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Policy Effects of Expanding the Opening-Up of the Service Sector on its High-Quality Development: Province-Level Evidence from China

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Abstract: China's shift toward a high-quality development(HQD) paradigm increased interest in service sector liberalisation; however, its impact on the service sector (HQDSS)remains underexplored. Utilising2005–2022 panel data from27 provinces and treating the policy of expanding service sector opening-up (OSS) as a natural experiment, this study employs the synthetic difference-in-differences method to assess the policy's effect on HQDSS. The results indicate that OSS implementation increases HQDSS by 0.02885 units, a finding consistent across multiple robustness tests. Mechanism analysis further reveals that OSS promotes HQDSS through talent agglomeration and capital-deepening.

Keywords: *China; Opening-up in the service sector; High-quality development of the service sector; Synthetic difference-in-differences*

JEL: O11, 014, 025, 053

I. INTRODUCTION

China's shift toward high-quality development(HQD) highlights the country's urgent need for corresponding advancements in the service sector. The State Council launched a two-phase pilot policy from 2015 to the present to expand the service sector and sustain foreign investment.

This study makes two contributions to existing literature. First, it assesses the pilot policy's effectiveness and the relationship between OSS and high-quality service sector development (HQDSS), offering insights for broader economic growth. Second, it employs the novel synthetic difference-in-differences (SDID) method developed by Arkhangelsky et al. (2021). By incorporating unit-and time-specific weights, this approach enhances the results' robustness and precision, providing stronger causal inference regarding the link between service sector openness and development.

II. LITERATURE REVIEW AND RESEARCH HYPOTHESIS

Since the early 21st century, the expansion of global service industries and trade volume in services increased academic attention to the economic effects of OSS implementation. OSS stimulates growth in service and goods trade and supports economic reforms in transition economies (Deardorff, 2001; Eschenbach and Hoekman, 2006). In China, policy evaluations by Wang (2020) and Wang and He (2021) using the SDID approach demonstrate that OSS implementation in Beijing produced significant and sustainable positive effects on economic development.

Mlachila et al. (2017) define high-quality growth as socially friendly, stable, resilient, and productivity-enhancing. Jiang (2019)conceptualises HQDSS as a systematic and coordinated process characterised by innovation, coordination, sustainability, openness, and sharing. Chen and Xu (2021) construct an HQDSS index system based on entropy weighting. Prior work examines OSS or HQDSS independently rather than through a unified framework to examine the impact of OSS on HQDSS and the underlying mechanisms. To address this gap, we propose the following hypothesis:

H1: OSS contributes to HQDSS.

A strong talent pool and sufficient capital are essential for HQDSS, with OSS playing a key role in both. OSS can attract skilled international professionals and accelerate human capital accumulation in pilot regions by easing labour mobility restrictions and introducing flexible visa and work permit policies. This process fosters talent agglomeration (TA), improving the service sector's structure and driving value-added growth. OSS lowers investment thresholds, facilitating foreign capital inflows by lowering investment thresholds, especially in finance. This lowers financing costs and promotes capital-deepening (CD), alleviating credit constraints, boosting capital productivity, and reinforcing service sector expansion.

H2a: OSS contributes to HQDSS through TA.
H2b: OSS contributes to HQDSS through CD.

III. RESEARCH DESIGN

A. Identification strategy

We treat OSS as an exogenous shock to examine its impact on HQDSS. To establish causal inferences in the OSS–development nexus, we employ the novel SDID method (Arkhangelsky et al., 2021).Although Arkhangelsky et al. (2021) introduce a novel causal inference framework, they do not address heterogeneous treatment effects or provide a formal estimator for such effects. Consequently, we also draw on Xu and Sun (2023), who extend the SDID framework to estimate treatment effects for each treated unit.

The SDID method offers two key advantages over difference-in-differences(DID). First, the conventional DID approach typically assumes a large number of treated units, whereas our analysis is constrained to 27 Chinese provinces due to data limitations. SDID provides more reliable estimates in small-sample settings. Second, DID relies on the parallel trends assumption, which is often violated in real-world applications. By employing a data-driven methodology, SDID seeks to construct a counterfactual control group with similar trends to

fulfil the parallel trends assumption. This approach enhances the validity of the results.

B. Data source and variables

Panel data for all variables from 2005 to 2022 were obtained from various editions of the China City Statistical Yearbook and the China Statistical Yearbook. Missing values were imputed using linear interpolation.

The explanatory variable is a dummy variable equal to 1 if the province is Beijing and the year is 2015 or later, or if the province is Tianjin, Shanghai, Hainan, or Chongqing and the year is 2021 or later; and 0 otherwise. The Appendix describes the calculation of the other variables. Table 1summarises the descriptive statistics of key variables.

Table 1.Descriptive statistics.

	N	Mean	Standard error	Min	Max
Dependent variable					
High-quality development of the service sector	486	0.116	0.0665	0.0448	0.534
Explanatory variable					
Opening-up in the service sector	486	0.0329	0.179	0	1
Mechanism variables					
Talent agglomeration	486	0.418	0.0334	0.301	0.570
Capital deepening	486	29.33	60.67	0.152	346.8
Control variables					
Industrial structure	486	2.371	0.135	2.085	2.836
Population size	486	7.666	0.710	5.361	9.155
Fiscal decentralisation	486	0.521	0.190	0.148	0.951
Digitalisation	486	15.57	1.045	12.88	17.76
Infrastructure development	486	14.63	5.077	4.040	26.69

IV. EMPIRICAL ANALYSIS

A. Baseline results

Table 2 presents the baseline regression results utilising both the DID and SDID methods. We rely primarily on the SDID estimates, which offer greater robustness, due to violations of the parallel trends assumption. After controlling for covariates, the OSS policy increases HQDSS by 0.02885, indicating a statistically significant positive impact. The traditional DID overestimates this effect. These findings support H1 and align with Wang and He (2021) who demonstrate that OSS promotes HQD.

Table 2. Baseline regression

Variable	DID_1	SDID_1	DID_2	SDID_2
	(1)	(2)	(3)	(4)
OSS	0.0432769*	0.02951***	0.0308779**	0.02885***
	(0.0216949)	(0.00615)	(0.0124954)	(0.00641)
Control variables	NO	NO	YES	YES
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	486	486	486	486

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors in parentheses.

B. Robustness checks

For brevity, we present only the figures corresponding to models that include the control variables. Figure 1 confirms the validity of the parallel trends assumption. Before OSS implementation, the trends in HQDSS for both actual and synthetic pilot regions closely aligned. As new pilot regions were added, the individual and temporal weights were adjusted, enhancing accuracy. Following policy implementation, actual HQDSS values significantly surpassed synthetic values, with the gap widening over time. This divergence suggests a strong, sustained policy effect.

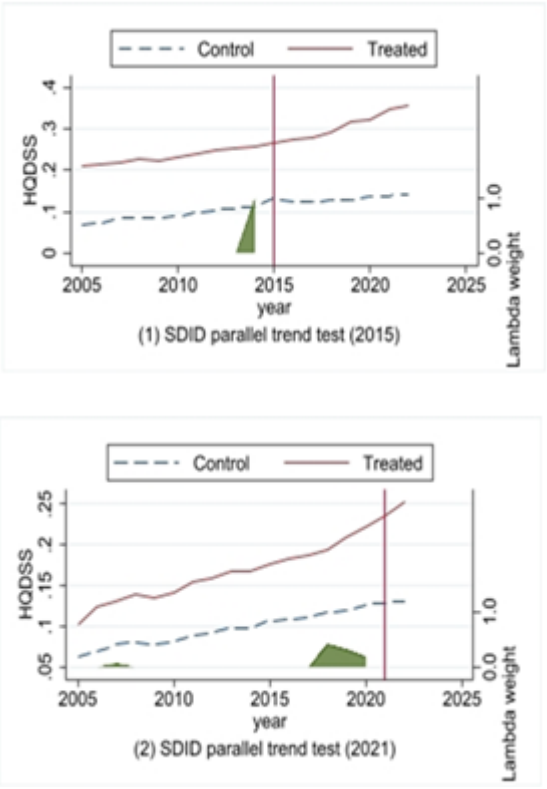

Figure 1.Synthetic-DID parallel trend test

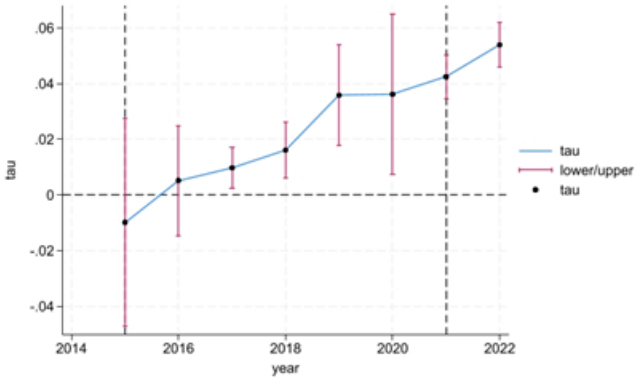

Figure 2.Dynamic effects of synthetic-DID

Figure 2 illustrates OSS's dynamic effects on HQDSS. The initial policy impact was limited, reflecting Beijing's focus on establishing institutional groundwork. However, from 2017 onward, policy priority shifts led to notable gains digital trade, green finance, and regional integration. With four new pilot regions after 2021, the estimated effects increased significantly. This result indicates that multi-regional implementation

generated cumulative benefits, confirming the OSS policy's robust and growing contribution to HQDSS over time. The accompanying confidence intervals support the statistical significance of these effects in later years.

To assess robustness, we conducted a placebo test with 500 replications using randomly assigned pilot provinces and policy years. As Figure 3shows, the distribution of placebo estimates is approximately normal and centred around zero. The actual regression coefficient lies in the far-right tail, with most placebo p-values exceeding 10%. This result indicates that the observed OSS effect is unlikely to be coincidental, thereby reinforcing the reliability and robustness of the baseline results.

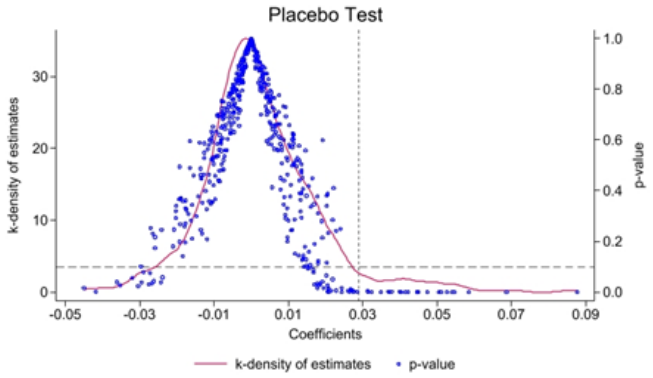

Figure 3: Placebo test

C. Mechanism analysis

The results validate OSS's promotional effect on HQDSS. To identify the underlying mechanisms, we examine the transmission channels through which OSS influences HQDSS.

As a fundamental component of knowledge-intensive industries, TA is as a principal channel through which OSS enhances HQDSS. To test this pathway, we substitute the dependent variable with TA and estimate the relationship using the SDID method. Without controlling for covariates, the coefficient of OSS on TA is 0.02242(Table 3,Columns 1–2) and statistically significant at the 1% level. After incorporating control variables, the coefficient decreases slightly to 0.01982 but remains significant at the 1% level. Thus, OSS fosters TA by attracting high-skilled labour inflows and agglomeration, thereby providing a human capital foundation for service sector upgrading. These findings support H2a.

CD constitutes another essential pathway through which OSS facilitates HQDSS. After replacing the dependent variable with CD and employing the SDID method, OSS significantly promotes CD at the 10% significance level (coefficient = 2.70791) after controlling for covariates (Table 3, Column 4). This finding suggests thatpolicy-induced capital accumulation in the pilot regions enhances the quality of production factors in services, thus supporting H2b.

Table 3. Mechanism analysis.

Variable	TA	TA	CD	CD
	(1)	(2)	(3)	(4)
OSS	0.02242***	0.01982***	0.58838	2.70791*
	(0.00833)	(0.00752)	(2.32419)	(1.38780)
Control variables	NO	YES	NO	YES
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	486	486	486	486

CONCLUSION

Utilising 2005–2022 panel data from 27 Chinese provinces, this study examines the natural experiment of Beijing becoming a pilot region for OSS in 2015, followed by Tianjin, Shanghai, Hainan, and Chongqing in 2021. This study examines if OSS in the pilot regions can promote HQDSS using the SDID approach. The results indicate that the OSS policy significantly enhances HQDSS in these pilot regions. These results remain robust across multiple sensitivity tests. The mechanism analysis reveals that OSS fosters increased TA and CD, which, in turn, positively influences HQDSS.

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The authors declare that we have no competing interests.

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