Global Aging: More Headwinds for U.S. Stocks?

Technical Appendix

By Zheng Liu, Mark M. Spiegel, and Bing Wang

This technical appendix provides some details of our methodology in studying the correlations between demography and equity values, presents some additional statistical results for the G-7 countries, China, and Korea, and describes the data used in the *FRBSF Economic Letter* 2014-38, "Global Aging: More Headwinds for U.S. Stocks?" by Zheng Liu, Mark M. Spiegel, and Bing Wang. http://www.frbsf.org/economic-research/publications/economic-letter/2014/december/baby-boomers-retirement-stocks-aging.

Statistical Methods:

Regression A: P/E ratio on M/O ratio

log(P/E ratio) = a + b*log(M/O ratio)

M/O ratio is defined as: (Population age 40-49)/(Population age 60-69)

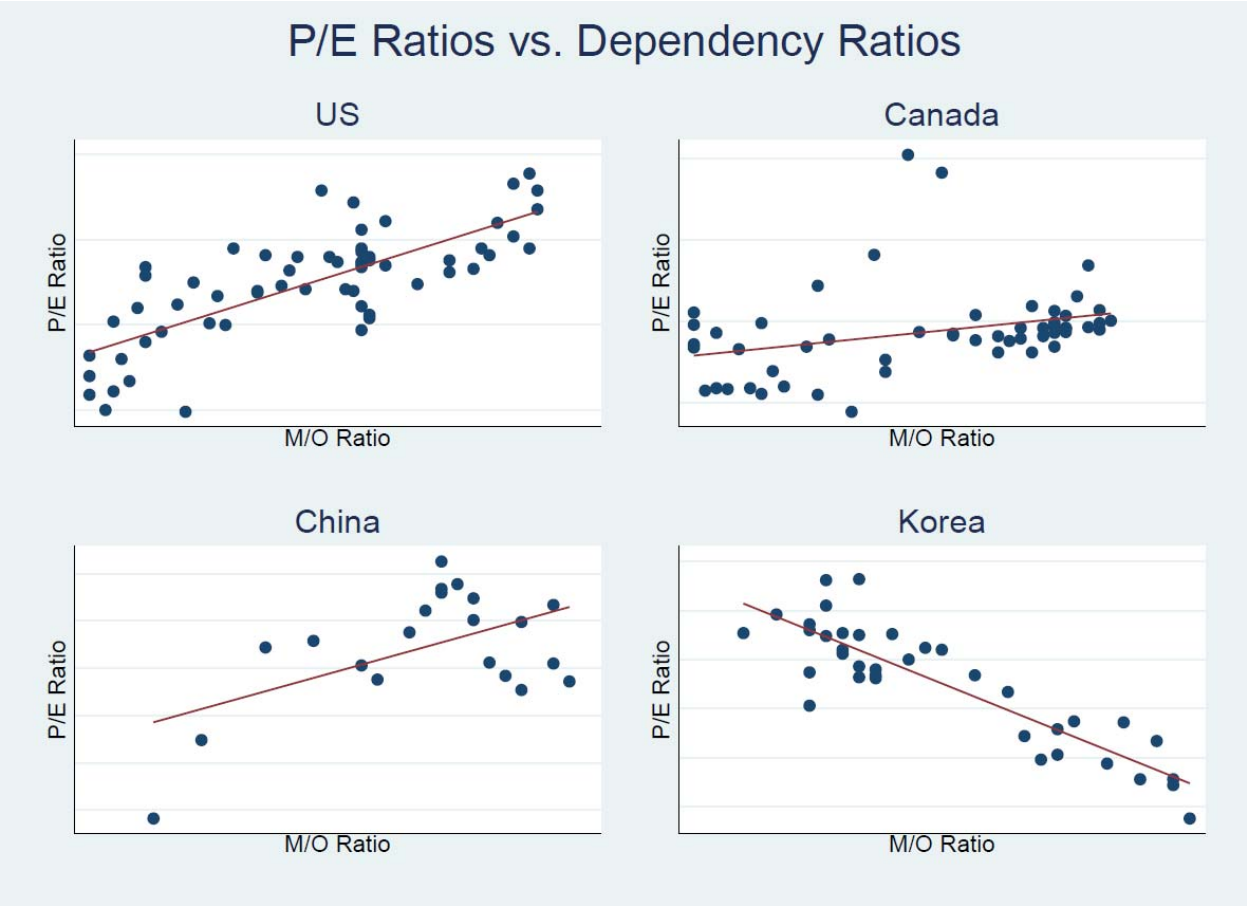
	Coefficient on M/O		Constant		R2
P/E					
U.S.	1.47	***	2.07	***	0.58
	(0.16)		(0.08)		
Canada	1.40	**	2.08	***	0.10
	(0.57)		(0.33)		
France	1.39		2.24	***	0.06
	(0.93)		(0.34)		
Germany	-0.61		2.89	***	0.05
	(0.42)		(0.14)		
Italy	-3.01	*	3.68	***	0.12
	(1.67)		(0.41)		
Japan	-0.78	**	3.60	***	0.11
	(0.31)		(0.17)		
U.K.	0.42		2.40	***	0.01
	(0.47)		(0.14)		
China	4.69	**	-0.53		0.29
	(1.69)		(1.36)		
Korea	-6.79	***	8.03	***	0.77
	(0.62)		(0.53)		

Notes:

Statistical significance denoted by * for 0.10, ** for 0.05, *** for 0.01.

Standard errors below each coefficient in parentheses.

Additional results on the correlations between P/E ratios and M/O ratios



Regression B: P/E ratio on proportion of retirees in total population

log(P/E ratio) = a + b*log(Proportion of retirees)

Proportion of retirees is defined as: (Population age 65+)/(Total population).

	Coefficient on Retirees		Constant		R2
P/E					
U.S.	-1.49	***	-2.16		0.12
	(0.53)		(1.75)		
Canada	0.85		4.84	***	0.11
	(0.34)		(0.79)		
France	1.44		5.50	***	0.06
	(0.90)		(1.74)		
Germany	0.26		3.21	***	0.01
	(0.58)		(1.07)		
Italy	-0.62		1.88		0.02
	(0.81)		(1.45)		
Japan	0.82	***	5.11	***	0.34
	(0.16)		(0.37)		
U.K.	1.67	***	5.76	***	0.23
	(0.41)		(0.79)		
China	1.34		6.81	**	0.07
	(1.14)		(3.04)		
Korea	1.13	***	5.50	***	0.45
	(0.21)		(0.61)		

Notes:

Statistical significance denoted by * for 0.10, ** for 0.05, *** for 0.01.

Standard errors below each coefficient in parentheses.

Data sources

M/O ratio and proportion of retirees:
Population data and projections for G7 countries and China and Korea
Source: Haver (U.S.), UN World Population Prospects 2012 (other countries).
Note: For U.S., data are available through 2013, with projections from 2014–2030.
For other countries, data are available through 2010, with projections from 2011–2030.

P/E ratio:
Price-to-earnings ratio data for stock exchanges in the following countries and available for the following time ranges:

U.S. (S&P 500): 1954–2013
Canada (S&P/TSX): 1956–2013
France: 1971–2013
Germany: 1969–2013
Italy: 1984–2013
Japan (Tokyo Stock Exchange): 1956–2013
U.K. (FTSE): 1954–2013
China (Shanghai Stock Exchange): 1990–2013
Korea: 1974–2013

Source: Bloomberg (U.S. and China), Global Financial Data (other countries).