

# I

## **A Dynamic Social Security System in Unison With Demographic and Lifestyle Changes**

**Chiu-Cheng Chang\*, PhD, FSA, FCIA, FAIRC, FSII, CLU, ChFC, MAAA**

**Presented at Retirement Implications of Demographic and  
Family Change Symposium  
Sponsored by the Society of Actuaries**

**San Francisco**

**June 2002**

---

\* Chiu-Cheng Chang is with the Graduate Institute of Management, Chang Gung University, TAO YUAN, TAIWAN, Tel: 886 3 327 5108, Fax: 886 3 327 1304, e-mail: huilin@mail.cgu.edu.tw.

## **Abstract**

This paper describes changes in demographic, family, and lifestyle patterns and anticipated major trends in further changes. Facing these changes, we introduce a dynamic social security system deemed most suitable for accommodating the changes. The details of the operation of the system then are described. All the desirable features of the system also are emphasized. Finally, all the questions as raised in the CALL FOR PAPERS then are answered under the system.

**Old age is Indian country. Uncharted and dark. Even when we have parents still living to provide us with maps, show us over the rising hill, the crest of the road, we don't want to look. Fear, perhaps. Not of death so much as of all the indignities lying in wait for us.**

**Nina Bawden in *Walking Naked***

## **1. Introduction**

The financing of social security programs has been the subject of many studies in social security literature. Much of the debate has focused on the relative advantages and drawbacks of pay-as-you-go and full funding, on the viability of public or occupational pensions as compared to personal saving schemes. In advocating one method of funding over another, many have based their arguments on past experience and projected demographic changes. No system, however, exists in a vacuum, and insufficient attention has been given to the broader international, social, political, cultural, and economic trends that govern the viability and sustainability of a social security system in the future.

Section 2 of this paper reviews the major changes and shifts around the world. Section 3 introduces the dynamic social security system in detail. In section 4, the key characteristics of the dynamic social security system are discussed. Section 5 applies the dynamic social security system to answer all the questions raised in the CALL FOR PAPERS. Finally, we draw our conclusions in Section 6.

## **2. Major Changes and Shifts Around The World**

### **2.1 Changing Population Structure**

Changes in the population structure are determined by changes in fertility, mortality, and international migration, which manifest themselves through increases in longevity. According to the United Nations, the gross reproductive rate (GRR) for the world as a whole was 2.44 between 1950 and 1955, 1.67 between 1985-1990, and is projected to decline to 1.15 in 2020-2025.

Fertility is projected to fall at a faster rate in the less developed areas, with the GRR declining by more than 60 percent over the period, while the rate in the more developed regions is expected to fall by only 33 percent. Mortality rates also have declined. Life expectancy at birth in the developed countries increased from 66.0 years in 1950 to 73.7 years in 1990, while the corresponding increase was from 40.7 to 60.7 years for the less developed regions.

The impact of reduced fertility and mortality is reflected in the changing share of the aged population. In 1950, 5.1 percent of the world's population was aged 65 and over. This proportion is expected to increase to 9.7 percent in the year 2025. While the more developed regions currently exhibit a more severe case of population aging, the less developed countries are projected to have a higher rate of aging. Between 1950 and 1980, the share of the elderly in the total population in the more developed regions rose by 53 percent and is expected to increase a further 53 percent by the year 2025. However, in the less developed regions, while the share of the elderly grew by only 18 percent between 1950 and 1980, it is projected to rise by a staggering 78 percent between 1980 and 2025. The majority of the world's population will be residing in the less developed countries in the 21st century. The rapid rate of population aging has also raised the elderly dependency ratio, which is the ratio of the number of elderly persons to the number of persons in the working age group. The ratios for all the major regions of the world are projected to increase: Asia will have the largest projected increase—77.1 percent in the 1990-2025 period—and Africa the smallest at 16.1 percent.

At the same time, the growth of the share of the working population for all major regions is projected to decrease, with the exception of Africa. In addition, the labor force participation rates of men above and below the normal retirement age have fallen sharply over the last decade. Not only will there be a large population of elderly, there also will be a smaller working population to support it.

These demographic changes will constrain the ability of economies to finance social expenditure. The shares of social security and health expenditures for many industrialized countries show sharp upward trends. In 1992/93, the expenditure shares ranged from 11.0 percent for the United States to 27.9 percent for the Netherlands. With annual growth rates averaging only

about 3 percent, it is highly unlikely that these economies will be able to sustain social programs financed by the taxes and contributions of the working population.

It is true that female labor force participation rates have risen significantly in recent decades, especially in the OECD countries. However, given the average gender earnings differentials and the concentration of women in part-time employment, women's earnings are considerably lower than men's. Therefore, while the number of women entering the labor force would more than counterbalance the number of older men withdrawing, this growth will not be able to provide a one-to-one offset for the decline in male participation in terms of the tax base for social expenditure contributions, implying a shrinking of the tax base.

## **2.2 Changing Family Pattern**

Family patterns have changed considerably worldwide in the recent decades, and further change is very likely. The proportion of divorced and single people in the population has increased, and the median length of marriage before divorce has gone down. The proportion of single-parent families among all families has increased significantly. There will be many more couples with few or no children and a new class of unmarried couples living together. Same-sex marriage is being accepted and permitted under the law in some countries. Two-earner families have become the norm rather than the exception. The proportion of families with either an absent father or absent mother also has increased considerably.

## **2.3 Changing Retirement Pattern**

Retirement patterns also have changed considerably worldwide in the recent decades, and further change can be expected. An increasing proportion of workers has taken early retirement; this is particularly so in the industrialized countries. A significant number of individuals are working part-time or intermittently before completely leaving the workforce. People have shared the same job on some specially arranged basis. Other forms of phased retirement have either emerged or can also be expected.

## **2.4 The Information Revolution and the Global Electronic Village**

The launch of Russia's "Sputnik" in 1957 marked the beginning of the era of global satellite communications and precipitated the information revolution. As a result, the information float collapsed. As information now can be shared simultaneously among countries, the "national economy" is now, and will continue to be, subsumed under the "global economy," or, in Kenichi Ohmae's words, "The Borderless World".

## **2.5 Shift from Nation State to Business State**

The globalization trend is exemplified by the global corporation. This will no longer be the colonial-style, multinational company with a headquarter-subsidiary mentality, but rather a network of downsized, outsourced, and largely stateless cross-border corporate alliances. In the past decade, the world's 37,000 transnational companies—up from 7,000 in the late 1960s—were responsible for more in sales than all trade exports put together: US \$5.8 trillion in 1992. In the United States, 80 percent of the dollar goods sold abroad are not exported, but are sold under the governance of the transnationals, either by affiliates, intrafirm trade, or through licensing or franchising agreements. These flows have been consolidated with the investment of capital overseas, which has led to the emergence of international production systems. Since 1983, foreign direct investment has grown five times faster than world trade and 10 times faster than world output (*The Economist*, June 24, 1995). The production lines of Mitsubishi Motors, for instance, stretch from Thailand to Malaysia to Japan. Production sharing will be the prevailing form of international economic integration.

Business leaders are the politicians of the future. Conversely, politicians will run their governments like corporations, promoting the country's comparative advantage for business. In the future, the international ties between business leaders and politicians will strengthen.

The power of the transnational corporations has grown to such an extent that governments are handing over tasks which once were under their sole purview. For instance, U.S. Congress has asked multinationals to take up some of the burden of foreign aid. Table 1 shows that foreign private investment outflows have registered much sharper increases than government foreign aid. Corporations have begun to develop their own human rights codes and

increased pressure on countries which, in the eyes of the United States, have less than satisfactory human rights records. Many governments in the West have sought to impose their standards on the developing countries with whom they have economic and trade links to little or no avail, generating only hostility and resentment in the process.

Transnational corporations have begun to take over this role. They are adopting politically correct profiles and strict codes of business ethics. For example, Levi Strauss, an American clothing company, cancels contracts with suppliers if they employ child labor. Chemical companies are more vigilant in policing their industry and computer companies are advocating higher environmental standards. Many are signatories to international agreements such as the International Chamber of Commerce’s Business Charter for Sustainable Development. And rightly or wrongly, the transnational companies impose these standards on their host countries. The transnational corporation has now become and will continue to be the major agent of international integration. The increasing power of the business corporation means that business concerns will override politics. And business issues cut across all national boundaries and will help to build the global business state.

**Table 1**

	Foreign Investment Outflow to Developing Countries		Foreign Aid	
	1990	1993	1990	1993
United States	\$423.2	\$548.7	11.4	9.7
Japan	310.8	422.6	9.1	11.3
Germany	143.1	178.7	6.3	7.0
France	67.9	140.6	7.2	7.9
Britain	77.2	243.2	2.6	2.9

All figures in billions of US dollars.

Source: Newsweek, June 26, 1995 p. 31.

## 2.6 Shift from Fixed to Flexible and Responsive Systems

The strength of the traditional multinational lies in its size and ability to exploit economies of scale. Cost was dominant and the variable cost of labor was the decisive factor. Now practices such as just-in-time production emphasize responsiveness and flexibility—factors which have downgraded the importance

of size.

With increasing automation, the present day global corporation is operating in an increasingly fixed-cost environment. Competitiveness and market share are built up and maintained through innovation, knowledge, and development of brand consciousness in the consumer—all of which involve high fixed costs. In the old variable-cost environment, companies focused on reducing the cost of materials, wages, and labor hours. Now companies focus on maximizing the marginal contribution to fixed costs (i.e., maximizing sales) which explains the importance of a large market base and the motivation for globalization.

In the present quicksilver world of consumer tastes, companies have had to adapt and become increasingly flexible and responsive to change. Big, overstaffed companies involving many bureaucratic layers are now anathema. Long hierarchies impede the flow of information, slow down the decision-making process, and reduce the ability of the company to respond to changes in the marketplace. This responsiveness is especially visible in the retail sector. In the past, stores operated strictly according to office hours and were almost always closed on Sundays. Now shops, including beauty salons and medical clinics, are beginning to stay open into the night and sometimes are open round the clock. Even British stores, conservatism and Sunday trading laws notwithstanding, have responded to consumer demands by staying open into the early evening and open their doors on Sundays.

Companies also have tried to adapt to the needs of employees. For instance, job-sharing has taken root in many organizations to accommodate demands of working parents. Shifts in thinking also have permeated social organizations such as schools, where some have adjusted hours and curricula, allowing students to arrive earlier and stay later, to accommodate their parents' work schedules.

Wage payments are beginning to move from fixed payscale systems to flexible ones based on productivity, which can respond quickly to changing economic circumstances. Benefits systems also are evolving gradually from fixed-benefits systems to ones that recognize and accept individual preferences. One way this is manifested is in the increasing popularity of "cafeteria benefits systems". While these require a greater initial capital outlay and are more



demanding in terms of monitoring, firms are starting to tailor systems to suit individuals to maximize productivity and value for money.

## **2.7 Shift from Short-Term to Long-Term**

This stress on flexibility has been accompanied by an increasingly long-term outlook. The debate over the environment and nonrenewable resources has focused attention on the long-run sustainability of short-term actions. Many companies and countries, unfortunately, are run with very short-time horizons—this month, quarter, half year—and the problem is exacerbated by the political process of elections every four or five years, where expedience is the guiding principle.

Long-range strategic visions and planning are beginning to replace short-term goals. Managers and executives must abandon their preoccupation with short-term quantitative measures of performance and profit and give attention to the kinds of investments and behavior that will spur innovation and strengthen the firm and nation's capacity to create wealth.

## **2.8 Formation of Trade Blocs and Harmonization of Standards**

While great strides have been made in the past decade to reduce barriers to trade and capital mobility, prospects for global trade liberalization remain guarded at best. If anything, the advent of the European Common Market in 1992 fuelled fears that some markets, the lifeblood of companies, would become increasingly closed. The formation of the North American Free Trade Area (NAFTA) and the growing activity with the forum for Asia-Pacific Economic Co-operation (APEC) are seen to be responses to this ominous development and represent efforts to maintain and promote free trade, at least within these regions. Many observers agree that the 21st century will see the world economy consisting of three main economic blocs: Europe, the Americas, and Asia (however defined), bringing about greater intra-bloc flows of trade, investment, and people.

Harmonization of standards within the bloc usually follows the creation of an economic zone. The European Union is trying to devise a common set of standards for everything from labor laws and minimum wages (envisaged in the Social Charter) to the beef content of sausages. The setting of common standards,

processes, and systems across countries reduces uncertainty and minimizes transaction costs, particularly for the global corporation operating in many different countries.

## **2.9 Increasing Labour Mobility**

The degree of labor mobility at present differs widely across regions. In North America, labor mobility, at least between Canada and the United States, is strongly encouraged and widely practiced. To a much lesser degree, Europeans are beginning to realize that people will have to move with and to a job, and not the other way around. In Asia, residents of Hong Kong and Taiwan, with significant foreign investments overseas, have long accepted the need for mobility. This trend is beginning to emerge even in Japan, one of the more closed Asian societies. Singapore, actively pushing the regionalization drive, is encouraging citizens to work abroad. Increased labor mobility between countries and the advantages of a common set of standards will govern the type of social security system which will be workable and acceptable.

## **2.10 Development of a New and Global Lifestyle**

Just as national economies will gradually merge into a greater world economy, the growth of transnational corporations will mean that people from vastly different cultures and climates will be eating the same foods, wearing the same kinds of clothes, and sharing the same music, movies, magazines and television shows. Satellite technology, international travel, and the spread of information will spawn an international culture.

Alongside this globalization of lifestyle, society will become more conservative and liberal at the same time. On the one hand, higher standards will be set for all aspects of business conduct, from adherence to a code of ethics to regulation. On the other hand, topics and issues which were once taboo—such as sex, drug addiction, euthanasia, cloning, same-sex marriage, and mental illness—will be discussed with greater openness. An alternative lifestyle will evolve. There will be a greater proportion of unmarried people, unmarried couples living together, and couples who may be married but have few or no children.

## **2.11 Shift from Reliance on Institutional Help to Self Help**

In the industrial countries, particularly after the Depression, there was a heavy reliance on large institutions to provide for the basic needs, from food to shelter to jobs. Over the past two decades, however, people have been moving away from this reliance to new habits of self-care. Many are taking responsibility for their own health by taking up exercise, reducing consumption of less healthful foods, and reducing smoking. The concept of health has been redefined from the mere absence of disease to the existence of a positive state of wellness. On another level, self-help will manifest itself by increasing independence from large companies through self-employment and small business entrepreneurship.

### **2.12 Shift from Complacency to Accountability**

Alongside this greater self-reliance will develop a greater awareness of the need for accountability. The average citizen will demand that both individuals and businesses be accountable for their actions, and this accountability will go beyond criminal and insurance liabilities. Grandparents of children born to unmarried mothers may be held liable for child support. Employers and doctors, stockbrokers and politicians, all who are in any position of duty and obligation, will be expected to take responsibility for not only their own actions but also the actions of others.

### **2.13 Major Changes and Shifts Around the World: A Summary**

1. The population will be ageing.
2. The spread of technology and information will engender a world that will be increasingly interdependent. Future technology will be so efficient that, most of the time, it will be taken for granted. The indications are already there—take for example the increasing use of the “smart card” —of the move from technological complexity to technological transparency.
3. Politics will take a back seat to economics. The global corporation will become the agent of international economic integration and the catalyst for social and political change in developing countries, taking over some of the roles of governments and international organizations. Decision-making will be increasingly decentralized.
4. The consumer will be sovereign. Firms will seek ways of adapting their operations and management styles to maximize their responsiveness to consumer tastes, which will evolve over time and differ across cultures.

People and knowledge, brain-power and innovation will be the driving forces of the 21st century and access to markets will be the critical factor determining business success. Countries have responded by carving out their “markets of influence,” most visibly through the formation of trade blocs.

5. Employees with innovative drive and the ability to harness and exploit information will expect and demand better remuneration, benefits and pension packages. However, with greater international labor mobility, the traditional pay-as-you-go social security systems will be increasingly anachronistic.
6. The availability of information, multinational production, trade, and foreign investment will nurture a new global lifestyle. Present cultural and societal barriers to certain types of behavior and lifestyle patterns will break down.
7. Individuals will become accustomed to looking after themselves and taking responsibility for their actions and their lives.

### **3. The Dynamic Social Security System (DSSS)**

The DSSS, as envisioned here, is a compulsory social security savings scheme. Both employers and employees must contribute jointly a certain percentage of employees’ monthly salaries to their individual DSSS accounts. A statutory board called the DSSS Board can be established to administer the scheme. The DSSS accounts earn interests and provide the employees a fund that they can rely on upon retirement or disability.

#### **3.1 Membership**

DSSS members are employees and self-employed persons in a given country. Although most members are either the citizens or the permanent residents of the country, foreign workers are likewise entitled to the membership. Active members are those who are actively at work while retired persons could still hold their membership when their accounts are being utilized.

#### **3.2 Contribution Rate**

In this scheme, both employer and employee contribution rates change according to the nation's economic situation. When the economic situation is not good, the contribution rate from both the employers and employees could be reduced; the degree of the reduction is a function of the economic situation. Similarly, if the economic situation is good, the contribution rate for both employers and employees could be increased. Again, the extent of the increase depends on how good the nation's economy is.

It is possible to drastically reduce only the employer's contribution rate in time of an economic recession to reduce the operating cost for employers. Similarly, some supplementary retirement scheme may be implemented to encourage voluntary contributions from employees, only with varying contribution rates among foreigners, citizens, and permanent residents. The contribution rate could also vary by age. For example, the total contribution rate from both employers and employees could be, say, 30 percent of salaries for those up to 55 years of age, 20 percent for those above 55 but not exceeding 60, 15 percent for those above 60 but not exceeding 65, and 10 percent for those above 65.

### **3.3 Individual Members' Accounts**

Each DSSS member's account is divided further into, say, three accounts, namely Ordinary, Medical, and Emergent Accounts. The contributions made by both employers and employees are apportioned to the three accounts—for example, 20 percent to the Ordinary Account, five percent to the Medical Account, and five percent to the Emergent Account. The apportionment rates among these accounts could vary with time and the member's age.

The amount in the Ordinary Account may be used for housing, education, approved insurance, and investment schemes and transfers to top-up parents' own accounts. On the other hand, Medical Account may be used only to pay hospital bills and certain outpatient medical expenses, such as kidney dialysis, chemotherapy, radiotherapy, assisted conception treatment, hepatitis B vaccinations, and day surgeries. Finally, the Emergent Account is reserved for old age and special contingencies.

### **3.4 Credited Interest Rate**

The interest rate credited to DSSS accounts is based on, say, the average of the 12 month deposit and month-end savings account rates of major banks in a given nation, subject to some minimum rate of, say, 2.5 percent. Since DSSS interest earnings are exempted from income tax, the effective rate of return on members' DSSS accounts is higher than the nominal interest rate, the extent of the excess being dependent on each member's tax bracket.

### **3.5 Administrative System**

The DSSS Board installs a comprehensive system to ensure that employers pay the monthly contributions (from both employers and employees) correctly and promptly. Each month, the DSSS Board sends a computerized DSSS payment form to each employer, who then sends the contributions due for the month, together with the completed form, to the Board. If no contribution is made for an employee, the employer is required to give reasons. Similarly, the employer must register new employees with the Board so that DSSS contributions can be made on their behalf. The Board's computer can easily detect those employers who fail to pay DSSS contributions promptly and correctly and single them out for follow-up action by the Board. Also, each member receives a DSSS Statement of Account that shows the progress of the accounts.

### **3.6 DSSS Benefits**

Although DSSS accounts are owned by each individual member, withdrawal of funds from these accounts may be made only for those approved purposes. These purposes are consistent to the objectives of the DSSS Board, which could include the following:

1. To help members buy and own houses
2. To help members protect their homes and families
3. To pay for education
4. To pay for hospital, surgical, and medical expenses
5. To save up for retirement
6. To enhance their savings through approved investments

### **3.7 Medical Account**

This account will be established as a compulsory national savings scheme, which helps individuals set aside part of their income to meet their personal or immediate family's hospital, surgical, and some outpatient treatment fees. Under this scheme, every employee contributes some percentage (depending on age) of his monthly salary to a personal Medical Account. There is a maximum limit for both the monthly contribution and the total amount of contributions to avoid excessive build-up. At some age, such as 60, the account holder is allowed to withdraw his Medical funds, leaving a minimum sum of some specific amount or the actual Medical Account balance, whichever is lower. Upon an account-holder's death, the balance in the account is paid to the heirs.

A Medical Account may be used to pay for hospital, surgical, and certain outpatient fees of the account-holder, his parents, or children. Family members may also pool their accounts to pay a bill. An account-holder also may use his account to pay for the expenses of a more distant family member, provided that the patient's immediate family has completely drained its accounts. Medical savings also may be used to pay for certain forms of outpatient treatment: kidney dialysis, chemotherapy, radiotherapy, assisted conception procedures, hepatitis B vaccination, AZT treatment, and day surgery.

### **3.8 Catastrophic Insurance Scheme (CIS)**

Since the Medical Account does not adequately provide for catastrophic or chronic illnesses, a low-cost catastrophic illness insurance scheme, (CIS), will be introduced to fill the gap.

All Medical account holders below age 70 will be covered automatically by CIS unless they opt out. They may pay their CIS premiums from their Medical Accounts and also may use their accounts to pay the premiums for their dependents who opt to join CIS.

CIS premiums can be kept low and affordable to encourage participation. This can be achieved by pegging the reimbursements at the average charges incurred by patients in an ordinary ward in a public hospital. There will be varying premiums for different age groups and sex.

CIS may be used to pay hospital, surgical expenses, and certain expensive outpatient treatments, such as kidney dialysis, chemotherapy, and radiotherapy. There could be high deductibles, depending on ward accommodation. Deductibles can be pegged at a level at which only some percentage of all hospitalizations in a year are eligible for CIS claims and CIS pays 80 percent of the amount in excess of the deductibles. There also can be maximum limits on the amounts claimable per policy year and in a lifetime. However, there can be no deductibles for some treatments, such as kidney dialysis, chemotherapy, and radiotherapy.

### **3.9 Medifund**

Despite Medical Account and CIS, there still will be some people who are unable to pay their portion of their hospital bills. Medifund will be an endowment fund set up by government to meet the need of these people. Only the income from Medifund will be used. Patients in public hospitals who are unable to pay their hospital bills, even after utilization of Medical Account and CIS, may apply to Hospital Medifund Committees for assistance. These committees comprise members who are actively involved in community or social work and who are familiar with the needs of the lower-income group. The actual assistance provided will depend on the individual circumstances.

### **3.10 Education Scheme**

This scheme will be introduced to allow DSSS members to use up to some percentage of their DSSS savings that is in excess of the Minimum Sum (see Section 3.11) as the study loan to finance the education on themselves or their children. The scheme will cover full-time degree and diploma courses at various institutions of higher education. The study loan granted under the scheme must be paid back with interest to the DSSS by cash. The repayment can be made one year after graduation by a lump sum or by monthly installments over a maximum period of, say, 10 years.

### **3.11 Withdrawal**

DSSS members may withdraw their money from their DSSS Accounts upon reaching normal retirement age or becoming permanently disabled,



provided they set aside a minimum sum and put it in their Retirement Accounts. This Minimum Sum Scheme will be established to ensure that there always would be a minimum sum available upon retirement, regardless of how DSSS savings are used for various approved purposes. Note that the minimum sum will be changing by time, and it is conceivable that the minimum sum may be increasing throughout the years in the future.

The DSSS Board also will allow its members to top-up their own or their parents' Retirement Accounts, either by cash or through transfers from their own DSSS savings. This is consistent with other DSSS schemes, such as Medical Account, CIS, and Education Schemes, in which members are allowed to use their DSSS savings to support their families. In this regard, DSSS saving schemes will play an important role in strengthening family relationships.

#### **4. Desirable Features Of The Dynamic Social Security System**

There are a few distinguished features of the dynamic social security system. These features form part of all the desirable features of a social security system for the 21<sup>st</sup> century. Listed below are DSSS' features.

##### **4.1 Fully Equitable**

The dynamic social security system is equitable in that the depositors do not subsidize other members of the system. Being equitable, the system provides incentives to its members to save simply because the benefit will be returned to them in full. If the savings constitute a sizable portion of the salary, people will be motivated to continue working longer and harder in order to increase their income and thus savings for retirement.

##### **4.2 Fully Funded**

All benefits for DSSS members are derived from their own and their employers' contributions and the investment income earned from the fund. This ensures that the liabilities of the DSSS Board are fully funded at any point in time without any subsidy. It creates no burden to the government nor to the society.

##### **4.3 Fully Vested**

All benefits under DSSS are vested immediately on the members without any requirement such as minimum age or length of service. This allows members to enjoy the benefits without any conditions.

#### **4.4 Fully Portable**

Under the dynamic social security system, a DSSS member can continue to save without any interruption, even if he changes job from time to time. Contributions made in all jobs will be credited into the member's DSSS Accounts within the system.

#### **4.5 Intergenerationally Independent**

Because the DSSS is fully equitable, fully funded, fully vested (immediately), and fully portable, it may be the closest thing to being intergenerationally independent.

#### **4.6 Fully Reciprocal Across National Boundaries**

Some countries already have a unified social security program administered by one agency that comprises representatives of employers, employees, and governments. Bilateral and multilateral conventions or treaties exist among many countries, especially in Europe, which guarantee equal treatment of aliens and citizens, payment of benefits outside the country, and the pooling of transfer records to meet qualifying periods. A totalization procedure sometimes is used.

The countries agreeing to do this count the earnings record of the individual as part of his earnings record in the given country for purposes of determining benefit eligibility. Pension credits obtained in one country are handled in such a way that a movement to a job in another country is administered like the continuation of work in the given country. Under the DSSS scheme, contributions made in all jobs would be credited into the employee's account by any signatory country to the agreement.

#### **4.7 Encouraging Private Intergenerational Transfers**

Many Asian societies rely on a system of informal support, whereby children accept that they have to ensure the welfare of the elderly in their family, notably through sharing of income and provision of basic needs. The DSSS scheme institutionalizes this system of private intergenerational transfers by allowing and encouraging children to top-up their parents' DSSS

Accounts. Income redistribution takes place within the family, and this emphasis on care of the elderly will help to reinforce the strength of the family unit.

#### **4.8 Encouraging Late, Phased or Flexible Retirement**

Note that early or mandatory retirement at a fixed age is costly—particularly when the labor force is shrinking—and inefficient when individual utility could be raised by continued employment. The DSSS scheme, with salary-based contributions, has a labor-supply inducing effect and reduces the incentive to take early retirement.

A phased, or flexible, retirement scheme is logical and should be encouraged. Individuals differ greatly in their financial conditions, health status, work attitudes, and life philosophy, and they should be able to work for as long as they choose.

#### **4.9 Emphasis on Saving and Personal Responsibility**

The dynamic social security system has several positive features:

1. It emphasizes personal responsibility for one's own welfare rather than dependence on others. This is consistent with the general trend in which people are moving away from reliance on public institutions to greater reliance on themselves. Saving for one's own future consumption is but an extension of this trend.
2. It encourages long-term planning rather than short-term expedience.
3. It facilitates understanding of the cost of living and financing for retirement.
4. It creates incentives to take up or remain in employment or to generate earnings through business.
5. It provides resources for economic development.

#### **4.10 Emphasis on Employer Responsibility**

The orderly functioning of DSSS disciplines employers and places emphasis on employer responsibility. It also provides a desirable means of

retiring older employees and attracting new talents.

#### **4.11 Provides for Disability and Medical Expenses**

One of the biggest public expenditure items is health care, particularly for the elderly and infirm. The United States currently spends about 15 percent of national income on healthcare, and this proportion is projected to rise as the population ages. Suffice to say that pension schemes should require individuals to plan for medical expenses and insure against catastrophic illnesses and disability. DSSS not only requires this but also allows premiums for approved medical insurance schemes to be paid with DSSS accounts.

### **5. Applications**

We now are in the position to answer all the questions as raised in the CALL FOR PAPERS and more. Our answers are based entirely on the dynamic social security system.

#### **5.1 Appropriateness of the Structure of Social Security for Phased Retirement**

Significant numbers of workers over age 50 are expected to work part-time, either steadily or intermittently, into their seventies. How can the system best accommodate phased retirement?

It is clear that this will never become a problem under DSSS, since the contributions made by both the employees and employers are adjusted automatically to a part-time basis, either steadily or intermittently or in whatever manner.

#### **5.2 Private Employer Plan Issues Related to Phased Retirement**

What would be the design of an ideal phased retirement program? What are the cost implications of such a program?

We believe that the DSSS is an ideal phased retirement program even though it is not primarily designed for that purpose. Since DSSS has so many

desirable features, it should also be an effective and, perhaps, most reasonable phased retirement program in terms of the cost involved.

### **5.3 Rationale for Family Benefits**

Should social insurance benefits be linked to family status? Should benefits be based on a family unit or should each person stand on their own?

The DSSS is designed entirely on an individual basis. It recognizes only each person through the membership and the member's DSSS account. This is consistent to various trends as described previously and with the fact that two-earner families have become the norm. Again, consistent to major changes and shifts around the world, social insurance benefits should not be linked to family status any more and should be based on each person alone.

### **5.4 Rationale for Widowed and Divorced Spouses Benefits in Social Insurance Systems**

Does the conceptual framework for the level of auxiliary Social Security benefits still fit given the changes in family structure? Should domestic partnerships be recognized in some way? Is the 10-year marriage requirement for divorced spouse benefits reasonable, given the high level of divorces with less than 10 years of marriage?

Just like family benefits, the conceptual framework for the level of auxiliary Social Security benefits such as widowed and divorced spouses benefits does not fit under the DSSS. This is because DSSS is based on each individual only; each person should stand on their own under DSSS. Similarly, domestic partnerships, whether opposite-sex or same-sex, are not recognized in any way under DSSS. Finally, since divorced spouse benefits simply do not exist under DSSS, the 10-year marriage requirement is redundant.

### **5.5 Alternatives for Divorced and Widowed Spouse Benefits under Social Insurance Systems**

What would be the cost of implementing these alternatives? Who would be the winners and losers under the different alternatives? What other alternatives could be used and what are their implications?

The three alternatives are credit splitting, bright-line length of marriage, and child-rearing credits; more alternatives are, at best, arbitrary and intuitive and can never be satisfactory to all parties concerned. Since divorced and widowed spouses must stand on their own under DSSS, we believe DSSS, with all its desirable features, offers the best alternative for divorced and widowed spouse benefits.

### **5.6 Implications of Trend to Defined Contribution (DC) Plans for Spousal Benefits**

Are DC plans leaving surviving spouses unprotected? Are employers sponsoring DC plans educating employees appropriately to prevent inadequate protection for surviving spouses? What are the issues? What are the solutions?

The DSSS is in fact a DC plan. It does not leave surviving spouses unprotected if the spouses have their own DSSS accounts. Since the trend has been toward two-earner families, the number of surviving spouses who do not have their own DSSS accounts should be decreasing rapidly. In such a situation (the worst case scenario), they must have inherited their spouses' DSSS account balances when their spouses died.

### **5.7 Solutions in Other Countries to Phased Retirement and Family Issues**

What are the solutions developed by other countries to these problems? Are these solutions adaptable to North America? How do other countries calculate social security benefits for phased retirement, widowed spouses, divorced spouses, and family benefits?

Singapore's Central Provident Fund is clearly one of the solutions. Similarly, the DSSS is another solution. These solutions are expected to become more and more popular because they not only have many desirable features, but also fit into major trends very well. Under the DSSS, the calculation of social security benefits for the above four cases is simple, direct, definite, and unambiguous. It leaves no room for dispute because it gets involved neither in arbitrary nor intuitive matters.

## **5.8 Implications of Privatization and/or Individual Account Proposals for Social Insurance Systems**

These proposals imply that their thinking has been toward the DSSS' concept and design.

## **5.9 Impact of Reform in Social Insurance System on Employer Pension System and Vice-Versa**

How will change in one system affect the other? Can changes be made in an integrated, holistic fashion to avoid the need for reactive change later? How do trends in employer pension plans influence the adequacy of benefits for families or phased retirees under social insurance systems?

It is believed that the DSSS is a combination of both social insurance system and employer pension system. The combination is made in such an integrated and holistic way that it has many desirable features.

## **5.10 All Other Possible Questions**

Since the DSSS is designed to accommodate all major trends in changes and shifts, it has many desirable features. It is believed that all other possible questions can be answered simply, definitely, and unambiguously under DSSS.

## **6. Conclusions**

This paper makes a survey of major changes and shifts in demographic, family, retirement, and lifestyle patterns. Facing these changes, we introduce a dynamic social security system deemed most suitable for accommodating the changes. As a result, the DSSS possesses a number of distinguished features that are highly desirable for a social security system. As examples, we apply the DSSS to answer all the questions raised in the CALL FOR PAPERS and find that the answers are all straightforward and unambiguous. We would, therefore, like to draw the following conclusions:

1. A social security system must take into serious consideration all major trends in changes and shifts in demographic, family,



retirement, and lifestyle patterns.

2. A social security system must possess as many desirable features as DSSS does.
3. A social security system must jointly be provided for by employees, their families, employers, and the government. Only through coordinated efforts and cooperation from all parties concerned can a social security system serve its intended objectives.

## References

- Chand, S.K., and A. Jaeger. 1996. "Ageing populations and public pension schemes." Occasional Paper No. 147, International Monetary Fund.
- Chang, C. C. 1995. "Prescriptions for Curing Global Health Care Problems." Technical report, Singapore.
- Chang, C.C. 1995. "Health Insurance Checkup in Asia." Speech, Vancouver, British Columbia, Canada.
- Chang, C. C. 1995. "Controlling Health Care Costs in Asian Countries." *Quarterly Publication*, Lincoln National Reinsurance Group Resource.
- Chang, C. C. 1995. "Affordable Health Care." *Quarterly Publication*, Society of Actuaries International Section Newsletter.
- Chang, C. C., and G. Chen. 1995. "A Social Security System for the 21<sup>st</sup> Century." Speech, Tokyo.
- Chang, C. C. 1995. "Social Security Systems Around the World." Speech, Boston.
- Chang, C. C. 1996. "Singapore's Social Security System: A Model of Solvency for all Countries?" *Journal of Actuarial Institute of Republic of China*. (October 1996): 237-249.
- Chang, C.C., and A. Balas. 1996. *Affordable Health Care*. Prentice Hall.
- Chang, C.C. 1997. "Singapore's Economic System and Government Functions." Speech, Chung-Hua Institution For Economic Research, Taipei, Taiwan.
- Chang, C. C. 1997. "Outcomes Measurement and Management." Speech, Taipei, Taiwan.

- Chang, C. C. 1998. "Patients, Heal Thyself-An Actuary's View on Health Care Issues." Invited plenary speech, Taipei, Taiwan.
- Chang, C.C. 1998. "Reforming Taiwan's NHI With Managed Competition." Speech, Birmingham, U.K.
- Chang, C. C. 1998. "Health Care Financing Systems Around the World." Speech, Maui, Hawaii.
- Chang, C. C. 1998. "Health Care Reform Around the World." Panel discussion, Maui, Hawaii.
- Chang, C. C. 1999. "Annuity Market in Singapore," *Journal of the Actuarial Institute of Rep of China*( December):97-141.
- Chang, C. C. 2000. "Non-Actuarial Approaches to Some Actuarial Retirement Issues," *Journal of Actuarial Institute of Republic of China* (November): 67-81.
- Chang, C. C. 2000 "Economic and Behavioral Essays on Retirement Issues." Speech, Toronto, Canada.
- Chen, H.C.D. 1995. "Ageing and Intergenerational Transfers: The Issues." Unpublished monograph, dissertation for the degree of Master of Social Sciences, National University of Singapore.
- Coates, J. F. 1994. "The Highly Probable Future: 83 Assumptions about the Year 2025," *The Futurist* (July/August).
- Davis, E. P. 1997. "Public pensions, pension reform and fiscal policy." European Monetary Institute, Staff Paper No.5.
- Davis, E. P. 1997. "Pensions in the corporate sector." Paper, Kiel Week Conference.
- Davis, E. P. 1997. "Can pension systems cope? Population ageing and retirement income provision in the European Union." Report, The Royal Institute of International Affairs, International Economics Programme.

Daykin, C.D. 1996 "Developments in social security and pensions world-wide." *British Actuarial Journal* 2: 207-226.

Daykin, C. D. 1997. "A crisis of longer life-problems facing social security systems worldwide and options for reform." Paper, London.

Elkins, J.1985. "Ten Trends for the 21st Century." Old Oregon.

Espina, A. 1996. "Reform of pension schemes in the OECD countries," *International Labour Review*: 181-206.

Holzmann, R. 1996. "Pension reforms, financial market development and economic growth: preliminary evidence from Chile." Working paper, International Monetary Fund.

Jollans, A. 1997. "Pensions and the ageing population." Paper, Staple Inn Actuarial Society.

Kritzer, B. E. 1996. "Privatising Social Security: The Chilean experience." *Social Security Bulletin* (Vol 59, No 3).

Lewis, D. 1997. "Pension Reform." Paper, Barbados.

Myers, R. J. 1992. "Chile's Social Security Reform, after 10 years." *Benefits Quarterly* (Third Quarter).

Naisbitt, J. 1982. *Megatrends: ten new directions transforming our lives*. New York: Warner.

*Newseek.* x 1995. (June 26).

OECD. 1996. "Ageing in OECD countries: a critical policy challenge." *Social Policy Studies* No. 20.

Ohmae, K. 1994. *The Borderless World*. London: HarperCollins.

Queisser, M. 1995. "Chile and beyond: the second generation pension

reforms in Latin America," *International Social Security Review*, (3-4/95): 23-39.

Roseveare D, W. Leibfritz. 1996. "Ageing populations, pension systems and government budgets: simulations for 20 OECD countries." Working Paper No. 168, OECD.

Singh, A. 1996. "Pension reform, the stock market, capital formation and economic growth: a critical commentary on the World Bank's proposals." *International Social Security Review* (3/96): 21-43.

Stein, G. 1997. "Mounting debts: The coming European pension crisis." Policy Series No 4, Politeia.

Superintendence of Pension Fund Administrators. 1996. "The Chilean Pension System."

*The Economist*, various issues.

Transactions of the 23rd International Congress of Actuaries, Helsinki, Finland. 1988.

Transactions of the 24th International Congress of Actuaries, Montreal, Canada. 1992.

Trowbridge, C. 1994. "Mortality Rates by Marital Status," *Transactions of the Society of Actuaries*, XLVI.

Vittas, D., and A. Iglesias. 1992. "The rationale and performance of personal pension plans in Chile." Policy Research Working Papers WPS 867, World Bank.

World Bank. 1994. *Averting the Old Age Crisis*. Oxford University Press.