

Does flattening government improve county-level economic resilience? Evidence from the Province-Managing-County reform in China

JUNYAN CHEN, SHUXIN DENG

Abstract Improving regional economic resilience is a key goal for governments around the world to address global economic instability. This paper employs a quasi-natural experiment of “Province-Managing-County” (PMC) reform in China, uses a time-varying DID method to investigate the mechanism and the impact of the flattening government on county-level economic resilience (CER) in China. Through empirical analysis of county-level data in China from 2000 to 2020, we found that government flattening significantly improved CER. The heterogeneity test results indicate that cities in eastern China, regions with higher levels of economic development, lower fiscal self-sufficiency rates, higher levels of tax effort, and industries with higher levels of industrial upgrading are more affected by PMC reform. A reliable mechanism indicates that PMC policies effectively affect CER by promoting fiscal self-sufficiency, narrowing the urban-rural gap, improving local innovation levels, and reducing tax efforts. Based on this, local governance suggestions were proposed to optimize intergovernmental coordination mechanisms, strengthen fiscal capacity building, and enhance regional adaptive governance to enhance regional economic resilience.

Keywords: • Flattening government • county-level economic resilience • province-managing-county • time-varying difference-in-differences

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1 Introduction

In the 21st century, the global economy is continuously facing significant challenges like financial crises, global warming, trade tensions, and the COVID-19 pandemic (Hu, Li, & Dong, 2022; Zhou, Zhang, Wang, & Sun, 2024). Against this backdrop, pinpointing particular ways to boost regional economic resilience has emerged as an immediate priority for governments across the globe (Eichengreen, Park, & Shin, 2024; Li, Hao, Han, Guo, Zhong, Zou & Fan, 2024; Yang, Lin, Xu, & Liu, 2024). Economic resilience pertains to a region's aptitude to endure unfavorable circumstances and sustain its operational state (Martin, 2012; Lee & Wang, 2023; Li et al., 2024). Existing research widely acknowledges that industrial structure (Tan, Hu, Hassink, & Ni, 2020), innovation level (Xu, Zhong, & Wang, 2024; Hu et al., 2022), economic agglomeration (Zhou, Zhang, Wang, & Sun, 2024), institutional environment (Du, Wang, & Zhou, 2023; Hu & Yang, 2019), as well as the digital economy (Tian & Guo, 2023; Hou, Zhang, & Song, 2023) is the key factor affecting of regional economic resilience. Indeed, as the architects and implementers of public policies, governments exert significant influence on regional economic resilience (Hu et al., 2022).

This study examines how PMC reform in China affect regional CER. Policies like tax reduction for CER depend on government structure (Lee & Wang, 2023; Liu et al., 2023). Flattening reduces bureaucratic complexities (Yang, 2016), stimulates grassroots initiative (Li, Lu, & Wang, 2016), lowers costs (Liu, Zhang, Zhai, & Chan, 2023), and enhances resource allocation (Zhang, Yang, & Song, 2020; Zhao, Zhong, & Zhang, 2022) by mitigating inter-level policy interpretation issues (Rodríguez-Ward, Larson, & Ruesta, 2018; Liu et al., 2023).

However, enhancing economic resilience via public actions requires sound governance and oversight (Hu & Yang, 2019; Tian & Guo, 2023). Flattening may boost local initiative but complicate power supervision ((Li et al., 2016; Yao & Zhang, 2017), risking resource misallocation (Wang, Zheng, & Zhao, 2011; Li et al., 2016; Bo, Wu, & Zhong, 2020). Recent evidence from China's decentralization efforts suggests that inadequate oversight can align lower-level interests against higher goals (Wang et al., 2011; Liu et al., 2023), worsening governance risks and harming economic resilience. Recent studies focus on fiscal decentralization's impact in India, Brazil, and Eastern Europe. India's constitutional reforms boost local initiative but face central tax constraints ((Mohapatra & Bishnu, 2012; Rao, Raghunandan, Gupta, Datta, Jena, & Amarnath, 2011). Brazil's 1988 Constitution enhanced local autonomy post-debt crisis (Montero, 2001). Eastern Europe sees positive expenditure decentralization but negative income effects (Mladenovska, Makreshanska, & Tashevsk, 2024; Rodríguez - Pose, Andrés, & Anne, 2009), showing varied outcomes due to institutional differences.

While significant progress has been made in this research field, empirical evidence on government structure and regional economic resilience remains scarce. Lee & Wang (2023) found U.S. vertically fragmented structures worsen resilience disparities, but data limitations and OLS correlations (Wing, Simon, & Bello-

Gomez, 2018; Lee & Wang, 2023) hinder causality. This study uses China's flattening reforms to explore causal effects.

Taking the recent exogenous changes in the organizational structure of the Chinese government – from a three-tier system (province-city-county) to a two-tier system (province-managing-county, PMC) – as a quasi-natural experiment, this paper conducted a time-varying difference-in-differences (TV-DID) estimation to analyze the impact of flattening government on CER. Based on the economic resilience concepts proposed by Martin (2012) and Yang et al. (2024), this study constructed an evaluation index system for CER, which includes three dimensions: resilience and recovery ability, adaptation and adjustment ability, and innovation and transformation ability. This paper uses county-level data in China from 2000 to 2020 for empirical analysis and finds that government flattening promotes the enhancement of CER, and different counties have different treatment effects in terms of geographical location, economic development level, industrial structure and fiscal capacity. Consistent results were obtained from baseline regression analysis through robustness testing, including propensity score matching DID (PSM-DID), placebo testing, exclusion of contemporaneous policy and coefficient of variation method analysis (COV).

Our study contributes in three aspects. First, differing from prior studies using macro indicators (Lee & Wang, 2023) and facing reverse causality (Wing et al, 2018), we employ DID method (Goodman-Bacon, 2021) to treat China's flattening government reform as a quasi-natural experiment, estimating its causal effect on county CER via counterfactual analysis. Second, we innovatively explore CER determinants from the perspective of flattened government structures, enriching literature focusing on industrial structure (Tan et al., 2020), innovation (Xu et al., 2024; Hu et al., 2022), economic agglomeration (Zhou et al., 2024), institutional environment (Du et al., 2023; Hu & Yang, 2019), and digital economy (Tian & Guo, 2023; Hou et al., 2023). Third, verifying the positive impact of governmental flattening on CER, our findings offer policy references, especially given Asia's resilience during COVID-19 (Eichengreen et al., 2024), providing implications for other economies.

The structure of this paper is organized as follows. In Section 2, an institutional background is presented, and theoretical hypotheses are put forward. Section 3 elaborates on the model design, data sources, and the definitions of variables. In Section 4, the results of the TV-DID model are shown and analyzed. This section also includes discussions on robustness checks, heterogeneity tests, and the influencing mechanism. Finally, Section 5 offers the conclusion of the entire paper.

2 Institutional background and theoretical hypothesis

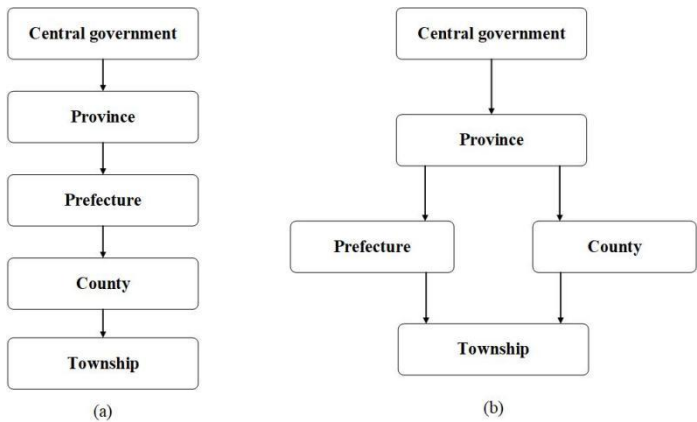
2.1 Institutional background

Since 1949, the Chinese government has maintained a five-level organizational system that consists of the central, provincial, prefecture, county, and township levels. In the 1980s, acknowledging the significant role that central cities could

play as engines for economic development, the Chinese government adjusted the local structure of provincial-level administrative institutions by establishing prefecture-level cities and implementing the "city managing counties" policy (Li et al., 2016). Under this policy framework, provincial governments have direct interactions with prefecture-level governments, and prefecture-level governments then interact with county-level governments. Consequently, there exists no direct connection between provincial governments and county-level governments (Cai, Zhang, & Yang,2022; Ding, Yang, & Wang, 2023), as illustrated in Figure 1(a). By the end of 2003, a total of 18 provinces fully implemented the “city governing counties” strategy. Nationwide, 272 prefecture governments supervised 1574 county-level governments, accounting for 80.4% of all county-level administrative regions in China.

As urbanization accelerated and the economy rapidly developed, the drawbacks of the “city managing counties” strategy gradually became apparent. These encompass: (1) a complex administrative hierarchy leading to elevated administrative costs and increased information asymmetry, resulting in inefficient communication channels and diminished administrative efficiency; (2) prefecture-level cities retaining the devolved authority and financial resources from the central government; and (3) prefecture-level cities exerting a “crowding-out effect” on county development, leading to imbalanced urban-rural interest distribution and widening economic disparities. To address these issues, in 2004, the PMC reform was initiated in Anhui, Hubei, Jiangxi, and Henan provinces. This reform marked a transition in China's government organization from a model where “provinces manage cities” and “city managing counties” to one where “provinces manage both cities and counties,” as depicted in Figure 1(b).

Figure 1: Organizational system of Chinese governments

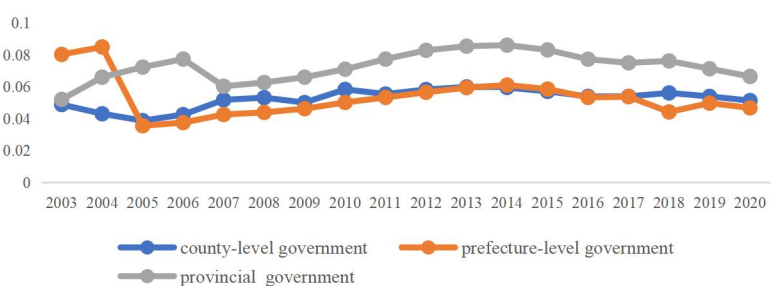


Overall, while the specifics of PMC reform vary across provinces, it generally encompasses three main components. First, it involves a reorganization of the administrative system. The PMC strategy establishes direct links between

provincial and county-level governments. For instance, following PMC reform, departments such as industry and commerce, local taxation, and quality supervision that were previously vertically managed by provincial-level authorities in pilot counties are now managed by the county committees and governments of these pilot counties, while still receiving guidance from provincial-level supervisory departments. This restructuring modified the embedded contracting relationship between government levels, reducing oversight costs and strengthening the initiative of county-level governments.

Second, the redistribution of expenditure responsibilities and fiscal revenues. In pilot counties, fiscal expenditures are no longer borne by prefecture-level governments, and they cannot transfer their expenditure responsibilities to PMC counties. Furthermore, prefecture-level cities are stripped of the right to divide the revenues of the counties that were previously under their jurisdiction. For example, the "Notice of the People's Government of Hebei Province on Implementing the Province-Managing-County Fiscal System" released by the Hebei provincial government in 2009. This notice clearly stipulates the tax distribution ratios among the central government, the provincial government, and the county-level governments under the PMC system. Specifically, in the allocation of value-added tax, the central government receives 75%, the province 10%, and the pilot county 15%. Previously, the distribution ratio was 75% for the central government, 10% for the province, and 15% for the prefecture governments. Figure 2 illustrates the proportion of fiscal revenue to local GDP for provincial-level, prefecture-level, and county-level governments in China from 2003 to 2020. After the PMC reform was launched in 2004, there was a drastic decline in the fiscal revenue ratio of prefecture-level governments. On the contrary, the ratios of county-level and provincial-level governments have shown substantial growth.

Figure 2: The ratio of fiscal revenue to GDP at different levels of governments in China (2003-2020)

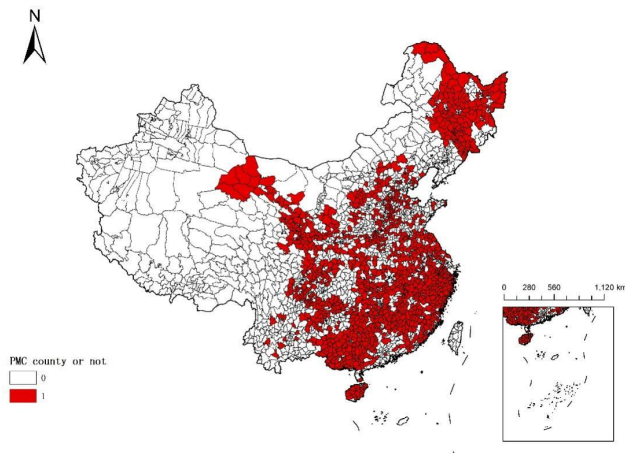


Third, there is an expansion of the economic and social management powers at the county level. In the process of promoting the PMC reform, both provinces and prefecture-level cities have employed a collaborative governance model to transfer powers to the county governments. Unless explicitly stated by national laws and regulations, economic and social management matters previously approved or

managed by prefecture-level cities are now submitted directly by pilot counties to the province for approval. In the context of PMC reform in Anhui province, a total of 867 powers were devolved from the provincial government, with 1167 responsibilities transferred from the prefecture-level to the county level. This substantial delegation of authority has considerably strengthened the autonomy of county-level operations, thereby expanding the administrative capacity of counties and addressing the issue of “leadership weakness” stemming from the scarcity of administrative resources at the county level.

“First experimenting and then spreading” represents the central concept in the Chinese government's implementation of various policies (Cui, Li, Li, Deng, & Shahtahmassebi, 2023; Sui, Geng, Zhou, Raza, & Aziz, 2023). The PMC reform in China was initially launched in 2004 and gradually expanded over the following 11 years, covering a total of 1,082 counties in 24 provinces nationwide by the end of 2020. Figure 3 illustrates the geographical distribution of the PMC pilot counties in China as of 2020, where the areas marked in red are PMC's policy implementation regions. This map depicts in detail the extent of PMC reform nationwide, highlighting its pivotal role as a strategic initiative for promoting county economic development by the Chinese government.

Figure 3: The geographical distribution of the piloted county of PMC reform in China in 2020



2.2 Theoretical hypothesis

2.2.1 The impact of flattening government on CER

Drawing upon the economic resilience concepts put forth by Martin (2012) and Yang et al. (2024), this research establishes an evaluation index system for CER. This system encompasses three dimensions: the capacity for resistance and recovery, the ability for adaptation and adjustment, and the capability for

innovation and transformation. As a result, we will explore and analyze the influence of the PMC reform on CER from these three distinct aspects.

First, the PMC reform flattens administrative divisions by focusing on the county level, allowing provincial governments to manage county governments directly, bypassing prefecture-level governments. This simplified organization structure streamlines government processes (Zhao et al., 2022), enhances communication efficiency among different levels of government (Rodriguez-Ward et al., 2018), and reduces bureaucratic delays in responding to changes (Liu et al., 2023). Moreover, overly complex organization structures tend to foster bureaucratic and corruption issues. A flattened government structure reduces redundant management layers and bureaucratic procedures, thereby lowering corruption risks and enhancing governance capacity and transparency (Rodriguez-Ward et al., 2018). These changes, in turn, improve the region's resistance and resilience ability.

Second, evidence from China suggests that an effective county government is essential (Huang, Gao, Xu, & Zhu, 2017; Cai et al., 2022; Li et al., 2016; Liu & Alm., 2016; Liu et al., 2023). According to Scott (2013) institutional theory, flattening the government structure by compressing management layers and reducing administrative steps creates a scientific, efficient, and flexible management model that is more adaptable to new economic conditions and market demands. Additionally, the fiscal decentralization theory posits that local governments have an informational advantage in understanding the preferences of their residents, allowing residents to choose public goods and taxes based on their preferences, thereby implementing a "voting with their feet" mechanism (Tiebout, 1956). Thus, a flattened government structure can also facilitate optimal resource allocation, thereby enhancing the region's adaption and adjustment ability.

Third, flattening government structures often leads to a reduction in hierarchical levels and managerial layers, thereby streamlining decision-making processes and lowering administrative costs. For example, Rodriguez-Ward et al. (2018) observed that governments at different levels hold varying attitudes towards arrangements aimed at reducing emissions resulting from deforestation and degradation. The delegation conflicts triggered by multi-level governance ultimately impede the achievement of government-set targets. Their study suggests that under China's traditional "city managing counties" strategy, even with active promotion of county-level innovation by the central government, institutional conflicts arising from excessive government tiers may lead to ineffective policy implementation. In contrast, a flattened government structure not only reduces communication chains between businesses and government by compressing management tiers but also provides favorable conditions for enterprise innovation, mobilizes government resources, and alleviates financial pressures on innovation. Therefore, a simplified government structure helps to avoid the "funnel effect" and provides a more conducive institutional environment for innovation and transformation.

However, some scholars hold opposing views. Institutional economics holds that resource allocation is determined by the power structure within the social system, rather than the market (Commons, 1932). Therefore, to explore the determinants

of CER, it is imperative to situate them within the framework of the national institutional context. China's economic decentralization heavily relies on a centralized political system (Weingast, 2014), leading local governments to be accustomed to being "upward accountability." Whether driven by promotion or avoidance of blame, local governments typically strive to fulfill the demands of higher-level governments (Li et al., 2016; Liu & Alm., 2016). Since 1978, the Chinese government has vigorously promoted rapid economic development, but it has also inevitably trapped local governments in a "GDP-only" performance competition (Wang et al., 2011; Zhang et al., 2020). The PMC reform grants county-level governments greater autonomy (Huang et al., 2017; Liu et al., 2023). However, the overemphasis on economic growth in assessment methods will further encourage local officials to exhibit a pronounced bias towards "production over welfare" during their tenure (Li et al., 2016; Yao & Zhang, 2017). This tendency impedes the effective execution of fiscal reforms (1), undermines the enhancement of public service quality and the region's medium-to-long-term human capital level (Yao & Zhang, 2017), and presents opportunities for misappropriation of public funds by county government officials (Bo et al., 2020), ultimately diminishing regional economic resilience.

In general, the PMC reform represents the most extensive practice of flattening government since the founding of China, with various provinces refining and adjusting its specific measures multiple times during implementation. Additionally, with the rise of China's anti-corruption campaign and the establishment of objectives prioritizing people's livelihoods and talent development, we argue that the negative impact of the PMC reform on CER should be mitigated. Therefore, it is hypothesized that:

Hypothesis 1: PMC reform can improve the CER.

2.2.2 The mechanisms of flattening government affecting CER

Theoretically, the implementation of PMC, as an endeavor in governmental flattening, is purported to enhance the fiscal self-sufficiency of county-level governments (Li et al., 2016; Ding et al., 2023; Cui et al., 2023; Liu et al., 2023). Local governments often employ measures such as tax exemptions, refunds, and subsidies to attract investment and stimulate local industrial development (Huang et al., 2017; Zhang et al., 2020). However, under the traditional system of "city managing counties", prefecture-level governments often prioritize urban development at the expense of sacrificing the fiscal self-sufficiency of subordinate counties (Li et al., 2016). The PMC reform reconfigures the original three-tier fiscal system of "province-prefecture-county" into a more streamlined "province-county" model, enabling pilot counties to bypass prefecture-level governments and directly manage fiscal allocations with provincial governments, thereby reducing the interception of fiscal funds by prefecture-level city governments. Consequently, the PMC reform enhances the surplus fund allocation capability of pilot counties, strengthens fiscal revenue self-sufficiency, and provides county-level governments with an effective tool to intervene in local economic activities and enhance regional economic resilience (Liu et al., 2023).

The PMC reform also facilitates the optimal resource allocation at the county level (Huang et al., 2017; Liu & Alm, 2016; Zhang et al., 2020). The second-generation fiscal federalism theory posits that flattening government structures lead to competition among local governments (Qian & Weingast, 1997). Compared to bailing out state-owned enterprises on the brink of bankruptcy, local governments prefer allocating resources to infrastructure investments (Cai et al., 2022), thereby enhancing the efficiency of local enterprises (Sui et al., 2023). The PMC reform has propelled a transformation in the allocation of social resources. It not only fosters new comparative advantages to support emerging industries but also guides the rational distribution of industries (Liu & Alm, 2016; Zhang et al., 2020). Concurrently, it restricts and eliminates outdated production capacities, preventing redundant constructions. This encourages local governments to implement more targeted industrial policies, directing resource elements more towards industries with comparative advantages (Qian & Roland, 1998). This, in turn, promotes specialization across regions, overcoming efficiency losses caused by market failures (Tan et al., 2020). Moreover, a diversified economic foundation enables a region to adapt to external shocks and adjust in a timely manner, as different industries respond differently to economic downturns, and distributed activities can diversify risks (Yang et al., 2024).

Additionally, the PMC reform is expected to narrow the urban-rural income gap. Since the initiation of PMC reform, the issue of excessive concentration of economic resources in urban areas under the “city managing counties” system should have alleviated (Liu & Alm, 2016). With the increase in fiscal capacity at the county level, its stimulating effect on farmers’ income should gradually manifest. Therefore, PMC reform is anticipated to reduce the urban-rural income gap. The reduction in gap enhances the attractiveness of rural areas for the return of high-tech talents (Huang et al., 2017), thereby promoting rural employment and enhancing the level of enterprise innovation (Liu et al., 2023), ultimately fostering resilience in county economies (Lester & Nguyen, 2015; Xu et al., 2024). Building upon these theoretical foundations, this paper presents the following hypotheses: Hypothesis 2: This PMC reform facilitate CER by enhancing county-level fiscal capacity, narrowing urban-rural gap, and fostering innovation of counties.

3 Data and Methods

3.1 Data

The data used in this article comes from the China County Social and Economic Statistical Yearbook (2001-2021), which is the county-level data officially released by the Chinese government. This database offers economic details for diverse county-level administrative entities. It encompasses information such as GDP, fiscal expenditures, population figures, public service conditions, and the loan balances of financial institutions at the county level.

The detail data regarding the PMC reform are meticulously gathered from official materials on local government websites. This data set includes modifications to the scope of the PMC reform and precise details about its implementation phases.

For instance, according to official documents issued by the Henan Provincial People ' s Government, since the introduction of the PMC reform for 5 administered counties in 2004, the provincial government has made several revisions to the scope of piloted counties and fiscal authority. In 2009, with the aim of further promoting the establishment of an efficient fiscal system, the Henan Provincial People ' s Government issued a "Notice on Improving the Provincial and Municipal County Fiscal System," which added 15 pilot counties (cities) as administrative management counties. In 2013, the provincial government issued the "Implementation Proposals on Deepening the Reform of the System of Counties Managed by Provinces in Henan", proposing the full-scale application of the PMC reform in 10 counties and cities beginning in 2014.

Given the difference in administrative levels, this paper removes the samples of four Chinese 4 municipalities (Beijing, Shanghai, Tianjin, and Chongqing). In addition, the samples of Hainan and Zhejiang provinces are also eliminated because these provinces have been implementing the PMC reform since the 1990s. Due to the lack of samples, the samples in Tibet were also rejected. Additionally, referring to Cai et al., (2022) and Sui et al., (2023), we perform winsorization on continuous variables at the 1% and 99% levels to reduce the impact of outliers.

3.2 Variable definition

3.2.1 Dependent variables

Given the diverse types of shocks and data accessibility issues, the current literature does not have a uniform standard for gauging regional economic resilience. Compared to single indicator methods, a multi-indicator framework can more comprehensively and accurately express the concept of economic resilience. Among these, the four dimensions of economic resilience proposed by Martin, (2012) – resistance, resilience, adjustment, and innovation—are widely accepted in academia. However, in practical applications, considering the correlation between resistance and resilience, these two dimensions are often merged into one (Cui et al., 2023). The final indicator system includes three aspects: resistance and elasticity, adaptability and adjustment ability, and innovation and transformation ability. This dimensional approach has also been applied in a series of emerging literature. Following the approach of Cui et al., (2023) and Yang et al., (2024), this study utilizes the entropy method to construct a comprehensive index system for assessing CER. Specifically, we select 13 secondary indicators to comprehensively represent CER. The specific methodology is outlined as follows. First, standardize the secondary indicators:

$$X'_{ij} = \frac{X_{ij} - \min X_{ij}}{\max X_{ij} - \min X_{ij}}$$

(1)

$$X'_{ij} = \frac{\max X_{ij} - X_{ij}}{\max X_{ij} - \min X_{ij}}$$

(2)

Equations (1) and (2) represent the standardization formulas for positive and negative indicators, respectively. Here, i denotes the i -th indicator, j represents the j -th county, X'_{ij} denotes the standardized value of the i -th secondary indicator for the j -th county after standardization, and X_{ij} represents the original value. Second, we compute the proportion of the j -th indicator in the i -th county:

$$p_{ij} = \frac{X'_{ij}}{\sum_{i=1}^n X'_{ij}}$$

(3)

Where, n represents the number of observations. Third, we calculate the entropy of the j -th indicator:

$$e_j = -k \ln \sum_{i=1}^n p_{ij} \ln(p_{ij}), k = \frac{1}{\ln(n)}$$

(4)

Fourth, the difference coefficient of the j -th indicator is calculated:

$$d_j = 1 - e_j$$

(5)

Fifth, the weights of each secondary indicator are obtained:

$$w_j = \frac{d_j}{\sum_{i=1}^n d_j}$$

(6)

Sixth, we derive the comprehensive score:

$$S_i = \sum_{j=1}^n w_j p_{ij}$$

(7)

Finally, we obtained the CER and sub indicator weights of each county in China from 2000 to 2020, as shown in Table 1.

The higher the economic scale and growth rate, the greater the economic volume and vitality. The economy has richer production factors and industrial systems, and is more capable of maintaining basic economic operations through resource

allocation (such as mobilizing reserve funds and launching alternative industries) in the face of external shocks. The income level determines the consumption and reproduction ability. The higher the income of urban and rural residents, the stronger their ability to resist risks. Savings individuals and society provide buffer funds and convert them into investment potential, which can provide support during economic downturns. Therefore, the above indicators can reflect the economic resistance and resilience ability.

Secondly, strong fiscal expenditures can enhance the economic system's ability to adapt to external changes, social consumption supports stable economic transformation, investment scale and direction determine the potential for industrial upgrading, diversified financing channels can diversify counties and flexibly allocate capital, reduce systemic risks, and medical resource security supports labor recovery. Therefore, they can reflect the adaption and adjustment Ability.

Thirdly, industrial upgrading is not simply about expanding the scale, but rather about promoting the industry from low value-added links to high value-added links through technological penetration and model innovation. According to the theory of endogenous growth, human capital (i.e. the knowledge, skills, and creativity of workers) is the source of technological innovation. The number of patents directly reflects the level of innovation in society. Therefore, these three indicators can better reflect innovation and transformation ability.

Table 1: Estimation System for CER

Dimension	Indicator	Definition	Attribute	Weight
Resistance and Resilience Ability (<i>res - a</i>)	Economic scale	Gross domestic product (GDP)	+	0.0696
	Economic growth	The growth rate of GDP	+	0.0280
	Urban income level	The per capita disposable income of urban residents	+	0.1035
	Rural income level	The per capita disposable income of rural residents	+	0.0655
	Savings level	The per capita savings deposit balance of residents	+	0.0732
Adaption and Adjustment Ability (<i>res - b</i>)	Fiscal expenditure	The ratio of general budgetary expenditures to GDP	+	0.0586
	Social consumption	The ratio of total retail sales of consumer goods to GDP	+	0.0527
	Investment scale	The ratio of total investment in fixed assets to GDP	+	0.0831
	Financing structure	The outstanding balance of loans from financial institutions to GDP	-	0.0411

Dimension	Indicator	Definition	Attribute	Weight
Innovation and Transformation ability (res_c)	Medical care	The average number of hospital beds per capita	+	0.0282
	Industrial upgrading	The ratio of tertiary sector output to secondary sector output	+	0.0474
	Human capital	The number of students enrolled in vocational schools and high schools	+	0.1653
	Innovation	The number of domestic invention patents granted	+	0.1839

3.2.2 Independent variables

Referring to Li et al. (2016), this study employs the PMC reform dummy variable as the independent variable. Different regions have distinct policy implementation years. The coefficient can gauge the average difference in CER between PMC pilot counties and other counties.

3.2.3 Control variables

Many studies show that the characteristics of counties are critical for local economic resilience (Cui et al., 2023; Yang et al., 2024), thereby county-level control variables influencing CER are selected in this study. Table 2 presents the definitions of each variable, and the descriptive statistics of these variables are shown in Table 3.

Table 2: Main variables definitions

Variable	Symbol	Definitions
CER	res	The score is calculated by the multidimensional composite index system.
PMC reform	pmc	1=PMC pilot county; 0=other counties.
Ratio of primary industry	$first$	The ratio of the primary sector' s added value to the GDP.
Ratio of secondary industry	$second$	The ratio of the secondary sector' s added value to the GDP.
Ratio of fiscal revenue	fis	The ratio of local government's general budget revenue to GDP.
The level of network infrastructure development	net	The ratio of fixed telephone users to the total population.
Ratio of primary student	pri_stu	The ratio of secondary school students to the total population.
Industrial development	$firm$	The logarithm of the number of industrial enterprises above a certain scale.

Table 3: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Median	Max
<i>res</i>	30184	0.15	0.078	0.017	0.138	0.692
<i>pmc</i>	30184	0.37	0.483	0	0	1
<i>first</i>	30184	0.24	0.125	0.002	0.223	0.564
<i>second</i>	30184	0.41	0.150	0.093	0.407	0.793
<i>fis</i>	30184	0.05	0.027	0.011	0.044	0.168
<i>net</i>	30184	0.13	0.093	0.013	0.108	0.540
<i>firm</i>	30184	3.86	1.149	0.693	3.829	8.115
<i>pri_stu</i>	30184	0.08	0.027	0.029	0.075	0.154

3.3 Estimation Strategy

This paper exploits the quasi-natural experiment of the PMC reform for a TV-DID estimation strategy. The implementation of PMC reform entails a package of public actions aimed at promoting coordinated development among counties. For instance, transfer payments will be directly disbursed by provincial-level governments to administered counties. Since the implementation of the PMC reform in 2004, the administrative levels of pilot counties have been reduced, while non-pilot counties have not experienced this reduction. Therefore, we can compare the economic resilience between counties that have been impacted by this reform (the treatment group) and counties that have not been impacted (the control group) before and after the PMC implementation. Referring the idea of Li et al., (2016), our regression model is set as follows:

$$res_{it} = \beta_0 + \beta_1 \times pmc_{it} + \alpha_i + \alpha_t + \Gamma'X_{it} + \varepsilon_{it} \quad (8)$$

where, i represents county and t represents year. res_{it} denotes the economic resilience of county i in year t . β_0 is the constant. pmc_{it} is the policy dummy variable. Specifically, if county i is the PMC piloted county in year t , $pmc_{it} = 1$; otherwise, $pmc_{it} = 0$. β_1 is our focus in this paper. It demonstrates the differences in CER between the treatment group and the control group. α_i and α_t represent the fixed effect of firm and year, respectively. X_{it} means control variables that reflect county characteristics. ε_{it} is the error term.

4 Empirical results and analysis

4.1 Baseline results

Table 4 presents the empirical regression results illustrating the relationship between China's flattening government reform and various aspects of economic

CER. Columns (1)-(4) represent results of regression models without any control variables, while columns (5)-(8) incorporate control variables that potentially influence the CER. All regressions control for county fixed effects and year fixed effects. Additionally, to mitigate potential heteroskedasticity, robust standard errors clustered at the county level are applied.

Specifically, the results in columns (1) and (5) of Table 4 suggest that regardless of the inclusion of control variables, the coefficients of the pmc are positive and pass the significant test, thus confirming our hypothesis 1. In other words, China's flattening government reform contributes to the enhancement of CER. This finding is aligned with the significant role of China's flattening government reform in county-level economic development. As discussed in Section 2.2, a flattening government reduces bureaucratic complexities (Yang, 2016), thereby enhancing fiscal self-sufficiency at the county level (Li et al., 2016; Cai et al., 2022), facilitating efficient allocation of resources, optimizing industrial structures, and narrowing the urban-rural economic gap, consequently bolstering the economic CER.

Furthermore, to delve deeper into the varied impact of flattening government reform on different dimensions of CER, according to Cui et al., (2023) and Yang et al., (2024), we substituted the dependent variable in Model (8) with resistance and resilience ability (res_a), adaptation and adjustment ability (res_b), and innovation and transformation ability (res_c), respectively. Columns (2)-(4) present the regression results without control variables; columns (6)-(7) incorporate control variables that may influence the CER. The results reveal that irrespective of the inclusion of control variables, the coefficients of the core independent variable (pmc) remain significantly positive, indicating that China's flattening government reform significantly enhances each dimension of CER.

Table 4: The impact of PMC reform on CER

	(1) <i>res</i>	(2) <i>res_a</i>	(3) <i>res_b</i>	(4) <i>res_c</i>	(5) <i>res</i>	(6) <i>res_a</i>	(7) <i>res_b</i>	(8) <i>res_c</i>
<i>pmc</i>	0.0103* ** (0.0016)	0.0199* ** (0.0032)	0.0039* * (0.0017)	0.0110* (0.0057)	0.0105* ** (0.0015)	0.0189* ** (0.0031)	0.0045* * (0.0018)	0.0173* ** (0.0048)
<i>first</i>					0.0650* ** (0.0110)	-0.0111 (0.0243)	0.0482* ** (0.0150)	0.6460* ** (0.0391)
<i>second</i>					0.0961* ** (0.0076)	-0.0099 (0.0165)	0.0672* ** (0.0115)	1.1436* ** (0.0302)
<i>fis</i>					0.0960* (0.0115)	0.1145* (0.0115)	0.1264* (0.0115)	0.0771 (0.0115)

					** (0.0218)	* (0.0480)	** (0.0345)	(0.0883)
<i>net</i>					- 0.0833* ** (0.0088)	- 0.2225* ** (0.0183)	0.0443* ** (0.0097)	- 0.0891* ** (0.0264)
<i>firm</i>					0.0074* ** (0.0011)	0.0018 (0.0024)	0.0024 (0.0016)	0.0300* ** (0.0039)
<i>pri_stu</i>					0.2913* ** (0.0388)	0.8293* ** (0.0696)	-0.0259 (0.0385)	-0.0847 (0.1350)
Constant	0.1508* ** (0.0006)	0.1764* ** (0.0012)	0.2647* ** (0.0006)	0.2341* ** (0.0021)	0.1605* ** (0.0072)	0.1349* ** (0.0157)	0.2841* ** (0.0097)	0.7548* ** (0.0260)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	30184	30184	30184	30184	30184	30184	30184	30184
adj. R2	0.8241	0.8091	0.7139	0.6043	0.8346	0.8203	0.7163	0.6800

Note: robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1, the same as below.

4.2 Robust checks

4.2.1 Parallel trend test

A basic assumption supporting Model (8) is that there is a common trend between the control group and the experimental group before the implementation of PMC reform. And if there is differentiation after the reform, it indicates that there is no systematic difference between the two ethnic groups. Here, following Beck, Levine, & Levkov (2010) and Zhu, Chen, Sun, & Lyu (2023), this paper conducts parallel trend test by adding a series of dummy variables in Model (8) to trace out the year-by-year effects of PMC reform on CER. The specific model is as follows:

$$res_{it} = \tilde{\beta}_0 + \sum_{T=-6}^{T=-2} \tilde{\beta}_1 \times PMC_i \times d(T) + \sum_{T=0}^{T=4} \tilde{\beta}_1 \times PMC_i \times d(T) + \alpha_i + \alpha_t + \varepsilon_{it} \quad (9)$$

$$res_{it} = \tilde{\beta}_0 + \sum_{T=-6}^{T=-2} \tilde{\beta}_1 \times PMC_i \times d(T) + \sum_{T=0}^{T=4} \tilde{\beta}_1 \times PMC_i \times d(T) + \alpha_i + \alpha_t + \Gamma' X_{it} + \varepsilon_{it} \quad (10)$$

where res_{it} denotes the CER index of county i in year t . PMC_i denotes whether the county i is administrated county or not. If it is an administrated county, PMC_i equals 1, otherwise equals 0. $\tilde{\beta}_{-T}$, $\tilde{\beta}_{+T}$ and $\tilde{\beta}_0$ represent the influence of the T period and baseline year, respectively. We exclude the data corresponding

to the year immediately following the implementation of the PMC reform (the lagged-one-year data), then estimating and comparing the dynamic effect of PMC reform on CER related to the years in Model (9) and Model (10).

The result of Model (9) is presented in Figure 4. After incorporating control variables, based on Model (10), we obtained the results depicted in Figure 5. It is observed that whether control variables are included or not, the estimated parameters are nonsignificant before the PMC reform, while after the policy shock, estimated parameters becomes significantly positive. This means that the promoting impact of PMC reform on CER is not due to the time trend before this policy. It can reveal that our TV-DID estimation passes the parallel trend testing, and the difference of CER between administrated counties ($pmc = 1$) and other counties ($pmc = 0$) is significantly enlarged after the PMC policy intervention. Therefore, our baseline results are robust.

Figure 4: Parallel trend test based on Model (9)

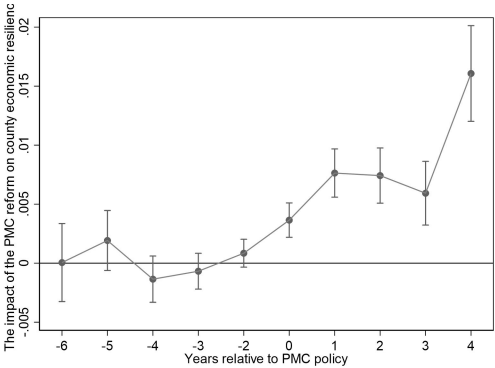
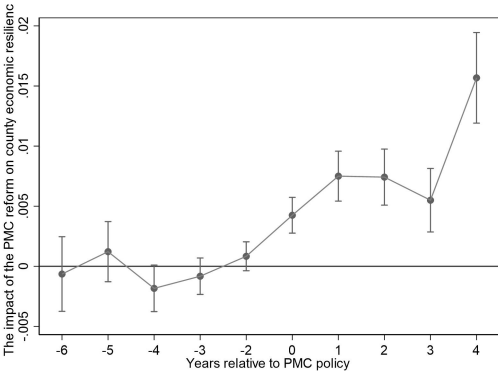


Figure 5: Parallel trend test based on Model (10)



4.2.2 PSM-DID

Another requirement for effective TV-DID estimation is the random trial sample. However, it is challenging to obtain completely random samples, which many introduce “selection bias” or “confounding bias” into Model (8). To mitigate the effects of these biases and to fulfill the requirements of TV-DID model, this paper refers to the proposed PSM strategy (Rosenbaum & Rubin, 1983) to reduce other confounding factors between the experimental group and the control group. Follow the steps below to set up the model:

Step 1: Estimating propensity score. The following equation is evaluated using the Probit model:

$$P_i = \text{probit}(PMC_i = 1 | X_i) = \Phi(X_i)$$

(10)

Where, P_i in the equation represents the propensity score. PMC_i is a dummy variable, denoting whether the county i is administrated county or not. X_i is the set of county characteristic variables. $\Phi(\bullet)$ represents a normal conditional distribution function. The predicted value of $P_i - \hat{P}_i$ is given by Equation (10) .

Step 2: Nearest-neighbor matching. For each county i that is administrated, choosing a county j that has not been administrated as its control group, with the two counties' propensity scores being as similar as feasible. This requires $j(i)$ to meet the following condition,

$$j(i) = \arg \min_j | \hat{P}_j - \hat{P}_i |, \forall j$$

(11)

Step 3: PSM-DID estimation. After verifying the common support hypothesis on the matched dataset and conducting balance testing, as presented in Figure 6 and Figure 7, we proceeded with regression analysis using matched data based on Model (8). The results of PSM-DID method are reported in Table 5. It shows that the coefficients of pmc are still significantly positive whether control variables are introduced or not, confirming the robustness of the estimated results in Table 4.

Figure 6: Standardized deviations of variables

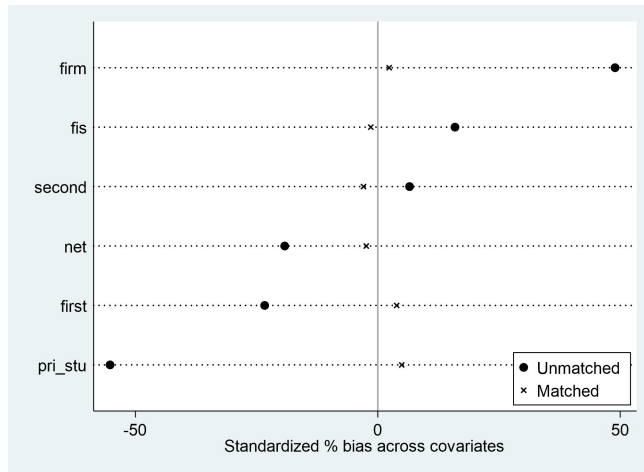


Figure 7: Common value rang test plot

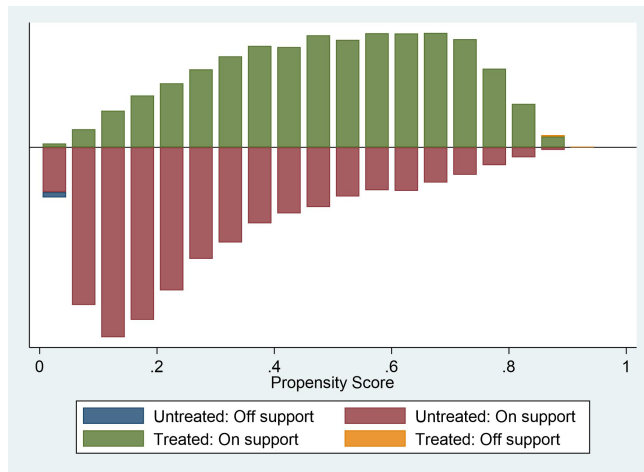


Table 5: Results of PSM-DID

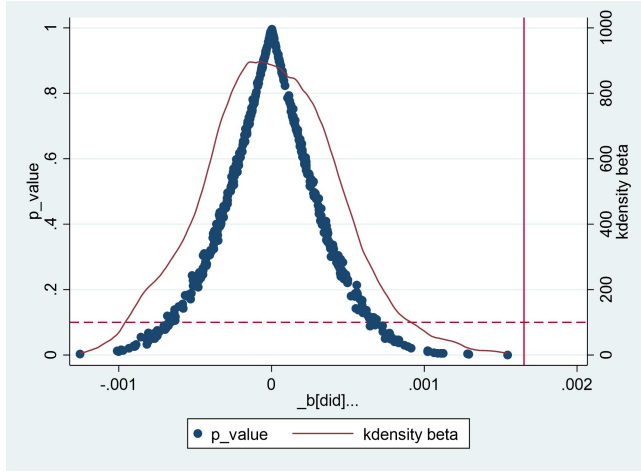
	(1) <i>res</i>	(2) <i>res_a</i>	(3) <i>res_b</i>	(4) <i>res_c</i>	(5) <i>res</i>	(6) <i>res_a</i>	(7) <i>res_b</i>	(8) <i>res_c</i>
<i>pmc</i>	0.0103* ** (0.0016)	0.0198* ** (0.0032)	0.0039* * (0.0017)	0.0110* (0.0057)	0.0104* ** (0.0015)	0.0188* ** (0.0031)	0.0045* * (0.0018)	0.0173* ** (0.0048)
<i>first</i>					0.0649* **	-0.0110	0.0483* **	0.6457* **

					(0.0110)	(0.0243)	(0.0150)	(0.0391)
<i>second</i>					-	-	-	-
					0.0961* **	-0.0099	0.0673* **	1.1436* **
					(0.0076)	(0.0165)	(0.0114)	(0.0302)
<i>fis</i>					0.0962* **	0.1148* *	0.1266* **	0.0772
					(0.0218)	(0.0480)	(0.0345)	(0.0883)
<i>net</i>					-	-	0.0439* **	-
					0.0834* **	0.2227* **		0.0883* **
					(0.0087)	(0.0183)	(0.0097)	(0.0263)
<i>s</i>					0.0074* **	0.0018	0.0024	0.0300* **
					(0.0011)	(0.0024)	(0.0016)	(0.0039)
<i>pri_stu</i>					0.2908* **	0.8284* **	-0.0266	-0.0846
					(0.0387)	(0.0695)	(0.0384)	(0.1350)
Constant	0.1508* **	0.1764* **	0.2647* **	0.2341* **	0.1605* **	0.1349* **	0.2842* **	0.7545* **
	(0.0006)	(0.0012)	(0.0006)	(0.0021)	(0.0072)	(0.0157)	(0.0097)	(0.0259)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	30182	30182	30182	30182	30182	30182	30182	30182
adj. R2	0.8242	0.8091	0.7139	0.6043	0.8347	0.8203	0.7163	0.6801

4.2.3 Placebo tests

To mitigate the potential confounding effects of unobserved variables on our assessment of policy impacts, this study employs a placebo test methodology (see Cai et al., 2022; Sui et al., 2023). In this approach, we construct randomly assigned treatment groups to replicate the conditions of policy implementation. This entails randomly allocating counties into treatment and control groups, irrespective of actual policy intervention. Subsequently, we repeat this random assignment process 500 times to generate a diverse range of treatment scenarios. Once these placebo treatment groups are established, we proceed to estimate the effects of these simulated interventions on our outcome variable using regression analysis. Specifically, we calculate the coefficients associated with the treatment variable in each iteration. This procedure yields a distribution of estimated coefficients, illustrating the range of potential effects observed under the null hypothesis of no true policy impact. As shown in Figure 8, upon obtaining the probability density functions of these estimated coefficients, we find a concentration of coefficient estimates around zero at a significance level of 1%, thereby affirming the robustness of our baseline conclusions.

Figure 8: Results of placebo test



4.2.4 Exclude interference from other policies

Other policies implemented during the same period as the PMC reform may affect the county-level economy and its convergence. If the influence of other policies is not excluded, our research results may be affected by these policies (Li et al., 2016; Huang et al., 2017). Therefore, by controlling for the effects of contemporaneous policies, we can more precisely evaluate the impacts of the PMC reform on CER.

In 2009, in order to incentivize financial institutions to increase agricultural loans, the Chinese government launched a pilot policy of incremental rewards for county-level agricultural loan financial institutions (RIAL). This policy rewards county financial institutions whose year-end agricultural loan balance has increased by more than 15% year-on-year and whose non-performing loan ratio has not correspondingly increased. The formulation of RIAL and PMC policies is aimed at revitalizing local economic activities and promoting county-level economic growth. Hence, eliminating the impact of the RIAL policy on the economic convergence of counties is highly crucial for the research focus of this study. As shown in the columns (1) and (2) of Table 6, even after introducing the contemporaneous policies (*policy*), the coefficient of *pmc* remains significantly positive. Consequently, the positive impact of the PMC reform on CER does not stem from any interference exerted by the RIAL policy.

In 1986, the Chinese government first identified 258 national poverty-stricken counties and carried out extensive poverty alleviation work in these areas. In 2014, the State Council again adjusted and updated the list of poverty-stricken counties, increasing from 592 to 832. The government mainly makes use of substantial fiscal transfer payments, policy-based incentives, and project-related support to drive economic growth and boost the local economic resilience within poverty-

stricken counties. Therefore, to reduce the impact of the "Poverty-stricken County Designation" (WHPSC), we classifies the selected counties into two groups: poverty-stricken counties (PSC, $policy = 1$) and other counties ($policy = 0$). Columns (3) and (4) in Table 6 presents the impacts of the PMC policy on economic convergence, separately for poverty-stricken counties and other counties. The results indicate that PMC reform significantly enhances CER, both in poverty-stricken and other counties.

Table 6: Results of excluding other policy interference

	(1)	(2)	(3)	(4)
	RIAL		WHPSC	
<i>pmc</i>	0.0101*** (0.0016)	0.0103*** (0.0015)	0.0104*** (0.0020)	0.0092*** (0.0019)
<i>policy</i>	0.0082*** (0.0016)	0.0071*** (0.0016)		
<i>first</i>		-0.0679*** (0.0110)	-0.1147*** (0.0131)	-0.0453*** (0.0158)
<i>second</i>		-0.0979*** (0.0076)	-0.1390*** (0.0091)	-0.0693*** (0.0103)
<i>fis</i>		0.0977*** (0.0218)	0.0416 (0.0271)	0.0818*** (0.0299)
<i>net</i>		-0.0826*** (0.0088)	-0.0214* (0.0123)	-0.0909*** (0.0104)
<i>firm</i>		0.0072*** (0.0011)	0.0078*** (0.0014)	0.0069*** (0.0016)
<i>pri_stu</i>		0.2817*** (0.0390)	0.0204 (0.0372)	0.4027*** (0.0551)
Constant	0.1466*** (0.0010)	0.1595*** (0.0072)	0.1979*** (0.0078)	0.1458*** (0.0107)
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	30184	30184	10411	19773
adj. R2	0.8245	0.8348	0.8323	0.8427

4.2.5 Coefficient of variation method (COV) Method

In order to make the results more robust, we reconstructed the indicator of economic resilience using the coefficient of variation method(). As shown in Table 7, the sign and significance of the regression coefficients are consistent with the baseline results, indicating that our results are robust.

Table 7: Results of COV Method

	(1)	(2)	(3)	(4)
	<i>res</i>	<i>res_a</i>	<i>res_b</i>	<i>res_c</i>

<i>pmc</i>	0.0077*** (-0.0014)	0.0094*** (-0.0028)	0.0071*** (-0.0019)	0.0069*** (-0.0016)
<i>first</i>	-0.0634*** (-0.0104)	0.0047 (-0.0208)	-0.0919*** (-0.0176)	-0.0978*** (-0.0117)
<i>second</i>	-0.1120*** (-0.0071)	0.0053 (-0.0141)	-0.1070*** (-0.0113)	-0.2072*** (-0.0087)
<i>fis</i>	0.2385*** (-0.0204)	0.1257*** (-0.0403)	0.5738*** (-0.033)	0.1043*** (-0.0259)
<i>net</i>	-0.0616*** (-0.0078)	-0.1838*** (-0.016)	0.0710*** (-0.0101)	-0.0537*** (-0.0098)
<i>firm</i>	0.0045*** (-0.0009)	0.0090*** (-0.0021)	-0.0052*** (-0.0016)	0.0074*** (-0.001)
<i>pri_stu</i>	0.3224*** (-0.0386)	0.7427*** (-0.0617)	0.0984** (-0.0438)	0.1417** (-0.0569)
Constant	0.1502*** (-0.0069)	0.0955*** (-0.0136)	0.2674*** (-0.0106)	0.1153*** (-0.0084)
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	30184	30184	30184	30184
adj. R2	0.8536	0.8535	0.8161	0.6122

4.3 Who benefits from the PMC reform?

4.3.1 Regional heterogeneity

There are huge regional differences in China, with differences in economic, social, and geographical features among different regions (Liu & Alm, 2016). There may be differences in the significant implementation of policies among county-level units in regions with different levels of development (Wang et al., 2011). To determine the differences in the effectiveness of PMC reform policies between the eastern and central western regions of China, we conducted regional heterogeneity tests.

To conduct this study, we divided the sample into counties in the eastern region and counties in the central and western regions. Then, we perform grouped regression estimations according to Model (8). The results are shown in columns (1) and (2) in Table 8. The coefficient of *pmc* in eastern regions are significant negative, indicating that the PMC reform have a good promoting effect on the CER in eastern China. On the contrary, the regression coefficients in the central and western regions are not statistically significant. This may be due to the eastern region, with its relatively developed economic infrastructure, abundant human resources (Tian & Guo, 2023), and favorable market environment (Du et al., 2023), is poised to benefit more from the resource allocation optimization and institutional environment improvement brought about by the flattening government reform. Conversely, the central and western regions may face

challenges such as inadequate infrastructure and talent outflow, leading to poor implementation of PMC reform.

4.3.2 Economic status heterogeneity

The original economic circumstances are capable of exerting an influence on the efficacy of the regional reform (Rodriguez-Pose & Ezcurra, 2010; Lessmann, 2012; Cavusoglu & Dincer, 2015). Some research argue that affluent regions usually witness relatively swift economic development and a significant rise in economic resilience. This is because these regions are able to draw in a greater amount of resources and opportunities. (Tian, Zhang, Zhou, & Yu, 2016). Consequently, we classified the samples into two distinct groups according to the mean value of the county's per capita gross domestic product (PCGDP). These two groups are the counties with a high-PCGDP and those with a low-PCGDP. Subsequently, employing Model (8), the results presented in Table 8.

Columns (3) and (4) in Table 7 show the impact of PMC reform on the economic resilience of high and low PCGDP counties. The results indicate that the economic resilience of all types of counties shows a significant trend of enhancement. However, the implementation of PMC reform has more pronounced effect in high PCGDP counties compared to the policy effects in low PCGDP counties. Previous research has illustrated that market competition exerts a substantial influence on economic resilience (Du et al., 2023). Typically, counties with more developed economies tend to exhibit greater market competition, which in turn encourages enterprises to continuously enhance their production efficiency and innovation capabilities (Liu et al., 2023; Sui et al., 2023). This enables the PMC reforms to effectively enhance CER.

4.3.3 Industry structure heterogeneity

Industry structure is indeed a crucial determinant of economic development, as pointed out by Tan et al. (2020) and Yang et al. (2024). The variations in industry structure among different counties can have an impact on how effectively the PMC reform works. To address this, We use the proportion of the value-added of the tertiary industry and the secondary industry to measure the degree of industrial upgrading in county level. Then, all surveyed counties were divided into two different groups: counties with higher levels of industrial upgrading (HIU), which exceeded the average ratio, and counties with lower levels of industrial upgrading (LIU), which were below the average.

Columns (5) and (6) in Table 8 present the effects of PMC reform on CER with a HIU (exceeding the mean) and counties with a LIU (below the mean), respectively. It is evident that the PMC reform significantly promotes CER in both groups of counties. Nevertheless, the promotional effect is more evident in counties featuring a greater degree of industrial upgrading. This phenomenon can likely be ascribed to the circumstance that counties with a higher level of industrial upgrading generally have a more varied industrial structure and a higher level of industrial technological content. Therefore, they are more likely to attract talents

with higher education and skills. These highly qualified talents can better adapt to the local industrial environment, enhance the county's industrial competitiveness and innovation capabilities, and bolster CER against external shocks.

4.3.4 Fiscal capacity heterogeneity

As an important financial system reform in China, the effect of PMC is related to the regional financial capacity. Some studies suggest that fiscal self-sufficiency and tax effort have a significant impact on the implementation of regional policies (Fernández-Marín, de Oliveira, & Mourao, 2022). To address this issue, we use the ratio of local government general budget expenditures to local government general budget revenues to measure the self-sufficiency of local government finances, and use the ratio of actual tax revenue to potential tax revenue to measure the level of regional tax efforts. Then, based on these two indicators, all surveyed counties were divided into two groups: counties with high financial self-sufficiency (High self), which were above average; Low self-sufficiency counties (Low self) have a lower than average level of financial self-sufficiency. The counties with higher tax effort (HTE) are higher than the counties with lower tax effort (LTE), but lower than the average.

Columns (1) and (2) of Table 9 respectively show the impact of PMC reform on CER in high-self counties (above average) and low-self counties (below average). Obviously, PMC reform has significantly promoted CER in two groups of counties. But in counties with lower financial self-sufficiency, the promoting effect is more pronounced. This may be due to the fact that in counties with low financial self-sufficiency, their own financial resources are more dependent on the policies and financial support of higher-level governments in areas such as infrastructure construction, industrial support, and livelihood security. Therefore, they are more sensitive to the reform of regional governance models.

Columns (3) and (4) of Table 9 respectively show the impact of PMC reform on CER in HTE counties (above average) and LTE counties (below average). Obviously, PMC reform has only significantly promoted CER in HTE counties. This is because in areas with high tax efforts, the government usually takes active measures to strengthen tax collection and management, and has high management capabilities. Under the provincial direct management county system, these areas can more directly receive support and resource allocation from provincial finance, reducing the interception and loss of intermediate links at the municipal level. They relied on the reform dividends of PMC to achieve stable growth in fiscal revenue and provide solid financial support for economic development.

Table 8: Results of heterogeneity analysis

	(1) Eastern	(2) Central/western	(3) High GDP	(4) Low GDP	(5) HIU	(6) LIU
<i>pmc</i>	0.0164** * (0.0029)	0.0021 (0.0015)	0.0218** * (0.0041)	0.0052** * (0.0012)	0.0141** * (0.0022)	0.0100** * (0.0019)

	(1) Eastern	(2) Central/wester n	(3) High GDP	(4) Low GDP	(5) HIU	(6) LIU
<i>first</i>	0.0077 (0.0238)	-0.0894*** (0.0110)	- 0.1236** *	- 0.0634** *	- 0.1162** *	- -0.0399** (0.0176)
<i>second</i>	-0.0314* (0.0162)	-0.1096*** (0.0082)	- 0.0608** *	- 0.0785** *	- 0.1172** *	- 0.1099** *
<i>fis</i>	0.2310** * (0.0494)	0.0434* (0.0223)	(0.0116) 0.1018** * (0.0278)	(0.0076) 0.0265 (0.0309)	(0.0135) 0.0644** (0.0323)	(0.0123) 0.0725** * (0.0281)
<i>net</i>	- 0.1156** * (0.0155)	-0.0434*** (0.0088)	- 0.0940** * (0.0113)	- 0.0043 (0.0067)	-0.0279** (0.0125)	- 0.0825** * (0.0101)
<i>firm</i>	0.0113** * (0.0023)	0.0082*** (0.0012)	-0.0037* (0.0021)	0.0072** * (0.0010)	0.0058** * (0.0015)	0.0070** * (0.0015)
<i>pri_stu</i>	0.3286** * (0.1019)	0.1145*** (0.0351)	0.7039** * (0.0693)	- 0.0867** * (0.0258)	0.2742** * (0.0384)	0.2381** * (0.0558)
Constant	0.0988** * (0.0171)	0.1816*** (0.0071)	0.2110** * (0.0129)	0.1352** * (0.0063)	0.1767** * (0.0081)	0.1721** * (0.0112)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
N	9082	21102	15602	14466	10245	19738
adj. R2	0.8609	0.8303	0.8018	0.8580	0.8650	0.8427

Table 9: Results of fiscal capacity heterogeneity analysis

	(1) High self	(2) Low self	(3) HTE	(4) LTE
<i>pmc</i>	0.0072*** (-0.0019)	0.0118*** (-0.0019)	0.0152*** (-0.00250)	0.0021 (-0.0017)
<i>first</i>	-0.1120*** (-0.0119)	-0.0362** (-0.0162)	-0.1030*** (-0.0172)	-0.0351** (-0.015)
<i>second</i>	-0.1322*** (-0.0089)	-0.0676*** (-0.0099)	-0.1205*** (-0.0106)	-0.0730*** (-0.0112)
<i>fis</i>	-0.0007 (-0.0417)	0.0651** (-0.0269)	0.0795*** (-0.0274)	0.1645*** (-0.037)
<i>net</i>	-0.0196* (-0.0118)	-0.0781*** (-0.0102)	-0.0762*** (-0.0115)	-0.0718*** (-0.0109)
<i>firm</i>	0.0046*** (-0.0014)	0.0055*** (-0.0015)	0.0042** (-0.0018)	0.0076*** (-0.0015)
<i>pri_stu</i>	-0.0391 (-0.0385)	0.3033*** (-0.0545)	0.3100*** (-0.0505)	0.3117*** (-0.047)
Constant	0.2096***	0.1551***	0.2032***	0.1287***

	(-0.0078)	(-0.0106)	(-0.0103)	(-0.0102)
Year FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
N	10365	19615	12728	17253
adj. R2	0.8347	0.8534	0.8273	0.8573

4.4 Influencing mechanisms

4.4.1 Enhancement of fiscal self-sufficiency

Theoretical insights in Section 2 suggest that flattening government reform reduces fiscal fund retention by prefecture-level governments, thereby enhancing fiscal capacity at the county level. The increase in fiscal capacity enables county-level governments to provide higher-level financial support to sectors such as high-tech industries and service-oriented sectors (Cai et al, 2022; Sui et al., 2023). stimulates the adjustment and refinement of the local industrial structures. And such adjustment and refinement are essential factors that determine the regional economic resilience (Tan et al., 2020; Xu et al., 2024).

We assess the fiscal capacity of county-level governments by utilizing the ratio of general budget expenditure to fiscal revenue. This ratio serves as a commonly adopted indicator for measuring fiscal self-sufficiency (Wang et al., 2011; Ding et al., 2023). Regression results are shown in columns (1) and (2) of Table 10. The coefficients of pmc is positive and pass significance tests in both columns, indicating that the implementation of PMC reforms significantly enhances the county governments' fiscal capacity. Our hypothesis 2 is supported.

4.4.2 Decrease of urban-rural gap

Heterogeneity analysis has revealed that due to scarce endowments in underdeveloped counties, policies aimed at enhancing regional economic resilience yield less pronounced effects. Consequently, this results in disparities in policy effectiveness between developed and underdeveloped counties, a distinction that also manifests between urban and rural areas. Thus, the reduction of urban-rural income disparities is expected to enhance the attractiveness of rural areas for the return of high-tech talents (Huang et al., 2017), thereby stimulating rural employment and fostering innovation among enterprises (Liu et al., 2023), ultimately bolstering the CER (Lester & Nguyen, 2015; Xu et al., 2024).

Specifically, We use the ratio of per capita disposable income of urban residents to per capita disposable income of rural residents to measure the urban-rural income gap. As shown in columns (3) and (4) of Table 10, the regression results indicate that the coefficients of the key variables are significantly positive. This confirms the validity of our hypothesis 2.

4.4.3 Increase of innovation level

Innovation stands as one of the most critical factors in advancing the county-level industrial structure upgrading (Liu et al., 2023), fostering specialization across regions (Tan et al., 2020), and enhancing the CER (Yang et al., 2024; Xu et al., 2024). To investigate whether innovation serves as a key channel through which China’s flattening government reform promotes the enhancement of CER, we carried out the manual collection of patent data for Chinese counties from the official website of the China National Intellectual Property Administration. The data we gathered spanned the period from 2000 to 2020. The logarithm of the number of domestic invention patents granted is utilized as a proxy for county-level innovation.

Taking the county innovation level (*innovation*) as the mediating variable, we obtain the results represented in columns (5) and (6) of Table 10. Regardless of whether the model incorporates control variables, the coefficients of the core independent variable consistently exhibit significant positive values. This reaffirms our Hypothesis 2.

4.4.4 **Decrease of tax effort level**

The decrease in regional tax efforts indicates an increased dependence on fiscal transfer payments. Under certain conditions, transfer payments have a supportive effect on regional economic resilience and serve as a "stabilizer" for short-term economic growth. For example, for border and impoverished areas in China, transfer payments have been used for a long time to fill infrastructure gaps (such as road construction and electricity supply), improve the foundation of economic development, and indirectly enhance the ability to resist risks. In addition, general transfer payments give local governments more autonomy, and if used to cultivate tax sources, it will enhance economic resilience. The results of columns (7) and (8) in Table 10 validate the tax effort mechanism mentioned above.

Table 10: Results of influencing mechanisms

	Fiscal self-sufficiency		Urban-rural gap		Innovation		Tax effort	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>pmc</i>	0.2357 *** (0.0777)	0.1398* * (0.0638)	- 0.1783 *** (0.0305)	- 0.1773 *** (0.0296)	0.1322 *** (0.0372)	0.1288 *** (0.0359)	- 0.0371 *** (0.0112)	- 0.0306 *** (0.0105)
<i>first</i>		1.1506* * (0.5357)		0.1364 (0.2264)		-0.2767 (0.2666)		0.3225 *** (0.1006)
<i>second</i>		- 4.2247* ** (0.3508)		0.0148 (0.1141)		0.0817 (0.1755)		0.0179 (0.0607)

	Fiscal self-sufficiency		Urban-rural gap		Innovation		Tax effort	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>fis</i>		- 54.4701 ***		- 0.6317 **		4.3309 ***		3.9999 ***
		(1.6675)		(0.2622)		(0.5350)		(0.2081)
<i>net</i>		-0.4214		- 0.5261 ***		- 1.1475 ***		- 0.0815 *
		(0.3091)		(0.1200)		(0.1509)		(0.0467)
<i>firm</i>		- 0.4717* **		- 0.0692 ***		0.1350 ***		0.0022
		(0.0589)		(0.0190)		(0.0251)		(0.0096)
<i>pri_stu</i>		0.2413		- 1.5655 ***		3.9655 ***		0.4149 **
		(1.4154)		(0.4862)		(0.6420)		(0.2114)
Constant	4.6311 ***	10.7380 ***	2.6171 ***	3.0676 ***	1.6630 ***	0.7508 ***	1.0469 ***	0.7358 ***
	(0.0287)	(0.3742)	(0.0181)	(0.1171)	(0.0170)	(0.1650)	(0.0059)	(0.0623)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	30183	30183	12451	12451	18460	18460	19960	19960
adj. R2	0.7701	0.8328	0.8583	0.8609	0.6544	0.6655	0.7003	0.7278

5 Conclusion

With the increasing uncertainty in the global macroeconomic environment, enhancing regional economic resilience has become a key objective for governments worldwide (Li et al., 2024; Yang et al., 2024). A thorough assessment of how the PMC policy influences CER can offer a valuable addition to China's evaluations of location-based policies.

This study takes the phased implementation of PMC reform in China as a quasi natural experiment. With county - level panel data from 2000 - 2020, it applies DID and PSM - DID models to explore the impact of government flattening on CER. It also analyzes policy effect heterogeneity across regions, economic statuses, and industrial structures, aiming to explore the path of PMC reform to promote the CER. The results indicate that the flat government reform has improved economic efficiency. This stimulating effect is more pronounced in pilot counties in the eastern region than in pilot counties in the central and western regions. Similarly, counties with high PCGDP, high level of industrial upgrading, lower fiscal self-sufficiency rate, and high level of tax effort are more responsive to reforms than counties with low PCGDP, low level of industrial upgrading, high fiscal self-sufficiency rate, and low level of tax effort. In addition, we found that

strengthening county-level fiscal capacity, narrowing the urban-rural gap, improving county-level innovation level, and reducing tax efforts are effective mechanisms for PMC reform to promote CER.

Drawing from the key findings outlined above, we suggest the following policy recommendations. Firstly, optimize the intergovernmental coordination mechanism. Given that the flat government reform has a more significant stimulating effect in pilot counties in the eastern region, the central and western regions should learn from the experience of the eastern region, fully consider their own economic foundation, industrial structure, and regional characteristics, and make adaptive adjustments to the reform measures. For example, the central and western regions can prioritize pilot projects in counties with relatively good economic foundations and high industrial agglomeration, gradually accumulate experience, and then promote them. In addition, regional collaboration and cooperation can be strengthened, and cross regional coordination mechanisms can be established. The eastern region can drive the development of the central and western regions and achieve complementary advantages through technology output, industrial transfer, and other means.

Secondly, strengthen the construction of fiscal capacity. Enhance the autonomy of county-level finance, increase the intensity of fiscal transfer payments for areas with low self-sufficiency rates, increase the proportion of general transfer payments, and strengthen the disposable financial resources of county-level governments. At the same time, county-level governments are encouraged to develop characteristic industries, broaden financial channels, improve fiscal self-sufficiency, and optimize tax collection and management policies. For areas with high tax efforts, appropriate tax incentives or reward policies should be given to reduce the burden on enterprises and stimulate market vitality. At the same time, we will strengthen the informatization construction of tax collection and management, improve the efficiency of tax collection and management, and prevent tax revenue loss.

Thirdly, enhance regional adaptive governance. Promote industrial upgrading and innovation: For counties with high per capita GDP and high level of industrial upgrading, increase support for scientific and technological innovation, encourage enterprises to increase research and development investment, and cultivate emerging industries. For counties with lower levels of industrial upgrading, targeted industrial support policies should be formulated to guide traditional industries to transform towards high-end, intelligent, and green industries. For example, establishing an industrial upgrading guidance fund to provide financial support and policy incentives to enterprises that meet the direction of industrial development. Narrowing the urban-rural gap, increasing investment in infrastructure construction in rural areas, improving the level of rural public services, and promoting the free flow of urban and rural factors. Efforts should also be made to enhance economic resilience in response to shocks: establish and improve an economic risk monitoring system to timely detect and warn of potential risks in economic operations. Develop emergency plans to cope with economic shocks, and be able to quickly take effective policy measures to stabilize economic operations in the face of external shocks.

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