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Agricultural Economics Extension Series No. 03-11
October 2003

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Truck-mounted potato bulk beds are in use by virtually all potato growers in Idaho, as well growers in all major potato production regions of the country. Bulk beds are used to transport potatoes directly from the field to on-farm storages, to processor storages, or to fresh pack sheds. Approximately three years ago the Internal Revenue Service (IRS) changed a previous policy and applied an excise tax to bulk potato beds, ruling that the 12 percent excise tax charged on multi-use and over-the-road trailers should also be charged on the potato bulk beds. It is our understanding that they have disallowed the single-purpose agriculture exemption. The IRS has also changed the basis on which potato trailers are taxed, applying the excise tax to the full value of the trailers, rather than to just the "running gear," (tires and axels) as had been the policy.

The Potato Growers of Idaho requested assistance from the University of Idaho College of Agricultural and Life Sciences in analyzing the impact of the excise tax on the Idaho potato industry and the economy of Eastern Idaho. They also asked for an estimate on tax revenue collected from the excise tax. The purpose of this paper is to discuss the likely consequence of the IRS's policy and to evaluate the likely economic impacts of the tax on bulk beds. The tax impact was evaluated over different time periods: the short-, intermediate-, and long-term. No attempt was made to project changes in the potato industry that would alter the current level of bulk bed demand.

Background

In a market-based economy, such as that operating in the United States, markets set prices and the market price allocates resources. Imposing a tax on any good or service effectively raises the price of that good or service and demand for that good or service will drop. In essence, a tax introduces a price wedge in the decision process and thus distorts resource allocation, compared to a no tax situation.

The consequence of introducing price wedge is that there are generally both positive and negative impacts on an economy. There will be winners and losers. Albeit counter-intuitive, inefficiency can have greater economic benefits than costs. This winners and losers concept can be illustrated for the case of technology adoption. A business adopting laborsaving technology is generally viewed as beneficial, since the economy becomes more efficient. On the losers' side, workers may be out of their jobs and the payroll that had previously circulated through the local economy disappears. If the labor saving device or technology was produced in another region or state, than the economic benefits accrue there, while the labor displacement costs are born locally. If the cost savings is passed along to the consumer, than the consumer is the ultimate recipient of the technology benefit, but the local economic impact may be negative. It is these issues that make it difficult to determine an economic impact in an accurate and unambiguous manner.

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The second challenge in the analysis of taxes is determining who bears the burden of the tax. Can the tax burden be shifted? And what if any economic impact results from the change in demand. Another difficulty is predicting the impact of the tax over time. The number of options available to growers who seek to avoid the tax changes over time. Analyzing the impact as a one-time impact would not accurately reflect reality.

The increase in the excise tax on bulk beds has a two-fold effect. First, farmers' costs of producing potatoes will rise and thus farmer income will drop. Second, bed sales will decline as farmers buy used beds or recondition the old beds. The later has a targeted impact on one of Eastern Idaho's manufacturing industry. And as shown in the following analysis, that industry will bear the brunt of the excise tax burden.

Definition of the Region of Impact

The area of economic impact for the analysis was defined as the three contiguous counties of Bannock, Bingham and Power. The two largest manufactures of bulk potatoes are located in Bingham and Power counties and the proximity of Bannock county and the city of Pocatello to these two counties meant the impact would not be isolated to the counties with the manufacturing plants.

Impact Analysis

Impacts depend upon the interrelationships between non-base and base industries with an economy. Some businesses exist entirely to service other businesses. These businesses are the *non-basic* industries for the economy. Farm equipment manufacturers would be an example of a non-basic industry. Farm equipment manufacturers, whose sales are largely exported outside Idaho, are the *export base* of this industry. Impact attributes the portion of the non-basic business to the existence of the exporting business.

The impact of the farm equipment manufacturers is measured by its impact on Idaho's economy. The farm equipment manufacturing industry's total impact on the region's economy is apportioned into two levels. The first level is the *direct impact* of the farm equipment manufacturers complex – the jobs, value added, and sales that are directly created by farm equipment manufacturers as exporting business. The direct portion of their employment, value added that is directly tied to exports are the direct impact. The portion of the industry that is services to other business are not direct impacts of the farm equipment manufacturers, but rather included in the impacts of the other base industries.

The second is the impact on other businesses in the region that provide goods or services to the farm equipment manufacturers complex – the *indirect impact*. The indirect impacts are the so-called ripple or multiplier effects of farm equipment manufacturers in the three-county region of Bannock, Bingham, and Power counties. Conceptually, the multiplier or ripple effects are driven by the exports of an economy. Exports, the new money coming into an economy, sets off a web of transactions as each business seeks to fulfill the demands of their customers. Industry's

impact upon the economy is thus comprised of two parts the magnitude of the multiplier and the magnitude of the exports. The sum of the two, direct and indirect, measures the total impact of agribusiness to the state's economy.

The farm equipment manufacturers buy goods and services from other businesses in the three-county region for operation and production purposes. Other businesses, in turn, buy goods and services from Idaho-based businesses to provide the goods and services demanded by the farm equipment manufacturers complex. Numerous rounds of inter-industry transactions occur, resulting from direct purchases by farm equipment manufacturers. Farm equipment manufacturers transactions create a multiplier effect—a change in the output of the industry generates or induces changes in the outputs of many other industries in the three counties. Therefore, total economic activity or output increases by some multiple of the initial change in output. This multiplier effect, or impact, is captured in the popular economic multiplier concept.

We assessed the impact of the excise tax on the farm equipment manufacturers and upon the Idaho economy by measuring the industry's impact on gross sales, employment, and value added in the three-county economy. A multiplier measures the direct and indirect impact or the total change in business sales that occurs in response to a one-dollar change in exports. Type I (indirect) multipliers measure just the changes in business sales. Type II multipliers (indirect plus induced) measure the change in gross sales plus wages, salaries, and proprietors profits. Type II assumes wages, salaries, and proprietors' profits circulate through the economy, along with business transactions.

Input/Output models² are the only analytical tool to assess indirect or multiplier effects. Input-Output (I-O) comprises both a system of economic accounts for a region as well as a tool for economic analysis and forecasting. The focus of input-output analysis is the cumulative interdependent nature of expansion or contraction of an economy. By accounting for each industry's direct purchases or sales, we can then ascertain the indirect impact of each industry. Conceptually, the processing sectors of the regional economy move toward a stable equilibrium where sales equal receipts in each industry. Receipts are altered when exports by an industry change. Changes in exports set off a series of transactions as each industry responds to either direct or indirect changes in their demands.

An example of direct change in demand occurs when farm equipment manufacturers exports increase. An example of an indirect demand change would be the response manufacturers have to increase output by purchasing more steel, machinery, labor and similar inputs thereby creating an indirect demand for the output of other sectors in the economy. When the other industries find their demand rising they too will buy more inputs and thus the initial agricultural export change ripples throughout the economy. These reverberations gradually wane as a portion of each round of spending leaks out to saving, taxes, and imports. The greater the import leakage the faster the effects die out and the smaller the multiplier. An industry's impact upon the

² Minnesota IMPLAN Group, Inc. IMPLAN Professional Version 2.0 Social Accounting and Impact Analysis Software. Idaho 2000 data. Minnesota IMPLAN Group, Inc, Stillwater MN. 1999.

economy is thus comprised of two parts -- the magnitude of the multiplier and the magnitude of the exports. An industry may have a large multiplier but minuscule exports and thus have little impact on the economy.

Impact of Excise Tax on Idaho's Bed Manufacturing Industry

The direct impact on potato growers of applying the excise tax to bulk potato beds is to raise the effective price by the value of the tax. While the excise tax is 12 percent of the purchase price, the IRS assumes a 3 percent discount has been applied, which is added back. This raises the effective rate of the tax to 15.4 percent. The bulk beds come in lengths ranging from 16 to 26 feet, with 20-foot and 22-foot being the most common in use. The beds also have a variety of features, such as automatic tarps. The price on bulk beds range from \$14,000 to \$18,000. The price increase from the excise tax ranges from approximately \$2,150 to \$2,750. For this analysis, a value of \$2,365 was assumed based on a typical bulk bed value of \$15,400.

Potato growers have three alternatives in replacing bulk beds: (1) purchase a new bed; (2) purchase a used/reconditioned bed; and (3) re-conditioning his/her existing bulk beds. For the last option, the grower may have the work done in a local machine shop or the work might be done on-farm. The regional incidence of the economic impact is determined by the grower's decision to buy a used bed or recondition his existing bed. And since the tax is national in scope, the economic impact in Idaho changes dramatically depending on residence of the grower. While there is the efficiency loss to all growers mentioned previously, part of the economic loss in economic activity when a new bulk bed is not sold is offset by money spent to recondition an old bulk bed. That holds for a grower in Idaho. But when the grower outside of Idaho makes this decision, the Idaho economy bears the full impact of the lost sale, including both the direct and indirect impacts. The location of the bulk bed manufacturer and sales is critical in assessing the regional incidence of the potential impact of the excise tax.

The sale of bulk potato beds in Idaho prior to the IRS ruling on the excise tax was estimated to be approximately 600 annually, according to industry sources. This includes truck beds purchased by Idaho potato growers, as well as by potato growers in other states. According to one company, "sales on new beds dried up" the first year the tax was applied. In addition, the demand for used bulk beds increased dramatically as potato growers purchased lower priced used beds or repaired older bulk beds. The increased demand for used beds resulted in a significantly raised the price on used bulk beds. While sales have recovered somewhat in the last two years, sales have continued below the level prior to the imposition of the excise tax, and it is uncertain as to whether or when the sales will return to the pre-tax levels. While the impact on the sales of new bulk beds was initially very severe, as used bulk beds can no longer be reconditioned bed sales will likely rebound.

Bulk Bed Sales Estimates

The initial negative impact of imposing an excise tax on bulk potato beds was born almost exclusively by the three Idaho manufactures. Sales of bulk potato beds during the short term (0-

5 years) will be down an estimated 1,325 beds. The annual loss in sales will average 265 beds, ranging from a high of 300 in year one to 200 in year 5. This represents a 44 percent drop in estimated sales without the tax. Sales during the intermediate term (6-10 years) should continue to improve as the number of bulk beds suitable for re-conditioning declines. Sales of bulk beds during this time period will be down an estimated 675 beds. The annual loss in sales will average 135 beds, ranging from a high of 200 in year six to 50 in year 10. This represents a 23 percent drop in estimated sales without the tax. The long-term sales reduction estimate (over 10 years) is expected to stay at 8 percent below pre-tax levels, or 50 beds per year.

Starting with the estimated pre-tax annual sales of 600 bulk beds, cumulative pre-tax sales, post-tax sales, post-tax lost sales, gross value of beds sold and beds not sold and federal excise tax collected were estimate for each time period. The average annual value of lost sales for each time period--the direct impact--was also calculated. The annual average lost sales value was used to generate the economic impact and the associated job losses. The long-term impact is an annual impact and it is assumed to be a permanent loss.

Short-Term Impact: Estimated 44% drop in sales

5-Year Cumulative Totals

Pre-Tax Sales: 3,000 bulk beds

Post-tax Sales: 1,675 bulk beds

Post-Tax Lost Sales: 1,325 bulk beds

Estimated Gross Value:

1,675 beds sold @ \$15,400 = \$25,795,000

1,325 beds not sold @ \$15,400 = \$20,405,000

Estimated Average Annual Value of Lost Sales: \$4,081,000

Federal Excise Tax Revenue:

1,675 beds sold @ \$15,400 x .154 = \$3,972,430

Average Annual Tax Revenue Generated: \$794,486

Intermediate-Term Impact: Estimated 23% drop in sales

5-Year Cumulative Totals

Pre-Tax Sales: 3,000 bulk beds

Post-tax Sales: 2,325 bulk beds

Post-Tax Lost Sales: 675 beds

Estimated Gross Value:

2,325 beds sold @ \$15,400 = \$35,805,000

675 beds not sold @ \$15,400 = \$10,395,000

Estimated Average Annual Value of Lost Sales: \$2,079,000

Federal Excise Tax Revenue:

2,325 beds sold @ \$15,400 x .154 = \$5,513,970

Average Annual Tax Revenue Generated: \$1,102,794

Long-Term Impact: 8% permanent drop in sales

Annual Totals:

Pre-Tax Sales: 600 bulk beds
 Post-tax Sales: 550 bulk beds
 Post-Tax Lost Sales: 50 bulk beds
 Estimated Annual Gross Value:
 550 beds sold @ \$15,400 = \$8,470,000
 50 beds not sold @ \$15,400 = \$770,000
 Annual Federal Excise Tax Revenue:
 550 beds sold @ \$15,400 x .154 = \$1,304,380

Economic Impact

Table 1 summarizes the economic impact on the three-county area where the impact of the lost bed sales would be most acute: Bannock, Bingham and Power counties. The economic impact will diminish over time as the bulk bed sales recover, dropping from \$6.4 million annually in the short-run to \$1.2 million annually in the long-run. While not discussed explicitly in this paper, Table 1 also illustrates the much-abused and misunderstood multiplier concept. The multiplier for the Farm Machinery and Equipment Manufacturing sector is approximately 1.56 – that is there is \$1.56 of sales generated in the three-county economy for each dollar of exports. The ripple or multiplier effect is thus \$0.56. When the direct losses in Table 1 are multiplied by this value, you will get the total impact. The total economic impact is the sum of the direct, indirect, and induced impacts. The indirect and induced impacts are often called the “ripple” effects attributed to the change in exports from the local economy.

Any economy is driven by “new money” that comes into the economy. New money is the exports from the three-county economy. Thus, the beds that are manufactured for those farmers outside eastern Idaho become the exports (new money) that drive economic activity (jobs, payrolls, and sales) in this three county economy. The multiplier for the bed manufactures times the loss in export sales determines the direct and indirect impact upon the three-county economy.

Table 1. Annual economic impact in the three-county economy.

Impact Type:	Short-Run	Intermediate-Run	Long-Run
		\$ millions	
Direct	\$-4.1	\$-2.1	\$-0.8
Indirect	\$-1.6	\$-0.8	\$-0.3
Induced	\$-0.7	\$-0.4	\$-0.1
Total	\$-6.4	\$-3.3	\$-1.2

Estimated job loss

As with the dollar value of economic impact, the job loss for each of the three time periods was calculated based on the average loss in bulk bed sales for that time period. Once lost, the jobs will only return only after bed sales improve. For the short-run analysis, the direct job loss in the Farm Machinery and Equipment Manufacturing sector is 24 – that is 24 jobs are generated to manufacture the \$4.1 million dollars of bulk beds that are lost. The job loss resulted from the primary average annual impact of \$4,081,000 in lost sales. An additional 33 jobs would be lost in other sectors of the three-county area, bringing the total job loss to 57. Over the five-year period, this would amount to 120 man-years of direct loss and 165 man-years of indirect and induced job losses.

For the intermediate-term, the direct job loss in the Farm Machinery and Equipment Manufacturing sector is 12. The job loss resulted from the primary average annual impact of \$2,079,000 in lost sales. An additional 17 jobs would be lost in other sectors of the three-county area, bringing the total job loss to 29. Over the five-year period, this would amount to 60 man-years of direct loss and 85 man-years of indirect and induced job losses.

For the long-term, the direct job loss in the Farm Machinery and Equipment Manufacturing sector is five. The job loss resulted from the primary average annual impact of \$770,000 in lost sales. An additional six jobs would be lost in other sectors of the three-county area, bringing the total job loss to 11. Since the eight percent sales loss is assumed to be permanent, the job losses are also permanent.

Table 2. Annual employment loss in the three-county economy.

Impact Type:	Short-Run	Intermediate-Run	Long-Run
		Jobs	
Direct	24	12	5
Indirect	21	11	4
Induced	12	6	2
Total	57	29	11

Income Impacts

In addition to the sales and job losses, the excise tax also impacts regional incomes. The loss in wages and salaries is proportional to the employment impacts. In the short run, there is a \$1.5 million annual loss in wages and salaries in the three-county region. About half of that loss (\$771,000) is the direct wage and salary losses by those workers in the farm equipment manufacturing business. The other half of the income impact is the ripple or multiplier effect incurred by workers in other business. In the intermediate run, there would be a total annual income loss of \$764,000 and in the long-run a total annual income loss of \$283,000.

Table 3. Annual income (wages and salary) loss in the three-county economy.

Impact Type:	Short-Run	Intermediate-Run	Long-Run
		\$1000	
Direct	\$771	\$393	\$145
Indirect	\$482	\$246	\$91
Induced	\$247	\$126	\$47
Total	\$1,500	\$764	\$283

Estimated Loss of Local Economic Activity

The loss in economic activity stemming from a loss in sales of potato bulk beds includes both the direct and indirect impacts. The primary impact, as shown above, was approximately \$31 million dollars, over the first ten years and an additional \$.77 million for each year after the first ten. The secondary impacts would total \$17.5 million during the first ten years. The total impact on local economic activity would be just over \$48.5 million in the first ten years and \$1.2 million each year beyond the first ten.

While the overall magnitude of the economic impact may appear to be small, it is crucial to remember that the impact is centered on small rural Idaho communities where the potato equipment manufacturers are located: Blackfoot, American Falls and Rexburg. The best way to sustain viable rural economies is to have policies that sustain the economic viability of local businesses. Removing the excise tax on potato bulk beds will not only benefit local communities in Idaho but will also help potato growers by allowing them to purchase equipment needed to maintain their investment in technology and participate in the globally competitive potato market.

Tax Revenue Assessment

The tax revenue collected by the Federal government will depend on the level of sales. For the short- and intermediate-run, the average annual sales were used to estimate tax revenue. The long-run tax revenue estimate was based on an assumed loss of 8 percent of the pre-tax sales. The overall tax revenue estimates are very rudimentary, because we had no verifiable data on bulk bed sales from other potato regions. We estimated that Idaho produces 80 percent of the bulk potato beds manufactured in the United States. This is likely a conservative estimate as we had numbers ranging as high as 90 percent from industry sources. If Idaho produces more than 80 percent of the bulk beds, then the tax revenue estimate for other regions will be too high. Table 4 summarizes the estimated tax revenue derived from applying the excise tax to bulk beds. Table 4 shows the expected tax revenue from bulk bed sales in Idaho and other regions. Tax revenue ranges from a low of \$1.0 million in the short-run because of reduced sales, to a high of \$1.6 million in the long-run, when sales return to 92 percent of their pre-tax level.

Table 4. Estimated annual federal excise tax revenue collection.

Source:	Short-Run	Intermediate-Run	Long-Run
		\$ Millions	
Idaho	\$0.8	\$1.1	\$1.3
Other Regions	\$0.2	\$0.3	\$0.3
Total	\$1.0	\$1.4	\$1.6

Summary

The initial negative impact of imposing an excise tax on bulk potato beds was born almost exclusively by the three manufactures. Sales of bulk potato beds during the short term (0-5 years) will be down an estimated average of 44 percent. Sales were down 50 percent the first year and will likely still be 33 percent below pretax levels by year five. The estimated cumulative impact during the first five years was estimated at \$32 million. The cumulative direct impact during the first five years was estimated at \$20.4 million in lost sales and the cumulative secondary impact of \$11.5 million.

Sales during the intermediate term (6-10 years) will continue to improve as bulk beds suitable to re-condition declines, but sales of bulk beds during this time period are expected to still average 23 percent below pre-tax levels. The total cumulative impact during this five-year period was estimated at \$16.5 million. The cumulative direct impact was \$10.4 million in lost sales over the five years and the cumulative secondary impact of \$5.9 million.

In the long term (over 10 years) sales are expected to stay at 8 percent below pre-tax levels. The total annual impact is estimated at \$1.2 million. The annual primary impact is estimated at \$770,000 and the secondary impact of \$430,000.

The primary economic impact to the local economy from the excise tax is not the higher cost of the bulk bed that is born by the potato growers. The major impact is the lost sales to Idaho's bed manufactures and the resulting loss of jobs and related economic activity. Initially, growers will avoid the tax as previously discussed. As time passes and farmers alternatives become more limited; you can't weld air. Farmers are forced to purchase new bulk beds and pay the tax. While the initial incidence of the excise tax is on the bed manufactures, the incidence of the tax will be borne by the grower in the long run.

As price takers, potato growers cannot pass along the tax to the consumer, by increasing potato prices. In the long term the only negative economic impact will be a long run drop in demand for beds. Potato growers will pay the higher price for the bulk bed or incur higher costs on re-conditioning beds to avoid the tax. The cost-price squeeze will be exacerbated and farmer's disposable income will drop as a result of the tax. The loss in farmer's income will ripple throughout the Idaho economy. This impact was not analyzed.

Growers also run the risk of becoming less competitive to growers in Canada as their cost of production rises, if Canadian growers don't face a comparable tax. This type of impact is extremely difficult to quantify and analyze, and was not included in this paper.