

Research on the Mechanism of Demographic Structure on China's Outward Foreign Direct Investment

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Abstract: This paper verifies the relationship between demographic structure and China's OFDI using time series data from 2000 to 2020. It is found that child dependency ratio has no effect on OFDI in China, while the old age dependency ratio has a significant positive effect on OFDI, leading to a theoretical mechanism that population aging makes affects China's OFDI by influencing the capital intensity of the country and then. In order to avoid excessive transfer of capital and further improve the quality of OFDI, the government should encourage childbirth and prevent the rapid rise of the old-age dependency ratio.

Keywords: OFDI, Demographic structure, Juvenile dependency ratio, Elderly dependency ratio.

1. Literature Review

Since its accession to WTO in 2001, China's OFDI has achieved rapid growth, with OFDI flows growing from \$916 million in 2000 to \$132.94 billion in 2020, and OFDI stock growing from \$27.768 billion to \$235.18 billion.

According to Sun, early (2014), China's large amount of cheap labor constitutes a comparative advantage for economic growth, allowing Chinese firms to engage in low-cost production of products and thus gain a competitive price advantage in the international market. However, after entering the 21st century, China's elderly population aged 65 and above has been rising as a proportion of the total population, with the elderly dependency ratio increasing from 9.9% in 2000 to 20.8% in 2021, and the proportion of the youth population aged 0-14 to the total population has been decreasing, from 32.6% in 2000 to 25.6% in 2021, with the population structure rapidly shifting to an aging and less child-bearing. The population structure is rapidly changing in the direction of aging and less children, i.e., the population age structure is increasingly aging. In this context, this paper investigates whether and how the demographic changes affect China's OFDI and other practical issues.

By combing through the relevant literature, we found that there are more studies on the relationship between demographic changes and international capital flows, Domeij & Floden (2006) studied the relationship between demographic changes and international capital flows based on a panel data of OECD countries from 1960-2002, and the study found that demographic changes promote capital flows in developed countries. Jianxing Lu and Wenkai Sun (2015) analyzed the relationship between demographic changes and international flows of capital through panel data of 98 countries or regions around the world from 1993-2012, and the study concluded that demographic changes would enhance the capital-labor ratio and pension size, which in turn promote capital outflows.

In summary, most studies in the existing literature focus on the impact of demographic structure on international capital flows, and there is a lack of research on the relationship between demographic change and OFDI in the Chinese context. Based on this, this paper will focus on the impact and mechanism of demographic change on OFDI in China. This will not only help to understand China's macroeconomic situation more deeply, but also provide theoretical references for Chinese enterprises to go global better.

2. Study Design

2.1. Demographic Status

From the chart of China's population structure change from 2000 to 2021 in Table 1, we can see that China's population structure is facing the serious challenge of aging and less children. In 2000, the proportion of the population aged 65 and above to the total population was only 7.00%, and the elderly dependency ratio was 9.9%, while by the end of 2021, this proportion increased to 14.20%, and the elderly dependency ratio also increased to 20.8%. The elderly population has grown from less than 90 million in 2000 to more than 200 million in 2021. The speed and depth of aging is unheard of in the history of China and extremely rare in the history of world population. In 2000, there were 290.24 million children aged 0-14, accounting for 22.90% of the total population and 32.6% of the child dependency ratio, but in 2021, the figure will be 247.21 million, accounting for 17.5% of the total population and 25.6% of the child dependency ratio. According to demographic laws, a decrease in the number of newborns means a decrease in the number of potential women of childbearing age in the future, which will further lead to a decline in the number of births, a demographic law that is difficult to reverse quickly. The rapid aging of the population structure and fewer children make the number of labor force relatively less, capital becomes abundant relative to labor, the return of capital will be lower, which may have an impact on OFDI in China.

Table 1. Demographic structure of China during 2000-2021

Year	Total population at the end of the year (10,000 people)	By age group						Child support ratio (%)	Old-age dependency ratio (%)
		0-14 years old		15-64 years old		65 years old and above			
		Population (10,000)	Specific gravity (%)	Population (10,000)	Specific gravity (%)	Population (10,000)	Specific gravity (%)		
2000	126743	29024	22.89988402	88847	70.10012387	8872	6.99999211	32.6	9.9
2001	127627	28716	22.49994124	89849	70.39968032	9062	7.100378447	32	10.1
2002	128453	28773	22.39963255	90302	70.29964267	9377	7.299946284	31.9	10.4
2003	129227	28559	22.09987077	90976	70.40014858	9692	7.499980654	31.4	10.7
2004	129988	27947	21.49967689	92161	70.8996215	9879	7.599932301	30.3	10.7
2005	130756	26543	20.29964208	94144	71.99975527	10068	7.699837866	28.1	10.7
2006	131448	26027	19.80022518	95037	72.30007303	10384	7.899701783	27.3	11
2007	132129	25633	19.39998032	95794	72.5003595	10702	8.099660181	26.8	11.1
2008	132802	25232	18.99971386	96547	72.69995934	11023	8.300326802	26	11.3
2009	133450	24688	18.49981266	97419	73.00037467	11343	8.499812664	25.3	11.6
2010	134091	22259	16.59992095	99898	74.50015288	11934	8.89992617	22.3	11.9
2011	134916	22261	16.49989623	100378	74.40036764	12277	9.099736132	22.1	12.3
2012	135922	22427	16.49990436	100718	74.09985139	12777	9.400244258	22.2	12.7
2013	136726	22423	16.39995319	101041	73.90035546	13262	9.699691354	22.2	13.1
2014	137646	22712	16.50029787	101032	73.39988085	13902	10.09982128	22.5	13.7
2015	138326	22824	16.50015182	100978	73.00001446	14524	10.49983373	22.6	14.3
2016	139232	23252	16.70018387	100943	72.49985635	15037	10.79995978	22.9	15
2017	140011	23522	16.80010856	100528	71.80007285	15961	11.39981859	23.4	15.9
2018	140541	23751	16.89969475	100065	71.19986339	16724	11.89973033	23.7	16.8
2019	141008	23689	16.79975604	99552	70.60024963	17767	12.59999433	23.8	17.8
2020	141212	25277	17.90003682	96871	68.59969408	19064	13.5002691	26.2	19.7
2021	141260	24721	17.50035396	96481	68.30029732	20059	14.20005663	25.6	20.8

2.2. Demographic Structure and Labor Supply

Based on the theory of demographic economics, the quantity of labor supply is a function of the total population size, the share of the working-age population and the labor force participation rate, with the following basic formula.

$$L = N \times l_r \times l_p$$

where N is the total population size. l_r is the share of the working-age population in the total population, which is generally set to 15-64 years old as the working-age population according to international practice. l_p Labor is the labor force participation rate, i.e., the share of the economically active population in the working-age population. Demographic changes will not only reduce the growth rate of the population size N, but also the share of the working-age population l_r and labor participation rate l_p which in turn will reduce the labor supply L.

2.3. Capital Intensity and OFDI

As a country's population ages, the country's capital-to-labor ratio will rise, i.e., capital intensity will rise, the law of diminishing marginal returns to capital will take effect, and the return to capital will tend to decline. In the empirical literature, the idea that rising capital intensity will reduce the return to capital has been supported by a large body of literature. Bai Chongen and Zhang Qiong (2014) estimated the overall return to capital in China from 1978-2013, and their analysis found that the investment rate was significantly negatively related to the return to capital, suggesting that rising capital intensity will reduce the return to capital. Peiwen Bai and Jie Xu (2017) measured the return to capital in 29 Chinese provinces based on inter-provincial panel data from 1993-2013 in China, and the study concluded that China has an overinvestment problem and a declining trend in the return to capital.

According to neoclassical theory, capital will flow from countries with high capital intensity and low return on capital to countries with low capital intensity and high return on capital. This is because when the return on capital decreases, firms will actively seek profits overseas, which in turn will promote the rise of OFDI. Combined with the above analysis, there may be a positive relationship between capital intensity and OFDI.

In summary, the hypothesis is proposed that demography affects OFDI by influencing capital intensity and thus OFDI.

2.4. Sample Selection

The population data selected for this paper are from the National Bureau of Statistics, the OFDI flow data are from the official database of UNCTAD, and the GDP data are from the official database of IMF, and the data are selected for a total of 31 years from 1990 to 2020, respectively. The main reason for choosing UNCTAD and IMF official website data is that it is one of the internationally recognized authoritative databases with more reliable and comprehensive data authenticity.

2.5. Model Design and Variable Definition

Since there are many measures of demographic structure, considering the convenience of the study and the availability of data, the old-age dependency ratio and the young-adult dependency ratio are chosen as explanatory variables to examine the effects on ofdi separately. The econometric model is set as follows:

$$\ln ofdi_t = \alpha + \beta \ln old_t + \gamma \ln gdp_t + \varepsilon_t \quad (1)$$

$$\ln ofdi_t = \alpha_1 + \beta_1 \ln child_t + \gamma_1 \ln gdp_t + \varepsilon_t \quad (2)$$

Of which $ofdi_t$ is the outward direct investment, and α is

the constant term. old_t is the old-age dependency ratio and $child_t$ is the child dependency ratio, and the change in both reflects the change in demographic structure. gdp_t is the gross domestic product, and ε_t is the random error term.

Regarding the selection of data, the data on China's outward FDI flows (in US dollars) published by UNCTAD are selected as $ofdi_t$ data, and Chinese historical GDP data (in USD) published by IMF are selected as control variables, and both variable data are processed in order to reduce the

endogeneity of the model by choosing $ofdi_t$, gdp_t , old_t and $child_t$ of logarithmic form.

3. Empirical Results

Table 2 shows the OLS regression results of the old age dependency ratio on OFDI. The results show that the old age dependency ratio has a significant negative effect on China's OFDI and GDP has a significant positive effect on China's OFDI at the 5% level of significance.

Table 2. OLS Regression Results of Older Adult Dependency Ratio on OFDI

lnofdi	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lnold	3.031561	1.007718	-3.01	0.008	-5.148698 -0.9144241
lngdp	2.385872	0.2287708	10.43	0.000	1.905242 2.866501
cons	-18.68401	1.677479	-11.14	0.000	-22.20826 -15.15976

For every 1% increase in the elderly dependency ratio, China's OFDI flows will increase by 3.03% with a p-value of 0.008, which passes the 1% significance test. For every 1% increase in GDP, China's OFDI flows will increase by 2.39% with a p-value of 0.000, which passes the 1% significance test. The coefficient of the constant term is -18.68, and the corresponding p-value is 0.000, which also passes the 1% significance test. Therefore, model (1) is more robust, and the change in the old-age dependency ratio has a significant positive effect on China's OFDI. The rise in the old-age dependency ratio implies that the ratio of labor force to total population decreases, labor becomes scarce relative to capital,

capital becomes relatively abundant, and the excess capital expands outward in search of higher returns to capital, thus promoting the rapid growth of OFDI in China and verifying the hypothesized influence mechanism.

Table 3 shows the OLS regression results of the child support ratio on OFDI. The results show that at the 5% significance level, the child support ratio has a significant negative effect on China's OFDI, and GDP has a significant positive effect on China's OFDI. At the 1% significance level, GDP still has a significant positive effect on China's OFDI, but the negative effect of the child support ratio on China's OFDI is no longer significant at this point.

Table 3. OLS Regression Results of Child Dependency Ratio on OFDI

lnofdi	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lnchild	-3.723381	1.481089	-2.51	0.022	-6.835034 -0.6117282
lngdp	1.241209	0.235113	5.28	0.000	0.7472545 1.735163
cons	3.396533	8.214742	0.41	0.684	-13.862 20.65507

Table 3 shows that at the 5% significance level, for every 1% increase in the child support ratio, China's OFDI flow will decrease by 3.72%, at which point the p-value is 0.022, failing the 1% significance test. for every 1% increase in GDP, China's OFDI flow will increase by 1.24%, at which point the p-value is 0.000, passing the 1% significance test. The p-value of the constant term is 0.684, which fails the significance test, so model (2) is not robust, and the change in the child support ratio has no significant effect on China's OFDI.

4. Research Conclusion

The child dependency ratio has no effect on OFDI in China, while the elderly dependency ratio has a significant positive effect on OFDI. The aging of the population makes our country abundant in capital relative to labor, which increases capital intensity and thus promotes OFDI.

The rapid demographic changes have led to the rise of domestic labor costs, which on the one hand has led to the gradual withdrawal of foreign investment from China due to rising costs, and on the other hand has made the demographic dividend we used to rely on no longer an advantage for development, but rather a price advantage for export products. Rapid demographic changes also promote excessive investment in capital, resulting in a waste of resources that runs counter to the strategy of going global with high quality. In order to alleviate the current situation of rapidly aging population structure and promote the development of high

quality OFDI, this paper puts forward the following policy recommendations.

First of all, change the concept and promote the new model of "old age care". As the most traditional elderly care model, due to the family planning policy, many families have only one child and the couple has to support four elderly people, which increases the burden of family elderly care. Activate the power of the elderly group, establish the active posture and main position of the elderly population in the elderly care business, fully explore the potential resources of the elderly population, and reshape the cultural system and lifestyle of the elderly. Encourage talents in professional and technical fields to extend their working years appropriately, guide the elderly to re-employ and participate in social activities, support the elderly talents who are healthy and have technical expertise to start their own business and realize their self-worth, so that the elderly group can turn from a consuming group to a self-serving and sustainable group and ease the pressure on the social labor force to a certain extent.

Second, we should actively respond to further optimize the fertility policy. Gradually liberalize the family planning policy, improve the age structure of the population, expand the supply of new labor, reduce the dependency ratio of the elderly population, ease intergenerational conflicts, increase the overall vitality of society, and reduce the peak level of aging. Maximize the dynamic role of population on economic and social development, firmly grasp the strategic initiative, proactively respond to the risk of persistently low fertility

levels, address population issues in an integrated manner, maintain the advantages of China's human resource endowment, and create a favorable demographic environment for the overall building of a strong socialist modern country.

Finally, our government should strengthen the management of OFDI, provide guidance for enterprises' OFDI, and continuously improve the level of enterprises going out.

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