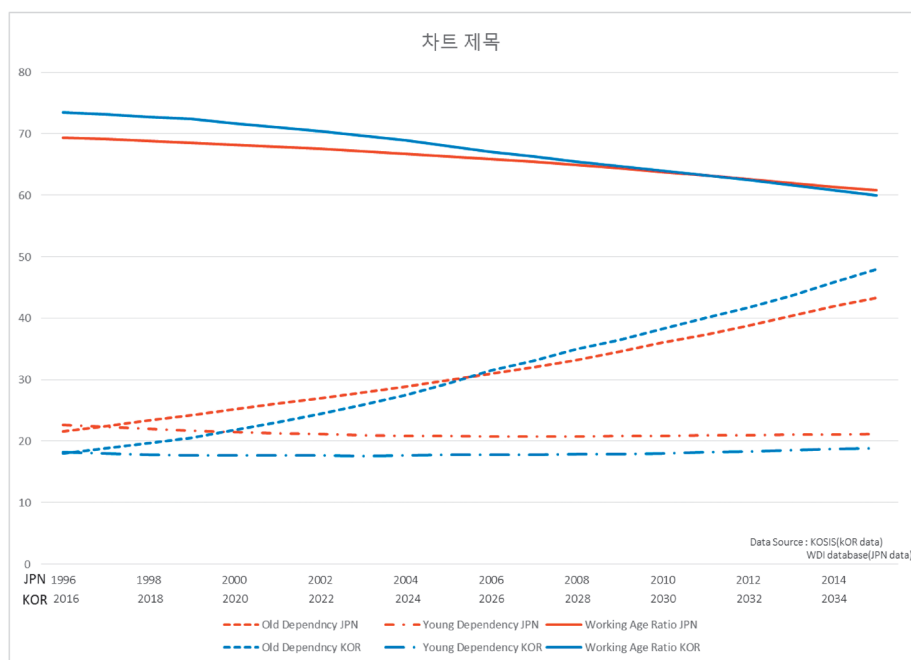


Figure 5. Japan's demogrpahy twenty years ahead of Korea's



Note: Korea's data are based on median estimation.

Data Source: Korea's data are from KOSISI and Japan's data are from WDI database

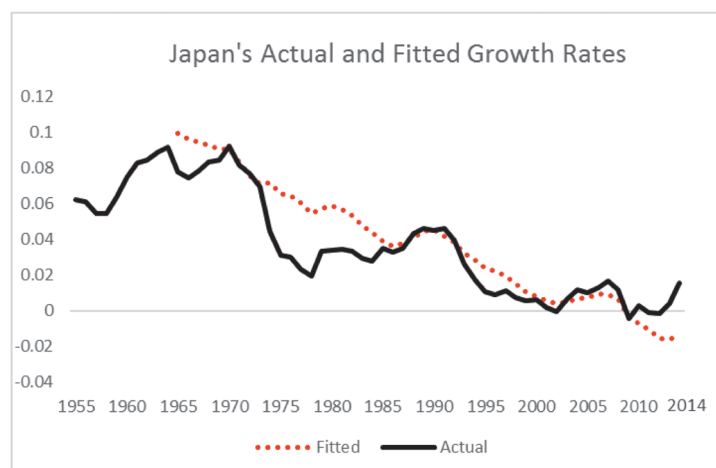
ing-age population ratio are almost identical. If anything, aging is even more rapidly progressing in Korea, in the sense that Korea's working-age population ratio is decreasing faster and Korea's old dependency ratio is increase faster than Japan's corresponding ratios.

Figure 6 shows Japan's actual and fitted growth rates.¹¹ The actual growth rate is a five-year moving average (from $t-5$ to t). The model explains the movements of Japan's growth rates quite successfully except for the recent few years. The model actually predicts lower than actual growth rates in the most recent years. For example, the predicted growth rate in 2013 is -1.6% while the actual growth rate is 0.4% . This may reflect the possibility that Japanese policies not captured by the model helped mitigate the effect of aging on growth.

Figure 7 shows the actual, fitted and future projections of Korea's growth rates. There is approximately a twenty year demographic gap between Korea and Japan. Therefore, in order to compare projections of Korea's future growth rates with Japan's past performance, we projected Korea's future growth rates up to twenty years. The future predicted values of demographi-

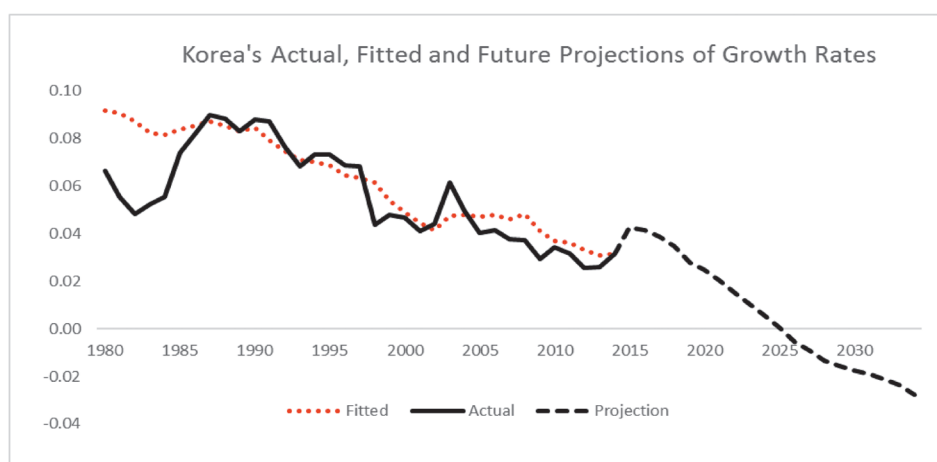
¹¹ The estimated coefficients in Column 2 in Table 2 are used to predict growth rates, as young and old dependency ratios are used for future projections later. However, predictions based on the other estimated coefficients do not vary much.

Figure 6. Japan's actual and fitted growth rates



Source: Authors' calculation.

Figure 7. Korea's actual, fitted and future projections of growth rates



Source: Authors' calculation

cal variables such as population and young and old dependency ratios were collected from Statistics Korea. Since there is some discrepancy in actual values of demographical variables between WDI and Statistics Korea, we adjusted future predicted demographic variables by equating the two values in 2014. We also assumed that there is no further change in human capital, but that openness and capital changes at the same rate as the average of the past 10 years.

The fitted growth rates also mimic Korea's actual growth rates quite well. However, the projected growth rates decline continuously, to reach -2.7% in 2034, implying that Korea's

growth rate in 2034 will be even lower than Japan's fitted growth rate from 20 years ago, which is -1.6% . One possible explanation is that, as we already explained above, aging is progressing even more rapidly in Korea than it did in Japan. Korea's future may thus be even gloomier than Japan's present.

6. Policy implications for Korea (and Japan)

In this section, we explore the policy implications of Korea's rapid population aging and its negative impact on growth.

6. 1. Past policy responses of Korea

Concerned about population growth and overpopulation, the Korean government kicked off a family planning program in 1962. [Lee and Choi (2015)] By 1996, the pendulum had swung the other way and fertility rate collapsed to well below replacement levels. As a result, the government eliminated its family planning program and instead put into place a series of pro-fertility programs aimed at tackling population aging. In addition, the government sought to tackle female infanticide, the related problem of unbalanced ratio of births, and reproductive health.

A significant law, the Framework Act on Low Birth Rates in an Aging Society, was enacted in 2005, and a presidential committee was set up the same year. The Act created the first Basic Plan for Low Fertility and Aging Society for 2006 to 2010. [Lee *et al.* (2013b)] The five-year plan, which seeks to boost fertility and address population aging, was renewed in 2011 and again in 2016. The plan's results are evaluated every year by the national parliament and government, and those evaluations inform and guide the formulation of the action plan for the following year. Broadly speaking, the government's efforts to increase fertility is based on three strategies. [Lee *et al.* (2013b)] First, the government seeks to strengthen support for childbirth and child rearing. Second, the government aims to foster a culture and society which protects the family and treats men and women friendly. Third, the government hopes to expand investment in the health of future generations.

With respect to childbirth and child rearing, the Korean government provides fees for care and kindergarten or, alternatively, allowance for childcare at home. It also provides free after-school education programs. Families with children receive other financial support, including more favorable tax treatment and means-tested loans program for home purchase or

renting. In addition, the government delivers pre-natal and post-natal health care and subsidizes the costs of in-vitro fertilization.

Realizing the vital importance of work-life balance for child birth and child care, the government tries to help parents balance work and family. [Lee and Choi (2015)] More specifically, the government mandates 90 days of maternity leave at 100% of salary and one year of childcare leave at 40% of salary, up to a maximum of 1,000,000 Korean won (around US\$900) per month. Furthermore, male workers are granted 5 days of parental leave, 3 days at 100% of salary and 2 days unpaid, when their wives give birth. Female workers are entitled to return to their for positions after their maternity or childcare leave. The penalty for employers who break the rules is a heavy fine of up to 5,000,000 Korean won (around US\$4,500).

Another set of government policies to boost fertility is centered on creating more family-friendly working conditions. [Lee and Choi (2015)] In this context, the Korean government is expanding workplace daycare centers, reducing work hours, and encouraging more flexible working conditions. It has also launched public education campaigns to foster gender equality within families and the society at large, in addition to publicizing and rewarding family-friendly companies with a certificate containing a special logo. An emphasis on the health of infants and children is an integral part of the Korean government's strategic response to excessively low fertility levels and demographic change toward older populations [Lee (2015)].

In addition to pursuing various pro-natalist policies to reverse or at least slow down population aging, the Korean government must cater to the needs of the country's large and fast-growing elderly population. [Park *et al.* (2012)] In this connection, it has taken action to promote the economic security, healthcare, and well-being the elderly. Economic security-enhancing policies include promoting more employment opportunities for the elderly, providing assistance for job training and retraining, and supporting elderly entrepreneurs starting new businesses. At the same time, the government is enhancing public and private pension systems, and has introduced a new basic old age pension which covers the majority of the elderly population. More and better employment opportunities will help the elderly remain valuable members of society, rather than become just social security beneficiaries.

Since elderly health care can be very costly, old-age economic security must be accompanied by a good health care system for the elderly. In this connection, the Korean government is making concerted efforts to set up a preventive care system, stabilize medical costs, and improve health insurance coverage. [Park *et al.* (2012)] Other policy measures include (i) providing greater opportunities for volunteer work and leisure activities, (ii) improving housing, transportation, and other social infrastructure for the elderly, and (iii) building up a more

robust social protection system which minimizes the risk of being abused for the vulnerable elderly, such as those who live alone. In addition, the government has launched various campaigns aimed at encouraging a more active lifestyle among the elderly. Leading more active lives, for example by engaging in sports and other high-energy activities, not only contributes to better health but also directly improves the well-being of the elderly.

6. 2. Future policy options for Korea

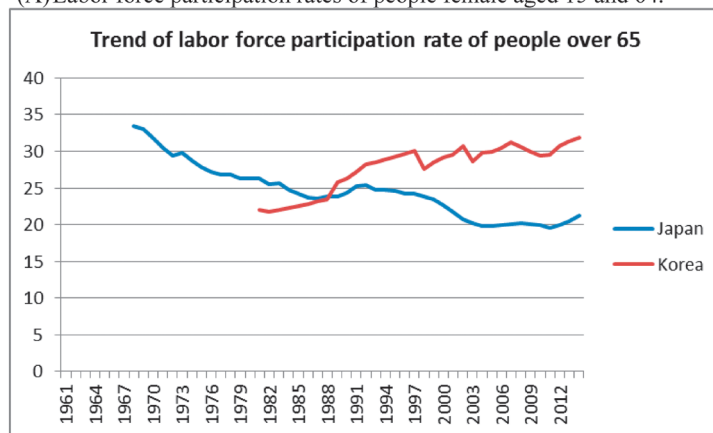
The previous section indicates that the Korean government is actively pursuing a wide range of policy measures to address the problem of rapid population aging. Many of those measures are aimed at raising fertility and some measures are designed to help Korea's elderly population. Despite growing government activism, Korea's rapid population aging shows no signs of slowing down, let alone reversing, as shown in Figure 3A. Therefore, going forward, Korean policymakers must give serious consideration to experimenting with different policy directions. While one broad direction is to pursue existing policies more effectively for greater impact, another strategy is to think outside the box and boldly try completely new policies.

The existing set of government policies can be improved through better implementation and more systematic coordination. For example, a holistic approach is required to raise the participation of married women in the workforce. The experiences of France and Sweden, two rare examples of countries where government intervention seems to have had a tangible effect in arresting a decline in fertility, suggest the pivotal importance of creating a flexible and friendly work environment which enables women to balance work and family. [Lee *et al.* (2009)] While Korea has bits and pieces of such a pro-family environment, those bits and pieces are not integrated into a systematic policy regime. As a result, the Korean work environment has a long way to go from fully welcoming the participation of female workers. This explains why Korea still has one of the lowest female labor force participation rates in OECD, along with Japan, even though it has been increasing continuously, as illustrated in Figure 8A. This is particularly important because higher female labor force participation rate is associated with faster economic growth, as we found empirically in Section 4. However, this may result in lower fertility rate, pointing to a need for a set of carefully calibrated policies that enable women to work *and* have and raise children.

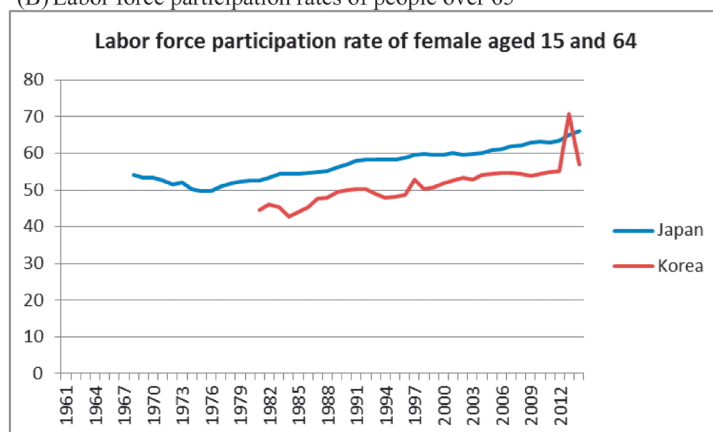
Figure 8B also illustrates that the labor force participation rate of the elderly in Korea has been continuously increasing, while that in Japan has been decreasing. It was found empirically in Section 4 that a higher labor participation of the elderly does not positively contribute to

Figure 8. Trend of labor force participation rates of female aged 15 and 64 and people over 65

(A) Labor force participation rates of people female aged 15 and 64.



(B) Labor force participation rates of people over 65



Data Source: International Labor Organization's online database (ILOSTAT).

economic growth. This might seem to weaken the case for policy support for elderly work, but there are other important factors at play. In particular, many elderly Koreans are forced to work at old age because they do not have adequate retirement income. [Park *et al.* (2012)] The national pension system was set up only in 1988, and extensive social, economic and cultural changes have weakened intra-family support. Therefore, until the pension and retirement system becomes more well-established, enabling the elderly to find work — for example, by introducing more flexible wage systems that allow the elderly to work less for lower pay — will remain a vital part of old-age income security in Korea.

Overall, there is a need for different government agencies to work systematically together,

perhaps under a high-level National Aging Council. Such a council can take a holistic view of Korea's aging challenge and enable the government to formulate and implement a strategic and systematic policy response, taking into account the views of all stakeholders. Furthermore, in light of the clear and present threat that rapid population aging poses to Korean economy and society, there is a growing case for Korean policymakers to think outside the box. More liberal and systematic immigration policy regime is a clear example of thinking outside the box [Lee (2015)]. As an ethnically and culturally homogeneous people, Koreans can be inward-looking and unwelcoming to foreigners. Moreover, in the past, low income level meant that Korea was a source of emigration to other countries rather than a destination for immigrants from other countries. However, more recently, the economic miracle which transformed the country into one of Asia's richest economies has transformed the country from a source of emigration to a destination for immigration. There is thus a strong win-win economic case for encouraging immigration from poorer and younger Asian countries. The experience of Singapore underlines the potential economic benefits of immigration.

On top of that, a rising proportion of Koreans are marrying foreigners, giving rise to a sizable multicultural population. This trend may even change the meaning of what it means to be Korean. While foreign immigrants have become a fact of life and Korean governments have made efforts to integrate them into national life, much more can be done to make immigration an integral part of the solution to population aging. For example, perhaps because immigration is a relatively new phenomenon, Korea does not have a clear and systematic immigration strategy for attracting and retraining the kinds of immigrants that would yield the greatest benefits for the economy and society.

7. Summary and concluding remarks

Without a doubt, population aging is one of the most significant structural challenges facing the world economy. The visible slowdown of economic growth across the world since the global financial crisis probably reflects both cyclical and structural factors. Yet the persistence of the slowdown and the apparent inability of the world economy to stage a sustainable recovery, and the constant downgrading of global growth forecasts by the IMF and other organizations, is giving rise to concerns that the deceleration is primarily structural rather than cyclical. The secular stagnation hypothesis is one well-known example of such concerns and pessimism. One structural driver of the global slowdown which is highlighted by many experts is the worldwide demographic transition to older population structures. The transition is most ad-

vanced in high income countries, but is also evident in many middle income countries, most notably China. In principle, population aging adversely affects growth through a number of channels, in particular its adverse effect on labor supply.

However, notwithstanding the intuitively and theoretical rationales for a negative impact of older demographic profiles on economic performance, the link between demographics and growth is ultimately an empirical issue. The central objective of our paper is to take a more in-depth look at the demographics-growth nexus by performing rigorous econometric analysis on panel data. Our panel data analysis yields some interesting and significant findings. Above all, our empirical evidence confirms the harmful effect of population aging on economic growth in both short run and long run. We also find that elderly participation in labor force has a positive influence on economic growth, which suggests that the harmful effect of aging can be mitigated by more active participation of the elderly in the labor force. Finally, we find that the future level of population aging, not just the past level, has a detrimental effect on economic growth. Future aging may raise concerns about future growth prospects and thus adversely affect current economic activity.

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Appendix Table 1. Country ranking of level of old age share during 2010–2014

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
1	Japan	5.95	24.30	1.84
2	Italy	9.76	21.20	1.14
3	Germany	11.92	20.85	0.89
4	Greece	8.38	19.87	1.15
5	Portugal	8.23	19.55	1.13
6	Bulgaria		18.99	1.10
7	Sweden	12.11	18.89	0.68
8	Latvia		18.87	1.58
9	Finland	7.60	18.39	1.08
10	Austria	12.52	18.21	0.57
11	Lithuania		18.08	1.66
12	Estonia		18.04	1.40
13	Croatia		18.01	1.40
14	France	11.76	17.79	0.60
15	Spain	8.38	17.78	0.94
16	Belgium	12.30	17.55	0.53
17	Denmark	10.94	17.53	0.66
18	Switzerland	10.29	17.37	0.71
19	Malta	7.12	17.34	1.02
20	Slovenia		17.14	1.46
21	Hungary		17.13	0.64
22	United Kingdom	11.93	16.81	0.49
23	Netherlands	9.16	16.60	0.74
24	Czech Republic		16.44	0.88
25	Romania	7.27	16.32	0.91
26	Serbia		15.81	1.37
27	Ukraine		15.61	0.72
28	Norway	11.42	15.46	0.40
29	Canada	7.68	14.88	0.72
30	Georgia		14.24	1.02
31	Poland		14.18	0.68
32	Bosnia and Herzegovina		14.14	1.73
33	Uruguay	8.26	14.14	0.59
34	Australia	8.62	14.08	0.55
35	Belarus		13.99	0.65
36	Luxembourg	11.10	13.95	0.29
37	Curaçao		13.81	1.33
38	New Zealand	8.41	13.67	0.53
39	China, Hong Kong SAR	2.94	13.67	1.07
40	United States	9.31	13.67	0.44
41	Russian Federation		13.14	0.51
42	Barbados	6.95	13.07	0.61
43	Montenegro		13.02	1.06
44	Slovakia		12.88	0.57
45	Iceland	8.19	12.69	0.45
46	Cyprus	6.25	12.05	0.58
47	Ireland	11.15	11.89	0.07
48	Republic of Korea	3.66	11.86	0.82
49	TFYR of Macedonia		11.63	1.01
50	Albania	3.40	11.50	0.79

Appendix Table 1. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
51	Aruba		10.99	0.78
52	Israel	5.00	10.70	0.57
53	Argentina	5.86	10.60	0.47
54	Armenia		10.49	0.96
55	Chile	5.07	10.18	0.51
56	Republic of Moldova		10.05	0.35
57	Singapore	2.27	9.99	0.77
58	Thailand	3.36	9.47	0.61
59	Trinidad and Tobago	3.47	8.72	0.53
60	China	3.59	8.69	0.51
61	Saint Lucia		8.67	0.49
62	Jamaica	4.74	8.66	0.39
63	Mauritius	2.48	8.35	0.59
64	Lebanon		8.24	0.41
65	Sri Lanka	4.35	8.10	0.37
66	Costa Rica	3.05	8.02	0.50
67	China, Macao SAR		7.82	0.12
68	El Salvador	3.32	7.66	0.43
69	Tunisia	3.68	7.46	0.38
70	Bahamas		7.45	0.49
71	Turkey	3.37	7.20	0.38
72	Grenada		7.19	0.19
73	Antigua and Barbuda		7.17	0.36
74	Brazil	3.22	7.12	0.39
75	Panama	3.65	7.12	0.35
76	Seychelles	6.06	6.99	0.09
77	St. Vincent and the Grenadines		6.93	0.24
78	Kazakhstan		6.78	0.09
79	Suriname		6.66	0.34
80	Viet Nam		6.56	0.17
81	Peru	3.47	6.43	0.30
82	Ecuador	4.63	6.31	0.17
83	Colombia	3.21	6.30	0.31
84	Dominican Republic	2.59	6.28	0.37
85	Bolivia (Plurinational State of)	4.43	6.14	0.17
86	Mexico	3.45	6.09	0.26
87	Morocco	3.07	6.05	0.30
88	Venezuela (Bolivarian Republic of)	2.35	5.80	0.35
89	Azerbaijan		5.75	0.35
90	Algeria		5.66	0.23
91	Paraguay	3.27	5.59	0.23
92	India	3.16	5.30	0.21
93	Gabon	6.89	5.26	-0.16
94	Malaysia	3.33	5.24	0.19
95	Fiji	2.13	5.24	0.31
96	Nepal	2.62	5.17	0.25
97	Cabo Verde	4.79	5.15	0.04
98	Myanmar	3.45	5.13	0.17
99	Egypt	4.05	5.05	0.10
100	South Africa	3.90	5.03	0.11

Appendix Table 1. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
101	Indonesia	3.50	5.02	0.15
102	Iran (Islamic Republic of)	3.82	4.93	0.11
103	Nicaragua	2.53	4.84	0.23
104	Bangladesh	2.68	4.84	0.22
105	Maldives		4.82	0.31
106	Bhutan		4.72	0.29
107	Uzbekistan		4.64	0.12
108	Guatemala	2.74	4.61	0.19
109	Honduras	3.15	4.56	0.14
110	Haiti	3.28	4.52	0.12
111	Pakistan	4.18	4.46	0.03
112	Kyrgyzstan		4.35	-0.22
113	Philippines	3.07	4.32	0.12
114	Lesotho	4.26	4.22	0.00
115	Turkmenistan		4.10	0.04
116	Djibouti		3.92	0.19
117	Mongolia		3.90	-0.12
118	Central African Republic	4.28	3.89	-0.04
119	Cambodia		3.87	0.16
120	Brunei Darussalam		3.82	0.03
121	Belize		3.78	-0.08
122	Jordan	4.07	3.75	-0.03
123	Lao People's DR		3.72	0.08
124	Syrian Arab Republic	3.85	3.72	-0.01
125	Congo	3.72	3.63	-0.01
126	Ghana	2.42	3.48	0.11
127	Botswana	3.78	3.48	-0.03
128	Namibia	3.66	3.47	-0.02
129	Sao Tome and Principe		3.44	-0.12
130	Swaziland		3.44	0.09
131	Sudan (Former)		3.42	0.11
132	Ethiopia	2.61	3.38	0.08
133	Malawi	2.68	3.32	0.06
134	Mozambique	2.82	3.31	0.05
135	Cameroon	3.63	3.23	-0.04
136	Tajikistan		3.19	-0.17
137	Mauritania	2.06	3.17	0.11
138	U.R. of Tanzania: Mainland	2.41	3.16	0.08
139	Iraq		3.16	-0.12
140	Guinea-Bissau	3.00	3.14	0.01
141	Zimbabwe	3.35	3.11	-0.02
142	Guinea	3.35	3.10	-0.03
143	Liberia	2.37	3.05	0.07
144	Senegal	2.62	3.03	0.04
145	Côte d'Ivoire	2.50	3.02	0.05
146	D.R. of the Congo	2.91	2.94	0.00
147	Zambia	2.53	2.92	0.04
148	Equatorial Guinea	4.98	2.92	-0.21
149	Benin	4.90	2.89	-0.20
150	Madagascar	3.29	2.83	-0.05

Appendix Table 1. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
151	Comoros	3.13	2.82	-0.03
152	Saudi Arabia		2.77	-0.07
153	Nigeria	2.87	2.75	-0.01
154	Togo	3.14	2.74	-0.04
155	Rwanda	2.99	2.70	-0.03
156	Kenya	3.66	2.70	-0.10
157	Mali	2.30	2.64	0.03
158	Sierra Leone	2.91	2.64	-0.03
159	Yemen		2.62	0.02
160	Oman		2.61	-0.07
161	Niger	1.25	2.55	0.13
162	Burundi	2.98	2.52	-0.05
163	Uganda	2.59	2.52	-0.01
164	Chad	3.83	2.51	-0.13
165	Burkina Faso	2.43	2.44	0.00
166	Gambia	2.22	2.42	0.02
167	Angola		2.33	-0.04
168	Bahrain		2.21	-0.05
169	Kuwait		1.89	0.02
170	Qatar		1.10	-0.11
171	United Arab Emirates		0.86	-0.05

Data Source: Authors' calculation using World Bank's World Development Indicators (WDI) online database

Appendix Table 2. Country ranking of average 5-year change in old age share between period 1 (1960–1964) and period 2 (2010–2014)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
1	Japan	5.95	24.30	1.84
2	Bosnia and Herzegovina		14.14	1.73
3	Lithuania		18.08	1.66
4	Latvia		18.87	1.58
5	Slovenia		17.14	1.46
6	Estonia		18.04	1.40
7	Croatia		18.01	1.40
8	Serbia		15.81	1.37
9	Curaçao		13.81	1.33
10	Greece	8.38	19.87	1.15
11	Italy	9.76	21.20	1.14
12	Portugal	8.23	19.55	1.13
13	Bulgaria		18.99	1.10
14	Finland	7.60	18.39	1.08
15	China, Hong Kong SAR	2.94	13.67	1.07
16	Montenegro		13.02	1.06
17	Malta	7.12	17.34	1.02
18	Georgia		14.24	1.02
19	TFYR of Macedonia		11.63	1.01
20	Armenia		10.49	0.96
21	Spain	8.38	17.78	0.94
22	Romania	7.27	16.32	0.91
23	Germany	11.92	20.85	0.89
24	Czech Republic		16.44	0.88
25	Republic of Korea	3.66	11.86	0.82
26	Albania	3.40	11.50	0.79
27	Aruba		10.99	0.78
28	Singapore	2.27	9.99	0.77
29	Netherlands	9.16	16.60	0.74
30	Canada	7.68	14.88	0.72
31	Ukraine		15.61	0.72
32	Switzerland	10.29	17.37	0.71
33	Sweden	12.11	18.89	0.68
34	Poland		14.18	0.68
35	Denmark	10.94	17.53	0.66
36	Belarus		13.99	0.65
37	Hungary		17.13	0.64
38	Barbados	6.95	13.07	0.61
39	Thailand	3.36	9.47	0.61
40	France	11.76	17.79	0.60
41	Uruguay	8.26	14.14	0.59
42	Mauritius	2.48	8.35	0.59
43	Cyprus	6.25	12.05	0.58
44	Slovakia		12.88	0.57
45	Israel	5.00	10.70	0.57
46	Austria	12.52	18.21	0.57
47	Australia	8.62	14.08	0.55
48	New Zealand	8.41	13.67	0.53
49	Belgium	12.30	17.55	0.53
50	Trinidad and Tobago	3.47	8.72	0.53

Appendix Table 2. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
51	Russian Federation		13.14	0.51
52	Chile	5.07	10.18	0.51
53	China	3.59	8.69	0.51
54	Costa Rica	3.05	8.02	0.50
55	Saint Lucia		8.67	0.49
56	Bahamas		7.45	0.49
57	United Kingdom	11.93	16.81	0.49
58	Argentina	5.86	10.60	0.47
59	Iceland	8.19	12.69	0.45
60	United States	9.31	13.67	0.44
61	El Salvador	3.32	7.66	0.43
62	Lebanon		8.24	0.41
63	Norway	11.42	15.46	0.40
64	Jamaica	4.74	8.66	0.39
65	Brazil	3.22	7.12	0.39
66	Turkey	3.37	7.20	0.38
67	Tunisia	3.68	7.46	0.38
68	Sri Lanka	4.35	8.10	0.37
69	Dominican Republic	2.59	6.28	0.37
70	Antigua and Barbuda		7.17	0.36
71	Republic of Moldova		10.05	0.35
72	Azerbaijan		5.75	0.35
73	Panama	3.65	7.12	0.35
74	Venezuela (Bolivarian Republic of)	2.35	5.80	0.35
75	Suriname		6.66	0.34
76	Fiji	2.13	5.24	0.31
77	Maldives		4.82	0.31
78	Colombia	3.21	6.30	0.31
79	Morocco	3.07	6.05	0.30
80	Peru	3.47	6.43	0.30
81	Bhutan		4.72	0.29
82	Luxembourg	11.10	13.95	0.29
83	Mexico	3.45	6.09	0.26
84	Nepal	2.62	5.17	0.25
85	St. Vincent and the Grenadines		6.93	0.24
86	Paraguay	3.27	5.59	0.23
87	Nicaragua	2.53	4.84	0.23
88	Algeria		5.66	0.23
89	Bangladesh	2.68	4.84	0.22
90	India	3.16	5.30	0.21
91	Malaysia	3.33	5.24	0.19
92	Grenada		7.19	0.19
93	Guatemala	2.74	4.61	0.19
94	Djibouti		3.92	0.19
95	Bolivia (Plurinational State of)	4.43	6.14	0.17
96	Myanmar	3.45	5.13	0.17
97	Ecuador	4.63	6.31	0.17
98	Viet Nam		6.56	0.17
99	Cambodia		3.87	0.16
100	Indonesia	3.50	5.02	0.15

Appendix Table 2. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
101	Honduras	3.15	4.56	0.14
102	Niger	1.25	2.55	0.13
103	Philippines	3.07	4.32	0.12
104	China, Macao SAR		7.82	0.12
105	Haiti	3.28	4.52	0.12
106	Uzbekistan		4.64	0.12
107	Sudan (Former)		3.42	0.11
108	South Africa	3.90	5.03	0.11
109	Mauritania	2.06	3.17	0.11
110	Iran (Islamic Republic of)	3.82	4.93	0.11
111	Ghana	2.42	3.48	0.11
112	Egypt	4.05	5.05	0.10
113	Seychelles	6.06	6.99	0.09
114	Swaziland		3.44	0.09
115	Kazakhstan		6.78	0.09
116	Ethiopia	2.61	3.38	0.08
117	U.R. of Tanzania: Mainland	2.41	3.16	0.08
118	Lao People's DR		3.72	0.08
119	Ireland	11.15	11.89	0.07
120	Liberia	2.37	3.05	0.07
121	Malawi	2.68	3.32	0.06
122	Côte d'Ivoire	2.50	3.02	0.05
123	Mozambique	2.82	3.31	0.05
124	Turkmenistan		4.10	0.04
125	Senegal	2.62	3.03	0.04
126	Zambia	2.53	2.92	0.04
127	Cabo Verde	4.79	5.15	0.04
128	Mali	2.30	2.64	0.03
129	Brunei Darussalam		3.82	0.03
130	Pakistan	4.18	4.46	0.03
131	Gambia	2.22	2.42	0.02
132	Kuwait		1.89	0.02
133	Yemen		2.62	0.02
134	Guinea-Bissau	3.00	3.14	0.01
135	D.R. of the Congo	2.91	2.94	0.00
136	Burkina Faso	2.43	2.44	0.00
137	Lesotho	4.26	4.22	0.00
138	Uganda	2.59	2.52	-0.01
139	Congo	3.72	3.63	-0.01
140	Nigeria	2.87	2.75	-0.01
141	Syrian Arab Republic	3.85	3.72	-0.01
142	Namibia	3.66	3.47	-0.02
143	Zimbabwe	3.35	3.11	-0.02
144	Guinea	3.35	3.10	-0.03
145	Sierra Leone	2.91	2.64	-0.03
146	Rwanda	2.99	2.70	-0.03
147	Botswana	3.78	3.48	-0.03
148	Comoros	3.13	2.82	-0.03
149	Jordan	4.07	3.75	-0.03
150	Central African Republic	4.28	3.89	-0.04

Appendix Table 2. (Continued)

	Country	Old age share		Average 5-year change
		1960-1964	2010-2014	
151	Cameroon	3.63	3.23	-0.04
152	Togo	3.14	2.74	-0.04
153	Angola		2.33	-0.04
154	Burundi	2.98	2.52	-0.05
155	Madagascar	3.29	2.83	-0.05
156	Bahrain		2.21	-0.05
157	United Arab Emirates		0.86	-0.05
158	Oman		2.61	-0.07
159	Saudi Arabia		2.77	-0.07
160	Belize		3.78	-0.08
161	Kenya	3.66	2.70	-0.10
162	Qatar		1.10	-0.11
163	Iraq		3.16	-0.12
164	Mongolia		3.90	-0.12
165	Sao Tome and Principe		3.44	-0.12
166	Chad	3.83	2.51	-0.13
167	Gabon	6.89	5.26	-0.16
168	Tajikistan		3.19	-0.17
169	Benin	4.90	2.89	-0.20
170	Equatorial Guinea	4.98	2.92	-0.21
171	Kyrgyzstan		4.35	-0.22

Data Source: Authors' calculation using World Bank's World Development Indicators (WDI) online database

Appendix Table 3. Sources/Definitions of Variables

Variables	Description and construction	Data Source
Real GDP	Per Capita Output-side real GDP at chained PPPs (in mil. 2011US\$)	Penn World Table 9.0
Population	Total Population	World Bank's World Development Indicators
Working Age Population Share	Population ages 15-64 (% of total population)	World Bank's World Development Indicators
Young Population Share	Population ages 0-14 (% of total population)	World Bank's World Development Indicators
Old Population Share	Population ages 65 and above (% of total population)	World Bank's World Development Indicators
Young Age Dependency Ratio	Ratio of people younger than 15 to the working age population	World Bank's World Development Indicators
Old Age Dependency Ratio	Ratio of people older than 64 to the working age population	World Bank's World Development Indicators
Projections of Young Age Dependency Ratio (Korea)	Projections of Ratio of people younger than 15 to the working age population	Statistics Korea
Projections of Old Age Dependency Ratio (Korea)	Projections of Ratio of people older than 64 to the working age population	Statistics Korea
Capital Stock	Capital Stock at current PPPs (in mil. 2011 US\$)	Penn World Table 9.0
Human Capital	Human Capital Index	Penn World Table 9.0
Trade Share	% of GDP	World Bank's World Development Indicators
Labor Force Participation Rate over 65	Ratio of labor force over 65 divided by total population over 65	International Labor Organization's ILOSTAT
Female Labor Force Participation Rate ages 15-64	Ratio of female labor force over female working population	International Labor Organization's ILOSTAT