Impact of the Excise Tax on Medical Device Manufacturers

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ABSTRACT

The United States Congress recently enacted legislation, Patient Protection and Affordable Care Act (PPACA), 2010 and Health Care and Education Reconciliation Act (Reconciliation Act), 2010, imposing a 2.3 percent excise tax on medical device manufacturers on all sales and imports after 2012. This study first discusses the background of this legislation. Next, the study discusses and analyzes how firms in the medical device industry may respond to this legislation. The study then analyzes selected financial information using COMPUSTAT data of medical device manufacturers for the years 2009 and 2010. Based on this analysis we conclude many firms will be adversely impacted by the excise tax. But smaller firms may be impacted more than larger firms. Possible outcomes of the recently enacted legislation are as follows. Some companies have considered reducing their work force in response to the excise tax and others have considered relocating some of their operations. Due to how recently the excise tax was enacted by the United States Congress only the future will reveal the actual impact of the tax and how medical device manufacturers and importers respond to this tax.

Keywords: Excise tax, Medical device manufacturers, PPACA, Reconciliation Act

INTRODUCTION

The roots of the excise tax onthe sales and imports of certain medical devices can be traced back to the framework for health care reform proposed by Finance Committee Chairman Max Baucus in 2009 (Baucus, 2009). In this 18 page document there is a two sentence description of the 'Medical Device Manufacturers Fee' in the 'Revenue Provisions' section: "Under this proposal, an annual fee of $4 billion would be imposed on the medical devices manufacturing sector in 2010. The fee would be allocated by market share" (p. 18).Based on this proposal, revenues of $40 billion would be generated over a ten year period from the medical device fee.

As a part of the PPACA,the United States Congress initially approved an annual fee on medical device manufacturers and importers beginning in 2011 (P.L. 111-148). This legislation was signed into law on March 23, 2010. The fee was targeted to bring in approximately $2 billion per year until 2017, and $3 billion after 2017. The fee initially was to be allocated to companies based on medical-device sales.

This annual fee was part of the $473 billion of revenues estimated to be generated by the PPACA from 2010 to 2019 (U.S. Congressional Budget Office, 2010). Based on the Congressional Budget Office estimates, the category of 'Fees on Certain Manufacturers and Insurers' (defined as fees on manufacturers and importers of branded drugs and certain medical devices as well as fees on health insurance providers) is projected to generate $101 billion of revenues from 2010 to 2019, and only two other provisions in the legislation provide more. These two categories are: (1) 'Excise Tax on High-Premium Plans' is estimated to generate $149 billion of revenue, and (2) $106 billion is estimated from 'Reinsurance and Risk Adjustment Collections' (U.S. Congressional Budget Office, 2010).

On March 30, 2010, Congress passed the Reconciliation Act of 2010 which repealed the direct annual fee imposed by the PPACA and replaced the annual fee with a 2.3 percent excise tax on certain medical devices sold by the manufacturer or importer of such devices (P.L. 111-152). This fee, as initially prescribed by the PPACA, was to be allocated to companies based on medical-device sales. Consequently, companies with more sales would have been allocated the fee at a higher rate than companies with lower sales. As revised by the Reconciliation Act of 2010, all medical device manufacturers and importers will now pay an excise tax rate of 2.3 percent on medical device sales. Consequently, all medical device manufacturers and importers will now pay the excise tax at the same rate of 2.3 percent.

Since the excise tax on medical device manufacturers is so recent that there is a lack of research regarding the impact of this tax. The purpose of this study is to analyze the likely effects of this tax on medical device manufacturers. The outline of the study is as follows. First, the study describes what medical device companies and others knowledgeable of the industry have stated in public announcements. Second, the study uses recent financial data from the medical device industry to illustrate the impact of the excise tax on selected financial results. Finally, the study summarizes the results.

IMPACT OF THE EXCISE TAX ON MEDICAL DEVICE MANUFACTURERS

Due to the excise tax being so recently enacted there is a lack of academic research thoroughly assessing how medical device manufacturers may be impacted. One study which has analyzed the employment effects of the tax on the medical device industry was authored by Diana Furchtgott-Roth and Harold Furchtgott-Roth(2011).Furchtgott-Roth and Furchgott-Roth (2011) find that the excise tax may result in close to 43,000 job losses and compensation losses of $3.5 billion (p. 2). The number of jobs which may be lost is more than 10% of the 409,000 employees of the medical device industry in 2009. Using 2009 data and an assumption of a 10% shift in production offshore, and assumed elasticities of 1.0 for demand and supply, their study estimates domestic employment compensation losses of $3.7 billion resulting from the excise tax (Table 11, p. 21). Their study also predicts that U.S. medical device manufacturing firms would close domestic plants and shift work to foreign countries.

The excise tax of 2.3% of sales will increase taxes of companies in the medical device industry. If these taxes cannot be passed on to the consumer in the form of higher prices then the company must reduce costs other than taxes or else profits will reduce. Since the excise tax is based on sales, companies will be required to pay the excise tax even when they may be incurring losses.Descriptive statistics of medical device manufacturers for 2009 and 2010 are discussed and analyzed in a later section of the study. Next we discuss some possible responses and how some specific medical device manufacturers have indicated they will respond to the tax.

Responses by Medical Device Manufacturers

There are few options available to medical device manufacturers to mitigate the income decreasing effect of the excise tax. First, companies could try to pass along this tax to consumers by increasing sales prices by an offsetting amount. Whether this option is feasible depends on how competitive the industry is and how responsive the market is to price increases (price elasticity). Second, companies may try to decrease their operating costs (manufacturing and non-manufacturing) such that, even with an increase in costs due to the excise tax, they are able to at least maintain their current profit margins.Such discretionary costs as labor, advertising, and research and development costs may be managed in the short term but the long term implications of reducing such costs may be detrimental. Third, companies could use a combination of options one and two. They may pass a portion of the excise tax on to consumers and also try to reduce their operating costs. Finally, the least preferable consequence from a shareholder's perspective is that profits may decrease if they are not able to pass the tax on to consumers and/or they are not able to reduce their costs. These options are discussed and analyzed with examples in the following section of the study.

Various medical device manufacturing and importing companies have announced how they are responding to the excise tax and how they will be impacted.In August of 2011, Covidien, a life sciences company incorporated in Ireland and with headquarters in Mansfield, Massachusetts, announced restructuring plans which would save the company between $175 million and $225 million per year (Donnelly, 2011). The restructuring

included “unspecified layoffs.” In making the announcement, chief executive Jose E. Almeida noted the excise tax as one of the reasons, “It was an unfortunate decision to single out our industry – medical devices are part of the solution, not the problem, in terms of lowering costs” (Donnelly, 2011).Unnamed Covidien executives stated the excise tax would cost the company $100 million or more per year.

In November of 2011 Stryker Corporation of Kalamazoo, Michigan, announced plans to reduce its work force by 5 percent by the end of 2012 with the goal of reducing operating costs by $100 million (Jones, 2011). Stryker CEO Stephen P. McMillan estimated the excise tax would cost Styker about $150 million per year and he included the excise tax as one of the reasons for the reduction in its work force and operating costs.

Stephen L. Ferguson, the Chairman of Cook Group, a privately held medical device manufacturer based in Bloomington, Indiana, made some very insightful comments about the impact of the medical excise tax. Ferguson, in responding to a question about how Cook’s workforce would be impacted, says “You don’t want to say to your workforce that you’re going to lay people off” (Ponnuru, 2012). But he noted, “The tax is going to result in growth in another location and not in the U.S.; that’s the way I see the impact on Cook” (Ponnuru, 2012).Ferguson also says “publicly held companies will face more pressure to reduce workforce numbers to placate shareholders, but will be more reluctant to blame the tax in public” (Ponnuru, 2012). The implication of Ferguson’s comment is that there could be many more public companies than Covidien and Stryker which will suffer detrimental consequences of the medical excise tax but have not stated such a causal relationship publicly.

In contrast to the above corporate responses,Richard Foster, Chief Actuary for Medicare & Medicaid Services, anticipates that most of the fees and taxes on medical device manufacturers and importers of drugs and on health insurance plans will ultimately be passed on to health consumers in the form of higher prices and higher insurance premium rates (U.S. Department of Health & Human Services, 2010). The Department of Health & Human Services report (2010) estimates these costs will increase health care expenditures up to $18.2 billion in 2018 and $17.8 billion in 2019 (U.S. Department of Health & Human Services, 2010). While there is much uncertainty for any cost estimates for six and seven years into the future, costs anywhere close to the estimates are quite significant.

MANAGING THE NEW EXCISE TAX ON MEDICAL DEVICE SALES AND IMPORTS

If no action is taken by medical device manufacturing companies, then the new excise tax, *ceteris paribus*, would reduce the income for such companies. Companies, however, want stable or increasing income and therefore, some management action is required to eliminate the income decreasing effect of the excise tax. In this section, we mathematically explore various options available to medical device manufacturers to manage the excise tax so as to maintain a level of income that would have prevailed if there was no such tax on medical device sales.

In general, the options available to firms are: (1) increase selling price, (2) reduce operating costs, and (3) use a combination of both one and two. In a competitive market, it is challenging to increase revenues by increasing the selling price of the goods in order to pass on the added cost of excise tax to the consumers. Therefore, the feasible option

available for managers is to reduce operating costs. However, we explore all three options in the following discussion.

Option 1: Increase Revenue by increasing Selling Price

Let R be current level of sales revenue before applying excise tax and x be the expense ratio (ratio of all expenses excluding income tax to sales). Therefore,

Total Expenses (excluding income tax) = xR, and
Earnings before taxes (EBT) = $R - xR$ (1)

If the excise tax of 2.3% on revenues is imposed then,
Total Expenses (excluding income tax) = $xR + 0.023R = R\,(x + 0.023)$.
Assume that company increases revenue from R to R' to eliminate the income decreasing effect of the new excise tax and stay at current level of income. Therefore,

Total expenses (excluding income tax and including excise tax) = $R'(x + 0.023)$, and
EBT = $R' - R'(x + 0.023) = R'(1 - x - 0.023) = R'(0.977 - x)$ (2)

To stay at the income level before the new excise tax, EBT with excise tax should equal the EBT without imposition of new excise tax. Therefore,

$$R'(0.977 - x) = R(1 - x)$$

Or

$$R' = R\left(\frac{1 - x}{0.977 - x}\right) \tag{3}$$

The percentage increase required in revenues, therefore,

$$\frac{R' - R}{R} = \left(\frac{1 - x}{0.977 - x}\right) - 1 \tag{4}$$

Equation (4) above represents the percentage increase in revenues that would be required to eliminate the income decreasing effect of the new excise tax and maintain the same level of income.

For example, let us assume that Firm A has current sales of $100 and expenses (excluding tax) of $80. Therefore, expense ratio (x) is 80% or 0.80.
EBT will be $100 – $80 = $20.
Assuming an income tax rate of 25%,
Income tax expense = 25% x $20 = $5, and
Net Income = $20 - $5 = $15.
If excise tax of 2.3% is imposed and Firm A increases revenue to eliminate the income decreasing effect of the new excise tax, then,

Increase in revenue = [(1 – 0.80)/ (0.977 – 0.80)] – 1
= [0.20/0.177] – 1 = 0.13 (rounded) or 13%.
Therefore, new revenue = $100 + $13 = $113.
Expenses (excluding income tax)= 0.80 x (113) = $90.40
Excise tax on revenue = 0.023 x (113) = $2.60
EBT = $113 - $90.40 - $2.60 = $20
Income tax expense = $5
Net Income = $15

Thus, by increasing the revenue by 13%, Firm A may be able to maintain the same level of income after the imposition of the excise tax.

Option 2: Reducing Operating Costs

Another option to counteract the new excise tax is to reduce operating costs of the firm. From the initial responses of a few companies to the new excise tax, this option seems to be a more feasible and likely option. One possible reason for this is that increasing revenue is considered a zero sum game in a competitive market. It is hard to increase sales prices in a competitive market unless the competitors choose do so likewise.

Since the new excise tax will be imposed on revenues, it can be considered an additional expense of 2.3% of sales. Let R be current level of sales revenue before applying excise tax and x be the expense ratio (ratio of all expenses excluding income tax to sales). Therefore,
Total Expenses (excluding income tax) = xR, and
Earnings before taxes (EBT) = $R - xR$
If the excise tax of 2.3% on revenues is imposed then,
Total Expenses (excluding income tax and including excise tax)
$= xR + 0.023R = R\,(x + 0.023)$, and
EBT = $R - xR - 0.023R$

Therefore, the firm would need to reduce their expenses by same amount as the increase caused by excise tax (*i.e.* 2.3% of revenues) to eliminate the income decreasing effect of excise tax. This is a substitution of an increase in costs (i.e. excise tax) with a similar amount of reduction in operating costs.

For example, let us assume that Firm A has current sales of $100 and expenses (excluding tax) of $80. Therefore, expense ratio (x) is 80% or 0.80.
EBT will be $100 – $80 = $20.
Assuming an income tax rate of 25%,
Income tax expense = 25% x $20 = $5, and
Net Income = $20 - $5 = $15.
If excise tax of 2.3% is imposed and company cuts down on expenses to eliminate the income decreasing effect of the new excise tax, then,
Reduction in expenses required is equal to increase in costs due to excise tax which is equal to 2.3% x $100 = $2.30, and therefore,
Total expenses (excluding income tax) = $80 - $2.30 = $77.70 (or 77.70% of revenues)
EBT = $100 - $77.70 - $2.30 = $20 (same as before the imposition of excise tax).

Option 3: A combination of increase in revenue and reduction in operating costs

Companies can choose to eliminate the income decreasing effect of the excise tax by increasing the revenue and reducing the costs together. Let us assume that out of 2.3% excise tax on revenues, 1.3% will be eliminated by reducing the expenses and remaining 1% will be eliminated by increasing the revenues from *R* to *R'*. Therefore,
Managed reduction in expenses (excluding taxes) = $0.013R'$
Total Expenses (excluding income tax and including excise tax)
$= xR' - 0.013R' + 0.023R'$
$= xR' + 0.01R' = R'(x + 0.01)$
EBT = $R' - R'(x + 0.01) = R'(0.99 - x)$

To stay at same income level, EBT with excise tax should be equal to EBT without excise tax. Therefore,

$$R'(0.99 - x) = R(1 - x)$$

Or,

$$\frac{R' - R}{R} = \frac{(1 - x)}{(0.99 - x)} - 1 \qquad (5)$$

Equation(5) above represents the percentage increase in revenue required to eliminate the income decreasing effect of new excise tax after expenses were reduced to eliminate 1.3% out of 2.3% excise tax on revenues.

For example, let us assume that Firm A has current sales of $100 and expenses (excluding tax) of $80. Therefore, expense ratio (*x*) is 80% or 0.80.
EBT will be $100 – $80 = $20.
Assuming an income tax rate of 25%,
Income tax expense = 25% x $20 = $5, and
Net Income = $20 - $5 = $15.
If excise tax of 2.3% is imposed and company cuts down on expenses to eliminate 1.3% out of 2.3% excise tax on revenues, then,
Expense ratio = 0.80 – 0.013 = 0.787
Percentage change in Revenue (using equation (5))
= {(1 – 0.80)/(0.99 – 0.80)} - 1
= 0.05 (rounded) or 5%.
Therefore, Revenue = $100 + $5 = $105.
Total expenses (excluding income tax and including excise tax)
= (78.7% x $105) + 2.3% x $105
= 82.635 + 2.415 = $85.05
EBT = $105 - $85.05 = $19.95 or $20 (rounded)
Assuming an income tax rate of 25%, Net Income = $15

Thus, the firms can use a combination strategy of reducing the costs and increasing the revenues too for taking away the income decreasing effect of the new excise tax over sales.

However, if Firm A decides to do nothing then they would experience a decrease in their income as shown below.

Sales = $100
Expenses = $80
Excise tax = $2.30 (2.3% of $100)
EBT = $100 - $80 - $2.30 = $17.70
Income tax assuming 25% tax rate = $4.43
Net Income = $17.70 - $4.43 = $13.27

Next, we conduct a descriptive analysis of medical device manufacturing industry using the Compustat data for the years 2009 and 2010 to analyze the impact of excise tax on medical device manufacturers.

DESCRIPTIVE ANALYSIS OF MEDICAL DEVICE MANUFACTURING INDUSTRY USING THE DATA FOR THE FISCAL YEARS 2009 AND 2010

Table 1 below shows the descriptive analysis of all US firms in the medical device manufacturing industry. There were a total of 165 firms with available data on Compustat for the year 2009 (Panel A) and 157 firms for the year 2010 (Panel B). Firms included in this data from following industries:

- Surgical & Medical Instruments & Apparatus (SIC 3841)
- Orthopedic, Prosthetic & Surgical Appliances & Supplies (SIC 3842)
- Dental Equipment and Supplies (SIC 3843)
- X-Ray Apparatus & Tubes & related Irradiation Apparatus (SIC 3844)
- Electromedical& Electrotherapeutic Apparatus (SIC 3845)
- Ophthalmic Goods (SIC 3851)

Total sales for year 2009 were nearly $91,693 million with mean sales of $556 million (median sales were $52 million). Total cost of sales was nearly $33,080 million providing a gross profit margin total of nearly $58,614 million (approximately 64%). Total pretax income for the industry amounted to $9,439 million approximately and income tax expense of $3,485 million and therefore, implied tax rate for the industry was nearly 37%. Total asset size of the industry was $154,227 million with a mean asset size of $935 million (median asset size was $55 million approximately). Return on Assets (ROA) for the industry was around 4% and industry margin was 7%. Asset turnover for the industry was approximately 0.60. If medical device excise tax 2.3% of sales was to be applied in the year 2009, it would result in additional taxes of nearly $2,109 million for all sample firms used in Table 1 and thereby increasing the taxes by nearly 60% for these firms.

Table 1: Descriptive analysis of all US medical equipment/device manufacturers*

PANEL A: Year 2009 (Total 165 Firms)					
	Total	**Mean**	**Median**	**Minimum**	**Maximum**
Sales ($)	91692.80	555.71	52.07	0.005	15835.00
Cost of Sales ($)	33079.12	200.48	20.90	0.003	3353
Gross Profit ($)	58613.68	355.23	22.34	-31.041	12802.00
Pretax Income ($)	9438.62	57.20	-1.53	-2088.675	3969.00
Tax Expense ($)	3484.84	21.73	0.06	-283.00	870.00
Net Income ($)	6009.65	36.42	-1.53	-2176.24	3099.00
Total Assets ($)	154227.20	934.71	58.69	0.232	28090.00
ROA	-	-0.40	-0.07	-7.873	0.50
Margin	-	-22.33	-0.08	-3342.20	3.45
Asset turnover	-	0.85	0.79	0.001	2.84
Industry ROA = Industry Net Income/Industry Total Assets = 0.04 or 4%					
Industry Margin = Industry Net Income/ Industry Sales = 0.07 or 7%					
Industry Asset turnover = Industry Sales/ Industry Total Assets = 0.59					
Industry tax rate = Industry Taxes/Industry Pretax Income = 0.37 or 37%					
Industry Gross Profit Margin = Industry Gross Profit/ Industry Sales = 0.64 or 64%					
PANEL B: Year 2010 (Total 157 Firms)					
	Total	**Mean**	**Median**	**Minimum**	**Maximum**
Sales ($)	94698.01	603.17	54.96	0.024	15933.00
Cost of Sales ($)	33685.41	214.56	21.58	0.003	3416.10
Gross Profit ($)	61012.60	388.62	26.60	-31.67	12836.00
Pretax Income ($)	12713.34	80.98	-0.62	-1063.00	3723.00
Tax Expense ($)	3572.61	22.76	0.14	-78.69	627.00
Net Income ($)	9370.10	59.68	-0.41	-1065.00	3096.00
Total Assets ($)	160029.16	1019.29	65.76	0.243	30424.00
ROA	-	-0.31	-0.01	-6.64	0.64
Margin	-	-2.64	-0.01	-170.792	3.15
Asset turnover	-	0.86	0.76	0.003	3.02
Industry ROA = Industry Net Income/Industry Total Assets = 0.06 or 6%					
Industry Margin = Industry Net Income/ Industry Sales = 0.10 or 10%					
Industry Asset turnover = Industry Sales/ Industry Total Assets = 0.59					
Industry tax rate = Industry Taxes/Industry Pretax Income = 0.28 or 28%					
Industry Gross Profit Margin = Industry Gross Profit/ Industry Sales = 0.64 or 64%					

** All dollar amounts in millions.*

Similarly, for the year 2010, total sales were nearly $94,698 million with mean sales of $603 million (median sales were around $55 million). Cost of sales was nearly $33,685 million resulting in a gross profit margin of nearly 64% (same as 2009). Total

pretax income was $12,713 million and income tax expenses were $3,573 million at an implied tax rate of 28%. Total asset size was $160,029 million with a ROA of 6% and industry margin of 10% approximately. Asset turnover was approximately 0.60. If excise tax of 2.3% is applied to 2010 sales of all sample firms used in Table 1, it would result in excise tax amount of $2,178 million and thereby increasing taxes by nearly 61%.

From above analysis we find that medical device manufacturing industry has a large gross profit margin (around 64%) but net profit margin is quite low (7% in 2009 and 10% in 2010). This means that period costs (non-manufacturing costs) for this industry are quite high and thereby result in a low profit margin. Implied tax rate was quite high for the year 2009 as compared to year 2010. The new excise tax would increase the taxes by approximately 60 percent.

The numbers in Table 1 require care in interpretation since the difference between mean and median for several items is quite large because of non-normal distribution. One reason is the distribution of the size of the firms, a few of the firms are quite large, resulting in a skewed distribution. Another possible reason is above sample includes firms which were incurring losses during these years and/or having tax expenses equal to or less than zero. Also, such firms negatively affect the ROA and profit margin of the industry. Therefore, Table 2 provides a similar analysis of all US firms in the medical device industry excluding the firms with negative income and/or income tax expense equal to or less than zero for the years 2009 (Panel A) and 2010 (Panel B). This results in a sample size of 67 firms for both years.

For the year 2009, total sales of sample firms were $75,881 million with mean sales of $1133 million per firm (median sales were $257 million). Cost of sales for industry was around $27,420 million yielding a gross profit margin of approximately 64%. Pretax income for the industry was $14,490 million and income tax expense was $3,870 million at an implied tax rate of 27%. Total asset size of sample firms was $113,012 million with mean asset size of $1687 million (median asset size was $355 million) per firm. ROA for the sample firms was nearly 9.5% and net profit margin was around 14%. An excise tax of 2.3% of sales would result in additional taxes of about $1,745 million for these firms (an increase of nearly 45%).

Similarly, for the year 2010, total sales of sample firms were $80,829 million and cost of sales were $28,784 million resulting in a gross profit margin of 64% approximately. Implied tax rate based on pretax income and income tax expense of sample firms was around 25%. Total asset size was $125,204 million with a ROA of around 9%. Profit margin of the sample firms is around 14%. An excise tax of 2.3% of sales would result in additional taxes of nearly $1,859 million (an increase of about 50%). Thus, we find that compared to Table 1, ROA and profit margin of sample firms is a little higher and the implied tax rate is lower in Table 2.

Next, in tables 3 and 4, we compare the ten largest and ten smallest firms out of the sample used in Table 2. For Table 3, we define the size of a firm as its sales size and for Table 4, the size of a firm is defined as its assets size. Note that for tables 3 and 4 we have excluded the firms incurring losses or having tax expenses less than or equal to zero and our sample firms only includes firms with SIC codes between 3841-3851 with data available on Compustat. Therefore, Boston Scientific Corp. was excluded from our sample firms in tables 3 and 4 despite being one of the largest firms in the medical device industry since it incurred losses during the years 2009 and 2010.

Table 2: Descriptive analysis of US Medical equipment/ device manufacturers with positive net income and tax expense greater than zero*

PANEL A: Year 2009 (Total 165 firms – 93 firms with negative income – 5 firms with taxes less than or equal to zero = 67 sample firms)					
	Total	**Mean**	**Median**	**Minimum**	**Maximum**
Sales ($)	75880.61	1132.55	257.46	1.689	15835.00
Cost of Sales ($)	27419.51	409.25	107.02	0.426	3353.00
Gross Profit ($)	48461.10	723.30	122.32	1.263	12802.00
Pretax Income ($)	14490.18	216.27	21.41	0.185	3969.00
Tax Expense ($)	3870.03	57.76	7.31	0.021	870.00
Net Income ($)	10782.64	160.93	13.48	0.103	3099.00
Total Assets ($)	113012.55	1686.75	354.51	10.476	28090.00
ROA	-	0.07	0.07	0.001	0.20
Margin	-	0.14	0.08	0.003	3.45
Asset turnover	-	0.86	0.790	0.022	2.15
Industry ROA = Industry Net Income/Industry Total Assets = 0.095 or 9.5%					
Industry Margin = Industry Net Income/ Industry Sales = 0.142 or 14.2%					
Industry Asset turnover = Industry Sales/ Industry Total Assets = 0.67					
Industry tax rate = Industry Taxes/Industry Pretax Income = 0.27 or 27%					
Industry Gross Profit Margin = Industry Gross Profit/ Industry Sales = 0.64 or 64%					
PANEL B: Year 2010 (Total 157 firms – 82 firms with negative income – 8 firms with taxes equal to or less than zero = 67 sample firms)					
	Total	**Mean**	**Median**	**Minimum**	**Maximum**
Sales ($)	80829.34	1206.41	345.09	1.579	15933.00
Cost of Sales ($)	28784.09	429.61	116.98	0.430	3416.10
Gross Profit ($)	52045.29	776.8	170.74	1.148	12836.00
Pretax Income ($)	14752.73	220.19	31.99	0.485	3723.00
Tax Expense ($)	3704.86	55.30	11.04	0.015	627.00
Net Income ($)	11268.50	168.19	20.95	0.350	3096.00
Total Assets ($)	125204.29	1868.72	369.48	3.435	30424.00
ROA	-	0.08	0.06	0.010	0.24
Margin	-	0.15	0.10	0.006	3.15
Asset turnover	-	0.88	0.81	0.017	2.18
Industry ROA = Industry Net Income/Industry Total Assets = 0.09 or 9%					
Industry Margin = Industry Net Income/ Industry Sales = 0.14 or 14%					
Industry Asset turnover = Industry Sales/ Industry Total Assets = 0.65					
Industry tax rate = Industry Taxes/Industry Pretax Income = 0.25 or 25%					
Industry Gross Profit Margin = Industry Gross Profit/ Industry Sales = 0.64 or 64%					

**All dollar amounts in millions.*

Table 3: Descriptive analysis of 10 largest and 10 smallest firms (based on sales size) with positive net income and tax expense greater than zero*

Panel A: Year 2009						
	Ten largest firms based on Sales size			**Ten smallest firms based on Sales size**		
	Total	**Mean**	**Median**	**Total**	**Mean**	**Median**
Sales ($)	55483.12	5548.31	4591.14	235.43	23.54	24.60
Cost of Sales ($)	18474.96	1847.50	1613.72	114.95	11.49	12.79
Gross Profit	66.7%	62.47%	62.11%	51.17%	51.73%	50.88%
Pretax Income ($)	11944.45	1194.45	858.60	20.71	2.07	0.68
Total Taxes ($)	3109.59	310.96	245.13	7.04	0.70	0.28
Implied tax rate	26.03%	27.46%	27.31%	33.99%	34.24%	36.18%
Net Income ($)	8839.51	883.95	642.70	13.65	1.37	0.64
Total Assets ($)	83753.21	8375.32	7105.66	257.08	25.71	17.92
ROA	10.55%	10.76%	11.56%	5.31%	6.53%	3.78%
Margin	15.93%	15.04%	16.54%	5.80%	6.47%	3.71%
Assets turnover	0.66	0.73	0.73	0.92	1.15	1.11
Panel B: Year 2010						
	Ten largest firms based on Sales size			**Ten smallest firms based on Sales size**		
	Total	**Mean**	**Median**	**Total**	**Mean**	**Median**
Sales ($)	56996.30	5699.63	4692.49	181.25	18.13	22.09
Cost of Sales ($)	18715.68	1871.57	1586.32	87.57	8.76	6.03
Gross Profit	67.16%	62.88%	62.11%	51.69%	51.98%	47.27%
Pretax Income ($)	11447.25	1144.72	788.95	17.65	1.76	0.95
Total Taxes ($)	2788.96	278.90	235.70	5.96	0.60	0.26
Implied tax rate	24.36%	26.76%	27.69%	33.77%	30.38%	33.91%
Net Income ($)	8813.48	881.35	553.05	11.67	1.17	0.58
Total Assets ($)	90637.84	9063.78	7971.45	160.78	16.08	14.62
ROA	9.72%	10.03%	10.39%	7.26%	7.15%	4.92%
Margin	15.46%	14.24%	16.35%	6.44%	7.61%	5.62%
Assets turnover	0.63	0.70	0.68	1.13	1.23	1.14

**All dollar amounts in millions.*

From Table 3, the total sales of the ten largest firms were $55,483 million compared to total sales of only $235 million for the ten smallest firms for the year 2009. Large firms had a gross profit ratio of around 67% as compared to 51% for smaller firms. A possible explanation for this difference is large firms have better economies of scale and better efficiency in using their resources as compared to smaller firms. One interesting observation was large firms had a lower implied tax rate as compared to smaller firms, 26% to 34% respectively. Total asset size of large firms was around $83,753 million as compared to $257 million for smaller firms. Large firms had a high ROA of 10.6% compared to 5.3% for smaller firms. To analyze this, we break down ROA into profit margin and asset turnover ratio. Another interesting observation found based on this analysis is that large firms had a higher profit margin (approximately 16%) as compared to smaller firms (approximately 6%) but smaller firms had a high turnover ratio (approximately 0.9) as compared to large firms (approximately 0.7). The mean turnover ratio for smaller firms was approximately 1.15 as compared to a mean of 0.73 for large firms. If we compare the sales of the ten largest firms with the total sales of the industry as reported in Table 1, we find that these ten firms account for approximately 60% of the

total industry sales for the year 2009. An excise tax of 2.3% would result in additional taxes of nearly $1,276 million (an increase of 41%) for large firms as compared to $5.4 million (an increase of 77%) for small firms.

Similarly, for year 2010, total sales of large firms were $56,996 million compared to $181 million for smaller firms. Large firms had gross profit ratio of about 67% as compared to 52% for smaller firms. The implied tax rate for large firms was around 24% compared to a tax rate of around 34% for smaller firms. Large firms had a ROA of about 9.7% compared to 7.3% for smaller firms. The profit margin of large firms was around 15.5% compared to 6.4% for smaller firms. However, smaller firms had a better asset turnover ratio of 1.13 as compared to 0.63 for larger firms. Also, the ten largest firms account for approximately 60% of the total industry sales as reported in Table 1. An excise tax of 2.3% of sales would result in additional taxes of nearly $1,311 million (an increase of 47%) for large firms as compared to $4.2 million (an increase of 70%) for small firms.

Table 4 reports the comparison of the ten largest firms with the ten smallest firms where size of firm is defined as its asset size. For the year 2009, the ten largest firms had sales of $55,159 million as compared to $279 million for the ten smallest firms. The large firms had a gross profit ratio of nearly 64% as compared to 48% for smaller firms. The implied tax rate based on pretax income and income tax expense was nearly 26% for large firms as compared to 28% for smaller firms. The large firms owned assets worth $85,284 million as compared to the asset size of $193 million for smaller firms. The ROA of large firms was about 10.4% while smaller firms had a ROA of 7.4%. The large firms had a profit margin of 16% and smaller firms had a profit margin of only 5%. However, smaller firms had a higher asset turnover ratio of 1.46 as compared to a ratio of 0.65 for larger firms. Comparing the asset size of the ten largest firms against the asset size of the industry, we find that these firms account for nearly 55% of industry assets. An excise tax of 2.3% of sales would result in additional taxes of nearly $1,269 million (an increase of 42%) for large firms as compared to $6.4 million (an increase of 116%) for small firms.

Similarly, for the year 2010, larger firms had sales of $55,542 million compared to $209 million for smaller firms. The gross profit ratio of large firms was nearly 67% as compared to 48% for smaller firms. The implied tax rate was about 24% for large firms and about 34% for smaller firms. The asset size was $92,693 million for large firms and was $147 million for smaller firms. The ROA of large firms was 9% and about 7% for smaller firms. The large firms had a higher profit margin of about 15% as compared to 5% for smaller firms. However, smaller firms had a higher asset turnover ratio of 1.42 as compared to 0.60 for larger firms. Comparing the asset size of large firms against the asset size of the whole industry, we find that the ten largest firms account for nearly 58% of industry assets during the year 2010. An excise tax of 2.3% of sales would result in additional taxes of nearly $1,277 million (an increase of 51%) for large firms as compared to $4.8 million (an increase of 92%) for small firms.

Based on above analysis we find some interesting observations:

- Larger firms had lower tax rates compared to smaller firms.
- Larger firms enjoyed higher gross profit margins and higher profit margins compared to smaller firms because of better economies of scales and operating efficiencies.
- Smaller firms had a better assets turnover ratio compared to larger firms.

- Larger firms continue to grow as evident from sales growth and assets growth while smaller firms appear to be shrinking.
- As a consequence of the new excise tax, smaller firms are expected to experience a larger percentage increase in their taxes (over 70% increase) as compared to larger firms (less than 51% increase). Firms incurring losses are expected to suffer the most.

Table 4: Descriptive analysis of 10 largest and 10 smallest firms (based on assets size) with positive net income and tax expense greater than zero*

Panel A: Year 2009						
	Ten largest firms based on Assets size			**Ten smallest firms based on Assets size**		
	Total	**Mean**	**Median**	**Total**	**Mean**	**Median**
Sales ($)	55159.13	5515.91	4591.14	279.15	27.92	25.12
Cost of Sales ($)	18240.95	1824.10	1512.33	144.90	14.49	15.11
Gross Profit	66.93%	62.77%	62.11%	48.09%	50.06%	48.27%
Pretax Income ($)	11652.66	1165.27	858.60	19.69	1.97	0.93
Total Taxes ($)	3006.32	300.63	245.13	5.51	0.55	0.18
Implied tax rate	25.80%	26.62%	26.25%	27.98%	25.52%	30.32%
Net Income ($)	8823.48	882.35	642.70	14.13	1.41	0.90
Total Assets ($)	85283.97	8528.40	7105.66	191.63	19.16	17.92
ROA	10.35%	10.16%	10.12%	7.37%	7.57%	5.09%
Margin	16.00%	15.20%	16.54%	5.06%	5.30%	4.24%
Assets turnover	0.65	0.68	0.71	1.46	1.43	1.46
Panel B: Year 2010						
	Ten largest firms based on Assets size			**Ten smallest firms based on Assets size**		
	Total	**Mean**	**Median**	**Total**	**Mean**	**Median**
Sales ($)	55541.98	5554.20	4692.49	208.49	20.85	22.09
Cost of Sales ($)	18172.80	1817.28	1509.71	108.40	10.84	6.03
Gross Profit	67.28%	62.55%	58.65%	48.01%	50.34%	39.52%
Pretax Income ($)	10635.60	1063.56	608.60	15.39	1.54	0.95
Total Taxes ($)	2516.18	251.62	224.65	5.21	0.52	0.26
Implied tax rate	23.66%	24.95%	25.70%	33.85%	30.40%	33.96%
Net Income ($)	8357.25	835.72	444.85	10.16	1.02	0.58
Total Assets ($)	92692.60	9269.26	7971.45	146.76	14.68	14.62
ROA	9.02%	7.97%	7.81%	6.92%	7.35%	4.92%
Margin	15.05%	13.12%	13.05%	4.87%	6.07%	5.63%
Assets turnover	0.60	0.61	0.57	1.42	1.36	1.29

**All dollar amounts in millions.*

CONCLUSION

The new medical excise tax was enacted by the United States Congress in 2010 as part of the PPACA and the subsequent Reconciliation Act. This tax, which will be 2.3

percent of sales for medical device manufacturers and importers after 2012, is estimated tobring in approximately $2 billion of revenue per year until 2017, and $3 billion per year after 2017. How this tax will impact medical device manufacturers and importers is not yet clear. Options considered in this study include increasing revenue, decreasing costs other than taxes, a combination of increasing revenue and decreasing costs, or simply doing nothing and incurring the medical excise tax.

The conclusions of this study are as follows. First, the profitability of medical device manufacturers and importers will be impacted by the new excise tax if they are unable to pass the tax on to consumers and are unable to manage revenues and costs sufficiently to mitigate the effects of the tax. Second, this study indicates smaller medical device manufacturers and importers are likely to suffer more detrimental consequences of the excise tax than larger medical device manufacturers and importers.

The implications of the study are as follows. Medical device manufacturers are not likely to simply do nothing in response to the new excise tax due to shareholders' demands that firms maintain or increase profits. Options considered by some companies are to manage costs other than taxes by reducing their work force and possibly relocating some operations. Given how recently the excise tax was enacted by the United States Congress it is too early to know what actions medical device manufacturers and importers will actually pursue as a result of the tax.

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