

INTERNATIONAL AGING, ECONOMIC INCENTIVES AND PUBLIC POLICY

1. INTRODUCTION

The world is aging. Why? After 1945, developed nations solved their infant mortality problem. A generation of children who would have died lived creating a 'baby boom' generation. In response to the large number of children birthrates in these developed nations dropped, creating 'baby bust' generations. As the baby boomers become older these nations are characterized by an unusually larger proportion of elderly and an unusually lower proportion of workers. Scholars and policy makers have recognized this as a potential international economic concern. The potential for intergenerational conflict regarding resource allocation to the elderly within nations is a relatively well discussed problem that has produced a substantial amount of study. However, what has not been heretofore recognized is that the level and the timing of the aging dynamics differ from nation to nation. For example, the United States, Japan and Europe solved their infant mortality problem earlier than India and China. Accordingly, nations will face the aging problem at different times. This fact provides the potential for overwhelming pressure on nations to reduce support for their elderly in a way that collectively imperils elderly support worldwide. These pressures have not been extensively studied.

At any given time 'younger' nations can have a competitive advantage in international economic markets because they do not face the burden of allocating resources or workers to care for a large elderly population. If older nations are to be competitive internationally they may be required to reduce the level of support they provide to their elderly in order to remain competitive – just at the time that they endure political and economic pressure internally to increase elderly support. Since different nations will age at different times most nations in the world will at one time or another face pressure to limit support for their elderly. Collectively, over time, all nations will face incentives to limit elderly support. As a result, on a collective basis support for the elderly of all nations may be in jeopardy.

2. BACKGROUND

Some of the economic challenges of aging are well known. The Plan of Action from the First World Assembly on Aging in 1982 considered potential “deteriorating dependency ratios” (United Nations, 2009). In 1997 a G8 conference focused on the challenges of globalization in the context of increased life expectancy of populations and lower birth rates (Denver Summit, Russian Federation, 1997).

In 2004 the Kansas City Federal Reserve Bank held a symposium on Global Demographic Change (Federal Reserve Bank of Kansas City, 2004). Discussions included labor supply, savings and income support for the elderly (Bloom and Canning, 2004) and the impact of population aging on financial markets (Poterba, 2004). A paper by an OECD economist (Visco, 2001) was one of the first to suggest that higher female or elderly labor force participation could provide a partial solution and discussed problems produced by indexing pension benefits to productivity gains. See, also, Palacios (2002) and Heller (2003). Policy analysts in the US recognize that the world’s richest economies are not immune from these trends (Kinsella and Velkoff, 2001 and National Institute of Aging, 2007).

Despite the recognition of the issues that attach to international aging, however, most existing literature does not consider aging in the context of international economic competition, nor does it investigate the dynamic implications of aging over time.

3. AGING AND WORLDWIDE ECONOMIES

In order to evaluate the national and international context of the economics of aging over time we simulated the potential economic impact of aging on the world’s 25 largest economies between 2010 and 2050. Simulations are always problematic. Economic dynamics will, of course, change. Markets will deal with the aging phenomena in many ways that cannot be anticipated. Still, international aging demographics are a known phenomenon and some of the implications for economic development are certain to evolve.

At some point regardless of societal differences, older people will no longer work and will need medical care and social support. Such medical care and social support is funded either through government programs in which case it becomes a tax on production, through personal savings in which case it provides for withdrawal of investment capital and savings or through family support in which

case it takes workers out of the workforce. Some observers would optimistically suggest that an elderly population improves a nation's economy because older workers may be more efficient and because caring for the elderly is an industry. However, an elderly population correlates with reduced economic viability as defined by *per capita* gross domestic product (Foreman *et al.* 2009). Our simulation illustrates the potential for pressures on national economies – and the dilemmas that may be faced by aging countries competing in an international economy.

We start with medium variant growth rate population projections from the United Nations (United Nations, 2006). From this we establish the potential working age population (persons 17 to 64) and elderly (persons 65 and older) in each country for the world's 25 largest economies between 1960 and 2050. In the second step we use World Bank data for household consumption in each nation's GDP using 2005 household consumption as a percent of GDP for a baseline (World Bank, 2009). In step three we allocate household consumption to the working age population assuming that elderly household consumption mirrors the nation's social security policy using pension data from Social Security Worldwide relating to pensions as a proportion of working age income (ISSA, Social Security Worldwide, 2008)¹. In step four we use the elderly population projections and the estimate for the percent of GDP consumed by the elderly to show the increase in the proportion of GDP for each nation allocated to the elderly between 2010 and 2050.

As has been studied in some detail, the ratio of working age population to elderly population will drop dramatically in almost every nation. Equally important, the ratios will be much different for some nations than others and these relative dependency burdens will undergo substantial change over time. For example, India shows large declines in the number of working age persons per elderly between 1950 and 2050 (from 17 to 4) but still maintains a ratio that is two to three times higher than most other nations. Even though India will age it will remain a relatively young nation. China changed from 12 working age adults for each elderly person to 8 between 1950 and 2005. This makes it relatively young now – but projections show that China will mirror the rest of the world by 2050. In 2050 Japan's

¹ More likely than not this will understate elderly household consumption in nations where there are private pensions and the elderly have savings and where medical care is provided by pension plans or government programs.

ratio will be 1.3 and Germany's will be 1.8. Saudi Arabia will have 5.0 workers per elderly person in 2050 (see Table 1).

TABLE 1 - *Working Age Population (17-64)
per Elderly Population (65+)*

Country	2010	2020	2030	2040	2050
Japan	2.75	2.03	1.84	1.49	1.30
Spain	3.77	3.22	2.52	1.85	1.51
Italy	3.07	2.65	2.17	1.67	1.59
Poland	5.06	3.52	2.71	2.40	1.74
Germany	3.10	2.79	2.10	1.79	1.78
Austria	3.71	3.22	2.39	1.94	1.87
Belgium	3.58	2.99	2.37	2.08	2.04
France	3.76	2.95	2.49	2.21	2.13
Canada	4.68	3.45	2.53	2.30	2.18
Netherlands	4.14	3.06	2.38	2.07	2.22
Switzerland	3.80	3.14	2.43	2.18	2.26
Australia	4.50	3.45	2.75	2.43	2.32
Sweden	3.35	2.79	2.51	2.34	2.35
United Kingdom	3.78	3.24	2.71	2.41	2.37
Norway	4.11	3.34	2.79	2.40	2.41
Russian Fed	5.54	4.48	3.39	3.13	2.46
China	8.16	5.60	3.92	2.67	2.47
Mexico	9.16	7.09	5.17	3.56	2.79
USA	4.98	3.88	3.05	2.88	2.79
Brazil	9.20	6.94	5.02	3.95	3.09
Indonesia	10.34	8.70	6.13	4.32	3.28
Turkey	10.69	8.60	6.03	4.37	3.32
Rep Korea	6.58	7.04	5.29	3.56	3.47
India	11.08	9.25	7.27	5.77	4.44
Saudi Arabia	20.31	15.45	9.73	6.44	4.95

Source: United Nations (2006).

There are substantial disparities in estimates of the percentage of each nation's GDP that is currently consumed by the elderly (see Table 2). We estimate that less than four percent of GDP is consumed by the elderly in Indonesia, South Korea, India, China and Saudi Arabia – coincidentally some of the world's current economic 'juggernauts'. At the other end of the spectrum, more than seven percent of GDP will most likely be consumed by elderly households in Sweden, Netherlands, Switzerland, Austria, Spain and Italy.

TABLE 2 - *Percent of GDP Consumed by Working Age Adults and Elderly*

Country	Household Consumption	Elderly	Working Age
Saudi Arabia	26	1.19	24.81
China	37	1.63	35.37
India	58	3.02	54.98
Rep Korea	53	3.33	49.67
Indonesia	64	3.43	60.57
Turkey	69	4.27	64.73
Norway	42	4.56	37.44
United States	63	4.65	58.35
United Kingdom	65	4.76	60.24
Canada	63	5.06	57.94
Australia	63	5.11	57.89
Belgium	53	5.28	47.72
Brazil	60	5.45	54.55
Russian Federation	49	5.63	43.37
Japan	63	6.06	56.94
Mexico	68	6.15	61.85
Germany	59	6.19	52.81
Poland	62	6.73	55.27
France	57	6.76	50.24
Sweden	48	7.10	40.90
Netherlands	49	7.48	41.52
Switzerland	63	7.67	55.33
Austria	56	9.29	46.71
Spain	58	9.94	48.06
Italy	59	10.49	48.51

Source: UN (2006), World Bank (2009), ISSA, Social Security Worldwide (2008).

Our estimate of the percentage of GDP that will be consumed by elderly households in future years presents several stark realities. In the least impacted countries (Saudi Arabia and China), elderly consumption will triple between 2005 and 2050. Increases in elderly consumption are substantial for each nation and very substantial for some (Singapore, Mexico, and Hong Kong). Differences between nations with the lowest elderly burden and the greatest (Brazil, Poland, Austria, Italy, Mexico and Spain) are three to six fold. Nations' rankings will change substantially over time. For example, in 2005 Brazil was the 13th oldest nation in the world in 2005. It will be the sixth oldest by 2050. Indonesia will move from 21st to

14th. Mexico in 2050 will be the second oldest major developed nation in the world, moving from 10th in 2005. Turkey will change from the 20th oldest nation to the ninth and the United Kingdom will become younger (comparatively), moving from 17th to 22nd (see Table 3).

TABLE 3 - *Estimated Percent of GDP Consumed by Elderly Households 2005-2010*

Country	2005	2010	2020	2030	2040	2050
Saudi Arabia	1.19	1.22	1.58	2.42	3.49	4.37
China	1.63	1.72	2.39	3.21	4.30	4.55
Rep Korea	3.33	3.72	3.50	4.48	6.18	6.31
India	3.02	3.12	3.67	4.56	5.56	6.92
UK	4.76	4.88	5.50	6.28	6.84	6.92
Norway	4.56	4.70	5.53	6.33	7.05	7.04
USA	4.65	4.80	5.88	7.09	7.39	7.56
Belgium	5.28	5.33	6.12	7.25	7.92	8.04
Australia	5.11	5.47	6.76	8.02	8.75	9.04
Russian Fed	5.63	5.04	6.01	7.51	7.99	9.51
Canada	5.06	5.37	6.85	8.64	9.25	9.58
Indonesia	3.43	3.67	4.29	5.83	7.82	9.72
Sweden	7.10	7.50	8.61	9.30	9.79	9.75
Germany	6.19	6.66	7.20	8.80	9.78	9.80
France	6.76	6.82	8.21	9.32	10.13	10.37
Japan	6.06	6.85	8.46	9.02	10.30	11.15
Turkey	4.27	4.38	5.33	7.28	9.53	11.86
Switzerland	7.67	8.33	9.65	11.65	12.55	12.27
Netherlands	7.48	8.07	10.21	12.26	13.51	12.89
Brazil	5.45	5.88	7.55	9.97	12.11	14.67
Poland	6.73	6.69	8.97	10.92	11.91	14.79
Austria	9.29	9.90	11.05	13.75	15.87	16.26
Italy	10.49	10.91	12.17	14.01	16.62	17.17
Mexico	6.15	6.69	8.40	11.01	14.91	17.94
Spain	9.94	10.26	11.59	13.89	17.17	19.50

How will this impact call on national resources? Table 4 compares World Bank data showing the allocation of GDP in 2005 to workers, government consumption, savings and net exports and the additional GDP share that will need to be consumed by the elderly in order to maintain *status quo*. For some nations, the difficulties inherent in resources necessary to care for the elderly are apparent. Mexico

will need to allocate an additional 12% of its GDP to caring for its elderly. This would create major problems for workers, government spending, investment or exports. Similarly, Brazil and Spain will need to allocate an additional 10% of their GDP to the elderly, requiring major reductions in resources allocated to workers, government programs or investment.

TABLE 4 - *Where will the Resources Come From?
Increased Household Consumption by Elderly Households
Compared with GDP Claims in 2005 (Percent of GDP)*

Country	Increase	Workers	Govt	Invest	NetX
United Kingdom	2.16	60.24	21.78	12.94	(3.88)
Norway	2.48	37.44	21.53	39.54	18.26
Sweden	2.66	40.90	27.22	24.78	7.71
Belgium	2.76	47.72	23.06	23.72	2.34
USA	2.91	58.35	15.79	13.87	(5.34)
China	2.92	35.37	14.15	48.83	5.56
Rep Korea	2.97	49.67	21.06	13.45	(8.85)
Saudi Arabia	3.18	24.81	23.13	50.54	34.29
Germany	3.61	52.81	18.56	22.16	4.99
France	3.61	50.24	23.72	19.20	(0.96)
Russian Fed	3.89	43.37	16.46	34.43	13.56
India	3.90	54.98	11.34	30.39	(2.96)
Australia	3.93	57.89	18.28	22.85	(2.84)
Canada	4.52	57.94	19.50	25.19	4.20
Switzerland	4.60	55.33	11.87	27.69	7.33
Japan	5.09	56.94	17.96	24.61	1.94
Netherlands	5.40	41.52	11.55	20.27	(1.54)
Indonesia	6.29	60.57	8.08	28.03	4.25
Italy	6.68	48.51	20.29	20.86	(0.05)
Austria	6.97	46.71	17.74	26.65	5.40
Turkey	7.58	64.73	13.07	18.21	(6.57)
Poland	8.06	55.27	7.75	14.29	(3.83)
Brazil	9.22	54.55	20.05	19.59	3.59
Spain	9.56	48.06	17.79	24.46	(5.22)
Mexico	11.79	61.85	12.94	43.47	23.53

Even for countries with small increases in resources needed for the elderly the increases may present major problems. In the United Kingdom and the United States, for example, the increase will only be from 2% to 3% of GDP. However, investment levels in the United Kingdom and the United States are already among the lowest in the

world so that any decrease in savings and investment related to the elderly will exacerbate existing problems.

In several countries workers receive relatively small portions of the GDP: Norway, China and Saudi Arabia, for example. To the extent that low worker payment reflects an energy based economy this should not pose a problem. However, a nation like China may need to increase resources allocated to workers in order to maintain long term stability. To the extent that resources are needed for the elderly, worker payment reforms in China may be delayed or reduced leading to social tension.

4. DISCUSSION – THE RANGE OF PROBLEMS

What the simulation suggests is that the need to allocate additional resources to the elderly could become a negative sum game over the next forty years that pits the elderly against workers, government programs and investment in the future. The disparity between the competitiveness of younger nations like China, Korea and India compared with older nations like Spain, Mexico, Italy, Austria, Poland and Brazil can also produce problems. If international competitiveness requires some marginally equivalent allocation of resources to workers and to investment, even countries like the United States, Switzerland and the Netherlands may face substantial pressure to reduce support for the elderly in order to compete worldwide.

Recognizing the significance of worldwide aging, a number of observers have suggested the need to encourage private savings by workers in order to reduce the role of social programs (OECD, 2007 and Pension Rights Center, 2009). However, private savings will not help a nation if a large elderly population withdraws its capital from a nation's economy in order to support itself. Another major initiative that is underway would extend the careers of workers (Penner *et al.*, 2003 and AARP, 2009). Extending working careers may delay the issue for five or ten years – indeed may compress the problem in terms of time. However, it would certainly violate a nation's social contract with its workers to delay retirement five or ten years. Most of all, these approaches fail to squarely address the negative sum game nature of growing numbers of elderly in a nation and from nation to nation.

Even if a nation determines to provide full public pensions the resources provided to the elderly as a result will provide efficiency

losses for that nation's economy. Much like a tax on savings and investment, such a deadweight loss can cause a permanent reduction in the level of that nation's economy compared with other economies. Suppose that Country A has more elderly than Country B so that for 20 years Country A supports enough elderly so that savings and investment are half that in Country B. The investment difference provides annual economic growth of 2% in Country A and 4% in Country B. If at the end of the 20 years the demographics of both nations are the same, output related to capital investment in Country A will, absent other factors, be permanently lower than Country B.

No matter the source, if a nation provides resources to retired persons – those resources come from and occur at the expense of some sector of the nation's economy. *Any* retirement plan becomes a negative sum game. As noted in our simulation, there will be an increase in the percent of GDP needed for retirees in most developed nations. How will nations provide these resources? Will they reduce the proportion of GDP allocated to workers? Will they reduce savings and investment? Will they reduce government spending for education, roads and other infrastructure? Will they borrow from future generations? Negative sum games produce great tension. Their results are often determined by economic or political power considerations. They produce strife².

Different nations will age at different rates and at different times. What this means is that nations will have a time when they are more competitive relative to other nations and times when they are less competitive. If nations must be internationally competitive on a relatively constant basis, at any point in time most of the nations in the world will have incentives to limit the resources allocated to their elderly in order to be competitive with the youngest. Moreover, a nation that abandons its elderly will be more competitive than other nations. If one nation decides to abandon its elderly, the rest will be compelled to do so in order to be competitive. As a result, over time, all nations' incentives to care for their elderly could unwind to the lowest common denominator.

² It might seem as if expanding economies would be able to care for their elderly based on improvements in efficiency and standards of living. However, resource allocations to workers and to the elderly are not simply a matter of absolute requirements but comparative ones. If retirees are substantially poorer than workers or if workers are 'impoverished' by retirees there will be strife.

5. SOME INNOVATIVE SOLUTIONS

Given all of this, what policy considerations should be considered? An effective approach would recognize the international impact of aging populations, the zero sum game implied by these trends, the long term impact that may be produced by large numbers of elderly retirees in an economy and the pressures that will be created by the demands of competition in a global economy. Most important, policy makers must recognize that the problem we face is novel enough to call for the development of novel and innovative solutions. 'Business as usual' could stimulate international and intra-national economic conflict. A number of 'different' solutions might include the following:

- i) *Spread the burden over time.* The most effective policy approach will recognize the potential for long term negative impact of an aging population on an economy and will develop mechanisms to deal with it. These mechanisms might include economic approaches that spread the burden of an aging society over four or five generations rather than one. One example would be the issuance of 100 year bonds to support excess elderly retirement and pensions over a ten to twenty year time frame in order to prevent a permanent reduction in an economy related to imposing the elderly burden on one generation.
- ii) *Spread the burden over different sectors of a nation's economy.* Another policy approach would recognize the negative sum game potential inherent in an aging society and would develop responses that minimize the negative impact of it on different economic sectors. For example, an aging society might provide an economic boom for medical care industries at the expense of education and business development. Innovative approaches may look at ways to continue to provide adequate resources for education and for the business community for future generations.
- iii) *Develop international treaties.* The incentives for nations to reduce resources provided to retired elderly in order to compete in a global environment will be great. In order to avoid the temptation to abandon their elderly, nations could commit to continue to care for their elderly by developing and executing treaties that require nations to provide a specified level of resources for the elderly.
- iv) *Develop an international fund to spread the burden over time.* Because nations will age at different rates and at different times,

the establishment and maintenance of an international fund of resources (in essence, income transfers from younger nations to aging nations), effectively 'an aging insurance fund' could help even out the relative burdens of caring for retired elderly over time and minimize worldwide incentives to abandon the elderly.

Indeed, as the full scope of the aging issues impact nations and international economies, it will be important to consider a wide range of economic and political responses. Rather than wait for these dynamics to arrive, as they inevitably will, now is the time to begin thinking about mechanisms. Better understanding of the full scope of the problem is but a beginning.

6. CONCLUSIONS

Indeed, we live in an aging world. The dynamics of international aging will produce changes, issues and the potential for conflict of a sort that history may not prepare us to understand. Now is the time to begin to investigate – to the extent that we can – the range of complex dynamics that will be produced in nations that are aging at different rates and at different times.

The aging dynamics are sure to present negative sum games for many nations, settings where the allocation of increased shares of national resources for elderly retired persons must be taken from workers, savings and investment, government funded infrastructure or from the retirees themselves. In a world characterized by international competition the incentives for a nation to reduce resources allocated to the elderly in order to be internationally competitive will be great. The use of resources by the elderly will reduce resources for future generations. In a given nation, resource consumption by a large generation of elderly can provide an economic deadweight loss on an economy that will reverberate for generations to come.

Accordingly, international aging provides unique problems that call for innovative policy approaches and solutions. These solutions might well include the development of mechanisms that spread the burden of the provision of resources to the elderly over time and over various sectors of a nation's economy and international agreements among nations to continue to provide a specified level of resources to their elderly and, perhaps to 'insure' or spread the economic burden of aging among nations and over time.

The ultimate solutions to these problems will require much

more. What of markets? Generally markets are extremely valuable in producing the most efficient solutions to economic problems. However, an aging world provides the potential for market breakdown and calls for other solutions.

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ABSTRACT

The world is aging. Scholars have recognized this and have investigated potential intergenerational conflict attributable to resource allocation as elderly retirees consume greater portions of a nation's GDP. Nations with greater numbers of elderly have less productive economies. What has not been studied in detail is the fact that the rates at which nations age differ from nation to nation and over time. This paper provides a simulation that shows how the timing differences will impact age distributions in the world's 25 largest economies. The simulation shows how elderly populations will consume increasing portions of national GDP over time and how these impacts will differ from one nation to another. Younger nations without elderly support burdens will enjoy a competitive advantage in international markets compared to nations with large numbers of elderly. Since the timing of the elderly burden differs nation to nation and because developed nations will find it necessary to be competitive economically, there will be constant pressure on all elderly nations to reduce support for their elderly in order to remain competitive. This could 'unwind' economic support for the elderly worldwide. We explore a number of potential public policy responses that a nation could use to minimize the pressure to reduce support for the elderly while remaining economically competitive in international markets.

Keywords: Aging, Aging Economics, Aging Policy

JEL Classification: F00, H30, I31, I38, J11, J14

RIASSUNTO

Invecchiamento della popolazione, incentivi economici e politiche pubbliche

Il mondo invecchia. Gli studiosi hanno riconosciuto questo fenomeno e hanno esaminato il potenziale conflitto intergenerazionale attribuibile all'allocazione delle risorse nel momento in cui gli anziani, andando in pensione, sottraggono quote più ampie del PIL di un paese. Le economie dei paesi che hanno una maggiore quota di anziani tra la popolazione sono meno produttive. Ciò che non è stato esaminato in dettaglio sono le differenze, tra i diversi paesi, nei tassi di invecchiamento ed il diverso momento in cui l'invecchiamento si verifica.

Questo studio fornisce una simulazione che dimostra come le popolazioni di 25 tra le maggiori economie mondiali invecchieranno in tempi diversi nei diversi paesi.

Tale simulazione evidenzia come una popolazione più anziana consumi

quote di PIL sempre maggiori nel tempo e come questo fenomeno differisca tra un paese e l'altro. I paesi più giovani che non devono sopportare l'onere causato dall'assistenza agli anziani godranno di maggiori vantaggi in termini di competitività sui mercati internazionali, rispetto a quei paesi che contano invece molti anziani tra la popolazione. Poiché il momento in cui si verifica la necessità di fornire assistenza agli anziani è diverso da paese a paese ci saranno costanti pressioni su tutti i paesi 'vecchi' affinché si riduca il sostentamento agli anziani per mantenere la competitività.

Nel lavoro vengono esaminate diverse politiche pubbliche finalizzate a fronteggiare le problematiche connesse a queste previsioni.