regional Industrial Structure Upgrading

Regional integration, as a key way and an important starting point to promote regional coordinated development, is mainly manifested in urban agglomeration and metropolitan area in geographical space. It is the sole method for developing in a high-quality manner [5].

Since the 11th Five-Year Plan, the Chinese government has released several regional coordinated development plans and related policies in succession, and after years of practice, the rationalization and modernization of the industrial structure have been greatly impacted by the regional integration strategy [2]. There are now 14 urban agglomeration development plans that have been approved by the State Council. These urban agglomerations have become an important spatial carrier for promoting regional development and promoting high-quality economic development.

2.2. Current Situation of Yangtze River Delta Integration

The Yangtze River Delta has consistently raised the bar for internal regional coordinated growth, and continuously generate new economic development momentum. The creation of the Yangtze River Delta City Economic Coordination Committee, which offers a useful forum for fostering contacts, is the most significant emblem and cooperation between different governments in the region.

3. The Context of Policy and the Research Question

3.1. Background on Policies

The Yangtze River Delta's regional integration is a process that is gradually improving, and its policies are also often adjusted to reflect changes in the country. 2019 saw the Yangtze River Delta Regional Integration Development Plan's Outline released by the State Council. The formal designation of the regional integration development of the Yangtze River Delta as a national policy. After the reform and opening, the Yangtze River Delta region has roughly experienced four stages: the birth of Shanghai Economic Zone from 1982 to 1991, the spontaneous cooperation of the Yangtze River Delta region from 1992 to 2004, the construction of the Yangtze River Delta regional system from 2005 to 2012, and the development of the national strategy of this region after 2013. The Yangtze River Delta's regional integration strategy takes the lead and offers other regional agglomeration regions experience as a reference, while also establishing an innovation platform for the nation's high-quality growth and exploring new avenues for the new development pattern.

3.2. Research Hypothesis

3.2.1. Regional integration and industrial upgrading

According to existing research data, regional integration policies are conducive to breaking the situation of separate governance and excessive competition among cities. First and foremost, regional integration cooperation helps to rationalize the industrial structure by adjusting resource allocation within the region based on the unique production advantages and labor divisions in each region. Secondly, the cooperation can help the region to break the internal administrative barriers, and the plan aids in directing the local government's industrial structure upgrade, so encouraging the upgrade of the industrial structure [6]. The study presented above leads this paper to suggest the following theory:

Hypothesis 1: Cooperation in regional integration is beneficial to the modernization of the industrial structure.

3.2.2. Differences within regional integration

The strategic function of regional integration has spatial limitations, which restricts the economic spillover of the core area and causes urban diseases to appear. In the Yangtze River Delta region,

Shanghai, as the central city of the region, has an excessive population agglomeration, which leads to the emergence of urban diseases such as illegal land use and disorderly industrial expansion. Although the northern Jiangsu and Anhui regions have a broad space for development, they are limited by their geographical and spatial positions, and cannot share the economic spillover results from Shanghai and the Southern Yangtze River Delta region [7]. With the deepening of regional economic integration, there exists the problem of imperfect interest coordination mechanism among cities in the region, which leads to vicious competition and other phenomena. Regional government management systems are not horizontal affiliations. The Yangtze River Delta region's integrated development is hampered by fragmented management, which also limits the area's ability to allocate resources effectively. The study presented above leads this paper to suggest the following theories:

Hypothesis 2: Regional economic differences still exist under the regional integration strategy.

4. Research Design

4.1. Model Design

This study focuses on how the regional integration policy is causing the industrial structure of the Yangtze River Delta to be updated and optimized. The Yangtze River Delta regional integrated urban agglomeration's addition and the Yangtze River Delta regional integrated development plan's promulgation as an exogenous occurrence offer a quasi-experimental chance to use the DID approach to solve the endogenous problem. Therefore, the following DID model is constructed in this paper:

$Y_{it}=\alpha+\beta \mathrm{treat_i}\times \mathrm{post_t}+\gamma \mathrm{X_{it}}+\mu_i+v_t+\varepsilon_{it}$

The explained variable Y_{it} represents the level of industrial structure optimization and upgrading of the province i in the year t. The core explanatory variable $\mathrm{treat_i}\times \mathrm{post_t}$ represents the dummy variable of whether the province and city i belong to the planning scope of the Yangtze River Delta region in the year t. β is the difference-difference estimator, which describes the effect of regional integration policy on the optimization and upgrading level of industrial structure in the region. The collection of control factors known as "$\mathrm{X_{it}}$" influences how the regional industrial structure is upgraded. To reflect discrete characteristics that remain constant across time, μ_i represents the fixed effects of provinces and cities. v_t represents the year fixed effect, which captures the time factor that does not vary with individuals. ε_{it} is the random disturbance term.

4.2. Variable Definition

4.2.1. Upgrading of industrial structure

This research employs a value-assignment method based on the concepts of Xu to quantify the degree of elevation of the regional industrial structure [3]. The precise technique for measurement is:$\mathrm{ISH_{it}}=Y_{1it}\times1+Y_{2it}\times4+Y_{3it}\times9$, where$Y_{1it}$, Y_{2it} and Y_{3it} respectively represent the added value of the three industries accounted for the proportion of local GDP respectively in t year of region i. The degree of industrial structure in the area is correlated with the ISH value.

4.2.2. Within the ambit of regional integration plans for the Yangtze River Delta

When the province is within the planning scope of the Yangtze River Delta regional integration policy, $\mathrm{treat_i}=1$otherwise $\mathrm{treat_i}=0$. If the year is greater than or equal to 2019, then $\mathrm{post_t}=1$, otherwise $\mathrm{post_t}=0$.

4.2.3. Control variable

Since the level of regional infrastructure construction, the degree of opening to the outside world, the scale of social construction and the improvement of the regional industrial structure may be impacted by several factors, the above factors in this paper are taken as control variables. The level of infrastructure construction (Infra) is measured by the per capita urban road area of the region, the degree of openness of the region is measured by the ratio of foreign investment to local GDP, and the

scale of local social construction (S) is measured by the ratio of local general budget expenditure to GDP of the year.

5. Empirical Test and Result Analysis

5.1. Regional Integration Cooperation and Industrial Structure Upgrading

This paper first examines whether the Yangtze River Delta regional integration cooperation has promoted the upgrading of industrial structure, and the results show as shown in Table 1.

As can be seen from Table 1, before the control variables are not considered in column (1), at the 1% significance level, the Yangtze River Delta integration policy variable's coefficient is considerably positive; in column (2), after the relevant variables proposed in this paper are controlled, the coefficient of the core explanatory variable is still significantly positive. It is evident that the Yangtze River Delta integration program significantly improves each city's level of industrial structure modernization. Thus, the theory put out in this work is true.

Table 1. The impact of the Yangtze River Delta integration policy on the modernization of the industrial structure in the region

	(1)	(2)
	y	y
$treat_i \times post_t$	0.016***	0.017***
	(3.03)	(3.72)
Infra		-0.366***
		(-8.28)
Open		-0.002**
		(-2.37)
S		-0.111***
		(-3.43)
Urban fixed effect	Control	Control
Time-fixed effect	Control	Control
Constant	0.619***	0.825***
	(150.14)	(17.83)
R-squared	0.046	0.309

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

5.2. Robust Test

5.2.1. Control fixed effects

Cities with stronger industrial structure have higher levels of regional economic development, a faster pace of scientific and technological development, and more abundant capital resources, and have the first-mover advantage of optimizing industrial structure. Furthermore, years of development also encourage the optimization of industrial structure, which presents endogenous challenges for the causality assessment in this paper's empirical section. In this regard, by setting the fixed effect of the city and the interaction effect between the city and the year, the potential for change brought about by scientific and technological advancements is diminished. The findings demonstrate that even after accounting for the potential dominance effects brought on by technology and economic factors, the earlier conclusions are still valid [8].

5.2.2. Common trend test

The DID method is used to test the impact of the policy of joining the regional integration of the Yangtze River Delta, and it is also necessary to test whether the processing group and the control group meet the common trend hypothesis. The approach of Li is cited in this study, and the first two years are represented with seven-year dummy variables, the first 1 year, the year of implementation,

the year after implementation, and the year following the Yangtze River Delta's regional integration policy's implementation [9]. The results show that the coefficients of dummy variables are not significant before the implementation of regional integration policy. It suggests that the same trend hypothesis is met by both the treatment group and the control group.

5.3. Heterogeneity Analysis

This paper mainly analyzes whether the impact of regional integration policy on the upgrading of regional industrial structure will be different depending on the level of the city line. Studies have shown that the degree to which Chinese cities receive development funding and support from the central government is directly correlated with those levels [10]. The administrative and city line levels of the cities in the Yangtze River Delta region vary, and the unequal distribution of development resources may cause different results. Consequently, the samples in this paper are split into two categories: first-tier cities and non-first-tier cities. The results are shown in Table 2.

Table 2. The different impacts of Yangtze River Delta integration policy on first-tier cities and second-tier cities

	(1)	(2)
VARIABLES	y	y
$treat_i \times post_t$	0.014***	0.015*
	(3.56)	(1.79)
Infra	-0.022	-0.234***
	(-1.10)	(-4.34)
Open	-0.002*	-0.009
	(-1.93)	(-1.41)
S	-0.243***	0.168
	(-6.07)	(0.37)
Constant	0.677***	0.985***
	(23.70)	(9.63)
R-squared	0.270	0.619

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Column (1) is listed as a first-tier city, and column (2) is listed as a non-first-tier city. The core explanatory variable coefficient of first-tier cities is significantly positive at the level of 1%, while that of non-first-tier cities is significantly positive at the level of 10%. As a result, the influence of the policy on different regions depending on the various stages of economic growth and city grades. For first-tier cities, regional integration has a greater impact on the upgrading of industrial structure. This behavior can support the paper's second hypothesis, which holds that regional distinctions persist despite the regional integration plan.

6. Conclusion

The regional integration strategy of the Yangtze River Delta, as implemented in the DID experiment, is the basis for this research. The following conclusions can be made using empirical analysis: Firstly, the upgrading of the industrial structure is positively impacted by regional integration, and this benefit grows over time. Second, there are still some disparities in the effects of industrial structure optimization among various cities within the region, even though regional integration can encourage the development and optimization of the overall regional industrial structure and most cities can profit from it.

The paper's primary conclusions lead to the following policy recommendations being proposed: First, continue to promote the regional integration policy, strengthen the radiating leading role of the central city, give full play to the positive role of the policy, and strengthen the science, innovation and management technology learning of the central city in other provinces and cities. Second,

strengthen and improve the coordination mechanism among regions, deepen coordination and cooperation, give each region's comparative advantages due consideration, avoid vicious competition, and maximize benefits. Third, weaken the policy barriers between provinces and cities within the regional integration policy, strengthen the exchange of talents and capital flow, provide the market its due say in how resources are allocated, and increase production efficiency.

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