

1.(a) Social MB = $120 \times (10 - 0.10Q)$ million \$ = $(1200 - 12Q)$ million \$

(b) Social MB = MC where MC is constant at \$200 million.

Here $(1200 - 12Q) = 240 \implies 960 = 12Q \implies Q = 80$.

2.(a) Consumers equate private MB to private MC.

Instead we want to equate social MB to social MC, which often gives a different optimal quantity.

(b) Immunizations against infectious diseases and treatment of infectious diseases.

3.(a) Medicare is more clearly social insurance. It is funded as an insurance program (pay out of payroll tax while young and get benefits when old and face greater health expenses) managed by the federal government. Medicaid by contrast is more income redistribution to the poor, similar to provision of food stamps and housing vouchers.

(b) Yes. Medicaid could also be provided / funded as a social insurance program, with payroll tax similar to the Medicare payroll tax and insurance benefits received if poor.

(c) Attitudes would need to change. In the U.S. Medicaid is seen as an inferior product of last resort to the needy.

4.(a) Yes. For example, life expectancy gains with increased per capita medical expenditures are the highest for low income countries.

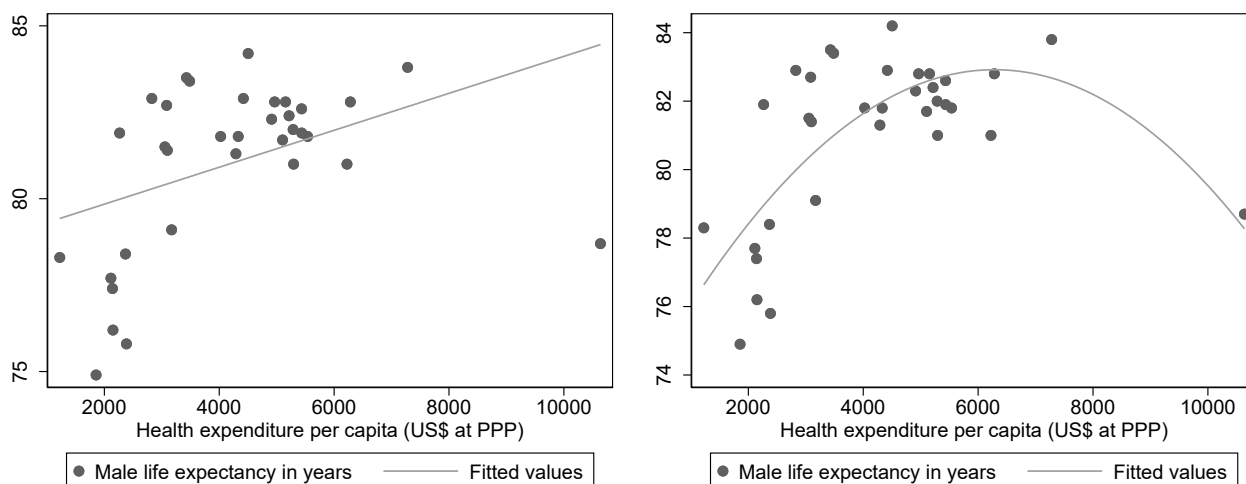
(b) Yes. This was the point of the Cutler and McClellan article – $MB > MC$ for several major medical innovations.

(c) Yes. For example, there is big variation in use of c-sections for delivering babies with little variation in outcomes.

5.(b) Chile, Columbia, and Mexico were dropped.

(c) Thee 34 observations have complete data available for all variables.

6.(a) From the first panel of the figure life expectancy increases with health spending per capita. The outliers (those furthest from the regression line) are three countries in the lower left and by far the largest outlier is the U.S. (the right most observation).



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6.(b) . regress lifeexp hlthgpc, vce(robust) yields

Linear regression	Number of obs	=	34
	F(1, 32)	=	2.05
	Prob > F	=	0.1616
	R-squared	=	0.1693
	Root MSE	=	2.2542

		Robust				
lifeexp	Coefficient	std. err.	t	P> t	[95% conf. interval]	
hlthgpc	.0005345	.0003731	1.43	0.162	-.0002254	.0012944
_cons	78.77283	1.585925	49.67	0.000	75.54241	82.00326

The relationship is positive as expected but is statistically insignificant with $p = 0.162$.

(c) From the second panel of the figure life expectancy at first increases with health spending and then begins decreasing once health spending reaches \$6,000 per capita. This makes little sense and arises because the curve is trying to fit the outlying value for the U.S.

(d) Now **hlthpc** appearing quadratically is statistically significant at 5% since $p=0.0000 < 0.05$.

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. generate hlthpcsq = hlthpc^2
. regress lifeexp hlthpc hlthpcsq, vce(robust)
. test hlthpc hlthpcsq
yields
( 1) hlthpc = 0
( 2) hlthpcsq = 0
      F( 2, 31) = 26.45
      Prob > F = 0.0000
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7.(a) . regress lifeexp hlthpc doctors nurses hospbeds, vce(robust) yields

Linear regression	Number of obs	=	34
	F(4, 29)	=	3.35
	Prob > F	=	0.0227
	R-squared	=	0.2479
	Root MSE	=	2.253

		Robust				
lifeexp	Coefficient	std. err.	t	P> t	[95% conf. interval]	
hlthpc	.000172	.0004441	0.39	0.701	-.0007362	.0010802
doctors	.2850313	.3902545	0.73	0.471	-.5131286	1.083191
nurses	.236206	.1531134	1.54	0.134	-.0769461	.5493581
hospbeds	-.0183695	.1801129	-0.10	0.919	-.3867418	.3500028
_cons	77.14758	1.672196	46.14	0.000	73.72755	80.5676

(b) No regressors are statistically significant at level 0.05.

(c) All variables except **hospbeds** have the expected sign (and **hospbeds** is highly statistically insignificant.)

(d) **doctors nurses hospbeds** are jointly statistically significant at level 0.05 as a separate joint test yields $F(3, 29) = 0.88$ Prob > F = 0.4633 so $p > 0.05$.

(e) The prediction for the U.S. is 82.48 compared to actual value of 78.7, so the U.S. is still performing worse than predicted (aside: the difference is a little less than for the predicted value of 84.46 from regression on just **hlthpc**).

(f) The residual is $78.7 - 82.48 = -3.78$. Only two countries (Latvia (-4.79) and Lithuania (-4.45)) had a residual with absolute value greater than 3.78. So the U.S. is borderline an outlier.