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The Growing Gap in Life Expectancy: Using the Future Elderly Model to Estimate Implications for Social Security and Medicare

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Across the industrialized world, health and mortality gradients by education and income have generally been steepening (Crimmins and Saito 2001; Meara, Richards, and Cutler 2008; Goldman and Smith 2011). The leading explanations for the increased gaps in life expectancy involve differential trends in smoking, diet and exercise, stress, chronic disease management, and access to health care. Less well known, however, is the impact these trends will have on public programs and their progressivity—especially Social Security and Medicare. To fill this gap, this paper uses the Future Elderly Model (FEM), a microsimulation model of health and economic outcomes for older Americans, to estimate the effects of steeper mortality gradients on the progressivity of Social Security and Medicare benefits.

I. Impact of Increasing Gaps in Life Expectancy

Many studies have examined the growing gap in mortality rates, and many have also examined the impact of a mortality gradient by life-time income or education on the progressivity of Social Security. Few studies, though, have examined the effect of the *increasing* gap in life expectancy on Social Security progressivity, and none to our knowledge has assessed the impact on Medicare. Waldron (2007) uses Social Security records to document the expanding mortality gradient by income, finding "a difference in both the level and the rate of change in mortality improvement over time by socioeconomic status for male Social Security-covered workers" for birth cohorts between 1912 and 1941. Diamond and Orszag (2004) argued that this reduction in lifetime progressivity justified offsetting changes to Social Security's benefit formula and tax provisions. This paper expands the literature by providing new estimates of the mortality gradient trend along with its impact on both Social Security and Medicare.

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II. Future Elderly Model

The results are based on the FEM, a demographic and economic simulation designed to predict the future costs and health status of older Americans and explore what current trends or future shifts imply for policy. Using data from the Health and Retirement Study, the Medicare Current Beneficiary Survey, and other sources, the model predicts health, economic outcomes, and medical spending outcomes for a representative sample of Americans aged 50 and older (Goldman et al. 2010). For those aged 65 and older, spending is estimated using Medicare claims records to track actual medical care use and costs over time. The model includes demographic factors (race, ethnicity, sex, marital status, and age), health status (heart disease, stroke, cancer, hypertension, diabetes, lung disease, and smoking), functional status, and earnings.

For this analysis, the FEM was adapted in two configurations. The first, called “FEM–time trend” added a linear time trend to mortality projections for years between 2000 and 2025, based on the mortality trend observed in the Health and Retirement Study. The trend is allowed to vary by income; specifically, the time trend is interacted with a dummy variable for above- and below-median average indexed monthly earnings (AIME) levels at age 50. In 2025 and beyond, the time trend was arbitrarily discontinued and the 2025 effect was held constant. In the second configuration, labeled “FEM-Waldron,” the model was constrained to mimic the mortality gradient estimates in Waldron (2007), and those trends were then assumed to continue, including after 2025. The model was then used to examine cohorts born in 1928, 1960, and 1990.

III. Results

We examine life expectancy at age 65, the present value of Social Security retirement benefits at age 50 (in 2009 dollars), and lifetime Medicare benefits at age 50 (in 2009 dollars, inflated by GDP growth plus excess medical cost growth capped at the levels mandated under the Affordable Care Act). Both are discounted at 2.9 percent annually.

Table 1 shows life expectancy at age 65. Under the FEM–time trend model, the gap in life expectancy at age 65 between the highest quartile of AIME and the lowest increases 81 percent, from 3.1 years for males born in 1928 to 5.6 years for males born in 1990. For females, the gap almost doubles, from 1.7 years to 3.3 years, over that time period. Under the FEM-Waldron model, the gap increases even more markedly, reaching an astonishing 13 years for both males and females born in 1990. Top-quartile men and women born in 1990 are projected to experience an increase in life expectancy at age 65 of more than 12 years relative to the 1928 cohort, while those in the bottom quartile of lifetime earnings experience a gain of less than four years. Differential gains of this magnitude are not unheard of in the United States, where there already exist life expectancy gaps of more than 14 years by race and education (Olshansky et al. 2012).

The dramatic difference between the two models occurs because, as noted above, the FEM–time trend model flattens the trend starting in 2025; under the FEM-Waldron model, by contrast, the underlying trends are assumed to continue beyond 2025. The differences between the two models are also visible in the ratio of life expectancies. That ratio rises for those born in 1990 relative to those born in 1928 under both models, though under the FEM–time trend version the ratio is modestly lower for the 1990 birth cohort than the 1960 one, mainly due to this flattening of the trend after 2025.

Table 2 shows the effects of these life expectancy gaps on Social Security benefits. For this purpose, each cohort effectively faces the same economic and policy environment; the results, therefore, isolate the impact of mortality changes on lifetime benefits. The net present value of Social Security benefits rises across the cohorts under these simulations because life expectancy is increasing. But the impact of the growing gradient is substantial. For example, under FEM-Waldron, Social Security benefits rise modestly, from an average of $91,355 for males in the lowest quartile born in 1928 to $103,714 for those born in 1990. For males in the top quartile, by contrast, benefits rise dramatically, from $223,126 to $324,120. The ratio of lifetime benefits increases from 2.44 to 3.13.

To get some sense of how large this effect is, consider the following thought experiment. Imagine average annual benefits for the top quartile are $50,000 per year, and for the bottom quartile average $10,000 per year. Then, to offset the impact of the growing gradient in mortality rates on lifetime benefit progressivity would require reducing the average top quartile benefit by 22 percent, to approximately $39,000. Many policy interventions, such as adopting the superlative consumer price index for the indexation of Social Security benefits, would have different distributional consequences by AIME relative to assuming a steady mortality gradient.

The FEM was also used to examine the impact on lifetime Medicare benefits (valued as the costs incurred by the program, not the value of insurance to the individual). Table 3 shows the preliminary results, which will be refined as part of an ongoing National Academies of Sciences panel on the topic. The preliminary results show that under the FEM–time trend variant of the model, the progressivity of Medicare benefits declines modestly between the 1928 and 1990 cohorts; under the FEM-Waldron variant, Medicare benefits become noticeably less progressive.

IV. Conclusions

The results suggest that the growing gradient in mortality rates by lifetime income and education can have a first-order effect on the lifetime progressivity of Social Security and Medicare benefits. Future trends in the gradient may also have a significant effect on total program costs, since benefit levels are higher in dollar terms for those in the top quartile than the bottom. It is difficult to determine today whether the FEM–time trend or FEM-Waldron variants of the model are more plausible for the future, since they make substantially different assumptions about the trend in the mortality gradient in 2025 and beyond. Given the pronounced impact of the assumed trend in mortality gradients on average life expectancy, the progressivity of Social Security and Medicare benefits, and total program costs, both policymakers and researchers should devote more attention to the effects.

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Table 1

Life Expectancy at Age 65

	Male birth cohort					
	FEM–time trend			**FEM-Waldron**		
AIME category/year	**1928**	**1960**	**1990**	**1928**	**1960**	**1990**
Lowest	13.6	15.2	16.0	15.0	16.9	18.5
2	14.3	17.0	18.3	16.5	19.8	23.1
3	15.8	19.5	20.9	18.0	22.8	27.0
Highest	16.7	20.7	21.6	19.4	25.7	31.6
Gap, high-low	*3.1*	*5.5*	*5.6*	*4.3*	*8.8*	*13.1*
Ratio, high/low	*1.23*	*1.37*	*1.35*	*1.29*	*1.52*	*1.70*
	Female birth cohort					
	FEM–time trend			FEM-Waldron		
AIME category/year	1928	1960	1990	1928	1960	1990
Lowest	18.1	19.9	20.8	16.9	18.9	20.4
2	19.0	21.3	22.0	18.7	21.9	25.1
3	19.6	22.8	23.6	19.9	24.6	29.1
Highest	19.9	23.5	24.1	21.2	27.7	33.6
Gap, high-low	*1.7*	*3.6*	*3.3*	*4.3*	*8.8*	*13.1*
Ratio, high/low	*1.10*	*1.18*	*1.16*	*1.25*	*1.47*	*1.64*

Table 2

Social Security Benefits (net present value, average by quartile, at age 50)

	Male					
	FEM time-trend			**FEM-Waldron**		
AIME category/year	**1928**	**1960**	**1990**	**1928**	**1960**	**1990**
Lowest	78,688	91,038	96,335	91,355	97,335	103,714
2	117,892	145,157	156,068	140,410	160,094	184,185
3	151,117	195,068	204,331	183,584	221,002	248,733
Highest	183,226	236,453	241,024	223,126	280,121	324,120
Gap, high-low	*104,538*	*145,415*	*144,689*	*131,771*	*182,785*	*220,406*
Ratio, high/low	*2.33*	*2.60*	*2.50*	*2.44*	*2.88*	*3.13*
	Female					
	FEM time-trend			FEM-Waldron		
AIME category/year	1928	1960	1990	1928	1960	1990
Lowest	56,729	57,682	55,154	49,240	52,802	52,568
2	95,783	101,758	103,024	93,176	104,237	113,617
3	122,388	140,316	142,518	125,655	147,231	165,729
Highest	167,744	197,793	197,632	180,730	221,093	248,072
Gap, high-low	*111,015*	*140,111*	*142,478*	*131,490*	*168,292*	*195,504*
Ratio, high/low	*2.96*	*3.43*	*3.58*	*3.67*	*4.19*	*4.72*

Table 3

Medicare Benefits at Age 50 (*average by quartile, at age* 50)

	Male					
	FEM–time trend			**FEM-Waldron**		
AIME category/year	**1928**	**1960**	**1990**	**1928**	**1960**	**1990**
Lowest	133,753	220,308	267,102	214,880	234,306	261,152
2	128,986	224,660	275,944	200,639	237,345	282,879
3	136,697	243,731	285,596	215,284	271,705	323,974
Highest	134,855	247,605	292,078	213,438	288,014	354,362
Gap, high-low	*1,102*	*27,297*	*24,976*	*−1,442*	*53,708*	*93,209*
Ratio, high/low	*1.01*	*1.12*	*1.09*	*0.99*	*1.23*	*1.36*
	Female					
	FEM–time trend			FEM-Waldron		
AIME category/year	1928	1960	1990	1928	1960	1990
Lowest	177,663	274,042	331,625	217,298	237,714	267,864
2	174,950	276,789	331,469	217,419	254,587	309,386
3	175,909	282,799	332,230	228,427	284,228	347,116
Highest	176,325	291,196	335,597	235,080	310,401	392,785
Gap, high-low	*−1,339*	*17,154*	*3,971*	*17,782*	*72,688*	*124,921*
Ratio, high/low	*0.99*	*1.06*	*1.01*	*1.08*	*1.31*	*1.47*