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Health Care Benefits vs. Costs: Are We Making the Right Choices?

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I. INTRODUCTION

America has a new health care system, which attempts to increase coverage at less cost. There are doubts that it is in fact doing so, but that should not be a surprise to anyone. We have for years pointed out that increasing coverage while lowering prices would not generally be feasible without severe rationing of services. And, in fact, we can now see that to date and for many Americans, not only are our health care options severely restricted but we also pay drastically increased insurance premiums.

In addition, the new health care system may also have undesired effects on much needed innovation, by making "low health care costs" the policy objective. Lowering health care costs is important, and there is certainly room to do so, but the question is at what impact to future benefits? Is it a coincidence that we see pharmaceutical companies reducing staff and planning on moving (further) key operations abroad? And should "lower costs" truly be the goal of policy? After all, one person's "cost" is another person's "revenue," and costs can rise for a number of good, socially desirable reasons.

In this article we argue that, instead, policy should focus on the price per constant quality of health care. There are reasons to think that prices may be inefficient in this market, and there may be policy options that could address that. Allowing for interstate competition between insurance companies would likely reduce premiums and significantly reduce health care costs.

Still, even "reducing price" must be attempted judiciously. Measures discouraging innovation may allow for lower prices in the present but, to the extent they reduce current R&D, they will represent a large social cost in the future. Such measures would include the growing number of cases in which pharmaceutical companies are denied the financial benefits from their patents till expiration. Yes we get cheaper medicines today, no doubt, but how about tomorrow?

II. BENEFITS TO SOCIETY FROM ADDITIONAL HEALTH CARE COSTS

There is a significant amount of literature showing the benefits of health care expenses in different areas. Here we present new evidence from two different and simple empirical comparisons between benefits and costs when comparing the United States against a large group of countries.

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A. Health Care Expenses and Longevity

We use data from the OECD for health care expenses, GDP, GDP implicit price deflator, population, life expectancy at 65 for both males and females, and life expectancy at birth. Data was available from 1960 to 2005 for the majority of the countries. The 21 countries studied are Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, The Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, United Kingdom, and the United States. Though it is possible that health care expenses might not incorporate exactly the same components across all of the countries, we expect for the most part that these data are roughly comparable.

We study the effect that real per capita health care expense as a percentage of real per capita GDP has on life expectancy at 65 divided by life expectancy at birth. Some countries might have higher life expectancy at birth due to other factors besides their health care systems (genetics, diet, or cultural lifestyles for example); however, this ratio represents the relative gain or improvement in life expectancy which is more directly due to interventions like health care, and the analysis will relate that to health care expenditures.

It is important to stress that, to the extent we find that higher spending is correlated with longer life expectancy, this would represent only a fraction of the total benefits of health care spending. Much of the benefit of health care is felt in the *quality* of living and not just in the *quantity* of living as captured by life expectancy.

Having observations for all of these countries over time, we estimate a panel regression model with country-specific fixed effects. We estimate two similar regressions by OLS, one for female and one for male life expectancies, using logarithmic transformations of the variables and allowing the interpretation of the coefficients as elasticities.[2]

Table 1 reports the results for female life expectancy in Panel A and male in Panel B. The findings are very similar for the two genders, with Adjusted R^2's of 73.3 and 72.4 percent respectively. The coefficient on real per capita health care expense as a percentage of GDP is positive and statistically significant, meaning that countries with greater health care expenses see greater increases in life expectancy at 65 relative to life expectancy at birth. Specifically, the elasticity of per capita health care expenses as a percentage of GDP is 0.21 for females and 0.23 for males, meaning that an increase of 1 percent in health care expenses will induce an increase of 0.21 percent in the ratio of life expectancy at 65 to life expectancy at birth for females, and 0.23 percent for males.[3]

[2] T-statistics are computed using robust standard errors.

[3] A specification with year specific fixed-effects to control for various structural breaks in particular changes in policies was also run and results are similar.

Table 1 – Benefits of health care expenses to longevity

Panel A

Log level female life expectancy at 65/at birth	
	Coefficient
Constant	-0.92(*)
Health Exp (real, pc, 5 yr growth) - GDP (same)	0.21(*)
Australia	0.03(*)
Austria	-0.04(*)
Canada	0.03(*)
Czech Republic	-0.04(*)
Denmark	-0.04(*)
Finland	-0.02(*)
France	0.03(*)
Germany	-0.07(*)
Iceland	0.02(*)
Ireland	-0.03(*)
Italy	0.05(*)
Japan	0.06(*)
Netherlands	-0.01(*)
Norway	0.02(*)
Poland	0
Portugal	0
Slovakia	-0.02(*)
Spain	0.07(*)
Sweden	-0.01(*)
UK	0.02(*)
US	-0.04(*)
Adjusted R^2	**0.733**
(*) These are statistically significant at 95% confidence level. Data Sources: Bureau of Labor Statistics; Social Security Administration; National Accounts, OECD.	

Panel B

Log level male life expectancy at 65/at birth	
	Coefficient
Constant	-1.01(*)
Health Exp (real, pc, 5 yr growth) - GDP (same)	0.23(*)
Australia	0.03(*)
Austria	-0.03(*)
Canada	0.01(*)
Czech Republic	-0.04(*)
Denmark	-0.05(*)
Finland	-0.03(*)
France	0.03(*)
Germany	-0.08(*)
Iceland	0.06(*)
Ireland	-0.04(*)
Italy	0.04(*)
Japan	0.07(*)
Netherlands	-0.04(*)
Norway	0.01(*)
Poland	0.01(*)
Portugal	0.03(*)
Slovakia	-0.02(*)
Spain	0.09(*)
Sweden	-0.01
UK	0
US	-0.04(*)
Adjusted R^2	**0.724**
(*) These are statistically significant at 95% confidence level. Data Sources: Bureau of Labor Statistics; Social Security Administration; National Accounts, OECD.	

B. Health Care Expenses and Cancer Survival Rates

Our second analysis relates health care expenditures to cancer survival rates. We combine the data from the previous approach with the 5-year cancer survival rates per country contained in Coleman, et al.—the first worldwide population-based study on cancer survival rates on five continents.[4] With the exception of the Czech Republic, Poland, and Slovakia, all of the remaining 18 countries are represented in Coleman, et al.[5]

The 5-year survival rates used in our model are for prostate, breast, colon, and rectal cancers (diagnosed between 1990 and 1994). Though the data are not as current as one might like, Coleman, et al. is the only study to our knowledge collecting and computing these comparable statistics across such a variety of countries.

This simple model estimates how these cancer survival rates across countries correlate with the share of real per capita health care expenses with respect to GDP. We estimate a cross-sectional linear regression model with 108 observations (18 countries by 6 cancer survival rates per country). We regress the 5-year cancer survival rates on per capita health care expenses as a percentage of GDP, allowing the coefficients to vary across colon and rectal, male and female,

[4] M.P. Coleman, et al., *Cancer survival in five continents: a worldwide population-based study,* 9(8) LANCET ONCOL. 730-56 (August, 2008) hereinafter "Coleman, et al."

[5] There are several other countries also studied by Coleman, et al., but we were unable to find compatible national accounts for those and hence have not used them in this analysis. Additionally, for a couple of the 18 countries, survival rates are computed excluding a few geographical regions.

breast and prostate cancers. The results are presented in Table 2. As with the previous approach, we find a positive and statistically significant coefficient on the log of the per capita health care expenses as a share of GDP on the five-year cancer survival rates. The Adjusted R^2 is 66.8 percent.[6]

Table 2

5-Year Cancer Survival Rates
1990-1994 through 1999

	Coefficient
Breast-Women	5.14(*)
Colon-Men	4.76(*)
Colon-Women	4.79(*)
Rectum-Men	4.69(*)
Rectum-Women	4.76(*)
Prostate-Men	4.97(*)
log (Health Care Expense / GDP per capita)	0.31(*)
Adjusted R^2	*0.668*

(*) These are statistically significant at the 95% confidence level.
Note: Health care expenses and GDP are in 1990 levels.

Data Sources: Coleman, M.P., et al, (2008); Social Security Administration; National Accounts; OECD.

It is important to stress that these survival rates are not only a function of the health care system of the country where diagnosis and treatment take place, but also a function of the health care systems in the countries in which the technologies used for these treatments were developed.

The United States takes a leading role in innovation in the health care industry, which directly benefits domestic consumers but also benefits health care systems around the world.[7] The majority of new technologies are developed and tested in the U.S. As Weisbrod [8] shows, the United States is uniquely positioned among OECD countries as not only a high health care consumer, but also as the leading R&D producer or technology provider. More recently and particularly on pharmaceuticals, Abrantes-Metz, Adams, & Metz[9] (2014) (which will also be discussed in section 4) shows that for the drugs reported as undergoing clinical trials from 1989 to 2002, the majority of these were developed in the United States alone and, less often, sometimes simultaneously in the United States and in other countries. These effects have not been considered in this simple analysis.

[6] There is a binding restriction on the sample size in this case. If not, adding country-specific fixed effects would be preferable. A specification including those effects was run and the results do not qualitatively change.

[7] There are several studies comparing the U.S. health care system against others across the world. But such comparisons routinely overlook the fact that innovation in the U.S. contributes to the success of health care systems in other countries. If a fair comparison is to be made, an extra score should be attributed to the innovator countries, including the U.S., for their contributions to all other health care systems across the world.

[8] Burton A. Weisbrod, *The Health Care Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment*, 29(2) J. ECON. LIT. 523-552 (June 1991).

[9] R.Abrantes-Metz, C. Adams, & A, Metz, *Determinants of Pharmaceutical Review, Sucess and Duration*, (2014) hereinafter "Abrantes-Metz, et al."

III. REDUCTION IN HEALTH CARE COSTS OR TOTAL EXPENDITURES AS THE POLICY OBJECTIVE

Health care spending per capita in the United States has been increasing as a percentage of GDP and has roughly tripled as a share of GDP over the past forty years, reaching almost 15 percent in 2005, with projections to exceed 19 percent by 2019. Furthermore, the United States spends more on health care per capita than other industrialized countries.[10] While such rapid growth is widely seen as a cause for great concern, much of the discussion on cost growth fails to address whether "more rather than less" health care expenditure is necessarily bad. For example, a 2008 report by the Congressional Budget Office ("CBO") seems to interpret the higher U.S. spending as intrinsically bad, implying that the marginal benefit of one additional unit of health care expense is zero. At the very least, the CBO seems to imply that the marginal benefit from one additional unit of health care is lower than its marginal cost, and hence should not be pursued.

What is important to address is if Americans are "getting more for higher spending." If the marginal benefit of spending is less than the marginal cost, then there is no social gain to spending more. But if benefits exceed costs on the margin, then increasing costs are not, in and of themselves, "bad." This of course would not mean that cost growth cannot and should not be slowed down, and that there aren't inefficiencies in the system or other markets such as insurance which should become more competitive in order to allow a slowdown in health care costs. But even granting all of that, if marginal benefits exceed marginal costs, society's net gain from increased expenditures will be positive.

Having provided such empirical evidence in the previous section, we focus instead on whether "total costs" is the appropriate way to measure value to society in this industry. In our view, *total expenditures* or *total costs* is a poor metric for policymakers. It is easy to imagine good, positive changes that every consumer of health care would welcome but that increase—not decrease—total costs. And it is easy to imagine policies which are designed to curb costs but which result in less (and less effective) health care for all.

We must be very careful to distinguish *costs* from *prices*. Prices inform the relative expense of one item or procedure over another. It is perfectly reasonable to lament the high *price* of health care. Most people would prefer to face lower prices than higher, and most of us would welcome a general decline in the price of health care since that would mean, all else equal, that more people could more easily afford more of it.

Costs, on the other hand, are total expenditures—the total dollars spent. Cost is *price* times *quantity*. If the price of an aspirin is $1, many might feel that this is too high since some can't afford it. When we buy 10 aspirins, the total cost becomes $10. But if the price *falls* to $0.75 and we then buy 20 (either because some of us buy more than we did before, or because new people are able to afford it for the first time), the total cost *rises* to $15. Once we realize that a

[10] CBO (2008); Referring to the CBO's comparison, these countries are Luxembourg, Norway, Switzerland, Austria, Iceland, Belgium, France, Canada, Germany, Australia, The Netherlands, Denmark, Sweden, United Kingdom, Italy, Japan; CBO (2008), Table 1, page 5.

decline in price could lead to an increase in total expenditures, we are forced to question whether *expenditure* is a useful metric for policy.

In fact the two goals—reducing costs and increasing coverage—are generally incompatible. Suppose we decide that it is socially unacceptable to have so many uninsured people. We take the most direct route and subsidize their purchase of health insurance. This has the immediate effect of raising costs, since we now have more social dollars chasing the same amount of health care. It will also have the effect of raising prices, since initially there are no more doctors, nurses, or hospital beds than there were before the subsidies began. Prices—including salaries to doctors and nurses—are likely to rise, and this will over time lead to more people entering the health care industry and thus a greater supply and consumption of "health care." The policy will succeed—we will see an increase in coverage—but only through the mechanisms of *higher* prices and *higher* costs.[11]

If policy makers decide that rises in price and cost are undesirable and prohibit those increases through price controls and the like, an increase in actual coverage might not materialize. With more dollars chasing the same amount of health care, but with prices not *permitted* to rise due to controls, new providers of health care are not likely to enter the industry and there will be no effective increase in coverage. The end result would be rationing.

Roughly speaking, if we have $10 chasing 10 apples, the price will settle at $1 per apple. If we subsidize apple consumption and have $20 chasing 10 apples, the price will be bid up, but that will induce more people to grow more apples, so we may, for example, end up with 16 apples available at $1.25 each—a greater consumption of apples yes, but at a higher price and greater total cost. If we prohibit the price of apples from rising, then we will have $20 chasing 10 apples at $1 per apple—so there will not be enough apples to go around. There will be "apple rationing." This same logic applies to the market for any "widget," including health care.

As illustrated with our aspirin example above, it is easy to imagine a drop in *price* leading to increased *costs* by inducing a more-than-offsetting increase in consumption. This is the first indication that cost can be a poor metric for discussing health care reform. Consider now a second example: new products. Suppose a pharmaceutical breakthrough leads to a treatment for a condition that was previously untreatable. People now spend money on something which literally didn't exist before. "Health care costs" therefore rise. But no one is worse off than before the breakthrough, and many people are better off. Shouldn't this be a welcome development?

Finally, consider a third example: better products. Imagine a new medical procedure doubles the 5-year survival rate for a heart transplant, but costs 50 percent more than the old procedure. Many rational consumers prefer the newer, better, more expensive procedure. "Health care costs" again rise. But by what rationale would this seem socially undesirable?

[11] This analysis is abstracting from the fact that prices might be originally inflated due to market power by insurance companies. As in any other market, the road to a decrease in market power is competition, which can be attained by allowing the purchase of insurance plans across states. If it is true that prices are inflated due to such absence of competition, then it is possible to increase coverage and decrease prices through measures that eliminate protections to insurance companies.

This illustrates a very subtle point even about *price*. We must always ask, "the price of *what*?" In this last example the simple answer is "the price of a heart transplant," and that price went up. That seems "bad" until we realize that the new heart transplant is really very different from the old. *The expected survival rate doubled*. The price *per expected year of survival* actually went down. If something is better, it is not necessarily bad that it has a higher price. What we really need is a largely hypothetical "constant quality price." It seems more appropriate to evaluate proposals on the level of this constant quality price. Is it not almost tautological that anything that lowers the price per unit of quality is socially desirable, even if it leads to an increase in the total "cost" of health care as conventionally measured?

An important study addressing this question is that by Lucarelli & Nicholson,[12] in which the authors build a quality-adjusted price index for colorectal cancer drugs. Given that the average price of treating this type of cancer with chemotherapy increased from about $100 in 1993 to $36,000 in 2005, due largely to the approval and widespread use of five new drugs between 1996 and 2004, the authors question whether the substantial increase in spending has been worth it. They construct a price index for colorectal cancer drugs that takes quality into account of each drug on the market and the value that oncologists place on the drug quality. It is shown that a naïve price index, which makes no adjustments for the changing attributes of drugs in the market, greatly overstates the true price increase. By contrast, when quality is taken into account through a hedonic price index and quality-adjusted indexes, the authors find that prices have in fact remained fairly constant over the 13-year period studied. The new treatment may be 360 times as expensive, but it appears to be about 360 times as effective too.

There is reason to think that prices are unnecessarily inflated in health care, and addressing these inefficient prices will as a corollary lead, *ceteris paribus*, to reduced costs. The growth in insurance markets over the last several decades and the consequent reduction in patient cost sharing over time may have contributed to inappropriately high prices. Consumers may not be as well informed about their options in health care as they are in other markets. Evaluating quality is difficult, and prices are not usually posted so that consumers can make their choices with full information.[13] Finally, it is likely that the absence of competition by insurance companies across states may contribute to inflated prices as well.[14]

Arguments for lowering health care costs today are typically based on a premise that consumer surplus generated by the use of a particular technological advancement will increase if its price decreases. Of course this ignores the production side and the returns to those who invest in research and development. When evaluating such a policy, one must keep both static and dynamic efficiencies in mind. In order to have better technology in the future, firms must invest in R&D today, and hence prices charged today must generate sufficient revenues to offset these investments. Only then can new and better technologies be delivered in the future and thereby

[12] C. Lucarelli & S. Nicholson, *A Quality-Adjusted Price Index for Colorectal Cancer Drugs*, National Bureau of Economic Research Working Paper No. 15174 (2009).

[13] Cutler has also pointed the relevance of potentially inflated factor prices in the growth of health care expenses, *see* David M. Cutler, *The Incidence of Adverse Medical Outcomes Under Prospective Payment*, 63(1) ECONOMETRICA, 29-50 (January, 1995).

[14] J. Cochrane, *Health-Status Insurance: How Markets Can Provide Health Security*, Policy Analysis No. 633, Cato Institute (2009).

increase future social welfare. This trade-off between static/short-run efficiency (that we might lower costs *today* and transfer social surplus from producers to consumers *today*) and dynamic/long-run efficiency (that we will have less innovation *tomorrow* and thus lower-than-otherwise social surplus *tomorrow*) must be carefully balanced in any policy discussion.

Jena & Philipson[15] show that consumer surplus is a poor guide for dynamic welfare in situations when new technologies involve costly R&D. Consider the rationale behind the patent system. The extent to which the net total social value of a new drug is captured by producers in the form of profit determines the level of R&D and hence dynamic efficiency. The reason patents are in place is precisely to transfer consumer surplus to producer surplus in the short-run so that efficient dynamic decisions on R&D can be made, thus enhancing consumer surplus in the long-run. Jena & Philipson argue that since patents are socially beneficial despite lowering consumer surplus in a static analysis, optimal policy in general cannot focus only on consumer surplus. The authors also present a theoretical model and find that, in order to promote dynamic efficiency, the optimal policy is to encourage the sort of "costly innovation" in the long-run that will allow for further increases in consumer surplus in the future.

Jena & Philipson demonstrate this point in the context of HIV/AIDS medications. Under the existing U.S. system, innovators involved in the development of HIV/AIDS medications in the late 1980's were capable of appropriating surplus from their breakthroughs. Jena & Philipson estimate that consumer and producer surpluses from these drugs amounted to $1.33 trillion and $63 billion, respectively. This means that the producer kept 5 percent of the total net social surplus from these socially important breakthroughs. If producers are not able to keep even 5 percent, they are likely to develop fewer important drugs, and the loss to consumers and the society as a whole will far outweigh whatever savings may be realized in the short-run.

IV. CONCLUDING REMARKS

It has been argued that the United States spends more on health care as a percentage of its GDP than any other industrialized country, and that presumably is inherently bad. We show empirical evidence that more spending in the United States has in fact been correlated with higher benefits.

We argue that much of the debate over health care reform in the United States has been focused solely on short-run (even static) analysis without consideration for longer-term efficiencies. It is important to keep in mind that it is today's costly innovation that allows for better quality health care tomorrow. Imposing policies that punish innovation as a way to reduce costs can lead to lower costs today, but it may not be true that they will lead to lower costs tomorrow—particularly if cost is measured in units of quality care. Indeed, we argue that "total health care expenditures" is not the relevant metric for policymakers, but rather that the *price* of one unit of constant quality health care is a more appropriate concept. Unfortunately to our knowledge such measures have yet to be appropriately developed.

[15] A. Jena & T. Philipson, *Innovation and Technology Adoption in Health Care Markets*, American Enterprise Institute for Public Policy Research (2008).