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HEALTH POLICY prescriptions

OBAMACARE'S TAX ON MEDICAL DEVICES: Cuts R&D by $2 Billion a Year

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Introduction

Harvard University Professor Elizabeth Warren is back in the news. She is running for the Democratic nomination for the U.S. Senate in Massachusetts (the primary election is September 6), eager to challenge Republican Senator Scott Brown in November; and no one should be distracted from the real issues facing America by the recent flap over her past claim of 1/32 Cherokee heritage for the blatant purpose of career advancement.

Let us marvel instead that Ms. Warren---as true-blue a left-wing progressive as there is to be found in American politics---in a recent opinion column has come out against one of the several taxes included in the Patient Protection and Affordable Care Act (PPACA, aka Obamacare); these taxes purportedly support the claim that the law would pay for itself.[1] And she chose carefully: She now stands foursquare against the 2.3 percent excise tax on durable medical equipment and supplies that the law will impose beginning in 2013. Nestled among a series of howlers---for example, she asserts for the record that the FDA "saves lives," and then complains about

1 Elizabeth Warren, "A Climate for Innovation," *MassDevice.com*, April 17, 2012, at http://www.massdevice.com/blogs/massdevice/mass-sen-hopeful-elizabeth-warren-device-tax-fda-and-climate-innovation.

Key Points:

- The Patient Protection and Affordable Care Act ("Obamacare") imposes an excise tax of 2.3 percent on medical equipment and supplies, effective in 2013.
- Regardless of the past and recent profitability of investment in the research and development of new and improved medical devices, this tax will reduce such investment.
- A conservative estimate of this adverse investment effect is about 10 percent annually through 2020, or about $2 billion per year.
- Based upon the peer-reviewed literature on the relationship between investment in medical technology and improvements in life expectancies, this investment decline can be predicted to yield an annual decline of about 1 million expected life-years for the U.S. population, concentrated upon particular population subgroups.
- The economic cost of that reduction in expected life-years would be at least $100 billion per year, a sum substantially greater than the entire U.S. market for durable medical equipment and other medical products.
- Accordingly, the excise tax on medical devices should be repealed.

the delays in FDA approvals of "life-saving devices"---Ms. Warren argues that the tax is inconsistent with "a fair tax system," as it would "disproportionately impact the small companies with the narrowest financial margins and the broadest innovative potential." Wait: There is more. This tax will induce "companies of all sizes to cut back on research and development for life-saving products." This is an effect almost never acknowledged by the political left, as a casual review of the debate over pharmaceutical prices would demonstrate. One is tempted to hypothesize that Ms. Warren's recognition that the Massachusetts "medical device and diagnostics industry employs around 24,000 people," combined with the dynamics of her Bay State candidacy for the U.S. Senate, might have something to do with her recognition of this reality. But that would be the kind of cynicism that was supposed to become a memory after the 2008 election.

In any event, let us shunt aside for another day the issue of tax fairness, a topic that Ms. Warren obviously does not understand; "small" is not necessarily synonymous with "worthy of tax breaks." Let us focus instead on her central criticism: the prospective effect of this tax on the research and development of new and improved medical technologies, and the attendant impact on patient wellbeing.

Any investment (in this case, in research and development) is "efficient" (that is, expected to be profitable) as long as the anticipated future rate of return (or stream of profits) from the investment, adjusted for risk and other factors, is equal to or greater than the market rate of interest.[2] This should be intuitively obvious: If the rate of return from an investment is expected to fall below the "cost of money," the investment will not be made. That future rate of return is determined in substantial part by the net price that the future products are likely to command; accordingly, the excise tax on durable medical equipment and devices can be predicted to lower research and development investment in medical technologies because of the reduction in after-tax prices, even if the lower rate of return remains at or above the market rate of interest.[3]

Note that the tax imposed by the PPACA is not random; it is the devices and equipment approved for sale that will be subjected to it. And so the tax will create a bias in the returns earned by producers: Upside potential for the investments yielding approved technologies would be reduced, while downside potential for losing investments would remain unaffected. This means that average returns must decline. If the marginal expected return in the absence of the tax is at the market rate of interest, the introduction of the tax must yield a reduction in (and perhaps zero or near zero) investment.[4] The only way for a producer to avoid this outcome is to reduce or eliminate investment in new technologies either riskier or prospectively less profitable, a market adjustment with highly adverse implications.[5] The upshot of this adjustment process is a market with less research and development investment---and fewer new technologies---than otherwise would be the case.

2 The interest rate in this context is the market rate for the relevant risk class of investments.

3 In the extreme case, if the price effect is sufficient to reduce the future rate of return below the market rate of interest, investment will fall to zero, because no part of the investment remains "efficient."

4 In the extreme case, the upper end of the statistical distribution of expected returns simply would be "cut off" (truncated).

5 That is, producers can restore (imperfectly) the mean expected return at the market rate of interest by truncating the lower end of the statistical distribution.

Estimating the Effect of this Tax

A downward shift in the expected return to an investment will affect current investor behavior. As a first approximation, it is reasonable to assume that a given percent decline in expected profitability (or in the expected return) would reduce investment by that same percentage. It certainly is possible in principle that research and development investment in medical technologies is so profitable that a decline in the expected return would have little effect. Were that true, we would expect to observe substantial new entry into the various markets for drugs, devices, and the like.[6] On the other hand, as noted above, it is possible as well that a sharp decline in (or zero) investment would result, as the expected rate of return might decline to a point below the market rate of interest. A "middle" assumption---proportionality---lying between these two bounds on the range of possible outcomes is reasonable for purposes of generating rough projections of the effect upon research and development investment of the tax on medical devices, except where the empirical literature suggests a different quantitative effect.[7]

The tax on durable medical equipment and supplies imposed by the PPACA is 2.3 percent of sales revenues rather than profits (however measured). Since profits obviously are far smaller than sales, this means that the tax is a greater proportion of the former. To some extent, the tax might result in an increase in market prices for the taxed goods, thus shifting some of the burden of the tax onto consumers.[8] One recent analysis that does not consider this factor presents data for 2010 showing that the tax would reduce profits by amounts ranging from about 7 percent to 40 percent for a sample of producers.[9] Accordingly, even with an assumed upward price effect---which almost certainly would not be by an amount shifting the tax fully or almost fully to consumers---a conservative assumption of the downward impact on profits would be 10 percent.

Table 1 shows the latest data available on private-sector research and development investment in medical devices and equipment, from the National Science Foundation, with extrapolations to 2020 and the estimated investment effect of the tax on devices. Between 1999 and 2007 (the latest year for which data are available), investment increased and decreased between various years; but for the whole period the compound annual growth rate was about 2.2 percent. This growth rate yields the projections in Table 1 to the year 2020. The tax on medical devices is assumed to reduce investment by 10 percent, as discussed above, yielding the projections of after-tax investment and the investment decline caused by the tax.

6 In a new paper, DiMasi and Grabowski find that for the pharmaceutical industry, average returns are about equal to the industry cost of capital. See Joseph A. DiMasi and Henry G. Grabowski, "R&D Costs and Returns to New Drug Development: A Review of the Evidence," in Patricia Danzon and Sean Nicholson, eds., The Oxford Handbook of Pharmaceutical Industry Economics, New York: Oxford University Press, forthcoming. If returns to investments in medical devices were substantially higher, we would expect to observe the capital market shift some pharmaceutical investment toward the device sector.

7 In other words, the assumed elasticity of research and development investment with respect to expected returns is roughly 1. This is consistent with the econometric findings reported in Benjamin Zycher, "Medicare Auctions for Durable Medical Equipment: Price Suppression and Research and Development Investment," monograph, Pacific Research Institute, June 2011, at http://www.pacificresearch.org/docLib/20110614_MedDevices.pdf. For a classic discussion of the marginal efficiency of investment, see J. Hirshleifer, Investment, Interest and Capital, Englewood Cliffs: Prentice-Hall, 1970, chapters 3 and 6.

8 In general, the distribution of the burden of such a tax---its "incidence"---is determined by relative demand and supply "elasticity" conditions, a topic outside the scope of the discussion here.

9 This analysis is a bit rough, but does provide a good order-of-magnitude sense of the effect of the tax on profits. See Devon Herrick, "The Job-Killing Medical Device Tax," National Center for Policy Analysis, Issue Brief No. 106, February 2012, at http://www.ncpa.org/pub/ib106.

Table 1 Private-Sector R&D Investment in Medical Devices and Equipment (billions of year 2011 dollars)					
Year	$2010	GDPPD	$2011	With tax	Decrease
1999	15.2	1.02134	15.5		
2000	17.3	1.02134	17.7		
2001	16.4	1.02134	16.7		
2002	17.7	1.02134	18.1		
2003	16.7	1.02134	17.1		
2004	12.8	1.02134	13.1		
2005	14.0	1.02134	14.3		
2006	15.5	1.02134	15.8		
2007	18.1	1.02134	18.5		
2008			18.9	18.9	
2009			19.3	19.3	
2010			19.7	19.7	
2011			20.2	20.2	
2012			20.6	20.6	
2013			21.1	19.0	2.1
2014			21.5	19.4	2.1
2015			22.0	19.8	2.2
2016			22.5	20.3	2.2
2017			23.0	20.7	2.3
2018			23.5	21.2	2.3
2019			24.0	21.6	2.4
2020			24.5	22.1	2.4

Sources: National Science Foundation at http://www.nsf.gov/statistics/industry*, various tables; Council of Economic Advisers; and author computations.*

These projections should be viewed as reasonable projections useful for order-of-magnitude analysis, rather than as predictions of precise future investment patterns and tax effects. The future investment decline is on the order of about $2 billion per year.

Lichtenberg has estimated that pharmaceutical research and development investments of, very roughly, about $2000 (in 2011 dollars) yield an increase of an expected life-year.[10] There does not appear to be available a similar analysis examining the impact of research and development investment in medical devices and equipment; but since the value of such investment is derived from the perceived value of increased longevity and health, and since markets (in the simple case) have incentives to equate the marginal returns to alternative investments, it is reasonable to use the Lichtenberg findings to derive rough estimates here. If we assume from Table 1 that the excise tax on medical equipment and devices reduces investment by $2 billion per year, the loss in expected life years would be about 1 million annually. (Note that this adverse effect would not be spread uniformly across the population.) If we assume $100,000 to be the value of an expected life-year, the economic cost of the tax is about $100 billion per year.[11] That figure is substantially greater than the entire U.S. market for durable medical equipment and other medical products.[12]

Conclusion

Because incentives to invest in the research and development of new medical technologies are driven by perceived returns, the excise tax on durable medical equipment and medical supplies can be predicted to reduce such investment. The finding here is that such investment would be reduced by about 10 percent annually, or about $2 billion during 2013 through 2020. By analogy with the estimates available in the literature for pharmaceutical investment, this investment loss would cause, conservatively, a loss of about 1 million expected life-years each year, the economic cost of which would be about $100 billion per year, a figure substantially greater than the entire U.S. market for medical devices and equipment. The sheer magnitude of this adverse economic effect suggests strongly that the excise tax on medical equipment and supplies should be repealed.

10 Frank R. Lichtenberg, "Sources of U.S. Longevity Increase, 1960-2001," *Quarterly Review of Economics and Finance*, Vol. 44, No. 3 (July 2004), pp. 369-389. A somewhat different analysis with qualitatively similar findings is presented by Kevin M. Murphy and Robert H. Topel, "The Economic Value of Medical Research," in Kevin M. Murphy and Robert H. Topel, eds., *Measuring the Gains from Medical Research: An Economic Approach*, Chicago: University of Chicago Press, 2003, pp. 41-73.

11 Murphy and Topel, *Ibid.*, estimate the value of a life-year at $160,000.

12 The Centers for Medicare and Medicaid Services estimates that in 2010, total U.S. expenditures on durable medical equipment and non-durable medical products was $82.5 billion. See CMS at http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads//tables.pdf, at Table 4.