Financial Empowerment of the Elderly Care Industry Development

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Abstract: In the era of rapid digital transformation, this paper examines how finance impacts the pension industry's development in the digital economy (2014-2021, 30 provinces). Key findings: Finance positively drives development, supports it via marketization, but its impact weakens as the digital divide widens with economic digitization. These insights guide policy formulation.

1. Introduction

Digital technologies like AI have driven China’s economic growth and transformed services, improving efficiency and customer experiences [1][2]. However, the deepening digital economy has widened the digital divide, especially affecting the elderly [3][4]. The pension industry, vital for social stability and well-being, has attracted significant attention. Finance has a very strong impact on quality development. A crucial question is whether finance can empower the pension industry’s growth in the digital economy, influenced more by digital dividends or the digital divide.

The focus of this paper is to explore the specific implications of financial empowerment for the high-quality development of the senior care industry in the digital economy. Therefore, this paper deeply analyzes the path and strategy of financial empowerment for the high-quality development of the pension industry, and explores the internal mechanism of financial empowerment for the pension industry in the era of digital economy.

2. Literature Review and Research Assumptions

Finance has an impact on the high-quality development of the senior care industry from the following aspects. First, financial support. Finance provides the necessary financial support for the senior care industry. Second, optimization of resource allocation. Finance optimizes resource allocation. Third, risk management. By providing risk management services, finance helps the pension industry to cope with market risks, policy risks, and other uncertainties, improving the stability and sustainability of the pension industry [5].

Accordingly, this paper puts forward the following hypothesis H1: finance fosters the high-quality development of the senior care industry in a positive way.

The rise in marketization levels serves as a crucial transmission channel in financial development's support for the pension industry's high-quality growth. Finance drives marketization improvement by optimizing resource allocation, directing funds to efficient areas, and fostering economic innovation and growth. Increased marketization propels pension industry advancement by stimulating innovation through competitive mechanisms, fostering diversified and personalized service models, and efficiently allocating resources to high-quality care projects.

Accordingly, this paper proposes the following hypothesis H2: Financial development supports the high-quality development of the senior care industry through a transmission channel that promotes the increase in the level of marketization.

As a rapidly aging and digitizing nation, China encounters a pronounced digital divide among seniors, marked by deficiencies in digital skills, device adoption, and internet use. This gap hampers their access to and use of financial digital services, directly impeding finance's role in advancing the senior care industry's high-quality development. The elderly's limited ability to utilize smart products creates a bottleneck, preventing full exploration and satisfaction of market demand

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potential, which adversely affects the efficient allocation and utilization of financial resources in this sector.

Accordingly, this paper puts forward the following hypothesis H3a: Amid the digital economy, the high-quality advancement of the senior care industry empowered by financial means is subject to the digital divide's negative moderating role.

The digital economy negatively moderates the relationship between the high-quality development of finance and the pension industry, with this effect varying based on the digital economy's development stage. Initially, finance supports the senior care industry, benefiting from digital dividends through information technology and fintech innovations. However, as digitization deepens and surpasses a certain threshold, these digital dividends transform into a digital divide, gradually diminishing finance's positive impact on the senior care sector.

Accordingly, this paper puts forward the following hypothesis H3b: As the digital economy keeps developing, the impact of financial empowerment on the high-quality advancement of the senior care industry is slowly becoming less pronounced.

3. Research design

Explained variable: the index of high-quality development of the pension industry (PI). The system consists of four dimensions and 12 sub-indicators, namely “economic benefits”, “social security”, “infrastructure” and “sustainable development”.

Explanatory variables: level of financial development (FDL). This paper adopts the year-end deposit and loan balances of financial institutions/regional GDP to measure the local financial development level.

Moderating variable: digital economy development level (DE). Referring to the article of Guo Feng et al. (2020), it is derived by using the entropy method to measure the level of digital economy.

Mediating variable: marketization index (MI). Calculated with reference to the articles of Xie Xuemei and Zhu Qiwei (2021) and Yu Hongmei et al. (2010).

Control variables: 1) Environmental regulation (ER). 2) Degree of government intervention (GI). 3) Tax burden level (TBL). 4) Social consumption level (CPI).5) Human Capital Level (HCL).6) Transportation Infrastructure Level (TIL).

4. Empirical analysis

4.1 Benchmark regression

Table 1 Benchmark regression results

p	(1)	(2)	(3)
FDL	0.0107*	0.0483***	0.0417***
	(2.23)	(7.63)	(6.14)
ER	-5.117***	-2.245	-3.951**
	(-3.50)	(-1.64)	(-2.85)
GI	-0.637***	-0.686***	-0.727***
	(-12.03)	(-14.15)	(-13.64)
CPI		-0.00847	-0.130
		(-0.12)	(-1.87)
TIL		0.0641***	0.0728***
		(7.98)	(7.60)
HCL			-2.741*
			(-2.51)
TBL			0.791**
			(2.93)
_cons	0.381***	-0.499***	-0.520***
	(19.63)	(-4.51)	(-3.62)

The benchmark regression results are shown in Table 1.As can be seen from Table 1, finance fosters the high-quality development of the senior care industry in a positive way, and Hypothesis H1 has been verified.

4.2 Mechanism Tests

4.2.1 Mediating effects

This paper uses a two-step approach to test it. The results are shown in Table 2. It indicates that financial development supports the high-quality development of the senior care industry through a transmission channel that promotes the increase in the level of marketization. Hypothesis H2 is confirmed.

4.2.2 Moderating effect

Moderated effects tests are conducted. The results are shown in column (2) of Table 2. It implies that amid the digital economy, the high-quality advancement of the senior care industry empowered by financial means is subject to the digital divide's negative moderating role. Hypothesis H3a holds.

Table 2 Results of the mediation effect test and moderating effect test results

	(1) *MI*	(2) *PI*
*FDL*DE*		-0.120***
		(0.0206)
FDL	0.457***	0.0327***
	(4.97)	(0.00862)
DE		0.952***
		(0.0928)
Constant		-0.627***
	16.42***	(0.116)
Observations	(8.43)	240

4.3 Further analysis

The triple-threshold test was conducted first and the results are shown in Table 3 and Table 4. As can be seen from Table 3 and Table 4, when the digital economy is the threshold variable, the statistics pass the single-threshold test and double-threshold test, while the triple-threshold test is not significant. There is a double threshold effect of the development of the digital economy.

Table 3 Results of the three-threshold test

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	0.1406	0.0006	17.30	0.0500	15.3026	16.7034	25.0114
Double	0.1264	0.0005	25.89	0.0200	16.4834	19.9756	18.8416
Triple	0.1234	0.0005	5.71	0.7700	37.0151	45.4807	54.1540

Table 4 Threshold effect model estimation results

	(1) *PI*
0 ($DE\leq 0.2716$)	0.0159*
	(0.00963)
1 ($0.2716<DE\leq 0.2868$)	0.0325***
	(0.00951)
2 ($0.2868>DE$)	0.0145
	(0.00891)
Constant	0.278
	(0.440)

5. Main Conclusions

Financial benchmark regression shows it positively impacts senior care industry quality development by: 1) securing economic foundations via capital and investment for sustainable growth; 2) optimizing resource allocation to foster diversified services; and 3) supporting policy enforcement and regulatory improvements.

The mediation effect test indicates financial development drives high-quality growth in the senior care industry by enhancing marketization. It does so by: 1) efficiently allocating funds through diversified financing mechanisms, supporting service organizations' expansion and quality; 2) refining market mechanisms via price discovery and resource allocation, channeling resources to competitive entities; and 3) fostering financial innovation and service upgrades to propel industry advancement.

The moderating effect analysis reveals that the digital divide negatively impedes the high-quality development of senior financial empowerment in the digital economy. Key barriers include: 1) Technology acceptance challenges among older adults due to economic constraints, cognitive limitations, and resistance to new technologies, hindering their engagement with digital financial products; 2) Service inapplicability, as digital offerings often overlook the unique needs of seniors and lack adequate offline support, failing to meet diverse demands; and 3) Insufficient policy support and regulatory gaps, which create obstacles for integrating digital finance into the elderly care sector.

The threshold effect test reveals that finance's impact on senior care industry quality diminishes as digital economy development deepens and the digital divide widens. Initially, digital dividends significantly drive financial empowerment, offering convenient, efficient services via technological innovation, transparency, and resource optimization. However, as digitization advances, the digital divide's expansion weakens this effect. Technology acceptance gaps hinder some seniors' use of digital tools, while inadequate service suitability fails to meet their unique needs.

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