Pacific Economic Cooperation Council

Pacific Economic Outlook: Structure 2007 – Aging and Economic Growth Potentials in the Pacific Region
Background Papers

CHINESE TAIPEI

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1. INTRODUCTION

In the past 50 years, Chinese Taipei has transformed from an agricultural economy to a service economy. The process of industrialisation and urbanisation has changed the dynamics of family structure in Chinese Taipei, shifting its demographic to younger and smaller families. At the same time, the economic development has also improved the standard of living in Chinese Taipei. Life expectancy increases along with the advance in medical and welfare system, but the improved quality of life is not without its woes. As people live better and grow older, the society also grew older. An aging population has profound impact on any economy, not least in Chinese Taipei. The increased life expectancy in Chinese Taipei has presented a new set of challenges to its economy.

While Chinese Taipei has managed to obtain its wealth at a relative short pace of time, this has also made it less equipped and allows it less time to deal with the challenges that an aging society brings. As the society grows older, the ratio of working population decreases and the overall productivity diminishes, adding fiscal and welfare constraints to the future generation. The Chinese Taipei Government will need to re-examine the needs of its aging population as well as the economic potential of the silver industry in order to better cope with the challenges it faces and the adverse impact this demographic change will have on its economy.

1.1 POPULATION DYNAMICS

By the United Nation definition, Chinese Taipei has become an aged society since 1993 with the percentage of elderly population (age 65 and above) reaching over 7 percent, or 1.48 millions of its total population.[1] This trend is likely to continue. Using the Council for Economic Planning and Development (CEPD) of the Executive Yuan estimates, by 2026, percentage of age 65 and above in Chinese Taipei will have reached over one fifth of its total population and by 2050, over a third of the population in Chinese Taipei will be senior citizens (Figure 1).
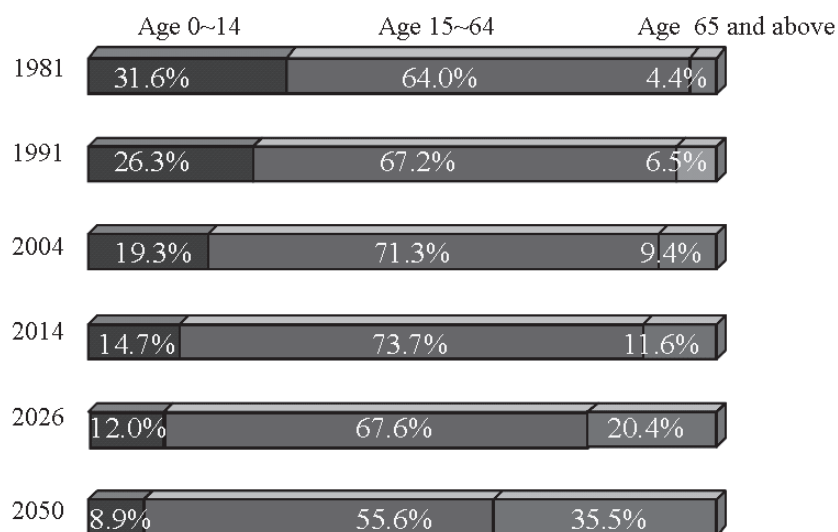
An aging society is a result of demographic changes. While it took some 150 years for economies in the west to complete the transition, it took Chinese Taipei in less than half that time.[2] This also presents a challenge for Chinese Taipei in that it will has to cope with the changes, fiscal and social, at a much faster pace. At present, the ratio of working population to senior citizen is 7.6 to one in Chinese Taipei. Using the 2004 CEPD estimates, this figure will be reduced to 2.7 workers to one senior citizen in 2026 and by 2050, the ratio will be further reduced to 1.6 workers to one senior citizen. The social and economic implications of these deserve closer scrutiny.

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[1] Department of Statistics, Ministry of the Interior, Chinese Taipei

[2] Chen M, "Macroeconomic Impact of an Aging Society to the Domestic Economy and Measures Forward " , Taiwan Economic Research Monthly, volume 27, Part 11, 21-29

Figure 1. Age distribution forecast for Chinese Taipei (Mean)

	Age 0~14	Age 15~64	Age 65 and above
1981	31.6%	64.0%	4.4%
1991	26.3%	67.2%	6.5%
2004	19.3%	71.3%	9.4%
2014	14.7%	73.7%	11.6%
2026	12.0%	67.6%	20.4%
2050	8.9%	55.6%	35.5%

Source: Council for Economic Planning and Development (CEPD) of the Executive Yuan, Chinese Taipei

For Chinese Taipei, the time it took to doubled the percentage of elderly population, from 10 percent to 20 percent took merely 21 years, which is considerably shorter than the 24 years it took for Japan, 48 years for Finland, 54 years for Germany, 61 years for Demark and 85 years for Sweden. This sudden increase in the elderly population translates to increased burden for the next generation, both in fiscal and in social terms. The pace to which Chinese Taipei is moving does not allow the economy sufficient time to cater for its demographic change. An aging population has profound impact on any national economy and Chinese Taipei is no different. As productivity diminishes, the fiscal and welfare burden on the younger generation increases. Chinese Taipei ages at an unsustainable speed with little safety net in place, which will have adverse impact on the future of its economy.
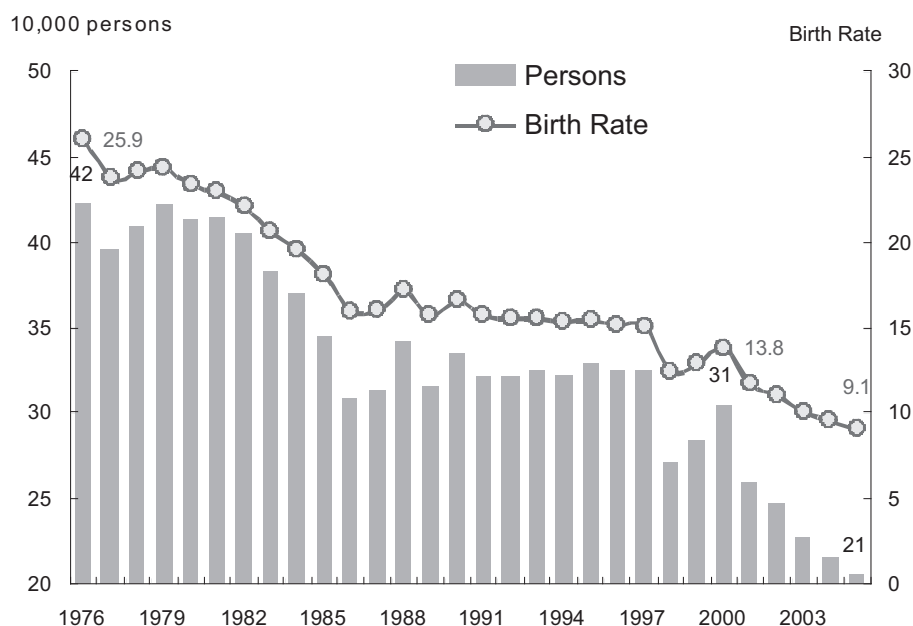
1.2 FERTILITY RATE

According to the Department of Statistics, Ministry of Interior, fertility rate in Chinese Taipei has declined from the high of 5.51 children per married couple in 1961 to just 1.12 children per couple in 2005, and the trend continues (Figure 2). Reasons behind the declining birth rate can be many folds. The change in both the family structure and size can be accounted for some of the changes. Increased women participation in the labour market can be another reason. As career became a realistic option for women, the traditional role of women is also changing. Baring children are no longer the only option for women and birth rate might have dwindled as a result.

The need for better qualified workforce has meant that the working population tend to enter the workforce at a much later age. This often has a knock on effect to the marriage age and the age of giving first birth (Table 1). The average age for giving first birth has increased by three years in twenty years (from 1981 to 2001) while the total birth rate has declined from 2.455 children per couple to just over 1.2

children per couple in 2005. There is a direct correlation between delay marriage and declined fertility rate.

Figure 2. Declining fertility rate in Chinese Taipei

People are postponing bearing children until at later age. The globalisation and coming age of knowledge economy has meant that workforce will need to be more specialised and be better trained. This also means that workforce in Chinese Taipei are now entering the job market at a much older age (Table 2). As the workplace grew to be ever more competitive, career has become the priority for many. Moreover, gender equality remained an issue to be resolved in Chinese Taipei. In order not to be discriminated in the workplace and bypass for promotion, many women also choose to start a family at a later age when they are more established in the workplace. It does seem for many that career and family are not necessarily compatible. As a result of aforementioned reasons, birth rate declines further.

Table 1. Married women by age

Year	15-34 1st. Marriage (10,000)	Age of 1st Marriage	Percentage of Married Women by Age(%)				
			15-19	20-24	25-29	30-34	35-39
1981	16.2	24.0	4.8	39.4	78.5	89.3	92.4
1991	14.7	26.0	2.4	24.5	65.1	82.8	86.1
2001	10.8	26.4	1.5	13.9	47.0	72.0	79.1
2003	11.0	27.2	1.1	11.3	41.5	68.5	76.8

Table 2. Fertility rates of childbearing age women

Year	Average age for giving 1st birth	Share (%)			Total Birth Rate
		1st Child	2nd Child	3rd Child + above	
1981	23.2	37.5	31.4	31.1	2.455
1991	24.9	42.2	36.5	21.3	1.720
2001	26.2	49.8	35.3	14.9	1.400
2003	26.7	51.3	36.6	12.1	1.235

Source: Department of Statistics, Ministry of Interior, Chinese Taipei

2. ECONOMIC IMPACTS ON GROWTH POTENTIAL

An aging society presents different challenges depending on which state of economic development that an economy is in. While for the developed economies, an aging society presents challenges to employment and retirement funds, developing economies faced a different set of challenges. Impacts of an aging population on economic growth can be many folds. One of the most immediate impacts of an aging population to economic growth is the increasing fiscal burden on public expenditures. The aging population will change the fiscal structure of government income and expenditure. As the percentage of a population that draws on pension increases and national contributions to welfare decreases, balancing its outgoing becomes government's immediate concern. Compounded by the diminishing productivity and flattening economic growth, the downward spinal worsens for Chinese Taipei.

The combination of the aging and migration of the working population creates long-term labour supply disequilibrium for Chinese Taipei. The knowledge divide between haves and have-nots furthers the income distribution gap, which ultimately leads to an unstable economic structure.

2.1 LABOUR SUPPLY

Not enough of labour force is being created in Chinese Taipei given the current demographic change, and as a result, guest workers are needed to make up the shortfall. The shrinking of labour force also decreases productivity. Unless there are technology advances that enable increase in output and employ the same or smaller labour force, total productivity growth will moderate.

According to the Ministry of Interior statistics, retirement as a reason to leave the labour market has been stable since 2001, fluctuating between 4.3 percent and 4.6 percent. It is important noting here that formal retirement does not mean the person is no longer participating in the labour market. Indeed, many retired workers remained active in the employment market. Still, not enough labour is being created and as a result, guest workers are needed to make up the shortfall. With an annual growth rate of nearly 4 percent since 1997, the number of foreign workers in Chinese Taipei has reached over 320,000 persons in 2005. Immigrant workers are

expected to make up more than a fifth of the total workforce if the current trend continues. The combination of the aging and migration of the working population creates long-term labour supply disequilibrium for Chinese Taipei.

2.2 SAVING (CAPITAL SUPPLY)

Private saving rate in Chinese Taipei has been among the highest in the world. However, the trend is changing. The decline in fertility rate and the speed of population aging far exceeds the expectation of the Chinese Taipei Government. The irony is, as fertility declines, young family should be able to save more. However, this effect is offset by the increase in elderly dependents in the household. In the 1980's, the percentage of young dependent to working age population (age between 15 and 64) was 50.43 percent of the total population. The elderly dependency rate (age 65 as a percentage of age between 15 and 64) was 6.73 percent. Together, the dependents make up some 57.16 percent of the total population. By 1990, the young dependent to working age population has declined to 40.57 percent of the total population and the elderly dependency rate has increased to 9.31 percent. Total dependents as a percentage to total working population were 49.88 percent. By 2003, the percentage of young dependent to working population has dropped further to 27.95 percent whereas the elderly dependent to the working population has increased to 13 percent. But the trend is reverting. The dependency rate now is at its lowest point in the past two decades. According to the CEPD forecast, by year 2051, the young dependency to working age population ratio will have dropped to 10.85 percent, but the elderly dependency rate would have increased to 71.49 percent. The dependency rate will have double the current figure to 82.34 percent, or about 1.4 working person to an elderly dependent.

Even though the decline in saving can be partly explained by the decline in fertility rate in that as fertility rate declines, the incentive to increase capital accumulation for the next generation diminishes. At the same time, the need to increase saving to cater for retirement should increase savings, but this is not observed in Chinese Taipei. The total saving rate has been on the decline for over two decades, which can be explained by other economic reasons. The sharp increase in unemployment rate since year 2000 has reduced capital supply. The dot com bubble and the global economic downturn in 2001 have resulted in financial market downturn. As investors' confidence dwindled, private investments in Chinese Taipei contracted further. In regard to private saving, Chinese Taipei rate of household saving has declined, from the high of over 38 percent saving per GDP in 1987 to just over 21 percent of the GDP by 2005. Chinese Taipei now has the lowest saving rate among its East Asian neighbours.

In the public sector, savings to GDP ratio for the Chinese Taipei Government was 7.76 percent in 1989, just over NTD 305.5 billions. But as welfare expenditure increases and fiscal income decreases, Chinese Taipei Government has been facing budget deficit rather than surplus in recent years. Chinese Taipei Government's attempt to appeal to voters by increasing welfare spending, particularly for the retired, has further deteriorated the Government's fiscal position. A number of events have further worsened the Chinese Taipei Government's fiscal position. The Severe Acute Respiratory Disease (SARS) in 2003 has brought the economic activity in Chinese Taipei to a standstill. In an attempt to revive the domestic economy, the Chinese Taipei Government has initiated a series of public spending packages.

The increased in unemployment rate has further decreased Government revenue and increased spending for unemployment insurance. The result was a worsening fiscal position for the Government, with public saving in negative growth for 2004 and 2005 with -3.97 percent and -2.78 percent respectively.

For the business sector, both public and private business savings have been on the decline despite increase in GDP. The public enterprises have been through a wave of privatisation and as a result, their investment and saving have both declined. Since the Chinese Taipei Government has reduced the limitation on capital movements in the 1970s, the shortage of domestic investment could be substituted by foreign savings. In other words, the free capital movement exhibited in Chinese Taipei produced no co-integration relationship between saving rates and investment rates. The Private enterprises' investment and saving decision has more to do with the international business cycle. The relation between saving and investment is unclear with little evidence to support the presence of Feldstein - Horioka Effect for Chinese Taipei. The high saving rate has not been reflected in domestic investment(Table 3).

Table 3. Feldstein - Horioka effect
Dependent Variable: INVESTMENT
Method: Least Squares
Sample: 1983-2003
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.483310	2.779928	1.972465	0.0633
SAVING	0.015574	0.093394	0.166757	0.8693
R-squared	0.001461	Mean dependent var		5.942381
Adjusted R-squared	-0.051093	S.D. dependent var		1.727536
S.E. of regression	1.771118	Akaike info criterion		4.071492
Sum squared resid	59.60035	Schwarz criterion		4.170971
Log likelihood	-40.75067	F-statistic		0.027808
Durbin-Watson stat	0.470396	Prob(F-statistic)		0.869323

Dependency from the elderly has also been on the increase. Decline in saving can be a result of worsening economic development in Chinese Taipei as well as crowding out from the increased in public welfare where saving is perceived as less significant. This also increases economic burden on the average households. Families with at least one person age 65 and above have increased by over 50 percent since 1990, from just over 20 percent of total household in Chinese Taipei in 1990 to 30.7 percent in 2004. In the 1993 census, 58.4 percent of pensioners' income came from their children, the number dropped to 47.13 percent in the 2000 Census. This situation is likely to deteriorate as birth rate declines; there are now fewer children to provide for the elderly. Government intervention is now critical.

The combination of an aging population and declining fertility rate, population decreases will shift aggregate demand curve to the left.

2.3 PRODUCTIVITY

With decline in labour force, diminishing productivity seems inevitable. Even though technology and efficiency gain can potentially offset the decline in labour participation rate, increasing return in efficiency gain will make future productivity gain difficult. Total Factor Productivity study suggest efficiency as growth engine for Chinese Taipei has been on the decline, from the peak of 8.18 for year 1961-1973 to 3.23 for year 1992-2002. Using labour force participation estimates from CEPD, 2004, data suggest that GDP growth will be hampered by the aging population and current 4.5 percent potential GDP[3] estimate from the Chinese Taipei Government appears ambitious.

Production capacity in Chinese Taipei has been moving to China for lower production cost might have more to do with the decline in investment in Chinese Taipei rather than its aging population. According to the CEPD, labour participation rate peaked in 1987 at 60.9 percent. The combination of a decrease in work population growth and increase in higher education participation has made labour participation rate declines. Furthermore, the declining trend is likely to continue.

The working population is likely to increase and peak in 2016, or 17.33 million persons between the age of 15 and 64. By 2026, the working population would have decline to 15.95 million and 10.9 million by 2051. Assuming work participation rate, employment and average added value per worker stays at current level, then it is expected that the GDP will be start to decline by the time when the work population starts to decline.

2.4 GDP GROWTH DECOMPOSITION

Considerable research has investigated the relation between factor of productivity and economic growth for Chinese Taipei; however, findings from the previous research are less than conclusive. 張雅棻・官德星（2005）concluded that the average TFP growth for Chinese Taipei between 1992 and 2002 was 2.16 percent, with K and h averaging 2.89 and -0.40 respectively. 張淑華（1996）finds the TFP played a more significant role for Chinese Taipei during the same period, with TFP growth average 3.23, and 1.77 and -0.49 for K and h respectively. Young's findings (1994) also find capital played a more significant contribution for growth, with TFP, K and h average 2.08, 3.02 and -0.35 growth between 1992 and 2002 respectively.

The Total Factor Productivity Growth Survey Report published by the Asian Productivity Organisation in Japan has produced a national report for Chinese Taipei.[4] In the APO report, the growth accounting method was used to obtain TFP growth, or by subtracting the contributions of capital and labour growth from GDP growth. When the growth accounting method was used to measured TFP growth for the different sample periods and sectors, the average rate of growth for TFP was 2.28 percent for all sectors; 2.93 percent for the industry sector and 1.45 percent for the service sector. The figure also suggests a decreasing trend over the years. The result also showed the lion's share of growth come from capital, followed by TFP growth and lastly, the labour (table 4). The figure obtained in this study is consistent to the findings of other studies.

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[3] 新世紀第二期國家建設計畫總體目標設定，Council for Economic Planning and Development, 2006
[4] http://www.apo-tokyo.org/00e-books/IS-04_TFPGrowth/02_RepChina_TFP.pdf

Table 4. Sources of GDP growth, 1965-99 (%contribution)

Period	Source			
	Q_t^*	$S_k \cdot K_t^*$	$S_l \cdot L_t^*$	TEPG
Industry & service				
1965–70	11.06	3.68 (33.29)	3.68 (33.76)	3.65 (32.95)
1971–80	10.32	5.14 (49.77)	3.08 (29.84)	2.10 (20.38)
1981–90	8.02	4.61 (57.42)	1.68 (20.92)	1.74 (21.66)
1991–99	6.52	3.30 (50.58)	1.07 (16.46)	2.15 (32.96)
Industry				
1965–70	14.39	2.69 (18.69)	4.04 (31.69)	7.14 (49.62)
1971–80	12.11	4.94 (40.76)	4.04 (33.39)	3.13 (25.85)
1981–90	6.71	4.37 (65.15)	1.03 (15.32)	1.31 (19.53)
1991–99	4.96	3.07 (61.87)	0.20 (3.96)	1.69 (34.17)
Service				
1965–70	9.23	5.73 (62.05)	3.27 (35.43)	0.23 (2.52)
1971–80	8.98	5.50 (61.20)	2.24 (24.94)	1.24 (13.86)
1981–90	9.05	5.00 (55.22)	2.30 (25.44)	1.75 (19.34)
1991–99	7.49	3.60 (48.09)	1.72 (22.91)	2.17 (29.00)

Q_t^*, GDP growth rate; S_K, income share of capital; K_t^*, capital growth rate; S_l, income share of labor; L_t^*, labor growth rate; TFPG, TFP growth rate.

Source: Total Factor Productivity Growth Survey Report, Part II – National Reports

According to a study published by Taiwan Institute of Economic Research[5] in 2006, Chinese Taipei could achieve a potential GDP growth of 5 percent per annum for the next decade. In decomposition, capital accumulation and labour activity growth have declined from 61.6 percent between 1996 to 2005 (excluding 2001) to 48 percent between 2006 to 2015, which is similar to the its counterparts in the more advanced economies. In terms of labour input, the TIER Study foresees a change in labour law in Chinese Taipei, which will enable private sector to recruit more professionals from the overseas and therefore, increase labour input despite aging and declining birth rates (Table 5).

[5] 台灣經濟結構的轉型與願景之研究、台灣經濟研究院，2006

Table 5. GDP growth decomposition, TIER study

Contribution to GDP (%)

	1996-2005	Excluding 2001	2006-2015
Labour	0.6	0.7	0.6
Capital	2.4	2.5	1.8
Total factor productivity	1.5	2	2.6
GDP	4.5	5.2	5

Contribution to GDP (Percentage)			
Labour	13.3	13.5	12
Capital	53.3	48.1	36
Total factor productivity	33.4	38.4	52
GDP	100	100	100

The TIER Study suggests a 0.6 percent labour contribution to GDP growth, which is similar to the figure between 1996 and 2005. However, if one assumes no improvement in the regulatory environment and accepts in trend recent development, then the contribution is likely to be lower, at just over 0.18 percent.

It is important to note that the above figure is inconsistent with the official statistics. According to data published by the Directorate of Budget, Accounting and Statistics, total factor productivity is a lot lower than suggested above, at 0.0874 percent.[6] Assuming the state of technology stays constant, or at the level suggested by the TIER Study, the average GDP growth from 2006-2015 will only average 2.5 percent. There is also data inconsistency issue when calibrating data for this study. The Official Statistics have been updated in 2006 to United Nation 93 SNA standard. However, historic data has not been fully updated and data before 2002 are still calculated using United Nation 68 SNA. Therefore, results from the above studies require careful interpretation

Applying the same assumption but incorporate Multiple Factor Productivity into the equation, outlook for Chinese Taipei become more positive. Latest average growth MFP from the past five years excluding 2001 was used for calculation. The average GDP growth for Chinese Taipei from 2007 to 2020 is 3.66 percent (Table 6). Whilst lower than the TIER study, the figure is consistent with the long-term potential growth published by the Council of Economic Planning and Development.

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[6] http://www.stat.gov.tw/public/Attachment/67316155471.doc

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Table 6. GDP growth decomposition with MFP

	MFP	K	L	GDP
2007	2.08	1.49	0.08823599	3.65823599
2008	2.08	1.49	0.08909074	3.65909074
2009	2.08	1.49	0.08993921	3.65993921
2010	2.08	1.49	0.0909385	3.6609385
2011	2.08	1.49	0.09182476	3.66182476
2012	2.08	1.49	0.09250356	3.66250356
2013	2.08	1.49	0.09267952	3.66267952
2014	2.08	1.49	0.09277378	3.66277378
2015	2.08	1.49	0.09291204	3.66291204
2016	2.08	1.49	0.09245957	3.66245957
2017	2.08	1.49	0.09196302	3.66196302
2018	2.08	1.49	0.09131565	3.66131565
2019	2.08	1.49	0.09054259	3.66054259
2020	2.08	1.49	0.08958729	3.65958729

All previous literatures suggest the retired have higher disposable income than their younger counterparts.[7] This adds to the complexity of the research since previous findings on aged society also suggests higher consumption growth with increased disposable income by the retired. Therefore, it can be concluded that an aging population producing little adverse effect to economic growth. However, whilst an aging society does not necessarily equate to reduced income, a shrinking population with reduced labour input does reduce output. At the current rate of demographic development, Chinese Taipei is expected to see a declining labour participation in the market starting in 2016. However, the impact of the reduced labour input is expected to be marginal labour input plays a less significant role. The negative impact of decline work participation is expected to be less than 0.0005 percent per annum.

3. POLICY IMPLICATIONS

Aging and declining birth rate in Chinese Taipei present immense challenge to the Government both economically and socially. Numerous policy measures have been introduced by the Chinese Taipei Government including:

(1) Tax incentive for newborns as a measure to encourage birth-rate;
(2) Improve financial security for the elderly, including the launch of a pension system for the elderly in 2002 in view of the aging needs.

But more needs to be done. A number of issues remained to be solved by the Chinese Taipei Government in order to reduce the social costs that an aging society presents including:

(1) How to adjust and reduce social cost of an aging society?
(2) How to maintain vitality and drive in the society as well as to maintain welfare?
(3) How to ensure the financial independence of the pensioners?
(4) How comprehensive can a social safety net be?

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[7] 莊朝榮「先進國家因應人口老話之對策」台灣經濟研究月刊，27 卷 11 期 49-54

(5) Do the pensioners have to be financially dependent of the working population? Perhaps the concept of 'retirement' will need to be re-examined. Do people really have to retired at the age of 65 when they are most experienced and knowledgeable?

To improve social security for the elderly, the Government will need to reform the current pension scheme in Chinese Taipei and to establish a national contribution system. At present, retired elderly of specific sectors are entitled to a national subsidy. According to the latest national survey, the sectors covered include some 70 percent of the population aged 65 and over. Despite the good intention, the scope covered by the subsidy is too wide and amounts to too little. The subsidy is not enough to meet the expenses of the elderly at present and at the same time, contributes to further financial burdens to the future generations. Therefore, a national pension scheme that will meet the living expenses of the future will need to be in place for the next generation of the retired as well as the current ones.

As the size of labour force declines, more needs to be done to entice both foreign workers and domestic workers alike to stay in the job market. For the foreign workers, they should be able to enjoy the same pension scheme as their counterparts in Chinese Taipei, as prescribed by Article 12 of Old-Age Insurance Convention, the International Labour Organisation (1933). This can be achieved through bilateral or multilateral agreements between the Chinese Taipei Government and host economies of the foreign workers working in Chinese Taipei.

The arbitrary compulsory retirement age of 65 also need to be re-examined. With the advance in medical technology as well as improved overall living standard in Chinese Taipei, physical wellbeing of people over 65 are considerably better than their counterparts of yesteryears. Workers over the age of 65 can still contribute to the economy, mentally and physically, so retirement should be a choice rather than a must.

More incentives need to be introduced as means to increase birth rate. Whilst there is little the Government can do to encourage child birth, the Government can help to produce an environment or workplace that is more conducive to raise a family. Law makers will need to formulate regulations that do not allow prejudice in the workplace and young families are not penalised.

The Chinese Taipei Government will need to device a comprehensive and sustainable care system that will not only improve the long-term care system, but is also financially viable. With the business potentials of the silver industry, the private sectors need to be made aware of these new opportunities so that an aging society can also be a prosperous one.

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