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Commentary: The impact and role mechanism of digital finance on the economic development of resource-based cities--an empirical study from China

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A Commentary on
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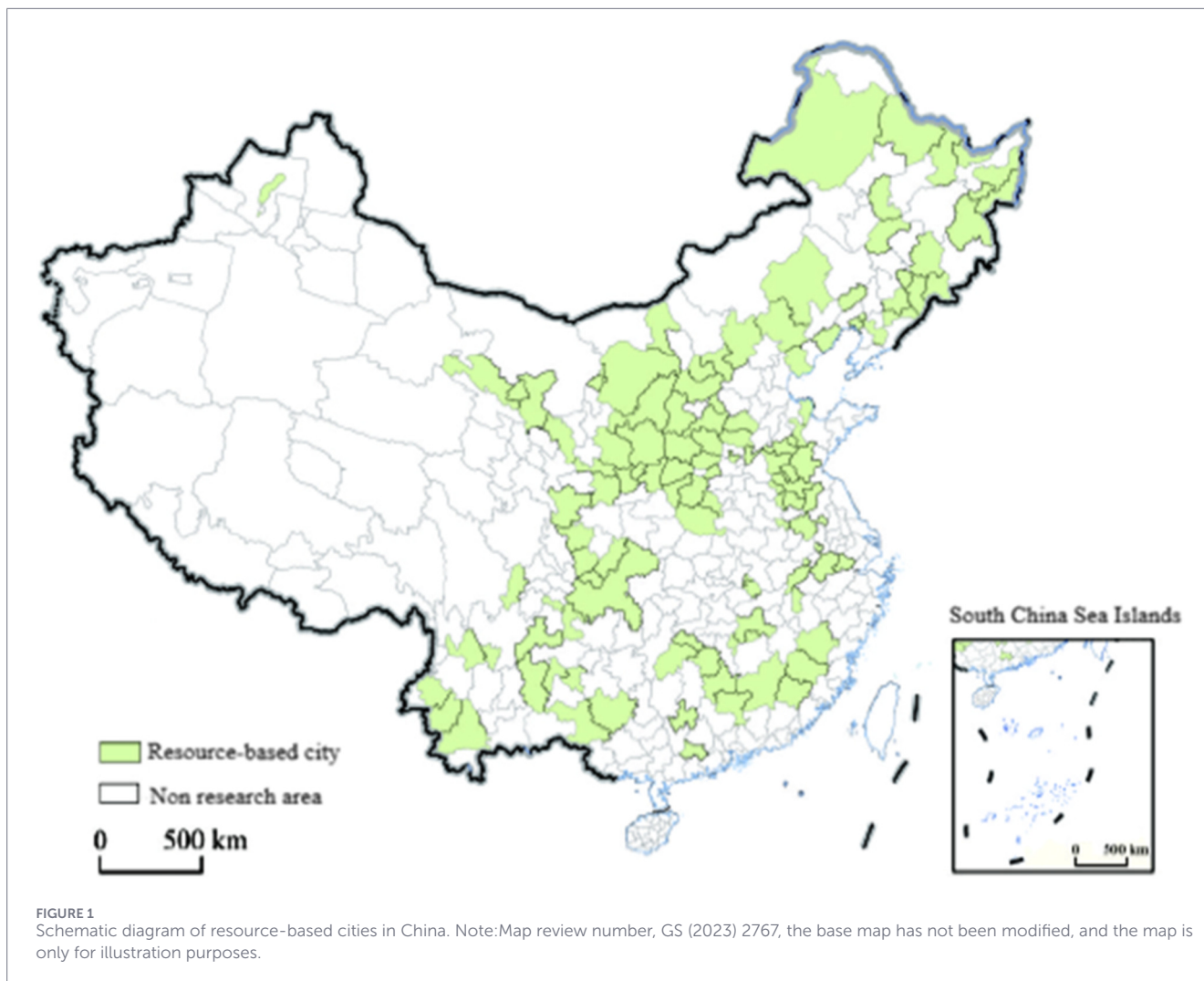
1 Introduction

Qi and Wang's research solves a key gap in regional economic research by focusing on resource-based cities, which is a background of insufficient exploration in digital finance research [1]. Using the panel data of 116 resource-based cities in China from 2014 to 2023 (Figure 1), this study systematically reveals how digital finance promotes economic development through regional innovation, industrial structure and entrepreneurship by using the intermediary, heterogeneity and interactive effect model. The article's core findings on the dual intermediary effect of digital finance, the heterogeneous impact of cross city types and the critical point effect provide valuable theoretical and policy insights for breaking the "resource curse". Previous research on resource-based cities has inspired this article [2–5]. This review acknowledged the advantages of this study and proposed the direction for further improvement.

2 Advantages of original research

2.1 Rigorous methodology and comprehensive analysis

This study integrates a variety of empirical strategies, including mediation effect model, heterogeneous grouping regression and interaction effect analysis, supplemented



by instrumental variables, did and robustness test, to solve the endogenous problem and ensure the reliability of the results. Multidimensional exploration covers the three core dimensions of digital finance and four urban development stages. It goes beyond simple linear correlation analysis and provides an overall view of the impact mechanism [6–8].

2.2 Close integration of theory and practice

Based on Institutional Economics and innovation diffusion theory, this study explains the potential logic of the role of digital finance in resource-based cities. Its differentiated policy recommendations for mature, growing, regenerating and declining cities are in line with actual needs, and provide operable guidance for policymakers to design targeted digital inclusive finance strategies [9, 10].

3 Limitations and future exploration directions

3.1 Single source digital financial index limits its universality

The research mainly relies on the data based on Alipay in the pku-dficc index, and fails to cover other major digital financial platforms (such as wechat payment and bank digital services) or digital financial instruments in specific industries. This may underestimate the actual development level of digital finance in resource-based cities, especially for industrial enterprises that do not rely too much on consumer oriented platforms.

3.2 Ignoring spatial spillover effects

Resource based cities often form clusters geographically and are interconnected through industrial chains. However, this

study overlooks the multidimensional spatial correlation in the development of digital finance, which includes not only technology diffusion and capital flow between adjacent cities, but also industrial synergy and policy imitation. For example, neighboring cities can form a linkage effect in the construction of digital financial infrastructure through regional coordination; Resource complementary cities rely on digital finance for cross regional factor allocation and enhance industrial synergy; Cities with similar resource endowments imitate each other's digital financial support policies, such as tax incentives, leading to the diffusion of spatial policies. Ignoring these spillover effects may affect the estimation of the actual impact on digital finance. It ignores the spatial spillover effects of geographic and industrial connections in resource-based cities, and traditional panel models cannot identify direct/indirect effects. Suggest using spatial econometric methods (SDM as the core, SLM as a supplement) and geographic industry composite spatial weight matrix [11–13].

In supplementary spatial econometric analysis, model selection should be in line with the characteristics of resource-based cities. The Spatial Durbin Model (SDM) is recommended as the core tool because it combines the spatial lag terms of explanatory and dependent variables, decomposing the total effect into direct and indirect effects (spillover effects from neighboring cities), which matches the multidimensional spatial correlation of resource-based cities. For scenarios that focus on policy diffusion, the Spatial Lag Model (SLM) can serve as a supplement, emphasizing the impact of the dependent variable's spatial lag term to elucidate the policy transmission pathway. In addition, a spatial weight matrix that combines geographical distance and industry relevance can be constructed to consider the differences in spatial relevance strength, thereby improving estimation accuracy.

3.3 The problem of negative intermediate analysis

Although the study identified the negative mediating role of industrial structure between digital finance and the economic development of resource-based cities, there is a lack of in-depth decomposition of the mechanism. It fails to elucidate the heterogeneity characteristics of different industrial sectors and their different responses to digital finance, which limits the explanation of why digital finance may exacerbate structural imbalances and how to mitigate such impacts.

The traditional resource mining industry is a capital intensive industry with a long investment cycle, high asset specificity, and heavy reliance on fixed factors. Digital finance prioritizes short-term returns and risk control in resource allocation, making it difficult to meet its long-term capital needs. This may hinder the transformation of traditional resource sectors, consolidate the path dependence on extensive development, and impede the optimization of industrial structure. In contrast, emerging service industries such as digital services and technology consulting are technology intensive, have short innovation cycles, and highly rely on data and talent. Digital finance reduces information asymmetry, lowers financing barriers, and accelerates technology diffusion, but

excessive tilt towards these industries may widen the development gap with traditional industries, leading to an imbalanced industrial structure.

In addition, the heterogeneity of digital finance extends to factor allocation: its impact on improving labor and resource utilization in traditional industries dominated by tangible assets is limited, but by combining data with capital and labor, it significantly increases the total factor productivity of emerging service industries. The failure to distinguish these differential pathways hinders the accurate identification of key driving factors for negative mediation effects and limits the development of targeted structural optimization policies.

4 Discussion

Qi and Wang's research empirically examines the relationship between digital finance and the development of resource-based cities in China, laying a solid foundation for subsequent research [1]. Its rigorous methodological design and targeted policy insights provide important value for breaking the "resource curse". However, this study has obvious limitations that need to be addressed in order to arrive at more comprehensive, in-depth, and applicable conclusions. Addressing these limitations will further enhance its academic and practical value.

First, the single source PKU-DFIIC index (based on Alipay data) ignores other mainstream digital financial platforms and digital financial services in specific industries, which may underestimate the actual development level of digital finance in these cities; Integrating multiple platforms and industry-specific data to build a more comprehensive digital finance index will improve the accuracy of empirical results. Secondly, this study ignored the spatial spillover effects generated by the geographical agglomeration and industrial connections of resource-based cities, and traditional panel models failed to identify the direct and indirect effects of digital finance. Therefore, it is recommended to use spatial econometric methods with the spatial Durbin model as the core and the spatial lag model as a supplement to construct a composite spatial weight matrix that combines geographical distance and industry relevance, in order to more comprehensively analyze the regional impact of digital finance. Thirdly, this study lacks in-depth decomposition of the negative intermediary mechanism of industrial structure, and fails to reveal the heterogeneous response of industries to digital finance. It is crucial to break down the industrial structure into resource dependent, manufacturing, and emerging service industries, and analyze the differential factor allocation impact of digital finance on these industries, in order to clarify the internal logic of this mechanism and formulate more precise industrial structure optimization policies.

Ultimately, revalidating core findings, supplementing spatial and industrial heterogeneity analysis, and optimizing research conclusions and policy systems through stratification [14, 15], regional, and industrial differentiation policies will better unleash the transformative potential of digital finance for the sustainable development of resource-based cities.

Author contributions

LY: Funding acquisition, Resources, Visualization, Writing – original draft, Writing – review and editing.

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Conflict of interest

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