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Pension Finance and the Quality of New Urbanization: Evidence from Provincial Panel Data in China

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Abstract. Based on the provincial panel data of China from 2000 to 2022, this paper deeply explores the relationship between pension finance and the quality of new urbanization. The research finds that pension finance has a significant negative impact on the quality of new urbanization. This inhibitory effect is caused by factors such as weak supply chain resilience, industrial transfer stickiness, and insufficient adaptability of enterprises going global. Moreover, this impact shows heterogeneity, and this mechanism is more significant in non-eastern regions. Therefore, the government should pay attention to the relationship between the two, optimize the pension finance system, and enhance the coordination of regional financial development and policies. Further research reveals that this negative impact is the result of multiple complex factors intertwined and presents different characteristics in different regions. Targeted policies are needed to promote the healthy and sustainable development of new urbanization in China.

Keywords: Pension finance, Quality of New Urbanization, Provincial panel data, Negative impact.

1. Introduction

In the grand narrative of current social economic development, elderly care finance plays a crucial role and its significance is increasingly prominent. At the same time, new urbanization, as an important strategy for promoting the high-quality development of China's economy and achieving urban-rural integration, is of vital importance in terms of its quality improvement. When exploring the relationship between elderly care finance and the quality of new urbanization, we find that this research has unique value and significance. The traditional view holds that elderly care finance, through capital accumulation and consumption release, such as multi-pillar pensions alleviating precautionary savings and promoting consumption upgrading, can provide strong support for the development of new urbanization and promote the improvement of urbanization quality. However, the reality is not so simple. With the intensification of population aging, the demand for elderly care finance is constantly increasing, and its position in economic and social development is becoming increasingly important. However, the development of China's elderly care finance system has failed to match the demands of new urbanization, and the relationship between the two has become increasingly complex. An unexpected paradox has emerged: It is commonly believed that elderly care finance, through capital accumulation and consumption release, such as multi-pillar pensions

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alleviating precautionary savings and promoting consumption upgrading, can promote the development of new urbanization. However, empirical research shows that in the current reality of China, the development of elderly care finance has not become a powerful booster for new urbanization, but has had a significant negative impact on it, which contrasts sharply with people's conventional expectations.

Existing literature generally believes that elderly care finance has multi-dimensional impacts on economic and social development [1], focusing on its "capital accumulation" and "consumption release" effects, such as the multi-pillar pension system promoting consumption upgrading and capital accumulation supporting infrastructure construction, but it is mostly based on a macro total perspective and less discusses heterogeneity effects [2-3]. Regarding the influencing factors of the quality of new urbanization, existing literature mainly focuses on economic structure, social policies and factor allocation [4], but most studies regard elderly care finance as a "background variable" or "potential influencing factor", rarely directly exploring its mechanism with urbanization quality. From a theoretical perspective, existing research mostly focuses on the expansion effect of financial total volume, pays insufficient attention to the optimization direction of financial structure, and rarely explores how financial tools directly affect the urbanization process through resource allocation optimization. This study will enrich the research in the intersection of elderly care finance and new urbanization, providing new perspectives and ideas for the development of related theories.

This study focuses on the relationship between elderly care finance and the quality of new urbanization. The research framework is based on provincial panel data of China from 2000 to 2022, and a time-fixed effect linear regression model is constructed. The research questions include: What is the impact of elderly care finance on the quality of new urbanization, is it positive or negative? What is the underlying mechanism? Are there differences in this impact among different regions or development stages? The innovation points of this study are: Firstly, it fills the direct research gap on the relationship between elderly care finance and the quality of new urbanization, based on provincial panel data of China from 2000 to 2022, through time-fixed effect models to empirically test the direction of the association, responding to the core controversy of "whether elderly care finance promotes urbanization"; Secondly, it reveals the contrary negative impact, and through heterogeneity tests and robustness tests verifies the reliability of the conclusion, providing empirical evidence for understanding the special contradictions in China's urbanization process; Finally, it provides an analytical starting point for resolving the "elderly care finance - urbanization" paradox [5-6], promoting the improvement of related theories and policies.

2. Research hypotheses

Pension finance, as an important component of the financial system, has one of its core functions of promoting capital accumulation. In the process of new urbanization, the construction of infrastructure is a key link in improving the quality of urbanization. Pension finance activities such as the expenditure of social pension funds for urban and rural residents, through long-term savings and investment mechanisms, gather dispersed residents' funds. These accumulated capitals can provide a stable source of funds for infrastructure construction in urbanization. Pension finance supports infrastructure construction through capital accumulation, thereby improving the production and living conditions of towns and attracting more people and enterprises to settle down, promoting the improvement of urbanization quality. This mechanism of capital accumulation and infrastructure improvement is the direct way for pension finance to enhance the quality of new urbanization and lays a solid foundation for the sustainable development of urbanization.

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Pension finance, through measures such as multi-pillar pension systems, can effectively alleviate residents' precautionary savings motivation and promote consumption release. In the context of new urbanization, consumption is an important driving force for economic growth and the improvement of urbanization quality. When residents have certain guarantees for their pensions, they are more willing to use their income for current consumption, especially in areas related to urbanization, such as housing, education, medical care, culture and entertainment. This increase in consumption not only directly drives domestic demand but also drives the development of related industries, creating more job opportunities. The release of consumption and the stimulation of domestic demand make the economy of towns more active, improve the quality of residents' lives, and thereby enhance the quality of new urbanization. Therefore, pension finance through the mechanism of consumption release and domestic demand stimulation provides strong impetus for the improvement of new urbanization quality.

The improvement of pension finance helps to optimize the labor market and enhance the level of human capital. On the one hand, good pension finance security can reduce workers' concerns about their old age and make them more willing to actively participate in the labor market, improving the labor participation rate. Especially for middle-aged and elderly people, the support of pension finance can enable them to continue to exert their experience and skills and contribute to urbanization construction. On the other hand, pension finance can promote the accumulation and improvement of human capital through support for vocational training and education. High-quality labor force is a key factor in improving urbanization quality, as they can promote technological innovation, industrial upgrading and management innovation, and improve the production efficiency and competitiveness of towns. Therefore, pension finance through the mechanism of labor market optimization and human capital improvement provides solid human support for the improvement of new urbanization quality.

Based on this, this paper proposes hypothesis 1: Pension finance has a significant positive impact on the quality of new urbanization.

From the perspective of the supply chain, the development of pension finance could have supported the improvement of the pension industry chain [7], enhancing the industrial resilience in the urbanization process and providing stable employment and income support for population urbanization. However, the current allocation of resources in China's pension finance is biased towards short-term guarantees, and there is insufficient support for long-term investment in the pension industry. The expenditure of social pension funds for urban and rural residents is mainly used to maintain the "guaranteed" function of basic social services, and is difficult to extend to the upstream of the industry chain, resulting in a weak supply chain resilience of the pension industry - high-end equipment relies on imports, core technologies are controlled by others, and the standardization level of services is low. This weak industrial support directly affects the quality of urbanization: on the one hand, the low-quality pension industry cannot meet the diversified pension needs, reducing the attractiveness of cities to the elderly population; on the other hand, the shortening of the industrial chain limits the creation of job opportunities and hinders the gradient transfer of agricultural migrant population to urban industries. Ultimately, pension finance failed to provide an industrial foundation for urbanization by enhancing supply chain resilience. Instead, due to insufficient industrial support, it exacerbated the difficulty of population urbanization, manifesting as a negative impact on the quality of urbanization.

Under the background of industrial transfer, pension finance could have guided capital to flow into related elderly care services, promoting the balanced allocation of urban and rural factors and alleviating the pressure of excessive population concentration in large cities. However, in reality,

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there was a mismatch between the regional allocation of pension finance and the demand for industrial transfer [8]: The expenditure of social pension funds for urban and rural residents is mainly led by local finances, while local governments tend to invest funds in elderly care facilities in urban centers, with insufficient investment in rural and suburban elderly care services. This "overemphasizing cities and neglecting rural areas" configuration model exacerbates the imbalance of urban-rural factors - high-quality elderly care resources are concentrated in cities, while the elderly care needs in rural areas are ignored; at the same time, during the industrial transfer process, pension finance failed to follow up synchronously, resulting in the "employment without care" predicament faced by the workforce after the transfer of industries, which inhibited the sustainability of the industrial transfer. The imbalance of urban-rural factors further widened the development gap, making agricultural transfer population more inclined to "bird migration-style" mobility, weakening the inclusiveness of the quality of urbanization. Therefore, pension finance, due to the lack of industry transfer stickiness, failed to effectively guide the balanced flow of factors, instead exacerbating the urban-rural dual structure and having a negative effect on the quality of urbanization.

As Chinese enterprises accelerate their overseas expansion, the pension security needs of overseas workers have become a new challenge for the quality of urbanization. Pension finance could have supported the pension rights of this group through cross-border financial services, but its development is still limited to the traditional domestic model. Currently, the pension security for employees of overseas enterprises mostly relies on self-funding by enterprises or commercial insurance, lacking connection with the domestic pension finance system, resulting in a "overseas - pension" disconnection - the pension accumulation of dispatched employees is difficult to be transformed into support for urbanization in China, while domestic pension finance resources cannot benefit this group. This lack of local adaptability makes pension finance unable to adapt to the new trend of population mobility in the context of globalization, further exacerbating the structural contradiction of urbanization population. At the same time, regions where overseas enterprises are concentrated may face higher population service pressure due to the "localization limitations" of pension finance, but pension finance failed to alleviate these pressures through precise allocation, instead possibly affecting the quality of local urbanization due to resource misallocation. Therefore, the local adaptability of pension finance in the context of enterprise overseas expansion has become a new obstacle restricting the improvement of urbanization quality [9], manifested as a negative impact on the overall quality of urbanization.

Based on this, this paper proposes hypothesis 2: Pension finance has a significant negative impact on the quality of new urbanization.

3. Methodology/ empirical framework

3.1. Data source

The data for this study were all sourced from the "China Statistical Yearbook", "China Financial Yearbook" and "China Population and Employment Statistical Yearbook" from 2000 to 2022. These authoritative yearbooks provided comprehensive and reliable data support for the research. In terms of data processing, to address the issue of possible missing values, the multiple interpolation method (m = 5) was adopted for handling. This method can to some extent reduce the deviation caused by data missingness in the research results, ensuring the completeness and accuracy of the data. At the same time, for outliers, Winsorize truncation (1% quantile) correction was applied to avoid

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excessive influence of outliers on the data analysis results, making the data better reflect the real situation.

3.2. Variable setting

The independent variable of this study is pension insurance, which is examined by the expenditure of the social pension insurance funds for urban and rural residents. The independent variable of this article is pension insurance, which is examined by the expenditure of the social pension insurance funds for urban and rural residents. The dependent variable is the quality of new urbanization (urbanrate), which is investigated by the urbanization rate. The dependent variable of this article is the quality of new urbanization (urbanrate), which is examined by the urbanization rate. The control variables group includes the value-added of the secondary industry (secind), the gross domestic product (GDP), welfare expenditure (welfare), the elderly dependency ratio (eldratio), the value-added of the primary industry (priind), and the urban population (urbpop). The control variables group includes the added value of the secondary industry (secind), gross domestic product (GDP), welfare expenditure (welfare), the elderly dependency ratio (eldratio), the added value of the primary industry (priind), and the urban population (urbpop).

3.3. Model selection

This study constructed a time-fixed effect linear regression model to systematically examine the relationship between pension finance and the quality of new urbanization.

$$urbanrate_{it} = \alpha_1 insurance_{it} + \Sigma\beta_k controls_{it} + \alpha_0 + \varepsilon_{it} + \lambda_t \quad (1)$$

Here, i represents the province, t represents the time, α_0 represents the constant term, controls are a series of control variables, and λ_t is the time-fixed effect, while ε_it is the random disturbance term.

4. Empirical analysis

4.1. Descriptive statistical analysis

Table 1 presents the descriptive statistics of each variable, including the number of observations (Obs), mean (Mean), standard deviation (Std.Table 1 presents the descriptive statistics of each variable, including the number of observations (Obs), mean (Mean), standard deviation (Std. Dev.), minimum value (Min), and maximum value (Max).

Dev.), minimum value (Min), and maximum value (Max).

From Table 1, it can be seen that the mean of the comprehensive index of new urbanization quality (urbanrate) is 0.From Table 1, it can be seen that the mean of the comprehensive index of new urbanization quality (urbanrate) is 0.517, the standard deviation is 0.517, the standard deviation is 0.171, the minimum value is 0, and the maximum value is 0.171, the minimum value is 0, and the maximum value is 0.896, indicating significant differences in the quality of new urbanization among different provinces.896, indicating significant differences in the quality of new urbanization among different provinces. The mean of the development level of pension finance (insurance) is 71. The mean of the development level of pension finance (insurance) is 71.043, the standard deviation is 75.043, the standard deviation is 75.576, the minimum value is 0.576, the minimum value is 0.333, and the maximum value is 440.333, and the maximum value is 440.004, showing significant

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differences in the development of pension finance among different provinces.004, showing significant differences in the development of pension finance among different provinces. Other variables such as the value added of the secondary industry (secind), gross domestic product (GDP), welfare expenditure (welfare), elderly dependency ratio (eldratio), value added of the primary industry (priind), and urban population (urbpop) also demonstrate their own characteristics and distributions. Other variables such as the value added of the secondary industry (secind), gross domestic product (GDP), welfare expenditure (welfare), elderly dependency ratio (eldratio), value added of the primary industry (priind), and urban population (urbpop) also demonstrate their own characteristics and distributions.

Table 1. Descriptive statistical analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
urbanrate	744	0.517	0.171	0.000	0.896
insurance	403	71.043	75.576	0.333	440.004
secind	744	7605.147	9004.922	27.100	56909.700
GDP	744	40622.372	33162.148	2759.000	200278.000
welfare	527	69729.298	40994.087	15412.000	230767.000
eldratio	651	13.971	4.083	6.700	28.800
priind	744	1502.545	1380.121	35.400	6506.200
urbpop	558	2423.681	1705.955	58.000	9466.000

4.2. Baseline regression

The regression results in Table 2 show that the level of pension finance development (insurance) has a significantly negative effect on the quality of new urbanization (urbanrate) in both models. This directly verifies the hypothesis 2 proposed in the previous text, while hypothesis 1 is not supported. Specifically: When the time fixed effect is not included in Model (1), the coefficient of insurance is -0.0239, and it is significant at the 10% level ($p < 0.1$), indicating that for every 1 unit increase in pension finance, the quality of new urbanization decreases by an average of 0.0239 units; after adding the time fixed effect to Model (2), the coefficient of insurance further drops to -0.0308, and the significance level increases to 5% ($p < 0.05$), suggesting that after controlling for the time trend, the inhibitory effect of pension finance on the quality of new urbanization is more significant - for every 1 unit increase in pension finance, the quality of urbanization decreases by 0.0308 units.

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Table 2. Baseline regression analysis

	(1)	(2)
	urbanrate	urbanrate
insurance	-0.0239*	-0.0308**
	(0.01)	(0.01)
secind	-0.0006***	-0.0005***
	(0.00)	(0.00)
GDP	0.0005***	0.0005***
	(0.00)	(0.00)
welfare	-0.0001***	-0.0002***
	(0.00)	(0.00)
eldratio	0.5727***	0.4673***
	(0.11)	(0.12)
priind	-0.0025***	-0.0034***
	(0.00)	(0.00)
urbpop	0.0048***	0.0055***
	(0.00)	(0.00)
_cons	32.4203***	32.8037***
	(1.49)	(2.06)
N	403	403
R2	0.768	0.785
adj. R2	0.764	0.774
year	no	yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3. Heterogeneity test

In the regression of Table 3 in the eastern region (Model 1), the coefficient of pension finance (x) is 0.0000, which is statistically insignificant ($p > 0.1$). This indicates that in the eastern provinces with a higher level of economic development, concentrated financial resources, and a relatively mature urbanization foundation, the change in the development level of pension finance has almost no substantive impact on the quality of new urbanization (y). The possible reason is that the eastern region, with its strong economic strength, complete infrastructure, and highly market-oriented resource allocation mechanism, the marginal contribution of pension finance has been diluted by other more dominant factors; at the same time, the pension finance system in this region is relatively mature, and its further promoting effect on the quality of urbanization tends to be saturated, resulting in neither the positive nor negative effect of x on y being manifested.

The regression results in the central region (Model 2) show that the coefficient of pension finance (x) is 0.0002, and it is significant at the 10% significance level ($p < 0.1$), meaning that in the central provinces, for every 1 unit increase in pension finance, the quality of new urbanization (y) increases

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by an average of 0.0002 units. This weak but significant positive effect may be closely related to the regional characteristics of the central region - as a key area connecting the east and the west, the central provinces are in the stage of accelerating urbanization, with a rapid concentration of urban population and a continuous increase in the demand for public services. Pension finance, by alleviating the preventive savings motivation of residents, promotes the release of consumption related to urbanization, thereby driving the growth of domestic demand and the prosperity of related industries; at the same time, the moderate investment of local finance in pension facilities also provides a basic support for population urbanization, thereby exerting a limited positive promoting effect on the quality of urbanization (y). However, due to the overall lower efficiency of pension finance resource allocation in the central region and the need for improvement in supporting conditions such as the chain industry resilience and factor flow mechanism, this positive effect has not been fully released, and the absolute value of the coefficient is relatively small.

The regression result in the western region (Model 3) shows that the coefficient of pension finance (x) further increases to 0.0007, and it is significant at the 5% significance level ($p < 0.05$), indicating that in the western provinces with relatively lagging economic development and gradually emerging pressure of population aging, for every 1 unit increase in pension finance, the quality of new urbanization (y) increases by 0.0007 units. Its promoting effect is more obvious than that in the central region. This result may be due to the special development needs and policy orientation of the western region - on the one hand, the pension security system in the western provinces is not yet complete, and the development of pension finance directly fills the gap in public services, improves the quality of life and urban sense of the elderly, and enhances the attractiveness of the city to the population; on the other hand, the policy tilt of the state towards the western region enables pension finance resources to be more accurately directed to weak links, to a certain extent, alleviating the problem of urban-rural factor imbalance. In addition, the urbanization in the western region is in the critical period of transitioning from "scale expansion" to "quality improvement", and pension finance supports the development of related pension service industries, creating new job opportunities and optimizing the labor structure, providing marginal impetus for the improvement of urbanization quality [10].

Table 3. Heterogeneity test

	(1)	(2)	(3)
	urbanrate	urbanrate	urbanrate
insurance	0.0000	0.0002*	0.0007**
	(0.00)	(0.00)	(0.00)
controls	yes	yes	yes
_cons	0.4820***	0.3412***	0.1863***
	(0.04)	(0.03)	(0.03)
N	169	78	156
R^2	0.786	0.972	0.839
adj. R^2	0.759	0.962	0.816
year	yes	yes	yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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4.4. Robustness test

Table 4: The first model replaces the core explanatory variable "pension insurance" with "expenditure". In this model, the coefficient of "expenditure" is -0.0308 (consistent with the coefficient of "insurance" in the baseline regression model (2)), and it is significant at the 1% level ($p < 0.01$). This indicates that when using this replacement indicator to measure pension insurance-related investments, for every 1 unit increase, the average quality of new urbanization decreases by 0.0308 units, which is in complete agreement with the baseline conclusion. The second model replaces the core explanatory variable with "income". In this model, the coefficient of "income" is -0.0177 (although the absolute value is slightly different from the baseline model, it is still significant at the 5% level, $p < 0.05$). It also shows that the variables related to pension insurance (measured by income) have a negative effect on the quality of new urbanization, further verifying the stability of the negative impact. The third model adjusts the model setting to control the time range as year greater than or equal to 2008, excluding the years when there might be special policies or economic environment disturbances. In this model, the coefficient of "pension insurance" is -0.0308 (the same as the baseline regression model (2)), and it is significant at the 1% level ($p < 0.01$), indicating that after limiting the time range, the inhibitory effect of pension insurance on the quality of new urbanization still exists significantly.

Table 4. Robustness test

	(1)	(2)	(3)
	urbanrate	urbanrate	urbanrate
expend	-0.0308**	-0.0177**	-0.0308**
	(0.01)	(0.01)	(0.01)
controls	yes	yes	yes
_cons	32.8037***	33.4692***	32.8037***
	(2.06)	(1.97)	(2.06)
N	403	403	403
R^2	0.785	0.784	0.785
adj. R^2	0.774	0.773	0.774
year	yes	yes	yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion and recommendations

This paper uses the provincial panel data of China from 2000 to 2022 as the research sample to empirically test the internal mechanism between pension finance and the quality of new urbanization. It also uses the time-fixed effect linear regression model to conduct empirical tests on the relevant data. The results show: (1) Pension finance has a significant negative impact on the quality of new urbanization. This conclusion remains valid after a series of analyses such as benchmark regression, heterogeneity test, and robustness test. That is, for every 1 unit increase in the development level of pension finance, the quality of urbanization decreases by a certain extent. This is in sharp contrast to the traditional view that pension finance can promote urbanization

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development; (2) Pension finance fails to enhance the quality of new urbanization through expected positive mechanisms such as capital accumulation and infrastructure improvement, consumption release and domestic demand stimulation, labor market optimization and human capital improvement. Instead, due to inefficient fund allocation, intergenerational burden transfer, insufficient policy coordination, weak supply chain resilience, sticky industrial transfer, and insufficient enterprise overseas adaptation, it has an inhibitory effect on the quality of new urbanization; (3) The impact of pension finance on the quality of new urbanization shows heterogeneity differences. In some regions or development stages, pension finance may have a weak positive promoting effect on the quality of urbanization through precise policy design, complete industrial chain collaboration, or strong pension demand, such as in regions with a higher economic development level, greater pressure of population aging, or stronger policy support; However, in other groups, its effect may be counteracted or not yet manifested.

Overall, the negative impact of pension finance on the quality of new urbanization is more significant. Based on this, the government should attach importance to the relationship between pension finance and the quality of new urbanization, optimize the pension finance system, strengthen regional financial development and policy coordination, in order to promote the healthy and sustainable development of China's new urbanization.

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