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**BEYOND DEMOGRAPHICS IS DESTINY:
UNDERSTANDING ECONOMIC MITIGATION
STRATEGIES FOR DEMOGRAPHIC CHANGE IN
CHINA**

by

John B. Judy

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Thesis Advisor:
Second Reader:

Naazneen Barma
Michael Glosny

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MITIGATION STRATEGIES FOR DEMOGRAPHIC CHANGE IN CHINA**

John B. Judy
Lieutenant, United States Navy
B.S., United States Naval Academy, 2008

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**NAVAL POSTGRADUATE SCHOOL
September 2015**

Author: John B. Judy

Approved by: Naazneen Barma
Thesis Advisor

Michael Glosny
Second Reader

Mohammed Hafez
Chair, Department of National Security Affairs

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ABSTRACT

The favorable demographics that have contributed to China's rapid economic growth are changing. China's working-age population is currently peaking and within two decades its overall population will begin to shrink. In addition to a shrinking working-age population, China will see an increase in the elderly population and a rising dependency ratio. This demographic change may have an economically significant impact. If China's enormous stock of labor and low dependency ratio were key elements in its rapid economic growth, then some economists conclude that the reversal of these elements will have detrimental effects on the Chinese economy.

This thesis examines this argument by examining how Germany, Japan, and Russia have already faced and attempted to mitigate similar demographic changes, and assesses China's potential mitigation strategies in this light. For each country, the thesis examines two economically significant demographic changes—decreasing working-age population and rising dependency ratio—and then examines how strategies to maximize labor force participation, increase productivity, and control old age benefits can potentially mitigate their effects. The comparison of China with Germany, Japan, and Russia leads to the conclusion that China is poorly prepared to mitigate the economic effects of its coming demographic change.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	RESEARCH SIGNIFICANCE.....	1
B.	LITERATURE REVIEW	4
1.	China’s Demographic Transition	5
a.	<i>Fertility</i>	5
b.	<i>Mortality and Aging</i>	8
2.	Demographic Dividend in China’s Economic Transformation	9
3.	Predictions on the Future Demographic Effects	10
C.	POTENTIAL EXPLANATIONS AND HYPOTHESES	11
D.	RESEARCH DESIGN	13
E.	THESIS ARGUMENT AND OVERVIEW	15
II.	CHINA’S DEMOGRAPHIC HISTORY	17
A.	POPULATION TRANSITION THEORY	19
1.	Stage 1: High-Stationary or Pre-transition Phase	20
2.	Stage 2: Early Expanding.....	21
3.	Stage 3: Late Expanding	22
4.	Stage 4: Low Stationary	22
5.	Stage 5: Decline	23
B.	DEMOGRAPHIC PRESSURES UNDER THE INFLUENCE OF MAO (1949–1976).....	24
C.	DEMOGRAPHIC PRESSURES IN THE POST-MAO ERA (1977– PRESENT).....	28
D.	FUTURE POPULATION TRENDS	35
1.	Working-Age Population Decline.....	35
2.	Population Aging.....	36
3.	Increasing Dependency Ratio	37
E.	CONCLUSION	38
III.	COMPARATIVE CASE STUDIES: GERMANY, JAPAN, AND RUSSIA	39
A.	DEMOGRAPHIC AND ECONOMIC OVERVIEWS.....	39
1.	Germany	39
2.	Japan	43
3.	Russia	46
B.	COMMON ECONOMIC-DEMOGRAPHIC THEMES	49
1.	Maximizing Labor Force.....	49
a.	<i>Female Employment</i>	50
b.	<i>Elderly Employment</i>	52
c.	<i>Immigrant Employment</i>	53
2.	Labor Productivity.....	54
3.	Controlling Old-Age Benefits.....	56
C.	COMPARISON CONCLUSIONS	58

IV.	THE CHINESE ECONOMY AND DEMOGRAPHIC MITIGATION POTENTIAL.....	61
A.	CHINESE ECONOMIC OVERVIEW	61
	1. Communist Command Economy (1949–1977).....	61
	2. Reforms to a Market-Based Economic System (1978–present).....	64
	3. Labor Reforms	69
B.	CHINA IN RELATION TO THE COMPARISON CASE STUDIES.....	72
	1. Maximizing Labor Force.....	73
	<i>a. Female Employment</i>	<i>73</i>
	<i>b. Elderly Employment.....</i>	<i>76</i>
	<i>c. Immigrant Employment.....</i>	<i>78</i>
	2. Labor Productivity.....	80
	3. Controlling Old-Age Benefits.....	83
C.	CONCLUSION	85
V.	CONCLUSION	87
A.	CHINA’S TRAJECTORY	88
	1. Maximizing Labor Force.....	88
	2. Labor Productivity.....	93
	3. Controlling Old-Age Benefits.....	95
B.	AREAS FOR ADDITIONAL INVESTIGATION.....	96
C.	CONCLUDING REMARKS	97
	LIST OF REFERENCES.....	99
	INITIAL DISTRIBUTION LIST	105

LIST OF FIGURES

Figure 1.	China's Population Pyramid in 2015 (1.4 billion).....	18
Figure 2.	Stages of Demographic Transition Model.....	19
Figure 3.	China's Population Pyramid 1950 (540 million).....	25
Figure 4.	CBR, CDR and Population of China 1949–1996.....	27
Figure 5.	China's Population 1980 (984 million).....	30
Figure 6.	China's Population 1950 (543 million) (L), 1980 (984 million) (C), 2010 (1,359 million) (R).....	34
Figure 7.	Working Age Population Decline in China.....	36
Figure 8.	German Population by Major Age Group.....	41
Figure 9.	Germany Population 2015 (L), China Projected Population 2040 (R).....	42
Figure 10.	Japanese Population by Age Group.....	44
Figure 11.	Japan Population 2015 (L), China Projected Population 2055 (R).....	45
Figure 12.	Russian Population by Age Group.....	47
Figure 13.	Exports (Billion \$).....	67
Figure 14.	China Population 65+ (in millions).....	77
Figure 15.	GDP per Person Employed, China.....	81
Figure 16.	Net Migration China (outward, in thousands).....	90

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LIST OF TABLES

Table 1.	Economic Statistics of Western Europe’s Low Fertility Countries	40
Table 2.	Female Employment Opportunities	51
Table 3.	Comparison of Health and Retirement Ages	52
Table 4.	Net Migration, Crude Birth, and Death Rates.....	53
Table 5.	Productivity/Labor and Business Freedom Scores	55
Table 6.	Dependency Ratios and Spending on Public Pensions	57
Table 7.	Employment Trends.....	70
Table 8.	Female Employment Opportunities	74
Table 9.	Census Employment Rates	75
Table 10.	Comparison of Health and Retirement Ages	78
Table 11.	Net Migration, Crude Birth, and Death Rates.....	79
Table 12.	Productivity/Labor and Business Freedom Scores	82
Table 13.	Dependency Ratios and Spending on Public Pensions	85
Table 14.	Results of a Drop in Female Labor Force Participation Rate	92

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LIST OF ACRONYMS AND ABBREVIATIONS

CBR	Crude Birth Rate
CDR	Crude Death Rate
GDP	Gross Domestic Product
GII	Gender Inequality Index
GLF	Great Leap Forward
LFPR	Labor Force Participation Rate
OECD	Organization for Economic Cooperation and Development
PRC	People's Republic of China
SOE	State Owned Enterprise
TFR	Total Fertility Rate
UN	United Nations

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I. INTRODUCTION

As the Chinese economy continues to grow in prominence in the world, it faces the possible challenge of a demographic drag on growth. In the past three decades, China has reaped a demographic dividend of working-age adults. This dividend has enabled China to achieve impressive growth, but this demographic dividend will soon recede, revealing potentially significant problems. Through the lens of population transition theory, this thesis analyzes the factors that contributed to China's demographic trajectory and looming challenges. A variety of factors have combined to shape China's demographics, including: government policy, cultural gender preferences, improved health services, and changing family ideals.

The thesis then examines how Germany, Japan, and Russia have already faced and attempted to mitigate similar demographic changes; and assesses China's potential mitigation strategies in this light. The comparator cases highlight the impact of demographics on labor markets and individual economic behavior, leading to broader economic challenges. For each country, the thesis examines two economically significant demographic changes—decreasing working-age population and rising dependency ratio—and then examines how strategies to maximize labor force participation, increase productivity, and control old age benefits can potentially mitigate their effects. Overall, the thesis finds that China's labor force is likely to shrink not only because of demographic factors, but also due to losing potential workers through immigration and by decreasing labor force participation by females. Additionally, China does not appear likely to mitigate its shrinking workforce by dramatic productivity gains. China's mitigation potential is better when considering elderly employment and controlling the cost to the government of old-age benefits. Overall, this thesis concludes that China is currently poorly suited to mitigate the economic impacts of demographic change

A. RESEARCH SIGNIFICANCE

China's population is aging at an earlier stage of economic development than any other major developed country. In 2004, Richard Jackson and Neil Howe stated, "China

may be the first major country to grow old before it grows rich.”¹ In 2007, Barry Naughton more confidently provides a similar prognosis: “China will grow old before it has had the opportunity to grow rich.”² These views are supported by the fact that the World Bank’s demographic statistics point to 2015 as the year during which China’s total working age population (15–64) will reach its zenith.³ The projection of an absolute decline in the working-age population demonstrates how severely China may be affected by aging. Many developed nations have experienced a decline in working-age population as a proportion of overall population due to demographic trends, and this is also true for China. In the context of a growing population, this proportional change indicates that the working-age population is growing more slowly than other age cohorts of the population. In contrast, China will soon have a shrinking population; thus, not only will the working-age cohort shrink in relative terms, but in absolute terms as well. China’s demographic makeup and immigration policies are combining to create a situation in which fewer workers will be available to drive the world’s second largest economy. While China’s economy looms large when measured in the aggregate (2014 GDP \$10.36 trillion, world’s second largest economy behind the United States),⁴ per capita statistics reflect that China (2014 GDP per capita \$7,593.9 [current U.S.\$]) is only just reaching global middle-income status.⁵

Human capital is an essential ingredient of economic growth. On an individual level, human capital is described as “the sum total of skills embodied within an

¹ Richard Jackson and Neil Howe, *The Graying of the Middle Kingdom: The Demographics and Economics of Retirement Policy in China* (Washington, D.C: Center for Strategic and International Studies, 2004), 3, http://www.lifestarinstitute.org/_archive/files/library/CSIS-GAI-China-The_Graying_of_the_Middle_Kingdom.pdf.

² Barry Naughton, *The Chinese Economy: Transitions and Growth* (Cambridge: The MIT Press, 2007), 176.

³ The World Bank, “Population Estimates and Projections,” August 16, 2015, <http://datatopics.worldbank.org/hnp/poestimates#>

⁴ The World Bank, “GDP (current US\$),” August 16, 2015, <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

⁵ The World Bank, “GDP per capita (current US\$),” August 16, 2015, <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

individual.”⁶ In turn, the aggregate of each individual’s human capital could be thought of as total national-level human capital. This means much more than the sheer number of workers, as it would also factor in education, talents, and other abilities that a worker possesses. This is demonstrated by the difference in production between a group of unskilled workers and those who possess applicable skills: even if the overall number of workers in both groups is equal, the skilled group will out-produce the unskilled group, based on a difference of human capital. If the working-age population of a country is shrinking without a corresponding increase in other aspects of human capital (e.g., education, health, etc.), then it follows that the human capital of the country is shrinking. If an increase of human capital contributed to economic growth, then a relative tapering off can be expected to have a corresponding detrimental effect on growth, all else being equal.

Changes in economic growth due to demographics may, in turn, contribute to social and political changes. Chinese demographer and scholar Wang Feng asserts demographic forces “have already begun to exert a powerful impact on the Chinese economy, and pose a serious risk to future economic growth, social harmony and political stability.”⁷ Changes in the pace of economic growth and the country’s demographic makeup, have the potential to create instability; this effect is magnified by China being the world’s most populous country.

Understanding the underlying aspects of the economic and demographic changes in China will provide insight for potential dangers to the world economy from slowing Chinese economic growth. At just under 1 trillion dollars in growth, the Chinese economy accounted for about half of world-wide economic growth in 2014.⁸ Economic and business news media are quick to point to a threat to global economic health from Chinese GDP growth slowing even slightly below the Chinese government’s target of

⁶ Charles Wheelan, *Naked Economics: Undressing the Dismal Science* (New York: W.W. Norton & Company, 2010), 127.

⁷ Wang Feng, “Demographic Transition: Racing towards the Precipice,” *China Economic Quarterly* (2012): 17, <http://www.brookings.edu/research/articles/2012/06/china-demographics-wang>.

⁸ World Bank, “GDP,” <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/1W-CN?display=graph>.

7.5%.⁹ When China's economic growth slows, repercussions are felt throughout the world. If demographic trends are contributing to lowering economic growth, Chinese growth may slow. Since Chinese growth has driven much of global economic growth for the past decade, the global economy may face slower growth rates.

Both domestically and globally, China's demographics have had and will continue to have an impact. This thesis endeavors to contribute to the understanding of this impact. Some prescribe to the sentiment represented by French sociologist Auguste Comte when he said, "Demography is destiny." This viewpoint portrays demographics as a singularly important aspect of economic growth, with an impact that can be neither shaped nor mitigated, but instead only must be endured. This thesis acknowledges that demographics have shaped and will continue to affect China's economic destiny, but challenges the view that demographics are deterministic as overly simplistic.

B. LITERATURE REVIEW

Examination of scholarly literature on three themes of the economic-demographic situation in China forms the academic foundation for this thesis. The first theme reviewed is how China's current demographic situation came to be. These works examine how changes in fertility, mortality, and aging have shaped China's demographics. This chapter also explores how government policy and modernization have contributed to these changes. This section provides the background for understanding the demographic transition of modern China. The second theme discussed in the review is the demographic dividend and how it has impacted China's economy. This examines authors who have demonstrated how the high growth China has experience in the past three decades is partially attributable to demographic factors. Also examined are several causal linkages that have been suggested between demographics and growth. This is important to understanding what effect changes in the underlying demographics may have on the economy. The third part of the literature review examines projections that scholars have

⁹ For example, Jake Spring and Xiaoyi Shao, "China's Growth Slowest since Global Crisis, Annual Target at Risk," *Reuters*, October 21, 2014, <http://www.reuters.com/>. and Martin Patience, "China's Economic Growth Slows to More than Five-Year Low," *BBC*, October 21, 2014, <http://www.bbc.com/>. and Michael Schuman, "Anyone Expecting a Rebound in Chinese Growth Won't Like the New GDP Figures," *Time*, October 21, 2014, <http://www.time.com/>.

made concerning the future of China's economic growth. This exposes a variety of viewpoints on how scholars expect demographic pressures to affect China's growth.

1. China's Demographic Transition

Demographic trends initially appear simple to understand and quantify. Populations can be counted and the methods of change are limited to the discrete events of birth, death, and immigration. Modern states can provide accurate estimates at the rate these events occur and simple math can be used to estimate future population figures. This deceptive simplicity masks the facts that a myriad of factors contributes to demographic change. In Dudley Kirk's review of demographic transition theory he states, "Demography is a science short on theory, but rich in quantification."¹⁰ To understand China's demographic transition, this review examines the factors that have impacted fertility, and how they have led to rapid aging.

a. Fertility

China's fertility has dramatically dropped from 6.1 children per women in 1950–1955 to the current level of about 1.6 children per women.¹¹ This trend has not been limited to China alone; worldwide, "the trend towards smaller families is one of the most enduring social developments of modern times."¹² Wang Feng notes that China's fertility level is comparable to present-day Germany, Japan, and Russia.¹³ The worldwide trend only represents part of the dynamic occurring in China, since "the decline in Chinese birthrates is in part the inevitable result of modernization, in part the result of deliberate government population control policy."¹⁴ In examining the role of government policy in fertility, Tuljapurkar explains that "most of the fertility change was concentrated in time, in the late 1970s with the 'Later, Longer, Fewer' campaign and then around 1990 with

¹⁰ Dudley Kirk, "Demographic Transition Theory," *Population Studies* (1996), 361.

¹¹ UNData, "Total Fertility Rate," World Population Prospects: The 2012 Revision, August 25, 2015, <http://data.un.org/Data.aspx?q=fertility&d=PopDiv&f=variableID%3a54>;

¹² Richard Jackson and Neil Howe, *The Graying of the Great Powers: Demography and Geopolitics in the 21st Century* (Washington, DC: Center for Strategic & International Studies, 2008), 47.

¹³ Wang, "Racing Towards the Precipice," 17.

¹⁴ Jackson and Howe, *Graying of the Middle Kingdom*, 8.

the one-child policy.”¹⁵ The argument is that, since drops in fertility are occurring in concentrated periods, which correspond with the government’s population control policy and when its effects are felt, a significant amount of the reduction in fertility is due to policy. In addition to changes occurring during concentrated time periods, changes in fertility have also been disproportionately concentrated in urban areas.¹⁶ England agrees with Tuljapurkar that, while the overwhelming trend has been a decline in fertility, this trend occurs non-uniformly over time and location.¹⁷

As one of the most well-known examples of government policy affecting fertility, the one-child policy is the subject of much scholarly work. General views on the effectiveness of the policy to control population growth vary. The goal of the policy was to “ensure that rapid population growth would not impede social and economic development.”¹⁸ By limiting population growth, the government believed it could better guide economic development and prevent high levels of unemployment, inadequate opportunities for education and exhaustion of resources.¹⁹ Wang and Mason describe the state’s concern as employing a “neo-Malthusian perspective” that the population would exceed the ability of resources to provide high standard of living and “framing of population growth as the root of all evils.”²⁰ Chinese officials are cited claiming that the policy has prevented 330 million births.²¹ Others have argued that the policy did little to reduce the actual birth rate beyond the expected decrease due to modernization but also forced couples to hide additional children. This view is supported by Naughton in his

¹⁵ Shripad Tuljapurkar, “How Demography Shapes Individual, Social, and Economic Transitions in Asia” in *Aging Asia: The Economic and Social Implications of Rapid Demographic Change in China, Japan, and South Korea*, ed. Karen Eggleston and Shripad Tuljapurkar (Stanford, CA: Walter H. Shorenstein Asia-Pacific Research Center Books, 2010), 35–36.

¹⁶ *Ibid.*, 36.

¹⁷ Robert Stowe England, *Aging China: The Demographic Challenge to China’s Economic Prospects*, The Washington Papers (Westport, Ct: Praeger, 2005), 19.

¹⁸ David Truesdell, “China’s Demographic Limits To Economic Growth” (master’s thesis, Naval Postgraduate School, 2012), 42.

¹⁹ *Ibid.*, 43.

²⁰ Wang Feng and Andrew Mason, “The Demographic Factor in China’s Transition” in *China’s Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (Cambridge, NY: Cambridge University Press, 2008), 136.

²¹ England, *Aging China*, 21.

review of the policy, “despite the strictness of the One-Child Policy, it has never been fully successful,” and during the 1980s about half of the children born were second child or later in birth order.²² Evidence of underreporting of births is found in censuses that count larger populations of children than were reported born in the corresponding birth year.²³

Another impact of policy’s impact on changes in fertility is on how the population of working age individuals will change over time. The growth rate or very soon the decline rate for this population will fluctuate due to baby busts that accompanied changes in government policy.²⁴ The economic impact of waves of workers aging out of the work force within a few years may prove potentially more troubling than if a similar transition had occurred steadily over a larger timeframe.

An additional unintended effect of the one-child policy has been an increase imbalance in the gender ratio.²⁵ Hudson and den Boer examine the historical reasons that Chinese society has preferred male off-spring and policies that have contributed to the unnaturally high ratio of males to females.²⁶ This phenomenon is present to varying degrees throughout Asia but is particularly pronounced in China.²⁷ The consequences of a high-sex ratio society are potentially detrimental in a variety of aspects. Socially, for example, these societies are prone to higher levels of individual and collective violence, crime in general and drug use.²⁸ Economically, unmarried males are less likely to be employed and women in high-sex ratio societies are less likely to be part of the work force.²⁹

²² Naughton, *The Chinese Economy*, 170.

²³ England, *Aging China*, 21.

²⁴ Tuljapurkar, “How Demography Shapes,” 36.

²⁵ Valerie M. Hudson and Andrea M. den Boer, *Bare Branches: The Security Implications of Asia’s Surplus Male Population* (Cambridge, MA: The MIT Press, 2004), 154.

²⁶ *Ibid.*

²⁷ *Ibid.*, 132, 138–152.

²⁸ *Ibid.*, 14–198, 201.

²⁹ *Ibid.*, 189, 203.

b. Mortality and Aging

As societies modernize, they have almost universally experienced a demographic transition brought on by increasing longevity and decreasing fertility. China, like other societies, is experiencing this familiar trend but, as Wang Feng notes, the transition is occurring in China “far more quickly than most other countries, largely thanks to the speed of its demographic transition from high death and birth rates to low death and birth rates.”³⁰ England observes that life expectancy increased from 44.8 years to 71.78 years for women and 42.3 years to 68.13 years for men since the founding of the People’s Republic of China in 1949 to 1995.³¹ The result of this increased life expectancy and reduced fertility is to skew the population older—England notes that the percentage of people 65 and older will more than triple from the 7% in 2000 to somewhere in the low 20% range by 2040.³²

The data shows that aging is occurring and will continue, but what is not agreed upon are the ultimate effects of the trend. Wang points out lower private savings rates and a shrinking supply of cheap labor as two potential challenges associated with this trend, but also areas of opportunity, including increased demand for financial services and vehicles for retirement investments and a growing health care industry.³³ England notes that longevity and an underdeveloped pension system will lead to pressure for the state to provide more social welfare benefits stressing public finances but downplays any possible labor shortages due to aging because of the large underutilized rural labor force.³⁴ Beyond economic concerns, aging will bring numerous health concerns like dementia and diabetes, which may stretch the state’s healthcare systems.³⁵ Aging will

³⁰ Wang, “Racing Towards the Precipice,” 18.

³¹ England, *Aging China*, 14.

³² *Ibid.*, 17.

³³ Wang, “Racing Towards the Precipice,” 19–20.

³⁴ England, *Aging China*, 118–119.

³⁵ Karen Eggleston and Shripad Tuljapurkar, “Introduction” in *Aging Asia: The Economic and Social Implications of Rapid Demographic Change in China, Japan, and South Korea*, ed. Karen Eggleston and Shripad Tuljapurkar (Stanford, CA: Walter H. Shorenstein Asia-Pacific Research Center Books, 2010), 3.

also bring social change, disrupting traditional family structures impacting both young and old.³⁶

2. Demographic Dividend in China's Economic Transformation

Essential to determining the potential impact of demographic changes on the Chinese economy is understanding how they have affected the economy in the recent past. Views on the impact of demographic changes on the economic transformation vary widely. The authors of *China: The Balance Sheet* do not include demographics as one of the key five key factors that have led to growth, instead focusing on policy changes that have unleashed the Chinese economy.³⁷ Barry Naughton credits declining dependency rates as the explanation for “a portion of the rapid growth in per capita GDP over the past two decades.”³⁸ Bloom and Williamson statistically attempt to place a number on this portion of growth for the entirety of East Asia. They determine that “a one percent increase in the growth rate of the working age population is associated with a 1.46 percent increase in the growth rate of GDP per capita.”³⁹ By Bloom and Williamson's estimates, favorable demographic changes account for as much as a third of economic growth during East Asia's miracle.⁴⁰ This is similar to findings by Wang Feng and Andrew Mason, who state demographics “accounted for 15 percent of China's economic growth between 1982 and 2000.”⁴¹ While the exact percentage of growth due to demographic transition is arguable, the demographic dividend has contributed significant economic growth to the Chinese.

Several causal links are used to explain how the demographic dividend spurs economic growth. One view is that it is the changes in age distribution brought by the

³⁶ Eggleston and Tuljapurkar, “Introduction,” 12–13.

³⁷ C. Fred Bergsten, Bates Gill, Nicholas R. Lardy, and Derek J. Mitchell, *China: The Balance Sheet* (New York, Public Affairs: 2006), 19.

³⁸ Naughton, *The Chinese Economy*, 174.

³⁹ David E. Bloom and Jeffrey G. Williamson, “Demographic Transitions and Economic Miracles in Emerging Asia” (National Bureau of Economic Research Working Paper 6268, 1997), 14.

⁴⁰ *Ibid.*, 4.

⁴¹ Wang and Mason, “The Demographic Factor,” 147.

demographic dividend that contributes to economic growth.⁴² This is due to individuals being able to save and invest excess resources accumulated during their working years.⁴³ This increased investment spurs growth and economic development. A second, less established link is that younger populations are more malleable, learning skills needed to drive a growing and changing economy.⁴⁴

3. Predictions on the Future Demographic Effects

As authors have questioned how China's evolving demographics will affect its future, the responses have ranged from alarming to moderate. This review examines first those who believe the effect of demographics on the economy will be catastrophic, leading to a dramatic slowdown in growth, stagnation, or even contraction. Secondly, this section will examine views that foresee an alternative future, in which China may continue its growth, albeit likely at a reduced rate.

Susan Shirk describes China as “racing the demographic clock.”⁴⁵ Shirk's concern is that without government policy changes, demographic burdens will overwhelm the pension and health-care systems.⁴⁶ Shirk believes that the aging strain will be more pronounced on China than it has been on similar countries like Japan and Korea.⁴⁷ Jackson and Howe describe a retirement crisis. The crisis has formed as most Chinese have relied on families for support as they age.⁴⁸ This system will crumble due to the “4-2-1 problem” of four grandparents and two parents all relying on one worker for support.⁴⁹ Even more dramatically, Jackson and Howe extend their argument beyond economics, stating China is one of several nations experiencing “extreme demographic change that could push them either toward civil collapse or (in reaction) neo-

⁴² Bloom and Williamson, “Demographic Transitions and Economic Miracles,” 3.

⁴³ Naughton, *The Chinese Economy*, 174.

⁴⁴ Ibid.

⁴⁵ Susan Shirk, *China: Fragile Superpower* (Oxford, NY: Oxford University Press, 2007), 20.

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Jackson and Howe, *Graying of the Middle Kingdom*, 3.

⁴⁹ Ibid., 3.

authoritarianism.”⁵⁰ Wang Feng also sees stormy skies ahead, stating “as China’s demographic fortunes reverse, the economy will slow down regardless of other factors driving growth.”⁵¹ Wang continues, “after years of demographically powered high-speed growth, the Chinese bullet train is racing towards a demographic precipice.”⁵² These authors believe that the window for structural reforms is closed or closing and without reform China should expect a difficult future due to demographic pressures.

Other authors have a more optimistic perspective on China’s future. Some see China as having significant untapped resources of human capital. Naughton describes how frequently human labor is still being used for menial, back-breaking tasks, that could be replaced by machines to increase productivity.⁵³ This acknowledgement of the significant amounts of underutilized rural labor available is echoed by Minami et al., who agree that “the country is still endowed with a vast rural hinterland with abundant labor supply,” but simultaneously there are concerns that restrictions on rural to urban labor movement will allow urban labor shortages to remain despite the rural surplus.⁵⁴ In conclusion, most authors agree that demographics will present a challenge to China’s continued growth, but that with appropriate policy this challenge may be mitigated.

C. POTENTIAL EXPLANATIONS AND HYPOTHESES

Demographics have had a significant positive impact on China’s growth. This thesis maintains that this demographic dividend has been essentially exhausted and the benefit it has provided will fade as well. This is a similar transition point that the case studies of Germany, Japan, and Russia have also faced.

A simplistic view of the demographic difficulties facing China suggests that the Chinese economy will flounder under demographic pressures, based on the following

⁵⁰ Jackson and Howe, *Graying of the Great Powers*, 193.

⁵¹ Wang, “Racing Towards the Precipice,” 19.

⁵² *Ibid.*, 21.

⁵³ Naughton, *The Chinese Economy*, 180.

⁵⁴ Jinjun Xue and Wenshu Gao, “Labor Migration and Urban-Rural Income Disparity,” in *Lewisian Turning Point in the Chinese Economy: Comparison with East Asian Countries*, ed. Ryoshin Minami, Fumio Makino and Kwan S. Kim (New York: Palgrave Macmillan, 2014), 210.

logic. The demographic transition will lead to a shrinking labor force and with abundant labor gone the price of labor will rise. Without relatively low cost labor, the comparative advantage which has driven Chinese economic growth, the Chinese economy will slip into stagnation or decline. Exacerbating this will be the increased cost of caring for a growing elderly population and, in turn, the reduced savings and hence potential for domestic investment. This is the scenario that those most pessimistic on the future of the Chinese economy foresee.

Thus, a “demographics as economic destiny hypothesis,” may conclude that economic decline for China is unavoidable. This logic assesses, as do Jackson and Howe, that due to demographic change, “workforces will actually shrink from one decade to the next – and GDPs may stagnate or even decline.”⁵⁵ This thesis will attempt to show that this hypothesis is overly simplistic. Instead of demographics being key to economic destiny this thesis will examine additional case studies for factors that can shape or mitigate the economic impact of demographic change.

A second group of hypotheses may conclude that China’s demographics will have a limited effect on economic growth. It might predict that China’s economic growth will be lower in the future not due to demographic reasons, but instead because continued growth at the current rate is unsustainable. In this line of thinking, the demographic dividend and its connection to growth is overblown and other factors account for China’s economic growth. As an economy transitions to a developed economy, the role of demographics is insignificant compared to those of innovation and productivity increases.

A third hypothesis is that the effects of demographic change can be mitigated. It does not deny demographics as an important factor, but instead of viewing them as an inalterable force, the demographic impact on the economy can be affected by a variety of factors. Particular factors might include work force maximization through workforce participation of females, elderly and immigrant labor. Another potential mitigation factor is increasing labor productivity, doing more with fewer workers. The final mitigation factor examined is controlling the cost to the government of elderly benefits. This

⁵⁵ Jackson and Howe, *Graying of the Great Powers*, 188.

hypothesis maintains that countries can be successful in mitigating the effects of demographic challenges and can continue to grow economically.

“Growing old before growing rich,” is a challenge brought about by policy and pressures unique to China, but this challenge also provides opportunity for continued growth of the Chinese economy. China still has a significant surplus of labor that is tied up in low-productivity, subsistence agriculture.⁵⁶ The feared scarcities of migrant workers in urban industries is not occurring due to demographic constraints, but instead policy constraints.⁵⁷ While demographics will be unfavorable to provide new workers in the future these policy constraints have held the economy back from its full potential and in easing them additional labor is available for the market. Critical in China will be turning a large population of underemployed, low productivity workers, into a slightly smaller population which has high workforce participation rates and high levels of productivity. Scarcity of new workers, driven by demographic factors, may contribute to this transition.

D. RESEARCH DESIGN

The research design underpinning this thesis is a comparative case study approach. China’s demographics are unique; no other nation will be so dramatically affected by a combination of policy and low fertility associated with modernization to create such a rapid demographic transition. This implies that any case studies examined will be an inexact reflection of possibilities that faces China. While this concern is valid, it is present always when using historical case studies and the differences are not so extreme to invalidate the method as an analytical approach. What the case studies reveal, will likely be also present within modern China to an even greater extent.

Appropriate selection of case studies is a critical aspect of research design. The basic criteria used must be quantifiable and avoid reinforcing preconceived expectations. While the focus of the thesis will be economic, it is the unique demographic condition

⁵⁶ *Lewisian Turning Point in the Chinese Economy: Comparison with East Asian Countries*, ed. Ryoshin Minami, Fumio Makino and Kwan S. Kim (New York: Palgrave Macmillan, 2014), xii.

⁵⁷ *Ibid.*

that is the independent variable being studied. This is the reason the criteria for selection are demographic in nature instead of economic. The criteria used were populations in excess of 50 million with negative population growth in 2014.⁵⁸ The three countries that fulfill both of these criteria are Germany, Japan and Russia. These countries can provide insight into the challenges that China will face in its near demographic future.

Germany, Japan and Russia provide examples of several possible economic outcomes from the later stages of demographic transitions and also strategies that governments have used to temper demographic effects. In the case of Germany, the government has adopted pro-natal policies including increased child-care facilities and parental leave.⁵⁹ Germany is also experiencing increased immigration, mitigating the effects of declining fertility on demographics. Currently, 13% of the German population was foreign-born, a historical high.⁶⁰ In Japan, one of the first countries to experience demographic aging, mitigation has included relatively smaller public pensions to reduce the impact of aging on government finances and the highest elderly labor-force participation rate in the developed world.⁶¹ Finally, Russia has not only experienced declining fertility but is also facing falling life expectancies as well.⁶² This demographic trend is undercutting economic growth and investments in human capital.⁶³ In addressing the demographic situation, Russia is employing both incentives to induce Russians abroad to repatriate and to encourage higher fertility.⁶⁴ The effect of these policies on

⁵⁸ CIA world fact book used for these estimates. 24 countries listed with populations over 50 million (China, India, United States, Indonesia, Brazil, Pakistan, Nigeria, Bangladesh, Russia, Japan, Mexico, Philippines, Ethiopia, Vietnam, Egypt, Turkey, Germany, Iran, Democratic Republic of the Congo, Thailand, France, United Kingdom, Italy, and Burma), 36 entities listed with negative population growth (Tokelau, Svalbard, Russia, Niue, Maldives, Poland, Guyana, Trinidad and Tobago, Georgia, Bosnia and Herzegovina, Croatia, Armenia, Japan, Cuba, Germany, Belarus, Hungary, Slovenia, Romania, Saint Vincent and the Grenadines, Lithuania, American Samoa, Federated States of Micronesia, Serbia, South Africa, Montenegro, Virgin Islands, Latvia, Ukraine, Puerto Rico, Estonia, Bulgaria, Saint Pierre and Miquelon, Moldova, Cook Islands, Syria)

⁵⁹ Jackson and Howe, *Graying of the Great Powers*, 51.

⁶⁰ *Ibid.*, 122.

⁶¹ *Ibid.*, 45.

⁶² *Ibid.*, 178.

⁶³ *Ibid.*, 179.

⁶⁴ *Ibid.*, 181.

demographics remains to be seen. The effect of demographics on the Russian economy may also be different because much of the economy depends on the extraction of natural resources.

E. THESIS ARGUMENT AND OVERVIEW

This thesis finds that the economic effects of demographics are important, but can be shaped or mitigated. This conclusion is reached by examining the differing economic outcomes of countries facing similar economic challenges. This thesis then continues to consider what factors are important to mitigation and to what extent they are present and what effect they have had in the economies of Germany, Japan, and Russia. The extent of these mitigation factors is then used to provide a baseline for evaluation of China. This evaluation finds that China is poorly prepared for its coming demographic change.

This thesis examines this argument through five chapters.

The second chapter focuses on understanding China's demographic trajectory. This is accomplished by examining population transition theory in general and assessing how China's recent demographic history fits this model. This history is broken down into two time periods: the Mao Zedong-influenced era from the founding of the People's Republic of China until the death of Mao; and the Post-Mao era, from Mao's death to the present. This review pays specific attention to the role that government policy has had in shaping China's demography. Finally, this chapter includes several of the potential economic impacts of China's demographic trajectory.

The third chapter establishes the comparison case studies used to determine how well China is poised to mitigate the economic effects of demographic change. This begins by briefly reviewing the demographic and economic situation of the comparison countries: Germany, Japan, and Russia. Next, three specific economic aspects that may provide mitigation are reviewed; in maximization of potential labor, productive use of labor, and controlling the cost of elderly care.

The fourth chapter compares China with the comparison case studies, seeking to understand to what extent is it likely that China will be able to emulate and benefit from

similar mitigation strategies. This chapter begins with a historical look at China's economy in two periods: the economy under Mao Zedong, and the growth and reform that has occurred since his death. Then China is assessed against the comparison case studies to understand if China will be likely to benefit from similar mitigation strategies.

The fifth chapter is the conclusion. This chapter reviews the findings of the three previous chapters—that China is destined for demographic change, that the economic effects of demographic change can be mitigated, and that China is currently poorly suited to mitigate its demographic change—and evaluates how China's mitigation potential might change in the future. This chapter also outlines areas where additional research could be conducted to further advance the understanding of the interaction between demographics and economics. The chapter concludes with the author's thoughts on broader implications of demographic decline.

II. CHINA'S DEMOGRAPHIC HISTORY

That China has the world's largest population is widely known. Demography breaks down this single number by examining how the population of a country is structured in terms of age and gender, but also examines underlying trends like fertility and life expectancy. Understanding these elements allows the researcher to not only to grasp the composition of a current population, but also to accurately predict how this composition will change overtime. This chapter focuses on China's demography, on how its population grew to where it is today and what its trajectory is for future generations.

Figure 1 presents China's population graphically, displaying the age and gender distribution of the approximately 1.4 billion people living in China in 2015. The population pyramid shows that China's population is not uniformly distributed across ages and does not smoothly taper, but instead is marked by periods of population booms and population busts. This process has been occurring throughout history pre-dating the establishment of the People's Republic of China (PRC) in 1949. Contributing to these earlier booms and busts were conflicts, famines, medical factors, cultural values, economic forces and a variety of other factors that shape population distribution across the world. This chapter and thesis in general focus on the period of time since the establishment of the PRC and examine how during this period governmental actions and more recently rapid economic growth have played roles in shaping this demographic distribution. Understanding how the present day population distribution has been developed will provide insight into the demographic challenge the PRC faces in its future.

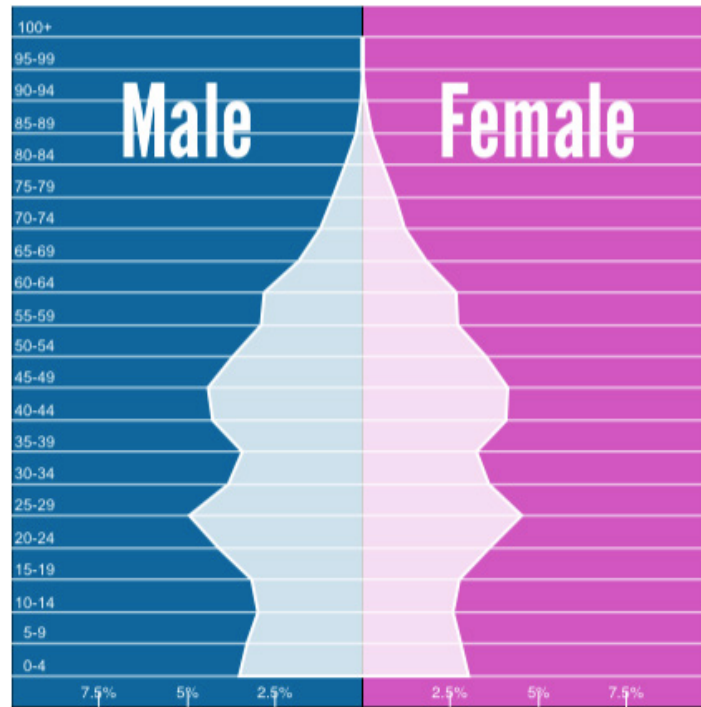


Figure 1. China's Population Pyramid in 2015 (1.4 billion).⁶⁵

To understand how governmental actions and economics have affected China's demographic, this chapter reviews general population transition theory, then chronologically examines the history that has contributed to China's demographic profile. The first period reviewed will start with the establishment of the PRC in 1949 through the death of Mao Zedong in 1976. This period is exemplified by generally pro-natal policies but also affected by unintended consequences of the Great Leap Forward and other policies not directly related to population size. The second era examined will be from 1977 to the present. Hallmarks of this period include generally anti-natal policies like the One-Child Policy and also the effects of population transition under modernization. Finally, this chapter will examine the future demographic trends that are already developing due to China's demographic history. Population trends tend to be sustaining

⁶⁵ From Martin De Wulf, Population Pyramids of the World from 1950 to 2100 (Data Source: United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2012 Revision, (Medium variant)), accessed 16 August 2015, www.populationpyramid.net/china/2015.

due to a concept called demographic momentum, so future demography is highly predictable from the present trends.⁶⁶

A. POPULATION TRANSITION THEORY

Population transition theory or the demographic transition is “the process of modernization of the reproductive behavior in human populations.”⁶⁷ As is the case in China, the reason or reasons that change in reproductive behavior occurs are debatable. Potential causal factors include declining mortality, changes in economic incentives associated with modernization, the spread of westernization, governmental policy or the spread of family planning education and technology.⁶⁸ Aspects of all these potential factors are present in China. Regardless of the cause, the demographic transition is underway and shares characteristics with demographic transitions that have occurred before. The demographic transition is often described as a series of phases. These phases are graphically represented in Figure 2.

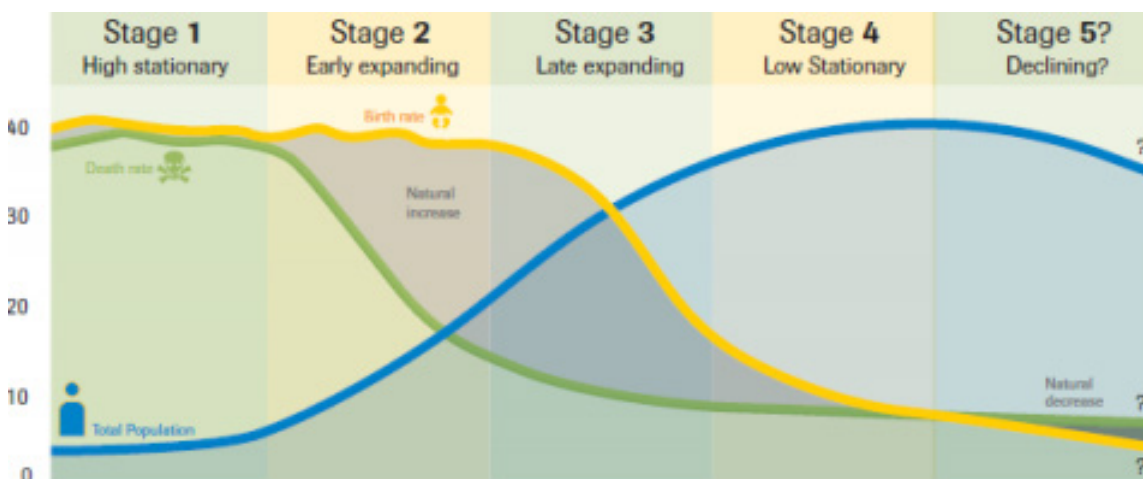


Figure 2. Stages of Demographic Transition Model.⁶⁹

⁶⁶ Jackson and Howe, *Graying of the Great Powers*, 10.

⁶⁷ Jean-Claude Chesnais, “Demographic Transition Patterns and Their Impact on the Age Structure,” *Population and Development Review*, Vol 16, No. 2 (June 1990), 327, <http://www.jstor.org/stable/1971593>.

⁶⁸ Kirk, “Demographic Transition Theory,” 367–381.

⁶⁹ From Drew Grover, “What is the Demographic Transition Model?” Population Education, posted October 13, 2014, <https://www.populationeducation.org/content/what-demographic-transition-model>.

The factors that govern the speed of the transition are how quickly fertility has fallen and life expectancy increased. The pace at which nations proceed through these stages varies. The transitions occurring in the Asian countries of China, South Korea, and Japan have been notably faster than countries that experienced the transition at earlier times.⁷⁰ Some researchers fear that the quickness of East Asia's and more specifically China's transition has the potential of "undermining economic growth and threatening social and political stability."⁷¹

1. Stage 1: High-Stationary or Pre-transition Phase

The first phase is the high stationary phase or pre-transition phase, evidenced by high fertility and high mortality (low life expectancy).⁷² The archetypal pre-transition society would be a pre-modernization, agrarian society.⁷³ Underdeveloped health care, poor sanitation and disease control, and inconsistent food supplies, combine to ensure that mortality rates are high.⁷⁴ Fertility is also high, resulting in generally larger families. Several explanations are given to explain this tendency of family sizes tend to be large. Economically having many offspring can be beneficial to provide labor on farms or other family enterprises. High infant mortality also leads families to have more children to ensure a desire number reaches adulthood. Pre-modern societies also lack access to effective birth-control technologies and may also have pro-natal religious teachings.

Pre-transition societies have relatively large populations of young people due to high fertility and family size. In turn, high mortality and short life expectancies shape the society's population pyramid at older ages. During the first stage of the demographic transition high fertility contributes to a high rate of births or crude birth rate. Also during this phase high mortality contributes to a high rate of deaths or crude death rate. Since the birth rate and death rate are both high and in balance, population growth is generally low. In pre-modern societies this tended to be the case with the exception of large mortality

⁷⁰ Jackson and Howe, *Graying of the Great Powers*, 154.

⁷¹ Ibid.

⁷² Chesnais, "Demographic Transition Patterns," 328.

⁷³ Truesdell, "China's Demographic Limits," 18.

⁷⁴ Ibid.

events, such as plagues, wars, or famines, which would cause a rapid decrease in population. The spread of modern medicine has ensured that no contemporary country any longer meets the crude death rate criteria of 30–50 per 1,000 that defines the pre-transition stage.⁷⁵

2. Stage 2: Early Expanding

The second stage of the demographic transition is brought on by a sustained decrease in mortality. For the demographic transition in Asia two potential explanations for this drop in mortality are given.⁷⁶ The first more conventional explanation is that the transfer of medical technology and the growth of public health programs was the primary contributor to lowering mortality.⁷⁷ Evidence for this includes the long list of health improvements that had been discovered or perfected in the western world that did not become common practice in much of Asia until the 1940s.⁷⁸ A second view is that increased productivity in agriculture leads to adequate nutrition to reduce child mortality.⁷⁹ Regardless which cause was predominant, their combined effect lowered mortality.

As in the first stage or pre-transition phase during the second phase fertility remains high. The factors that lead to the reduction of mortality, such as advances in medical technology and public health or better nutrition, have no intrinsic negative effect on fertility. A potential increase in fertility is dampened because family size is not strictly limited by medical capability or nutritional availability. Instead, societal norms and economic factors play significant roles to stabilize family size decisions. Overall, declining mortality and steady fertility together lead to an imbalance between birth rates and death rates, with many more people being born than dying. The natural result of this imbalance is rapid population growth. Fertility rates during this stage remain high.

⁷⁵ Truesdell, “China’s Demographic Limits,” 18.

⁷⁶ Bloom and Williamson, “Demographic Transitions and Economic Miracles,” 7–8.

⁷⁷ *Ibid.*, 7.

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*, 8.

3. Stage 3: Late Expanding

The third stage of a demographic transition is evidenced by a decrease in fertility. This decrease in fertility is caused not by medical factors limiting a women's ability to conceive children, but instead factors of choice whether it be at the individual, societal, or governmental level that leads to women having fewer children. There are three necessary preconditions for this drop in marital fertility to occur: fertility rate must be an aspect of choice, lower fertility is desired, and fertility can be effectively controlled by medical or other techniques.⁸⁰ As fertility declines, the crude birth rate or number of children born for every 1000 people also decreases. Theories addressing why this drop in fertility occurred vary but three oft-cited reasons are increased access to contraceptives, government policy, and family desires, which may be partially based on the economic costs and benefits of raising children.⁸¹ Regardless of the root cause, the drop in fertility to replacement levels or below has been experienced by every country of the developed world.⁸² While few would be surprised to see this evidence that the developed world has progress through this stage of its demographic transition, the more surprising fact is that the developing world has also progressed to at least this stage of its demographic transition if not beyond. Demographers Jackson and Howe have found in 2008 that "since 1970, the average fertility rate in the developing world has dropped from 5.1 to 2.9 the rate of population growth has decelerated from 2.2 percent to 1.3 percent per year."⁸³ This slowdown of population growth and fertility coming within balance with mortality represents the beginning of the fourth stage of the demographic transition.

4. Stage 4: Low Stationary

Many models of the demographic transition represent the fourth stage as the final stage of the transition. At this stage death rates and birth rates are low, fertility is at replacement levels and the total population is stable.⁸⁴ This fourth stage of stability in

⁸⁰ Kirk, "Demographic Transition Theory," 365.

⁸¹ Bloom and Williamson, "Demographic Transitions and Economic Miracles," 8–9.

⁸² Jackson and Howe, *Graying of the Great Powers*, 9.

⁸³ *Ibid.*, 133.

⁸⁴ Grover, "Demographic Transition Model?"

population size and a balance between death rates and birth rates was the expected final stage of the population transition.⁸⁵ In much of the world, this stage of balance has been merely a new transition as fertility rates have continued to remain below replacement levels and consequently death rates are eventually destined to exceed birth rates. Most developed countries are currently in this fourth stage but, because fertility rates remain below replacement, they will not remain at this stage.⁸⁶

5. Stage 5: Decline

Until recently the declining stage of demographic transition has been considered more theoretical than real, since only Japan was widely recognized to be experiencing it.⁸⁷ Yet as global aging continues and fertility rates remain low the list of countries going into natural population decline continues to grow. The initial countries, in addition to Japan, were mainly former Soviet Republics, but the trend is spreading through southern Europe and is projected to begin to appear in the rest of Asia within the next decade.⁸⁸ The explanation for the decline is that, after years of fertility below replacement level, the population is aging. This older population is contributing to the crude death rate at a higher pace than the smaller younger generation, with still low fertility, is contributing to the crude birth rate. The net result of this is quite simply that the natural population gradually begins to decline.

Immigration has played an important role in preventing or reducing the amount of population decline in some countries. The general flow of immigration has been from the developing world to the developed as workers seek better economic opportunities in the developed world. The levels of immigration that each country experiences is dependent on many factors, including government policies, perceived economic opportunity, established immigrant communities, and proximity to sources of potential immigrants. While immigration has allowed much of the developed world to avoid overall population

⁸⁵ Kirk, "Demographic Transition Theory," 383.

⁸⁶ Grover, "Demographic Transition Model?"; Kirk, "Demographic Transition Theory," 383.

⁸⁷ Truesdell, "China's Demographic Limits," 26.

⁸⁸ Jackson and Howe, *Graying of the Great Powers*, 186.

decline, a state like Japan where immigration is low is experiencing the challenges of population decline in the fifth stage of its demographic transition. The developing world, the source of many of these immigrants, is in the midst of its own demographic transition and soon will be facing its own challenges of population decline.

B. DEMOGRAPHIC PRESSURES UNDER THE INFLUENCE OF MAO (1949–1976)

The demographics of present day China began to be shaped well before the establishment of the PRC in 1949. At this point China had already begun its demographic transition. In the period from 1950–1955, China’s crude death rate was down to 22.1 deaths per thousand and its crude birth rate for the same period was 42.2 births per thousand.⁸⁹ This places China at the founding of the PRC squarely in the second stage, the early expanding stage of its demographic transition. The population pyramid of China in 1950 reflects a nation with a large percentage of young people and a much smaller percentage of elderly people (see Figure 3).

⁸⁹ UNData, “Crude Death Rate (1950-1955),” World Population Prospects: The 2012 Revision, August 16, 2015, <https://data.un.org/Data.aspx?q=crude+death+rate&d=PopDiv&f=variableID%3a65>; UNData, “Crude Birth Rate (1950-1955),” World Population Prospects: The 2012 Revision, August 16, 2015, <https://data.un.org/Data.aspx?q=crude+birth+rate&d=PopDiv&f=variableID%3a53>.

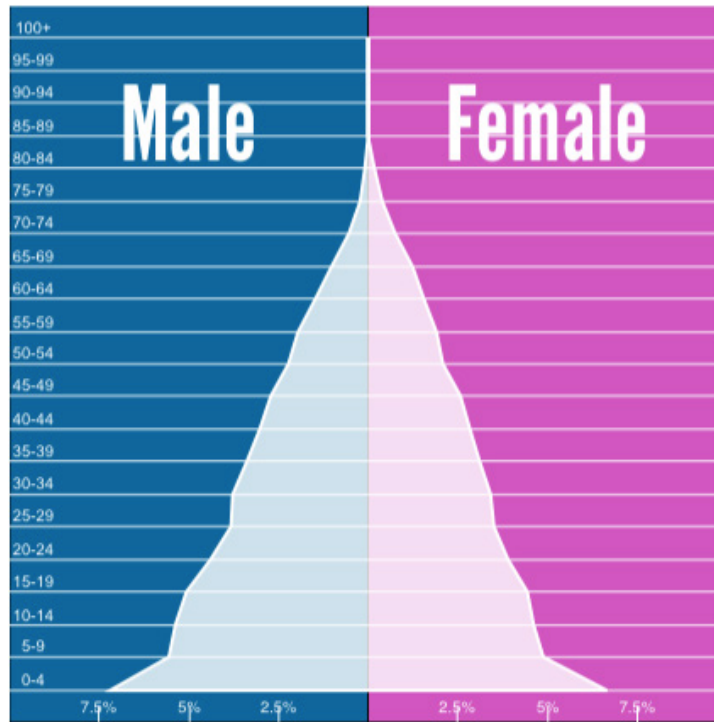


Figure 3. China's Population Pyramid 1950 (540 million).⁹⁰

The vast majority of Chinese at this time were rural and poor. Life expectancies were still fairly low at 44.8 years for women and 42.3 years for men.⁹¹ The Chinese Communist Party had wrested power over mainland China from the Kuomintang and Mao Zedong was in charge. Under Mao, many of the government's policies would indirectly have a significant impact in shaping the demographics of the nation. Coincidentally, it is the generation born at the time of this transition that powered much of the growth of the Chinese economy to the size it is today. These workers have also now begun to leave the workforce, prompting many of the dire predictions about the potential future of the Chinese economy.

One of the first policies of the Chinese Communist government that had an indirect effect on demographics was an egalitarian view of women. The PRC rhetorically supported gender equality as one of the goals of the revolution.⁹² Laws were passed to

⁹⁰ From De Wulf, *Population Pyramids of the World*, www.populationpyramid.net/china/1950.

⁹¹ England, *Aging China*, 14.

⁹² Hudson and den Boer, *Bare Branches*, 148.

provide equal access to education and end the practice of arranged marriages.⁹³ While the implementation of these laws was inconsistent, certainly many women enjoyed more rights than they had under the previous government.⁹⁴ This empowerment of women can be linked to a decrease in fertility as women take more control over decisions regarding family planning, usually leading to a smaller overall family size.⁹⁵ The extent of the fertility decline that can be linked to this change is unknowable, but it is one of many ways government policy has affected China's demography.

The Great Leap Forward (GLF) was a period of PRC history guided by an obsession with economic growth.⁹⁶ During the GLF, China attempted to accelerate growth by maximizing the labor of its peasants. The quotas that farmers were required to meet and give back to the government were based on unrealistic expectations. The necessity of meeting these quotas led to communes taking extreme measures like giving the produce they needed to live off of to make up for shortfalls. Officials were encouraged by the reports they received and continued to believe that even more production was possible. This became a cycle that drove the rural peasants to take additional desperate measures. Eventually, the reality of the peasants' plight was revealed when a great famine hit many rural provinces. Estimates vary about the exact number who perished in the famine, but the estimate Naughton uses of 25–30 million excess deaths and 30 million postponed or missing births is widely cited.⁹⁷ The demographic effects on the population were dampened by the overall size of the Chinese population (650 million) and the fact that the mortality affected a broad swath of the population instead of being concentrated to a specific age group or gender. The famine did create a spike in the crude death rate (CDR) between 1959 and 1961, but by the mid-1960s the crude death rate was back to its downward trend (see Figure 4). The crude birth rate

⁹³ Hudson and den Boer, *Bare Branches*, 149.

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*, 205.

⁹⁶ Naughton, *The Chinese Economy*, 69.

⁹⁷ *Ibid.*, 72.

(CBR) also reflects the famine in that it fell dramatically during the GLF, but then was higher for years afterwards due to delayed births (see Figure 4).

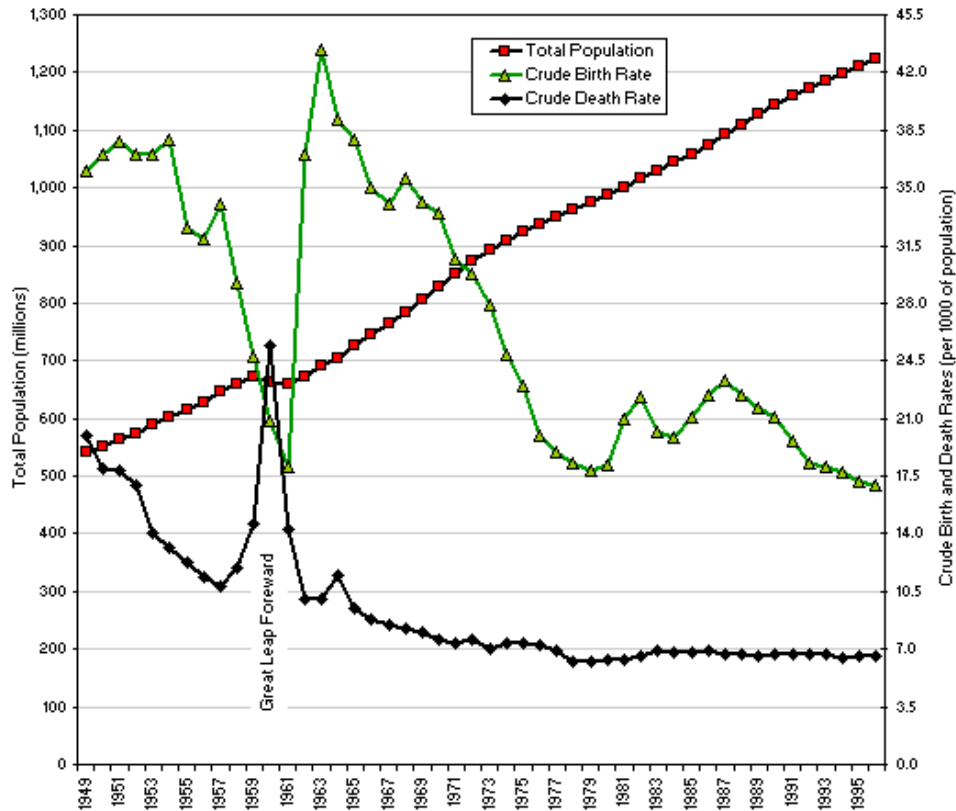


Figure 4. CBR, CDR and Population of China 1949–1996.⁹⁸

In Mao’s China, population policy was not a high priority of the government but instead an indirect effect of other policies. Under Mao’s leadership, China progressed through the second stage and into the third stage of its demographic transition. Mortality generally declined due to improvements in medicine and nutrition, with the exception of the period of the GLF famine. Overall, the population grew rapidly from about 550 million to 900 million in just over two and a half decades. Fertility declined slightly but still remained relatively high.

⁹⁸ From Total Population, Crude Death Rate, Crude Birth Rate, 1949–1996, China-Profile, (Data Source: National Bureau of Statistics of China (various years): China Statistical Yearbook), last modified December 18, 2011, http://www.china-profile.com/data/fig_p_10.htm.

C. DEMOGRAPHIC PRESSURES IN THE POST-MAO ERA (1977–PRESENT)

In the years following Mao, the Chinese government would shift dramatically on population policies, making the control of population size an intended effect of policy. The first of these policies was in response to the baby boom that followed the GLF. This baby boom was in part caused by delayed births. During the GLF, many potential parents did not have children, merely struggling to survive themselves. After the GLF, as conditions were not so dire, these potential parents had children at a faster rate, making up for those delayed during the GLF. This fertility spike that began in the early 1960s continued into the early 1970s resulting in a rapid return to population growth. In 1968, neo-Malthusian Paul Ehrlich's book, *The Population Bomb*, championed a renewed concern that population growth was outstripping the earth's natural resources. Neo-Malthusian fears of overpopulation were becoming a worldwide concern.⁹⁹ The Chinese government, reacting to these fears and driven by the belief that population control was essential increasing per capita GDP, responded with policies to directly control population growth.¹⁰⁰ The first of these campaigns was the "Later, Longer, Fewer" campaign.¹⁰¹ The campaign encouraged smaller family size by waiting longer to marry, having fewer children, and waiting longer between children.¹⁰² The demographic change that occurred during the campaign was dramatic, as within the span of a decade total fertility rate (TFR) dropped from 5.7 to 2.8 births per woman.¹⁰³

By 1980, despite the drop in fertility, China's population continued to grow at a rapid pace. The CDR was actually increasing at this time.¹⁰⁴ This is seemingly contradictory phenomenon is possible because of what both of the metrics measure. Total fertility rate (TFR), or often stated as just fertility, is the number of children that a notional woman would produce if she went through her entire child bearing period in the

⁹⁹ England, *Aging China*, 20.

¹⁰⁰ Wang and Mason, "The Demographic Factor," 136.

¹⁰¹ Tuljapurkar, "How Demography Shapes," 35.

¹⁰² Wang and Mason, "The Demographic Factor," 137.

¹⁰³ *Ibid.*, 138.

¹⁰⁴ UNdata, "Crude Birth Rate."

calculation year. It is calculated for a given year but summing the average number of children born to women of each year of child-bearing age in that year. Therefore, it does not seek to represent any particular birth year of women, but instead represents the expected average number of children a woman would have if reproduction rates did not change for the entirety of her life. TFR is not sensitive to how many women of child bearing age there actually are as only the average woman of a particular age is used in the calculation. Crude birth rate (CBR) however is calculated by simply recording the average number of births per 1000 people of population. CBR is therefore very sensitive to the demographic composition of the population. For example, if a countries population is primarily elderly, its CBR will likely be very low because, for every woman of child-bearing age, there will be many people beyond child bearing years. If a population is primarily composed of young people of child-bearing age, then even if fertility is low and each woman is having a small number of children the rate of children born to this population would be comparatively high.

In China, the growth in population in the 1980s and the rise in crude birth rate was a result of the “echo-boom” as children born during the GLF boom reached reproductive age. China’s population pyramid for 1980 shows this situation; decreased fertility during the 1970s leads to few infants, and the echo boom on the cusp of reaching reproductive age (see Figure 5).

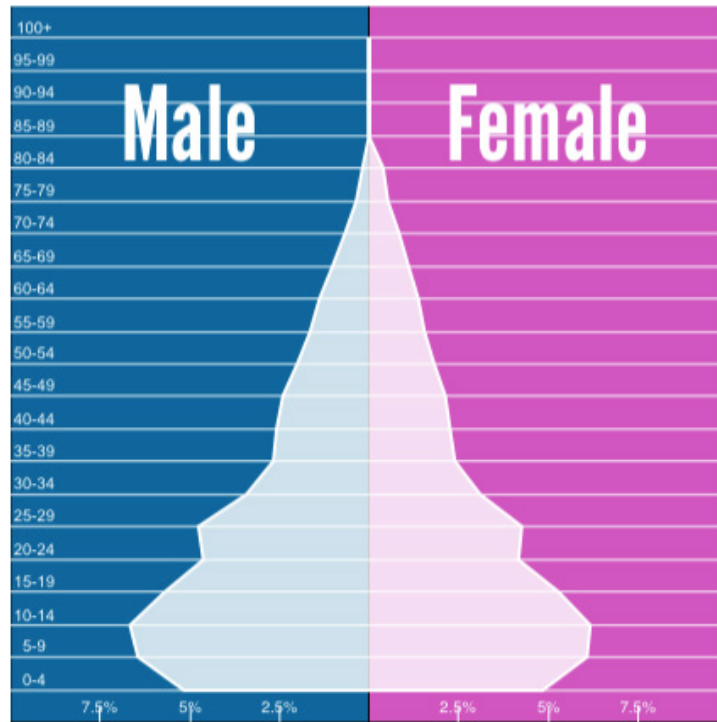


Figure 5. China's Population 1980 (984 million).¹⁰⁵

The government policy response to this rising population was the one-child policy, first announced in 1980.¹⁰⁶ The one-child policy was introduced as an emergency measure, but has remained as the basis for Chinese population policy ever since.¹⁰⁷ A true universal one-child policy would result in a TFR of 1. The fact that China's total fertility rate has never been recorded as this low demonstrates that exceptions to the policy have always existed. Implementation of the policy has evolved over the decades in response to popular pressures and changing governmental concerns. With the one-child policy being the foundation of China's population policy from 1980 until present, this section will address how implementation of the policy has evolved and the effect it has had on both the workforce and the gender balance in China.

The one-child policy has never been implemented to the point where every couple in China only had one child. Due to popular pressures and the need for more labor on

¹⁰⁵ From De Wulf, Population Pyramids of the World, www.populationpyramid.net/china/1980.

¹⁰⁶ Wang and Mason, "The Demographic Factor," 138.

¹⁰⁷ Ibid.

farms, couples in rural China have been allowed a second child for almost the entirety of the policy.¹⁰⁸ By the mid-1990s, implementation of the policy began to shift from “pure reliance on administrative coercion to greater emphasis on service provision.”¹⁰⁹ In other words, while not completely dismantling the policy, the government tried to present a more palatable approach to family planning. Fertility levels continued to drop, but so too did the confidence that officials had in the reported numbers.¹¹⁰ As one-child policy adherence became an element that officials were evaluated upon, the numbers reported by these officials became more questionable.¹¹¹ Fertility continued to drop with the policy but to what level became unknown. By 2000, China’s population census reported a total fertility rate of 1.22, well below replacement level.¹¹² Replacement level fertility rate is around 2.1. This, over time, will lead to a stable overall population, as the average woman of child-bearing age produces a new potential mother and father, with a small extra to account for those who die before adulthood and the slight natural gender imbalance at birth. While fertility rate from the 2000 census of 1.22 number is widely considered erroneously low, the fact that China’s population growth had significantly slowed was widely accepted.¹¹³ China was by 2000 in the fourth stage of its demographic transition.

With the one-child policy remaining in place, a new population concern has arisen in China in the past decade, that of worker shortages.¹¹⁴ China is beginning to experience the result of decades of fertility below replacement level—its population is growing older, and will eventually shrink. While overall population decline is still a future concern for China, as the nation grows older, the number of people leaving working age is exceeding those entering working age. This decline in the number of working age

¹⁰⁸ Wang and Mason, “The Demographic Factor,” 138.

¹⁰⁹ *Ibid.*, 139.

¹¹⁰ *Ibid.*, 141.

¹¹¹ *Ibid.*, 140.

¹¹² *Ibid.*, 141.

¹¹³ *Ibid.*, 140–141.

¹¹⁴ See, for example, Harold L. Sirkin, “China’s Worker Shortage Is a Global Problem,” Bloomberg, published May 30, 2013, <http://www.bloomberg.com/bw/articles/2013-05-30/chinas-worker-shortage-is-a-global-problem>.

individuals is at the center of the demographic and economic nexus that this thesis explores.

Before focusing on the economic aspects of this and comparable demographic situations, one additional important impact of China's one-child policy and its demographic future for China should be examined: China's gender ratio has become unnaturally skewed as an unintended effect of the one-child policy. The natural gender-ratio at birth is slightly more males than females, usually between 105–107 males per 100 females with ratios above 105 at ages 0–4 indicating selection against females.¹¹⁵ Chinese, like many other cultures, have a preference for sons.¹¹⁶ In China and other parts of East Asia this “preference is manifested in sex-selective abortions as well as in a gender bias in the care of female infants and children that results in excess female deaths.”¹¹⁷ The one-child policy has exacerbated this trend as parents allowed a strictly controlled number of children go to great lengths to ensure they have a son.¹¹⁸ The result of this has been an increase in the sex ratio.¹¹⁹ The sex ratio among 0–4 year olds was 120.2 males per 100 females in 2002.¹²⁰ Comparing China to the worldwide number of 105.1 males per 100 females in 2002 makes it clear that China is experiencing a significantly abnormal gender distribution.¹²¹ Hudson and den Boer work *Bare Branches: The Security Implications of Asia's Surplus Male Population* expounds on potential negative societal and economic effects of this imbalance. A central to aspect of these effects is the behavior of the excess bachelor population that imbalance creates.¹²² These “Bare Branches” are prone to be underemployed or unemployed, lack strong ties to communities, participate in risky behavior including violent and criminal

¹¹⁵ Hudson and den Boer, *Bare Branches*, 30.

¹¹⁶ *Ibid.*, 23.

¹¹⁷ *Ibid.*

¹¹⁸ *Ibid.*, 154–156.

¹¹⁹ *Ibid.*, 156.

¹²⁰ *Ibid.*, 264.

¹²¹ *Ibid.*, 264–270.

¹²² *Ibid.*, 187–188.

behavior.¹²³ Women in societies with excess males have often seen their status decline, are more likely to be kidnapped or sold as brides, and have seen higher levels of prostitution.¹²⁴

Concerns over economic impacts, demographic impacts, the imbalanced gender ratio and human rights have led many to believe that the one-child policy should be repealed. The PRC has indeed begun loosening the policy: in 2013, the National People's Congress, "adopted a proposal ... that allows couples to have a second child if either of them has no siblings."¹²⁵ This is following a trend of relaxing the one-child policy from as early as the late 1990s.¹²⁶ In addressing the gender ratio imbalance, the *China Daily*, published results of a study that found "no evidence for the traditional idea that having sons ensures better care in old age," and that having a daughter as a first child could be correlated with being happier.¹²⁷ China's official policy is slowly shifting from anti-natal to more neutral. Demographers are pessimistic about sudden rebounds in fertility, but tend to agree that well designed pro-natal policies may help slow the decline of fertility.¹²⁸ China's policy still is far from pro-natal and even if an immediate increase in fertility was experienced from lifting the one-child policy, it would take decades for it to significantly alter the demographic momentum already established under the one-child policy.

In discussing China's demographics, policy, especially the one-child policy is often a primary focus. The preceding sections and other scholarly works demonstrate this repeatedly. Policies are accessible to scholars, they can be understood, they lend themselves to quantification and have specific start dates and end dates. Yet, especially in a population the size of China's, policies can never be perfectly implemented and the

¹²³ Hudson and den Boer, *Bare Branches*, 188–200.

¹²⁴ *Ibid.*, 202–207.

¹²⁵ Wang Xiadong, "All couples may be allowed to have a second child soon: expert," *China Daily*, last modified May 5, 2015, http://europe.chinadaily.com.cn/china/2015-05/08/content_20656281.htm.

¹²⁶ *Ibid.*

¹²⁷ Xu Wei, "Having daughters makes you happier, survey says," *China Daily*, last modified May 19, 2015, http://www.chinadaily.com.cn/china/2015-05/19/content_20755382.htm.

¹²⁸ Jackson and Howe, *Graying of the Great Powers*, 51–52.

resulting demographic changes are a combination of many forces, most of which are much more difficult to quantify than policy. When considering demographic changes that have occurred in the Post-Mao era it is important to acknowledge that drops in fertility have occurred in developing societies around the world. China’s drop in fertility would have occurred as it has elsewhere without anti-natal policies, but these policies have augmented the change causing it to occur faster and to drop lower than would have occurred due to modernization alone. Evidence for this can be seen in the correlation in timing between the “Later, Longer, Fewer” campaign and the one-child campaign and the largest reductions of fertility.¹²⁹ While correlation does not always indicate causation, these anti-natal policies have seemed to have an effect on China’s fertility rates.

Since the founding of the PRC, China’s demographics have undergone a dramatic shift. China has moved from stage 2 to stage 4 of its demographic transition. Figure 6 demonstrates how much China’s demographics have been reshaped over a period of 75 years. This shift has transformed China’s society and economy.

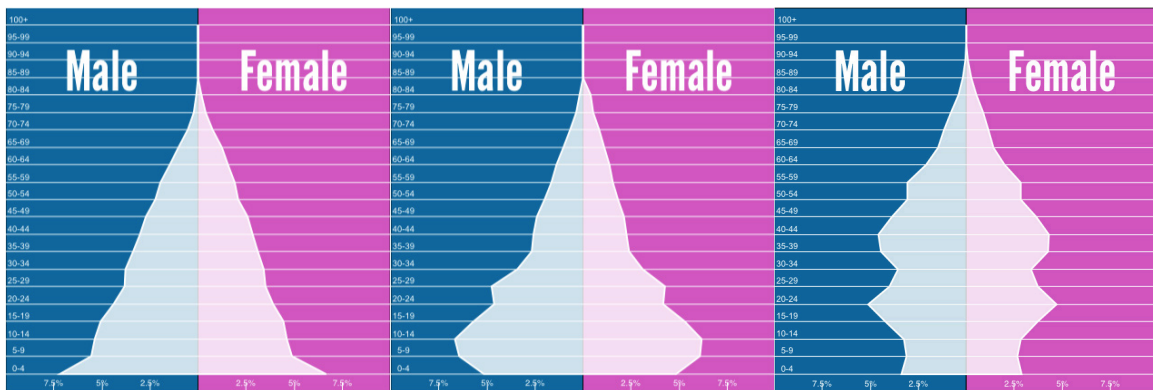


Figure 6. China’s Population 1950 (543 million) (L), 1980 (984 million) (C), 2010 (1,359 million) (R).¹³⁰

¹²⁹ Tuljapurkar, “How Demography Shapes,” 35–36.

¹³⁰ From De Wulf, Population Pyramids of the World, www.populationpyramid.net/china/1950, www.populationpyramid.net/china/1980, www.populationpyramid.net/china/2010.

D. FUTURE POPULATION TRENDS

By understanding the current situation, elements of China's demographic future are highly predictable. Demographic projections for the next several decades are highly predictable because the vast majority of those accounted for in the projections are already alive. This section will examine three aspects of China's demographic future that may have important economic consequences: the shrinking of China's working age population, which is already occurring; the aging of the population; and an increasing dependency ratio.

1. Working-Age Population Decline

Estimates differ on the exact year that China's working age population will reach its peak, but they agree that it has already happened or will happen within the decade. The difference in estimates is not due to disagreement in the overall dynamics of China's population, but instead differing definitions of the working age population. The World Bank, United Nations, and other international organizations generally use people aged 15–64 as their definition of working age population. China's own estimates for the peak are earlier because its definition is in line with its official retirement ages of 60 for men and either 50 or 55 for women. The estimates based on the working age standard of (15–64) may overestimate the number of people who consider themselves potential workers. Regardless of the age used to define working age the population dynamic is unchanged: more people will be exiting the workforce by reaching retirement age than will be entering the workforce. The dynamic occurring in total working age population is charted in Figure 7. The economic impact of this is that China's current growth model relying on increasing factor inputs, including labor, to achieve rapid growth cannot be sustained.¹³¹

¹³¹ Mitali Das and Papa N'Diaye, "The End of Cheap Labor," *Finance and Development* (June 2013), <http://www.imf.org/external/pubs/ft/fandd/2013/06/pdf/das.pdf>.

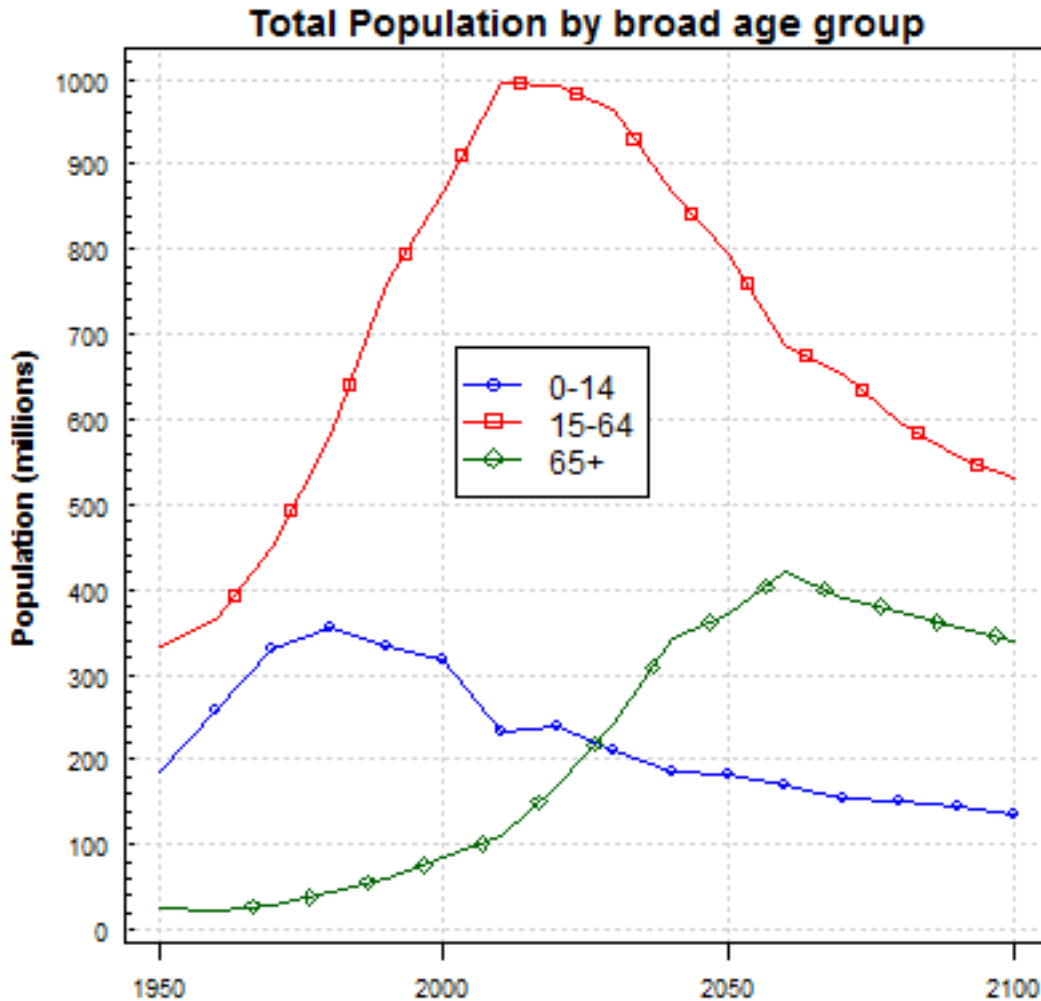


Figure 7. Working Age Population Decline in China.¹³²

2. Population Aging

Aging presents a possible second pathway that demographic change will impact the economy. China's median age will rapidly rise from 34.5 in 2010 to 48.7 by 2050.¹³³ For comparison, this increase is over 4.5 times (14.2 years to 3.1 years) the increase of the United States median age during this same period (36.9 to 40.0).¹³⁴ Aging becomes

¹³² From United Nations, Department of Economic and Social Affairs, World Population Prospects, the 2015 Revision, <http://esa.un.org/unpd/wpp/Graphs/>

¹³³ "China's Achilles Heel," *The Economist*, posted April 21, 2012, <http://www.economist.com/node/21553056>.

¹³⁴ *Ibid.*

an economic concern because some evidence has suggests that as a workforce ages it, “become less dynamic and innovative and less able to adapt to rapid market and technological change.”¹³⁵ Individual productivity suffers with age as physical capacity generally begins to deteriorate as early as 30, and deterioration of cognitive abilities begins as early as the mid-40s.¹³⁶ If an older population leads to decreased productivity and innovation, it will have a negative impact on the Chinese economy.

3. Increasing Dependency Ratio

A third economic concern that occurs with aging is a rise in dependency ratio. The dependency ratio is the ratio of the population too young or too old to work divided by the number of working age people. Generally, speaking low dependency ratios are economically beneficial. In countries with low dependency ratios can focus more private and public investment can be spent on growing the economy instead of providing for those too young or old to work. Chapter four examines how China’s increasing dependency ratio compares with other aging societies. The overall effect of a higher dependency ratio is that fewer workers are supporting though taxes a larger number of people who are more likely to require government support. A particularly acute manifestation of this can be seen in “4-2-1” families, where as a result of the one-child policy, many individual workers are responsible for two parents and four grandparents in old age. This will prove an unwieldy burden on the youngest generation, meaning that aging Chinese, who have traditionally relied on their offspring during retirement, will instead be more likely to depend on state programs.¹³⁷ High dependency ratios may mean that more private and public funds will have to be directed towards caring for the dependent population and less towards the investment that has financed Chinese economic growth.

¹³⁵ Jackson and Howe, *Graying of the Great Powers*, 108.

¹³⁶ *Ibid.*, 110.

¹³⁷ “China’s Achilles Heel.”

E. CONCLUSION

This section began with a review of population transition theory, which describes the shift “from a pre-modern regime of high fertility and high mortality to a post-modern one in which both are low.”¹³⁸ This pattern has become universal with all countries in the modern world being able to be categorized in stages 2–5 of the continuum.¹³⁹ By reviewing China’s demographic history its progress through the early stages of the transition under Mao was observed. Following Mao, the government’s policies designed to control population growth accelerated the transition by reducing the fertility rate. Presently, China is in the fourth stage of its demographic transition and will soon be entering the fifth stage of the transition. The demographic transition will cause potential economic hurdles as the working age population shrinks, rapid aging occurs in the population, and the dependency ratio rises.

¹³⁸ Kirk, “Demographic Transition Theory,” 361.

¹³⁹ *Ibid.*, 382.

III. COMPARATIVE CASE STUDIES: GERMANY, JAPAN, AND RUSSIA

While China is the largest country facing the economic consequences of the fifth stage (natural population decline) of its demographic transition, it will not be the first country to do so. The demographic transition in China began later than the transitions in much of Western and Southern Europe, Russia, and Japan. These experiences provide potential case studies to examine the possible impacts on China. This chapter examines three comparison cases, Germany, Japan, and Russia, with the goal of understanding how the final stages of the demographic transition has impacted these countries' economies, how the effects have been or can be mitigated, and if these effects are likely to occur in the Chinese economy. To accomplish this goal, the chapter provides an overview of the demographic and economic situation of these countries and then, thematically, examines economic challenges driven by this shared demographic situation.

A. DEMOGRAPHIC AND ECONOMIC OVERVIEWS

1. Germany

The German economy has recently been seen as an economic bright spot surrounded by many struggling economies in Europe. The contrast is more evident when Germany is compared to the other low fertility countries of Western-Europe; Austria, Switzerland, Italy, Spain and Portugal.¹⁴⁰ Germany is not only the largest economy of this group by far, it has also had one of the strongest economic growth rates among these countries during the recovery from the great recession (see Table 1).

¹⁴⁰ Jackson and Howe, *Graying of the Great Powers*, 42.

Table 1. Economic Statistics of Western Europe's Low Fertility Countries.¹⁴¹

	Germany	Italy	Spain	Switzerland (2013)	Austria	Portugal
GPD 2014 (Billions U.S. \$)	3,852	2,144	1,404	685	436	230
Average GDP Growth Rate (2010-2013)	2.1%	-0.5%	-1.0%	2.0%	1.5%	-1.2%

Germany has also experienced an average gain in GDP per capita over the same period of 2.5% per year. The German economy is considered the economic engine of the European Union and has helped drive the post-recessionary recovery.

The mathematical explanation of why GDP per capita is growing at a faster rate than aggregate GDP is that Germany is experiencing population decline. During this period Germany's total population shrunk by over a million people or about 1% of total.¹⁴² Since the 1970s, Germany's total fertility rate has remained below replacement levels (figures for East and West Germany combined prior to 1990).¹⁴³

As a result of these trends, Germany has experienced demographic events similar to those that China is experiencing and will experience within a generation. One of the first economically significant such events is the shrinking of the working-age population. Germany's working age population peaked around 2000 and has begun a decline that will continue to increase in pace as more of the population reaches retirement (see Figure 8).

¹⁴¹GDP from World Bank, "GDP"; GDP Growth from World Bank, "GDP Growth (Annual %)," August 16, 2015, <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?display=default>.

¹⁴² World Bank, "Population Estimates."

¹⁴³UNdata, "Total Fertility Rate," United Nations, Department of Economic and Social Affairs, Population Division, August 16, 2015, <https://data.un.org/Data.aspx?q=fertility&d=PopDiv&f=variableID%3a54>.

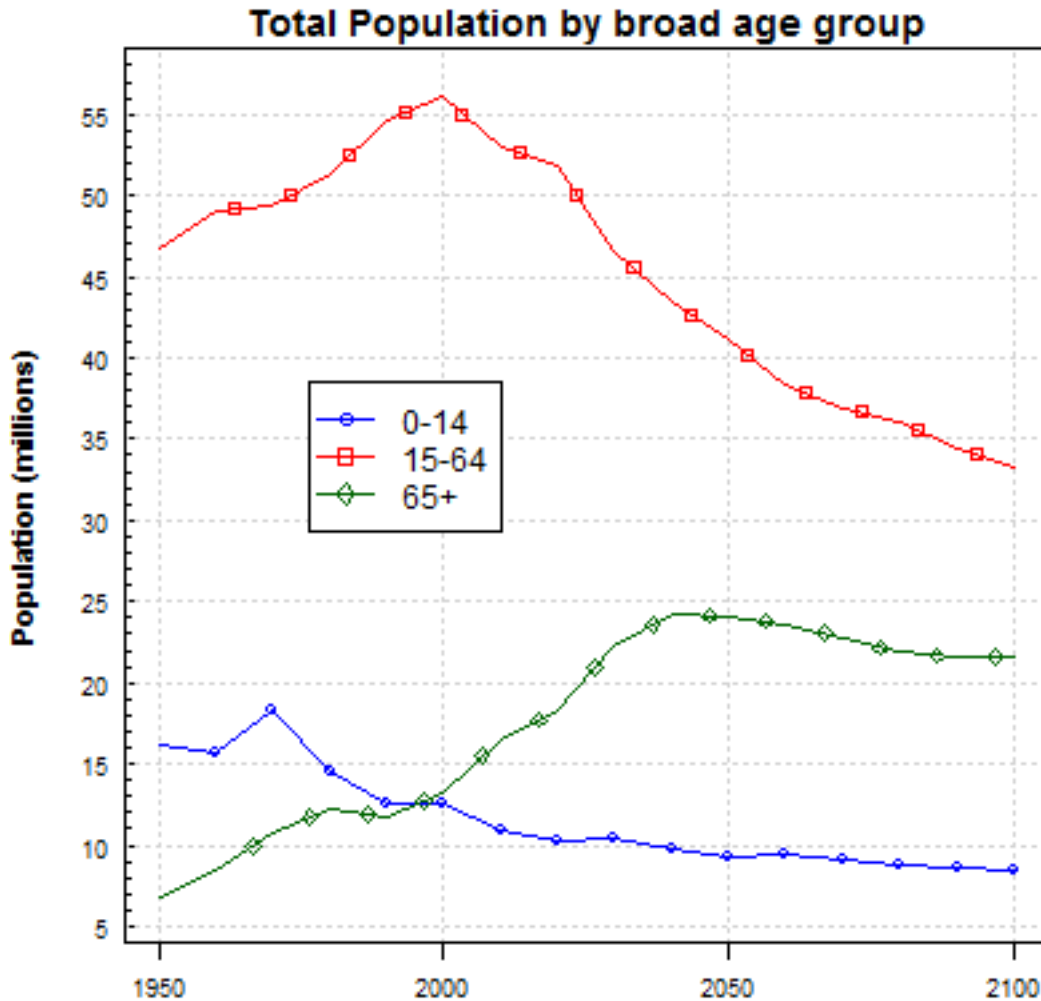


Figure 8. German Population by Major Age Group.¹⁴⁴

Germany entered the fifth stage of its demographic transition around 2010 as its overall population began to shrink. These are the expected developments of countries as they enter the fifth stage of their demographic. Not only will China experience both of these transitions like Germany, there is remarkable similarity between Germany's current population distribution and that which is projected for China in the year 2040 or about 25 years from now (see Figure 9).

¹⁴⁴ From United Nations, Department of Economic and Social Affairs, World Population Prospects, the 2015 Revision, <http://esa.un.org/unpd/wpp/Graphs/>

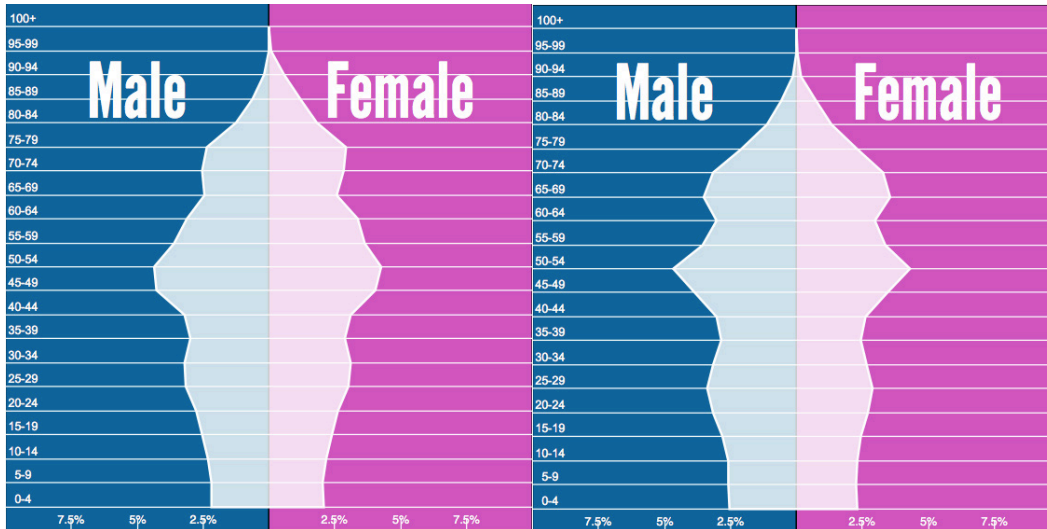


Figure 9. Germany Population 2015 (L), China Projected Population 2040 (R).¹⁴⁵

Despite these demographics the German economy is generally considered very strong. The economy has been resilient in the face of economic crisis both internationally and more locally in Europe.¹⁴⁶ A recent OECD survey credits much of this strength to a “strong manufacturing sector and a robust labour market.”¹⁴⁷ The survey raises several economic concerns that Germany is facing due to its demographic situation. The survey predicts that reduction in employment due to demographics will reduce potential growth by a fraction of a percent of GDP annually over much of the next two decades.¹⁴⁸ Other demographic concerns include the budgetary impact of health and long-term care provision for a growing elderly population.¹⁴⁹ Germany has made progress in dealing with demographic changes by implementing pension reforms that have reduced their impact on the budget.¹⁵⁰ Germany has also been able to increase its labor force

¹⁴⁵ From De Wulf, Population Pyramids of the World, www.populationpyramid.net/germany/2015, www.populationpyramid.net/china/2040.

¹⁴⁶ OECD, *OECD Economic Surveys: Germany 2014* (Paris: OECD Publishing, 2014), 10, http://dx.doi.org/10.1787/eco_surveys-deu-2014-en.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid., 16–18.

¹⁴⁹ OECD, *Germany 2014*, 16.

¹⁵⁰ Ibid.

participation despite a shrinking working-age population by including more older workers, women and immigrants.¹⁵¹ Germany has been able to continue to grow a strong prosperous economy despite its demographics by taking forward-looking policy action.

2. Japan

Japan has often been a leader in East Asia. It was the first East Asian country to win a war against a European power. It was the first East Asian country to industrialize and modernize. Japan was also the first East Asian country to experience the drop in fertility rates associated with modernization and its demographic transition. In much of the 20th Century, it was the largest Asian economy and at times during the late 20th Century, second only to the United States in economic size. Now, Japan is leading Asia and the world in demographic aging. This demographic situation is sometimes linked to the prolonged economic malaise that Japan is experiencing.

Japan's economic difficulties began during the 1990s, the "lost decade" which followed an asset price bubble collapse in the country. Anemic economic growth continued through the 2000s, despite government efforts, including the current slate of reforms known as Abenomics. Japan's average annual GDP growth during the past two decades (1994-2014) has been 0.86%.¹⁵² This slow growth and associated deflationary pressures have "reduced Japanese living standards below the OECD average."¹⁵³

Demographically, Japan has experienced the "perfect demographic storm: plunging fertility, soaring life expectancy, and negligible net immigration."¹⁵⁴ Japan's fertility rate is currently among the world's lowest and has remained below replacement levels for about two generations.¹⁵⁵ The demographic outcome of this is that Japan's working-age population began shrinking around 2000 and will continue to shrink (see

¹⁵¹ OECD, *Germany 2014*, 29.

¹⁵² World Bank, "Annual GDP Growth."

¹⁵³ OECD, *OECD Economic Surveys: Japan 2015* (Paris: OECD Publishing, 2015), 10, http://dx.doi.org/10.1787/eco_surveys-jpn-2015-en.

¹⁵⁴ Jackson and Howe, *Graying of the Great Powers*, 45.

¹⁵⁵ *Ibid.*

Figure 10). The OECD finds that rapid population aging, due to Japan's demographics, is limiting Japan's potential growth rate.¹⁵⁶

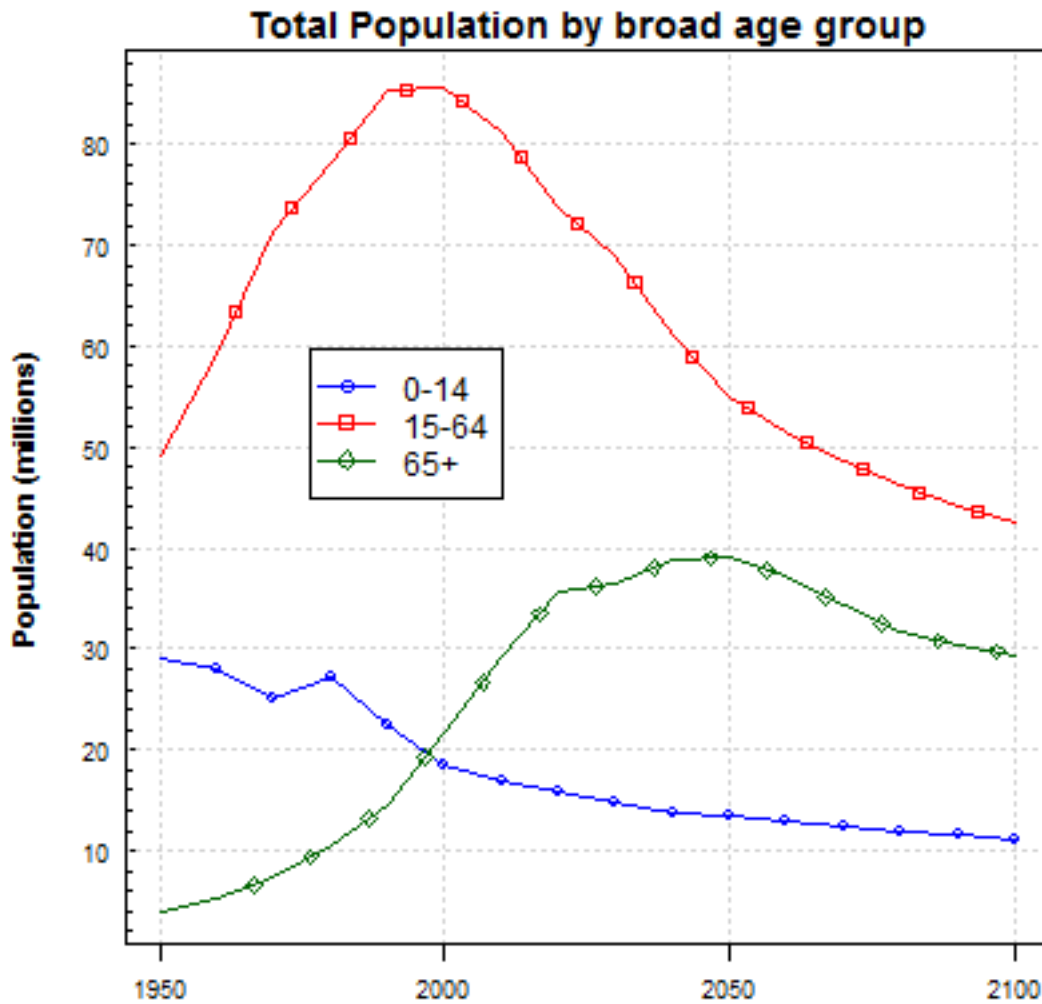


Figure 10. Japanese Population by Age Group.¹⁵⁷

Despite an extended period of very low-fertility, Japan's high longevity has delayed the fifth stage of its demographic transition to around 2005.¹⁵⁸ Japan's current

¹⁵⁶ Jackson and Howe, *Graying of the Great Powers*, 45.

¹⁵⁷ From United Nations, Department of Economic and Social Affairs, World Population Prospects, the 2015 Revision, <http://esa.un.org/unpd/wpp/Graphs/>

¹⁵⁸ United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision, Volume II, Demographic Profiles*, 409.

population distribution is similar to that projected for China around 2055 or 40 years from now (see Figure 11).

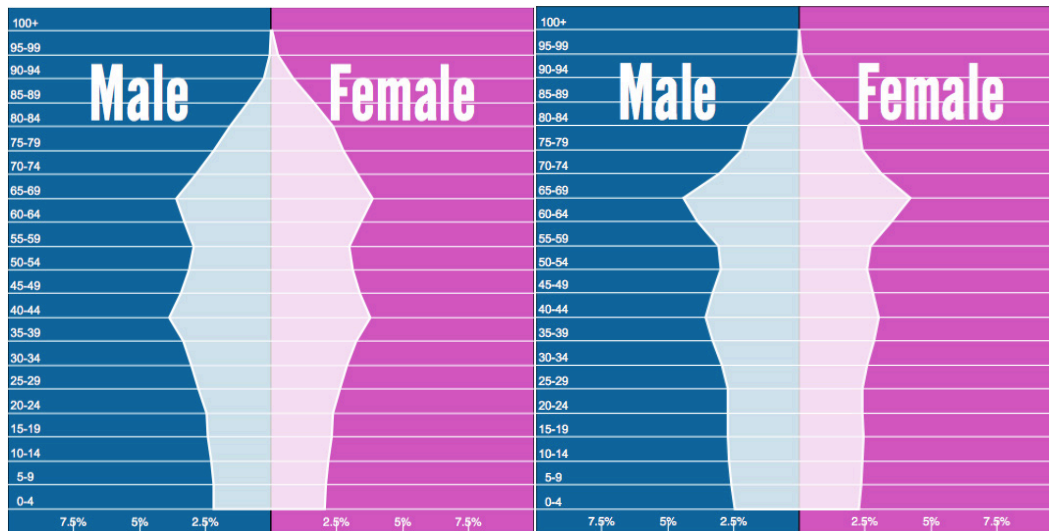


Figure 11. Japan Population 2015 (L), China Projected Population 2055 (R).¹⁵⁹

The economic impacts of demographics have been strongly felt in Japan. Elements that have dampened the demographic impact of labor force decline in Germany like immigration and female labor force participation are not as prevalent in Japan. A direct comparison of these aspects will be expanded upon later in this chapter. On the other hand, Japan has had success in keeping older workers in the work force, having the highest level of elderly-worker work force participation in the world.¹⁶⁰ Japanese social conventions also provide some potential advantages to the government as it faces its growing aging population: Japanese elderly rely more highly on grown children and other family connections during retirement and less on public pensions than in other areas of the developed world.¹⁶¹

¹⁵⁹ From De Wulf, Population Pyramids of the World, www.populationpyramid.net/japan/2015, www.populationpyramid.net/china/2055.

¹⁶⁰ Jackson and Howe, *Graying of the Great Powers*, 45.

¹⁶¹ Ibid.

3. Russia

The Russian economy is currently in sharp decline due to the combined effects of low oil prices and economic sanctions in put in place due to events in Crimea and Ukraine. The large reliance on extractive economic activity makes the Russian economy particularly vulnerable to global commodity prices. While commodity prices and the sanctions regime will greatly affect the Russian economy in the short and potentially medium term, neither of these elements is directly related to Russia's demographic situation. This supports the idea that while demographics may play a significant role in long-term economic growth, short-term events can cause spikes or slow-downs in growth that temporarily overcome long-term effects like demographics.

Demographically, Russia is unique among the countries in this study in that its peak working-age population occurred after its peak total population. Russia entered the fifth stage of its demographic transition in mid-1990s, as total population began to a decline.¹⁶² Its working-age population is actually just now peaking. This is the unfortunate effect of Russia's low life-expectancy (67.2 years) being nearly the same as the nominal end of a person's working years.¹⁶³ Instead of enjoying many years in retirement, if Russians worked until 65 or the aged used by many international organizations to define retirement they would be on average a few years from death. Whereas in Japan and Germany the number of elderly people has grown rapidly, in Russia this population is not projected to grow significantly in number, but will grow eventually as a percentage of overall population due to a decline in the working age population (see Figure 12).

¹⁶² United Nations, *World Population Prospects*, 634.

¹⁶³ *Ibid.*, 632.

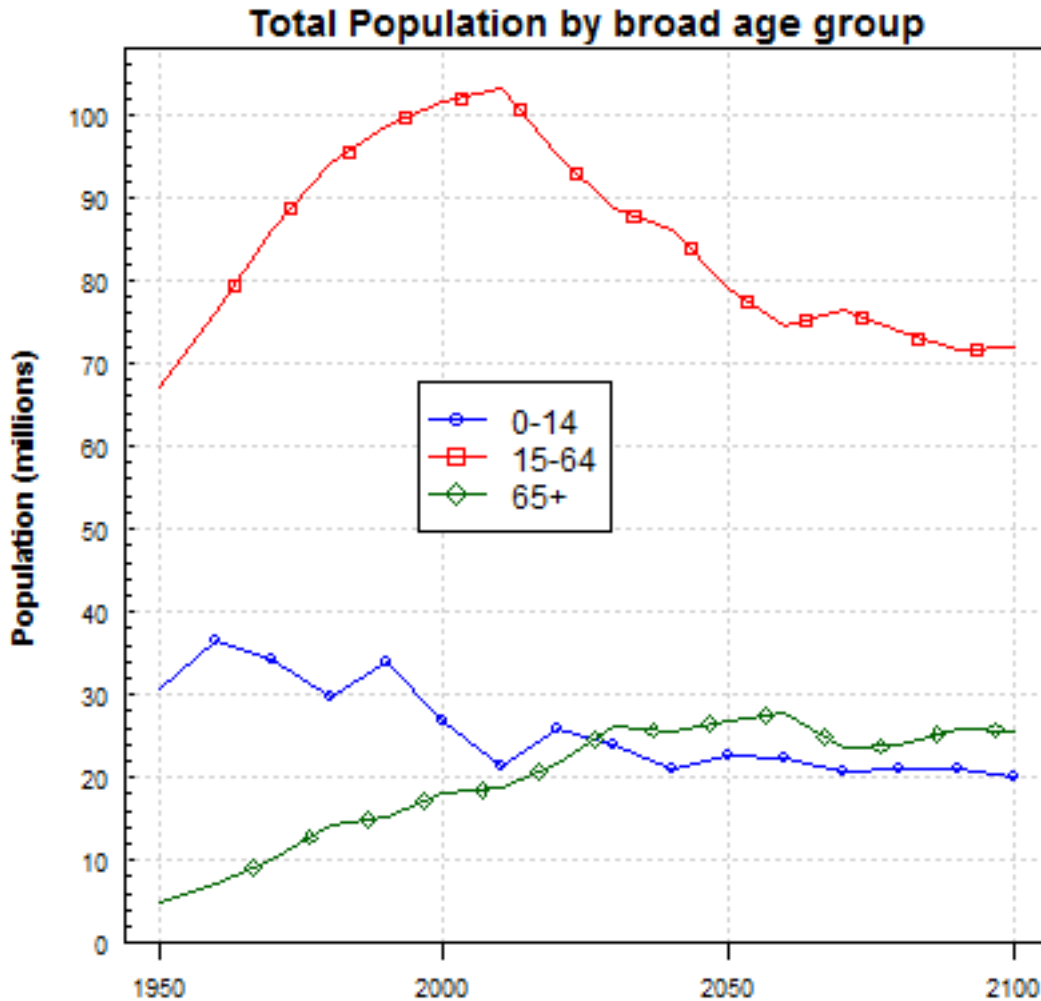


Figure 12. Russian Population by Age Group.¹⁶⁴

The combination of Russia’s low fertility and low life expectancy provides cause for concern. Russia’s low life expectancy is blamed in part on “risky lifestyles, prodigious rates of per capita alcohol consumption, and [a] crumbling health-care system.”¹⁶⁵ Economically, these health factors and low life expectancy have the potential to “slowly erode a nation’s human capital.”¹⁶⁶ There is also concern that low life expectancy is economically harmful by discouraging future-oriented saving and

¹⁶⁴ From United Nations, Department of Economic and Social Affairs, World Population Prospects, the 2015 Revision, <http://esa.un.org/unpd/wpp/Graphs/>

¹⁶⁵ Jackson and Howe, *Graying of the Great Powers*, 179.

¹⁶⁶ Ibid.

investment.¹⁶⁷ The government has begun to provide incentives to increase fertility, but “experience suggests that the impact on fertility of support provided around the time of birth is most likely temporary, as it only accelerates but does not increase the number of childbirths.”¹⁶⁸

While Russia’s short and medium term growth will be highly dependent on the non-demographic factors of commodity prices and sanctions regimes, a demographic effect on Russia’s long-term economic trajectory seems likely. If the Russian economy recovers from low-commodity prices and sanctions are removed it is expected that life expectancy will increase in line with higher incomes.¹⁶⁹ If this occurs future pension cost will increase. The current political administration has ruled out increases to the low retirement age of 60 for men and 55 for women, but a policy that links these ages to a growing life expectancy will become needed to contain pension costs.¹⁷⁰ Other long-term economic demographic effects in Russia include loss of productivity due to the erosion of human capital. One potential benefit for the Russian economy is that employment of older workers is highly concentrated in low-productivity Soviet era companies.¹⁷¹ If future, highly educated workers are enabled to enter more productive enterprises overall productivity could rise.¹⁷² Completing Russia’s transition to a market oriented economy and reducing cronyism and corruption is key to releasing the potential of these future generations.¹⁷³

¹⁶⁷ Jackson and Howe, *Graying of the Great Powers*, 179–180.

¹⁶⁸ OECD, *OECD Economic Surveys: Russian Federation 2013* (Paris: OECD Publishing, 2014), 24–25, http://dx.doi.org/10.1787/eco_surveys-rus-2013-en.

¹⁶⁹ *Ibid.*, 17.

¹⁷⁰ *Ibid.*

¹⁷¹ *Ibid.*, 25.

¹⁷² *Ibid.*

¹⁷³ *Ibid.*, 10–11.

B. COMMON ECONOMIC-DEMOGRAPHIC THEMES

In reviewing the economic and demographic situations of Germany, Japan, and Russia several consistent themes arise that link their demographic and economic situations. The case comparison illuminates key differences between the economies that are successfully navigating a demographic decline and those that struggle, demonstrating that challenging demographics alone is not deterministic of economic potential. For countries approaching the fifth stage of their demographic transition like China, emulating the attributes of economies that have successfully managed their demographic picture should help during their own transition. Two general economic concerns are linked with demographic decline: a shrinking labor force and increasing public spending on benefits for the elderly. To respond to a shrinking labor force more productive economies seem able to utilize a high percentage of potential workers and also allocate workers to high productivity areas. Controlling public benefits is a political problem that also is affected by society expectations. This section will review how these case study economies have performed in these areas of utilizing potential workers, enabling allocation of labor to higher productivity areas, and controlling benefits.

1. Maximizing Labor Force

As the working age population shrinks, economies must find a way to replace these workers or risk economic decline. Often, strong economies are able to incorporate workers from areas of society that may have been previously marginalized from the work force. The direction of causality for this trend is debatable. Economies may be able to thrive because they are able find productive use for people previously out of the workforce or it may be that thriving economies drives up incentives (wages) which encourages those outside the workforce to join in. It appears at least likely that a correlation will occur as healthy economies pull in workers. As economies modernize, three population segments that often have the potential for providing new workers are females, the elderly, and immigrants.

a. Female Employment

In modern economies female participation in the work force has increased everywhere, but the level to which it has increased has much to do with societal norms and the support and opportunity women are provided to enter the workforce. Female labor force participation rates provide the most basic measure of the extent to which women have been included in the workforce. Using this measure, Germany has the highest female employment rate, while the low female employment rate for Japan and the gender gap is striking, at nearly twice that of Germany or Russia (Table 1). Another measure of this is the Gender Inequality Index (GII) produced by the United Nations Development Programme that can provide insight to the equality of opportunity for females. In this index both Germany and Japan are in the most equal category of Very High Human Development, while Russia is in the next category of High Human Development (see Table 2). Germany's strong economy leads the comparison economies in integrating women into its workforce.

Table 2. Female Employment Opportunities.¹⁷⁴

	% Employment Rate (15–64) Male	% Employment Rate (15–64) Female	% Employment Rate Difference	GII HDI Rank (2014)
Germany	77.6	68.0	9.6	5
Japan	80.8	62.5	18.3	17
Russia	73.6	64.7	8.9	57

¹⁷⁴ Male and Female Employment Rates from OECD Surveys: Germany (2012), Japan (2013), Russia (2012); GII Rank from United Nations Development Programme, Human Development Reports, “Table 4: Gender Inequality Index,” August 16, 2015, <http://hdr.undp.org/en/content/table-4-gender-inequality-index>; employment rate difference calculated by author.

b. Elderly Employment

A second potential source of additional workers is the elderly. Adding older workers or extending the working lifetime of those in the workforce is not without some concerns as discussed earlier. Regardless of the potential negatives of productivity decline and overly conservative actions, older workers can help keep an economy growing and also provide income potential for elderly that may displace some of the government’s financial burden.¹⁷⁵ The participation of elderly workers in an economy depends on the health of these workers and often on the government’s retirement policies. Japan, of the comparison countries, has the healthiest elderly workers based on life expectancy at age 60 and also workers in Japan retire at a later age (see Table 3). Despite similar official retirement ages in Germany and Japan, the effective retirement age, or average age in which older employees leave the workforce for at least 5 years is much higher in Japan. Japan has led the comparison countries in employing elderly workers and this is enabled by the better health at older ages that Japanese enjoy.

Table 3. Comparison of Health and Retirement Ages.¹⁷⁶

	Addition Years of Life expectancy at Age 60 (2012)		Normal (Official) Retirement Age		Effective Retirement Age	
	M	F	M	F	M	F
Germany	22	25	65	65	62.1	61.6
Japan	23	29	65	65	69.1	66.7
Russia	14	20	60	55	63.3	60.0

¹⁷⁵ Jackson and Howe, *Graying of the Great Powers*, 112.

¹⁷⁶ Life Expectancy at Age 60 from UNdata, “Life Expectancy at Age 60,” August 26, 2015 (Source: WHO data), <https://data.un.org>; Normal Retirement Age from OECD, *Pensions at a Glance 2013: OECD and G20 Indicators* (Paris: OECD Publishing, 2013). 256, 289, 325, http://dx.doi.org/10.1787/pension_glance-2013-en; Effective Retirement Age from OECD, “Expected Years in Retirement,” in *Society at a Glance 2014: OECD Social Indicators* (Paris: OECD Publishing, 2014), 105, DOI : http://dx.doi.org/10.1787/soc_glance-2014-15-en.

c. Immigrant Employment

A third way to maximize a labor force despite challenging demographics is to import labor in the form of immigrants. Immigration is a controversial issue in countries around the world. Some native-born workers are concerned that they will be displaced in their jobs or that the influx of labor will drive down wages. Other countries, especially largely homogenous ones, deal with concerns that immigrants threaten their national identity. Overall, economic analysis suggests substantial benefits to countries that receive immigrants. Employers gain from increased competition in the labor market and the public gains from less expensive products and services.¹⁷⁷ The economic effect of immigrants would seem even more valuable to countries facing potential labor shortfalls due to demographic decline. Several factors drive the rate of flow for immigrants, including proximity, economic opportunity, legal restrictions, existing immigrant communities, and the ability for immigrants to culturally assimilate in a potential destination country. This section examines the net migration rate (per 1,000 population) to compare which countries are receiving the largest percentage of immigration. Immigration can help make up for losses due to demographic decline, but is almost never sufficient to completely overcome these losses (see Table 4).

Table 4. Net Migration, Crude Birth, and Death Rates.¹⁷⁸

	Net Migration Rate (per 1,000)	Crude Birth Rate (per 1,000)	Crude Death Rate (per 1,000)	Difference between CBR and CDR (CBR-CDR)
Germany	1.3	8.5	10.9	-2.4
Japan	0.6	8.4	9.8	-1.4
Russia	1.5	11.8	15.5	-3.7

¹⁷⁷ Thomas A. Pugel, *International Economics*, 15th ed., international edition (New York, NY: McGraw-Hill/Irwin, 2012), 368.

¹⁷⁸ Net Migration Rate, Crude Death Rate, and Crude Birth Rate for period (2010-2015) from United Nations, *World Population Prospects*, 320, 409, 634; Difference between CBR and CDR authors Calculation.

In terms of maximizing the labor force, Germany has done best at inclusion of females, Japan at inclusion of elderly, while all countries have net inward migration rates but at levels lower than the natural decline of the population. Getting more workers from a shrinking working age population is one way of mitigating the economic effect of demographic decline. A second mitigation method is using the existing workers more productively by enabling labor to move from areas of low productivity to high productivity.

2. Labor Productivity

Isolating and measuring the productivity of labor alone provides some analytical challenges. A basic measure is simply dividing GDP by workers. This would provide an indication on average how much contribution to GDP each laborer in an economy produces. Analytical concerns with this measure include the innate concerns with the accuracy of GDP as a measure of output; in addition, other productivity factors such as capital and technology impact the result.¹⁷⁹ Another possible way of measuring labor productivity is to make the basic assumptions that wages are related to how much a worker produces and that workers will tend to take the highest wage job possible. While this method clearly has flaws it can generally be assumed that in a labor market based on market principles labor will generally be driven to productive use. With these assumptions then the more open the labor market will allow labor to enter higher productivity sectors. The Heritage Foundation produces an index that attempts to measure labor freedom by considering elements like legal factors related to hiring, firing, and wage regulations.¹⁸⁰ Another useful index is The World Bank's Doing Business index, which measures how easy it is for a business to be conducted. It can be assumed that in a country where businesses can easily be created strong market forces will improve overall productivity. Where competition is stifled, as in the case of monopolies or when state owned enterprises are not forced to compete in an open market, companies are generally

¹⁷⁹ OECD, *Measuring Productivity – OECD Manual: Measurement of Aggregate and Industry-Level Productivity Growth* (Paris: OECD Publishing, 2001), 14, <http://dx.doi.org/10.1787/9789264194519-en>.

¹⁸⁰ "Labor Freedom," The Heritage Foundation, 10 Jul 2015, <http://www.heritage.org/index/labor-freedom>.

much less efficient at using labor and other resources. By examining all these measures some conclusions can be made about how productively labor is used in each country (see Table 5).

Table 5. Productivity/Labor and Business Freedom Scores.¹⁸¹

	GDP per Person Employed	Labor Freedom Score	Doing Business Score
Germany	43,243	51.2	79.73
Japan	44,851	90.2	74.8
Russia	19,656	58.9	66.66

The more developed state of the German and Japanese economy leads to a higher GDP per person employed due in part to the higher level of capital available for each worker. Surprisingly, Japan, which is known for its lifelong employment norm, does very well in labor freedom. The labor freedom index measures legal restrictions on hiring and firing, but does not try to measure ingrained business norms. This helps explain the seeming disconnect in the Japanese score along with the fact that the Japanese economy has been evolving away from the lifelong employment practice. Overall, the German and Japanese economies appear to be more agile than the Russian economy in allowing for labor to move to the most productive uses. Particularly worrisome in the Russian economy is the high level of state owned enterprises.¹⁸² From the OECD report, “the continued dominance of the largest SOEs, which seem to have privileged access to finance, has an important impact on the economy, as it complicates market entry and suffocates competition, while preserving pockets of inefficiency.”¹⁸³ As labor becomes

¹⁸¹ GDP per Person from The World Bank, August 16, 2015, <http://datacatalog.worldbank.org>; Labor Freedom Score from “2015 Index of Economic Freedom,” The Heritage Foundation, <http://www.heritage.org/index/explore>; Doing Business Score 2015 from “Doing Business Report Series,” World Bank Group, <http://www.doingbusiness.org/reports>.

¹⁸² OECD, *Russian Federation 2013*, 61.

¹⁸³ *Ibid.*

more constrained, moving workers from generally inefficient SOEs or other areas of low productivity to more productive uses can significantly boost economic growth.

3. Controlling Old-Age Benefits

While demographic change has a direct economic impact through its impact on the labor force, there is also an indirect impact on the effect of demographic change due to the growing elderly population. As the population ages the percentage of retirees increases, which can in turn put pressure on government finances. This pressure is two-fold as fewer laborers are contributing taxes and more elderly are in need of health-care, pensions and other benefits provided by the government. Several datasets provide insight into the potential impact of these trends. One of the most important is the old-age dependency ratio, or the ratio of elderly people 65 and above to working age people 15–64. The dependency ratio will vary from each country depending at where they are in their demographic transition and also how dramatically the transition has occurred. The current percent of GDP spent on public pensions also provides insight into how much economies are currently being burdened by retirees. This section also examines how long retirees spend in retirement. Life expectancy and government policy on nominal retirement age can either shorten or lengthen this period. The general rule is that the longer elderly spend in retirement the more expensive it is likely to be for society to ensure those elderly receive their benefit entitlements. The elements combined provide a picture of how expensive care is for elderly and will be for each economy (see Table 6).

Table 6. Dependency Ratios and Spending on Public Pensions.¹⁸⁴

	2015 Old-age Dependency Ratio	2050 Old-age Dependency Ratio	% GDP Spent on Public Pensions	Expected Years in Retirement		Nominal Retirement Age	
				M	F	M	F
Germany	32.7	59.9	11.3	19.9	23.8	65	65
Japan	43.6	71.8	10.2	16.0	22.7	65	65
Russia	18.8	32.8	9.2	12.4	20.0	60	55

Care for the elderly is currently least expensive as percent of GDP spent on public pensions in Russia. This is due to a low old-age dependency ratio and shorter time spent in retirement due to shorter life expectancies. As the old-age dependency ratio rises and if life expectancies rise closer to those found in most of the developed world, Russia's lower nominal retirement ages will become increasingly more expensive for the government to support. The current statistics for Russia may underestimate the true old-age dependency ratio. For comparability, dependency ratio uses age 65 and above as the beginning for "dependency" for all countries regardless of actual retirement age. Russia's young official retirement ages means that the population above its official retirement but below 65 are not defined as dependent by dependency ratio though in reality they may rely on state benefits. Germany faces increasing old-age dependency ratios and has already begun gradually increasing the nominal retirement age to 67.¹⁸⁵ Japan has also pursued benefits reform to control the future expense of its elderly population. As the developed world ages, elderly benefit spending will consume more government resources. The impact of this in a fiscally constrained environment may be the crowding

¹⁸⁴ 2015 and 2050 Old-age Dependency Ratios from United Nations, *World Population Prospects*, 320, 409, 634; % GDP Spent on Public Pensions from OECD, *Pensions at a Glance 2013*, 256, 289, 325; Expected Years in Retirement from OECD, "Expected Years in Retirement," 105; Nominal Retirement Age from OECD, *Pensions at a Glance 2013*, 256, 289, 325.

¹⁸⁵ OECD, *Pensions at a Glance 2013*, 256.

out of investments that could have contributed to stronger economic growth. This makes controlling the cost of these benefits essential to future economic strength.

C. COMPARISON CONCLUSIONS

Germany, Japan, and Russia have been grappling with demographic challenges similar to those that are looming in China. Although the demographic challenges are similar across the three countries, the economic impact of these challenges varies dramatically. Elements like maximizing the available labor force, allowing labor to be used in the most productive manner, and minimizing the cost of the elderly have contributed to the different economic strength of these comparison states. While no countries demographics will be exactly the same, each of the comparison countries is experiencing the fifth stage of their demographic transitions with declining working-age and total populations. If this demographic factor was solely deterministic for a country's economic destiny, then similar demographic structures would invariably lead to similar economic outcomes, but this is clearly not the case.

The German economy appears the strongest of the case studies. It benefits from its higher level of female employment and levels of immigration that replace approximately half the natural decline of the population. The economy is friendly to new productive businesses, leading to the productive use of labor. Yet the growing number of elderly workers will place increasing stress on the government's budget in the future.

The Japanese economy has suffered through a long period of slow but generally positive growth. Its very healthy population has extended the working life of many of citizens contributing to the labor force and simultaneously has provided the elderly with income separate from government benefits. Immigration is not nearly as a significant resource for new labor as it is in either Germany or Russia. Japan's economy generally scores well in productivity measures.

The Russian economy has been hit hard by non-demographic concerns but also seems likely to be poorly prepared for demographic aging. Its citizens leave the work force early due to poor health and it has maintained low retirement ages. The extractive nature of much of its economy and the legacy of the Soviet economy has combined to

keep productivity low and discourage more efficient business challengers. A macabre benefit of Russia's low life expectancy has been to keep its dependency ratio lower as well. If Russia can improve its life expectancy a rising population of retirees will likely force it to increase its official retirement age.

Demographic change is an impactful economic event, but its effects can be shaped and mitigated. Using the same standards for comparison the next chapter will explore how the Chinese economy compares to these cases and what this indicates for the future of Chinese economic growth.

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IV. THE CHINESE ECONOMY AND DEMOGRAPHIC MITIGATION POTENTIAL

The previous chapter has shown several potential effects of and mitigation strategies for economies facing the decline stage of the demographic transition. The evidence illustrates that demographics play a role in economic matters, and also that this effect can be shaped. This thesis seeks to understand how similar demographic effects might influence the Chinese economy. To assess this impact, this chapter will provide a brief overview of the development of the modern Chinese economy. The narrative history provides insight into why China's labor market evolved into its present form. With this path of development as context, the comparison economics are used as a baseline to assess how China may fare when demographic decline begins to impact the labor market. This is conducted by using the same metrics as the previous chapter to assess China's readiness for its demographic challenges, in comparison to the economies reviewed in Chapter Three.

A. CHINESE ECONOMIC OVERVIEW

This overview will focus on the same period of time as the demographic review of China, beginning with the founding of the PRC in 1949. As outlined in the second chapter, the PRC's economic history can be described in two periods. The first period was an economy guided by communist ideology. The second period included a gradual and incremental break from the communist command economy to a market-based economy. The beginnings of this transition can be observed as early as 1978 and is still a work in progress.¹⁸⁶ Following the overview of general economic reform, the effect of reform on the labor market will be examined in greater depth.

1. Communist Command Economy (1949–1977)

When the CCP wrested power from the Chinese Nationalists in 1949 the Chinese economy and China in general had been decimated by war. During the previous decades,

¹⁸⁶ Naughton, *The Chinese Economy*, 85.

China had suffered the ravages of an Imperial Japanese invasion. The Japanese presence then made China a battlefield for World War II. Finally, after uniting in the effort to defeat the Japanese, Chinese Communists and Nationalists fought each other in a bitter civil war. During this series of wars, vital agricultural infrastructure and manufacturing capital was destroyed, damaged or neglected.¹⁸⁷ During the final years of the Chinese Civil War, the Nationalist government failed in managing the economy and hyperinflation added to the economic tumult.¹⁸⁸

For the next three decades communist ideology and Mao Zedong would guide the economy. Economists have developed vocabulary for economic swings experienced by market-based economies, booms and busts, bulls and bears, etc. These terms fail to adequately describe the economic roller-coaster that occurred when market mechanisms are removed and the economy becomes a manifestation of ideology and political power struggles. Mao Zedong, the most influential person in all aspects of Chinese life including the economic sphere, “repeatedly changed economic policies in accordance with his own revolutionary ideals or personal wishes.”¹⁸⁹ Naughton notes that a general pattern emerged where the economy suffered when the government’s ideological fervor dominated and recovered when the government loosened its grip on the economy. As he describes, the period from establishment of the PRC in 1949 through the Great Leap Forward in 1961 demonstrates these cycles.¹⁹⁰

In the first few years (1949–1952) after independence the CCP was pragmatic and the economy performed well. The hyperinflation that marked the end of the Nationalist era was brought under control, land reform empowered peasants by giving them the land they worked, and relative peace allowed industry to quickly recover. The recovery of the economy encouraged the leadership to begin more aggressively pursuing a Soviet style economy.

¹⁸⁷ Naughton, *The Chinese Economy*, 50.

¹⁸⁸ *Ibid.*

¹⁸⁹ *Ibid.*, 62.

¹⁹⁰ Details on these economic cycles during this period are taken from *Ibid.*, 62–72.

Following this period the government began more aggressively pushing through ideological socialist reforms that abolished private property and enterprise. The very nature of the economy was changed to resemble the Soviet model of a socialist economy. Public ownership is a hallmark of this economic model: from 1954 to 1956 nearly all farms were turned into collectives or cooperatives and private factories or businesses almost universally became publically controlled. By 1956, China had truly become a socialist economy.

Ironically, it was also 1956 that Nikita Khrushchev spoke out against the excesses of socialism under Stalin in the Soviet Union. In this environment, and due to the difficulties being faced in the Chinese economy due to its rapid transformation, the Chinese leadership responded by moderating its ideological drive and allowing dissenting voices in the “Hundred Flowers” campaign. During this two year period from 1956–57, it appeared that China might develop an economic brand of socialism that was more market friendly, adaptable, and likely more successful than the Soviet command economy.

This hope was quickly dashed by a reversal led by Mao, as he suddenly initiated a campaign to punish those who had spoken out during the Hundred Flowers campaign. Unsatisfied by economic growth to this point and meeting constraints limiting faster growth, the Great Leap Forward (GLF) initiative attempted to rapidly increase development through the sheer labor and determination of the people. Instead of incremental developmental steps, the vision of the GLF was to make giant leaps by doing everything at once. When manic effort failed to meet the expectations, regional administrators began to exaggerate their production to at least meet the requirements on paper. In turn the reports of increasing production led to increased production targets in a continuous feedback cycle. More and more drastic measures began to occur in the villages and countryside as peasants turned useful tools into useless steel in backyard steel mills to meet steel production quotas, and farmers attempted to meet agriculture quotas by turning over to the Party the grain they needed to survive. The tragic result of this madness was the famine of 1960–61, where 25 to 30 million lives were lost.

The GLF was the most extreme of the damage brought on by the Maoist government but the pattern continued throughout Mao’s leadership as perceived threats

or ideological goals led to government intervention in the economy with often disastrous results. Comparing the Maoist economy in similar terms to the modern economies from the previous chapter provides some insight to its struggles. The economy was highly unproductive, with virtually complete government ownership and control eliminating the competition that would have been vital to increasing productivity. Labor was used inefficiently: while a large labor force existed, government control over where people worked ensured that market mechanisms to direct labor to its most productive uses did not exist.¹⁹¹

2. Reforms to a Market-Based Economic System (1978–present)

The death of Mao brought the opportunity for a transformation of the economy. The desire for reform stemmed from two factors. First, economically China had fallen behind its East Asian neighbors.¹⁹² Second, food shortages still threatened to the country and fears of a repeat of the GLF famine existed.¹⁹³ China in many ways developed its own reform path, taking its successful East Asian neighbors economies as model but not making a market economy an expressed goal.¹⁹⁴ Reform was driven by the sense change was needed. It was a moment in PRC history when economic experimentation was not forbidden by ideological dogmatism. Deng Xiaoping famously compared the experimental and uncertain nature of the reforms to a man walking across a river by feeling for the stones.¹⁹⁵

Reform began gradually in agriculture. These initial reforms returned control of farms to households instead of state run collectives. Additionally, production in excess of government quotas could be sold, which “reinstated the link between effort and reward throughout rural China.”¹⁹⁶ The result was a dramatic increase in the production of these

¹⁹¹ Naughton, *The Chinese Economy*, 76.

¹⁹² Loren Brandt and Thomas G. Rawski, “China’s Great Economic Transformation,” in *China’s Great Economic Transformation* (New York: Cambridge University Press, 2008), 8.

¹⁹³ *Ibid.*

¹⁹⁴ Dwight H. Perkins, *East Asian Development: Foundations and Strategies*, (Cambridge, MA: Harvard University Press, 2013), 126.

¹⁹⁵ *Ibid.*, 145.

¹⁹⁶ Brandt and Rawski, “China’s Great Economic Transformation,” 9.

farms. Not only were the farmers producing more, they were doing it more productively and decreasing the amount of time spent farming.¹⁹⁷ This excess labor shifted to locally run factories that experienced a surge in production.¹⁹⁸ These factories, known as township and village enterprises (TVEs), began to compete with the state-owned enterprises (SOEs) revealing how inefficient the SOEs were.¹⁹⁹ The successes of these initial reforms provided reformers the confidence to continue and created a population base of support and even desire for more reform.²⁰⁰

Continued reform developed into the dual track pricing system. Dual track provided a type of compromise between a centrally planned economy and a free market economy.²⁰¹ Under dual track a set amount of goods were allocated to the government at a fixed price, while any production beyond that was sold on an open market. In addition to permitting the development of markets, the government allowed control of economic decisions to shift from central planners to local managers in charge of individual enterprises. These economic reforms enabled market mechanisms to impact enterprise decisions making and gave local managers the authority to make these decisions. Economic cycles were experienced but were driven by macroeconomic forces instead of ideological interventions in the economy. This instability challenged the ability of economic planners and also challenged the social cohesion of the PRC.²⁰²

The confluence of these forces contributed to the unrest that led to the Tiananmen Square protest of 1989. Specific economic grievances that contributed to the discontent leading to the protests including rising prices due to inflation and perceptions of corruption in those empowered by the state.²⁰³ Reformist leaders initially refused to

¹⁹⁷ Naughton, *The Chinese Economy*, 90.

¹⁹⁸ Ibid.

¹⁹⁹ Fang Cai, Albert Park, and Yaohui Zhao, "The Chinese Labor Market in the Reform Era," in *China's Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (New York: Cambridge University Press, 2008), 171.

²⁰⁰ Naughton, *The Chinese Economy*, 90.

²⁰¹ Ibid., 92.

²⁰² Ibid., 98.

²⁰³ Perkins, *East Asian Development*, 130.

disperse the protest; finally, conservative leaders ordered the military action that violently cleared the square of protestors.²⁰⁴ The unrest and the failure of reformist leaders to restore order led to a brief period of anti-reform dominance. Conservatives attempted to reverse course on reforms but their attempts failed and market forces quickly acted to correct imbalances in the economy.²⁰⁵ The failure of the brief anti-reform movement eroded remaining support among Communist Party leaders for a return to the old economic system and ushered in a new enthusiasm for reform.²⁰⁶

This second phase of reform continued to move towards a fully market based economy. Deng Xiaoping's "Southern Tour" in 1992 is seen as a symbolic beginning of this movement returning to pragmatic market-based reform policies and opening up to globalization.²⁰⁷ With this new push some of the remaining vestiges of the old command economy began to fade. The dual track system was abolished in favor a fully market based economy in 1993.²⁰⁸ Also in 1993, the Company Law gradually shifted many SOEs to limited-liability corporations—not complete privatization, but a step closer.²⁰⁹ The 1990s also saw a significant increase in foreign direct investment (FDI) in the Chinese economy. In the decades prior, companies had been reluctant to invest in China due to an immature legal framework and concerns they would be left without recourse to protect their investments from political authorities.²¹⁰ FDI began to increase with the development of the legal system and political support for investment. In addition to money, foreign investment brought with it market access, technology and manufacturing know how.²¹¹

The Chinese export economy began to thrive by using its comparative advantage of low cost labor to become a leader in low value-added manufacturing. As exports

²⁰⁴ Naughton, *The Chinese Economy*, 98.

²⁰⁵ *Ibid.*, 99.

²⁰⁶ *Ibid.*

²⁰⁷ *Ibid.*, 99–100.

²⁰⁸ *Ibid.*, 101.

²⁰⁹ *Ibid.*, 104.

²¹⁰ Perkins, *East Asian Development*, 136.

²¹¹ *Ibid.*, 137.

became an increasing part of the economy, China pursued further integration in the global market. An important milestone in this pursuit was the 2001 ascension of China into the World Trade Organization (WTO). This step provided impetus for additional reform as the WTO membership process required China to accede to international standards on economic issues including labor regulations and market openness.²¹² WTO membership also put pressure on SOEs for continued reform. WTO regulations attempted to limit protectionist policies that SOEs had benefited from and also introduced foreign competition, breaking up monopolies that many SOEs enjoyed.²¹³

Since the turn of the century China has continued to mature as a market based economy and rapidly has developed into the world's leading exporter (see Figure 13).

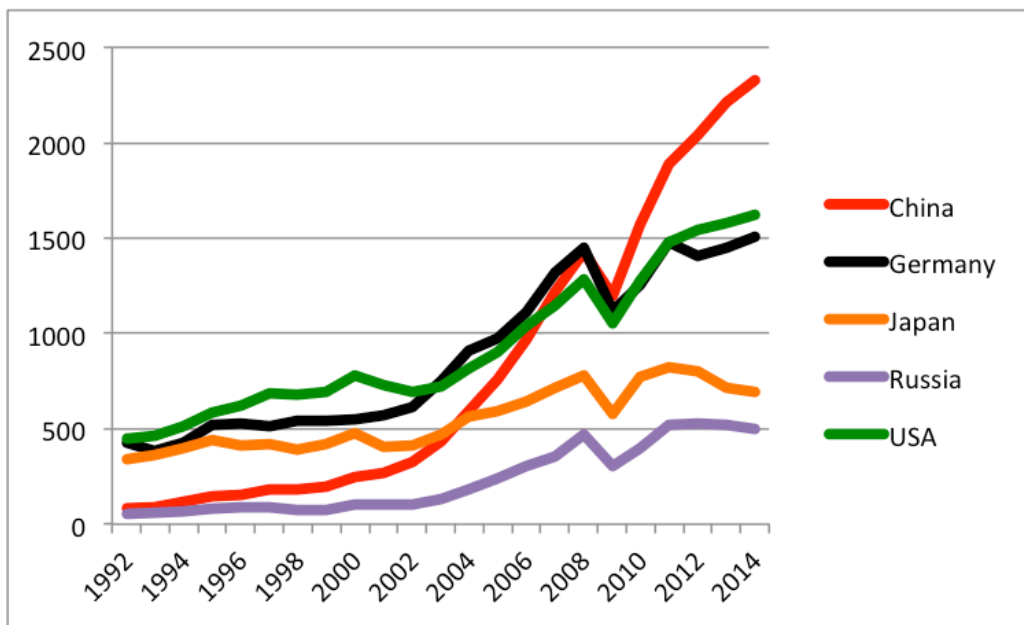


Figure 13. Exports (Billion \$).²¹⁴

²¹² Naughton, *The Chinese Economy*, 105.

²¹³ Perkins, *East Asian Development*, 135.

²¹⁴ Data Source: OECD, "Trade in goods and services," July 26, 2015, doi: 10.1787/0fe445d9-en.

Overall, Chinese GDP grew at an average of 10% per year for 3 decades from 1983 to 2013.²¹⁵ During this period China went from being the twelfth largest economy in the world, with a GDP comparable to Switzerland, to the second largest economy only behind the United States.²¹⁶ During this period, GDP per capita increased from \$224 in U.S. dollars in 1983 to \$7594 in 2014.²¹⁷ While China's growth has made some Chinese extremely wealthy overall, the rising economic tide has truly lifted all ships. China's after tax Gini coefficient, a commonly used measure of inequality, is moderately high (0.41), but only slightly more inequitable than the United States (0.38).²¹⁸ More impressively during its economic reform from 1981–2010, China lifted over 680 million people out of extreme poverty (defined as earning less than \$1.25 per day).²¹⁹ The effect of this extraordinary economic growth has been increased standards of living and expectations for the Chinese people. This in turn created a burgeoning domestic market that has grown increasingly important.

Despite the rapid growth of the Chinese economy there are still significant economic concerns. China has not fully transformed into a capitalist economy. The Communist Party and government still play a significant role in the economy. At times this role is direct, as in the case of the much reduced but still large number of SOEs in China. Political influence in investment and infrastructure development has also created concerns of white elephant projects and other economically unsound investments. Other less direct effects include the political influence that pervades the financial system

²¹⁵ The World Bank, "GDP Growth (Annual %)," August 26, 2015, <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>.

²¹⁶ The World Bank, "GDP (current US\$)," August 16, 2015, <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>.

²¹⁷ The World Bank, "GDP per capita (current US\$)," August 16, 2015, <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>.

²¹⁸ OECD, *OECD Factbook 2014: Economic, Environmental, and Social Statistics* (Paris: OECD Publishing, 2014), 65, <http://dx.doi.org/10.1787/factbook-2014-en>.

²¹⁹ "The World's Next Great Leap Forward Towards the End of Poverty," *The Economist*, June 1, 2013, <http://www.economist.com/news/leaders/21578665-nearly-1-billion-people-have-been-taken-out-extreme-poverty-20-years-world-should-aim>.

including the government owning controlling shares of China's major banks.²²⁰ Political pressures led to banks making loans to state firms that were economically unsuitable for such loans.²²¹ Additional concerns include an immature legal system, which at times has also bent to political pressures, and the environmental impact of China's growth. China's reforms have been incredibly successful in lifting much of the country out of abject poverty, but the reform is incomplete.

The transformation of the economy has changed the economic prospects of Chinese citizens, in terms of both their consumer and worker roles. Since the impending demographic decline will greatly affect labor, it is important to understand how the Chinese labor market has been reformed with the economy as a whole.

3. Labor Reforms

Over the course of the economic reforms, the labor market in China has been established and gone through a transformation. As reforms began, the vast majority of Chinese workers were rural and working in agriculture (see Table 7). Reforms significantly improved the productivity of the primary sector and facilitated shifting of labor from the primary sector to other sectors of the economy. In these other sectors which even more radical transformation occurred as the economy shifted away from the central planning of the Soviet System towards market-based capitalism.

²²⁰ Franklin Allen, Jun Qian, and Meijun Qian, "China's Financial System: Past, Present, and Future," in *China's Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (New York: Cambridge University Press, 2008), 507.

²²¹ Naughton, *The Chinese Economy*, 460–461.

Table 7. Employment Trends.²²²

Year	Sector (%)			Residence (%)		SOE share of Urban Employment
	Primary	Secondary	Tertiary	Urban	Rural	
1978	70.5	17.3	12.2	23.7	76.3	78.3
1985	62.4	20.8	16.8	25.7	74.3	70.2
1995	52.2	23.0	24.8	28.0	72.0	59.1
2005	44.8	23.8	31.3	36.0	64.0	23.7
2013	31.4	30.1	38.5	49.7	50.3	16.6

When reforms began in the urban economy almost 4 out of every 5 workers worked for state-owned enterprises under the central planning of the Communist Party. Under central planning workers were assigned to a job and expected to remain there for the entirety of their working lives. Leaving a job in search of a better opportunity simply did not happen, but unemployment also practically did not happen as employment was essentially guaranteed by the state. This system attempted to guarantee a minimum standard of living, the so called “iron rice bowl,” and reinforced the state’s role in daily economic life. The implicit promise of the “iron rice bowl” was a secure job and care for life as long as one stayed in line politically.

Reform of this system of lifetime employment began in the mid-1980s. In an effort to make SOEs more competitive the Communist Party began giving SOE managers more autonomy including more control over the wages SOEs paid to workers.²²³ In 1986,

²²² After Cai, Park, and Zhao, “Chinese Labor Market,” 168; The primary sector consists collecting natural products including agriculture, mining, forestry, etc. The secondary sector consists of manufacturing and construction. The tertiary sector is comprised of services; 2013 data from “China Statistical Yearbook 2014,” National Bureau of Statistics of China, <http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm>

²²³ Cai, Park, and Zhao, “Chinese Labor Market,” 171.

the concept of temporary employment or labor contracts was introduced to allow SOEs to gain or drop workers depending on market conditions.²²⁴ In the mid-1990s, SOEs slowly began to lay off workers as they faced pressure to move toward profitable operation under the Company Law.²²⁵ Layoffs brought a new concern since social insurance benefits such as pension and housing had always been tied to the company; laid off employees stood to lose significantly without a social safety net.²²⁶ The Labor Law and other measures during the late 1990s attempted to address these concerns and also provide basic worker rights, but implementation has been slow.²²⁷ In 1997, the still unprofitable and unsustainable SOEs were aggressively restructured.²²⁸ During this time from 1997–2004 over 27 million SOE workers were laid off as the SOEs trimmed their workforce from 107 million to 64 million.²²⁹ Additional social assistance programs were instituted with or in response to this, including a welfare like minimum living standard program (1998) and standardized unemployment insurance (1999).²³⁰

These reforms have helped to create a functioning labor market, where employees have the freedom to move between jobs without risking the total loss of benefits, and firms have the ability to make employment and compensation decisions based on market forces.²³¹ As with general economic reform, significant progress has been made but there are issues that remain. One of the largest issues is the *Hukou* system, which registers the population based on their family's historic home. This has been especially damaging to rural workers, who come to cities in search of employment. These workers often have difficulties getting social services for themselves or their families and their migrant status makes them vulnerable to exploitation by employers and other.²³²

²²⁴ Cai, Park, and Zhao, "Chinese Labor Market," 172.

²²⁵ *Ibid.*, 173.

²²⁶ *Ibid.*

²²⁷ *Ibid.*, 173–174.

²²⁸ Cai, Park, and Zhao, "Chinese Labor Market," 174.

²²⁹ *Ibid.*, 177.

²³⁰ *Ibid.*, 174.

²³¹ *Ibid.*, 175.

²³² *Ibid.*

Labor reform, like more general economic reform, has greatly improved the lives and status of many Chinese people. These reforms have transformed the country from the Soviet-model command economy that was originally adopted under Mao to an economy that more closely resembles market-based capitalism. Critics can easily point to excessive government intervention, SOEs, or the *Hukou* system as relics of the old system that still remain, but the overall transformation is undeniable. With each year under reform, the PRC gets further from the time and systems of Mao and further into the age of a powerful and largely capitalist Chinese economy.

B. CHINA IN RELATION TO THE COMPARISON CASE STUDIES

While reform has fundamentally changed the nature of the Chinese economy, questions remain about how demographic trends will affect future prospects and whether the economy will be strong enough to withstand the demographic change it has begun experiencing. Many of the aspects of the economic reform and labor market reforms link directly to the qualities that have determined how well the comparison countries have performed in demographic decline. As will be illustrated below, while the command economy did well in maximizing its workforce, with almost universal labor participation, the labor was highly unproductive. Analytically, moreover, comparing an aspect like controlling pension benefits between a socialist economy and a capitalist economy is akin to comparing apples and oranges.

This section will examine how China's current economy is positioned to mitigate the potential economic damage from demographic decline. While the comparison countries are experiencing demographic decline, China's is still about a decade away. China is already experiencing some of the precursor effects to decline including the shrinking of the labor force and a rising number of retirees. China still has time before the full onset of decline to potentially better prepare itself through sound policy. This snapshot will look at China today in the same categories—maximizing labor force, labor productivity, and controlling old-age benefits—used to examine the comparison countries and reveal where it is well-prepared for decline and where additional action is required.

1. Maximizing Labor Force

When China was a command economy, labor force participation was virtually universal. While everyone had a job under socialism at times these jobs were simply make-work jobs, unproductive, and with poor pay.²³³ Gradually, as the Chinese economy has reformed and modernized, labor force participation declined. Labor force participation before SOE reform was 79% in 1990 then dropped to 76.8% in 2000 and down to 71% in 2010.²³⁴ This decline was intentionally slowed by the government due to concerns of the social unrest that could be caused by a large group of unemployed.²³⁵ The aggressive reforms of the mid-1990s caused large increase in unemployed by forcing SOEs to restructure.²³⁶ This had led to a decrease in labor force participation. This is not completely a negative: some level of unemployment is generally considered positive in an economy as it represents workers transitioning to better and higher productivity jobs and is also a sign that employers have the ability to hire additional staff to support growing enterprises. Now that the number of workers in China is at its peak and demographic decline is a certain part of its future it may need to draw additional workers into the economy to support continued growth. As with the comparison countries, China could potentially maximize its labor in three ways: increased employment of females, extending the working life of older citizens, and immigration.

a. Female Employment

At 68 percent, the female employment rate in China is comparatively quite high at first glance (see Table 8).

²³³ Naughton, *The Chinese Economy*, 185.

²³⁴ The World Bank, "Labor Force Participation Rate, Total (% of total population ages 15+)(National Estimate)," August 26, 2015, <http://data.worldbank.org/indicator/SL.TLF.CACT.NE.ZS>.

²³⁵ Naughton, *The Chinese Economy*, 185.

²³⁶ *Ibid.*, 185–189.

Table 8. Female Employment Opportunities.²³⁷

Country	% Employment Rate (15-64) Male	% Employment Rate (15-64) Female	% Male-Female Employment Rate Difference	GII HDI Rank (2014)
Germany	77.6	68.0	9.6	5
Japan	80.8	62.5	18.3	17
Russia	73.6	64.7	8.9	57
China	82.0	68.0	14.0	91

²³⁷ Male and Female Employment Rates from OECD Surveys: Germany (2012), Japan (2013), Russia (2012), China (2008); GII Rank from <http://hdr.undp.org/en/content/table-4-gender-inequality-index>; GII (Gender Inequality Index) is produced by the United Nations Development Programme. The index provides insight to the equality of opportunity for females in by examining health, economic, and social opportunities; Employment rate difference calculated by author.

Beyond this headline number though there are concerns for how well China is currently integrating females in meaningful employment and how it is likely to perform in the future. If the employment rate for females is divided between urban and rural females a different story emerges.²³⁸ During the last three censuses female employment in rural China has remained quite high (see Table 9), a fact that has maintained the high overall female employment figure. Much of this rural work is in labor-intensive agriculture and the whole family pitches in to work on family farms. As more technology permeates the Chinese agricultural sector the number of people employed in agriculture will decline. Future job growth is likely to be concentrated in the urban areas. The effect of SOE restructuring and the increased social safety net can be seen as a decline in overall employment, but the decline has been steeper for urban women and the gap between urban men and women has grown larger.

Table 9. Census Employment Rates.²³⁹

	1990			2000			2010		
Employment Rate for those aged 20–59 years (%)									
	China	Urban	Rural	China	Urban	Rural	China	Urban	Rural
Women	84.3	77.4	87.1	79.5	63.1	88.9	73.6	60.8	84.4
Men	95.7	91.9	97.4	92.0	82.3	96.8	88.7	81.1	94.3
Gender Gap (M-W)	11.4	14.5	10.3	12.5	19.2	7.9	15.1	20.3	9.9

²³⁸ Isabelle Attane, “Being a Woman in China Today: A Demography of Gender,” *China Perspectives* no. 2012/4 (Dec 2012): 5–15, <http://chinaperspectives.revues.org/6013>.

²³⁹ After Employment rates from Attane, “Woman in China Today,” 8; Gender Gap from Author’s Calculations.

Where most modern economies have trended towards more female involvement it seems that in China the gender gap is growing. This helps explain why China performs relatively poorly on the Gender Inequality Index rank (see Table 8). The ideological commitment that the communist party showed to gender equality at the founding of the PRC seems to have faded along with other socialist instruments like the command economy. Replacing this commitment seems to be a resurgence of traditional Confucian values of a man's superiority to women and a woman's place to be within the home.²⁴⁰ This along with the demographic gender imbalance seems to provide a consistent message that gender equality in the workforce is eroding in China. From the viewpoint of maximizing potential labor these societal values may prevent China from fully utilizing almost half of its potential labor. In this respect, China is comparable to Japan, also influenced by Confucian values, and it appears likely to continue to underutilize its female workforce as it experiences demographic decline.

b. Elderly Employment

With China unlikely to fully activate the potential of better female inclusion in the workforce, it will have to look to other potential sources to increase labor during its demographic decline. China's elderly population, while currently large due to the size of the overall population, is only now truly beginning to grow (see Figure 14). This population is expected to double in the next two decades and nearly triple to over 360 million by 2055.²⁴¹ The growth of this population is a testament to the increased life expectancy of China. The potential downside, which will be examined later in this chapter, is that this elderly population may pose an economic burden on a shrinking number of workers.

²⁴⁰ Attane, "Woman in China Today," 9.

²⁴¹ UNdata, "Population Aged 65 and over," United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2012 Revision, August 26, 2015, <http://data.un.org/Data.aspx?d=PopDiv&f=variableID%3A23>.

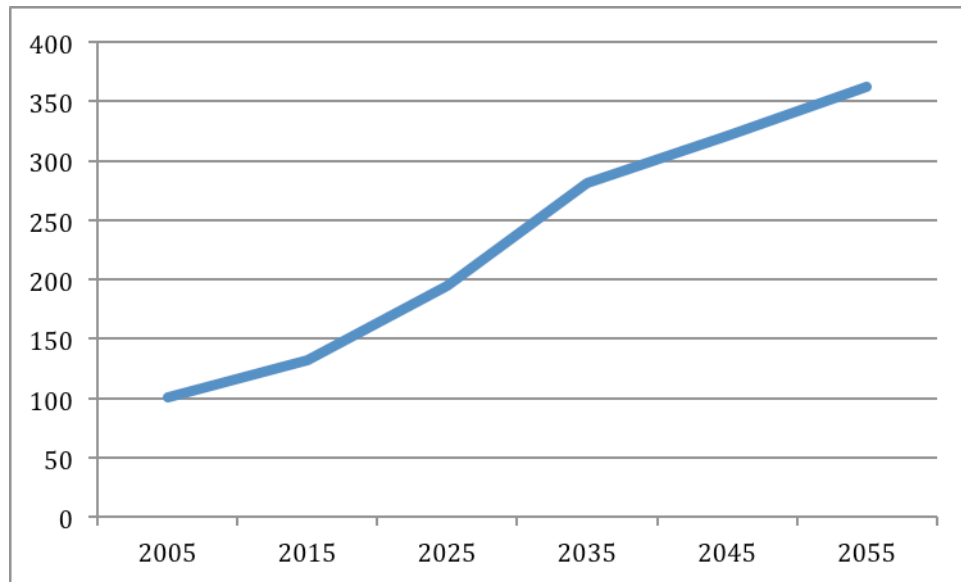


Figure 14. China Population 65+ (in millions).²⁴²

China appears well suited to employ this growing elderly population. Despite a low nominal retirement age, China’s effective retirement age is higher than both those of Germany and Russia (see Table 10). Already leading Russia in life expectancy, it is likely that this number will increase to closer to those of Germany and Japan as China continues to develop. Once again Japan provides the closest comparison to China, in that China is likely to have similar longevity and its elderly generally work well past the nominal retirement age. China’s nominal retirement age is low, but this has not prevented Chinese from working later in life. The low nominal retirement age may become a concern in regards to the resource drain it places on the government due to benefits, which will be addressed later in this chapter.

²⁴² Data Source: UNdata, “Population aged 65 and over,” August 26, 2015, <http://data.un.org/Data.aspx?d=PopDiv&f=variableID%3A23>.

Table 10. Comparison of Health and Retirement Ages.²⁴³

Country	Life expectancy at Age 60 (2012)		Nominal (Official) Retirement Age		Effective Retirement Age	
	M	F	M	F	M	F
Germany	22	25	65	65	62.1	61.6
Japan	23	29	65	65	69.1	66.7
Russia	14	20	60	55	63.3	60.0
China	18	21	60	50/55	66.8	62.0

c. Immigrant Employment

China currently has a net outward immigration rate (see Table 11). This pattern of emigration has been present at various times during China’s history. Prior to the PRC, many Chinese left in search of opportunities to work in manual labor industries. As the PRC was coming to power many Chinese capitalists went with the Chinese Nationalists to Taiwan to escape the communist economic system. In recent times, much has been made of the brain drain, where Chinese students go abroad to study and at times stay abroad with their professional skills. The common factor in all of these periods is the pursuit of economic opportunity driving emigration. If China continues to prosper it may find fewer of its citizens leave in search of economic opportunity and it may attract

²⁴³ Life Expectancy at Age 60 from UNdata, “Life Expectancy at Age 60,” United Nations, August 26, 2015, http://data.un.org/Data.aspx?q=life+expectancy&d=WHO&f=MEASURE_CODE%3aWHOSIS_000015; Normal Retirement Age from OECD, Pensions at a Glance 2013: OECD and G20 Indicators (Paris: OECD Publishing, 2013) 232, 256, 289, 325, http://dx.doi.org/10.1787/pension_glance-2013-en; Nominal female retirement in China, 50 for laborers, 55 for professionals; Effective Retirement Age from OECD, “Expected Years in Retirement,” in Society at a Glance 2014: OECD Social Indicators (Paris: OECD Publishing, 2014), 105, DOI : http://dx.doi.org/10.1787/soc_glance-2014-15-en.

immigrants from less prosperous economies. If this occurs China has the potential to reverse its outward immigration rate.

Table 11. Net Migration, Crude Birth, and Death Rates.²⁴⁴

Country	Net Migration Rate (per 1,000)	Crude Birth Rate (Per 1,000)	Crude Death Rate (Per 1,000)	Difference between CBR and CDR (CBR-CDR)
Germany	1.3	8.5	10.9	-2.4
Japan	0.6	8.4	9.8	-1.4
Russia	1.5	11.8	15.5	-3.7
China	-0.2	13.4	7.2	6.2

Economic opportunity alone is not the only factor that impacts a potential immigrant’s decision. Immigration is also affected by legal restraints, proximity and ease of entry to home country, existing immigrant communities, and intangible factors like cultural acclimatization. It remains to be seen if improving economic opportunities in China are able to reverse the flow of emigrants and better attract immigrants. For now China’s economy is losing potential workers, leaving it far behind the comparison countries in terms of immigration.

As China’s workforce begins its decline and the economy drives up the cost of labor it may draw in outside workers. Currently, though China is losing ground both in underutilization of female workers and due to the immigration of potential workers. China is utilizing its older workers effectively and this is likely to increase as continued modernization is expected to increase longevity. If China is unable to maximize its work

²⁴⁴ Net Migration Rate, Crude Death Rate, and Crude Birth Rate for period (2010-2015) from United Nations, World Population Prospects, 188, 320, 409, 634; Difference between CBR and CDR, authors calculation.

force, then continued economic growth will be even more dependent on increasing the productivity of its workers.

2. Labor Productivity

China's labor productivity in terms of GDP per person employed is expectedly lower than the more developed comparison countries (see Table 12). Chinese laborers still undertake relatively low-technology forms of work in both the rural and sectors while, by contrast, German and Japanese workers are more highly productive due to their access to capital investments and technology. Yet productivity does not only rely on the capital a worker has to work with; it can also be impacted by business practices, or even matching the right worker to the right task.

Generally, when enterprises are forced to compete in a fair market, competition drives businesses to be more productive. A business that produces more with the same inputs should have an inherent advantage that can lead to either lower prices or higher profit margins for the business. Without competition, this strong incentive to try to do more with less is lessened. In China, productivity at the competition shielded SOEs has grown slower. From 1978–1988, growth output per worker in non-SOEs (3.89 per year) outpaced that of SOEs (3.30 per year).²⁴⁵ From 1988 to 2004, competition increased due to globalization and significant SOE reform was enacted leading to even more increase in of output per worker, in both SOEs (5.86 per year) and non-SOEs (6.67 per year).²⁴⁶ When competition was introduced incentive was provided for productivity improvement.

When China joined the World Trade Organization (WTO) in 2001 domestic Chinese companies were further exposed to competition.²⁴⁷ WTO accession reduced China's ability to adopt protectionist measures to shield its companies from international competition.²⁴⁸ Naughton's analysis of the effect of this in terms of productivity is that:

²⁴⁵ Loren Brandt, Chang-tai Hsieh, and Xiaodong Zhu, "Growth and Structural Transformation in China," in *China's Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (New York: Cambridge University Press, 2008), 696.

²⁴⁶ Ibid.

²⁴⁷ Naughton, *The Chinese Economy*, 110.

²⁴⁸ Ibid.

This will inevitably accelerate the pace at which the market discriminates between successful and unsuccessful market competitors. While this process is driving the creation of a more productive and competitive economy, it also increases the urgency for China to provide effective policies to ease the transition of millions out of obsolete, low-productivity jobs, and speed their finding of productive roles in the emerging economy.²⁴⁹

Naughton's analysis appears correct due to the acceleration in growth in GDP per person employed occurring around this time period (see Figure 15).

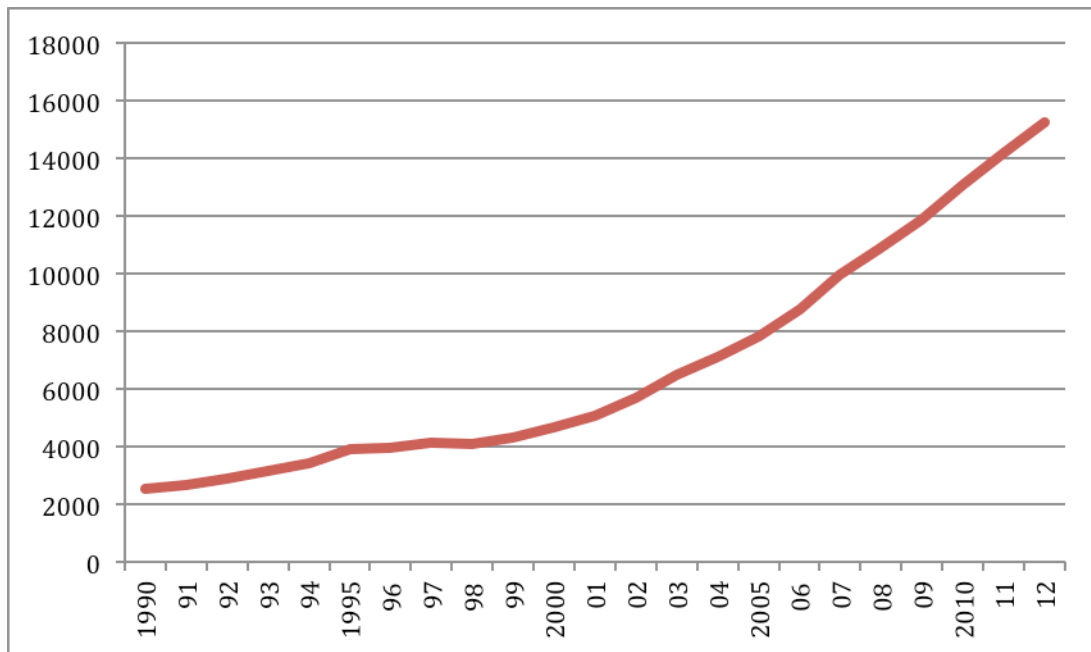


Figure 15. GDP per Person Employed, China.²⁵⁰

Things that can deter competition are high entry barriers for new businesses and when the government forbids competition or subsidizes a particular enterprise at the expense of others. The Doing Business Score (see Table 12) shows that competition in China is stifled compared to that of the comparison countries.

²⁴⁹ Naughton, *The Chinese Economy*, 110.

²⁵⁰ Data Source: World Bank, "GDP per Person Employed (constant 1990\$ PPP)," 25 Aug, 2015, <http://data.worldbank.org/indicator/SL.GDP.PCAP.EM.KD>.

China's labor freedom score, which examines labor regulations, is above that of Germany and Russia, but below Japan's (see Table 12). The *Hukou* system still hurts the free movement of labor in China, since it provides significant disincentives for underutilized workers in rural areas to move to urban areas where potential jobs may be found.

Table 12. Productivity/Labor and Business Freedom Scores.²⁵¹

Country	GDP per Person Employed	Labor Freedom Score	Doing Business Score
Germany	43,243	51.2	79.73
Japan	44,851	90.2	74.8
Russia	19,656	58.9	66.66
China	15,250	63.0	62.58

Overall, China is closest to Russia in terms of its productivity. This may be a carry-over effect from the Soviet style command economy that both of these economies grew out of. Another potential parallel is that the lack of real political competition in both countries has had an effect on business competition. Political connections would seem more important in countries with underdeveloped legal institutions and where one party rule exists. The economic importance of political competition though is not completely clear as Japan provides an example of a country whose growth occurred during a period of extended one-party dominance. Economically, at least, encouraging competition seems to be linked to increased productivity that China has experienced since 1988.

²⁵¹ GDP per Person from The World Bank, August 16, 2015, <http://datacatalog.worldbank.org>; Labor Freedom Score from "2015 Index of Economic Freedom," The Heritage Foundation, <http://www.heritage.org/index/explore>; Doing Business Score 2015 from "Doing Business Report Series," World Bank Group, <http://www.doingbusiness.org/reports>.

3. Controlling Old-Age Benefits

An additional concern of demographic change is the budgetary impact of medicine, pension and other old age benefits. In China, these programs have undergone significant change. In the socialist era, reform pensions and other benefits were generally the responsibility of the individual work unit, often an SOE. As part of China's marketization reforms, a pension system has been developed that can follow the individual from job to job. This pension only covers urban workers, which comprise about half the workforce.²⁵² Rural elderly Chinese, by contrast, mostly depend on family for support.²⁵³ For rural elderly that are without dependents, unable to work, and without money there is a social relief program that provides a minimal benefit.²⁵⁴ China's current pension systems are underfunded according to a Chinese Academy of Social Studies report that states "without adjustments, pension deficits would appear in 2030, and that by 2050 the accumulated shortfall would amount to 90% of China's GDP."²⁵⁵ While the current system is underfunded, the lack of a universal pension system keeps spending on public pensions well below the comparison cases (see Table 13). A World Bank study estimates that a minimal pension with universal coverage would currently cost China about 0.24% of GDP growing to about 0.43% of GDP by 2040.²⁵⁶ The benefit from this proposed coverage would be enough to bring elderly to the poverty level.²⁵⁷ A more generous benefit, similar to the OECD average, would provide urban elderly 28% average wage replacement and would cost 0.75% GDP now and 2.1% GDP in 2040.²⁵⁸ Comparatively, the cost for a universal elderly poverty protection in China is low but is set to rise due to demographics.

²⁵² OECD, *Pensions at a Glance 2013*, 232.

²⁵³ England, *Aging China*, 28–29.

²⁵⁴ *Ibid.*, 29.

²⁵⁵ "Paying for the Grey," *The Economist*, posted April 5, 2014, <http://www.economist.com/news/china/21600160-pensions-crisis-looms-china-looks-raising-retirement-age-paying-grey>

²⁵⁶ Mark C. Dorfman, Robert Holzmann, Philip O'Keefe, Dewen Wang, Yvonne Sin, and Richard Hinz, *China's Pensions System: A Vision* (Washington, DC: World Bank, 2013), 29–30, doi: 10.1596/978-0-8213-9540-0.

²⁵⁷ *Ibid.*, 30.

²⁵⁸ *Ibid.*

China's old-age dependency ratio is set to rise quickly over the next several decades. Old-age dependency ratio is the ratio of elderly people to those working-age. Since working-age people are generally the ones contributing taxes to the government and elderly receiving benefits, the ratio provides insight to this balance. As the ratio increases, effectively each working-age individual will have to contribute to supporting more elderly people.

At the family level, the prevalence of one-child families means that individuals will be responsible alone for supporting elderly family members during their retirement. This is the "4-2-1 problem," where successive generations of single child families, means that the youngest generation may need to help support two parents and four grandparents as they age. This heavy support burden is likely to prompt calls for the government to shoulder a larger financial share of elderly costs. If the government does increase its commitment to the elderly, the very low nominal retirement ages will increase the expense of pension benefits.

Table 13. Dependency Ratios and Spending on Public Pensions.²⁵⁹

Country	2015 Old-age Dependency Ratio	2050 Old-age Dependency Ratio	% GDP Spent on Public Pensions	Expected Years in Retirement		Nominal Retirement Age	
				M	F	M	F
Germany	32.7	59.9	11.3	19.9	23.8	65	65
Japan	43.6	71.8	10.2	16.0	22.7	65	65
Russia	18.8	32.8	9.2	12.4	20.0	60	55
China	13.1	39.0	3.0	13.4	18.8	60	50/55

C. CONCLUSION

Concerns about future demographic challenges in China's economy are valid, but it is also important to maintain perspective of how much China has economically progressed. China has progress from a Soviet-style command economy towards a market-oriented economic model. This transformation working in tandem with a large demographic dividend has driven China economy to second largest in the world. As China faces demographic decline, its economy will be tested. Will the still imperfect labor market be prepared to handle demographic change? Will global competition continue to push China's companies to operate more efficiently? Will China be able to control the costs of a growing elderly population?

²⁵⁹ 2015 and 2050 Old-age Dependency Ratios from United Nations, World Population Prospects, 320, 409, 634; % GDP Spent on Public Pensions and Nominal Retirement Age from OECD, Pensions at a Glance 2013, 232, 256, 289, 325; Expected Years in Retirement from OECD, "Expected Years in Retirement," 105; Nominal female retirement in China, 50 for laborers, 55 for professionals.

In comparison to countries currently experiencing demographic decline, China falls behind in several key aspects. In respect to maximizing labor, China appears to be regressing in the utilization of female labor. China also is struggling to keep or attract potential workers through immigration. Only in extending the working life of workers as they age does China compare favorably to the comparison countries. China also has significant progress still to make in order to maximize the productivity of its workers. Some of this will naturally increase as each worker has access to more capital and as newer cohorts of workers tend to be better educated than retiring workers. Yet, holdover effects from the command economy and the high levels of political influence in the economy threaten to keep China's workers less productive than those of Japan or Germany. Finally, China has been able to keep its pension costs very low, by far the lowest of the comparable countries, albeit as a result of the low coverage of retired workers. This can be used to invest and continue to grow the economy in the short term. In the long term, as China ages these costs will grow.

Overall, when considering these metrics, China's economy is poorly positioned for the coming demographic decline. While China still has a decade before it enters into the fifth stage of its demographic transition, without significant changes, China's economy will enter this transition without some of the mitigating factors that have helped the comparison economies through the transition.

V. CONCLUSION

This thesis challenges the notion that demographics are economically deterministic. It examines countries in similar demographic situations to reveal that these have widely varying economic impacts. It then examines several potential mitigation measures that might explain these varying outcomes. The first mitigation measure it examines is labor force maximization, consisting of the employment of females, the elderly, and migrant. Then it examines labor productivity as a potential way to mitigate the effects of a decreasing workforce. And finally, it examines controlling the government's cost of elderly care. Using Germany, Japan, and Russia as a baseline, the thesis examines China's readiness to mitigate its demographic transition and finds China presently poorly suited for its impending demographic change.

This analysis would be incomplete without acknowledging a common flaw in scholarly work on demographics and economics. Often, present trends are extrapolated without the consideration of how the environment around these trends may change. In demographics, this was famously the case of the early Malthusian thinkers. These thinkers identified the near exponential growth of the human population, and rightfully judged that the current economy and agriculture could not support such a burgeoning population. The logical flaw, however, is that while the current economy and agriculture could not support the future population, the growing population and demand for more food led to innovations that dramatically increased future outputs. The foil of the Malthusian viewpoint is the "cornucopian" viewpoint, the assumption that future innovation will always provide enough. My viewpoint, is that, while it is difficult to predict the future, the essential point from a policy point of view is that the future is not already determined but instead can be shaped.

This thesis examines China's demographic decline and the economic hardships that some are predicting as a result. While China's demographic trajectory, as reviewed in Chapter Two, is unlikely to significantly change, my argument is that demographic decline does not necessarily precipitate economic hardships. To examine this argument the cases of Germany, Japan, and Russia were reviewed. These countries are all

experiencing demographic decline, but with greatly differing economic levels of hardship. The widely varying experiences of these three countries provides evidence that demographic decline does not affect all countries in the same manner. The extension of this line of reasoning then is to examine countries to better understand what is different in these cases that impacts the effects of demographic decline. Chapter Three reviewed these economies and examined the potential mitigation pathways employed to dampen the effects of demographic decline.

Chapter Four then applied these same criteria to China. The finding that concludes Chapter Four is that “China’s economy is poorly positioned for the coming demographic decline. While China still has a decade before it enters into the fifth stage of its demographic transition, without significant changes, China’s economy will enter this transition without some of the mitigating factors that have helped the comparison economies through the transition.”²⁶⁰ This is based on China’s current demographic-economic situation and as stated before it would be a mistake to extrapolate the trend without consideration for how it may change the environment it is in. While China is currently not well suited is there a high probability that this could change?

A. CHINA’S TRAJECTORY

Some of China’s potential mitigation effects may change as the demographic environment changes. This section examines the potential trajectories of the mitigation measures, and reviews some potential policy issues that could impact these trajectories.

1. Maximizing Labor Force

The first pathway of mitigation that this thesis examines is the maximization of available labor. China is already maximizing its potential elderly workforce at high levels and this is only expected to improve as rising GDP per capita generally contributes to improvements in longevity and health. China is losing potential workers both by underutilizing females and by its negative net migration rates. These trends may not be set. A potential dynamic in China’s economy is that as labor becomes more scarce due to

²⁶⁰ Quote from the Conclusion of Chapter 4.

demographic decline, the cost of labor will rise. Increasing wages could pull more females or attract more immigrants into China's labor market.

This free market type dynamic occurs when there are not significant barriers in the market. Unfortunately, for China's economic future there seems to be a growing barrier specifically for further inclusion of women in the market. The Gender Inequality Index indicates that China's women have significantly less equality than those of the comparison countries. Chinese women's economic opportunities have been deteriorating over the past two decades in relative to those of Chinese men.²⁶¹ This corroborates the predictions of worsening relative status of women in gender imbalanced societies made by Hudson and den Boer in *Bare Branches*.²⁶² China seems to be headed in the wrong direction on female inclusion in the workforce.

Immigration is potentially a different story. The PRC has always had net outward immigration, generally rising from 1950–1955 and reaching a peak in 2000–2005.²⁶³ Since this period net outward migration has begun to decline (see Figure 16).²⁶⁴

²⁶¹ Attane, "Woman in China Today," 6-12.

²⁶² Hudson and den Boer, *Bare Branches*, 202–207.

²⁶³ United Nations, *World Population Prospects*, 188.

²⁶⁴ *Ibid*

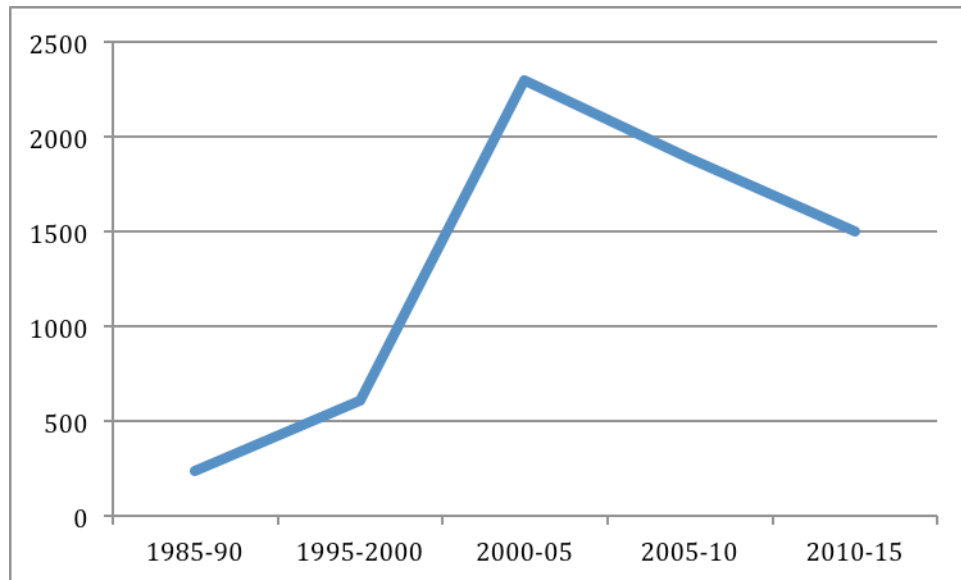


Figure 16. Net Migration China (outward, in thousands).²⁶⁵

As economic opportunity is often a primary driver of migration, it seems likely that as China’s economy grows it will attract more immigrants and have fewer leave in search of economic opportunities elsewhere. A second aspect that may slow the outward migration is demographic change itself. Those who emigrate tend to be young adults.²⁶⁶ As China’s population ages, this demographic of those most likely to leave will shrink, likely reducing its outward immigration total.

As far as those immigrating to China the numbers is still small compared to those leaving and especially in relation to the overall size of the Chinese population. Several immigrant communities have developed in China, including those which would be expected due to proximity, like Beijing’s “Korea Town” of Wangjing, or Shanghai’s Japanese enclave but also others are from further abroad, like Yiwu’s Middle Eastern community and Guangzhou’s African community.²⁶⁷ These communities may provide an

²⁶⁵ Data Source: United Nations, *World Population Prospects*, 188.

²⁶⁶ Pugel, *International Economics*, 369.

²⁶⁷ Shen Haimei, “Inflow of International Immigrants Challenges China’s Migration Policy,” Brookings, September 8, 2011, http://www.brookings.edu/research/opinions/2011/09/08-china-immigrants-shen#_ftn4.

important foothold in China, lowering the impact of cultural displacement and developing networks for future immigrants.

The gender imbalance has also played a role in immigration as, “a shortage of females in China has also created a demand for foreign brides.”²⁶⁸ These brides at times are purchased from poorer surrounding countries or are illegal immigrants forced to marry Chinese men.²⁶⁹ This is another aspect of gender-imbalanced societies examined by Hudson and den Boer, though they raise concerns that many of these “brides” are actually forced into prostitution.²⁷⁰

Overall, China appears likely to continue its high levels of employment of elderly workers, potentially increase the level of immigrant employment (or at least slow the net migration decline), and decrease the level of female employment. Due to relative size, the loss in potential female labor force vastly outweighs the potential gain in immigrant labor. A 5% drop in the female labor force participation rate from 2010 to 2020 would result in losing approximately 46 workers per 1000 population over ten years (see Table 14).²⁷¹ To offset this, the net migration would have increase from -0.2 annually to 4.6, assuming that every incoming migrant will participate in the labor force. This equates to a net inward immigration of over 6 million immigrants a year and is higher than the U.S. immigration rate of 3.1 per year.²⁷²

²⁶⁸ Haimei, “International Immigrants.”

²⁶⁹ Ibid.

²⁷⁰ Hudson and den Boer, *Bare Branches*, 206.

²⁷¹ 5% drop used for illustrative purposes, actual drop from 1990 to 2000 was 4.8%, actual drop from 2000 to 2010 was 5.9% ; Employment rates from Attane, “Woman in China Today,” 8.

²⁷² United Nations, *World Population Prospects*, 802.

Table 14. Results of a Drop in Female Labor Force Participation Rate.²⁷³

	Females (20–59)
% of Total Population	30.65
2010 LFPR	63.7
Workers in 1000 (2010)	226
Workers in 1000 with 5% decrease in LFPR (hypothetical 2020)	180
Labor Force Difference per 1000 population	46

Not only does China seem unlikely to mitigate demographic decline by maximizing its labor force, it appears likely that decreasing labor force participation by women will make the effect of demographic decline on the workforce more acute.

Several policy changes could potentially allow China to better maximize its labor. Completely doing away with the One-Child policy may have several benefits. First, it may lead to a small increase in fertility. Any increase is likely to remain small due to the ingrained social norms of small families that have developed over several decades of the policy. While an increase in fertility would eventually provide more labor and help ease the extent of China’s demographic decline, the effect on the labor market would occur at least two decades from now. Second, several scholars have noted that the One-Child policy contributes to the gender imbalance.²⁷⁴ Abolishing the policy may help restore the natural gender balance yet, once again, this would be a slowly developing effect and is not a foregone conclusion; for example, South Korea and India also have gender imbalances without a One-Child policy. Restoring the gender balance could improve the status of women in China, leading to higher labor force participation rates.

²⁷³ Female % of Total Population from China Statistical Yearbook, “Population by Age and Sex,” August 26, 2015, <http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm>. ; Employment rates from Attane, “Woman in China Today,” 8.

²⁷⁴ See England, *Aging China*, 24-25; Hudson and den Boer, *Bare Branches*, 156.

A second potential policy improvement would be reform of the immigration system. China is unaccustomed to being the receiver of immigrants and its relevant policies are focused on visitors, not those intending to stay and work for the long-term.²⁷⁵ The current system favors those “who are highly educated and can work in high-tech or bring large investments with them.”²⁷⁶ As China’s demographics change, the demand for workers of all skill levels may drive this policy to be more inclusionary. Access to legal methods of immigration could improve the lives of the “foreign brides” bringing them out from an undocumented status, reducing the abuse and smuggling of women.²⁷⁷

2. Labor Productivity

A second pathway of mitigation is by using the labor available more productively. China’s productivity is currently lower than the comparison countries, but this is expected in a developing country that does not have nearly the same capital stock per worker compared to Japan or Germany. Productivity growth, in terms of output per worker, though has been improving rapidly: according to one study it has, “tripled in China between 1980 and 2004, and this pace has been maintained to the present.”²⁷⁸ Part of this growth reflects high rates of investment leading to increasing capital stock for workers to use.²⁷⁹

China’s economy has maintained very high rates of investment, but not all investment has the same amount of beneficial economic effect. Beyond firms funding their own investment, China’s domestic banks provide the primary vehicle for financing need for investments.²⁸⁰ This banking sector is dominated by the four state-owned banks.²⁸¹ These banks have tended to give the majority of their loans to SOEs and to

²⁷⁵ Haimei, “International Immigrants Challenges.”

²⁷⁶ Ibid.

²⁷⁷ Ibid.

²⁷⁸ Alan Heston and Terry Sicular, “China and Development Economics,” in *China’s Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (Cambridge, NY: Cambridge University Press, 2008), 37.

²⁷⁹ Ibid

²⁸⁰ Allen, Qian, and Qian, “China’s Financial System,” 515.

²⁸¹ Ibid., 522.

fund government sponsored development projects.²⁸² A significant portion of these loans became non-performing (up to 29% in 2001 though down significantly to about 1% in 2014) indicating that some lending decisions had been made due to political considerations or other non-economic justifications.²⁸³ If China's financing markets have truly been reformed, then future investments should help improve labor productivity, but if politics and not economics drives lending decisions much of this investment may be wasted.

Ensuring future investment is economically productive is one way that China can improve its labor productivity. This requires firm barriers between politics and economics. In China, many see the SOEs as bastions of low-productivity growth enabled by political relationships. Perkins and Rawski predict, "China's productivity prospects will benefit from further reforms aimed at getting the state out of direct ownership and management of industrial and service sector enterprises."²⁸⁴ Whether these types of reforms will come to fruition remain to be seen.

A second aspect of using labor well is a functioning labor market, allowing labor to move freely to from low-productivity jobs to higher productivity. This has also seen significant improvement in China during reform, though barriers in the labor market still remain. The Hukou system presents barriers for rural Chinese to move to and find work in cities. As urban economies grow, the Hukou system can be a constraint on growth as it deters potential rural workers from joining the urban economy.²⁸⁵ The justifications for the system include preventing urban overcrowding and providing employment protection for urban residents.²⁸⁶ Reforms have reduced the importance of the Hukou and other

²⁸² Allen, Qian, and Qian, "China's Financial System," 518.

²⁸³ World Bank, "Bank nonperforming loans to total gross loans," August 28, 2015, <http://data.worldbank.org/indicator/FB.AST.NPER.ZS/countries>; Allen, Qian, Qian, "China's Financial System," 525.

²⁸⁴ Dwight H. Perkins and Thomas G. Rawski, "Forecasting China's Economic Growth to 2025," in *China's Great Economic Transformation*, ed. Loren Brandt and Thomas G. Rawski (Cambridge, NY: Cambridge University Press, 2008), 880.

²⁸⁵ Cai, Park, and Zhao, "Chinese Labor Market," 198.

²⁸⁶ Naughton, *The Chinese Economy*, 125.

barriers to rural to urban migration, but they have progressed slowly, are incomplete.²⁸⁷ China still has a significant misappropriation of labor due to these barriers in the labor market.²⁸⁸

3. Controlling Old-Age Benefits

The cost of old-age benefits is going to rise in China due to the increasing number of elderly people. This is almost unavoidable consequence of demographic aging. It also appears that these costs will be no worse than those within the comparison countries. The expectation of significant government support of the elderly has not developed for Chinese that work outside the state sector. These lower expectations should help China control the expense of these benefits.

Minimum universal pension coverage would help alleviate the potential problem of elderly poverty. This would certainly increase the governments cost, but as the World Bank study estimated only by perhaps 2.1% of GDP.²⁸⁹ Even with this additional cost China would still be well below the pension costs of the comparison countries relative to GDP. A second potential reform will be to raise the nominal retirement age. This would help ensure that elderly costs remain low as life expectancies grow. Retirement ages are set to increase to 67 in most OECD countries by 2050 and China might use this number as a guide.²⁹⁰ A final potential reform would be to change from a pay as you go scheme, where current workers pay for current retirees to one where workers contributions are invested towards their future benefits. This is similar to the retirement changes Americans are familiar with where defined benefit plans have been generally phased out in favor of defined contribution plans. The effect of this change is to shift longevity risk, that life-expectancies will grow, from corporations to individual retirees. A transition like this is complicated because legacy costs from the previous plan must be paid as well as

²⁸⁷ Naughton, *The Chinese Economy*, 134-135.

²⁸⁸ *Ibid.*, 135.

²⁸⁹ Dorfman, Holzmann, O'Keefe, Wang, Sin, and Hinz, *China's Pensions System*, 30.

²⁹⁰ OECD, *Pensions at a Glance 2013*, 13.

contributions to future beneficiaries.²⁹¹ While the transition is difficult, in the long run it may ensure a more sustainable retirement system.

B. AREAS FOR ADDITIONAL INVESTIGATION

The story of China's demographic transition is just beginning to be told. This thesis attempts to contribute some to the understanding of how this transition may impact China's economic future, but the author does not suppose that this is the definitive work on the matter. This research in many ways exposed the author to more questions than it has answered.

An especially compelling topic includes further historical and quantitative work on the economic effects of gender-imbalance. *Bare Branches* covers much of the societal implications of this phenomenon, but the economic implications are less developed.²⁹² This is becoming increasingly pertinent as India, South Korea, and China, continue to grow in economic significance and are all experiencing imbalances.²⁹³

Additional research would be beneficial in determining the accuracy of predictor statistics just prior to demographic decline for those later on during the decline. Does demographic decline lead to changes in immigration flow or are immigration flows more sensitive to national attitudes and historical precedent? Another potential incident where population dynamics might drive policy is labor mobility. Will China loosen its barriers to internal migration as its urban industries begin to experience more labor shortages or will protectionist attitudes prevail?

²⁹¹ Dorfman, Holzmann, O'Keefe, Wang, Sin, and Hinz, *China's Pensions System*, 167-168.

²⁹² Hudson and den Boer, *Bare Branches*, 187-227.

²⁹³ *Ibid.*, 58-64.

C. CONCLUDING REMARKS

Demographic change will continue to shape the world we live in. Its effects will be far reaching, impacting various aspects of life. This change is often presented in alarmist terms, but the effects of demographic change need not always be negative. Some countries undergoing demographic change are likely to adapt well, others not. Demographic decline will reduce the working age population. Some countries will be able to mitigate some of this effect by pulling workers in from the margins, who either by personal or societal choices have not previously been working. Bringing in workers from the margins will be unlikely to completely account for the loss of labor due to demographic change. Labor will become scarcer but it is a resource and, as with other resources, well-functioning markets will allocate this resource efficiently. If labor is efficiently allocated to its most productive uses, total production may increase even as labor as a factor decreases. Examples abound where labor became more expensive and technology or capital filled the gap: robots replacing auto assembly line workers, ATMs replacing tellers, computers replacing telephone switchboard operators.²⁹⁴ There is no reason to believe that this will not also occur as demographic decline occurs. Finally, countries experiencing demographic decline will have to adapt to an older population. This will include ensuring that there is control over the benefits for the elderly population. People living longer and healthier is not a bad thing, but the generous benefits designed for workers expected to only spend a few short years in retirement are unaffordable when that time period grows to several decades.

These are the challenges that most of the developed world faces, and these are the challenges that China faces. In many ways, China does not appear ready for its demographic decline, but this does not mean it is destined for economic hardship. There is still some time for China to mitigate the economic effects of its decline. After all, demographics are not deterministic, but instead demographics are what you make of them.

²⁹⁴ Wheelan, *Naked Economics*, 142.

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LIST OF REFERENCES

- Allen, Franklin, Jun Qian, and Meijun Qian. "China's Financial System: Past, Present, and Future." In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas G. Rawski. 506–568. New York: Cambridge University Press, 2008.
- Attane, Isabelle. "Being a Woman in China Today: A Demography of Gender." *China Perspectives* no. 2012/4 (Dec 2012): 5–15, <http://chinaperspectives.revues.org/6013>.
- Bergsten, C. Fred, Bates Gill, Nicholas R. Lardy, and Derek J. Mitchell. *China: The Balance Sheet*. New York, Public Affairs: 2006.
- Bloom, David E., David Canning, and Gunther Fink. *Implications of Population Aging for Economic Growth* (NBER Working Paper 16705). Cambridge, MA: National Bureau of Economic Research, 2011. <http://www.nber.org/papers/w16705>.
- Bloom, David E., David Canning, and Jocelyn E. Finlay. "Population and Aging and Economic Growth in Asia." In *The Economic Consequences of Demographic Change in East Asia*, edited by Takatoshi Ito and Andrew K. Rose. Chicago: University of Chicago Press, 2010. <http://www.nber.org/chapters/c8148>.
- Bloom, David E. and Jeffrey G. Williamson. *Demographic Transitions and Economic Miracles in Emerging Asia* (NBER Working Paper 6268) Cambridge, MA: National Bureau of Economic Research, 1997. <http://www.nber.org/papers/w6268>.
- Brandt, Loren, Chang-tai Hsieh, and Xiaodong Zhu. "Growth and Structural Transformation in China." In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas G. Rawski, 683–728. New York: Cambridge University Press, 2008.
- Brandt, Loren and Thomas G. Rawski. "China's Great Economic Transformation." In *China's Great Economic Transformation*. 1–26. New York: Cambridge University Press, 2008.
- Cai, Fang, Albert Park, and Yaohui Zhao. "The Chinese Labor Market in the Reform Era." In *China's Great Economic Transformation*, edited by Loren Brandt and Thomas G. Rawski. 167–214. New York: Cambridge University Press, 2008.
- Chesnais, Jean-Claude. "Demographic Transition Patterns and Their Impact on the Age Structure." *Population and Development Review* 16, no. 2 (1990): 327–336, <http://www.jstor.org/stable/1971593>.

- “China’s Achilles Heel.” *Economist*. April 21, 2012.
<http://www.economist.com/node/21553056>.
- Das, Mitali and Papa N’Diaye. “The End of Cheap Labor.” *Finance and Development* 50, no. 2 (June 2013): 34–37.
<http://www.imf.org/external/pubs/ft/fandd/2013/06/pdf/das.pdf>.
- De Wulf, Martin. “Population Pyramids of the World from 1950 to 2100.” Accessed August 16, 2015. www.populationpyramid.net.
- Dorfman, Mark C., Robert Holzmann, Philip O’Keefe, Dewen Wang, Yvonne Sin, and Richard Hinz. *China’s Pensions System: A Vision*, Washington, DC: World Bank, 2013, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/03/04/000356161_20130304144743/Rendered/PDF/757300PUB0EPI0001300pubdate02026013.pdf.
- Eggleston, Karen, and Shripad Tuljapurkar. “Introduction.” In *Aging Asia: The Economic and Social Implications of Rapid Demographic Change in China, Japan, and South Korea*, edited by Karen Eggleston and Shripad Tuljapurkar, 3–17. Stanford, CA: Walter H. Shorenstein Asia-Pacific Research Center Books, 2010.
- England, Robert Stowe, *Aging China: The Demographic Challenge to China’s Economic Prospects*. The Washington Papers. Westport, CT: Praeger, 2005.
- Grover, Drew. “What is the Demographic Transition Model?” Population Education. October 13, 2014. <https://www.populationeducation.org/content/what-demographic-transition-model>.
- Heston, Alan, and Terry Sicular. “China and Development Economics.” In *China’s Great Economic Transformation*. Edited by Loren Brandt and Thomas G. Rawski, 27–67. Cambridge, NY: Cambridge University Press, 2008.
- Hudson, Valerie M., and Andrea M. den Boer. *Bare Branches: The Security Implications of Asia’s Surplus Male Population*. Cambridge, MA: MIT Press, 2004.
- Jackson, Richard, and Neil Howe. *The Graying of the Great Powers: Demography and Geopolitics in the 21st Century*. Washington, DC: Center for Strategic & International Studies, 2008.
- . *The Graying of the Middle Kingdom: The Demographics and Economics of Retirement Policy in China*. Washington, DC: Center for Strategic and International Studies, 2004,
http://www.lifestarinstitute.org/_archive/files/library/CSIS-GAI-China-The_Graying_of_the_Middle_Kingdom.pdf.

- Kirk, Dudley. "Demographic Transition Theory." *Population Studies* 50, no 3. (1996): 361–387, <http://www.jstor.org/stable/2174639>.
- Naughton, Barry. *The Chinese Economy: Transitions and Growth*. Cambridge: MIT Press, 2007.
- Organization for Economic Cooperation and Development. *Measuring Productivity – OECD Manual: Measurement of Aggregate and Industry-Level Productivity Growth*. Paris: OECD Publishing, 2001. <http://dx.doi.org/10.1787/9789264194519-en>.
- . *Pensions at a Glance 2013: OECD and G20 Indicators*. Paris: OECD Publishing, 2013. http://dx.doi.org/10.1787/pension_glance-2013-en.
- . "Expected Years in Retirement." In *Society at a Glance 2014: OECD Social Indicators*. 104–105. Paris: OECD Publishing, 2014. http://dx.doi.org/10.1787/soc_glance-2014-15-en.
- . *OECD Economic Surveys: Germany 2014*. Paris: OECD Publishing, 2014. http://dx.doi.org/10.1787/eco_surveys-deu-2014-en.
- . *OECD Economic Surveys: Russian Federation 2013*. Paris: OECD Publishing, 2014. http://dx.doi.org/10.1787/eco_surveys-rus-2013-en.
- . *OECD Economic Surveys: Japan 2015*. Paris: OECD Publishing, 2015. http://dx.doi.org/10.1787/eco_surveys-jpn-2015-en.
- . *OECD Factbook 2014: Economic, Environmental, and Social Statistics*. Paris: OECD Publishing, 2014. <http://dx.doi.org/10.1787/factbook-2014-en>.
- Patience, Martin. "China's Economic Growth Slows to More than Five-Year Low." BBC. October 21, 2014. <http://www.bbc.com/>.
- "Paying for the Grey," *Economist*, April 5, 2014, <http://www.economist.com/news/china/21600160-pensions-crisis-looms-china-looks-raising-retirement-age-paying-grey>.
- Perkins, Dwight H. *East Asian Development: Foundations and Strategies*. Cambridge, MA: Harvard University Press, 2013.
- Perkins, Dwight H. and Thomas G. Rawski. "Forecasting China's Economic Growth to 2025." In *China's Great Economic Transformation*. Edited by Loren Brandt and Thomas G. Rawski, 829–887. Cambridge, NY: Cambridge University Press, 2008.

- Pugel, Thomas A. *International Economics*. 15th ed. International edition. New York: McGraw-Hill/Irwin, 2012.
- Ryoshin, Minami, Fumio Makino, and Kwan S. Kim. *Lewisian Turning Point in the Chinese Economy: Comparison with East Asian Countries*. New York: Palgrave Macmillan, 2014.
- Schuman, Michael. "Anyone Expecting a Rebound in Chinese Growth Won't Like the New GDP Figures." *Time*. October 21, 2014. <http://www.time.com/>.
- Sirkin, Harold L. "China's Worker Shortage Is a Global Problem." Bloomberg. May 30, 2013. <http://www.bloomberg.com/bw/articles/2013-05-30/chinas-worker-shortage-is-a-global-problem>.
- Shen Haimei. "Inflow of International Immigrants Challenges China's Migration Policy." Brookings, September 8, 2011. http://www.brookings.edu/research/opinions/2011/09/08-china-immigrants-shen#_ftn4.
- Shirk, Susan. *China: Fragile Superpower*. Oxford, NY: Oxford University Press, 2007.
- Spring, Jake and Xiaoyi Shao. "China's Growth Slowest since Global Crisis, Annual Target at Risk." *Reuters*. October 21, 2014. <http://www.reuters.com/>.
- Tan Shih Ming. "News Analysis: Structural Reforms Need to Boost Asia's Productivity Growth." People's Daily Online. May 16, 2014, <http://en.people.cn/business/8629496.html>.
- Truesdell, David. "China's Demographic Limits to Economic Growth." Master's thesis, Naval Postgraduate School, 2012.
- Tuljapurkar, Shripad. "How Demography Shapes Individual, Social, and Economic Transitions in Asia." In *Aging Asia: The Economic and Social Implications of Rapid Demographic Change in China, Japan, and South Korea*, edited by Karen Eggleston and Shripad Tuljapurkar, 35–42. Stanford, CA: Walter H. Shorenstein Asia-Pacific Research Center Books, 2010.
- United Nations, Department of Economic and Social Affairs. "World Population Prospects, the 2015 Revision." Accessed August 24, 2015. <http://esa.un.org/unpd/wpp/Graphs>.
- United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects: The 2012 Revision, Volume II, Demographic Profiles* (ST/ESA/SER.A/345). New York: United Nations, 2013.

- Wang Feng. "Demographic Transition: Racing towards the Precipice," *China Economic Quarterly*, (2012): 17–21,
<http://www.brookings.edu/research/articles/2012/06/china-demographics-wang>.
- Wang Feng, and Andrew Mason. "The Demographic Factor in China's Transition." In *China's Great Economic Transformation*. Edited by Loren Brandt and Thomas G. Rawski, 136–166. Cambridge, NY: Cambridge University Press, 2008.
- Wang Xiadong, "All Couples May Be Allowed to Have a Second Child Soon: Expert." *China Daily*. Last modified May 5, 2015.
http://europe.chinadaily.com.cn/china/2015-05/08/content_20656281.htm.
- Wheelan, Charles. *Naked Economics: Undressing the Dismal Science*. New York: W.W. Norton & Company, 2010.
- "The World's Next Great Leap Forward Towards the End of Poverty," *Economist*, June 1, 2013, <http://www.economist.com/news/leaders/21578665-nearly-1-billion-people-have-been-taken-out-extreme-poverty-20-years-world-should-aim>.
- Xu Wei. "Having Daughters Makes You Happier, Survey Says." *China Daily*. Last modified May 19, 2015. http://www.chinadaily.com.cn/china/2015-05/19/content_20755382.htm.
- Xue Jinjun, and Wenshu Gao. "Labor Migration and Urban-Rural Income Disparity." In *Lewisian Turning Point in the Chinese Economy: Comparison with East Asian Countries*, edited by Ryoshin Minami, Fumio Makino and Kwan S. Kim. New York: Palgrave Macmillan, 2014.

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