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**NAVAL  
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**MONTEREY, CALIFORNIA**

**THESIS**

**CHINA'S DEMOGRAPHIC LIMITS TO ECONOMIC  
GROWTH**

by

David Truesdell

June 2012

Thesis Co-Advisors:

Naazneen Barma  
Michael Glosny

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<b>REPORT DOCUMENTATION PAGE</b>			<i>Form Approved OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
<b>1. AGENCY USE ONLY (Leave blank)</b>	<b>2. REPORT DATE</b> June 2012	<b>3. REPORT TYPE AND DATES COVERED</b> Master's Thesis	
<b>4. TITLE AND SUBTITLE</b> China's Demographic Limits to Economic Growth		<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> David Truesdell		<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Naval Postgraduate School Monterey, CA 93943-5000		<b>10. SPONSORING/MONITORING AGENCY REPORT NUMBER</b>	
<b>9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> N/A		<b>11. SUPPLEMENTARY NOTES</b> The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number _____N/A_____.	
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release; distribution is unlimited		<b>12b. DISTRIBUTION CODE</b> A	
<b>13. ABSTRACT (maximum 200 words)</b>  China's demographic transition will create great difficulty in continuing the scale of the economic development seen over the last thirty years. This difficulty will be experienced through the costs of the demographic detour, which began during the Great Leap Forward and was then magnified through the birth limiting campaigns up to and including the One-Child Policy. While the skewing of the dependency ratio over the last thirty years resulted in significant contributions to China's economic development, this has reached a limit where the unborn laborers will present a strain on development. This strain will be present in the form of a shrinking and rapidly aging labor pool resulting in a decrease in innovation and productivity as well as an overhaul to thousands of years of tradition of doing business through familial ties. This will all be culminated in the testing of an already failing pension system as China experiences the transition from the demographic stage of a slowly growing population to post-transition.			
<b>14. SUBJECT TERMS</b> geography, Economics, Great Leap Forward, One-Child Policy			<b>15. NUMBER OF PAGES</b> 95
			<b>16. PRICE CODE</b>
<b>17. SECURITY CLASSIFICATION OF REPORT</b> Unclassified	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> Unclassified	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> Unclassified	<b>20. LIMITATION OF ABSTRACT</b> UU

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**CHINA'S DEMOGRAPHIC LIMITS TO ECONOMIC GROWTH**

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Lieutenant, United States Navy  
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Submitted in partial fulfillment of the  
requirements for the degree of

**MASTERS OF ARTS IN SECURITY STUDIES  
(Far East, Southeast Asia, and the Pacific)**

from the

**NAVAL POSTGRADUATE SCHOOL  
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## **ABSTRACT**

China's demographic transition will create great difficulty in continuing the scale of the economic development seen over the last thirty years. This difficulty will be experienced through the costs of the demographic detour, which began during the Great Leap Forward and was then magnified through the birth limiting campaigns up to and including the One-Child Policy. While the skewing of the dependency ratio over the last thirty years resulted in significant contributions to China's economic development, this has reached a limit where the unborn laborers will present a strain on development. This strain will be present in the form of a shrinking and rapidly aging labor pool resulting in a decrease in innovation and productivity as well as an overhaul to thousands of years of tradition of doing business through familial ties. This will all be culminated in the testing of an already failing pension system as China experiences the transition from the demographic stage of a slowly growing population to post-transition.

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## **ACKNOWLEDGMENTS**

First and foremost, I would like to acknowledge my primary advisor, editor, and wife Angelina Truesdell, my two boys, Jonathan and William, for inspiration. Next, I would like to thank the, Professor Naazneen Barma and Professor Michael Glosny, for their honest, educated, and much needed support through the process necessary in finishing my thesis. Lastly, I would like to thank all of the great staff here at the Naval Postgraduate School because this thesis truly is the capstone of my time here, it would not have been possible without each and every professor I have had had the pleasure to learn from both in and out of class.

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# **I. INTRODUCTION**

## **A. MAJOR RESEARCH QUESTION**

Has China's demographic transition since 1949, with its aging population, reduced dependency ratios, and lower than replacement fertility rates, contributed to economic development within China? Will this demographic legacy limit China's future economic growth?

## **B. IMPORTANCE**

Any possible limitation to China's economic development should be evaluated thoroughly, and its demographic transition could negatively affect its future economic growth. Currently there are two schools of thought regarding projections of China's economic growth. The first, and most dominant, projects its future on a trajectory determined by recent and past success, which presents little to no limits on future growth and development. The second sees a limitation to China's growth. This limitation may come in the form of discontinued FDI, internal instability, or, as I will address in my thesis, the inability to cope with the coming demographic transition.

While demographic transitions from pre-industrial countries, with high fertility and mortality rates, to modern industrialized nations, with low fertility and mortality rates, tend to follow similar models, China's demographic path has been different. Using Japan, South Korea, and India as models for what China will be experiencing can provide some insight but it is limited due to specific conditions only experienced by China. China's demographic experiences include a far lower GDP per capita than Japan, an area and population that dwarfs South Korea, the One-Child Policy that India never experienced, and the Great Leap Forward, which is not comparable to any other nation's experience.

My thesis will thus approach the topic of the relationship between China's demographic story and its economic development as a qualitative analysis spanning from 1949 until 2000, broken into three temporal case studies and conclude with an analysis of the impacts China's transition into the near future. The case studies will be China during

the Great Leap Forward, China immediately after the One-Child Policy was instituted, and China in 2000. The timing of my thesis is appropriate because “demographic processes are highly inert in that they are conditioned by past population structures and by the relative continuity of demographic behavior. To comprehend a current demographic situation, one must analyze the evolution of that population in the past.”<sup>1</sup>

The implications of my research will enhance the starting positions for multiple future questions. If China’s demographic transition is different from currently accepted models, what benefits has it reaped from governmental intervention to alter the country’s demographic profile? What have the costs been or will they come later? Is China’s model transferable and would it be advantageous to replicate it? If China’s growth is limited due to its demographic transition, then, analysis of when, how, and the resulting regional and global dynamics is critical to allow for proper understanding of China’s economic trajectory and enable the United States to prepare for what the future may hold if there are indeed demographic limits to China’s economic growth.

### **C. PROBLEMS AND HYPOTHESES**

My hypothesis is that China’s demographic transition - consisting of its population’s age structure, labor percentages, dependency ratios and fertility rates – has positively affected its economic development so far, but some of the factors that contributed to China’s success will present long term costs in the next thirty to fifty years. The Great Leap Forward resulted in skewed dependency ratios, age ratios, and birth rates, enabling China to become more productive through a disproportionately large labor pool. Furthermore, China’s One-Child Policy continued the manipulation of the dependency and age ratios through restrictive birth rates, again resulting in a disproportionately large labor pool. In addition, China’s cultural preference for male children compounded the effects of the One-Child Policy by reducing the number of women in each generation, resulting in even fewer children than there would have been otherwise. When evaluated individually, each factor bears only a fraction of responsibility, but when taken all

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<sup>1</sup> Victor Perevedentsev, "The Demographic Situation in Post-Soviet Russia," in *Population Under Duress: The Geodemography of Post-Soviet Russia*, ed. George J. Demko (Boulder: Westview Press, 1999), 17.

together and compounded over a span of 60 years, I expect to find that China will experience a limitation on its labor pool, and hence its economic growth, within this century.

Admittedly, there have been many contributing factors to China's economic growth and success. One problem I will have is not only determining if the demographic stages China has gone through have affected its economic development, but to what extent. Likewise, if the demographic history of China has contributed to its success, will it also create a limitation to China's economic growth in the future, and if so, when and to what degree might this limit exist? Are there any policies or actions for China to help mitigate the effects of its changing demographics and has it undertaken any already?

To address if a demographic limitation to Chinese economic growth exists I must first address if China's past economic growth has been dependent on, or even greatly influenced by, the growing labor force and then analyze the factors that will contribute to the limits of that labor pool. China's demographic picture has affected its economic performance in many ways. These factors include the median age of the Chinese population increasing due to medical advances, skewed dependency ratios, strict immigration restrictions, and a labor pool that is no longer expanding.

China's median age contributes to the aging of the population that may or may not correspond with the maturity of economic development. A country with a median age of 30 years old would have an advantage over a country with a median age of 70 years old if they were both competing to be a manufacturing giant, simply in terms of the available pool of working age labor. Skewed dependency ratios enable increases in the size of the workforce as well as the ability to invest capital that otherwise would have gone to dependent care, supporting the youth or elderly. A labor pool that is no longer expanding creates a limitation in human capital, forcing a transition away from industrial policies based on what had once appeared a limitless source of human capital. Immigration restrictions are a tool to control the flow of human capital, potentially offsetting a rapidly aging population and adding to a labor pool that is no longer expanding.

## D. LITERATURE REVIEW

The literature on demographic transition theory is quite large and can provide a lot of information qualitatively as well as through quantitative, empirical and historical evidence. Dudley Kirk describes demography as, “a science short on theory, but rich in quantification.”<sup>2</sup> Jean-Claude Chesnais defines the demographic transition as “the process of modernization of the reproductive behavior in human populations.”<sup>3</sup> Chesnais also goes on to explain that “the demographic transition can be made with reference to five phases: phase 1 (pretransition), phase 2 (declining mortality, high fertility: accelerating population increase), phase 3 (peak population growth), phase 4 (crude birth rate declining faster than the crude death rate: slowing population growth), phase 5 (posttransition).”<sup>4</sup> If there is any hope in affecting a country’s demographic transition, analysis should be done in a preemptive manner because, as explained by Nicholas Eberstat, “The overwhelming majority, roughly 80%, of the people who will inhabit China in 2030 are already alive, living there today.”<sup>5</sup>

The relationship between the stages of demographic transition and economic growth are represented through “labor supply, savings behavior, and productivity changes.”<sup>6</sup> One of the most profound impacts on economic performance by demographics is that the dependency ratio and life expectancy “have positive and large impacts on economic growth.”<sup>7</sup> This is at least partially due to how dependency ratios and life expectancy “affect family decision making,” and “increase the incentive to invest in education.”<sup>8</sup>

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

3 Jean-Claude Chesnais, "Demographic Transition Patterns and their Impact on the Age Structure," *Population and Development Review* (1990), 327.

4 *Ibid.*, 327.

5 Nicholas Eberstadt, "Demographic Trends Cloud China's Long-Term Economic Outlook," *Japan Spotlight* (2011), 26.

6 Cliff Waldman, "China's Demographic Destiny and its Economic Implications," *Business Economics* (2005), 33.

7 *Ibid.*, 34.

8 *Ibid.*

Within the stages of demographic transition, Andrew Mason has found there to be two demographic dividends that can greatly contribute to a country or region's economic development.

The first dividend arises because over the demographic transition countries experience an increase in the share of their populations concentrated in the working ages. On its face, this has a direct, favorable effect on per capita income. Whether or not the first dividend is realized, however, will depend on how wages, labor force participation rates, and unemployment are affected by the rapid growth in the working age population that typically leads to the first dividend.<sup>9</sup>

The second dividend arises as a response to the prospect of population aging. A key economic challenge for aging populations is to provide for old-age consumption in the face of substantially reduced labor income. Some societies are trying to meet this challenge by relying on transfer systems—either public programs or familial support systems. Other societies are responding by increasing their saving rates and accumulating greater physical wealth or capital. It is in this latter response that prospects for capital accumulation and more rapid economic growth are enhanced.<sup>10</sup>

Wang Feng and Mason go on to explain that, “whether China will enjoy a second dividend remains to be seen,” because it will be dependent on the consumer, saving, and support environment created by policy within China.<sup>11</sup> Victor Perevedentsev very astutely explained that, “demographic processes are highly inert in that they are conditioned by past population structures and by the relative continuity of demographic behavior. To comprehend a current demographic situation, one must analyze the evolution of that population in the past.”<sup>12</sup>

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9 Andrew Mason, *Demographic Dividends: The Past, the Present, and the Future* (Honolulu, HI: Population Studies Program, University of Hawaii at Manoa, 2005).

10 Ibid.

11 Wang Feng and Andrew Mason, "The Demographic Factor in China's Transition," in *China's Great Economic Transformation*, eds. Loren Brandt and Thomas G. Rawski (Cambridge: Cambridge University Press, 2008), 154.

12 Perevedentsev, *The Demographic Situation in Post-Soviet Russia*, 17.

The first substantial event affecting China's demographics in China's recent history is the Great Leap Forward. Debates over the events of the Great Leap Forward focus on the magnitude of destruction. Barry Naughton argues that throughout the Great Leap Forward, "about 25-30 million excess deaths occurred due to the great Chinese famine. In addition, another roughly 30 million births were postponed due to malnutrition and shortage."<sup>13</sup> However, Frank Dikotter has estimates putting the excessive deaths associated with the Great Leap Forward "as high as 50 to 60 million people."<sup>14</sup> While Barry Naughton explains that after the Great Leap Forward, China was able to become a demographic early achiever, due to its socialized economy and public health system,<sup>15</sup> there seems to be little to no mention of the Great Leap Forward's skewed dependency ratio as a contributing factor to economic development, by Naughton or anyone else. As seen in Figure 1, the structural change in labor changed significantly after 1978. After reforms began in 1978, "the share of labor employed primarily in agriculture fell from 71 to 45 percent" by 2005, while the share of labor in the manufacturing and services sectors increased.<sup>16</sup> This transition from agriculture to manufacturing and services is a hallmark of industrialization and development, signifying the process of transition within China.

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13 Barry Naughton, *The Chinese Economy* (Cambridge: The MIT Press, 2007), 72.

14 Frank Dikotter, *Mao's Great Famine*, First ed. (New York: Walker Publishing Company, Inc., 2010), 333.

15 Barry Naughton, *The Chinese Economy*, 165.

16 Fang Cai, Albert Park and Yahohui Zhao, "The Chinese Labor Market in the Reform Era," in *China's Great Economic Transformation*, eds. Loren Brandt and Thomas G. Rawski (Cambridge: Cambridge University Press, 2008), 167.

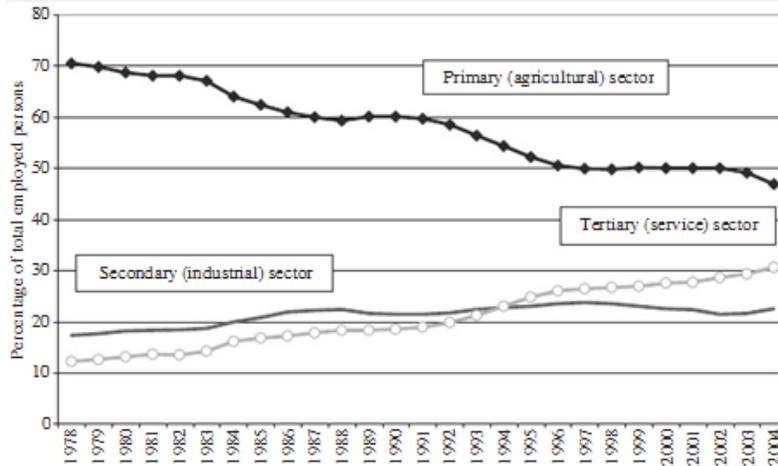


Figure 1. Structural Change in Employment. (From <sup>17</sup>)

China’s One-Child Policy and the preceding birth-limiting campaigns also greatly affected China’s demography as “the average number of children expected to be borne by Chinese women were reduced from about six to slightly over two by 1980.”<sup>18</sup> Also, the One-Child Policy created “an exceptional demographic window of opportunity for growth during the reform era.”<sup>19</sup> One lasting effect of the One-Child Policy is that “more than 160 million Chinese families have only one child, a product in part of the country’s three-decade-old policy limiting couples to one child each,” which is greater than the total populations of Japan and Russia.<sup>20</sup> Again, the resulting dependency ratios become a contributing factor to China’s economic development.

Interesting sections of literature focus on China’s gender imbalance. This literature focuses particularly on how the imbalance has come to existence and its potential security implications. Mara Hvistendahl explains the current gender imbalance stems from a cultural preference for males, China’s One-Child Policy, and sex-determination technology, all of which “resulted in 119 male births for every 100 female

<sup>17</sup> Naughton, *The Chinese Economy*, 151.

<sup>18</sup> Kenneth Lieberthal, *The One Child Policy Turns 30* (Washington, D.C.: The Brookings Institution, 2010).

<sup>19</sup> Naughton, *The Chinese Economy*, 177.

<sup>20</sup> Wang Feng, "China’s Population Destiny," *Current History* (2010), 244.

births.”<sup>21</sup> Valerie M. Hudson projects that, “China will have a surplus of between 29 and 33 million males in the age group 15-34.”<sup>22</sup> Hudson also goes on to argue the growth of men without chances to marry—known as ‘bare branches’ in China—a will create, “a significant increase in societal, and possibly intersocietal, violence.”<sup>23</sup> Ultimately, Hudson says history displays governmental intervention to correct such gender imbalances through, “recruitment of bare branches into imperial armies, an approach that may lead to greater intersocietal violence in the effort to preserve domestic stability.”<sup>24</sup> As trends stand, by 2030 the “proportion of never-married men in their late 30s may be more than 25% nationwide.”<sup>25</sup>

There is wide consensus that China’s early and rapid transition to the post-transition stage, with a rapidly aging population, and low birth, mortality, population growth and consumption rates, will create a situation not yet experienced anywhere else. Barry Naughton put it quite eloquently when he wrote that, “China will grow old before it has had the opportunity to grow rich.”<sup>26</sup> Cliff Waldman explains that all projected population growth into 2050 will come from lower and middle-income countries, with China as the only exception.<sup>27</sup> David E. Bloom describes some reasons “population aging may have less dramatic negative effects on economic growth than some have predicted.”<sup>28</sup> These reasons include healthier elderly, lower youth dependency, resulting in increased females in the workforce, potential for behavioral and policy changes to population aging, and increased migration from labor-surplus to labor-deficit countries.<sup>29</sup>

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21 Mara Hvistendahl, "Why China's Gender Gap Persists," *Current History* (2010), 248.

22 Valerie M. Hudson and Andrea M. den Boer, *Bare Branches* (Cambridge: The MIT Press, 2004), 186.

23 *Ibid.*, 200.

24 *Ibid.*, 227.

25 Eberstadt, *Demographic Trends Cloud China's Long-Term Economic Outlook*, 26.

26 Naughton, *The Chinese Economy*, 176.

27 Waldman, *China's Demographic Destiny and its Economic Implications*, 32.

28 David E. Bloom, "Population Aging and Economic Growth," in *Aging Asia*, eds. Karen Eggleston and Shripad Tuljapurkar (Stanford: Walter H. Shorenstein Asia-Pacific Research Center Books, 2010), 21.

29 *Ibid.*

Susan Shirk described China's situation by saying, "All today's leaders need to do is avoid any international and domestic disruptions that could trip up their race against the demographic clock."<sup>30</sup>

The literature on China's rise covers reasons for its rapid economic growth. The different arguments are rooted in the economic reforms put forth by Deng Xiaoping as the basis of three decades of economic growth.<sup>31</sup> One argument for China's emergence as an economic juggernaut is that the Chinese Communist Party implemented what Chalmers Johnson called a "developmental state,"<sup>32</sup> with its massive population ready to mobilize, and that Deng's reforms acted as a catalyst.<sup>33</sup> The developmental state is one that uses a developmental orientation through strong state intervention, and planning to achieve economic development, opposed to a regulatory orientation which refrains from strong state intervention and focuses on regulatory agencies and the development of free markets.<sup>34</sup> A second view is that Deng's reforms were the beginning of a successful period of economic experimentation within the Chinese economy.<sup>35</sup> A third view is that of the convergence school, arguing that the reforms put forth by Deng Xiaoping began a transition into a market economy through "increasing liberalization, internationalization, and privatization of economic activities."<sup>36</sup> A fourth argues the specific policies were not as critical as the open door policy, which "symbolizes China's sharp turn towards participation in the world market to speed up economic growth and technological modernization."<sup>37</sup> Whatever the case, many believe that "the process of market transition in China is far from complete."<sup>38</sup>

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30 Susan L. Shirk, *China: Fragile Superpower* (New York: Oxford University Press, 2008), 21.

31 C. Fred Bernstein et al., *China's Rise* (Washington D.C.: Peterson Institute for International Economics, 2009), 106.

32 Chalmers Johnson, *MITI and the Japanese Miracle* (Stanford: Stanford University Press, 1982), 19.

33 Naughton, *The Chinese Economy*, 83.

34 Chalmers Johnson, *MITI and the Japanese Miracle*, 19.

35 Wing Thyee Woo, "The Real Reasons for China's Growth," *The China Journal* 41 (January, 1999), 116.

36 Ibid.

37 Carl Riskin, *China's Political Economy* (Oxford: Oxford University Press, 1988), 316.

38 Naughton, *The Chinese Economy*, 85.

Aside from economics, assessments of China's political future fall into three main camps. Two of the camps focus primarily on international politics, and predict either that China's rise will continue in a peaceful manner,<sup>39</sup> or that it will split Northeast Asia and lead to increasing tensions and conflict in the region.<sup>40</sup> The third camp, typically focusing on domestic conditions, is that China's rise will stagnate or crumble.<sup>41</sup> The domestic issues often focused on are domestic "destabilizing dissent", China's reliance on economic growth,<sup>42</sup> and the coming demographic transition.<sup>43</sup>

Literature on China's economic future falls into one of three categories, which do not each have as much consensus at the previously mentioned three camps of China's political future. These categories are; literature on the future successes of China, pending issues for China to overcome, and what China must do to continue its prosperity. A stakeholder and strong proponent of China's future success are the Chinese authorities who "project another quadrupling of GDP by 2030."<sup>44</sup> Another proponent of China's success, and Asia's as a whole, is Peter A. Petri, who predicts, "By 2030, Asia's GDP in PPP should be 55% larger than the combined GDP of the EU and the United States."<sup>45</sup> He also says, "China would account for much of this gain as its share of world output rises from 13% in 2010 to 22% in 2030."<sup>46</sup> Less optimistic outlooks include Wang Feng who wrote that, "Japan's economic stagnation, closely related to the aging of its population, serves as a ready reference."<sup>47</sup> I agree with Nicholas Eberstadt when he admits that, "China still has many potential sources for enhancing productivity in the

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39 Peter A. Petri, "Asia and the World Economy in 2030: Growth, Integration, and Governance," in *Strategic Asia 2010-11*, eds. Ashley Tellis, Andrew Marble and Travis Tanner (Washington D.C.: The National Bureau of Asian Research, 2010), 48.

40 Kenneth Lieberthal, "China's Strategies and Goals Toward Northeast Asia," *Asia Policy* (2007), 68.

41 Shirk, *China: Fragile Superpower*, 21; Jaime Morgan, "China's Growing Pains: Towards the (Global) Political Economy of Domestic Social Instability," *International Politics* (2008), 415.

42 Lieberthal, *China's Strategies and Goals Toward Northeast Asia*, 45.

43 Shirk, *China: Fragile Superpower*, 20.

44 Eberstadt, *Demographic Trends Cloud China's Long-Term Economic Outlook*, 26.

45 Petri, *Asia and the World Economy in 2030: Growth, Integration, and Governance*, 60.

46 Ibid.

47 Feng, *China's Population Destiny*, 246.

years immediately ahead,”<sup>48</sup> but then goes on to question China’s future growth possibilities explaining that, “China’s conventionally defined manpower will peak by 2016.”<sup>49</sup> Eberstadt also addresses the disappearance of family connection to ask, “What will become of Chinese economic performance when this key element of the country’s growth formula is radically altered?”<sup>50</sup> One hypothesis within the literature providing suggestions on what China must do to avoid economic downturn was presented by Michael Pettis who “argued that China’s GDP will grow at 3-4 percent, half of that predicted by other economists,” unless consumption drastically increases.<sup>51</sup>

## **E. METHODS AND SOURCES**

My goal is to explore the past relationship of China’s demographic transitions and economic performance to better assess the presence of a limitation to China’s economic growth. As already stated, my thesis will thus approach the topic of the relationship between China’s demographic story and its economic development as a qualitative analysis spanning from 1949 until 2000, broken into three temporal case studies. These case studies will be China during the Great Leap Forward, China immediately after the One-Child Policy was instituted, and China in 2000. I chose a format of chronological exposition and analysis for my thesis to present an accurate understanding of how past events and policies have contributed to recent economic successes but will eventually present future challenges for China. To do this I will consult both literary and statistical sources.

The writings include those put out by historians, economists and political scientists focusing on demographic transition theory,<sup>52</sup> China’s past and present

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48 Eberstadt, *Demographic Trends Cloud China's Long-Term Economic Outlook*, 29

49 Ibid., 25.

50 Ibid., 29.

51 Michael Pettis and Douglas H. Paal, "Rebalancing and Growth: The Arithmetic of Chinese Adjustment," Carnegie Endowment for International Peace, September 22, 2011, <http://carnegieendowment.org/2011/09/22/rebalancing-and-growth-arithmetic-of-chinese-adjustment/5480>.

52 Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 327–365; Kirk, *Demographic Transition Theory*, 361–387; Perevedentsev, *The Demographic Situation in Post-Soviet Russia*, 17–40.

demographics,<sup>53</sup> the Great Leap Forward,<sup>54</sup> China's One-Child Policy,<sup>55</sup> and China's economic development.<sup>56</sup> My statistical sources will include; mortality, fertility, and population statistics from the UN Department of Economic and Social Affairs;<sup>57</sup> UN Human Development reports and indices;<sup>58</sup> data from the National Bureau of Statistics of China's;<sup>59</sup> Gapminder World,<sup>60</sup> and the CIA World Factbook.<sup>61</sup>

## F. THESIS OVERVIEW

The first chapter consists of an introduction, literature review, and thesis outline. The second chapter will be a description of demographic transition theory explaining; the five stages, the two economic dividends, and country examples. The third chapter will be a case study of the Great Leap Forward and the demographic detour created through its massive death toll skewing China's demography toward a more labor focused society bringing with it a baby-boom setting the stage for significant economic prosperity.

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53 Bloom, *Population Aging and Economic Growth*, 21–34; Eberstadt, *Demographic Trends Cloud China's Long-Term Economic Outlook*, 26–29; Feng, *China's Population Destiny*, 244–251; Feng and Mason, *The Demographic Factor in China's Transition*, 136–166; Hudson and Boer, *Bare Branches*; Hvistendahl, *Why China's Gender Gap Persists*, 248; Waldman, *China's Demographic Destiny and its Economic Implications*, 32–45.

54 Dikotter, *Mao's Great Famine*, 420.

55 Feng, *China's Population Destiny*, 244–251; Hudson and Boer, *Bare Branches*; Hvistendahl, *Why China's Gender Gap Persists*, 248; Lieberthal, *The One Child Policy Turns 30*, 1–45.

56 World Bank, *The East Asian Miracle* (Oxford: Oxford University Press, 1993).; Bruce Dickerson, *Who Consents to the 'Beijing Consensus'? Crony Communism in China* (George Washington University: The Elliot School of International Affairs, 2010).; Stephan Haggard, *Pathways from the Periphery* (Cornell: Cornell University Press, 1990).; Immanuel C. Y. Hsu, *The Rise of Modern China* (Oxford: Oxford University Press, 1995).; Johnson, *MITI and the Japanese Miracle*; Paul Krugman, "The Myth of Asia's Miracle," *Foreign Affairs* 73, no. 6 (November/December, 1994), 62–78.; Morgan, *China's Growing Pains: Towards the (Global) Political Economy of Domestic Social Instability*, 413–438; Naughton, *The Chinese Economy*; Liqing Zhang and Zhixian Sun, "Effect of China's Rise on East Asian Economic Integration," *Economic Change and Restructuring* (2008), 315–330.

57 United Nations Department of Economic and Social Affairs, "United Nations Department of Economic and Social Affairs - Population Division," UN Population Division, January 12, 2012, [http://esa.un.org/unpd/wpp/unpp/panel\\_population.htm](http://esa.un.org/unpd/wpp/unpp/panel_population.htm).

58 U. N. Human Development, "United Nations Human Development Reports," United Nations, January 12, 2012, <http://hdr.undp.org/en/statistics/>.

59 National Bureau of Statistics of China, "National Bureau of Statistics of China," National Bureau of Statistics of China, April 2012, <http://www.stats.gov.cn/english/>.

60 Hans Rosling, "Gapminder.Org," January 2012, <http://gapminder.org>.

61 CIA, "CIA World Factbook," CIA, May 3, 2012, <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>.

The fourth chapter will be the case studies of China after the formal announcement of the One-Child Policy and China in the year 2000. In this chapter, I will address the multiple birth-limiting campaigns, culminating into the One-Child Policy, and the resulting demography, which created an environment of increased investment into human capital. This investment in human capital becomes quite apparent in my analysis of China in the year 2000. The fifth chapter will be a chronological analysis of China's demography and its contributions to economic development and growth. My analysis will begin with the demographic detour started by the Great Leap Forward and magnified through the birth limiting campaigns and the One-Child Policy concluding that the skewing of the dependency ratio for over thirty years resulted in significant contributions to China's economic development.

The sixth chapter will be my conclusion, in which I present my finding that, the economic impacts of the demographic detour created by the Great Leap Forward and the One-Child Policy created economically favorable condition within China and that China's demographic transition over the next thirty to fifty years will likely experience great difficulty in continuing the scale of the economic development seen over the last thirty. This difficulty will be experienced through the costs of the demographic detour; and the unborn laborers attributed to the One-Child Policy. This cost will be present in the form of a shrinking and rapidly aging labor pool resulting in a decrease in innovation and productivity as well as an overhaul to thousands of years of tradition of doing business through familial ties. This will all be culminated in the testing of an already failing pension system as China experiences the transition from the demographic stage of a slowly growing population to post-transition.

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## II. DEMOGRAPHIC TRANSITIONS EXPLAINED

### A. INTRODUCTION

To understand the relationship between China's demographics since the Great Leap Forward and its economic development I must first provide an explanation of demographic transition theory. Demographic transition theory states that societies "experience modernization progress from a pre-modern regime of high fertility and high mortality to a post-modern one in which both are low."<sup>62</sup> Demographic transition theory uses the demographic transition model to explain developments within a society, or country, through changes in its demography. The demographic transition model consists of five different stages,<sup>63</sup> based on a variety of demographic factors, and includes two potential economic dividends received throughout the transition.<sup>64</sup> The first dividend occurs as the result of disproportional growth in a society's working aged population, ages 15-64, and is received during the third and fourth stages of the demographic transition model. The second dividend is the result of increased consumption by an increasing elderly population, funded by the wealth they obtained throughout the previous stages.

This chapter is broken into four sections; the introduction, definition, the stages, and the conclusion. The introduction will provide a brief overview of the chapter as well as a roadmap of the current chapter. Next, the section on definitions will briefly describe the transition model along with explaining different demographic factors used throughout this thesis. The stages section explains each of the five stages of the demographic transition model in depth while giving an example of each. Finally, the conclusion will provide a summary of the chapter.

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<sup>62</sup> Kirk, *Demographic Transition Theory*, 361.

<sup>63</sup> Early theorists only considered the first four stages, but since the introduction of the fifth, there has been no challenge to its incorporation to the theory.

<sup>64</sup> Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 327; Feng and Mason, *The Demographic Factor in China's Transition*, 146.

## B. DEFINITIONS

The demographic transition model is a five-stage model that describes the evolution of countries from high birth and death rates to low birth and death rates,<sup>65</sup> and can correlate to a country's maturation from a pre-modern to a modern economic system.<sup>66</sup> The primary demographics used in demographic transition theory are crude birth rate, population growth rate, crude death rate, population median age, dependency ratios, gender ratios, life expectancy, and total fertility rates.<sup>67</sup> Definitions used in this thesis come from a compilation of sources.<sup>68</sup>

Crude birth rate is the calculation of live births per thousand people in a population<sup>69</sup> and will be used interchangeably with birth rate throughout this paper. Population growth rate is the rate at which the overall population increased in a given year; this is to account for births, deaths, and immigration. Crude death rate is the calculation of deaths per thousand people in a population, without any regard for age or reason and will be used interchangeably with death and mortality rate throughout this paper. The population's median age is the age at which half of the population is older and half the population is younger; this is calculated not by averaging out the population's ages but by determining the density of age groups.

Dependency ratios are determined by dividing a country's eligible workforce by the number of dependents within the country. The eligible workforce is defined as persons between the ages of 15 and 64, dependents are the persons 14 years and younger plus persons 65 years and older. Gender ratios represent the ratio of males to females in a general or specified population. Life expectancy indicates the number of years a

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<sup>65</sup> Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 327.

<sup>66</sup> Oden Galor, "The Demographic Transition and the Emergence of Sustained Economic Growth," (2005, *Journal of the European Economic Association*), 495.; Kirk, *Demographic Transition Theory*, 361.

<sup>67</sup> Feng and Mason, *The Demographic Factor in China's Transition*, 136.

<sup>68</sup> Feng and Mason, *The Demographic Factor in China's Transition*.; Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*.; Kirk, *Demographic Transition Theory*.; Galor, *The Demographic Transition and the Emergence of Sustained Economic Growth*.

<sup>69</sup> Not to be mistaken with births per woman in a given year.

newborn infant is expected to live “if patterns of mortality at the time of its birth were to stay the same throughout its life.”<sup>70</sup> Total fertility rates are the number of children born per woman throughout her lifetime.

### C. STAGES

So far, of the five identified stages within the demographic transition model only the first four have been experienced by multiple countries. As illustrated in Figure 2, the five stages are: pre-transition (high birth rate and high mortality rate), accelerating population (declining mortality rate and high birth rate), peak population growth (birth rate declining slower than mortality rate), slowing population growth (birth rate declining faster, but still higher than, mortality rate), and post-transition (birth rate below mortality).<sup>71</sup> Only Japan has experienced the post-transition stage. I will describe the first stage’s condition and its economic impacts, but due to limited data can only describe when different countries experienced that stage of transition. I will describe and explain the 2nd–5th stages through preliminary conditions, necessary conditions, economic impacts, and an example of a country that experienced that stage.

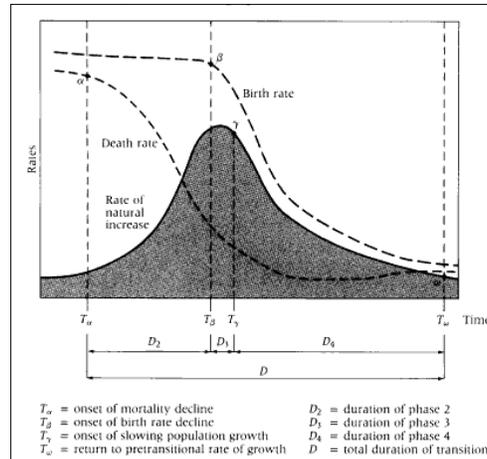


Figure 2. The Demographic Transition Model. (From <sup>72</sup>)

<sup>70</sup> World Bank, "Gross Domestic Product 2010," January 12, 2012, <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>.

<sup>71</sup> Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 327.

<sup>72</sup> Ibid., 328.

## 1. Stage 1 – Pre-transition

The first stage of the demographic transition model is pre-transition. Any country prior to the 17th century provides an example of a country in the pre-transition stage. The necessary condition to be a pre-transition country is a high mortality rate, 30-50 per thousand, coupled with a high birth rate, also 30-50 per thousand.<sup>73</sup> High, and often volatile, mortality and birth rates cause consistent and steady population growth to be very difficult for a country in pre-transition. Deficiencies in medical knowledge, lack of vaccines and proper hygiene, plagues, and occasional food shortages kept the mortality rate high, while a necessity for replacement workers, low prospects of children to reach adulthood, and a desire to grow one's community maintained a high birth rate.

In a natural case, these high birth and high mortality rates indicate a low life expectancy, and large turnover of people. A low life expectancy is ordinary because if a country had these high rates paired with a high life expectancy, it would result in the healthiest and youngest of the population dying thus keeping the mortality rate high, affecting the birth rates, causing the civilization to dwindle. It is because of this low life expectancy and large turnover of population that a pre-transition country has little incentive to invest in human capital, or to foster education beyond necessary on the job training. Pre-transition countries are typically pre-industrial because industrialization requires excess labor, which means it will already have begun the transition to the second stage. I will use the economic situation of pre-transition as a baseline to measure the departures made when a country begins transition to and through the other stages.

Due to limited records, data from a pre-developed country is difficult to find and rather unreliable. At least since the 1960s, no country remains in the pre-transition stage. Because of advances in medicine and the outreach of aid through medical programs, mortality rates have consistently decreased, with the exception of combat zones. The

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<sup>73</sup> Keith Montgomery, "The Demographic Transition," March 18, 2008, <http://www.uwmc.uwc.edu/geography/demotrans/demtran.htm>.

best historic example is seventeenth century England, pre-industrial revolution. As depicted in Figure 3, the population of England was slowly growing, less than 1 percent per year, the century prior to the Industrial Revolution.

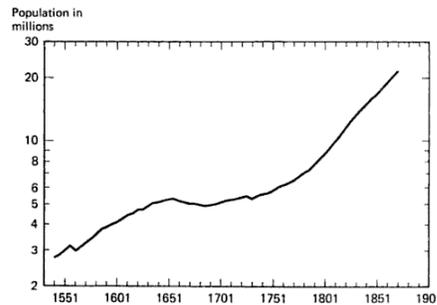


Figure 3. English Population Totals 1541-1871. (From <sup>74</sup>)

## 2. Stage 2 – Accelerated Population Increase

The second stage of the demographic transition model is accelerated population increase. Precursors of this stage include the same conditions as in the pre-transition stage: high mortality and high birth rates. The necessary condition for the transition to the second stage is a development causing a steady decrease in the mortality rate. This decrease in the crude death rate may occur through permanent improvements to the food supply, better sanitization, vaccines, or public health programs.<sup>75</sup> The increase in population growth is attributed to a declining crude death rate, while retaining high crude birth rates from pre-transition; the same inputs with fewer outputs.

The economic impact of the second stage of the demographic transition model is growth and development of the working aged population. Causation is rooted in an increase in quality of life, often through a medical development resulting in improved hygiene or better treatment of the laborers. The result of this increased quality of life is a more productive population through the synergetic increase in healthy years of productivity and the more experienced workers they become. This more productive and

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<sup>74</sup> Edward Anthony Wrigley, Roger Schofield and Schofield R.S., *The Population History of England 1541–1871* (Cambridge: Cambridge University Press, 1989), 207.

<sup>75</sup> Montgomery, *The Demographic Transition*.

enduring population will see benefit in investments in human capital through education, training, and the ability to specialize. Therefore, as a country goes through stage 2, it continues to have a high inflow of workers who will work for a longer time, gaining greater experience, thus creating a surplus of labor. In addition, with a surplus of workers, people gain more free time to explore doing other things; such as education for themselves and the youth, better business practices, and innovation. This leads to more efficient uses of labor, creating a synergy of increased human capital, lifespans and development,<sup>76</sup> which then leads us to stage 3.

India in 1953 is an example of a country in the second stage of the demographic transition model: accelerated population increase. Figures 4, 5, and 6 graphically depict India's experience through the second stage of the demographic transition model. Figure 4 shows the great increases in longevity, while Figure 5 illustrates the continued increase in dependents, which together resulted in accelerated population growth, as seen in Figure 6. As of 1953, India had a death rate of 26, and a high birth rate of 43, resulting in an annual population growth rate of 2 percent.<sup>77</sup> In addition, life expectancy was 38 years old and rising (Figure 4); and its dependency ratio was 71, to peak 12 years later at 81 (Figure 5).<sup>78</sup> India's transition started in the early 1900s, (Figure 6) and by 1953 was growing at an accelerated rate. In India's case, it can be associated with Mahatma Gandhi's return to India in 1915 and participation in the Indian National Congress. Gandhi led nationwide campaigns on easing poverty, increasing economic self-reliance, and the independence of India from foreign domination.<sup>79</sup> It was with the assistance, or acknowledging the need, of these nationwide programs that the second stage of demographic transition began. In India's case, it was the impact of Gandhi's nationwide campaigns that allowed India's quality of life and longevity to improve. With this improvement in longevity, India moved into the second stage of the demographic transition model.

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<sup>76</sup> Galor, *The Demographic Transition and the Emergence of Sustained Economic Growth*, 501.

<sup>77</sup> Rosling, *Gapminder.Org*.

<sup>78</sup> Ibid.

<sup>79</sup> Percival Spear, "Mahatma Gandhi," *Modern Asian Studies* (1969), 297.

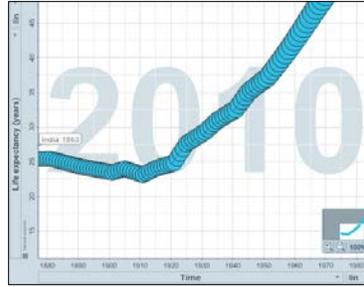


Figure 4. India's Life Expectancy, 1880-1980. (From <sup>80</sup>)

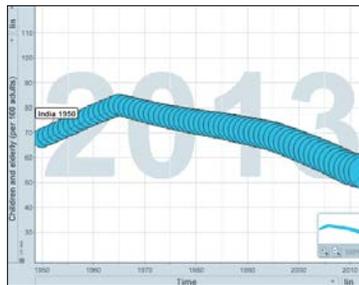


Figure 5. India's Dependency Ratio, 1950-2010. (From <sup>81</sup>)

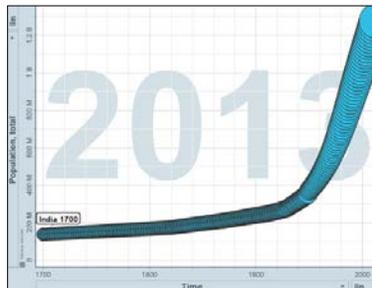


Figure 6. India's population, 1700-2000. (From <sup>82</sup>)

### 3. Stage 3 – Peak Population Growth

The third stage of the demographic transition model is peak population growth. The necessary condition for this stage is for a country's birth rate to begin decreasing but

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<sup>80</sup> Rosling, *Gapminder.Org*.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

not yet at a rate higher than the death rate. The birth rate will still be greater than the death rate, but the time for accelerated growth is over. Preliminary conditions for the birth rate to go down are met when fertility is within the calculus of choice, reduced fertility is seen as advantageous, and effective techniques of fertility reduction are available.<sup>83</sup> The main economic impact is the introduction of the first dividend, due to decreased birth rate. The third stage is often the shortest in duration due to the slowed rate of change in the death rate after having already plummeted through the second stage.

The preliminary conditions are met by the realization and further progress of the developments that decreased the mortality rate through the second stage. Medical developments, a shift from an agrarian lifestyle, and technological developments begin replacing the need for a large surplus of labor. Medical developments that contribute to the transition from the second to the third stage of the demographic transition model all focus on the youth. From better birthing practices to childhood vaccines, as countries develop, their infant mortality rates go down. As the infant mortality rates decrease and more children maintain better health, parents no longer need to have multiple children hoping for one to achieve adulthood. They can have two or three with the expectation for them to succeed on the journey into adulthood. The time delay between decreased crude death rates and birth rates is generational due in part to the confirmation that people will survive longer before the decrease in births begin.<sup>84</sup>

In addition, a shift from an agrarian lifestyle can also contribute to a decrease in the crude birth rate. As a society becomes increasingly urbanized, or at least strays away from agricultural productivity, and the necessity of children of large families working, they can now become investments in the future. This creates an environment that displays benefits to having fewer children to foster and concentrate resources.<sup>85</sup> In addition, there are technological developments that lessen the need for a large surplus of

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<sup>83</sup> Kirk, *Demographic Transition Theory*, 365.

<sup>84</sup> Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 329.

<sup>85</sup> Galor, *The Demographic Transition and the Emergence of Sustained Economic Growth*, 500.

labor; as illustrated in the area of agricultural labor. If development makes available technology such as tractors and thrashers, the demand for human labor comes down drastically. This can also be seen in the usage of assembly lines and robots.

Governmental influence can assist in the previous stages, as described in India, but as countries develop governments are able to take larger roles and have better reach into populations. Governmental policies can influence, or shock in the case of China, the transition from the high crude birth rate of the second stage to the decreasing crude birth rate of the third stage. These policies can include subsidies or tax incentives for family planning, contraceptive education programs, or government-sponsored medical intervention. In the case of China, I will argue later in this thesis, the policies of both the Great Leap Forward and the One-Child Policy were not typical scenarios of governmental influence affecting the population but policies that created immense shocks not witnessed elsewhere in the world, before or since.

The greatest economic impact of the third stage is putting a country in position to begin the first dividend, reaping the rewards to the second stage's continued increase in a productive labor force with a decreasing dependency ratio as the birth rate lowers. "The first dividend measures increases in income per capita that occur because the productive population is growing at a faster rate than the total population over part of the demographic transition."<sup>86</sup> The dependency ratio can illustrate the extent of which the productive population is growing compared to the rest of the population.

An example of stage 3 of the demographic transition model is India in 1973. The preconditions of India having been in stage 2 have already been discussed and met. In 1973, India's crude death rate was 15, down from 26 in 1953, and a birth rate of 37, down from 43 in 1953. These rates resulted in the necessary high and peaked annual population growth rate of 2.3 percent, up from 2 percent in 1953, for the duration of stage 3, which lasted from 1962-1979. In addition, life expectancy was 51 years, an increase of 13 years since 1953, and its dependency ratio was 77 percent, decreasing from its peak of 81 percent in 1965. The overall GDP growth during this 17-year period was 75

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<sup>86</sup> Feng and Mason, *The Demographic Factor in China's Transition*, 146.

percent, or 3.8 percent per year. However, if you look at the GDP per capita growth in India from 1963-1979, it was only 14.5 percent, or 0.9 percent per year. These growth rates are misleading unless contextualized next to the 46 percent growth in population over the same 17 years, or 2.3 percent annual.<sup>87</sup>

#### **4. Stage 4 - Slowing Population Growth**

The fourth stage of the demographic transition model is slowing population growth. The preliminary conditions for this stage, like the last, are medical developments, the shift to an industrializing economy, technological developments replacing the need for a large surplus of labor, and/or governmental policies, merely over a longer period. The necessary condition for this stage is a crude birth rate decreasing at a higher rate than the crude death rate. Throughout the fourth stage, the population will continue to grow, but at a slower and consistently decreasing rate than the previous stage. The greatest economic impact of this stage is the full realization of the first dividend, as well as being an economic indicator to prepare for the second dividend.

While the differences in demographic factors between the third and fourth stage may not appear significantly different, the transition represents a tipping point. The tipping point is the shift from a country growing due to high birth rates and increasing longevity, stage 3, to a country growing based primarily on increased longevity. It is in this stage that a country's median age begins to rise at an increasingly rapid rate, but still being maintained well within the productive ages of 15-64.

As mentioned, a country begins to experience the first dividend at the end of the third stage. However, the fourth stage will bring full realization of the first dividend in both duration and magnitude. Throughout the fourth stage a country will experience a more rapid decline in dependency ratio, and an even healthier labor force than stage 3. The lowering dependency ratio will allow parents and educational institutions to have more focus of resources, and allow females, who were traditionally raising children, to become potential laborers at younger ages. The magnitude of the first dividend will

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<sup>87</sup> Rosling, *Gapminder.Org*.

depend on the length of time a country took to transition through the second and third stages. For example, if the transitions occurred quickly the extension of life to the elderly will not affect the dependency ratio until much later, increasing the magnitude of the first dividend. The reverse is also true; if the transition takes multiple generations to achieve stage 4, the first dividend will not be as great due to the dependency of elderly.

Besides the first dividend, the fourth stage can act as an economic indicator. The fourth stage indicates that the wave of population is calming and a review of governmental policies may be needed to continue the path of economic growth in lieu of dependence on perpetual labor inputs. The policies reviewed should include: planning for pensions, rate of transition into a higher levels of industry, immigration, and ensuring the development of a wealthy elderly population.

Plans for pensions should be reviewed in light of the once again growing dependency ratio, although this time it will be skewed toward an abundance of elderly. The rate of transition into a higher level of industry is necessary to see that the workforce available in stage five will be able to sustain the environment created with the shrinking labor force and skewed dependency ratio. Immigration policy evaluations can be used as a possible gap fix in the event a negative population trend is expected. Ensuring a wealthy and consuming elderly population is possibly the best method to ensure an effective use of the second dividend and a steady transition into the fifth stage. A wealthy elderly population would be able to support a modern economic system through domestic consumption and transfers of wealth. It is because of this forewarning, along with the benefits of the first dividend, that the setup, or investment, for the second dividend can begin.

To achieve the second dividend a country requires a wealthy elderly population to increase consumption in order to continue economic growth, or at least maintain the economic system already in place. The theory of the second dividend is that it arises “because changes in age structure influence the processes that lead to the creation of wealth.”<sup>88</sup> The aging of the population throughout the previous stages should lead to an

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<sup>88</sup> Feng and Mason, *The Demographic Factor in China's Transition*, 149.

accumulation of capital. This accumulation of wealth will then lead to a country's capital intensity, and "output per worker will rise."<sup>89</sup> Throughout the fourth stage, fewer children will allow dual working families and increases to savings and productivity. As capital intensity, output per worker, the size of the labor pool, savings, and productivity all increase through the fourth stage, individuals leaving the workforce will have accumulated significant wealth throughout their lifetimes, enabling the second dividend in stage 5.

An example of stage 4 of the demographic transition model is current day India. The preconditions of India having been in stage 3 have already been discussed and met. In 2008, India's crude death rate was seven, down from 15 in 1973, and a birth rate of 23, down from 26 in 1973, resulting in an annual population growth rate of 1.3 percent, again down from 2.3 percent in 1973. In addition, life expectancy was 65 years, an increase of 14 years since 1973.<sup>90</sup> India's dependency ratio in 2008 was 55 percent, lower than the 77 percent in 1973, and much lower than its peak of 81 percent in 1965.<sup>91</sup> India's overall GDP growth in the 28-years span from 1980 to 2008 was 495 percent, or 5.6 percent per year, up from 3.8 percent per year throughout stage 3.<sup>92</sup> In addition, GDP per capita rose 4 percent annually, compared to 0.9 percent per year in stage 3. These rates illustrate the economic development throughout stage 4 especially when contextualized next to the 1.8 percent annual growth in population, compared to 2.3 percent in stage 3.<sup>93</sup> In short, stage 4 brought more economic development with less population growth, equating to greater growth in GDP per capita.

## **5. Stage 5 – Post-transition**

The fifth stage, post-transition, is mostly theoretical in the sense that only one country, Japan, has actually achieved the necessary conditions. The preconditions are

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89 Feng and Mason, *The Demographic Factor in China's Transition*, 149.

90 Rosling, *Gapminder.Org*.

91 Bank, *Gross Domestic Product 2010*.

92 Rosling, *Gapminder.Org*.

93 *Ibid*.

those set forth by stage four with a diminishing birth rate. The necessary condition to achieve stage five is the reduction of birth rate equal to or below the crude death rate, thus creating a sustained or negative trend in population growth. The economic impacts of being in the post-transition stage appear linked to the country's ability to prepare for the second dividend during the prosperous times through stage 4.

The key to economic progress through the fifth stage is increased productivity from the laborers you do have, while ensuring an elderly population that can foster consumption due to already accumulated wealth. After achieving the fifth stage, a country must be able to endure the transition of the labor force from having more inputs (laborers) than outputs (retirees), to more outputs than inputs. If a country is able to ensure the development of a wealthy elderly population, through the suggested review of policies in stage 4, the second dividend will enable economic growth, or at least stability, to the current economic system.

As mentioned, Japan is the only exemplar for the fifth stage of the demographic transition cycle. Since 2004, Japan has had either zero or negative growth.<sup>94</sup> In 2011, Japan had a crude death rate was 10.09, and a crude birth rate of 7.31, with an annual population growth rate of -0.278 percent.<sup>95</sup> In addition, life expectancy was 82.25 years, and its dependency ratio was 56 percent, rising from a low of 43 percent in 1994.<sup>96</sup> Japan's sustainability for the demographic transition appears to be the movement into a high level of industry and the creation of a wealthy and consuming elderly. As seen in Figure 7, not only was the labor income able to continue to rise for those in the working ages, 15 to 64 years old, but the consumption habits of the elderly, 65 years and older, grew by over 50 percent from 1984 to 2004. Japan's GDP per capita for 2010 was \$62,100 (USD), the fifth highest in the world.<sup>97</sup> Increased consumption and industrial development allowed Japan to sustain the transition to stage 5, post-transition, and illustrates the need for planning to enhance the economic effects of the second dividend.

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94 Bank, *Gross Domestic Product 2010*.

95 CIA, *CIA World Factbook*.

96 Bank, *Gross Domestic Product 2010*.

97 CIA, *CIA World Factbook*.

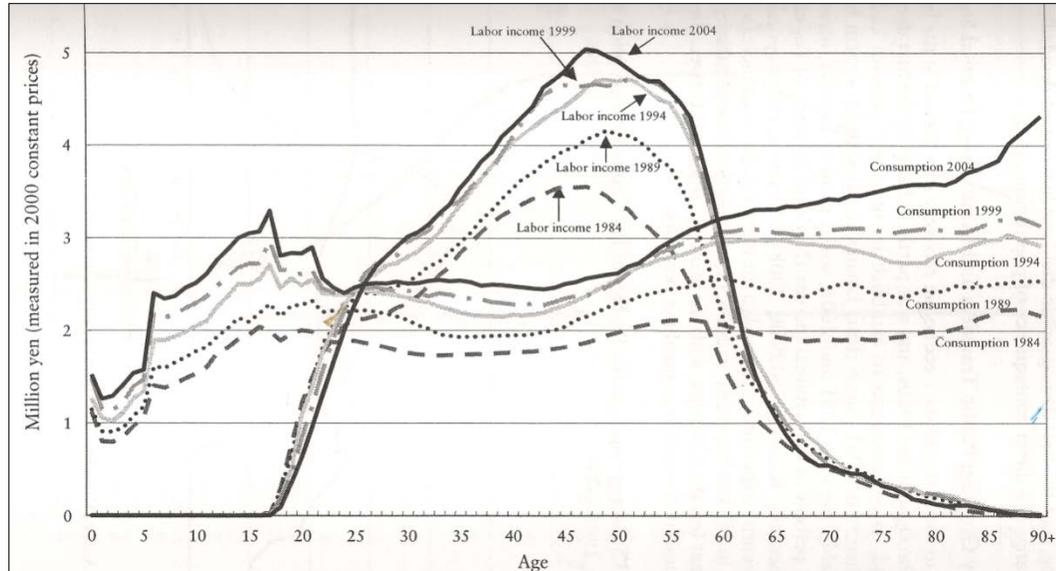


Figure 7. Age-specific Profiles of Per Capita Consumption and Production in Japan, 1984-2004. (From <sup>98</sup>)

#### D. CONCLUSION

While demographic transition theory does not explain everything, I argue that it is definitely a significant piece in terms of economic development in terms of the stages depicted in the demographic transition model. The path appears natural and flowing as seen through the experience of many different countries described through birth rates, population growth rates, crude death rates, population median age, dependency ratios, gender ratios, life expectancy, and total fertility rates. The five-stage model describes the evolution of countries from high birth and death rates to low birth and death rates, as a country matures from a pre-industrial to a modern economic system. Along the path, there are two dividends, each growing out of the results of previous stages. The first dividend is formed by the disproportional growth between the labor pool and dependents. The second is rooted in the wealth accumulated by the elderly.

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<sup>98</sup> Naohiro Ogawa, Amonthep Chawla and Rikiya Matsukura, "Changing Intergeneration Transfers in Aging Japan," in *Aging Asia*, eds. Karen Eggleston and Shripad Tuljapurkar (Stanford: The Walter H. Shorenstein Asia-Pacific Research Center, 2010), 51.

### **III. CASE STUDY OF CHINA'S DEMOGRAPHY AND ECONOMIC INFLUENCES, 1949-1970**

#### **A. INTRODUCTION**

To argue the case for China's demographic transition and its influence on economic performance, I will briefly go as far back as Qing dynasty. This chapter will present China's demographic and economic situation prior to and immediately following the Great Leap Forward. In this thesis, 1965 China will be my first case study and the base year, before the full effects of the Great Leap Forward took effect. In this chapter I address the period of 1949 to 1970 to establish the situations prior to, during and caused by the Great Leap Forward. While the demographic situation for economic growth is rooted in 1970, the economic benefits of the Great Leap Forward cannot be fully analyzed until 1980, which is addressed in the next chapter. This will later be compared with China's demographic and economic situation after instituting the One-Child Policy, and then again with 2000 China.

China's demographic transition followed a similar to any other country as it went from a pre-transition state (stage 1) to experiencing accelerated growth (stage 2), until it experienced a great shock from the Great Leap Forward in 1958, causing a demographic detour. Through massive mobilization of the Chinese populace and the death of millions of dependents, the Great Leap Forward created a governmentally caused demographic shock, speeding the country's transition through the second and third stages of the demographic transition model. This detour consisted of a drop in the median age in China from 23.8 in 1950, to 19.7 in 1970, an unnatural drop in the elderly dependency ratio from 7.4 elderly to every 100 potential laborers in 1950, to 6.6 in 1965, and a 6.1 percent lower number of infants aged 0-4 in 1960 than 1955.<sup>99</sup> In addition, China was set up to begin receiving economic benefits from the first demographic dividend and prematurely achieve stage 4 of the demographic transition cycle. This detour created a

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<sup>99</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

unique path of demographic development within China which was later exacerbated by the One-Child Policy contributing to the over thirty years of unprecedented economic growth within China.

In this chapter, I will first discuss how China's demographic transition followed a natural course prior to the Great Leap Forward. Next, I will discuss different facets of the Great Leap Forward and how they contributed to the demographic and economic situation following the Great Leap Forward. These facets include, labor growth, labor un-productivity, and ultimately the demographic detour caused by the Great Leap Forward.

## **B. THE NATURAL DEMOGRAPHIC TRANSITION OF CHINA**

Prior to the Great Leap Forward, 1958-1962, China had long been on a natural path through the demographic transition cycle. The path began with pre-transition (stage 1) during the Ming and Qing dynasties. Transition to the stage of accelerated population growth (stage 2) began after the fall of the Qing, and continued as the Nationalists rose to power. The population even experienced a significant growth spurt immediately after the Communists took power.

The pre-transition stage is evident through a rural population of over 90 percent, with many farmers who produced barley enough to feed themselves, and the low population growth rates of 0.4 percent existent for nearly six hundred years under the Ming and Qing dynasties.<sup>100</sup> The primary limitation on growth was a nearly one-to-one ratio of needed laborers to mouths to feed, often associated with “the limited role of animals in farm work,”<sup>101</sup> and little change in agriculture or technology, “during the six centuries beginning with the Ming”.<sup>102</sup>

Transition into the second stage of the demographic transition model, accelerating population, occurred around 1914, shortly after the fall of the Qing Empire. This is evident in a gradual increase in population growth, a gradual transition away from the

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100 Naughton, *The Chinese Economy*, 34,36.

101 *Ibid.*, 35.

102 *Ibid.*, 35.

agricultural sector as a percent of GDP, and investments into modernization and human capital. Population growth in the period from 1911-1949 steadily climbed with an average of 0.6 percent per year.<sup>103</sup> Agriculture as a share of GDP decreased from 61.8 percent in 1914 to 59.2 percent by 1933 with industry rising by 2.2 percent to 19.8 percent, over the same period.<sup>104</sup> Throughout this time, literacy began to increase and upon the unification of China in 1927, the Nationalists began to “invest in such things as education and agricultural extension services.”<sup>105</sup>

While the Chinese civil war from 1937-1949 “brought mass suffering to the population and serious damage to the economy,”<sup>106</sup> the demographic transition did not end upon the Communist takeover. From 1953 to 1958, China’s death rate had fallen from 25 to 21 per thousand, and its birth rate had already begun dropping, from 44 to 36 per thousand. Life expectancy continued to grow from 41 in 1949, to 50 in 1958. During the years from 1949-1957, China’s population growth averaged 1.8 percent, up from 0.6 percent of the previous 38 years.<sup>107</sup> China was transitioning in a natural progression, until the shock of the Great Leap Forward.

### **C. THE GREAT LEAP FORWARD**

The Great Leap Forward is an example of how governmental policies can affect the demographic cycle. The Great Leap Forward was to be “a radically new approach to economic and social development.”<sup>108</sup> However, “it amounted to a tremendous, willful leap away from reality, with tragic consequences that included, ultimately, the death of tens of millions of Chinese.”<sup>109</sup> The goal of this radically new approach was massive industrial acceleration using mass mobilization of the populace. This goal is identical to the first demographic dividend: increased economic growth due to disproportionately

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103 Rosling, *Gapminder.Org*.

104 Riskin, *China's Political Economy*, 17.

105 Naughton, *The Chinese Economy*, 43.

106 *Ibid.*, 47.

107 Rosling, *Gapminder.Org*.

108 Kenneth Lieberthal, *Governing China*, 2nd ed. (New York: W. W. Norton & Company, 2004), 103.

109 *Ibid.*

more laborers than dependents, and is typically experienced at the end of the third and throughout the fourth stages of the demographic transition cycle. Mobilization of the masses was undertaken through development of communes, to include communal nurseries and retirement homes. While efforts to mobilize the masses were effective, the levels of production suffered and the potential dividends provided by the communes were wasted.

The Great Leap Forward was a push to achieve “more, faster, better, and more economical results,” corresponding to Mao’s declaration in November of 1957 that China “may well catch up with or overtake Britain,” in steel production.<sup>110</sup> Despite resistance against his plans for the Great Leap Forward from advisors, such as Bo Yibo, one of Mao’s chief economic planners, Mao went forward anyway. Mao demanded full allegiance to his plan of simultaneously developing agriculture and industry, both heavy and light.<sup>111</sup>

### **1. Labor Growth**

Aware of China’s greatest asset, a potential labor force of hundreds of millions, Mao believed that full mobilization would be able to catapult China beyond the rest of the world.<sup>112</sup> Mao’s vision for this workforce would be achieved through communes to share the burden and fulfill each need. Communes “served both as basic-level government organs and the key economic units,” and assigned peasants “to specialized work teams that traveled from one village to another to perform particular tasks.”<sup>113</sup> Through the communes, kindergartens nurseries for the children would enable a greater workforce, enabling women to contribute.<sup>114</sup> In addition, retirement homes would be able to care for the elderly in order to lessen any burden from able-bodied workers.<sup>115</sup>

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110 Dikotter, *Mao's Great Famine*, 14.

111 Ibid., 19.

112 Ibid., VII.

113 Kenneth Lieberthal, "The Great Leap Forward and the Split in the Yan'an Leadership 1858–1965," in *The Politics of China*, ed. Roderick MacFarquhar (Cambridge: Cambridge University Press, 2011), 95.

114 Dikotter, *Mao's Great Famine*, 245.

115 Ibid., 264.

This skewing of the dependency responsibilities, though not reflected in any calculations of a dependency ratio, should have been able to create a larger, and thus more productive, workforce, realizing the first dividend much earlier than the typical fourth stage of the demographic transition.

However, the reality was much different. The supervisors of the nurseries lacked training and often abused the resources intended for the children. Illness was rampant with documented infection rates of up to 90 percent in some areas and death rates were high.<sup>116</sup> Retirement homes were not any better than the nurseries. “Abuse was rife. Some of the elderly were beaten, even those with only a few meager possessions were robbed and others were put on a slow starvation diet.”<sup>117</sup>

## **2. Labor Un-Productivity**

The enabling of the workforce may have contributed to productivity but the projects undertaken were often ill conceived, counter-productive, total facades, or all of the above. Three examples of such projects were grain output and distribution, the backyard furnaces, and irrigation of the Tao River. Not one of them achieved what they were set out to, illustrating the perpetual cycles of absurd distribution and dissociation from reality that led to famine and millions of deaths throughout the Great Leap Forward.

Grain output and distribution began as exaggerated estimations to gain political clout but ended as a horrendous tragedy. While Mao was pushing for “more, faster, better, and more economical results,” the party officials found favor through high crop yield, which spurred them into competitive bidding built upon unreasonable expectations. From these unreasonable expectations, local officials maintained a facade of success by providing the bid’s portion in taxes, leaving the deficit to be suffered by the rural populace. The incredible productivity seen by Mao, although inflated at every level of government before him, led him to suggest that a third of the cultivated land be diverted

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<sup>116</sup> Dikotter, *Mao's Great Famine*, 264.

<sup>117</sup> *Ibid.*, 264.

for other purpose.<sup>118</sup> This command created a downward spiral of increased migration from the harsh life in the agricultural sector to the subsidized urban life-style, increasing the government's demand for food with less labor to work the fields.<sup>119</sup>

Focused on the goal of overtaking Britain in steel, Mao demanded a way to bring big industry to the village. From this demand came a movement to support industrial development and bring China into the forefront of the industrial world. In the summer of 1958, backyard furnaces began in an effort to support the government's movement to gather iron and steel. A typical backyard furnace was maintained by the villagers behind the local commune and was simple enough for every peasant to contribute his fair share to outstrip Britain.<sup>120</sup> Steel fever spread as quotas increased and local party members felt pressure from the central government to produce more. As peasants frenzied to collect fuel to smelt the steel, accidents became frequent; trees were crushing villagers and inexperienced workers slain by improvised explosives.<sup>121</sup> The rush to meet quotas for steel also detracted from agricultural output, causing up to a third of the time devoted to agriculture to be lost. Ultimately, much of the steel created in the backyard furnaces was a waste due to improper smelting techniques creating ingots, which were too small and brittle for the modern rolling mills. In total, the losses from steel fever are estimated to be "5 billion yuan – not including damage to buildings, forest, mines and people."<sup>122</sup>

Another example of China's un-productivity was the Tao River Irrigation project. The Tao River project was one of many irrigation projects undertaken primarily during the winter periods of the Great Leap Forward, many of which ended with similar results.<sup>123</sup> This particular project was to divert the river "up the mountains" to provide clean water to villages 900 kilometers away and to transform Gansu "into a giant park as

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118 Dikotter, *Mao's Great Famine*, 136.

119 Ibid.

120 Ibid., 58.

121 Ibid., 59.

122 Ibid., 61.

123 Dongping Han, "Farmers, Mao and Discontent in China," *Monthly Review* (September 2009, 2009), 23.

lush and green as the Summer Palace in Beijing.”<sup>124</sup> As the project went on it ran into numerous obstacles, many stemming from poor management. The obstacles included soil erosion, landslides, silt filling reservoirs, mudding rivers, the freezing cold of winter, and the workers’ need to forage for their own food. Work on the project stopped by the summer of 1961, and then abandoned in March of 1962. In the end, the Tao River irrigation project cost the state 150 million yuan, 600,000 workdays, and at least 2,400 lives for a total of zero hectares irrigated.<sup>125</sup>

#### **D. THE DEMOGRAPHIC DETOUR**

Although the Chinese government restricts the statistics and records from the period of 1958 to 1962 professional estimations of the Great Leap Forward all agree the costs have been great. During this period, approximately “30 to 40 percent of all houses were turned into rubble” in the unfulfilled expectation that they would be rebuilt better and stronger.<sup>126</sup> Damage to nature and its resources were countless after the polluting of rivers from factories and the massive cutting of forests to fuel the backyard furnaces.<sup>127</sup> From 1958 to 1962, an estimated “30 million births were postponed due to malnutrition and shortage.”<sup>128</sup> Excess deaths due to the Great Leap Forward fall between 30 and 55 million.<sup>129</sup> The discontinuity in the demographic transition created by the Great Leap Forward then set China up for a path all its own.

All of these costs total up to a significant demographic detour. The difference between China’s demographic transition and a natural transition is most noticeable in the drops in the median age and life expectancy. The median age in China dropped from 23.8 in 1950, to 21.3 in 1960, followed by 19.7 in 1970.<sup>130</sup> As a country progresses

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124 Dikotter, *Mao's Great Famine*, 28.

125 *Ibid.*, 28.

126 *Ibid.*, 169.

127 *Ibid.*, 175.

128 Naughton, *The Chinese Economy*, 72.

129 Dikotter, *Mao's Great Famine*, 324.

130 United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

along the demographic model, the median age should increase with a drop in death rate, it is the opposite case here. The dependency ratio abruptly slowed its growth over time, going from 63.2 dependents per 100 potential laborers in 1950, to 72.1 in 1955, 77.3 in 1960, 78.4 in 1965, and actually decreased to 77.3 in 1970.<sup>131</sup>

In a more natural progression through stage 2, a country's dependency ratio should have leveled off or continued to rise due to lowering death rates (increased elderly dependents), and begin decreasing only when birthrates begin to fall quicker than the death rates at the end of stage 3. China's change in dependency ratio, however, is from both a decrease in elderly as shown in the old dependency ratio,<sup>132</sup> which showed a significant drop from 7.4 in 1950, to 6.6 in 1965 and from a lower number of infants.<sup>133</sup> The total of infants aged 0-4 in 1960 was, 96.8 million, down from 103.1 million in 1955, for a 6.1 percent decrease.<sup>134</sup>

All of this is to say that the demographic result of the Great Leap Forward was a labor-aged population with few elderly to support, a limited number of children to focus upon and the ability to grow immensely in the years to come, in both economic and demographic terms. Also, a flood of potential laborers were born in the years immediately following the Great Leap Forward,<sup>135</sup> which meant that because of demography's generational lag, twenty years down the road the labor pool would dwarf its elderly dependents, and allowing China to earn its first demographic dividend in an unprecedented manner (Figure 8). As seen in Figure 8, there will be a massive shift in the in the number of potential laborers as the three largest age groups, that is 0 to 4, 5 to 9, and 10 to14 year olds, enter the labor force. This future labor force will also have the benefit of significantly smaller groups of elderly to support, because populations do not experience large influxes of already aged persons.

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<sup>131</sup> Ibid.

<sup>132</sup> Old dependency ratio only takes into account the 65+ population to the work force population.

<sup>133</sup> Ibid.

<sup>134</sup> Ibid.

<sup>135</sup> The total of infants 0-4 in 1970 was, 132.5 million, up 36.9 percent since 1960. (Source: Ibid.)

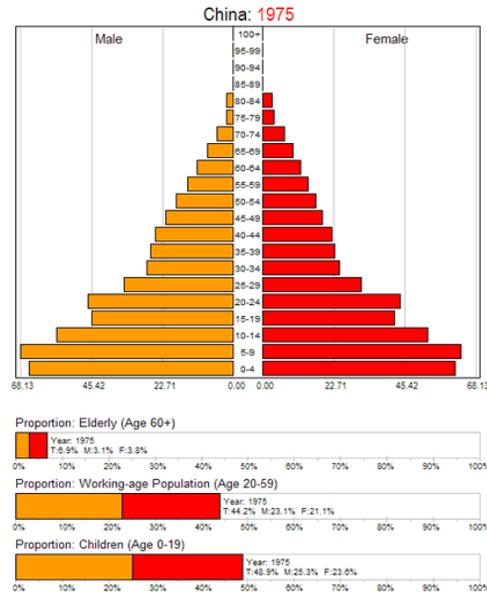


Figure 8. Population Pyramid for China, 1975. (From 136)

## E. CONCLUSION

Prior to the Great Leap Forward, China's economic and demographic situation was similar to any other country as it went from a pre-transition state (stage 1) to experiencing accelerated growth (stage 2). However, China's demographic and economic development took a significant detour during and immediately following the Great Leap Forward. This detour, caused by The Great Leap Forward created a governmentally caused demographic shock through inefficient and forced industrialization, which resulted in the death of millions, disproportionately dependents. This skewing of dependency ratios and the resulting baby boom to follow the Great Leap Forward set the stage for China to begin accelerating through its demographic transition and economic growth at a pace not yet experienced anywhere else.

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136 Gerhard Heilig, "China Profile," December 18, 2012, [http://www.china-profile.com/data/ani\\_pop\\_1.htm](http://www.china-profile.com/data/ani_pop_1.htm).

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## **IV. CASE STUDY OF CHINA'S DEMOGRAPHY AND ITS ECONOMIC INFLUENCES, 1970-2000**

### **A. INTRODUCTION**

Having examined China's demographic and economic situation immediately following the Great Leap Forward, I can now move on to China's demographic and economic situation just before and after instituting the One-Child Policy of 1980. The year of 1980 is focused on as a turning point from the path set by the Great Leap Forward to that set by the One-Child Policy, which is compounded to that already set by the Great Leap Forward. In the next chapter, I will compare the economic and demographic picture in China at three different times -1965, 1980, and 2000- and go on to examine the subsequent demographic influences on the Chinese economy from 2000-2011.

In this chapter, I intend to demonstrate that China's demographic detour created from the Great Leap Forward continued and expanded under China's One-Child Policy. I will first describe the Chinese demographic and economic situation leading to the institution of China's One-Child Policy, 1970-1979, along with the government's goals of the One-Child Policy, 1980. Note that the situation in 1980 is to be primarily attributed to the Great Leap Forward, although the birth-limiting campaigns were also underway. Next, I will cover some of the One-Child Policy's demographic results followed by how some of the demographic results influenced China's economic situation from 1980-2000.

As discussed in the previous chapter, because of the skewed dependency ratio after The Great Leap Forward, China was staged for a pre-mature realization of the first demographic dividend which begins at the end of stage 3 within the demographic transition model. The Post-Great Leap Forward baby boom, lasted from 1965-1980, creating a massive influx of potential laborers. In 1980, the institution of the One-Child Policy then regulated this large labor pool's ability to produce dependents, again creating a major shock to China's already unnatural demographic development. This shock

resulted in the sustainment of the first demographic dividend through governmentally regulated low dependency ratios, this time by limiting the youth dependency ratio, opposed to Great leap Forward's skewing primarily of the elderly dependency ratio.

## **B. 1970-1980: THE LEAD-UP TO THE ONE-CHILD POLICY**

Three overlapping elements led to the announcement of the One-Child Policy. The first element, starting in 1953, was rapid population growth peaking in a baby boom after the disastrous Great Leap Forward (as discussed in the previous chapter). The second element was Mao's focus on manpower as the key to modernization.<sup>137</sup> Third, and ultimately, came both Deng Xiaoping's belief that rapid population growth would impede modernization and his being in a position to exercise that belief.<sup>138</sup>

From 1953 on, population growth was occurring at a rate not previously experienced in China. The years 1953 to 1970, brought the annual population growth rate as high as 2.8 percent, a significant change from a growth rate of no more than 0.3 percent throughout the previous century.<sup>139</sup> This population growth illustrates China's transition into the second stage of the demographic transition model, accelerated population increase, due to modernization and medical developments. Throughout China's history, fertility rates were relatively stable at six per woman, except for periods of crisis such as the Great Leap Forward, and until 1970 when it began to decrease naturally.<sup>140</sup> This decrease would have been expected as seen in demographic transition theory, even with the detour of the Great Leap Forward, due to decreasing death rates which began around 1914.<sup>141</sup>

Mao Zedong's leadership contributed to the factors leading to the development of China's One-Child Policy. There were three "birth limitation campaigns" attempted prior

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137 Penny Kane and Ching Y. Choi, "China's One Child Policy," *BMJ* 319 (9 October 1999, 1999), 992.

138 John Bongaats and Susan Greenhalgh, "An Alternative to the One-Child Policy in China," *Population and Development Review* 11, no. 4 (December 1985, 1985), 586.

139 Kane and Choi, *China's One Child Policy*, 992.

140 Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 585.

141 Rosling, *Gapminder.Org*.

to the One-Child Policy.<sup>142</sup> Mao Zedong's firm belief in revolution and the power of voluntarism greatly hindered these efforts to encourage family planning.<sup>143</sup>

The first birth limitation campaign began in August 1956, in the form of vigorous propaganda put forth by the Ministry of Public Health supporting mass birth control efforts.<sup>144</sup> This effort lasted just over one year and had little impact on fertility when it was rendered ineffective by the Great Leap Forward.<sup>145</sup> The second campaign began in the early 1960s and emphasized the virtues of late marriage. By 1964, Birth control offices were established in the central government and some provincial level. This campaign showed signs of success within the cities, "where the birth rate was cut in half during the 1963-66 period."<sup>146</sup> However, the chaos of the Great Proletarian Cultural Revolution brought the program and much of the progress made to an end.<sup>147</sup>

The third campaign, pushing the mantra of "later-longer-fewer" was established in 1971. The goal of this campaign was "later marriage, longer spacing between first and subsequent children, and fewer children."<sup>148</sup> While this campaign gained traction, through similar means as the second, it was not strictly enforced and was assessed as unable to achieve the desired goal for 1980; let alone the "aim of reaching a zero growth population by the year 2000".<sup>149</sup> The goal of having a sustainable population of an estimated 1.2 billion by the year 2000 was thought to be necessary to achieve the "Four Modernizations".<sup>150</sup> The "Four Modernizations" was the core of a development strategy

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142 Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 586.

143 Eduard B. Vermeer, "Dimensions of China's Development," *Population and Development Review* 32 (2006, 2006), 120.

144 Robert L. Worden, "China: A Country Study," Library Of Congress, [http://lcweb2.loc.gov/cgi-bin/query/r?frd/cstdy:@field\(DOCID+cn0055\)](http://lcweb2.loc.gov/cgi-bin/query/r?frd/cstdy:@field(DOCID+cn0055)).

145 Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 586.

146 Worden, *China: A Country Study*.

147 Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 586.

148 Kane and Choi, *China's One Child Policy*, 992.

149 Ibid.

150 Worden, *China: A Country Study*.

aimed at turning the country into a relatively advanced industrialized nation by the year 2000. These modernizations were: agriculture, industry, science and technology, and national defense.

After Mao's death in 1976, Deng Xiaoping introduced a fourth birth limitation campaign. This became known as the One-Child Policy on September 25, 1980, when China publicly announced the population control policy to the world.<sup>151</sup> The goal of China's One-Child Policy was to ensure that rapid population growth would not impede social and economic development.<sup>152</sup> The One-Child Policy was unique, however, in that it publicly linked reproduction with economic cost or benefit.<sup>153</sup>

The One-Child Policy, like the previous campaigns, employed a combination of propaganda, social pressure, and coercion. The aim of this policy was to be achieved through elimination of third or higher births, while incentivizing the ideal of only one child per couple, hoping 30 percent of couples would achieve this ideal.<sup>154</sup> Also, the One-Child Policy was not meant to be a permanent fixture but a "sacrifice for one generation",<sup>155</sup> or "a crash program for 20 to 30 years."<sup>156</sup>

Under the one-child program, a sophisticated system rewarded those who observed the policy and penalized those who did not. Couples with only one child were given a "one-child certificate" entitling them to such benefits as cash bonuses, longer maternity leave, better child care, and preferential housing assignments. In return, they were required to pledge that they would not have more children. In the countryside, there was great pressure to adhere to the one-child limit. Because the rural population accounted for approximately 60 percent of the total, the effectiveness of the one-child policy in rural areas was considered the key to the success or failure of the program as a whole.

In rural areas the day-to-day work of family planning was done by cadres at the team and brigade levels who were responsible for women's affairs

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151 Lieberthal, *The One Child Policy Turns* 30, 4.

152 Kane and Choi, *China's One Child Policy*, 992.

153 Worden, *China: A Country Study*.

154 Kane and Choi, *China's One Child Policy*, 992.

155 Lieberthal, *The One Child Policy Turns* 30, 5.

156 Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 587.

and by health workers. The women's team leader made regular household visits to keep track of the status of each family under her jurisdiction and collected information on which women were using contraceptives, the methods used, and which had become pregnant. She then reported to the brigade women's leader, who documented the information and took it to a monthly meeting of the commune birth-planning committee. According to reports, ceilings or quotas had to be adhered to; to satisfy these cutoffs, unmarried young people were persuaded to postpone marriage, couples without children were advised to "wait their turn," women with unauthorized pregnancies were pressured to have abortions, and those who already had children were urged to use contraception or undergo sterilization. Couples with more than one child were exhorted to be sterilized.<sup>157</sup>

The Chinese Communist Party under Deng Xiaoping's leadership was committed to developing the economy and saw controlling the population as a tool to achieve that end.<sup>158</sup> As Deng Xiaoping wanted to achieve the "Four Modernizations", he saw the manipulation of population growth as a means within their control.<sup>159</sup> Due to the belief that population growth would impede social and economic development, the One-Child Policy may have been his only option to achieve the goal of a population below 1.2 billion by the year 2000. The most pressing factor was the fact that the Post-Great Leap Forward baby boomers were quickly approaching reproductive age.<sup>160</sup> The second factor was a strong economic desire to save resources and increase the per capita standard of living.<sup>161</sup> By limiting the population's size, the government would be able to control employment levels, living standards, and education<sup>162</sup>

### **C. 1980-2000: DEMOGRAPHIC RESULTS OF THE ONE-CHILD POLICY**

Intentions and realizations are often quite different, especially when discussing unprecedented governmental policies. Although the One-Child Policy failed to keep China's population below 1.2 billion by the year 2000, the government continued to

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<sup>157</sup> Worden, *China: A Country Study*.

<sup>158</sup> Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 586.

<sup>159</sup> Ibid.

<sup>160</sup> Lieberthal, *The One Child Policy Turns 30*, 5.

<sup>161</sup> Ibid.

<sup>162</sup> Bongaats and Greenhalgh, *An Alternative to the One-Child Policy in China*, 586.

celebrate it as a success in terms of its prevention of “some 300 million births” by that time.<sup>163</sup> The demographic results of the One-Child Policy include a below replacement fertility rate, an unnatural gender imbalance, and 20 years of an unnaturally high ratio of adults to youth.

As seen in Table 1, China’s fertility rate and birth rate in 1970 were that of a country still in the second stage of the demographic transition model: accelerated population increase. In 1970, China’s fertility rate was 5.5 births per woman over her lifetime, and the birth rate was 34 births per thousand in the population.<sup>164</sup> Over the next ten years China’s fertility and birth rate plummeted as the government applied pressure on family planning programs, culminating with the One-Child Policy. In 1980, China fertility rate had fallen to 2.6 births per woman, and the birth rate went down to 22 births per thousand.<sup>165</sup> These trends of population control resulted in China’s fertility rate falling below the replacement value of 2 births per woman by 1994. By the year of 2000, China’s fertility rate had fallen to 1.7 births per woman with a birth rate of 15 per 1,000.<sup>166</sup>

The transition stages are determined by reviewing the rates of change for the birth and death rates, and then context is ensured by evaluating the rate of annual population growth. 1970 fall under stage 3, peaked population growth, because of the large difference between the birth and death rates, which a 2.235 percent annual population growth would confirm. 1980 is considered stage 4, slowing population growth, because of a birth rate which is still significantly greater than the death rate but with a population growth rate which has decreased to 1.44. 2000 also falls under stage 4, slowing population growth, due to the birth rate continuing to be greater than the death rate. Thus allowing for a positive, though diminishing, population growth rate of 0.597.

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163 Hu Huiting, "Family Planning Law and China's Birth Control Situation," China Internet Information Center, October 18, 2002, <http://www.china.org.cn/english/2002/Oct/46138.htm>.

164 Rosling, *Gapminder.Org*.

165 Ibid.

166 Ibid.

Table 1. Chinese Demographics 1970-2000. (After <sup>167</sup>)

Chinese Demographics 1970-2000					
	1970	1980	Percent Change <sup>168</sup>	2000	Percent Change <sup>169</sup>
Population	814622841	981347111	20.47%	1262881912	28.69%
Birth Rate <sup>170</sup>	31	21	-32.26%	13	-38.10%
Fertility Rate <sup>171</sup>	4.77	2.6	-45.49%	1.7	-34.62%
Death rate <sup>172</sup>	8	7	-12.50%	7	0.00%
Annual Pop. Growth	2.235	1.44	-35.57%	0.597	-58.54%
Dependency Ratio <sup>173</sup>	77	69	-10.74%	48	-30.43%
Life expectancy <sup>174</sup>	64.57	67.67	4.80%	71.62	5.84%
Transition Cycle Stage	3	4		4	

The One-Child Policy has had other consequences, in addition to the falling fertility rate, as a result of the incentives created by the idealized directive to have only one child. China is a country which has a cultural preference for male children. This preference is rooted in the desire to continue the family lineage into future generations;<sup>175</sup> as well as the economic responsibilities a son has to support his parents in retirement, as opposed to a daughter who traditionally joins her spouse's household for these regards.<sup>176</sup>

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<sup>167</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>168</sup> Change from 1970 to 1980.

<sup>169</sup> Change from 1980 to 2000.

<sup>170</sup> Births per thousand population.

<sup>171</sup> Births per woman within her lifetime.

<sup>172</sup> Deaths per thousand population.

<sup>173</sup> Number of dependents (aged 0-14 or 65+) per 100 potential laborers (aged 15-64).

<sup>174</sup> Age expected for a newborn baby born that year to achieve.

<sup>175</sup> Vermeer, *Dimensions of China's Development*, 126.

<sup>176</sup> Shuzhuo Li et al., "Gender, Migration, and the Well-being of the Elderly in Rural China," in *Aging Asia*, eds. Kare Eggleston and Shripad Tuljapurkar (Stanford: Walter H. Shorenstein Asia-Pacific Research Center, 2010), 68.

An imbalance of gender ratios has been found to occur naturally with 106 males born for every 100 females, which was the case in China as late as 1982. However, by 1987, this ratio was 113 to 100, by 1995 it was 117 to 100, and in 2000, 120 to 100.<sup>177</sup> The desire for male heirs was thus expanded when the government began to support single-child family planning, and the development of ultra-sounds allowed for greater discrimination in the birthing process.<sup>178</sup> Although the gender imbalance does not have a direct effect on China's economic situation it creates a compounding influence feeding into the changing demographics which do influence China's economy. This compounding influence is that in each successive generation one will have fewer and fewer women who will each have one child. The preference is for that child to be a male resulting in fewer and fewer women.

#### **D. 1980-2000: ECONOMIC BENEFITS DERIVED FROM CHINA'S ONE-CHILD POLICY**

The demographic and economic situation in 1980 is a result of the Great Leap Forward. This situation created by the Great Leap Forward included a massive labor pool, and an already decreasing dependency ratio to go with it. This situation in 1980 created an exceptional demographic base for the One-Child Policy to then compound upon.

The economic benefits, as a product of the demographic situation rooted in the One-Child Policy, include an additional 20 years of a favorable dependency ratio, a higher level of investment in human capital, increased worker productivity, and growth in per capita income. Overall, the institution of the One-Child Policy exacerbated the demographic detour initiated by the Great Leap Forward- it continued to extend the first demographic dividend, which occurs "because the productive population is growing at a faster rate than the total population over part of the demographic transition."<sup>179</sup> In

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<sup>177</sup> Shuzhuo Li, "Imbalanced Sex Ratio at Birth and Comprehensive Intervention in China" (Hyderabad, Xi'an Jiaotong University: Institute for Population and Development Studies, October 29, 2007, 2007).

<sup>178</sup> Vermeer, *Dimensions of China's Development*, 126.

<sup>179</sup> Feng and Mason, *The Demographic Factor in China's Transition*, 14.

addition, the One-Child Policy laid the foundation for a future issue of a shrinking labor pool.

Countries typically experience lowering fertility and birth rates, decreasing the dependency ratio. The population as a whole makes calculated choices to have fewer children after witnessing decreased death rates and perceived advantages in reduced fertility.<sup>180</sup> As the dependency ratio lowers, resources previously used for maintaining those dependents becomes redistributed. In China's case, this effect was artificially stimulated through governmental intervention by means of the One-Child Policy and occurred at an unprecedented rate. The dependency ratio which was affected by the Great Leap Forward fell from 78.4 dependents to every 100 workers in 1965, to 77.3 dependents to every 100 workers in 1970.<sup>181</sup> Through natural means and the beginning of governmental emphasis on family planning the dependency ratio dropped to 60 by 1980. After the implementation of the One-Child Policy, the dependency ratio plummeted to 48 in 1985, and then to 38 by 2000 allowing the resources of an estimated 300 million children to be redistributed throughout China's economy.<sup>182</sup>

The One-Child Policy "made every child precious".<sup>183</sup> Investment in the children who were born after the institution of the One-Child Policy began increasing substantially, particularly in terms of their education.<sup>184</sup> For example, in 1980, there were 29 million children enrolled in primary school. By 2000 that number was reduced to 16 million; meaning the state was not pressured to expand facilities, but was instead able to upgrade them while reducing class sizes and increasing teacher training. Another example is that from 1980 to 2000 enrollment in lower middle school went from 15 million to 17.6 million. Thus showing that despite a significant reduction in the number of children potentially able to attend lower middle school there was actually an increase

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180 Kirk, *Demographic Transition Theory*, 365.

181 United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

182 Lieberthal, *The One Child Policy Turns 30*, 11.

183 Ibid.

184 Ibid.

in enrollment because of the greater emphasis placed on continuing education.<sup>185</sup> With the extra investment in education, the Chinese labor force became “much more skilled” and labor productivity rose at a much faster rate than real wages.<sup>186</sup> Calculations of labor contribution as a percentage of total factor productivity within this period are as high as 10.25 percent.<sup>187</sup> Figure 9 illustrates the changes in output per worker from 1952 to 2005. The rapid growth in labor productivity circa 1991 is likely due to the entrance of children raised in the environment created by the “later-longer-fewer” campaign and the One-Child Policy into the labor market.

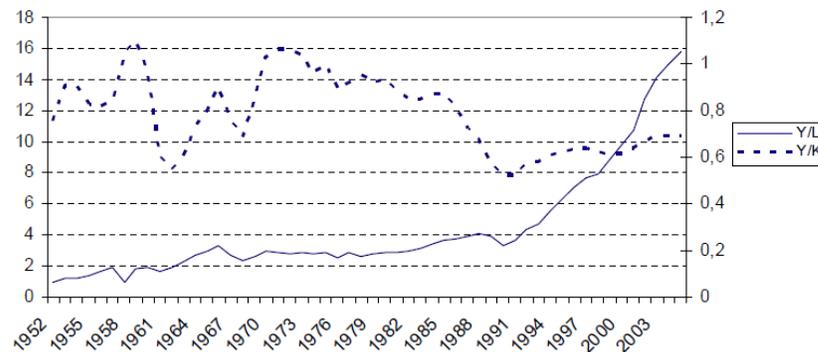


Figure 9. Single Factor Productivity: Output per worker and output per capital.  
(From <sup>188</sup>)

The One-Child Policy also laid the foundation for a potential issue to be faced at a later time. Because of the estimated 300 million unborn children, a drought of new laborers would be felt once those unborn children would have reached the age of employment.<sup>189</sup> This disappearance of new laborers would become compounded each year when laborers, born in the 1950-1980 baby-boom, begin leaving the labor pool. This difference would create a less than favorable replacement rate within the labor pool.

<sup>185</sup> Ibid.

<sup>186</sup> Lieberthal, *The One Child Policy Turns 30*, 11.

<sup>187</sup> Selin Ozyurt, *Total Factor Productivity in Chinese Industry, 1952–2005*, International Association for Research in Income and Wealth, [2007].

<sup>188</sup> Ibid.

<sup>189</sup> Huiting, *Family Planning Law and China's Birth Control Situation*, 1.

Economic growth in the form of China's GDP was quite substantial from 1980 to 2000. As seen in Table 2, the GDP grew from \$US 189 million to almost \$US 1.2 billion; a 532.77 percent increase. This increase was a result of a multitude of factors, well beyond solely demographics: for example the opening up of China to the global market, and the many economic reforms put forth by Deng Xiaoping's administration. Chinese officials say between 1982 and 2000, the "improvement" in the dependency ratio "has accelerated China's economic growth by 2.3 percent per year, that is, it contributed to over one-quarter of China's economic growth."<sup>190</sup>

High growth in per capita income within China from 1980 to 2000 was another benefit of the One-Child Policy, although the growth may not be as great as it first appears.<sup>191</sup> During that time, China experienced a growth in per capita income of 392 percent, from \$193 to \$949. In 1980, China's GDP per potential laborer was \$623 and in 2000, it was up to \$1825, which was a 193 percent increase in per laborer income. A growth in GDP per laborer of 193 percent from 1980 to 2000 is still high, but when compared to the more readily available benchmark of growth in GDP per capita of 392 percent, it puts into perspective how demographic changes can affect a country's economic situation.

In this case, the skewed dependency ratio, although not the whole case, is a substantial part of it. If a country's dependency ratio becomes skewed, the per capita income is skewed in kind, as illustrated in Table 2. When compared only to the number of potential laborers within China, those aged 15-65, the overall GDP reflects the population's productivity in a more contextual sense. For example, a person working from home generating \$50,000 in revenue, or \$50,000 per capita, looks more productive than a person working at home with four children generating \$50,000 in revenue, or \$10,000 per capita, although the productivity is the same. If we used revenue per potential laborer, we would have \$50,000 in both scenarios.

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<sup>190</sup> Vermeer, *Dimensions of China's Development*, 116.

<sup>191</sup> Growth in GDP per capita is typically achieved through growth in total GDP (numerator), however, if the population (denominator) growth declines, GDP per capita will appear to have increased with or without actual growth.

Table 2. 1980-2000: Growth in GDP per Capita vs GDP per Pot. Laborer. (After <sup>192</sup>)

1980-2000: Growth in GPD per Capita vs GDP per Potential Laborer			
	1980	2000	Percent Change
GDP <sup>193</sup>	\$189,399,992,474	\$1,198,474,934,199	532.77%
Total Population	981235000	1262645000	28.68%
GDP per Capita	193	949	391.71%
Dep Ratio <sup>194</sup>	69	48	-30.43%
Percent of Pot. Laborers <sup>195</sup>	31	52	67.74%
Pop 15-64 <sup>196</sup>	304182850	656575400	115.85%
GDP per Pot. Laborer <sup>197</sup>	623	1,825	193.16%

## E. CONCLUSION

China was naturally progressing through the demographic transition model when it was interrupted first by the Great Leap Forward and then again, to a greater degree, by the One-Child Policy. The One-Child Policy was intended to protect economic development from an unsustainable population. In reality, though, the One-Child Policy created an economically advantageous environment for investment into human capital and an immense pool of potential laborers with few dependents from 1980 to 2000 at the earliest. Some estimate this demographic situation has contributed up to 2.5 percent annual growth in GDP from the period of 1978-2000.<sup>198</sup>

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<sup>192</sup> Bank, *Gross Domestic Product 2010*.

<sup>193</sup> In current US\$.

<sup>194</sup> Dependents (ages 0-14, and 65+) per 100 laborers (ages 15-64).

<sup>195</sup> Laborers (ages 15-64) per 100 population.

<sup>196</sup> Calculated by, Total Population \* Percent of Pot. Laborers = Pop 15-64.

<sup>197</sup> Calculated by, (GDP) / (Pop 15-64) = GDP per Pot. Laborer.

<sup>198</sup> Vermeer, *Dimensions of China's Development*, 116.

## **V. COMPARATIVE ANALYSIS OF THE IMPACTS OF CHINA'S DEMOGRAPHIC EVENTS**

### **A. INTRODUCTION**

This chapter will be a comparison of China's demographic situation in 1965, 1980, 2000, and the economic impacts. China was naturally progressing through the demographic transition model when it was interrupted first by the Great Leap Forward and then again, to a greater degree, by the One-Child Policy. To best understand how the Great Leap Forward and the One-Child Policy's demographic detours affected China's economic situation they must be compared chronologically. Also, the snapshots in time must be able to illustrate the lasting impressions of each detour. As discussed in Chapter III, 1965 China will be the base year, before the full effects of the Great Leap Forward took effect. 1980 China will illustrate the lasting effects of the Great Leap Forward before the One-Child Policy. Finally, 2000 China will show the compounding effect of the One-Child Policy with the detour already created by the Great Leap Forward.

### **B. CHINA'S DEMOGRAPHIC TRANSITION**

The demographic transition sustained by China from 1965 to 2000 was "faster and more complete" than any similar effort.<sup>199</sup> The transition from a country with an accelerating population increase (stage 2) to a country with a slowing population growth (stage 4), has traditionally taken an estimated three to five generations.<sup>200</sup> China has completed this transition in two and a half generations; from 1980 to 2000 China reduced its birth rate from 36 per thousand to 13 per thousand, its death rate from 21 per thousand to 7 per thousand, and its population growth rate from over 1.5 percent per year to 0.6 percent (Figure 10 and Table 3).<sup>201</sup>

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199 Naughton, *The Chinese Economy*, 162.

200 Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*, 329.

201 World Bank, *Gross Domestic Product 2010*; United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

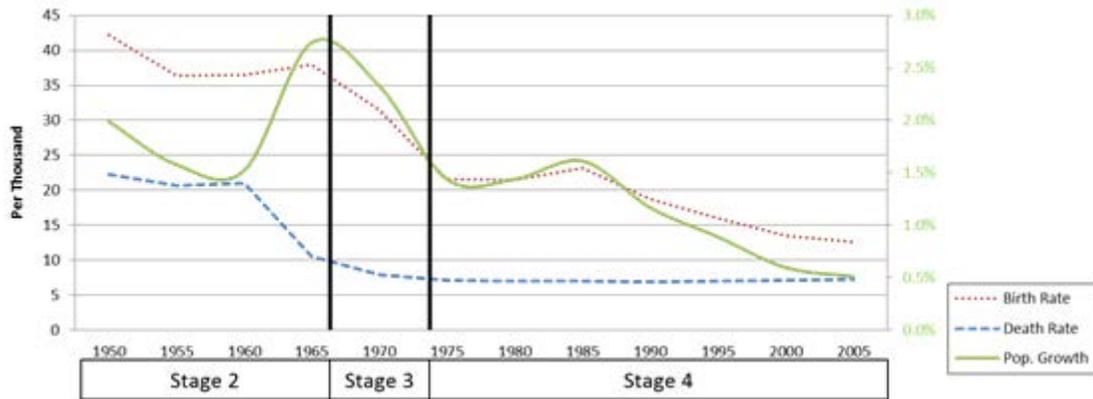


Figure 10. China's Demographic Transition 1950-2005. (After <sup>202</sup>)

As seen in Figure 10, China's transition was quite easily separated into the second, third, and fourth stages of the demographic transition cycle. As discussed in Chapter II, China's demographic transition has been underway since the early 1900s, beginning with the second stage, accelerated population growth. By 1950, as illustrated in Figure 10, there was already a significant difference between the birth and death rates within China with birth rates already naturally decreasing, which may have indicated the beginning of the third stage of the demographic transition model, peak population growth. However, this transition was interrupted in 1958 by the Great Leap Forward creating conditions of excess resources, no longer needing to support the 30-50 million dead, and a baby boom which took place immediately after. As a result, the second stage of the demographic transition, accelerated population growth, was intensified and population growth rates exceeded 2.5 percent.

As the baby-boom peaked between 1965 and 1970, China transitioned into the third stage of the transition model, peak population growth. This stage lasted until the mid-1970s, when individuals began seeing benefits of smaller families, and governmental campaigns promoting education and access to birth control increased. This choice of individuals to have smaller families and the support through governmental programs brought China into the fourth stage of the demographic transition, slowing

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<sup>202</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

population growth. This may have allowed for China to overcome the detour created by the Great Leap Forward, but by the late 1970s, and officially in 1980, China's One-Child Policy was announced.

The mixture of incentives and consequences of family planning added another twist to the already detoured path of China's demographic transition. Although it took a few years for the One-Child Policy's effects to be institutionalized the birth rate continued to plummet from the early 1980s to 2000 and beyond. This has pushed China toward becoming the second country in the world to enter the fifth stage of the demographic transition, post-transition. A country within the post-transition stage maintains a negative population growth through low birth and death rates. This can create many problems which are still not yet understood and beyond the scope of this thesis.<sup>203</sup> In 2012, China's estimated population growth was down to 0.481 percent.<sup>204</sup>

Table 3. Chinese Demographics 1965-2000. (After <sup>205</sup>)

Chinese Demographics 1965-2000					
	1965	1980	Percent Change	2000	Percent Change
Population	710290299	981235000	38.15%	1262645000	28.68%
Birth Rate	36	21	-41.67%	13	-38.10%
Death rate	21	7	-66.67%	7	0.00%
Annual Pop. Growth	1.521	1.44	-5.33%	0.597	-58.54%
Dependency Ratio	78	69	-11.99%	48	-30.43%
Life expectancy	59.43	67.67	13.87%	71.62	5.84%
Transition Cycle Stage	2	4		4	

### C. DEMOGRAPHY'S ECONOMIC IMPACTS

The economic impacts of the demographic detour created by the Great Leap Forward and the One-Child Policy created lasting impressions on China. This is most

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<sup>203</sup> Feng and Mason, *The Demographic Factor in China's Transition*.; Chesnais, *Demographic Transition Patterns and their Impact on the Age Structure*.; Kirk, *Demographic Transition Theory*.; Galor, *The Demographic Transition and the Emergence of Sustained Economic Growth*.; Ogawa, *Changing Intergeneration Transfers in Aging Japan*.; Mason, *Demographic Dividends: The Past, the Present, and the Future*.

<sup>204</sup> CIA, *CIA World Factbook*.

<sup>205</sup> World Bank, *Gross Domestic Product 2010*; United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

easily measured as illustrated in the drastic reduction in the dependency ratio, from 78 dependents per 100 potential workers in 1965, to 69 in 1980, and 48 in 2000. A second impact is the transition of the labor force being seen as tools for production to something worthy of investment. A third economic impact is that some financial statistics, particularly that of GDP per capita, become skewed and must be interpreted more closely.

One economic impact of a country's dependency ratio is that as the dependency ratio lowers, the resources previously used for maintaining those dependents are redistributed. Both the Great Leap Forward and the One-Child Policy skewed China's dependency ratio in an economically favorable fashion. One major difference between the demographic effects of the Great Leap Forward and the One-Child Policy is that the former affected the elderly while the latter was directed at youth.

After the Great Leap Forward, the redirected resources totaled what supported tens of millions, the majority of whom were elderly, but the One-Child Policy redirected the resources of an estimated 300 million children between 1980 and 2000. These resources, both monetary and labor, were able to be redirected into industrialization and modernization efforts as well as education and infrastructure. Removing the elderly put those resources back into the system to be used as best fit; when removing the youth much of the freed resources were redirected at the remaining youth, meaning that the One-Child Policy "made every child precious".<sup>206</sup> Each experience presented different economic impacts. The Great Leap Forward's removal of the elderly created a short-term fix because people will continue to age, replacing this draw on resources. Alternatively, the One-Child Policy presented an opportunity for long-term investment in the future labor force. Estimates by Chinese officials say between 1982 and 2000, the "improvement" in the dependency ratio "has accelerated China's economic growth by 2.3

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206 Lieberthal, *The One Child Policy Turns 30*, 11.

percent per year, that is, it contributed to over one-quarter of China’s economic growth.”<sup>207</sup> Of course, this estimate does not take in account the productivity lost in terms of unborn potential laborers.

As seen in Figure 11, the dependency ratio changed greatly in the period from 1950 to 2000. Prior to the Great Leap Forward, the dependency ratio had begun to slow its growth, increasing by 9 dependents per worker from 1950 to 1955, and only another 5 dependents per worker fewer by 1960. However, by 1965, after the Great Leap Forward, the dependency ratio only grew by 1 dependent per hundred workers and actually began shrinking by 1970, returning to the 1960 level. The skewing of the dependency ratio by the Great Leap Forward is illustrated in Figure 11 by the noticeable decrease in the old-age dependency ratio, which remained below China’s 1950 level until 1975. This occurred despite medical advances, the end to an extended period of conflict and an increased life expectancy from 44.6 years in 1950, to 66.3 years in 1975.

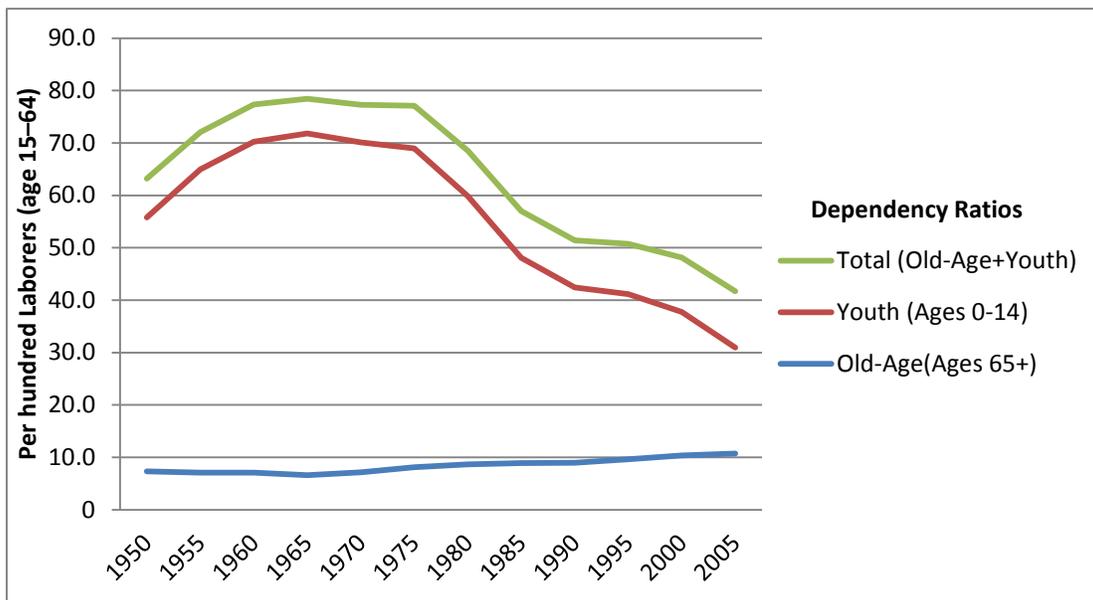


Figure 11. China’s Dependency Ratio, 1950-2005. (After <sup>208</sup>)

<sup>207</sup> Vermeer, *Dimensions of China's Development*, 116.

<sup>208</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

The overall dependency ratio was then reduced by three coinciding factors. The first factor is the natural decrease in birth rates that comes along with medical developments and the increased expectation of children to survive into adulthood. The second factor was progress made through the third birth limiting campaign, established in 1971, pushing the mantra of “later-longer-fewer,”<sup>209</sup> as discussed in Chapter IV of this thesis.<sup>210</sup> The third factor was the formal institution of the One-Child Policy. All three of these factors account for the reduction in the dependency ratio but this time it was weighted by the skewed youth dependency ratio.

Overall, the effect of the birth limiting campaign can be seen in Figure 11 as the youth dependency ratio decreased by 10 youth dependents per 100 workers from 1970 to 1980, when compared to the ten year period from 1960 to 1970 showed a decrease of 0.1 youth dependents per 100 laborers. In contrast, the first ten years of the One-Child Policy, from 1980 to 1990, experienced a decrease of 17 youth dependents per 100 laborers, and another 5 by 2000, resulting in a youth dependency ratio of 37.7 youth per 100 laborers and an overall dependency ratio of 48.1 dependents per laborer.<sup>211</sup> Post-One-Child Policy analysis of the dependency and birth rates compared to more natural conditions is limited due the fact that the One-Child Policy is still in place.

As stated earlier, the economic impact of a country’s dependency ratio is that as the dependency ratio lowers, the resources previously used for maintaining those dependents becomes redistributed. As seen in Figure 12, the labor pool grew in both absolute and relative terms compared to the total population creating the potential for a much more productive society, with or without the increased human capital seen after the One-Child Policy. However, while China has sustained and benefited from a decreasing dependency ratio, the labor pool will soon begin to shrink due to the One-Child Policy. This issue is discussed in further detail in the following chapter.

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<sup>209</sup> The goal of this campaign was; later marriage, longer spacing between first and subsequent children, and fewer children.

<sup>210</sup> Kane and Choi, *China's One Child Policy*, 992.

<sup>211</sup> The youth dependency ratio was 70.2 in 1970 and 59.8 in 1980.

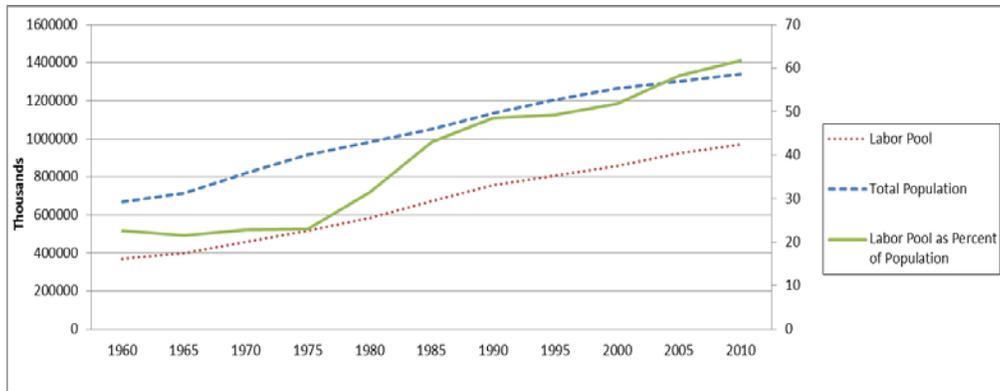


Figure 12. China's Labor Pool. (After <sup>212</sup>)

A second economic impact of China's demographic transition is the development of a more skilled labor force. Prior to and after the Great Leap Forward, China's labor force was primarily unskilled and agricultural labor. While the Great Leap Forward put great emphasis on and attempted to develop skilled labor the results were almost counter-productive. This counter-productive result is displayed in a loss of at least 5 billion yuan,<sup>213</sup> and countless man-hours wasted in the backyard furnaces, as well as the famine which resulted from the efforts and failure to modernize the agricultural sector.<sup>214</sup> Also, by 1965, with a life expectancy of less than 60 years of age and a fertility rate just shy of six births per woman in her life time, the opportunity to put any significant investment into any particular child was not reasonable.<sup>215</sup>

As China's development continued, from 1965 to 1980, China rapidly exited the second stage of the demographic transition model, accelerated population growth, passed through the third stage, peak population growth, and entered the fourth stage, slowing population growth. Through this period China's life expectancy significantly increased, from 59 years to 68 years, and the fertility rates decreased from 5.94 births per woman in

<sup>212</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>213</sup> Dikotter, *Mao's Great Famine*, 61.

<sup>214</sup> *Ibid.*, 136.

<sup>215</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

her lifetime to 2.61 births. This allowed for not only more time for a laborer to use their knowledge but an opportunity for increased investment into the fewer children, both by the state and the family, creating a pool of workers more prepared for skilled labor.

The opportunity of investment into the youth, or future labor force, increased significantly with the institution of the One-Child Policy in 1980. As discussed in Chapter IV, this policy is credited with the avoidance of an estimated 300 million births between 1980 and 2000, allowing those resources to be invested elsewhere, particularly for the development of those children who were born.<sup>216</sup> This investment is illustrated in the improvement in the adult literacy rate,<sup>217</sup> from 66 percent in 1982,<sup>218</sup> to over 90 percent in 2000.<sup>219</sup> These workers would be primed for skilled labor far beyond that of their parents, once they were ready to enter the workforce. Calculations of labor contribution as a percentage of total factor productivity within this period, 1980-2000, are as high as 10.25 percent.<sup>220</sup>

The third effect of China's demographics on economics addressed here is the need for careful interpretation of financial statistics, particularly GDP per capita. As seen in Table 4, the doubling of China's GDP from 1965 to 1980 would normally be exceptional, even when you consider the GDP per capita only increased by 41 percent. Nevertheless, once this growth is put into perspective by demographics, you see that the number of potential laborers within China grew at the same rate as the GDP. This means the actual output per laborer most likely remained at the same level, or even possibly lowered. As already mentioned, the skewing of the dependency ratio distorts these calculation from 1980-2000 as well.

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<sup>216</sup> Huiting, *Family Planning Law and China's Birth Control Situation*, 1.

<sup>217</sup> The percentage of people ages 15 and above who can, with understanding, read and writes a short, simple statement on their everyday life.

<sup>218</sup> Persons born prior to 1967.

<sup>219</sup> Persons born prior to 1985.

<sup>220</sup> Ozyurt, *Total Factor Productivity in Chinese Industry, 1952-2005*, 20.

However, from 1980-2000 there was still a substantial growth in worker productivity, approximately 190 percent growth. The shift from stagnant productivity during the period following the Great Leap Forward until 1980 to growth in productivity from 1980 onward is a result of how the calculations were affected. The Great Leap Forward's impact was through distortion of the population, or the denominator of the formula, and not actual growth. On the other hand, The later-longer-fewer birth limiting campaign and the One-Child Policy actually had an impact on real growth because of the increased investment in labor force skills, as well as the impact on the population.

Table 4. 1965-2000: Growth in GDP per Capita vs GDP per Potential Laborer.  
(After <sup>221</sup>)

1965-2000: Growth in GDP per capita vs GDP per Potential Laborer					
	1965	1980	Percent Change	2000	Percent Change
GDP (Current US\$)	\$97 Bil	\$189 Bil	94.32%	\$1,198 Bil	532.77%
Total Population	715 Mil	981 Mil	37.20%	1,263 Mil	28.68%
GDP per Capita	\$136.29	\$193	41.61%	\$949	391.71%
Dep Ratio <sup>222</sup>	78	69	-11.99%	48	-30.43%
Percent of Pot Laborers <sup>223</sup>	22%	31%	43.52%	52%	67.74%
Pop 15-64 <sup>224</sup>	154 Mil	304 Mil	96.91%	657 Mil	115.85%
GDP per Pot Laborer <sup>225</sup>	\$631	\$623	-1.32%	\$1,825	193.16%

#### D. CONCLUSION

China's demographic transition obviously had a significant impact on its economic development from 1965 to 2000. The demographic factors that changed

<sup>221</sup> World Bank, *Gross Domestic Product 2010*.

<sup>222</sup> Dependents (ages 0-14, and 65+) per 100 laborers (ages 15-64).

<sup>223</sup> Laborers (ages 15-64) per 100 population.

<sup>224</sup> Calculated by, Total Population \* Percent of Pot. Laborers = Pop 15-64.

<sup>225</sup> Calculated by, (GDP) / (Pop 15-64) = GDP per Pot. Laborer.

include the elimination of up to tens of millions of dependents, primarily elderly, through the Great Leap Forward. A baby boom experienced from the end of the Great Leap Forward until the late 1970s creating a very large wave of future laborers. A governmentally induced transition into the fourth stage of the demographic transition model, slowing population growth, through the birth limiting campaigns and ultimately the One-Child Policy in 1980 favorably skewed the dependency ratio. A skewed ratio due to the estimated 300 million births averted from 1980 to 2000.<sup>226</sup>

The economic results of the transition include a large labor pool without the distraction, either financially or responsibly, of dependents. An opportunity to invest in the youth, creating a generation primed to become skilled workers beyond the productivity of their parents. As well as, two distinct impacts on productivity, the Great Leap Forward's skewing of the GDP per capita through negatively affecting the population, and the One-Child Policy's increased productivity through investment in human capital, as well as population controls.

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<sup>226</sup> Huiting, *Family Planning Law and China's Birth Control Situation*, 1.

## VI. CONCLUSION

### A. INTRODUCTION

In summary, China's demographic transition had a significant impact on its economic development from 1965 to 2000. A primary demographic factor that impacted economic development was the number of dependents, persons aged 0-14 and over 65 years old, per hundred potential laborers, aged 15-64 years old. The baby boom experienced from the end of the Great Leap Forward until the late 1970s created a very large wave of future labor inputs, which enabled future economic growth. This wave of laborers was then exacerbated by a governmentally induced transition into the fourth stage of the demographic transition model, slowing population growth, through the later-longer-fewer birth limiting campaign and ultimately the One-Child Policy in 1980. The One-Child Policy, and the resulting skewed dependency ratio, due to the estimated 300 million births averted from 1980 to 2000 created an environment that fostered increased investment into human capital.<sup>227</sup>

From 1965-2000, we saw the economic results of China's demographic transition included a large labor pool without the distraction, either financially or responsibly, of dependents. In addition, this governmentally skewed dependency ratio created a labor force primed for skilled labor far beyond that of their parents, once they were ready to enter the workforce. Calculations of labor contribution as a percentage of total factor productivity within this period are as high as 10.25 percent.<sup>228</sup>

So far, this has all been economically positive but what happens when the question of sustainability arises? Can the government continue to skew the dependency ratio in favor of productivity and would it be desirable for it to do so? What happens if the government can no longer sustain such a favorable dependency ratio? Can China survive transition into the fifth stage of the demographic transition model, post-transition? What will be the effects of the lost labor pool created by the OCP,

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<sup>227</sup> Huiting, *Family Planning Law and China's Birth Control Situation*, 1.

<sup>228</sup> Ozyurt, *Total Factor Productivity in Chinese Industry, 1952-2005*, 20.

particularly when there will be too little replacement labor for the retiring post-GLF baby boom? What economic impacts will occur as a result of this labor shortage? This cost can be assessed by evaluating the current demographics and where the Chinese demographic picture is expected to be in the next twenty years.

## **B. 2010: CHINA'S DEMOGRAPHICS TODAY**

China's demographics did not change greatly from 2000 to 2010, except for the continued decrease in the dependency ratio and significant increase in the country's median age, both of which are results of the One-Child Policy. China remains within the fourth stage of the demographic transition cycle, slowed population growth. Currently, the situation continues to be economically favorable although the expectation is that the dependency ratio will begin to rise as the current labor force begins to retire and there are not enough youth to replace them. I will address some of the future costs of China's aging population, particularly when these older people have fewer children to take care of them, in the following section.

As seen in Table 5, from the period of 2000 to 2010, overall population growth remained low and continued to decrease, reaching one half percent by 2010. This low population growth resulted in a total population growth over the period of just over six percent, compared to an eleven percent growth in the ten years prior. Also, the death rate has remained low at seven deaths per thousand in the population, a rate that is typical for a developed nation.<sup>229</sup>

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<sup>229</sup> Compared to the United States' death rate of 8 and Japan of 10, and South Korea of 5.

Table 5. Chinese Demographics 2000-2010. (After <sup>230</sup>)

Chinese Demographics 2000-2010			
	2000	2010	Percent Change
Population	1262881912	1341335000	6.21%
Birth Rate	13	13	0.00%
Fertility Rate	1.7	1.64	-3.53%
Death rate	7	7	0.00%
Annual Pop. Growth	0.597	0.5	-16.25%
Dependency Ratio	48	38	-20.42%
Life expectancy	71.62	73	1.93%
Median Age	30	34.5	15.00%
Transition Cycle Stage	4	4	

The dependency ratio continues to decrease a result of the low fertility and birth rates, while the One-Child Policy is assessed to have avoided an additional 100 million births by 2010, in addition to the 300 million between 1980 and 2000.<sup>231</sup> China's fertility rate remains low at 1.64 births per woman's lifetime, some of which can be attributed to the One-Child Policy. Although some modifications have been made to the One-Child Policy at the provincial level, it continues to incentivize having small families while administering punishments to many of the larger families. One modification in 2007, allows rural parents to receive annual payments at the age of 60 if they had a single child or two daughters, sometimes referenced as the one and a half child policy.<sup>232</sup> The birth rate remained low at 13 births per thousand in the population, due to the One-Child Policy as well as the natural benefits which come along with the choice to have a smaller family.

The median age within China has increased by almost five years within the ten year period of 2000-2010, to 34.5 years. The median age is representative of the population's age where fifty percent of the population is older and the other fifty percent

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230 United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

231 韩莎莎, "400 Million Births Prevented by One-Child Policy," *People's Daily*, October 28, 2011, 2011.

232 Robert Benewick and Stephanie Donald, *The States of China Atlas* (Berkeley: University of California Press, 2009), 29.

is younger than that age. The rapid change of China's median population is due to China's disproportionately high number of workers and elderly, from the Post-Great Leap Forward baby boom, and the low proportion of children due to the One-Child Policy, birth limiting campaigns, and natural benefits of smaller families that modernization brings. This disproportion of age groups is best illustrated through Figure 13, China's population pyramid, particularly in the less than 20 year old age groups.

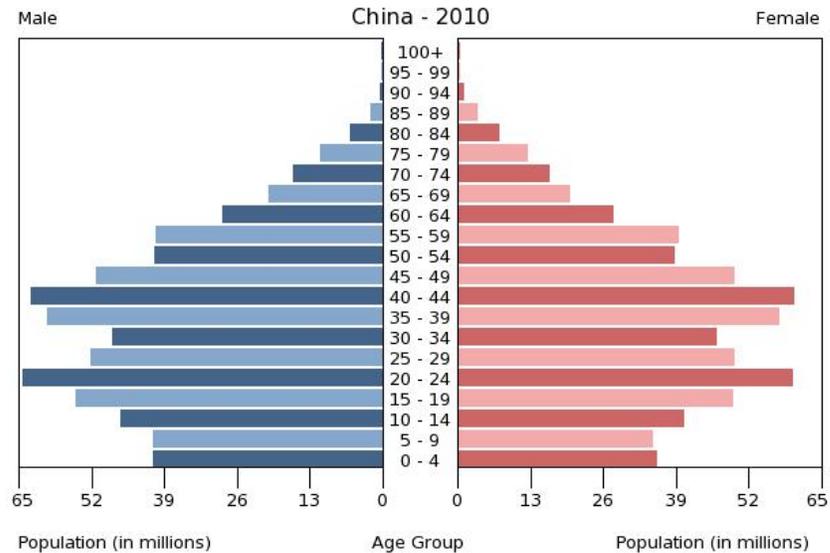


Figure 13. China Population Pyramid – 2010. (From <sup>233</sup>)

### C. 2010-2030: CHINA'S DEMOGRAPHICS TOMORROW

Predictions of what is to come in the next five years regarding political stability, economic growth, and regime empowerment are typically a little more than well-educated guesses at best, but this is where demography is different. Demographics can be calculated out and predicted generations ahead of time “because the overwhelming majority, roughly 80%, of the people who will inhabit China in 2030 are already alive, living there today.”<sup>234</sup>

<sup>233</sup> United States Census Bureau, "International Programs - Regions Summary - U.S. Census Bureau," May 9, 2012, <http://www.census.gov/population/international/data/idb/region.php>.

<sup>234</sup> Eberstadt, *Demographic Trends Cloud China's Long-Term Economic Outlook*, 26.

Over the period from 2010 to 2030 China will experience at least three significant demographic changes. These three changes are the transition into the fifth stage of the demographic transition theory, or post-transition; the reversal of an estimated fifty years of a declining dependency ratio; and a significant increase in the population's age. All of these changes can be attributed to, or were at least hastened by, the demographic detour created by the Great Leap Forward and the One-Child Policy. One difference between these changes is the inevitability and magnitude of each, particularly in relation to the One-Child Policy.

As seen in Table 6, by 2030 China will meet the required conditions to be in the fifth stage of the demographic transition model, post-transition. These requirements are a diminishing birth rate equal to or below an already low death rate, resulting in a sustained or negative trend in population growth. This transition to the fifth stage is expected to occur around 2025 when the population growth rate first becomes negative.<sup>235</sup>

The negative growth rate is a result of the decreasing birth rate, which is decreasing due to the compounding effect of the One-Child Policy and China's preference for male children. The correlation of the birth rate and the number of females within China is obvious when the fertility rate, the number of children born per woman in her lifetime, has remained around 1.64 children per woman since 2005, and expected to remain steady.<sup>236</sup>

Due to government intervention, sustaining the unnatural fertility rate of 1.64 children born per woman in her lifetime, fewer females are born to later bear children with each generation. While implementation of the One-Child Policy is at the provincial level and some modifications have occurred, such as providing bonuses and privileges to daughter only or one-son families in 2004, no significant changes have yet to be seen.<sup>237</sup>

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<sup>235</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>236</sup> Ibid.

<sup>237</sup> Benewick and Donald, *The States of China Atlas*, 29.

Gender birth ratios, naturally occurring at 103 to 105 boys for every 100 girls, were nationally as high as 123 boys for every 100 girls in 2007, driven by China's cultural preference for male children.<sup>238</sup>

If the One-Child Policy were more lenient or rescinded in the near future, the birth rate would likely increase and a more natural gender ratio would follow. These two changes would delay transition into the posttransition stage for an unspecified amount of time. This must be done in the near future because the changes in birthing practices must take place before 2025 to maintain population growth. However, such a change would not necessarily be as positive for the dependency ratio.

Table 6. Chinese Demographics 2010-2030. (After <sup>239</sup>)

Chinese Demographics 2010-2030			
	2010	2030	Percent Change
Population	1341335000	1432149485	6.77%
Birth Rate <sup>240</sup>	13	9	-30.77%
Fertility Rate <sup>241</sup>	1.64	1.64	0.00%
Death rate <sup>242</sup>	7	10	42.86%
Annual Pop. Growth	0.5	-0.18	-136.00%
Dependency Ratio <sup>243</sup>	38	46	20.42%
Life expectancy <sup>244</sup>	73	78	6.85%
Median Age <sup>245</sup>	34.5	42.1	22.03%
Transition Cycle Stage	4	5	

<sup>238</sup> Nicholas Eberstadt, "China's Future and its One-Child Policy," *American Enterprise for Public Policy Research* 30 (September 2007, 2007), 3.

<sup>239</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>240</sup> Births per thousand population.

<sup>241</sup> Births per woman in her lifetime.

<sup>242</sup> Deaths per thousand population.

<sup>243</sup> Ratio of dependents (ages 0-14 and 65+) to potential laborers (aged 15-64).

<sup>244</sup> Expected age for a child to attain if born that year.

<sup>245</sup> Age of which half of the population is older and half of the population is younger than.

The second significant demographic change China will experience between 2010 and 2030 is the reversal of an estimated 50 years of a decreasing dependency ratio. China's dependency ratio has been falling since the end of the Great Leap Forward. The dependency ratio's peak occurred between 1960 and 1965, at around 78.4 dependents for every 100 potential laborers and has been decreasing ever since. Estimates currently project China's dependency ratio to begin climbing after bottoming out around 38 dependents for every hundred potential laborers between 2015 and 2020. The dependency ratio is projected to continue increasing for numerous generations afterward, reaching 82.3 dependents per 100 laborers in 2100.<sup>246</sup> As seen in Figure 14, the dependency ratio will become slanted to the retiring and near retiring elderly population, those who had been born in the post-Great Leap Forward baby boom and before the announcement of the One-Child Policy.

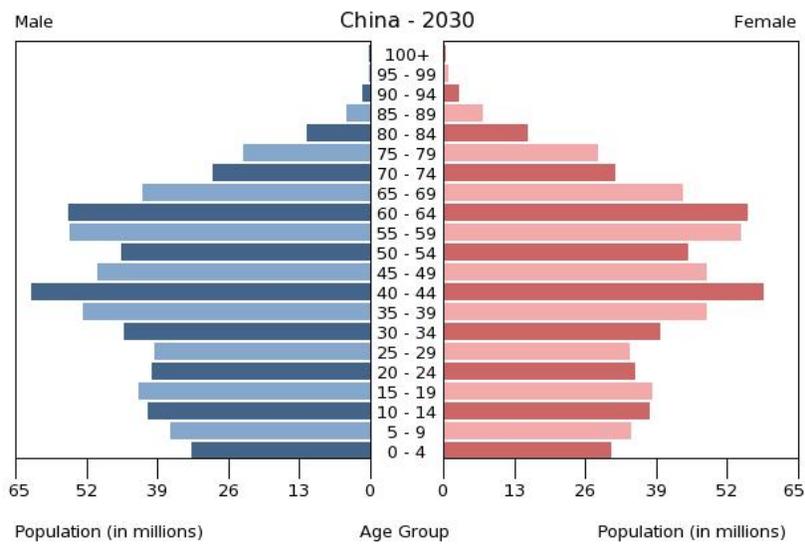


Figure 14. 2030 China Population Pyramid. (From <sup>247</sup>)

Should there be a change in the One-Child Policy, resulting in an increased birth rate, in the near future, much like transition to post-transition stage, projections of the dependency ratio would be affected greatly. Changes in the birth rate would cause the

<sup>246</sup> Ibid.

<sup>247</sup> United States Census Bureau, *International Programs - Regions Summary - U.S. Census Bureau*.

increase in the dependency ratio to occur at a quicker rate but potentially for a shorter duration. Adding children would of course be adding dependents, for a fifteen to twenty year period, who would then go on to become laborers. For that fifteen to twenty year period there would be an increased strain on resources but the light at the end of the tunnel would come more quickly once those children entered the labor force.

The third significant demographic change is the continued aging of China's population. China's population will continue to age at a rate of about four years every ten from 2010 to 2030.<sup>248</sup> Many of the problems associated with an aging population are similar to and overlap with the previous two demographic changes, however the significance of China's rapid aging can be illustrated in magnitude and comparison to other nations. The magnitude of China's aging is grasped in the fact that the only part of China's "population that stands to increase in size between now and 2030 is the over-fifty-year-old group," while the sixty-five plus population will more than double in size from 100 million in 2005 to over 235 million in 2030.<sup>249</sup> By comparison, China will be an older society than the United States by 2030 and Japan, which had reached a median age of 41 years old around 2000, while being "far more affluent than the most sanguine of optimist imagine China might be by 2030."<sup>250</sup>

Modification of the One-Child Policy, resulting in an increased birth rate, would directly affect the aging of China's population. Any added youth to China's demography would slow the aging of the population.

#### **D. ECONOMIC IMPLICATIONS**

The economic implications of China's demographic transition to the fifth stage of the demographic transition model are three fold. First, there is the potential of exhausting the labor pool forcing wages to increase in response to the shortage in the labor supply. Next, the quality of labor within the labor pool will change, particularly due to the

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<sup>248</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>249</sup> Eberstadt, *China's Future and its One-Child Policy*, 3.

<sup>250</sup> Ibid.

decreasing number of entrants into that group. Last, there is the question of the retirement system, or lack thereof, for the post-Great Leap Forward baby boomers.

It is difficult to imagine a population of over one billion having difficulty finding enough people to employ, but that situation could become a reality in the near future. Because demographic shifts directly affect the supply of labor, predictions put the expected end to China's era of a growing labor pool to land between 2013 and 2015.<sup>251</sup> Barry Naughton projects China's working-age population to decrease annually by 0.1 percent from 2015 to 2020, peaking at 0.8 percent from 2035 to 2040 and 0.6 percent from 2045-2050.<sup>252</sup>

As the labor pool begins to contract, the search for employment and employees will become an exercise in the law of supply and demand. This limitation on the supply of labor, with a constant, if not increasing, demand will increase wages raising "the question of whether China's low-cost advantage may disappear and threaten its export competitiveness".<sup>253</sup> This increase in wages and decrease in export competitiveness would then put China's economic model in question if domestic consumption is not able to increase. Domestic consumption may very well increase with the transition of laborers to retirees, if the retirees have accumulated enough capital; allowing China to capitalize on the second demographic dividend. Nevertheless, this is unlikely due to Japan's difficulty in capitalizing on this dividend, averaging annual GDP growth of just below one percent since 2000,<sup>254</sup> with a much wealthier population.<sup>255</sup>

The next economic implication is derived from the quality of China's labor supply over the next twenty years. The quality of laborers within China greatly changed since the One-Child Policy with the working-age population expanding over fifty-five percent

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251 Eberstadt, *China's Future and its One-Child Policy*, 3; Feng, *China's Population Destiny*, 247.

252 Naughton, *The Chinese Economy*, 175.

253 Albert Park, Fang Cai and Yang Du, "Can China Meet its Employment Challenges?" in *Growing Pains: Tensions and Opportunity in China's Transformation*, eds. Jean Oi, Scott Rozelle and Xueguang Zhou, 1st ed., Vol. 1 (Stanford: The Walter H. Shorenstein Asia-Pacific Research Center, 2010), 27.

254 World Bank, *Gross Domestic Product 2010*.

255 Eberstadt, *China's Future and its One-Child Policy*, 2.

from 1980 to 2005 with the education level and technical expertise increasing likewise. Over the next twenty years, China's fifteen to twenty-four year old group will decrease in absolute size.<sup>256</sup> This youngest echelon of the working class is the part of the labor force with "the best health, the highest levels of education, the most up-to-date technical skills- and thus the greatest potential to contribute to productivity."<sup>257</sup> This decrease will likely be felt the greatest in the need for innovation to maintain global competition, creating an environment that is far less than ideal "if one is aiming to maintain rapid rates of economic growth."<sup>258</sup> In particular, as diminishing returns to capital set in, the only way a country can continue to grow at a reasonable rate is through increases in total factor productivity, of which innovation is a crucial component.

The quality of laborers will also change in the way they view family. China is considered a low-trust society, with a lack in confidence in laws and official institutions.<sup>259</sup> Familial ties are used to create the informal relationships required to do business in such a society, and China is no exception. However, since the inception of the One-Child Policy, the availability of familial ties has been diminishing and will continue to do so as millions of families represent the 4-2-1 family concept.<sup>260</sup> The 4-2-1 family concept represents a family of four grandparents, two parents, and one child. This construct is the result of at least two generations under the One-Child Policy. The persons raised within this construct have no siblings, cousins, aunts, or uncles; "their only blood relatives will be their ancestors," removing the key familial element of traditional Chinese business.<sup>261</sup> While the exact impact this will have on Chinese economics are unknown, it will force a change from how things have traditionally been done.

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256 Eberstadt, *China's Future and its One-Child Policy*, 2.

257 Nicholas Eberstadt, "China's Family Planning Goes Awry," *Far Eastern Economic Review* 172, no. 10 (Dec 2009, 2009), 25.

258 Eberstadt, *China's Family Planning Goes Awry*, 26.

259 *Ibid.*, 29.

260 *Ibid.*, 29.

261 *Ibid.*, 29; Eberstadt, *China's Future and its One-Child Policy*, 3.

A third economic challenge brought about by China's demographic transition is the question of caring for the rapidly growing elderly population. The magnitude of this requirement is shown in the projected absolute growth of the 65-plus age group population from the current 110 million to over 280 million by 2035.<sup>262</sup> In dependency terms, this growth is from 10.7 elderly per hundred potential laborers today to 30.3 in 2035.<sup>263</sup> Childbirth, particularly of male children, has constituted the traditional Chinese retirement system. This is still the case for the majority of China, particularly for the rural elderly.<sup>264</sup> As longevity increases and China's enters its third generation under the One-Child Policy, the role of caring for parents, particularly in the development of 4-2-1 families, becomes even more burdensome as the sole provider for six ancestors.

Recent efforts to develop a modern social security system within China have had many setbacks and are far from sufficient. Barry Naughton describes China's social security system as "very much a work in progress," and it will remain as such until many different issues are addressed.<sup>265</sup> Some of these issues include, incorporation into budgetary figures, government payments for solvency, scandals, local government efforts of redistribution to other funds, and inability to make timely payments to recipients. As China's transition continues, the strain on this currently under-developed system will only increase. The need for this system is obvious when one considers that in two decades, taking in the success of the One-Child Policy, roughly a third of China's women entering their sixties will have no living son and therefore no recourse to the traditional retirement system.<sup>266</sup>

## **E. CONCLUSION**

In conclusion, China's demographic transition will create great difficulty in continuing the scale of the economic development seen over the last thirty years. This

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<sup>262</sup> Eberstadt, *China's Family Planning Goes Awry*, 26.

<sup>263</sup> United Nations Department of Economic and Social Affairs, *United Nations Department of Economic and Social Affairs - Population Division*.

<sup>264</sup> Li et al., *Gender, Migration, and the Well-being of the Elderly in Rural China*, 71.

<sup>265</sup> Naughton, *The Chinese Economy*, 205.

<sup>266</sup> Eberstadt, *China's Future and its One-Child Policy*, 2.

difficulty will be experienced through the costs of the demographic detour, which began during the Great Leap Forward and was then magnified through the birth limiting campaigns up to and including the One-Child Policy. While the skewing of the dependency ratio over the last thirty years resulted in significant contributions to China's economic development, this skewing has reached a limit where the unborn laborers will present a strain on development. This strain will be present in the form of a shrinking and rapidly aging labor pool resulting in a decrease in innovation and productivity as well as an overhaul to thousands of years of tradition of doing business through familial ties. This will all be culminated in the testing of an already failing pension system as China experiences the transition from the demographic stage of a slowly growing population to post-transition.

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