Economic and Social Impact of China's Aging Population and Public Policy Response

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Abstract: *In mapping out China's future development, policymakers must bear in mind the challenges from a falling birthrate and aging society. Based on previous demographic censuses and original data of large sample surveys, this study employed an indirect method for estimating China's total fertility rate (TFR) and a demographic forecast method based on the parity progression ratio (PPR). Our analysis details the socioeconomic implications behind demographic change, and we have proposed public policy countermeasures. The findings include: (i) China's ultra-low fertility rate over the past three decades has led to an increasingly aging society, and China's future fertility rate is likely to continue to decrease. (ii) Around 2024, China's total population is expected to peak at 1.407 billion, followed by chronic negative population growth at an accelerating pace. By 2050, China's newborn population will shrink to 8.73 million and the aging population will increase to roughly 30% of the total population resulting in the total dependency ratio above 50%. (iii) With a falling birthrate and aging society, China will face unprecedented challenges with respect to education, employment, and pension. (iv) As a public policy response, China should remove birth control altogether. If the fertility rate continues to stall, policymakers should consider issuing policies to encourage birth and create a birth-friendly society for all birth cycles.*

Keywords: *falling birthrate, aging society, education, employment, elderly health, removal of birth control*

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1. Introduction

In the *Notes to the Proposals on the 13th Five-year Plan* in 2015, President Xi Jinping commented that "currently, China's demographic structure is characterized by an aging population and a falling birthrate. Populations of childbearing age have become much less willing to give birth. Women's total fertility rate is significantly below the replacement level."[1] Periodically, the CPC Central Committee has adjusted China's birth policy to cope with the falling birthrate and aging society. In the new era, China has established a more conducive socioeconomic situation and new governance concepts. In the 13th Five-year Plan (FYP) period (2016-2020), China responded to the demographic change with a swathe of birth policy improvements.

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[1] *Notes to the Proposals on the 13th FYP*, Chinanews.com: http://www.chinanews.com/gn/2015/11-03/7604017.shtml.

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中国人口老龄化趋势的经济社会影响及公共政策应对

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摘 要： *科学研判人口低生育率和老龄化当前形势和未来趋势，是制定中国未来长期发展战略的决策基础。本研究基于历年人口普查以及各类大型抽样调查原始数据，采用总和生育率间接估计法、孩次递进人口预测方法对中国当前人口形势和未来趋势进行量化估计，在此基础上对人口变动背后的社会经济内涵进行深入分析，并提出相应公共政策。本研究的主要结论包括：①当前人口形势判断方面，中国处于较低甚至极低生育水平，近30年的持续低生育率导致了中国人口老龄化形势的日趋严峻。尤其是，中国未来生育率很可能还会继续降低。②人口未来发展趋势方面，到2024年前后中国人口总规模将达到14.07亿的峰值，此后进入人口负增长时期且下降速度逐年加快。2050年中国出生人口规模下降到873万，老年人口比例将达30%左右，抚养比将突破50%。③人口变动的社会经济内涵方面，由于人口少子化以及老龄化趋势日趋严重，中国的教育、劳动就业和养老等面临空前挑战。④公共政策应对方面，应尽快全面取消生育限制。如果生育率仍旧低迷，则应考虑适时出台鼓励生育的人口政策，并从全人群、全生育周期的角度全力打造生育友好型社会。*

关键词： *少子化；老龄化；教育；就业；老年健康；取消生育限制*

JEL 分类号：J11

一、引言

2015年在《关于“十三五”规划建议的说明》中，习近平总书记指出：“当前，我国人口结构呈现明显的高龄少子特征，适龄人口生育意愿明显降低，妇女总和生育率明显低于更替水平”。[1]为了应对中国当前的少子化和老龄化形势，党中央不断调整和优化生育政策，这不仅是中国社会和人口健康发展的必然要求，更是顺应民心、合乎科学发展规律的英明决策。新时代不仅社会经济形势发生了明显改善，而且执政理念和治理方式也有了重大变化。可以说，“十三五”以来生育政策的持续优化也是把握人口变动基本规律、适应当前中国人口形势重大变化和重大转折的重要举措。

2019年10月召开的党的十九届四中全会提出 “优化生育政策”[2]， 2019年11月《国家积极应对人口老龄

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1 关于“十三五”规划建议的说[EB/OL].中新网， http://www.chinanews.com/gn/2015/11-03/7604017.shtml.

2 党的十九届四中全会《决定》（全文）[EB/OL].环球网， https://china.huanqiu.com/article/9CaKrnKnC4J?bsh_bid=5463454556.

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In October 2019, the Fourth Plenum of the 19th CPC Central Committee called for "optimizing birth policy."[2] In the following month, the *National Mid- and Long-term Plan for Actively Responding to Aging Population* was released.[3] In October 2020, the Fifth Plenum of the 19th CPC Central Committee adopted the *Proposals on the Formulation of the 14th Five-Year Plan on National Economic and Social Development and the 2035 Vision*. The *Proposals* called for "implementing a national strategy on aging population; formulating a long-term strategy for population development, improving birth policy, and enhancing birth policy inclusiveness."[4] Keenly aware of the country's evolving fundamental socioeconomic conditions and key challenges, the central government has elevated the response to aging population into a national strategy.

In drafting China's demographic policy, two fundamental questions must be answered: First, what is China's current demographic situation and how will it evolve in the foreseeable future? Second, what are the socioeconomic implications of China's aging society? Policymakers should be prepared for the challenges and opportunities arising from demographic change.

In an attempt to answer these questions, this paper will: (i) examine the current situation of China's falling birthrate and aging population; (ii) forecast China's demographic trends and socioeconomic implications; (iii) propose policy response to the demographic challenges.

2. China's Current Demographic Situation

As a key demographic indicator, age structure offers insight into demographic change in the past and future which holds the key to unraveling the relationship between population size and structure.

2.1 Falling Birthrate

Demographers normally divide a population into children (0-14 years), working-age population (15-64 years), and elderly population (65 years and above). The child population aged between 0 and 14 years reflects the number and fertility rate of women of childbearing age. The question is, how will Chinese women's fertility rate influence the size and structure of the child population?

Since the 1990s, academics have been arguing over the measurement of the fertility rate for Chinese women of childbearing age. Fertility rates released by the National Bureau of Statistics (NBS) based on census data substantially deviated from data published by the National Health and Family Planning Commission (NHFPC) (see Table 1). Data discrepancies have prevented an assessment on China's demographic trends.

This study employs the latest demographic data released by the NBS, i.e. 2018 sample demographic survey data to estimate China's total fertility rate (TFR) over the past decade (see Table 1). The findings are threefold: (i) Both NBS census data and the NBS demographic survey estimate in 2018 are below NHFPC data; (ii) China's TFR exceeded 1.6 in 2016, and fell within the range of 1.3-1.51 in all other years; (iii) for all data examined, China's TFR was below the target of 1.8 for the decade of 2008-2018 and was below the population replacement level, indicating a diminishing potential population growth rate.

Since most women aged 40-49 do not bear children, we used the percentage of women aged at or above 40 years among women of childbearing age to reflect future fertility change and evolving traits

[2] *Decisions of the Fourth Plenum of the 19th CPC Central Committee* (full text), Huanqiu.com: https://china.huanqiu.com/article/9CaKrnKnC4J?bsh_bid=5463454556.

[3] *National Mid- and Long-term Plan on Aging Population* issued by the CPC Central Committee and the State Council, the Chinese central government website: http://www.gov.cn/zhengce/2019-11/21/content_5454347.htm.

[4] *Proposals of the CPC Central Committee on the Formulation of the 14th Five-Year Plan for National Economic and Social Development and the 2035 Vision,* the Chinese central government website: http://www.gov.cn/zhengce/2020-11/03/content_5556991.htm.

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化中长期规划》出台[3]。2020年10月党的十九届五中全会通过了《中共中央关于制定国民经济和社会发展第十四个五年规划和二〇三五年远景目标的建议》，提出“实施积极应对人口老龄化国家战略。制定人口长期发展战略，优化生育政策，增强生育政策包容性”。[4]这一系列积极应对人口老龄化战略和规划的逐步提出和提升，不仅标志着国家已经正式将应对人口老龄化问题提升为国家战略，而且标志着国家对社会经济发展基础条件、基本判断和重大问题本质特征认识的不断深化。

为了更好地制定中国人口长期发展战略、优化生育政策，需要解决两个基础性重要问题。一是中国当前和未来一个时期的人口形势和人口变动趋势到底如何？这既包括对人口少子化的认识，也包涵了对未来人口老龄化形势的判断。二是中国人口未来的发展轨迹、发展趋势的社会经济含义是什么？人口的基础条件变化将会给社会经济发展带来哪些机遇和挑战？如何更好地抓住机遇和更积极地应对各种不确定性挑战。

本文将主要针对以上问题进行研究。首先，分析当前中国人口的少子化和老龄化形势；其次，预测中国未来人口发展趋势，并分析人口变动的社会经济内涵；最后，在以上分析基础上，提出积极应对人口少子化和老龄化的公共政策建议。

二、中国当前人口形势判断

人口年龄结构是人口特征的重要标志，一方面人口年龄结构是人口变动历史的缩影，另一方面也是未来人口变动的基础。深入研究人口年龄结构特征，是准确把握和科学认识人口总量与结构内在关系的重要途径。

（一）人口少子化形势

分析人口年龄结构通常采用0~14岁少儿人口构成、15~64岁劳动年龄人口构成以及65岁及以上老年人口构成指标。0~14岁人口变动的趋势是育龄妇女总量结构和生育水平变动特征的反映。中国目前育龄妇女的生育水平到底如何，将会直接影响少儿人口总量和结构变化。

自20世纪90年代开始，学界对于中国育龄妇女生育水平的测量便争论不休。国家统计局历年人口变动抽样调查所得的生育率与原国家卫生和计划生育委员会所公布的数据之间也存在较为显著的差异（见表1），“数据打架”直接影响对中国人口变动趋势的基本判断。

为更好地判断当前中国生育现状，本文采用国家统计局公布的最新人口数据即2018年国家人口变动抽样调查数据结果，可以推算过去10年间中国总和生育率变化趋势（见表1）。根据推测结果主要有三点基本发现：首先，不论是国家统计局实际调查数据还是国家统计局2018年人口变动调查推算结果，两者均低于原国家计生委所公布数据；其次，推测结果中除2016年总和生育率高于1.6以外，其余年份均处于1.3~1.51这一区间之内；最后，在2008~2018这11年期间，不论是哪种数据结果均小于1.8的生育目标，更远离人口更替水平，这标志着中国人口的潜在增长率不断下降。

[3] 中共中央 国务院印发《国家积极应对人口老龄化中长期规划》[EB/OL]. 中华人民共和国中央人民政府网，http://www.gov.cn/zhengce/2019-11/21/content_5454347.htm.

[4] 中共中央关于制定国民经济和社会发展第十四个五年规划和二〇三五年远景目标的建议[EB/OL]. 中华人民共和国中央人民政府网，http://www.gov.cn/zhengce/2020-11/03/content_5556991.htm.

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Table 1: TFR of Chinese Women of Childbearing Age

Year	National sample survey on childbearing in 2017*	NBS**	Estimate based on sample demographic survey in 2018		
			Mean	Lower limit	Upper limit
2008	1.71	1.48	1.51	1.48	1.53
2009	1.68	1.37	1.49	1.47	1.52
2010	1.64	1.18	1.3	1.27	1.33
2011	1.61	1.03	1.45	1.41	1.48
2012	1.78	1.25	1.46	1.42	1.49
2013	1.55	1.22	1.45	1.42	1.49
2014	1.67	1.26	1.49	1.46	1.53
2015	1.41	1.05	1.48	1.45	1.52
2016	1.77	1.24	1.63	1.59	1.68
2017		1.58	1.46	1.41	1.51
2018		1.50	1.50	1.45	1.56

Notes: *See He *et al*. (2018); ** NBS sample surveys on demographic change and demographic censuses of 2010 and 2015.

Table 2: Child Births of Women Aged 40-49 (%)

Year	0 child	1 child	2 children	3 children+	Total births
2010	31.86	3.05	7.42	17.32	5.37
2015	33.58	3.07	4.86	12.47	4.45
2017	36.01	2.54	4.32	6.40	3.72

Note: Data are from original sample data aggregated from 1% population sample surveys in 2010, 2015 and 2017.

of childbearing women. By comparing the actual child births of women aged 40-49 in 2010, 2015 and 2017, several conclusions are summarized (see Table 2).

Despite the replacement of the one-child policy with the two-child policy, only 3.72% of Chinese women aged 40-49 gave birth in 2017, a decrease from 5.37% in 2010. Meanwhile, 36.01% of Chinese women aged 40-49 did not give birth in 2017, an increase from 31.86% in 2010. From 2010 to 2017, the percentage of Chinese women aged 40-49 with one, two, and three children fell by 0.5, 4.08 and 10.92 points, respectively. Despite the relaxed birth policy, a smaller percentage of Chinese women aged 40-49 chose to have two or three children. Their reluctance to raise more children has damaged the recovery of China's fertility rate.

The relaxed birth policy has nudged many Chinese women of childbearing age to consider raising a second child, however, the policy-induced fertility rate is smaller than the lifetime desired fertility rate (Guo, 2008). The declining percentage of Chinese women who gave birth to one child in their lifetime indicates a lack of response of China's fertility rate to the birth policy adjustment. Amid China's rapid socioeconomic transformations, Chinese women of childbearing age have become less interested in raising children.

Urbanization is a key contributor to China's low fertility rate. To elucidate urbanization's effects on fertility rate, a statistical analysis of China's population sample survey data of 2010, 2015, 2017 and

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表1:全国育龄妇女总和生育率

年份	2017年全国生育状况抽样调查*	国家统计局**	基于2018年人口变动抽样调查推算		
			均值	下限	上限
2008	1.71	1.48	1.51	1.48	1.53
2009	1.68	1.37	1.49	1.47	1.52
2010	1.64	1.18	1.3	1.27	1.33
2011	1.61	1.03	1.45	1.41	1.48
2012	1.78	1.25	1.46	1.42	1.49
2013	1.55	1.22	1.45	1.42	1.49
2014	1.67	1.26	1.49	1.46	1.53
2015	1.41	1.05	1.48	1.45	1.52
2016	1.77	1.24	1.63	1.59	1.68
2017		1.58	1.46	1.41	1.51
2018		1.50	1.50	1.45	1.56

注:*具体参见贺丹等(2018);**参见国家统计局历年人口变动抽样调查、2010年人口普查、2015年人口小普查。

表 2:40~49岁育龄妇女分孩次生育情况

单位:%

年份	0孩	1孩	2孩	3孩+	生育合计
2010年	31.86	3.05	7.42	17.32	5.37
2015年	33.58	3.07	4.86	12.47	4.45
2017年	36.01	2.54	4.32	6.40	3.72

资料来源:2010年、2015年、2017年1%人口抽样调查原始抽样数据汇总。

从以往的生育模式来看,由于40~49岁妇女基本完成生育过程,近似等同为终身生育水平,故可通过分析40岁及以上育龄妇女生育的比例来反映未来生育水平的变化趋势和生育人群的变化特点,通过将2010年、2015年、2017年三年40~49岁育龄妇女实际分孩次生育状况进行对比可得出以下几个结论(见表2):

第一,从有生育育龄妇女的构成来看,即使生育政策从独生子女政策到全面二孩政策的不断放开,40~49岁育龄妇女生育的比例却从2010年的5.37%下降到2017年的3.72%;第二,从当年没有生育孩子的妇女比例来看,40~49岁育龄妇女的比例逐渐提高,从2010年的31.86%提高到2017年的36.01%,由此还可以看出高龄育龄妇女的比例在不断提高;第三,从生育不同孩次妇女的比例变化来看,1孩、2孩以及3孩及以上的比例逐年下降。40~49岁育龄妇女1孩、2孩以及3孩及以上的比例从2010年到2017年分别下降0.51个百分点、3.10个百分点以及10.92个百分点,可见40~49岁育龄妇女中孩次越高下降的比例越大,这不仅从某种程度上"对冲"了生育政策放开的效果,而且也使生育水平的回升大打折扣。

现有生育孩次变化情况可以从一个侧面反映生育特征和政策预期之间的关系,可以肯定的是,虽然中国二孩生育意愿较高,但是政策生育率是小于终身意愿生育率的(郭志刚,2008)。另外,一孩终身生育率的下降

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Table 3: Urban and Rural Women of Childbearing Age with Different Numbers of Children

	2010		2015		2017		2018	
Indicator	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1 child (%)	76.53	55.39	62.8	47.42	46.92	39.7	45.43	38.59
2 children (%)	21.09	35.71	34.19	42.37	49.81	50.21	50.69	48.34
3 children or more (%)	2.38	8.9	2.99	10.21	3.21	10.2	3.84	13.07
Total (%)	100	100	100	100	100	100	100	100%
Total fertility rate (TFR)	0.8872	1.4445	0.8185	1.2654	1.3800	1.7395	1.2918	1.6882

Note: Data are from China's demographic census of 2010, 1% population sample survey of 2015, and sample population survey data of 2017 and 2018.

Table 4: Childbearing Status of Women Aged 40-49 Years

Indicator	Level of education	1982	1990	2000	2010	2015
Average number of children	Junior middle school or below	5.09	3.63	2.36	1.89	1.59
	High school	2.90	2.28	1.49	1.31	1.09
	Junior college or above	2.30	1.77	1.14	1.07	0.84
	Total	5.00	3.54	2.23	1.77	1.46
Percentage of women who gave birth to three children or more (%)	Junior middle school or below	96.40	77.37	37.55	18.01	13.47
	High school	92.36	32.87	9.23	4.53	3.65
	Junior college or above	86.53	12.83	1.18	0.54	0.91
	Total	96.19	74.43	33.29	15.31	11.08

Note: Data are from demographic census and 1% population sample survey data.

2018 was conducted (see Table 3) with the following findings:

(i) Even with the two-child policy, the fertility rate is lower among urban women of childbearing age than among their rural peers. The difference, showing an inclination to narrow, is still approximately 0.4.

(ii) From 2010 to 2018, urban and rural women of childbearing age who gave birth to only one child decreased by 31.10 percentage points and 16.80 percentage points, respectively. These figures suggest that the absolute one-child fertility rate has declined.

(iii) Rural fertility rate, which exceeds urban fertility rate, is below the replacement level of 2.1. With the population in urban areas on the rise, who raise fewer children than rural residents, China's fertility rate will inevitably decrease under the current birth policy.

Education's effects on fertility rate cannot be overlooked. Research indicates a negative correlation between Chinese women's level of education and the number of children raised in their lifetime (Table 4). Since 1982, the TFR of Chinese women aged 40-49 years decreased to 1.45 in 2015. College-educated women gave birth to fewer children over their lifetime than their non-college-educated peers. In 2015, less than 1% of college-educated Chinese women of childbearing age gave birth to two children or more. As high school and college enrollment rates increase, so will women's level of education. Given the

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表3:城乡分孩次生育状况

	2010年		2015年		2017年		2018年	
指标	城市	农村	城市	农村	城市	农村	城市	农村
1孩(%)	76.53	55.39	62.8	47.42	46.92	39.7	45.43	38.59
2孩(%)	21.09	35.71	34.19	42.37	49.81	50.21	50.69	48.34
3孩+(%)	2.38	8.9	2.99	10.21	3.21	10.2	3.84	13.07
合计(%)	100	100	100	100	100	100	100	100
总和生育率	0.8872	1.4445	0.8185	1.2654	1.3800	1.7395	1.2918	1.6882

资料来源:2010年人口普查、2015年1%人口抽样调查、2017年和2018年人口变动抽样调查数据汇总。

表4:40~49岁育龄妇女生育状况

指标	受教育程度	1982年	1990年	2000年	2010年	2015年
平均生育子女数(个)	初中及以下	5.09	3.63	2.36	1.89	1.59
	高中	2.90	2.28	1.49	1.31	1.09
	大专及以上	2.30	1.77	1.14	1.07	0.84
	平均	5.00	3.54	2.23	1.77	1.46
生育三孩及以上比例(%)	初中及以下	96.40	77.37	37.55	18.01	13.47
	高中	92.36	32.87	9.23	4.53	3.65
	大专及以上	86.53	12.83	1.18	0.54	0.91
	平均	96.19	74.43	33.29	15.31	11.08

资料来源:人口普查和1%人口抽样调查原始抽样数据汇总。

预示着中国生育率的低水平特征并没因为生育政策的调整而发生变化。由于中国正处于社会经济快速发展的阶段,社会结构发生剧烈变化,中国公民的生育观念既受到社会结构变化的影响,又受到少子型社会的影响,处于育龄期的妇女生育意愿将持续降低。

城镇化也是影响中国低生育率的重要因素。为了更好地明晰城镇化的高速发展对生育率的影响,将2010年、2015年、2017年、2018年四年的国家人口变动抽样调查数据分城乡和孩次进行分类统计分析(见表3),发现有如下几个特征:首先,从总和生育率变动特征来看,即使是在全面二孩生育政策条件下,城市育龄妇女生育率仍然远低于乡村育龄妇女生育率,尽管两者的差距有缩小的趋势,但仍保持在0.4左右。其次,不论城市还是乡村,一孩生育率均逐年下降。2010~2018年,城市的降幅达到31.10个百分点,农村降幅达到16.80个百分点,孩次结构的变化可能预示一孩生育率的绝对下降。最后,虽然乡村生育率远高于城市,但乡村育龄妇女的生育水平也远低于2.1的更替水平。随着人口城镇化比例的不断提升,由于城乡生育水平"梯度"的存在,在现行生育政策条件下,生育水平持续下降的趋势不可避免。

受教育程度的提高对生育率的影响也不可忽视。研究表明,中国妇女的受教育程度与终身平均生育子女

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correlation between education and fertility rate, China's fertility rate will inevitably decrease under the current birth policy (Zhang, Wang, 2020).

2.2 Population Aging

Since the 1990s, China's fertility rate has decreased to below the replacement level, resulting in a falling percentage of the children population. In demographic forecasts, any fertility rate below the replacement level inevitably leads to an increase in the percentage of the aging population (Guo, 2015).

According to the Sixth National Population Census in 2010, China's population aged above 60 and above 65 reached 178 million and 119 million, accounting for 13.3% and 8.87% of the country's total population, respectively. In 2018, these figures increased to 249 million and 167 million, accounting for 17.88% and 11.94% of the total, respectively. This increase is due to a low fertility rate over the past decade, resulting in a rise of China's aging population, especially those individuals aged between 60 and 69.

In 2010, China's elderly population aged 60-69 years stood at 92 million, which was 51.84% of the total elderly population aged 60 years and above. By 2018, the figure increased to 150 million, or 60.0% of the total elderly population. In response to the sharp increase in the elderly population aged 60-69 years, China should prepare for the upcoming burden of elderly care.

3. China's Demographic Outlook

Pressing demographic challenges highlight the importance to forecast China's total population, fertility rate, and aging population. This study forecasts China's population based on an age-child order progression model, which adjusts parameters by specifying interval parameters and according to the fertility rate of women of childbearing age and life expectancy. Please refer to Wang (2003, 2012, 2015 and 2019) for the basic principles of the forecast.

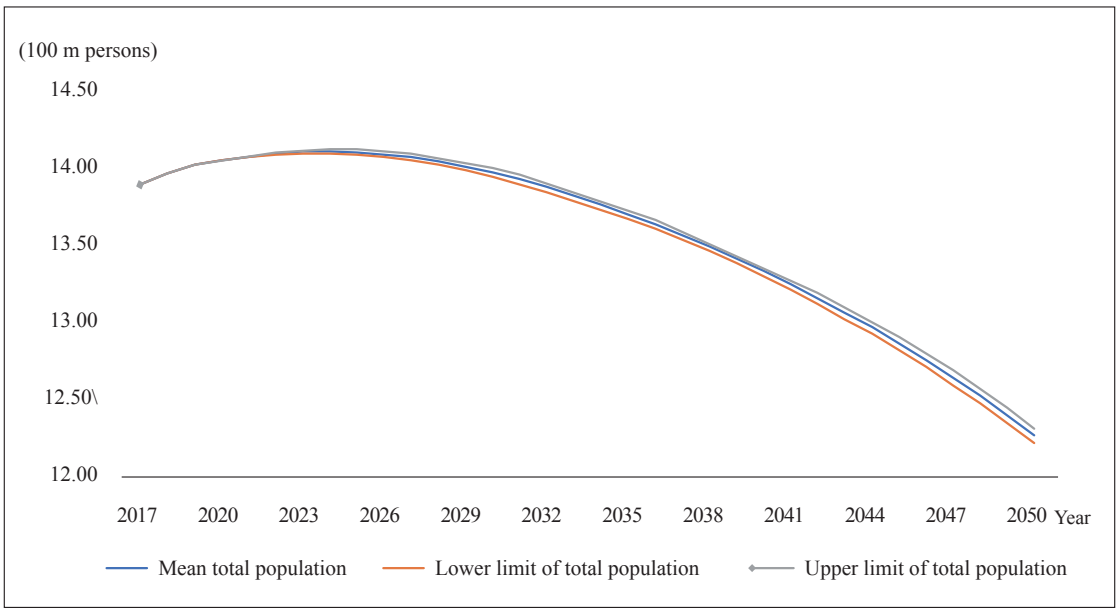

Figure 1: China's Total Population, 2017-2050

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数呈负相关(见表4)。首先,自1982年起,40-49岁育龄妇女的总和生育率持续大幅度下降,到2015年下降为1.45;其次,受过高等教育的妇女终身平均生育子女数远远低于仅受过低等教育的妇女终身水平;最后,随着育龄妇女受教育程度的提高,多孩生育比例大幅度下降,2015年大专及以上育龄妇女多孩生育的比例低于1%。由于随着国家社会经济的快速发展,高中和高等教育不断普及,育龄妇女受教育程度提高具有"单向"不可逆的特征,同样,由于不同受教育水平育龄妇女生育水平"梯度"的存在,从育龄妇女受教育程度的角度看,在现行生育政策条件下,生育水平持续下降的趋势也不可避免(张丽萍、王广州,2020)。

(二)人口老龄化形势

20世纪90年代以来,中国生育率持续下跌,低于更替水平,少年儿童人口比重持续下降。在预测中,只要使用低于更替水平的生育参数,未来老年人口比例都会迅速提高(郭志刚,2015)。

2010年第六次全国人口普查显示,中国60岁及以上、65岁以上人口规模分别为1.78亿和1.19亿,占比分别达到了13.3%和8.87%。2018年,60岁及以上、65岁及以上人口规模分别为2.49亿和1.67亿,占比分别为17.88%和11.94%。这表明,近年来持续的低生育率导致中国人口老龄化程度不断加深且速度急剧提高。

在中国人口的老龄化程度持续、快速加深背景下,老年人口的年龄结构变动特征鲜明。2010年全国60~69岁老年人口0.92亿,占60岁及以上老年人口的51.84%,2018年全国60~69岁老年人口1.50亿,占60岁及以上老年人口的60.0%。由此可见,老年人口绝对数量和比例增加的主要原因是60~69岁年轻老人占比的迅速提升。认识这一短期变化趋势可以为充分准备和应对高龄老年人口照料负担提供一个战略机遇期。

总之,在过去的20多年里,由于生育水平长期、持续的远低于更替水平,少儿人口比例持续下降,且未来下降的趋势也不可避免,同时,伴随着社会经济的快速发展,中国人口的平均预期寿命不断延长,中国进入少

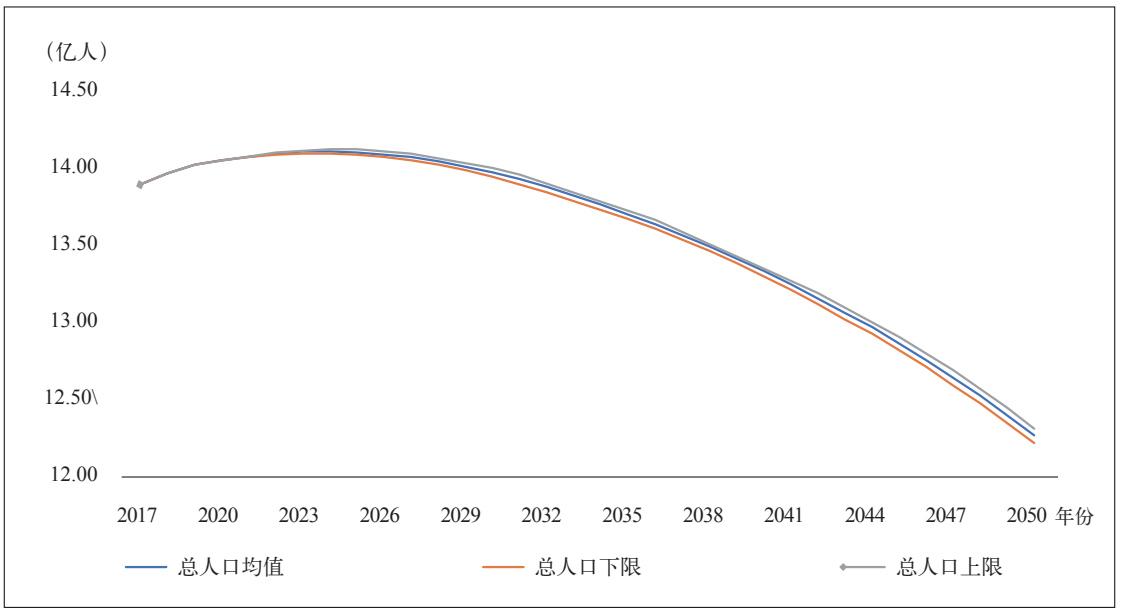

图1:2017~2050年中国人口总规模

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3.1 Future Trend of Total Population

3.1.1 Total population

With the current birth policy, China's population is expected to peak at 1.407 billion in 2024. In 2030, 2035, 2040 and 2050, China's population will decrease to 1.396 billion, 1.375 billion, 1.345 billion and 1.261 billion, respectively. This is a decrease of 11 million (2030), 32 million (2035), 62 million (2040) and 146 million (2050) from the peak population. Even by the most optimistic estimate, China's population will peak at approximately 1.408 billion by 2024 and decrease to 1.398 billion, 1.377 billion, 1.348 billion and 1.264 billion by 2030, 2035, 2040 and 2050, respectively. That is to say, China's population will shrink by 10 million (2030), 31 million (2035), 60 million (2040) and 144 million (2050) from the peak population (see Figure 1). China's population will decrease at an accelerating pace. Under the current demographic policy, China's population growth will fall into the four intervals of -0.24% and -0.20%, -0.33% and -0.37%, -0.50% and -0.47%, and -0.85% and -0.81%, by 2030, 2035, 2040, and 2050 respectively (see Figure 2).

3.1.2 Newborn population

Table 5 summarizes the results of China's TFR estimate. Due to the low fertility rate, China's newborn population is estimated to continue to decrease (see Figure 3). Before 2023, China's newborn population is expected to exceed 12 million each year. By 2024, the year when China's population is expected to peak, China's newborn population will decrease to less than 12 million. By 2030, 2035, 2040 and 2050, China's newborn population will decrease to 10.16 million, 9.95 million, 10.13 million and 8.73 million, respectively. By 2050, China's newborn population will shrink by over 1/3 from the level before 2023. Except for 2022 and 2034-2041, China's newborn population will experience negative growth

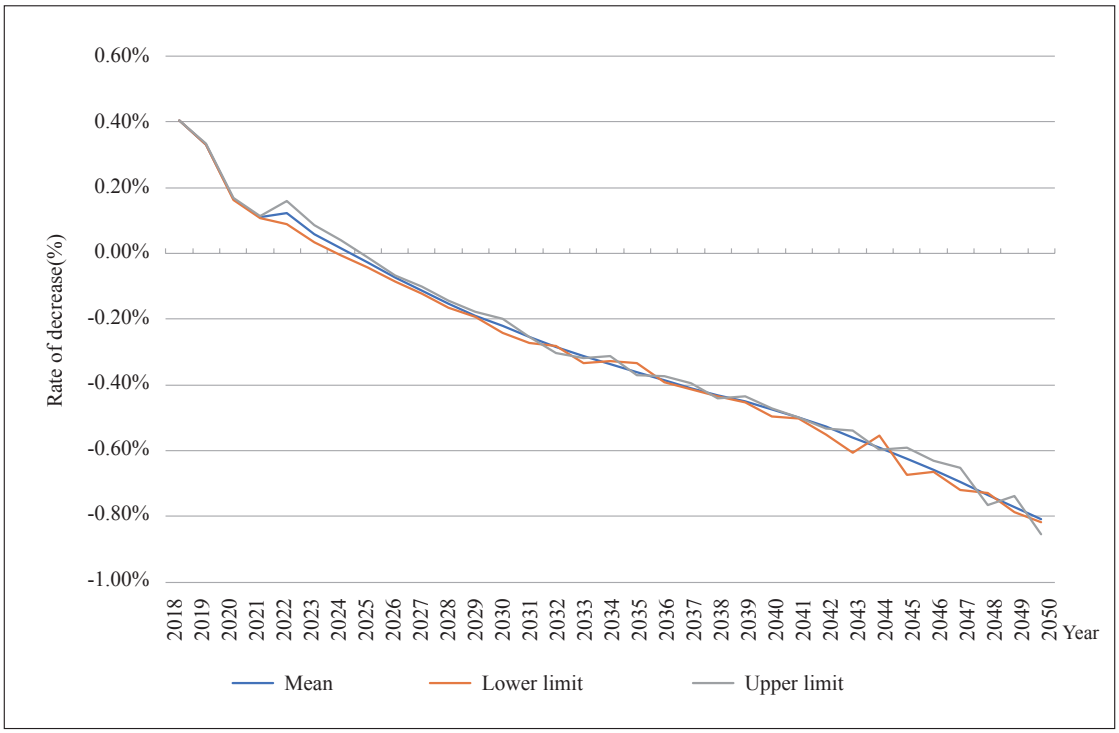

Figure 2: Change in China's Total Population, 2018-2050

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子高龄化社会的历史进程和加速趋势越来越确定。

三、中国未来人口发展趋势预判

本文主要基于年龄孩次递进模型对中国人口进行预测与分析，该模型采用区间参数设置对参数进行调整，同时依据目前育龄妇女生育水平以及预期寿命对参数做进一步调整，预测的基本原理见王广州(2003，2012，2015，2019)。

(一)人口规模未来趋势

1.总人口规模

按照现行生育政策，大约在2024年左右，中国人口即将达到峰值14.07亿左右。而在2030年、2035年、2040年和2050年，人口规模将分别下降到13.96亿、13.75亿、13.45亿、12.61亿，相较于峰值分别减少1100万、3200万、6200万、1.46亿。即使按最乐观估计，2024年，中国人口峰值将达14.08亿左右，在2030年、2035年、2040年以及2050年，人口规模可能分别降低至13.98亿、13.77亿、13.48亿、12.64亿，相较于峰值也将分别减少1000万、3100万、6000万、1.44亿(见图1)。

中国人口规模减小速度将逐年加快。在现行人口政策下，人口规模在2030年、2035年、2040年以及2050年增速将分别在−0.24%~−0.20%、−0.33%~−0.37%、−0.50%~−0.47%以及−0.85%~−0.81%四个区间内(见图2)。

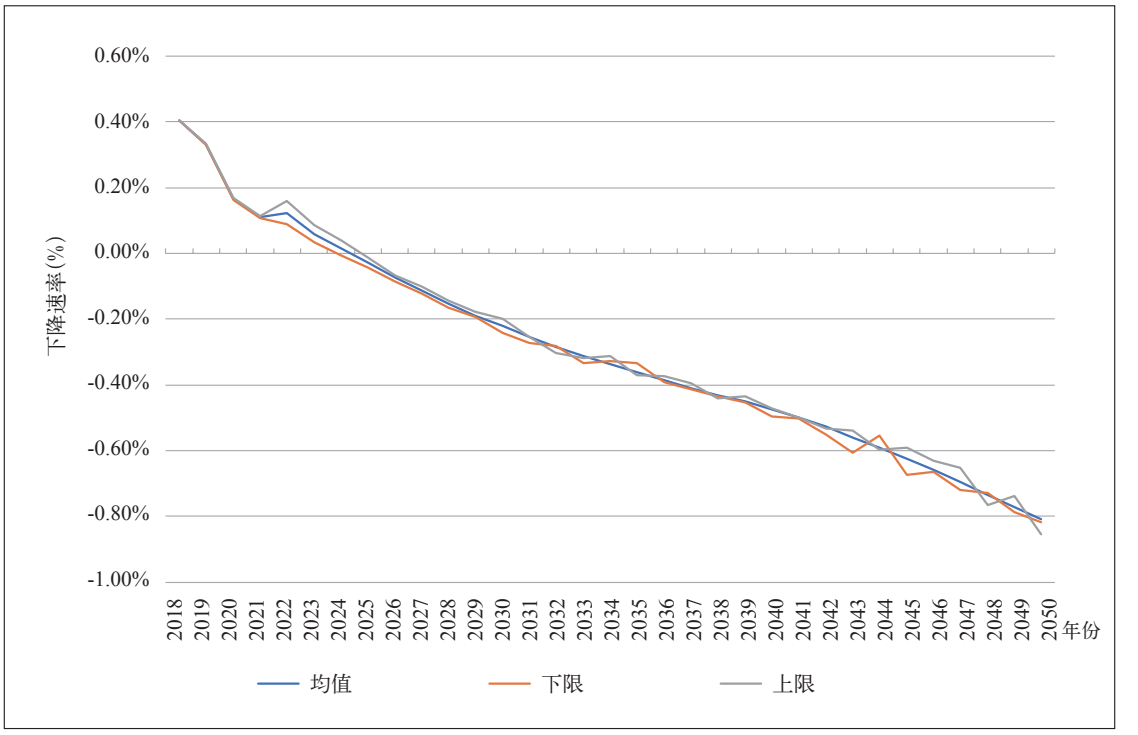

图2：2018~2050年总人口规模增速

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Table 5: Future TFR Estimates

TPFR	Mean			Lower limit			Upper limit		
	1 child	2 child	3 child+	1 child	2 child	3 child+	1 child	2 child	3 child+
2017	0.91	0.556	0.1053	0.91	0.556	0.1053	0.91	0.556	0.1053
2018	0.91	0.55	0.1053	0.91	0.55	0.1053	0.91	0.55	0.1053
2019	0.91	0.42	0.1053	0.91	0.42	0.1053	0.91	0.42	0.1053
2020	0.91	0.4	0.1053	0.91	0.4	0.1053	0.91	0.4	0.1053
2021	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2025	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2030	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2035	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2040	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2045	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2050	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15

in all the rest years. In 2040 and 2050, China's newborn population is expected to experience negative growth rates of -0.057% and -0.025%, respectively.

3.2 Changing Age Structure of Population

In parallel to the above changes in population, the age structure of China's population will experience several changes (see Figure 4). First, the share of China's working population will steadily decrease. By 2035, 15~64-year-olds will account for 65.41% of the Chinese population, and 15~59-year-olds will account for 57.33%. Second, children aged 0-14 years, as a part of the total Chinese population, will decrease from 16% at present to approximately 11% by 2035; this ratio is likely to stay at this level for a long time thereafter. Lastly, China's elderly population is expected to account for a larger share in the total population than the child population by 2026, and this will mark an unprecedented transition in China's history. By 2030, 2035, 2040 and 2050, 65-year-olds will account for 18.66%, 22.84%, 26.07% and 29.23% of the Chinese population respectively, and this ratio is likely to exceed 30% after 2050.

China's total dependency ratio and elderly dependency ratio will increase steadily from the relatively high level (see Figure 5), and child dependency ratio will decrease. China's elderly dependency ratio will reach 27.43%, 34.92%, 41.70% and 49.36% in 2030, 2035, 2040 and 2050, respectively, an increase of 33.5% over the period between 2017-2050. By 2035, China's elderly dependency ratio is expected to exceed 30%, total dependency ratio will surpass 50%, and child dependency ratio will decrease below 20%. After 2050, China's elderly dependency ratio will exceed 50%, and total dependency ratio will surpass 68%, giving rise to serious demographic challenges.

If these demographic data are accurate, China's total population is likely to peak at 1.407 billion by 2024 under the effects of COVID-19 and other factors like the falling birthrate. Based on China's recent socio-economic conditions, this estimated population peak is earlier than previous research forecasted (Wang, Wang, 2019). After the population peak, China's population will start to decline

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表5：未来总和生育率估计

TPFR	均值			下限			上限		
	1孩	2孩	3孩+	1孩	2孩	3孩+	1孩	2孩	3孩+
2017	0.91	0.556	0.1053	0.91	0.556	0.1053	0.91	0.556	0.1053
2018	0.91	0.55	0.1053	0.91	0.55	0.1053	0.91	0.55	0.1053
2019	0.91	0.42	0.1053	0.91	0.42	0.1053	0.91	0.42	0.1053
2020	0.91	0.4	0.1053	0.91	0.4	0.1053	0.91	0.4	0.1053
2021	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2025	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2030	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2035	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2040	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2045	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15
2050	0.91	0.4	0.12	0.91	0.4	0.1053	0.91	0.4	0.15

2.出生人口规模

通过育龄妇女受教育结构和年龄孩次模型对中国未来总和生育率进行估计，估计结果如表5所示。由于较低生育率，出生人口规模将呈逐年下降趋势（见图3）。在2023年前，有望保持1200万以上的新出生人口，而到2024年的人口峰值点，中国新出生人口将下降到1200万以下。在2030年、2035年、2040年以及2050年，中国新出生人口将下降到1016万、995万、1013万以及873万。到2050年，新出生人口规模将减少1/3以上。同时，除2022年以及2034~2041年以外，其余年份新出生人口规模均呈负增长态势，其中2040年、2050年新出生人口增速分别达−0.057%、−0.025%。

（二）人口年龄结构未来变化

与中国人口总体规模相对应的是，中国人口年龄结构也将发生相应变化，并表现出如下特征（见图4）：首先，中国劳动人口比例持续下降，截至2035年，中国15~64岁人口比例为65.41%，15~59岁人口比例为57.33%；其次，中国0~14岁少年儿童占比将从目前的16%下降到2035年的11%左右，预计在很长时间内有可能持续保持在这个比例附近；最后，中国老年人口所占比例持续上升，2030年、2035年、2040年以及2050年65岁及以上人口比例分别为18.66%、22.84%、26.07%以及29.23%，到2050年后很可能超过30%。同时，预计2026年左右中国老年人口比例将首次超过少儿人口比例，这将是中国历史上从未有过的重大转折。

从抚养比来看，中国总抚养比、老年抚养比保持在较高的水平上且逐年上升（见图5），少儿抚养比逐年下降。老年抚养比在2030年、2035年、2040年以及2050年将分别达到27.43%、34.92%、41.70%以及49.36%，2017~2050年上升近33.5个百分点。同时，预计2035年老年抚养比将超过30%，总抚养比超过50%，少儿抚养比则

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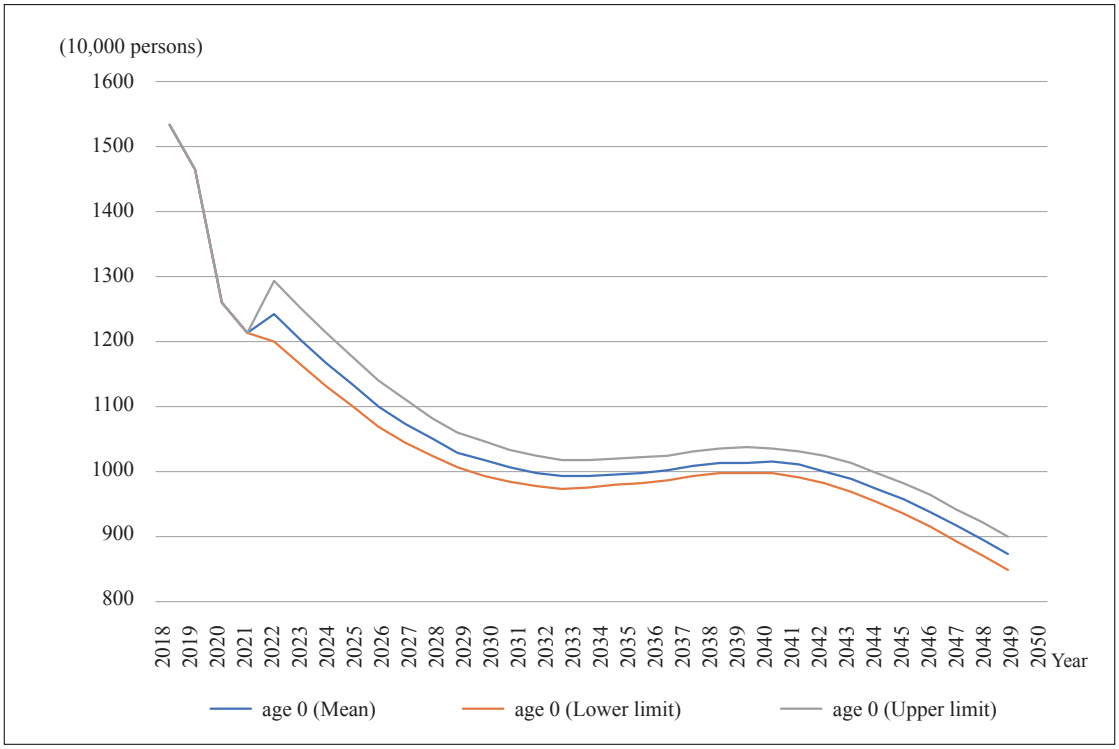

Figure 3: Estimate of China's Newborn Population, 2017-2050

at an accelerating pace. In the following 30 years, China's total population will shrink to fewer than 1.3 billion. By 2050, China's newborn population will be approximately two-thirds the present level, thus unveiling an era of falling birthrate. Meanwhile, challenges from China's aging society will become more evident. By 2050, China's elderly population aged 65 and above will reach 369 million and increase six to seven million each following year. After 2050, China's total dependency ratio will exceed 50%, i.e. every two working-age persons will share the burden of supporting one elderly person.

4. Socio-Economic Implications of China's Demographic Change and Policy Response

Demographic change will influence socio-economic development in profound ways. In the above section, we forecasted China's future population size, falling birthrate and aging society. The effects changing demographics will have on education, employment, and elderly care must be addressed. Science-based demographic forecast is essential to policymaking in these sectors.

4.1 Socio-Economic Implications of Demographic Change

Based on the NBS demographic sample survey data of 2017, this study created an age-birth order model for the effects of demographic change on China's education, employment and elderly care to estimate China's long-term demographic trends and socio-economic implications.

4.1.1 Education

Under the current birth policy and educational system, the level of education in China will

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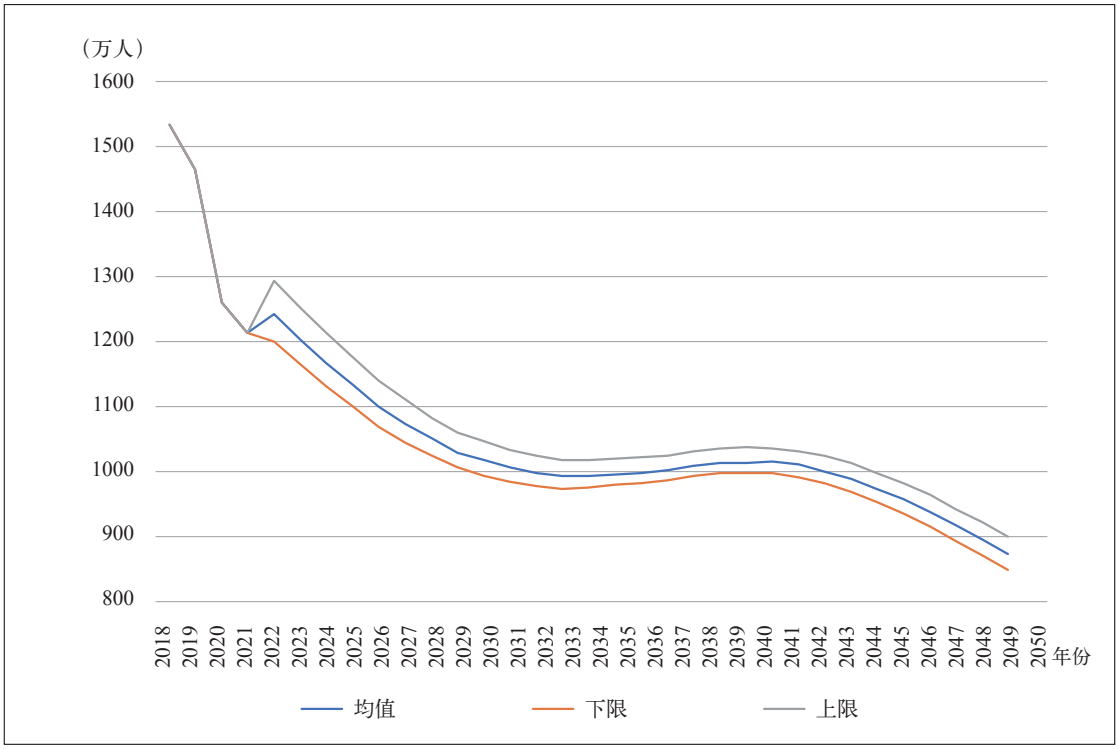

图3：2018~2050年新出生人口规模估计

跌破20%；2050年后，老年抚养比将超过50%，总抚养比将超过68%，人口结构性问题日益突出。

综上所述，如果现有人口总量和结构数据偏差不大，那么，受新冠疫情和生育率下降趋势等因素的影响，中国总人口规模有可能在2024年前后达到14.07亿的峰值，这一判断与新的环境、形势密切相关，比以往相关研究结论（王广州、王军，2019）有所提前。此后，中国人口规模开始下降，且下降速度逐年加快，30年后中国总人口规模将降至13亿以下的规模。相应地，出生人口逐年减少，到2050年中国出生人口规模约为目前的2/3，正加速进入少子化时代。同时，人口老龄化问题也逐步凸显，到2050年中国65岁及以上老年人口规模将达到3.69亿，平均每年将增加600万~700万。2050年后中国老年抚养比将超过50%，即两个劳动年龄人口就需要抚养一位老人，人口老龄化问题日趋严重。

四、人口变动的社会经济内涵及政策应对

人口是社会经济的基础。人口构成的变化不仅是社会经济发展的结果，同时对社会经济的各方面也必然将产生深远的影响。人口作为一个重要全局性基础变量，会对中国教育、就业、养老、公共政策等方面产生重大影响，这些领域的相关制度以及配套措施也需要及时随着人口结构的变动进行调整与改革。因此，科学并合理地预测教育、就业、养老等领域人口的变动趋势显得尤为重要，可以为更好地提出更加科学的公共政策奠定基础。

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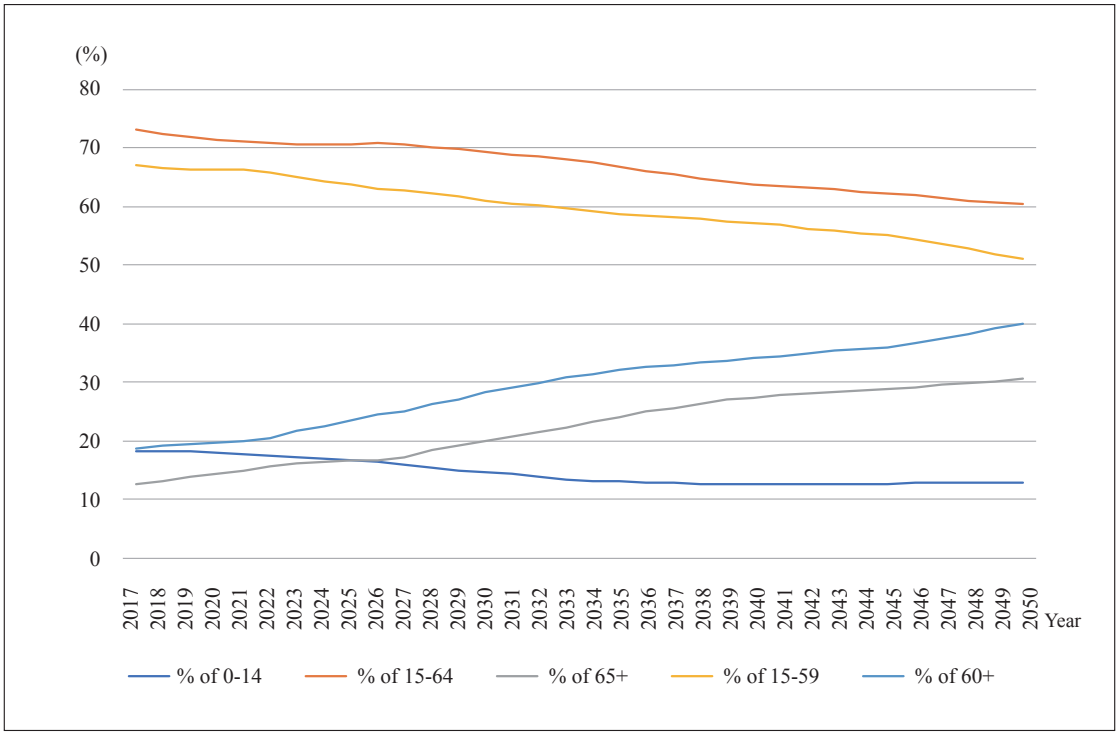

Figure 4: China's Demographic Trend, 2017-2050 (Medium variant)

experience the following changes:

First, the average years of schooling for the Chinese population will increase steadily (see Figure 6). By 2030, 2035, 2040 and 2050, the average years of schooling in China will increase to 14.22 years, 14.35 years, 14.67 years and 15.33 years, respectively. This is an increase of 0.85 years (2030), 1.18 years (2035), 1.51 years (2040) and 2.17 years (2050) from 2017. As mentioned previously, an increase in the level of women's education will significantly reduce aggregate fertility rate. With the rising length of education, China's newborn or child population will inevitably decrease.

Second, due to the low fertility rate, the number of China's primary school pupils will peak at 107.8 million by 2024, then this number will shrink to 82.7 million, 68.2 million and 65.03 million by 2030, 2035 and 2040, respectively, which is about one third below the 2024 level, and stabilize in the range between 65 million and 67 million in the period between 2040-2050 (see Figure 6).

Third, under the joint effects of change in population size and an increasing level of education, the number of students of college level and above is expected to peak at 30.77 million by 2036, then to decrease and stabilize between 24 million to 25 million in the period 2044-2050, down by about one fifth. With a low fertility rate, there will be fewer newborns and thus fewer college students. The numbers of junior middle school and high school students will peak in 2027 and 2031 respectively, before stabilizing over the period between 2040-2050.

Demographic change will present serious challenges to China's education sector. Yet as rural residents migrate to cities, compulsory education resources will continue to be overstretched in urban areas, while rural schools will struggle to recruit students. Thus, an important question is how to balance urban

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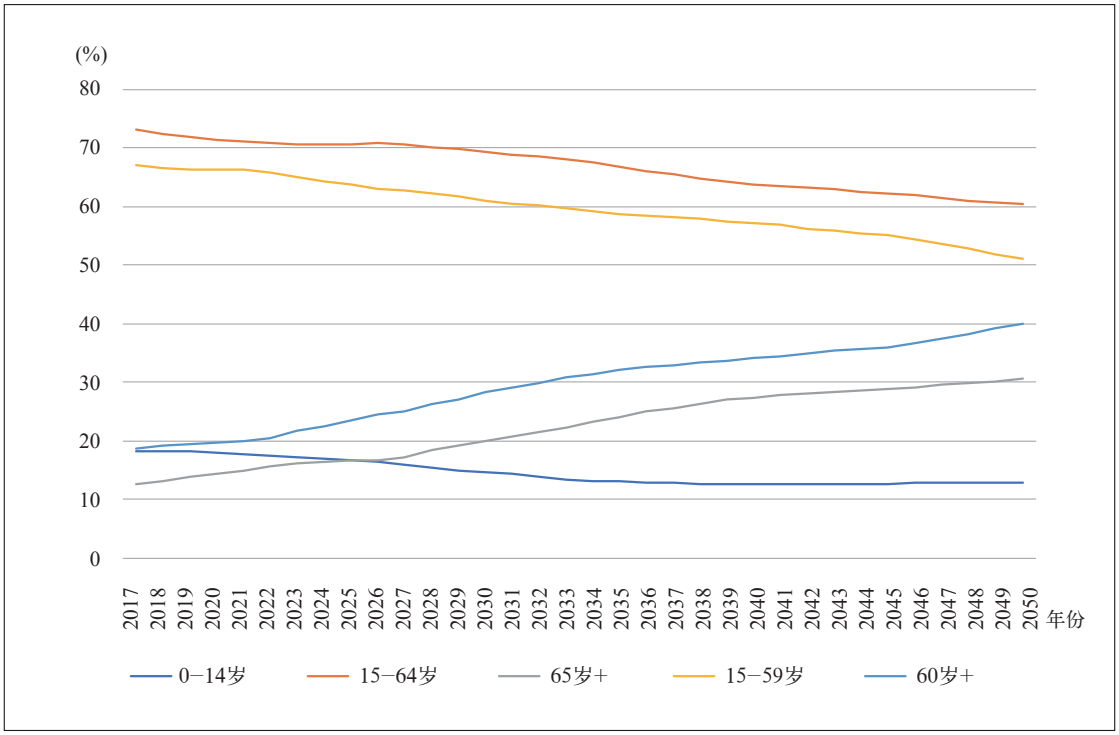

图4:2017~2050年人口年龄结构变化趋势(中方案)

(一)人口变动的社会经济内涵

为了深入分析人口变动的社会经济内涵,本文将继续基于2017年国家统计局人口变动抽样调查数据,通过构建年龄孩次模型,对中国教育、就业、养老等方面的问题进行分析,目的是深入理解人口长期变动趋势和变化特点对社会经济的影响。

1.教育

在现存的生育政策与教育制度下,中国未来受教育人口变动有如下几个特征:

首先,中国人口平均受教育年限逐年上升。2030年、2035年、2040年以及2050年人均受教育年限分别为14.22年、14.35年、14.67年以及15.33年,较2017年分别提高了0.85年、1.18年、1.51年以及2.17年。前文已经指出,育龄妇女的受教育程度提高会使总和生育率明显降低。随着中国全民受教育年限的提高,出生或低龄人口规模势必会进一步减少。

其次,从受教育结构来看,由于低生育率,中国小学在校人数在2024年左右达到1.078亿峰值后逐年下降,2030年、2035年、2040年小学在校人数分别为8270万、6820万、6503万,下降原来1/3左右,并在2040~2050年趋于平缓,保持在6500万~6700万的区间内浮动(见图6)。

最后,受人口规模变动和受教育程度提高等变化趋势的影响,预计大专及以上的在校人数在2036年左右达到3077万的峰值后逐年下降,在2044~2050年间开始趋于平缓,保持在2400万~2500万的区间内浮动,降幅

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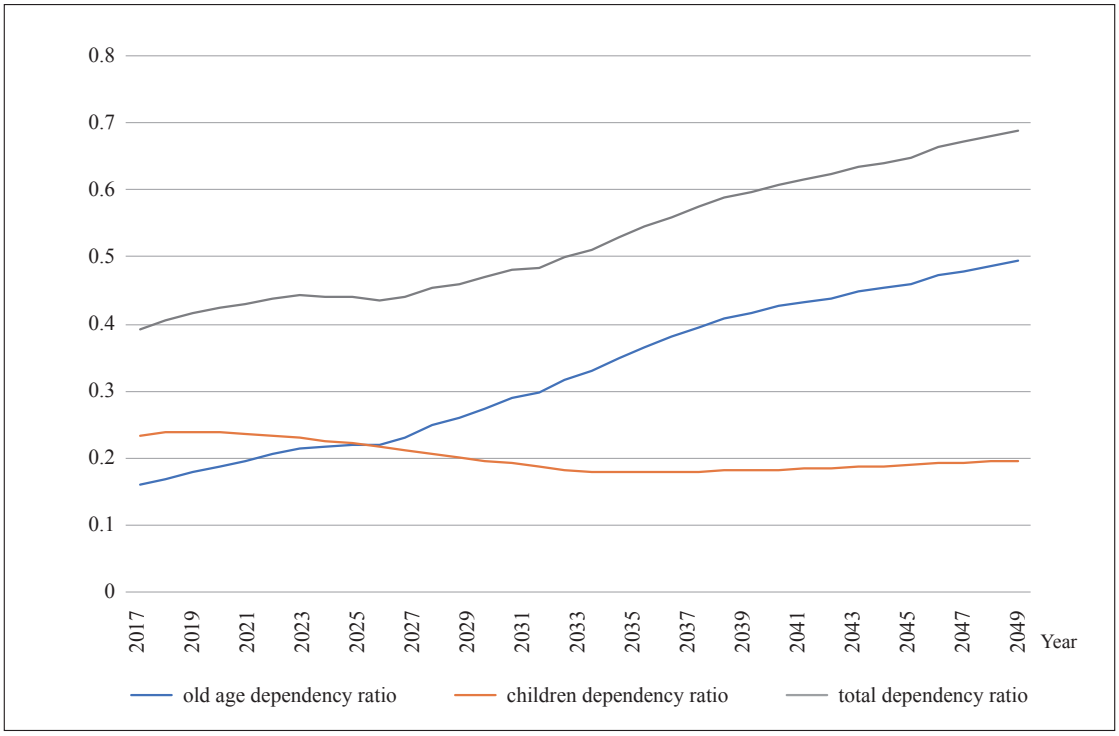

Figure 5: Change in China's Population Dependency Ratio, 2017-2050 (Medium variant)

and rural educational resources and ensure access to education for all school-age children. The number of China's college students will peak by 2035, increasing at a slower rate than in the 12th and 13th Five-Year Plan periods. With fewer enrollment expansion pressures, China should focus on the quality of higher education and "enhance the capacity to cultivate highly qualified professionals" (Liang and Wang, 2020) by effectively reallocating limited resources.

4.1.2 Employment

With China's population peak still ahead, the proportion of China's working-age population began to shrink in 2017, and is expected to fall to 59.22% in 2050, a decrease of 12.6 percentage points from 2017. China's total workforce is expected to stay at 600 million by 2034 and decrease to fewer than 500 million after 2048. Meanwhile, women will account for a rising share of the workforce (see Figure 8).

We observe the following demographic trends of China's workforce: (i) Both male and female working populations will decrease steadily. By 2030, 2035, 2040 and 2050, China's employed male population will reach 360 million, 350 million, 330 million and 288 million, and employed female population will reach 260 million, 245 million, 229 million and 197 million, respectively. (ii) In 2020, China's employed population aged 27-37 years accounts for 30.39% of China's total employed population. In 2030 and 2040, this figure will be 32.91% and 27.77%, respectively (see Figure 7).

China's total population is yet to experience negative growth. With the current birth policy in place however, China's working-age population may shrink at a faster rate. The consequent

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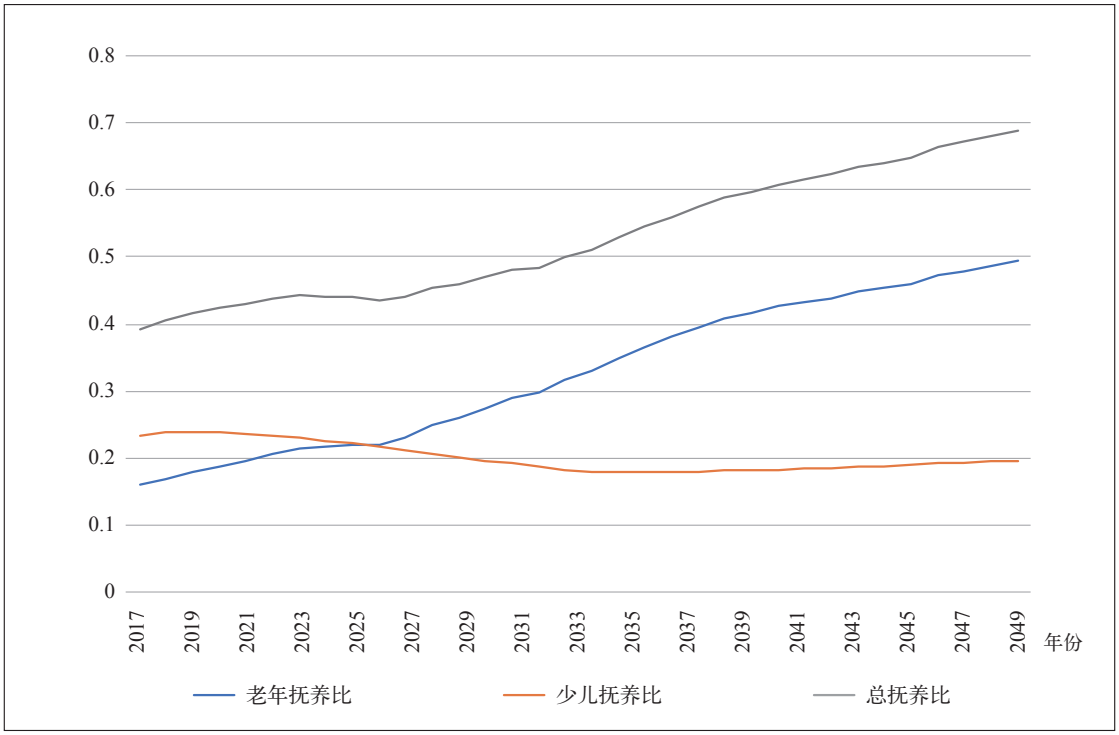

图5:2017-2050年人口抚养比变化趋势(中方案)

约为原来的1/5,降幅较小。中国低生育水平所导致的受教育人口规模变动逐渐传递到高等教育的受教育规模。而初高中的在校人数分别在2027年以及2031年经历峰值后回落,后在2040~2050年保持较为平稳的水平。

由此可见,中国教育领域发展在未来面临着许多严峻的挑战。一是中国小学及初中在校人数分别在2025年及2027年达峰值,即义务教育阶段人口在2025~2030年达峰值,加之中国高速城镇化以及人口流动等影响,中国义务教育将同时面临城镇"入学难"而农村"无生源"的问题。如何更好地平衡城乡之间的教育资源,使得所有适龄儿童都能够解决"上学难"的问题,是值得认真商榷与思考的。二是高等教育人口在2035年左右达到峰值,由于其提升幅度小于"十三五"以及"十二五"时期,这将有助于高等教育将目标转向教育质量的提高,同时以"围绕全面提高人才培养能力这个核心点,加快形成高水平人才的培养体系"为目标(梁彦、王广州,2020),将有限资源进行有效转移与划分。

2.就业

尽管目前中国总人口峰值还未到来,依旧处于人口增长期,但中国劳动年龄人口比例自2017年起已逐年下降,预计到2050年会降至59.22%,较2017年下降12.6个百分点(见图4)。预计中国总就业人口在2034年左右保持在6亿的规模,并在2048年后跌破5亿的规模,同时就业人口的性别比呈现上升趋势(见图8)。

中国就业人口发展趋势有如下几个特点:首先,从性别角度看,不论男女,就业规模都呈逐年下降的趋势。其中,男性2030年、2035年、2040年以及2050年就业人口分别为3.6亿、3.5亿、3.3亿以及2.88亿。女性2030年、2035年、2040年以及2050年就业人口分别为2.6亿、2.45亿、2.29亿以及1.97亿。其次,从年龄别看,2020年

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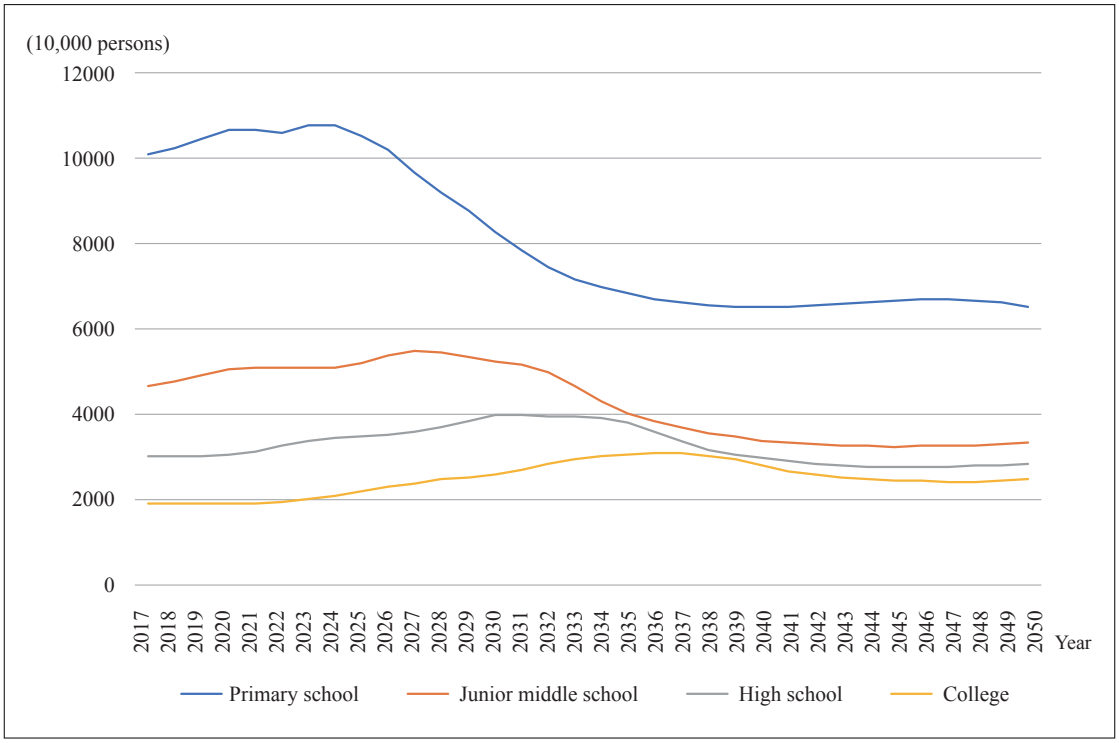

Figure 6: Change in Student Population, 2017-2050

shortage of labor will force China's economy to transition from labor-intensive to knowledge-intensive industries. Amid this transition, China should enhance labor market supervision and social protection for workers, train vulnerable workers for new jobs, and offset the economic shocks of a shrinking workforce.

4.1.3 Elderly health

Judging by the average life expectancy trends in developed countries, China's average life expectancy is estimated to increase from 80.42 in 2017 to nearly 84 years for women and from 75.62 in 2017 to 79.22 years for men by 2050. However, the increase in life expectancy does not mean better health. China's semi-independent elderly population is expected to reach 33.20 million, 38.21 million, 43.22 million and 51.17 million by 2030, 2035, 2040 and 2050, respectively, with an annual average growth rate of roughly 3%. Compared with semi-independent elderly population, China's dependent elderly population is small but will grow faster at approximately 3.5% (see Figure 9). By 2030, 2035, 2040 and 2050, China's dependent elderly population is expected to reach 8.96 million, 10.93 million, 12.91 million and 16.53 million, respectively. Rapid increases of dependent and semi-independent elderly population will place China's current elderly care and public health systems under enormous pressure.

With rising average length of education, China's elderly population will become better educated. With changing consumer behaviors and changing expectation on elderly care, comes a fundamental change in demand for elderly care and health services. China should make appropriate strategic choices based on its national conditions to ensure access to elderly care services.

China's low fertility rate will lead to a labor shortage in various sectors, including elderly care

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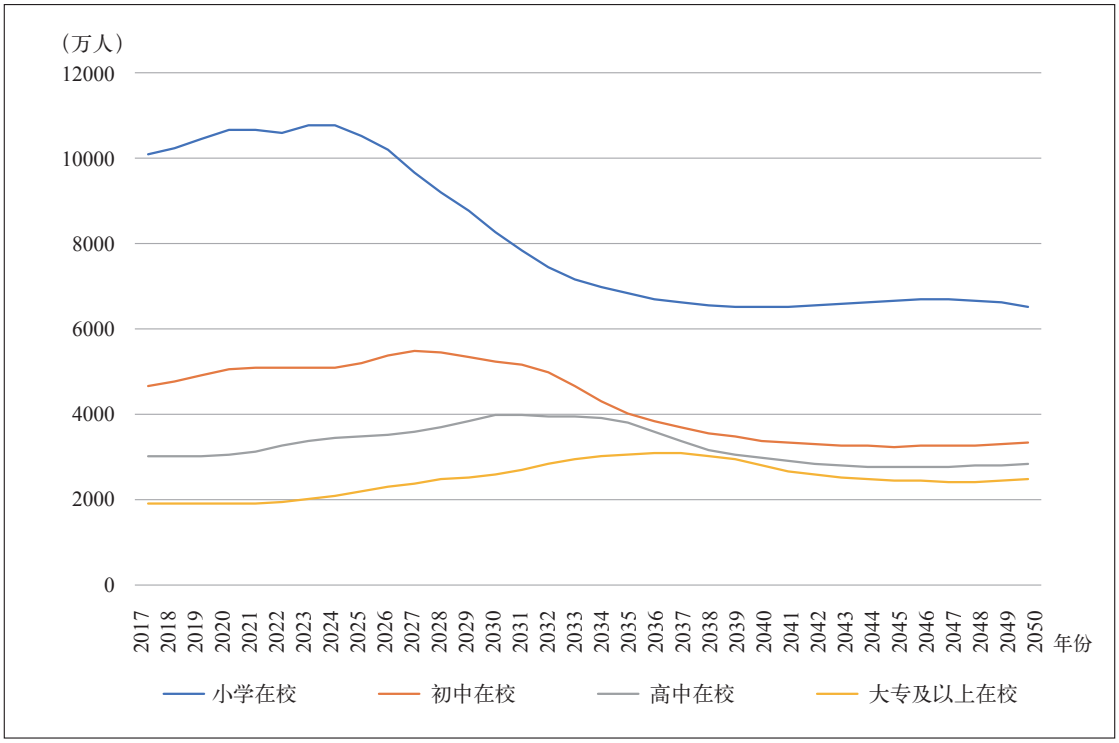

图6：2017~2050年在校人口规模变化趋势

27~37岁年龄段就业人口较为庞大，占到2020年总就业人口的30.39%，2030年和2040年相应梯次人群比例分别为32.91%和27.77%（见图7）。

虽然中国还未进入总人口负增长阶段，但在当前生育政策下，持续走低的生育率可能使中国劳动年龄人口负增长的速度进一步提高。由于年轻劳动力规模的大幅度下降会导致劳动力结构性供需矛盾日益突出，这必将促使中国经济结构作出重大调整，推动产业结构的转型升级—由劳动密集型转向知识密集型。在产业升级转型的同时，需加强劳动力市场的监管以及健全劳动者的社会保障制度。在保护弱势就业者的同时对其专业技能以及知识进行再培训，提高劳动者的素质，保证其能够充分再就业，进而形成新的良性循环，减缓劳动力的减少对中国经济运行造成的冲击。

3.老年人口健康

根据平均预期寿命的变动规律和发达国家平均预期寿命的变动趋势，预计到2050年，中国人口平均预期寿命女性将由2017的80.42岁上升到接近84岁，男性由2017年的75.62岁上升到79.22岁。但是，寿命的延长并不意味着其健康寿命的延长。预测显示（见图9），2030年、2035年、2040年、2050年中国半自理老人人口规模将分别达到3320万、3821万、4325万以及5117万，年平均增长率为3%左右。虽然不能自理老人的人口规模相较半自理老人的人口规模较小，但其增速相对较高，为3.5%左右。预测显示，2030年、2035年、2040年以及2050年不能自理老人人口规模分别为896万、1093万、1291万以及1653万。不能自理老人和半自理老人规模的快速

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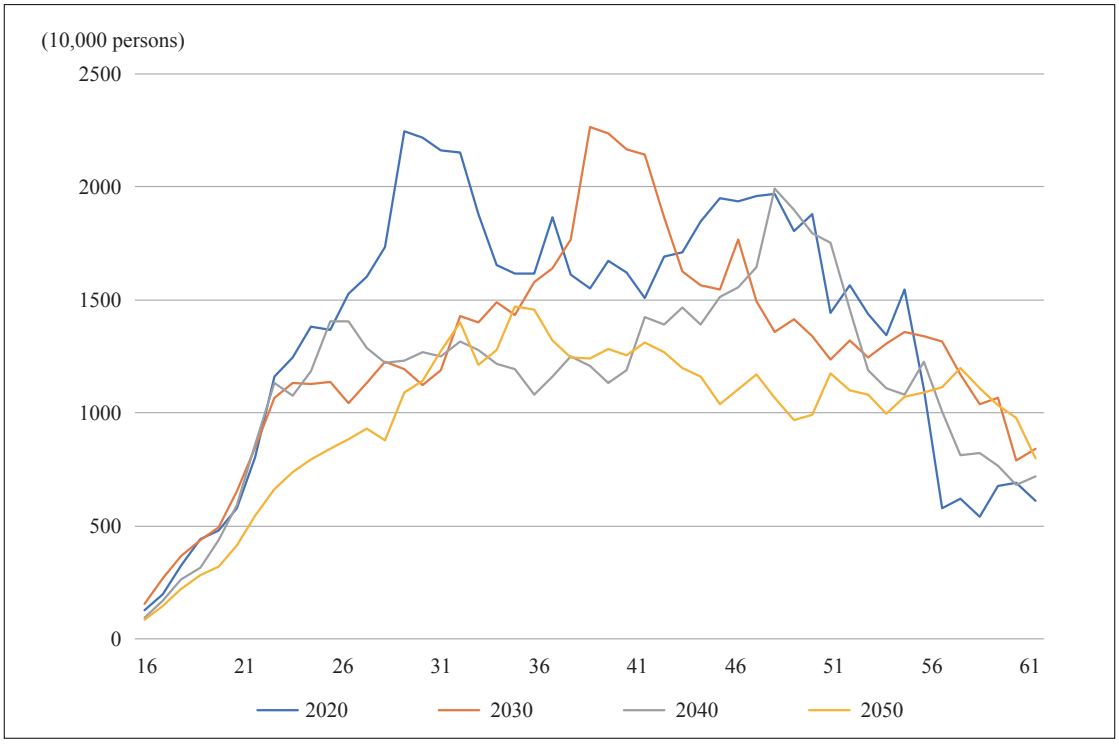

Figure 7: Change in China's Employed Populations by Age, 2017-2050 (Medium variant)

services. How to attract and train caregivers is a question that requires careful consideration. China should support home and community-based elderly care services and train family members and community volunteers to share the burden of public health systems. Meanwhile, China should encourage the development of smart devices for the elderly to compensate for the labor shortage.

4.2 Public Policy Response

Considering the demographic challenges to China's education, employment, and healthcare, we suggest the following public policy responses:

(i) Allowing each family to have two children instead of one is far from enough to reverse China's low fertility rate, which has continued steadily over recent years. China should be cautious about further decreases in the fertility rate and avoid the "low fertility trap." To do so, China must phase out birth control at an early date.

(ii) China should enact pro-birth socio-economic policies to counter the effects of the falling birthrate, aging population and negative population growth. For instance, China should offer economic aid and incentives to childbearing families. Regulations should be enacted to help women of childbearing age balance the work-family relationship and increase public facilities for children at workplaces. China should also create a social environment for men to take an active role in sharing housework so as to create a birth-friendly society.

(iii) China should foster public awareness that child raising matters for the whole country and society, not just for individual families. Lessons can be drawn from South Korea's falling TFR despite the country's pro-birth policies. China should revamp the population policy from a broader perspective covering the entire lifecycle to encourage childbearing.

(iv) China should put the challenges of falling birthrate and aging society into broader socio-

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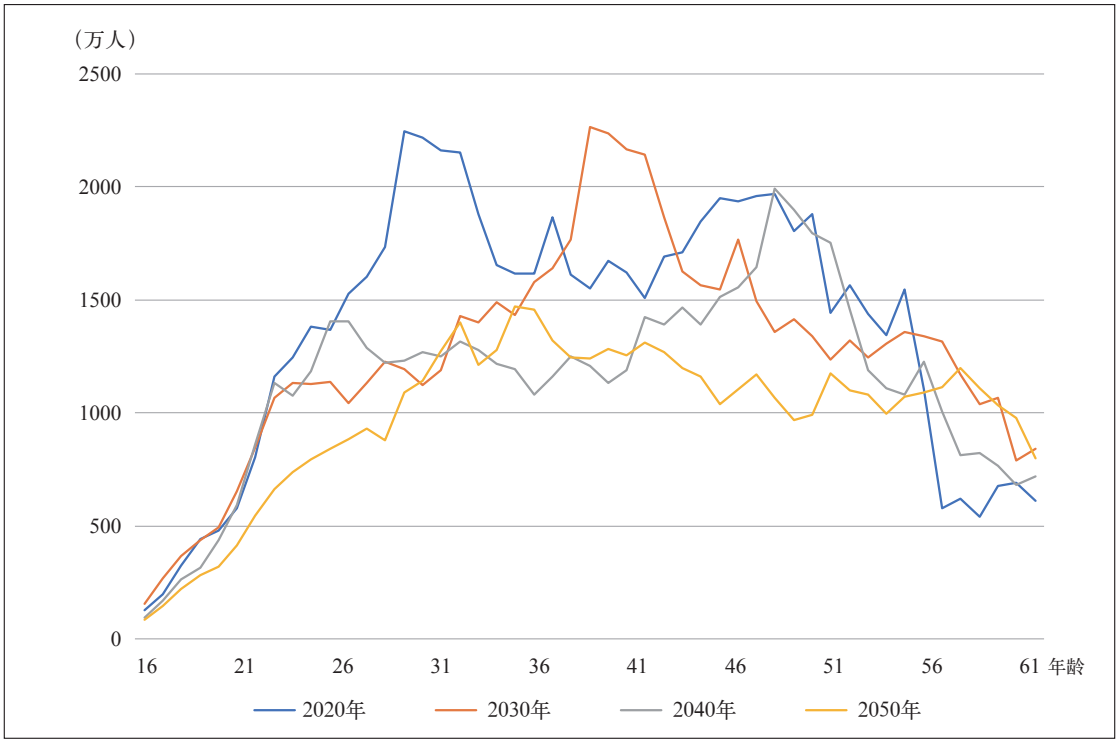

图7：2017~2020年年龄别就业人口规模变化趋势（中方案）

增加，无疑将给中国现存的老年看护制度以及公共卫生医疗体系带来沉重压力。

不仅如此，由于中国人口平均受教育年限的逐渐提高，未来中国老年人口的平均教育程度也将有显著提高。这意味着，中国未来老年人群的消费观念、养老观念等都会发生巨大的变化，其养老、健康消费需求也将发生根本性改变，故中国需要结合本国国情做出恰当的战略选择，真正实现“老有所依，老有所养”。

此外，由于中国持续较低的生育率，导致中国劳动力人口持续短缺，养老服务行业人力资源短缺问题将日趋严重。如何吸引大量的劳动力人口从事该行业，如何合理调配资源对其进行充分的教育以及技能培训，这些都是需要我们重新思考的。同时也需要加强对家庭养老，社区养老的资源支持，对家庭成员以及社区志愿者进行培训，分担公共医疗卫生系统的压力。同时需要加大对研发智能养老设备企业的投入，以降低可能由于缺乏人力资源给中国养老产业带来的损害。

（二）公共政策应对

基于中国人口少子化和老龄化的趋势及其在教育、就业以及健康等方面的重大影响，中国应该在公共政策方面做出以下应对措施：

第一，在中国低生育率的背景下，仅仅全面放开两孩政策还远远不够。特别是根据近年来逐步下降的生育形势，我们需要更加警惕生育水平的进一步下降和避免深陷“低生育陷阱”的问题，在政策上需要尽快完全放开生育限制。

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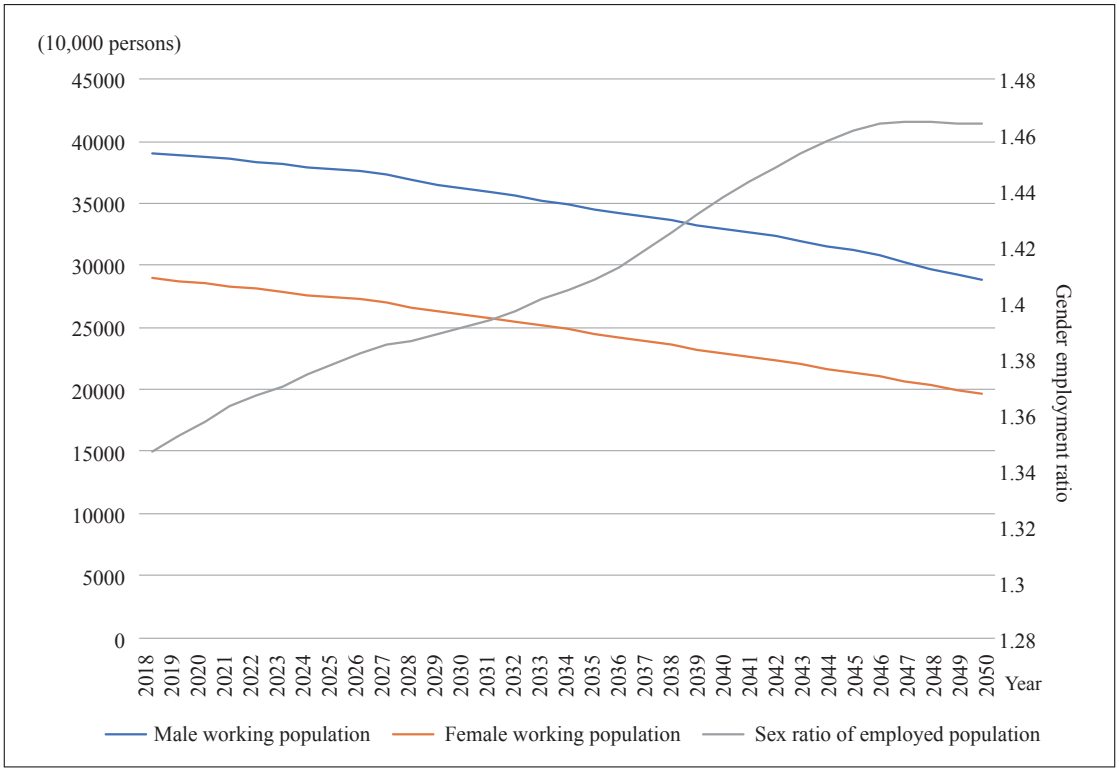

Figure 8: Demographic Change of China's Employment by Gender, 2017-2050 (Medium variant)

economic contexts. With its broad implications for education, employment and elderly care, demographic change is hard to reverse. China should prepare for, and adapt to, the new normal of negative population growth to mitigate its socio-economic effects.

It should be noted that even abolishing birth control and offering birth incentives, China's fertility rate is still likely to stall and fail to recover to the replacement level. China must start to prepare for an aging society in the window period of the upcoming decade. We should not be blindly optimistic to expect to overcome the economic effects of a labor shortage with artificial intelligence, nor should we let pessimism prevail and take no remedies at all.

In this decade-long window period, the whole society, and especially competent authorities must take proactive countermeasures. The public should be fully aware of the challenges of a falling birthrate and an aging population. In this critical decade-long window period, policymakers must draw lessons from the responses of Europe, the United States, Japan, and South Korea to an aging society and prepare human, material and financial resources for coping with falling birthrate and aging population.

5. Conclusions

A science-based assessment of China's demographic situation and future trends forms the basis for China's policymaking to cope with falling birthrate and aging population. With original data from China's census and sample surveys over the years, this study employed an indirect method for estimating TFR and the birth order progression forecast method to assess China's demographic situation and future trends. Then, the social and economic implications of China's demographic change and public policy

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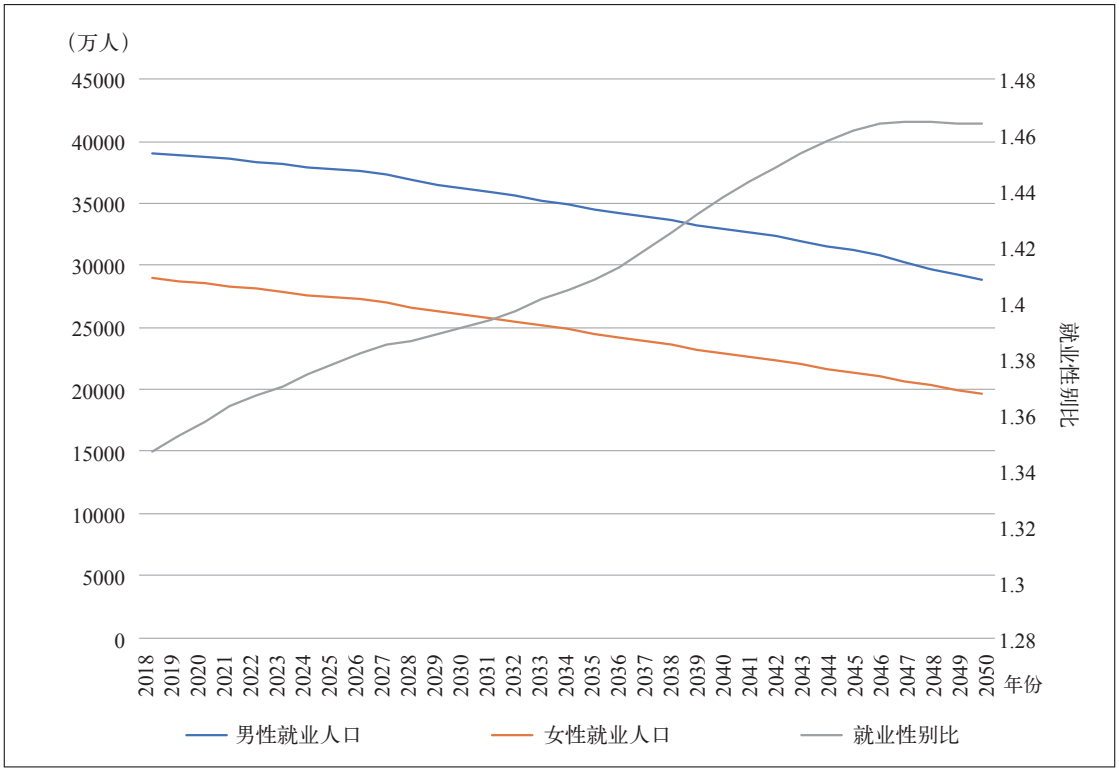

图8：2017~2010年分性别就业人口变化趋势（中方案）

第二，由于少子化、老龄化以及人口负增长等问题日趋严重，在放开生育限制的同时，需要出台有利于生育的社会经济政策。包括对生育孩子的家庭进行适当的经济帮扶与鼓励。同时，需要出台相应规定与措施，使育龄妇女能够更好地处理事业与家庭的关系，在工作场所适度增加儿童公共设施与设备。此外，还需营造男性积极分担家务劳动的社会氛围，从而全面营造生育友好型社会。

第三，除了取消生育限制、出台相应生育鼓励措施以及构建友好的生育社会外，整个社会都需要充分认识到生育孩子并不是一个家庭的事情，而是整个国家和社会的事情。即不能仅就生育而讨论生育，从长远来看，更重要的是需要从整个国家的全人口全生命周期的角度，对人口政策进行全面重构和优化，以期重新提振国民生育信心和生育意愿，将生育意愿切实转化为实际生育行为。

第四，我们的视野也不能仅仅局限在少子化以及老龄化本身，应该更多地从经济发展以及社会整体的角度讨论该问题。目前我们所提出的都是调整性的政策，在中国人口规模剧烈变动的情况下，中国教育、就业、养老等方方面面都会产生一系列矛盾以及问题，单单依靠调整性政策是无法从根本上解决这些矛盾的。在人口负增长将成为新常态的未来，我们需要的是适应性政策与调整性政策齐头并进，适应并调节中国经济以及社会结构所面临的巨大变化。

需要特别指出的是，即使将来全面取消生育限制并出台相应鼓励措施，中国生育率仍存在回升幅度不大的可能，即恢复到更替水平的可能性较低。面对这种情况，我们还有十年的窗口期，需要未雨绸缪。首先，需要克服盲目乐观的倾向，不能将希望完全放在对于人工智能的研发以及技术革新上，抛弃人工智能能够完全替代人工，

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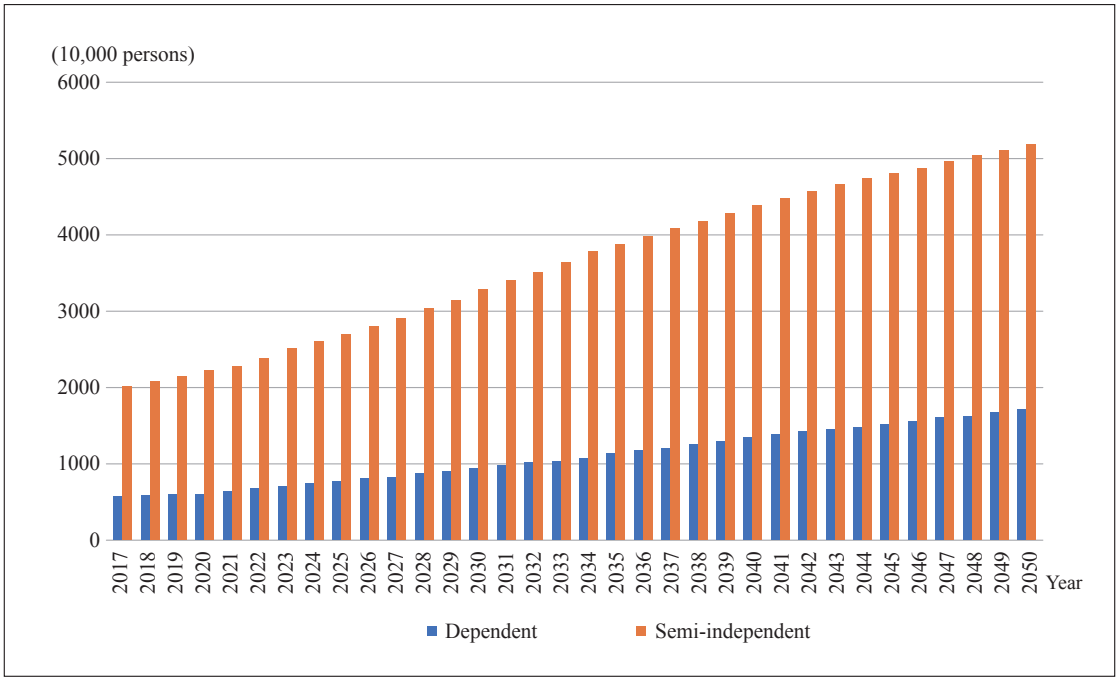

Figure 9: Change in Semi-Independent and Dependent Elderly Populations, 2017-2050 (Medium variant)

countermeasures were proposed with the following conclusions:

First, China's TFR fell in the range of 1.30-1.51 from 2010 to 2018, exceeding 1.6 in 2016 as the only exception. From 2010 to 2018, the proportion of unmarried Chinese women increased. The increasing length of education and rapid urbanization have led to a further reduction in China's fertility rate, which is likely to decrease further in the future. Nearly three decades of a low fertility rate has led to a grim prospect of an aging population.

Second, China's total population is expected to peak at 1.407 billion by 2024 before decreasing at an accelerating pace thereafter. By 2050, China's newborn population will shrink by more than 1/3 to reach 8.73 million, hastening the birthrate decline. China's aging population is expected to rise steadily, reaching 30% by 2050, with total dependency ratio exceeding 50%.

Third, a deep crisis looms large for China's education sector as student population starts to shrink in the coming 50 years. A low fertility rate will cause China's workforce to decrease with significant economic ramifications. By 2050, China's dependent and semi-independent elderly populations will reach 51.17 million and 16.53 million, respectively, whose demand for elderly care services must be addressed.

Fourth, China must abolish birth control and introduce pro-birth socioeconomic policies, such as allowances to spouses of childbearing age, better conditions for career women to raise children, and encouragement for husbands to share the burden of childcare and housework. Public policy should take a wholistic approach to foster a pro-birth social environment. In the upcoming decade-long window period, China should actively adapt our economic and social systems to an aging society. Adaptation matters as much as birth policy adjustment.

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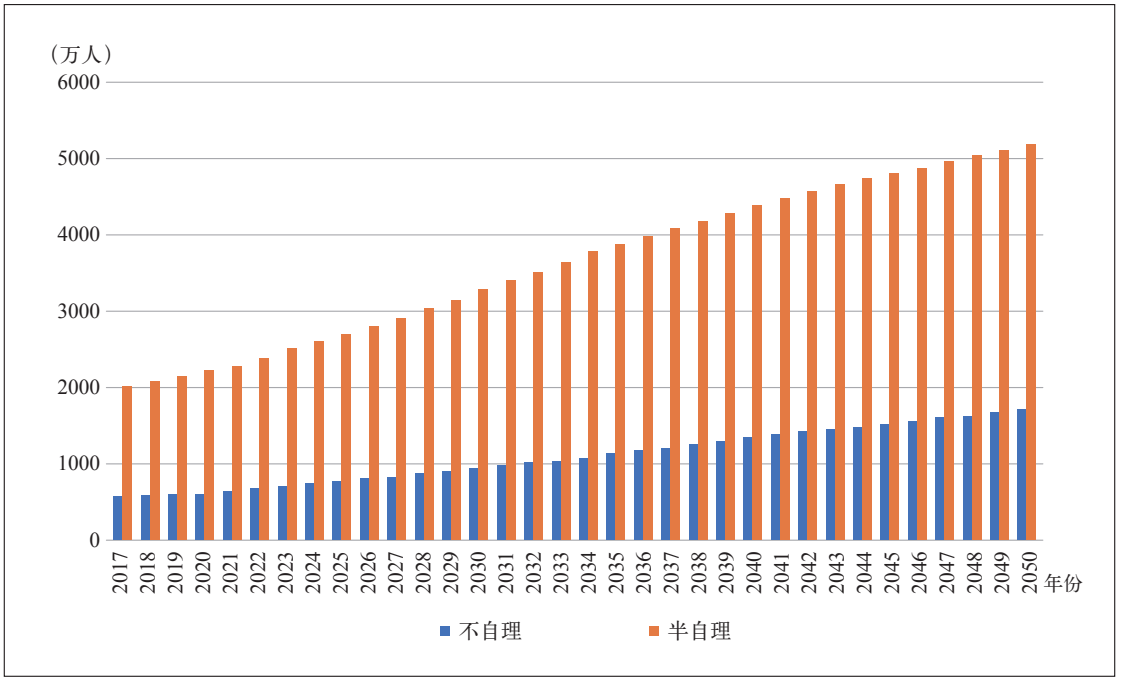

图9：2017~2050半自理以及不能自理老年人人口规模变化趋势（中方案）

弥补由于劳动力人口短缺对中国经济产生的影响的思想。其次，也不能过度悲观，完全不采取任何补救措施。

我们需要从长远战略的角度，抓住十年窗口期，积极作为。在这期间，社会各界特别是相应的政府主管部门应该为减缓中国老龄化积极行动起来。社会各阶层需要从思想意识上充分认识到中国少子化、老龄化的态势，充分重视该问题。同时从制度上要紧紧抓住这十年的关键窗口期，学习欧美、日本、韩国等国家和地区应对人口老龄化的经验，从人力、物力、财力等各个方面为应对人口少子化、老龄化做好必要的准备。

五、主要结论

在低生育水平下中国少子化、老龄化趋势日趋严重，科学研究当前人口形势并预判未来人口变化规律是制定中国未来人口发展战略的基础。本文对中国当前的人口形势以及未来发展形势进行判断，在此基础上分析人口变动背后的社会经济内涵及其公共政策应对策略，主要得出以下研究结论：

第一，中国当前人口形势判断方面，2010~2018年，除了2016年总和生育率略高于1.6以外，其余年份总和生育率都在1.30−1.51区间内；20~34岁未婚女性的比例上升，居民受教育程度的提高以及中国加速城镇化的进程均导致了生育率的进一步降低，并预示了中国生育率未来进一步走低的可能性；近30年的持续低生育率也导致了中国人口老龄化形势日趋严峻。

第二，中国未来人口发展趋势方面，到2024年前后中国人口总规模将达到14.07亿的峰值，此后进入人口负增长时期且下降速度逐年加快；2050年中国出生人口规模下降到873万，相较于目前减少近1/3以上，加速进入

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少子化时代；中国老年人口比例逐年上升，到2050年老年人口比例将达30%左右，老年抚养比将突破50%。

第三，人口变动的社会经济内涵方面，由于少子化以及老龄化趋势日趋严重，在未来50年内，教育领域各个阶段的在校人数在达到峰值后相继下降，教育领域的发展在未来将面临重重矛盾与危机；持续低生育率导致我国劳动力人口比例持续下降，这必将对中国产业规模和结构产生巨大影响；中国未来不能自理和半自理的老年人口规模将迅速增加，2050年将分别达到5117万和1653万，养老事业发展面临很大挑战。

第四，公共政策应对方面，首先，应该完全取消生育限制。其次，适时出台鼓励生育的社会经济政策，可考虑的公共政策包括为育龄夫妇生育提供物质补贴和支持、更好地平衡职业女性抚育子女和工作的关系、鼓励丈夫更多参与子女的抚育工作以及家务劳动等。再次，应该放宽公共政策的视野，不能仅仅就生育谈生育，而应该实行全人口全生命周期管理，营造生育优化的社会制度、环境和氛围。最后，除了调整性政策，还应同时重视适应性政策，抓住未来10年的战略窗口期，从经济、社会制度各个层面逐渐适应少子化和老龄化的人口发展环境。

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