DEMOGRAPHIC DIVIDEND AND PROSPECTS FOR ECONOMIC DEVELOPMENT IN CHINA

Feng Wang, University of California, Irvine
and
Andrew Mason, University of Hawaii at Manoa and
Population and Health Studies, East-West Center

During the last 25 years, the People's Republic of China has undergone demographic as well as economic changes of historic proportions. Demographically, China has transformed itself from a "demographic transitional" society, where reductions in mortality led to rapid population growth and subsequent reductions in fertility led to a slower population growth, to a "post-transitional" society, where life expectancy has reached new heights, fertility has declined to below-replacement level, and rapid population ageing is on the horizon. In the not-too-distant future—in a matter of a few decades—China's population will start to shrink, an unprecedented demographic turn in Chinese history in the absence of major wars, epidemics or famines. In this process, China will also lose its position as the most populous country in the world.

Economically, China has completed its transition from a socialist, centrally-planned economy to a market-based economy. From a socialist economy that was closed to the outside world and plagued by low efficiency and stagnation, China has become, in the last two decades, one of the most dynamic and fast- growing economies in the world. In less than twenty years' time, between 1982 and 2000, China's real GDP per capita, as adjusted for purchasing power parity (PPP adjusted), quadrupled – a record unmatched elsewhere in the world.[1]

At the start of these historical transformations, China's leaders adopted the improvement of the standard of living of the Chinese population as its new political mandate and the basis for political legitimacy. They accordingly formulated two basic national policies: (i) developing the economy and (ii) controlling population growth. The Government of the People's Republic of China announced its one-child-per-couple policy in 1980, an unprecedented act of governmental intervention in population. Such an extreme policy came about even though the fertility level in China had already more than halved during the previous decade, and was already at a level not much above the replacement level (Lee and Wang, 1999; Wang, 2005).

The rationale for China's one-child policy was a neo-Malthusian perspective on the relationship between population and development—a view largely dismissed by mainstream economists. While the architects of China's population policy could argue that the country's remarkable post-reform economic record presents an evidence of the success of the policy, this assertion could be questioned on two grounds. The first is the extent to which the transition to low fertility was accelerated by the one-child policy (Wang, 2005). The second, which is considered in this paper, is the extent to which the decline in fertility, the slowdown in population growth, and the changes in age structur ibuhe i

with a relative increase in the population of the labour fo

Figure 1. Population age structure in China, 1982, 2000 and 2030
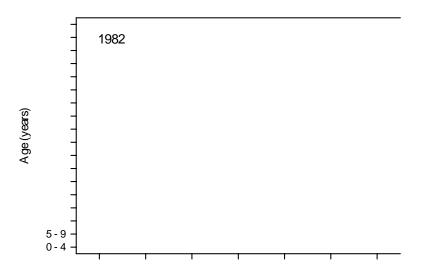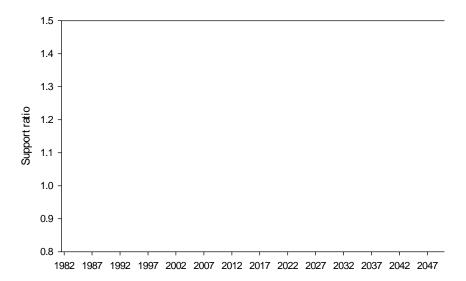
1982

Age (years)

5 - 9
0 - 4

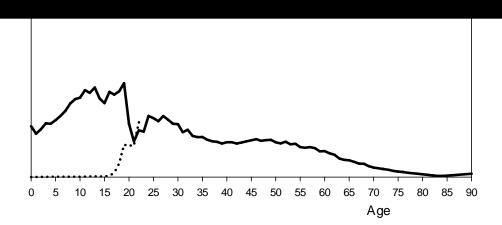**Figure 3. Estimated first demographic dividend in China, 1982-2050**

experienced rapid growth in their support ratios primarily because of the baby boom in the 1940s and 1950s, but many, as illustrated by the experience of France and the United States, are now in a period of decline (table 1).

In China and elsewhere, the first dividend is a persistent but ultimately a transitory phenomenon. In China, output per capita is projected to be higher by about 10 per cent in 2050 than in 1982 due to the first dividend. If the projection were extended further into the future, the net effect would be smaller. The contribution to annual growth in output per worker during the roughly seven decades tracked is negligible. However, output per capita is substantially elevated over the demographic transition. This is an event of considerable economic significance during the era of the transition. Moreover, the first dividend can have long-lasting effects if the increased income is re-invested in the form of physical or

C. POPULATION AGEING AND THE SECOND DIVIDEND

As shown above, China's rapid fertility decline in the 1970s has brought to the country a substantial

Two inter-age flows—from workers to children and from workers to the elderly—are summarized by the arrows shown in figure 5. The foot of the arrow in each of the panels in figure 5 is located at the mean age of the outflow from workers and the head of the arrow is at the mean age of the inflow to recipients. For the 1982 panel, for example, the mean age of the outflow from workers to children is 37 years while the mean age of the inflow to children is 9 years. The width of the arrow is the per capita reallocation. Given the assumption of golden rule, steady state growth, the area of each arrow is equal to aggregate life-cycle wealth that must be maintained to support each age reallocation (see Lee, 1994 and Lee, 2000 for an explanation). In the case of downward flows, that is, flows from older to younger-age groups, the life-cycle wealth is negative. It is negative because those who are alive are obligated to make transfers to those who have not yet been born. The obligation is not a legal one. Rather, it is a social obligation to provide support to the next generations of children. The actual level of that support is unknown but, under the simplified assumptions followed here, children are supported at the same level relative to adults in the future, as has been the practice in the past.

The effects of age structure on life-cycle wealth are quite pronounced (table 2). In 1982, transfers are strongly downward from workers to children and total life-cycle wealth is more than nine times total labour income and negative. As population ageing proceeds, flows to children decline and are surpassed by flows to the elderly. By 2050, steady state life-cycle wealth will be 2.6 times labour income. Steady-state life-cycle wealth required to support consumption by the elderly will rise to 7.1 times labour income. The important implication of table 2 is that population ageing in China must lead to rapid growth in the capital stock, to an enormous expansion of public or familial-based transfer programme, or a significant decline in the living standards of the elderly.

The magnitude of the second demographic dividend depends on the particular mechanisms used to reallocate resources. Economic reform adds complexity to the picture in China because the institutions and mechanisms used to achieve reallocations are a fundamental feature of reform. Resources can be reallocated from surplus ages to deficit ages in different forms and relying on different institutions (table 3). In China's post-reform economy, three forms became available: capital, transfers and credit. Capital can be accumulated at surplus ages; later, at deficit ages, it yields capital income and can be liquidated. An important point to note is that capital held by individuals can only be used to reallocate resources from younger to older ages. Secondly, those in deficit ages can rely on current transfers from those in surplus ages. Thirdly, individuals can rely on credit markets. Those at surplus ages can lend to children, relying on loan repayments later in life when they are at deficit ages. Credit markets play a small role in inter-age reallocation systems, however, because of constraints on indebtedness.[5]

TABLE 2. LIFE-CYCLE WEALTH IN CHINA
1982, 2000 AND 2050

	1982	2000	2050
Mean age of consumption	28.0	32.5	44.4
Mean age of production	37.3	37.8	41.8
Ratio of life-cycle wealth to labour income			
Total	-9.2	-5.3	2.6
Support of child dependants	-11.2	-7.8	-4.5
Support of elderly dependants	2.0	2.5	7.1

TABLE 3. REALLOCATION SYSTEM

	Institution		
Form	Family	Market	State
Capital	Housing Consumer durables Education	Factories Inventories Farms	Public infrastructure State owned enterprises Funded pension plans
Transfers	Childrearing costs Support of elderly Bequests	Public debt	Public education Public health care Unfunded pension plans
Credit	Familial loans	Consumer credit	Student loans

Source: Adapted from Lee (1994).

In a market economy, three institutions are involved in reallocations. In many societies, the *family* is the principal institution responsible for reallocating resources across age groups, and in virtually all societies, families dominate reallocations to children. Two other institutions, the *market* and the *State*, vary in their importance depending on the economic system. In pre-reform China, market institutions played little or no role and the State played a dominant role. In post-reform China, the emergence of a market economy and the recognition of private property have expanded the mechanisms available for resource reallocations with important economic implications.

Suppose that the reallocation system for the elderly relied entirely on capital throughout the entire history under consideration. Prior to reform, this would assume that the State was implicitly funding pensions by investing in state enterprises. After reform, capital accumulation became a combined responsibility of the family, the market, and the State. A complete assessment of the economic implications of these changes would require a simulation model that could be used to track the complex dynamics involved. However, an indication of the importance of the demographic change can be assessed by using a highly stylized model of the economy that involves steady-state, golden-rule growth. The population is assumed to be in a stable equilibrium, i.e., no changes in the age structure, the saving rate and the ratio of capital to total output is constant, all economic growth arises because of exogenous improvements in the productivity of workers, and the interest rate is equal to the rate of economic growth. Under these conditions, the path of consumption over time is at its maximum in the sense that consumption in no period can be increased without reducing consumption in some other period. Demographic conditions in 1982, under steady-state golden-rule assumptions, would imply a capital-output ratio of 2.0. Demographic conditions in 2050, again under steady-state golden-rule assumptions, imply a capital-output ratio of 7.1. Given simple assumptions, an increase in the capital-output ratio of this magnitude would lead to a doubling of output per worker.[6] The impact on the rate of growth of output per worker depends on the time frame over which capital deepening occurs. Evenly spread over a century, output per worker would have to grow at 0.7 per cent per year. Spread over 50 years, output per worker would grow at 1.4 per cent per year as a result of capital deepening.[7] Such a dividend, if materialized, is by no means trivial. It has roughly the same magnitude as the first demographic dividend China reaped in 1982 - 2000, when China experienced its historically fastest growth in per capita income.

These calculations are suggestive, and there are many complexities that are not addressed. One is that, in pre-reform China, a large portion of life-cycle wealth, perhaps all, was held as transfer wealth rather than as capital. Life-cycle wealth represented the pension obligations or the implicit debt of future generations as embodied in the State and its organs, e.g., state-owned enterprise. To an unknown extent, economic reform destroyed that life-cycle wealth.

A continuing issue in China will be through what mechanisms and to what extent life-cycle wealth should be replenished. Transfer wealth will necessarily play a major role, because the greatest obligations are to those who are near or who have already reached retirement. For them, accumulating capital is not

an option, only transfer wealth. The question then is the extent to which pension obligations are absorbed by the State (taxpayers), shifted to private firms as well as state-owned enterprises (SOEs) that are privatized or shifted to families.

A second complication for China is separating the transitional issues associated with economic reform from the ongoing issues that arise with population ageing. Establishing a large-scale pay-as-you-go (PAYGO) pension system would most readily meet the short-term objective of fulfilling obligations to current pensioners. Such a strategy, however, could commit China to a path that foregoes the second demographic dividend.

Direct econometric support for the existence of a second demographic dividend comes in the form of studies of the effect of demographic factors on aggregate saving. Saving rates must rise above their equilibrium level to produce an increase in the capital-output ratio. There is no doubt in East Asia that aggregate saving rates are well above equilibrium, but there are many competing hypotheses about why saving rates are so high in East Asian economies. A number of studies have found evidence to support the view that saving rates have been influenced by changes in age structure (Mason,1987; Mason, 1988; Kelley and Schmidt, 1996; Higgins and Williamson, 1997; Deaton and Paxson, 2000) and life expectancy (Bloom and others, 2003; Kinugasa, 2004). The magnitudes of estimated effects are sensitive to the methods and data employed.

D. CONCLUDING REMARKS

The available evidence supports the conclusion that the demographic transition has led to more rapid growth in output per capita in many East Asian countries where the demographic transition has been especially rapid. China has clearly enjoyed significant gains in output per effective consumer as a result of the first dividend. Whether or not China will enjoy a second dividend remains to be seen. Demographic change offers an opportunity for significantly more rapid economic growth, but only if the policy environment is supportive. It would be a serious error, however, to reach any welfare conclusions about demographic change in general, and fertility decline in particular. Two reasons for this are particularly important to emphasize. The first is that capital deepening is achieved by foregone consumption. The resulting growth in output per worker is not without any opportunity cost, but comes at the expense of reduced material standards of living among those who are saving at such high levels. The second point is that rapid fertility decline in China may have involved an enormous sacrifice on the part of parents that are forced to have a single child. It is unknown how many children would have been born in the absence of the one-child policy or how to value the costs imposed by the loss of reproductive freedom.

In many ways, China has always been a demographic early-achiever. Its mortality declined early and

with it a second demographic dividend, such an event depends heavily on the right institutional environment. State-enforced fertility decline has also resulted in the deterioration of the accuracy of the collection system for birth statistics. This has caused a sustained and sharp increase in the sex ratio at birth and in excess female mortality at young ages and has forcefully altered the kinship structure for many Chinese families. These social costs are not only severe but are also long lasting.

Moreover, the general assessments of the economic impact of changing demographics in China conceal important sub-national variation. China's economic growth in the last two and one-half decades has been highly uneven geographically, with most of the growth concentrated in its cities and coastal areas. China's rapid ageing process will also take place unevenly across the country, due to the State's differential birth control policies in the past. Assuming current fertility and a moderate improvement in mortality, China's urban population in twenty years' time will be as old as that of Japan or Italy today, with one-fifth of the population having the age of 65 or over. In contrast, China's rural population will not reach this level of ageing until the middle of the twenty-first century. The extent to which the Chinese economy will be able to benefit from the capital accumulation associated with an ageing population depends not only on the institutional forms of resource allocation, but also on the allocation and utilization of such sources among its citizens.

————————————

NOTES

[1] China's best record prior to the current growth period was between 1952 and 1972, when its economy grew by 64 per cent per decade, a record far below the recent one. Comparable fast-growing periods in other countries are: Germany during 1880 and 1914, with a 33 per cent per decade; Japan between 1874 and 1929, with 43 per cent per decade; and the Soviet Union between 1928 and 1958, 54 per cent per decade (Meisner 1999, 417- 418).

[2] The production and consumption values in figure 2 are estimated from the 2000 Urban Family Income and Expenditure Survey for China. Both profiles are normalized to aggregate to 100. Production is an estimate of the economic value of labor based on reported earnings and self-employment income. Consumption is based on detailed information on family expenditure on food, clothing, housing, entertainment, recreation, transportation and communication, etc. Housing consumption includes the imputed value of owner-occupied housing. The methods employed are comparable to those used in Mason (2005) and described in more detail in Lee and Mason (2005).

[3] The effective number of producers is measured using the age-profile of productivity shown in figure 2 to weight the population. The effective number of consumers uses the age-profile of consumers. Rural profiles are not currently available.

[4] For a detailed discussion of the theoretical underpinnings of intergenerational transfers see Lee (1994).

[5] Credit could, in theory, play an important role if children financed their own consumption by borrowing from adults with a lifecycle surplus. The debt would be repaid

[7] See Lee, Mason, and Miller (2003) for a dynamic simulation analysis of Taiwan Province of China. The simulated transition from a low to a high capital-intensive economy required closer to fifty than to 100 years.

_____

REFERENCES

Ashton, B., and others (1984). Famine in China, 1958-61.

Lee, Ronald (1994). The formal demography of population aging, transfers, and the economic life cycle. In *Demography of Aging*. L. G. Martin and S. H. Preston, eds. Washington, D.C.: National Academy Press, pp. 8-49.

_____ (2000). Intergenerational transfers and the economic life cycle: A cross-cultural perspective. In *Sharing the Wea*