AN ECONOMIC ANALYSIS OF THE POTENTIAL RETURNS FROM A FUTURE NATIONAL WHEAT CHECKOFF PROGRAM

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Virtually every agricultural commodity has one or more state and/or federally authorized organizations dedicated to promoting the economic welfare of its producers funded through some form of checkoff assessment on sales by producers and often others in the marketing chain[2]. The funds collected by checkoff groups are used primarily to expand demand (both domestic and foreign) through generic advertising efforts, the development of new uses of the associated commodities, and other promotional activities. Although some checkoff programs also fund research intended to reduce production costs and/or enhance yields, the share of their total budgets spent on research is generally much smaller than the share spent on demand promotion activities.

Wheat checkoff programs currently operate at the state-level under state legislative authority. Currently 22 of the 42 wheat producing states operate a wheat checkoff programs. Wheat producers in those states are assessed a checkoff fee ranging from one cent to five cents per bushel or from 0.25% to 0.75% of the value of a wheat bushel to their respective state commissions. The state checkoff funds are used primarily to finance production research projects within each respective state to boost wheat yields and/or reduce costs of production. However, each state commission contributes about one quarter of a penny per bushel ($0.0028) to the U.S. Wheat Associates (USW) to finance wheat export market development. USW is the USDA Foreign Agriculture Service (FAS) wheat export cooperator. FAS matches the wheat checkoff dollars invested in wheat export promotion, thus enhancing the impact of the checkoff dollars contributed to USW by the states.

Concerned about growing negative pressure on the U.S. wheat market, from low relative productivity growth and production returns to wheat quality concerns, gluten and other wheat consumption issues and growing wheat export competition, industry leaders have begun a dialogue on the possibility of establishing a national wheat checkoff program similar to those currently in place for soybeans, cotton, sorghum, and other agricultural commodities to enhance wheat industry profits. The objective of this study is to provide an economic assessment of the potential returns from the establishment of a future national wheat checkoff program in which the current checkoff assessments would be increased and the additional funds nationally administered for a new national domestic promotion program with some funds to remain with the states to enhance their production research and export promotion efforts. Following a brief literature review and analytical considerations, the study methodology is discussed. The

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[2] The term “checkoff” refers to the collection of a fee and comes from the concept of checking off the appropriate box on a form, like a tax return, to authorize a contribution for a specific purpose, such as the public financing of election campaigns, or, as in this case, the financing of programs to enhance producer welfare.

subsequent analysis considers the potential returns to wheat producers from a national wheat checkoff program over two alternative nine year forecast periods of 2012/13-2019/20 based on the FAPRI and the USDA wheat market forecasts available at the time of this research. The study concludes with a summary of the major conclusions and implications for the establishment of a national wheat checkoff program.

Literature Review and Analytical Considerations

Most studies of the effectiveness of agricultural commodity checkoff promotion programs have concluded that they increase net producer revenues by more than they cost producers. The consensus apparent across a wide range of studies by many researchers covering a large number of checkoff commodities is that the return to stakeholders from advertising and promotion by commodity checkoff organizations is positive and robust (Table 1). In general, commodity checkoff program advertising and promotion have been found not only to be effective in increasing sales but also to have increased sales by more than enough to cover the costs of the advertising and promotion activities. Although varying widely across commodities and time periods, the benefit-cost ratios (BCRs) calculated for checkoff programs generally fall in the range of about $2 to $10 (Table 1). An estimated BCR of greater than 1 is taken as an indication that the program is beneficial because net revenues (or profits) have increased by more than one dollar for every dollar spent on promotion.

The reported BCRs for soybeans and grain sorghum, the only two grains with a national checkoff program, were reported to be $6.5 and $8.5, respectively[3], meaning that their respective checkoff programs return $6.5 and $8.5 to producers for every checkoff dollar spent on promotion and advertising (Williams, Capps, and Lee, 2014 and Capps, Williams, and Málaga, 2013, respectively). Two studies in 2010 concluded that the returns to wheat producer checkoff contributions for export market promotion have been highly effective, generating high benefit-cost ratios (BCRs) (IHS Global Insight, 2010 and Kaiser, 2010a). As far as the authors of this study are aware, however, no evaluations of the effectiveness or returns to the state wheat checkoff programs have been conducted. Other studies of the returns to a diverse group of checkoff commodities report BCRs in the range of $0.54 to $44.9 from their respective promotion programs with a median of $6.5 (Table 1).

Importantly, note that the BCR for any commodity checkoff program is not indicative of the amount of the additional net revenues (profit) the program generates for producers or the magnitude of the impact of the program on market demand or price. Despite the reasonably high BCRs calculated for most checkoff programs, the total amount of checkoff funds spent by those programs is actually quite small relative to the value of production of the checkoff commodity. Soybean producers, for example, have spent over a billion dollars on checkoff programs since the 1970s (Williams, Capps, and Lee 2014). Nevertheless, those expenditures actually have been quite meager compared to the value of annual soybean sales (cash receipts) over the same period. Between 1970/71 and 2012/13, total soybean checkoff investments amounted to only between 0.03% and 0.44% of total soybean farm cash receipts each year. The same is the case for other commodity checkoff programs regardless of the size of their programs.

[3] A negative estimated export promotion elasticity for the sorghum checkoff program was not statistically significant.

With such low advertising-to-sales ratios (often referred to as the checkoff investment intensity), the overall impact of commodity checkoff programs could hardly be expected to be highly significant in a practical sense in its effects on U.S. production, prices, revenues, exports, and world market shares even if the impact could be said to be statistically significant.

The low checkoff investment intensities across commodities is one reason for the wide variation in the reported BCRs across checkoff programs (see Table 1). Benefit-cost ratios are calculated as the ratio between the additional industry net revenues (profits) generated by checkoff programs and the cost of the advertising and promotion required to generate that additional revenue (i.e., checkoff expenditures). Because small increases in industry net revenues are generated by checkoff programs with even smaller expenditures of checkoff dollars, small changes in the revenues generated (the BCR numerator) or in checkoff expenditures (the BCR denominator) can result in large changes in the calculated benefit-cost ratios.

Checkoff groups sometimes interpret estimated BCRs much in excess of 1 to imply large absolute impacts of their program on the market. Nothing could be further from the truth. A BCR of 5, for example, results by dividing a $5 billion industry profit benefit by a $1 billion checkoff investment or by dividing a $5 benefit by a $1 investment. Both investments yield a 5-to-1 return. Thus, the level of the BCR is actually independent of the level of the revenues earned and checkoff dollars spent. That is, there is no unique BCR associated with a given level of checkoff expenditures and revenues. Small checkoff programs with low levels of checkoff expenditures and producer revenues generated can have higher BCRs than large checkoff programs with high levels of checkoff expenditures and producer revenues generated. For example, the $14.44 BCR reported for the lamb checkoff program with annual checkoff expenditures of about $1.5 million (Ghosh and Williams 2016) is much higher than the reported $6.5 BCR for the soybean checkoff program which spends over $120 million annually (Williams, Capps, and Lee 2014).

Also, checkoff groups often erroneously assume that high BCRs are the objective of their programs. In fact, the objective is to generate additional sales that add to producers' profits. They also erroneously tend to assume that checkoff programs with the highest BCRs are the most effective checkoff programs. In fact, however, a high BCR actually implies that producers are underinvesting in their checkoff program which imposes an opportunity cost on the industry. That is, a high estimated BCR tells producers how much additional revenue they could earn for each additional dollar of increased assessment and expenditures given how the checkoff funds are being spent by their checkoff organization. So the high BCR to the lamb checkoff program of $14.44 means that by *not* increasing the level of the lamb checkoff assessment and, therefore, investments in lamb promotion, lamb producers *fail to earn* the additional $14.44 that is available to them for every additional dollar they might choose to invest. As the level of expenditures increase, of course, the BCR would be expected to drop to some extent because of diminishing returns. So, in fact, given an effective, efficient, and growing checkoff program, the optimal BCR is equal to one because checkoff expenditures will have increased to the point where any additional expenditures will return less to producers than the additional investment.

Of course, a low BCR can also result from an inefficient, ineffective checkoff program that has little impact on market sales or sales. For that reason, in addition to the BCR, an important measure for checkoff programs is the checkoff promotion elasticity, that is, the percentage

change in demand generated from a 1% change in checkoff expenditures. A checkoff promotion elasticity close to zero would, of course, mean that the promotion program operated by the checkoff organization with the funds contributed by producers is totally ineffective in moving demand. That is, there is no "bang" for the "bucks" invested by producers. In this case, the estimated BCR would be zero. But what is a reasonable level for a promotion elasticity? Across the numerous studies of commodity checkoff programs, the estimated domestic and export demand promotion elasticities vary between 0.005 to 0.428 and -0.3 to 0.98, respectively (Table 1). The median domestic and export promotion elasticities of 0.049 and 0.051, respectively, imply that the few highly positive reported domestic and export promotion elasticities skew their means (0.076 and 0.122, respectively) upward substantially. Given these reported checkoff promotion elasticities, a reasonable expected promotion elasticity is around 0.05 meaning that a 10% increase in checkoff promotion expenditures increases commodity demand by 0.5% and a doubling of expenditures would be expected to generate about a 5% increase in demand.

Methodology

Obviously, since a national wheat checkoff program has not yet been implemented, no wheat checkoff funds have been collected under such a program and no nationally-financed research or promotion activities have been conducted. Hence, no data are available for measuring the effectiveness of a potential, future national wheat checkoff program. Consequently, an analysis of the future returns from a non-existent national wheat checkoff program must rely on what is known about how checkoff programs impact commodity markets. For this analysis, three key sets of assumptions were required: (1) an assumed wheat checkoff promotion elasticity, (2) an assumed level of national checkoff expenditures over the period of analysis, and (3) a forecast baseline for wheat production, demand, and price over that same period from which to measure the changes generated by the assumed checkoff expenditures.

The Three Key Assumptions

In determining a checkoff promotion elasticity to use for a domestic wheat demand promotion program, we assume that such a program would be as effective as the average existing domestic checkoff program. Figure 1 plots the domestic promotion elasticities estimated for 44 checkoff activities (retail, food service, etc.) in the U.S. domestic market by the 23 checkoff programs listed in Table 1. The mean across all those estimated promotion elasticities is 0.076. Clearly, however, there are at least two outliers (that is, unusually high values). Dropping the two outliers from the set of promotion elasticities reduces the mean promotion elasticity to a more reasonable 0.061 across the studies considered. Rather than using just one measure of the promotion elasticity, however, we calculate the promotion elasticities that are one standard deviation above and below the mean (0.10 and 0.02) to use for calculating a reasonable range of potential demand impacts of promotion reflecting an enhanced wheat checkoff program that may be somewhat more or less effective than the average commodity checkoff program in promoting demand. These promotion elasticities are referred to as "promotion effectiveness" measures in this study.

For wheat export demand promotion funded with national wheat checkoff funds, we also assume that such a program would be as effective as the average existing export demand checkoff program. Figure 2 plots the 26 export promotion elasticities reported by the relevant checkoff

program studies in Table 1. Some of the studies reported export demand elasticities for multiple exported commodities. Note that there are both negative and positive outliers in this case. Removing all of the negative export promotion elasticities (most of which are statistically insignificant) and the unreasonably high export promotion elasticities of about 0.2 or higher leaves 18 export promotion elasticities with a mean of 0.072. The export promotion elasticities that are one standard deviation above and below that mean are, respectively, 0.148 and 0.014.

For the second assumption regarding the potential level of additional checkoff expenditures into the future, we begin by assuming a plausible range of national wheat checkoff assessments. Currently, state wheat checkoff assessment rates vary widely from $0.01/bu in Arkansas and Wyoming, $0.15/bu in North and South Dakota[4], $0.2/bu in Arizona, Idaho, Colorado, Kansas, Minnesota, Montana, Oklahoma, and Texas, and $0.05/bu in California, Oregon, and Virginia to 0.25% of the value of a bushel of wheat in Kentucky, 0.4% of the value of a bushel of wheat in Nebraska, 0.5% of the value of a bushel of wheat in Maryland, Michigan, North Carolina, and Ohio, and 0.75% of the value of a bushel of wheat in Washington. By way of comparison, the national soybean and sorghum checkoff assessment rates are currently set at 0.5% of value and 0.6% of value, respectively. The variance in the state assessments rates provides a reasonable range for considering the effects of different potential levels of national wheat checkoff program expenditures on the returns to wheat producers.

A third key assumption is the level of wheat production, demand, and price that will exist over some forecast horizon. Multiplying the assumed additional checkoff assessment rates by a forecast of wheat production (for the per bushel assessment rates) or a forecast of wheat farm price (for the percent of value rates) generates the total amount of national wheat checkoff funds that could be made available in this way for wheat promotion. For the wheat production and price forecasts, we use two alternative sources of wheat market forecasts: (1) USDA (Westcott and Trostle, 2014) and (2) FAPRI (2014). The resulting amounts of national wheat checkoff collections at the alternative additional assessment levels assuming 100% participation by wheat producers using the FAPRI and USDA forecasts of wheat production and farm price through 2019/2020 are given in Tables 2 and 3, respectively. The estimated national wheat checkoff collection totals at the $0.01/bu, $0.15/bu. and $0.02/bu additional assessment levels using the USDA wheat forecast data (Table 3) are slightly higher than those using the FAPRI forecast data (Table 2) because the USDA wheat production forecasts are slightly higher than those of FAPRI on average. However, the estimated additional wheat checkoff collection totals at the additional 0.4% and 0.5% of value assessment rates using the FAPRI forecast data (Table 2) are substantially higher than those using the USDA forecast data (Table 3) because the FAPRI wheat farm price forecasts are higher than those of USDA on average.

This method of calculating the additional funds that might be available to fund an enhanced checkoff program produces a plausible range of national checkoff funds that could be actually be raised over the next few years and the corresponding cost to wheat producers. Using the FAPRI forecast, the average annual potential national wheat checkoff funds would range from $21.5 million to $67.5 million depending on the national checkoff assessment level (Table 2). Using the USDA forecast gives a corresponding potential average annual range of $21.6 million to $57.0 million in additional wheat checkoff funds (Table 3).

[4] South Dakota's wheat assessment rate will change to 0.4% of value in 2015.

Steps in the Analysis

Using these three assumptions, the analysis of the potential returns from a future national wheat checkoff program proceeds in two steps. First, an estimated impact of such a checkoff program on U.S. wheat sales (domestic, export, and total) over 2012/13 to 2019/20 (the FAPRI forecast period) is estimated assuming that the checkoff funds generated would be as effective in impacting sales as the average existing checkoff program. Using the mean of the checkoff elasticities for domestic sales promotion or export promotion (e_A) reported in the most recent studies of 23 checkoff programs, the marginal impact of checkoff promotion (A) on domestic wheat demand or wheat exports (Q) is measured as:

$$(1) \qquad \frac{\partial Q}{\partial A} = e_A \frac{\bar{Q}}{\bar{A}} .$$

Assuming that all future national wheat checkoff collections in each year are spent on domestic or export demand promotion (or both), the potential change in domestic demand or export demand in each year at each assumed checkoff assessment level is calculated by multiplying the left-hand-side of equation (1) by the checkoff collections in each year at each of the alternative checkoff assessment levels (see previous section for levels assumed). Then, multiplying the quantity impact (for domestic or export demand) by the price forecasts from USDA and FAPRI provides two separate forecasts of the domestic and export sales revenue changes related to the checkoff expenditures for each additional alternative assessment level in each year (the "USDA checkoff revenue forecasts" and the "FAPRI checkoff revenue forecasts"). To provide a reasonable range of results, this calculation also is done using promotion elasticity values (the rates of "program effectiveness") that are one standard deviation above the mean promotion elasticity ("high" program effectiveness) and one standard deviation below the mean promotion elasticity ("low" program effectiveness). The result is six sets of potential future national wheat sales revenue impact measures for both domestic demand and exports in each year corresponding to the three promotion effectiveness measures ("high," "low," and "mean") for the two sets of wheat farm price forecasts (USDA and FAPRI).

The second step is to calculate the BCR levels that would result if the potential future national sales revenue increases calculated were achieved with the five alterative checkoff program assessment levels ($0.01/bu, $0.015/bu, $0.02/bu, 0.4% of value, and 0.5% of value)[5]. The result is three sets of BCRs at each assessment level: (1) a "low" BCR using the "low" promotion effectiveness measure, (2) a "mean" BCR using the "mean" program effectiveness measure, and (3) a "high" BCR using the "high" program effectiveness measure). The three sets of estimated BCRs correspond to each of the alternative future national checkoff assessment levels for both domestic demand and export demand. These BCRs are calculated assuming that either domestic demand or exports are promoted with all available additional checkoff funds but not both at the same time. A third set of BCRs are calculated for total demand which assumes that both domestic demand and exports are promoted simultaneously with the additional funds. In this

[5] We do not use a 0.25% of value paid in one state because the funding level implied is not much different from the lower end of the per bushel rates used. Also, we exclude the 0.75% of value level in a few states from consideration as being too high for an initial *additional* checkoff under a new enhanced checkoff program.

case, the forecast additional checkoff funds are allocated to domestic demand and exports according to the weight of each in total demand.

Benefit-Cost Analysis

The Gross Producer Revenue Benefit-Cost Ratio (PBCR) is the additional industry revenues (net of checkoff assessments) earned by producers valued at the farm level as a consequence of the checkoff expenditures divided by the historical level of checkoff expenditures made to generate that additional revenue. The gross producer revenue BCR is, thus, calculated as:

$$(2)\quad GBCR = \sum_{t=1}^{T} \frac{R_t}{E_t}$$

where R is the additional revenues generated by the checkoff program over the period of analysis (T years) and E is the checkoff expenditures over that same period. Because the checkoff represents a cost to producers, checkoff expenditures in each year (E_t) must be netted out of the additional profit generated (R_t) in those years (i.e., $R_t - E_t$) to arrive at the *net* grower profit BCR:

$$(3)\quad NBCR = PBCR - 1 .$$

In this analysis, two alternative sets of checkoff revenue generated (R_t) are calculated associated with the "USDA checkoff revenue forecast" and the "FAPRI checkoff revenue forecast" as discussed earlier. Five alternative sets of checkoff expenditures (E_t) are calculated corresponding to the five alternative levels of future national wheat checkoff assessment levels (see Tables 3 and 4). Because the USDA and FAPRI checkoff revenue forecasts were each generated for three demand variables (domestic demand, exports, and total demand) with three alternative estimates of checkoff promotion impact ("high," "low," and "mean" checkoff program effectiveness) at the five alternative levels of future checkoff expenditures, 90 alternative BCRs are calculated to represent the potential range of BCRs that the wheat industry might realistically expect from the implementation of a future national wheat checkoff program.

The calculated BCRs are presented in two tables representing the BCR estimates based on the two sources of wheat market forecasts (FAPRI and USDA). Table 4 provides the BCR estimates based on the FAPRI forecasts. Table 5 provides the BCR estimates based on the USDA forecasts. As indicated earlier, the BCR estimates for "domestic demand" in the two tables assume that all future national checkoff funds at the respective assumed national assessment levels are spent on only on domestic demand promotion. Likewise, the BCR estimates for "export demand" in the two tables assume that all future national checkoff funds at the respective alternative assessment levels are spent only for export promotion. Finally, the BCR estimates in both tables for "total demand" assume that the future national checkoff funds at each alternative assessment level are spent simultaneously for both domestic and export demand promotion. In the latter case, the share of the future national checkoff funds spent on domestic and export demand promotion were set to be proportional to the shares of domestic and export demand in the total U.S. demand for wheat.

There is little qualitative difference between the BCR estimates based on the FAPRI and on the USDA forecasts. The BCR estimates based on the USDA estimates are somewhat smaller than

those based on the FAPRI forecasts primarily because of the lower forecast farm price of wheat and, therefore, a smaller value of the demand generated by promotion expenditures. In both cases, the export demand BCRs vary more widely than is the case for domestic demand promotion because of the greater variance in the export promotion elasticities than for domestic demand promotion elasticities across checkoff promotion studies. For that reason, the lowest and the highest estimated BCRs in both cases are for export demand promotion. The lowest export demand BCRs are for the highest levels of checkoff expenditure and the lowest level of export promotion elasticity. At the same time, the highest export promotion elasticities are for the lowest levels of checkoff expenditure and the highest level of export promotion elasticity.

The estimated domestic demand promotion BCRs based on the FAPRI and USDA forecasts are in the range of $1.38 to $36.12 and $1.41 to $30.72, respectively (Table 4). For export demand promotion, the BCR estimates based on the FAPRI and USDA forecasts are in the range of $0.36 to $43.88 and $0.35 to $36.66, respectively. For total demand, the BCRs are in the range of $0.92 to $39.64 and $0.93 to $33.30, respectively. Note that the BCRs at all levels of program effectiveness (low, mean, and high) for both forecast scenarios decline as the future checkoff funding level increases. That is the expected result because revenues tend to increase at a decreasing rate as funding increases at a given level of program effectiveness. In other words, the impact of each future wheat checkoff dollar spent on promotion is not constant but rather declines as funding increases. That is the principle of diminishing returns. So as funding increases, industry revenues also increase, capturing some of the unrealized benefits of spending at lower levels. But the additional revenue generated by each additional dollar spent (i.e., marginal revenue) tends to decline as funding increases so that the revenue increases at a decreasing rate. As a result, the BCR, which is calculated as the ratio of revenues to expenditures, declines as funding increases. The BCR increases at lower levels of funding because the marginal revenue (the gain in revenue per dollar spent) is higher at lower levels of revenue. But even though the BCR is higher, the industry revenues generated are also lower. As a consequence, estimated BCRs really should not be compared across checkoff programs (although it is done all the time). A higher BCR for one checkoff program compared to another may simply mean that the funding level is much lower for the high BCR program and have nothing at all to do with the relative effectiveness of the investments of checkoff funds between the two programs.

One interpretation of these results is that the range of possible BCRs is too wide to be useful for determining whether or not to move forward with a national wheat checkoff program in the future. Perhaps a better interpretation of these BCR results, however, is that despite the wide disparity in assumed demand promotion effectiveness, potential funding levels, and wheat market forecasts, the BCRs across most assumptions are positive and greater than one. That is, a future national wheat checkoff program is likely to be effective in generating a revenue increase to producers per dollar spent on promotion under most assumptions. To remind us of the possibility that a national wheat checkoff program might not benefit wheat producers under all possible assumptions, however, some of the estimated BCRs turn out to be less than one, meaning that less than one dollar in revenue is returned to producers per checkoff dollar spent on promotion. Note, however, that all BCRs estimated to be less than one assume a “low” level of program effectiveness. Under the assumption of an average or high level of program effectiveness, the estimated BCRs are all much in excess of 1.

Conclusions and Implications for the Implementation of a National Wheat Checkoff Program

Given the numerous assumptions about the level of future checkoff expenditures, the relationship between expenditures and market variables, and the level of future wheat market supply, demand and prices among others, the analysis presented here is necessarily hypothetical in nature. Accordingly, the conclusions of this analysis are also hypothetical in nature and intended only to provide guidance in on-going discussions regarding the potential future implementation of a national wheat checkoff program. In general, the study concludes that a national wheat checkoff program would likely return more to wheat producers in revenues than the cost of the program to them in checkoff assessments. More specifically, the study concludes:

- The range of potential benefit-cost ratios (BCRs) for a future national wheat checkoff program is quite wide. Most potential BCRs are greater than one under all alternative assumptions of the analysis. That is, a future national wheat checkoff program would likely generate an increase in revenues to producers under most assumptions.

- The estimated levels of increased revenue under a future national wheat checkoff program and the associated BCRs depend critically on the effectiveness with which the future checkoff funds are invested to enhance demand, the level of the future funding, and future wheat prices and quantities. Obviously, a high level of checkoff funding could generate a low return to producers if the checkoff funds are squandered. By the same token, a lower level of checkoff funding could generate higher returns if the funds are more effectively managed and efficiently invested to enhance demand. Also, the value of the returns to producers will be affected by the level of the future price of wheat.

- A high BCR should not be considered the main target for a future national wheat checkoff program but rather the additional revenues to producers generated by the checkoff investments. BCRs and funding levels tend to be inversely related at same level of promotion effectiveness. That is, as funding grows, revenues grow as well but at a decreasing rate so that BCRs decline as funding increases.

- A high BCR generally implies that a checkoff program is underfunded. As funding increases, the checkoff investments capture some of the revenues that are unrealized at lower funding levels. In the process, however, the BCR tends to drop. Given some level of program effectiveness, the optimal BCR, therefore, is 1-to-1 because any additional increase in funding will generate smaller increases in revenue than the additional checkoff cost to producers.

- The same level of BCR can be generated by many different levels of additional funding depending on the levels of program effectiveness. By the same token, different BCRs can be generated for the same level of additional funding depending on the level of program effectiveness at that level of additional funding. At a given level of program effectiveness, however, higher levels of funding generate higher levels of revenues for producers and result in lower BCRs. An increase in program funding along with an increase in program effectiveness can result in higher BCRs.

The study results and conclusions provide the basis for drawing some implications for the establishment, operation, and potential returns from a national wheat checkoff program. The primary implication is that such a program is likely to work in the sense that producer returns are likely to be greater than the costs of the program. The real question is how much of a return could producers expect? The answer to that question depends critically on how effectively the national wheat checkoff funds are invested and on the level of additional funding.

Other, related implications of this study include the following:

- The BCR to future checkoff fund expenditures would likely be high in the early years of the program and then drop over time if the funding level increases. However, learning, increased experience, and greater efficiency in investing the checkoff funds available to promote demand under a checkoff program of a given size over time would likely generate some scale effects that enhance the BCR to the funds invested even without an increase in the level of the funding.

- What checkoff funds are spent on makes a difference for the returns to producers. For example, a large number of wheat checkoff dollars that are squandered or invested in ineffective promotional efforts will likely return less to producers than a smaller level of funding that is invested in highly effective promotional activities. Studies of other checkoff programs suggest that some activities may be more effective than others in enhancing demand (see, for example, Williams, Capps, and Lee 2014).

- Given the critical nature of how checkoff funds are allocated among potential promotional activities under a future national wheat checkoff program, those charged with managing the allocation of the funds would be well-advised to conduct a study of best practices across commodity checkoff groups to determine not only the most impactful type of activities in which to invest but also the most effective mechanisms for managing and investing the future checkoff funds. “Doing things right” is important in terms of developing processes to collect and manage checkoff funds, defining the administrative responsibilities of those charged with managing the funds, establishing goals, objectives, budgets, and so on. More important, perhaps, is “doing the right things” in terms of the markets (retail and/or food service promotion, domestic and/or international, demand promotion and/or production research, etc.) and the types of activities (television, radio, internet, and/or print advertising, point-of-sale promotions, coupons, recipes, technical and trade servicing, support for advertising activities of wheat product manufacturers and retailers, etc.) in which to invest the future checkoff funds. An in-depth review of best practices across various commodity checkoff programs would be important as an early activity of a newly implemented national wheat checkoff program.

- Setting the initial level of the wheat checkoff assessment is important and should probably not begin at a high level. This study demonstrates that the BCR would likely be high for an initial modest level of wheat checkoff funds which would communicate well to stakeholders and provide the basis for seeking an additional increase in the funding level over time. Also, attempting to manage too many funds early in the life of a national wheat checkoff program

could result in waste and inefficiency until those charged with managing the increased funds gain sufficient experience with administering and investing the funds.

- To demonstrate the effectiveness of checkoff promotion activities to stakeholders and to provide guidance for program management, those charged with managing a future national wheat checkoff program should plan for periodic external evaluations of the program's effectiveness. Such return-on-investment studies are required generally every five years for federally mandated checkoff programs.

- To facilitate such evaluations, an early consideration in the process of implementing a national wheat checkoff program should be the development of a system or process to collect and maintain all data and other information regarding checkoff program activities and expenditures by type of activity, product, and market segment. Failure to develop such a system at the outset could severely limit the ability of researchers to provide useful evaluations of the impact of the increased checkoff funding.

- Finally, a common mistake made by checkoff groups is to represent a checkoff program to stakeholders as the panacea to their financial problems in an effort to gain support for the establishment of such a program. In fact, checkoff programs are only one of many forces that affect markets, including relative price changes, weather, agricultural policies, changes in incomes, population growth, competition for consumer sales from competing suppliers and products, consumer health concerns, demographic trends, and many more as discussed in the first section of this report. Frankly, many of those forces are much more powerful drivers of commodity markets like wheat than checkoff programs. Nevertheless, stakeholders often come to expect large impacts on their bottom lines from their contributions or any increase in their contributions to a checkoff program given the benefits touted for such programs. Checkoff programs, however, actually generate a small amount of funds to invest in promotion compared to the size of their industries, generally no more than a fraction of 1% of the total industry sales each year. With such a low level of investment compared to sales, the overall market impact of a commodity promotion program could hardly be expected to be huge. When they fail to see the large impact on their returns that they have been led to expect, producers tend to become disenchanted with the program and how it is being managed. Consequently, beginning in the early stages of discussion of establishing a national wheat checkoff program, the actual potential of the program should be emphasized to avoid unrealistic expectations if the program becomes reality. Also helpful would be to consistently characterize a national wheat checkoff program (before and after implementation) as an effective tool for producers to work collectively to help reduce downside pressure on prices and profits in bad years and contribute to higher prices and profits in good years rather than as a panacea to all the financial problems they face. A subsequent ROI study after some period of program implementation that shows positive returns would serve to reinforce support for the program.

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Figure 1: Estimated Domestic Demand Promotion Elasticities for 44 Checkoff Activities Over 23 Checkoff Programs

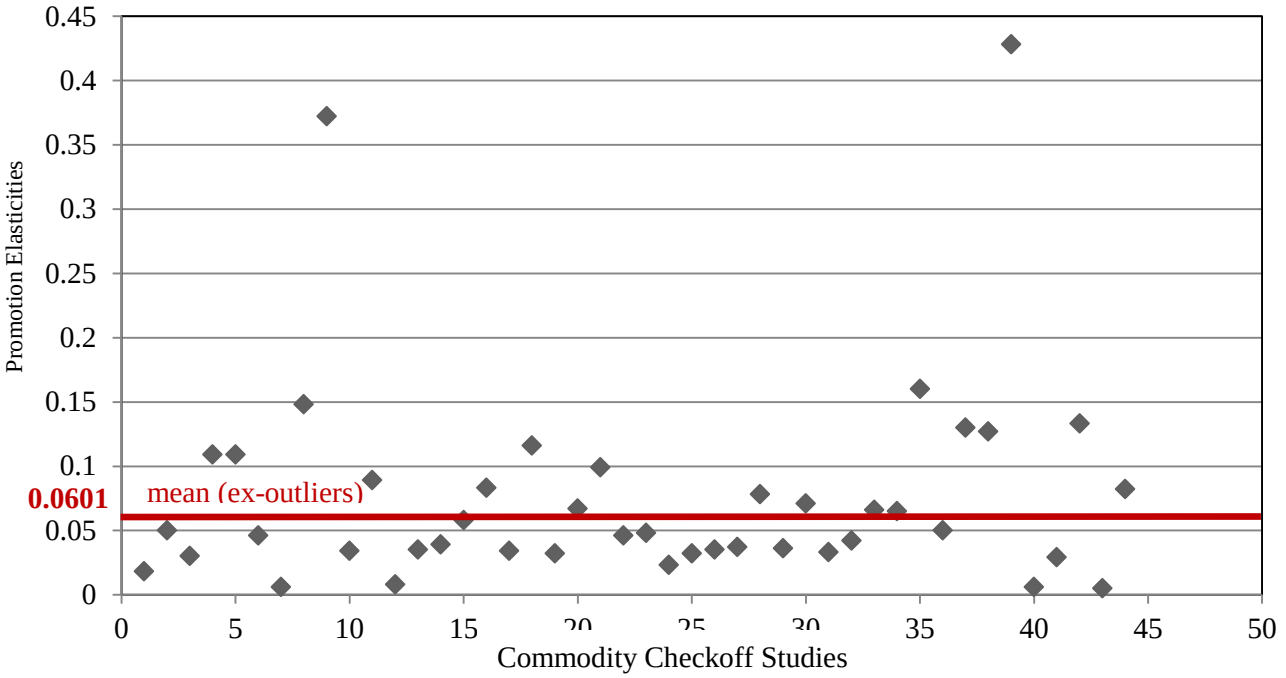

Figure 1: Estimated Export Demand Promotion Elasticities Reported for 26 Checkoff Programs

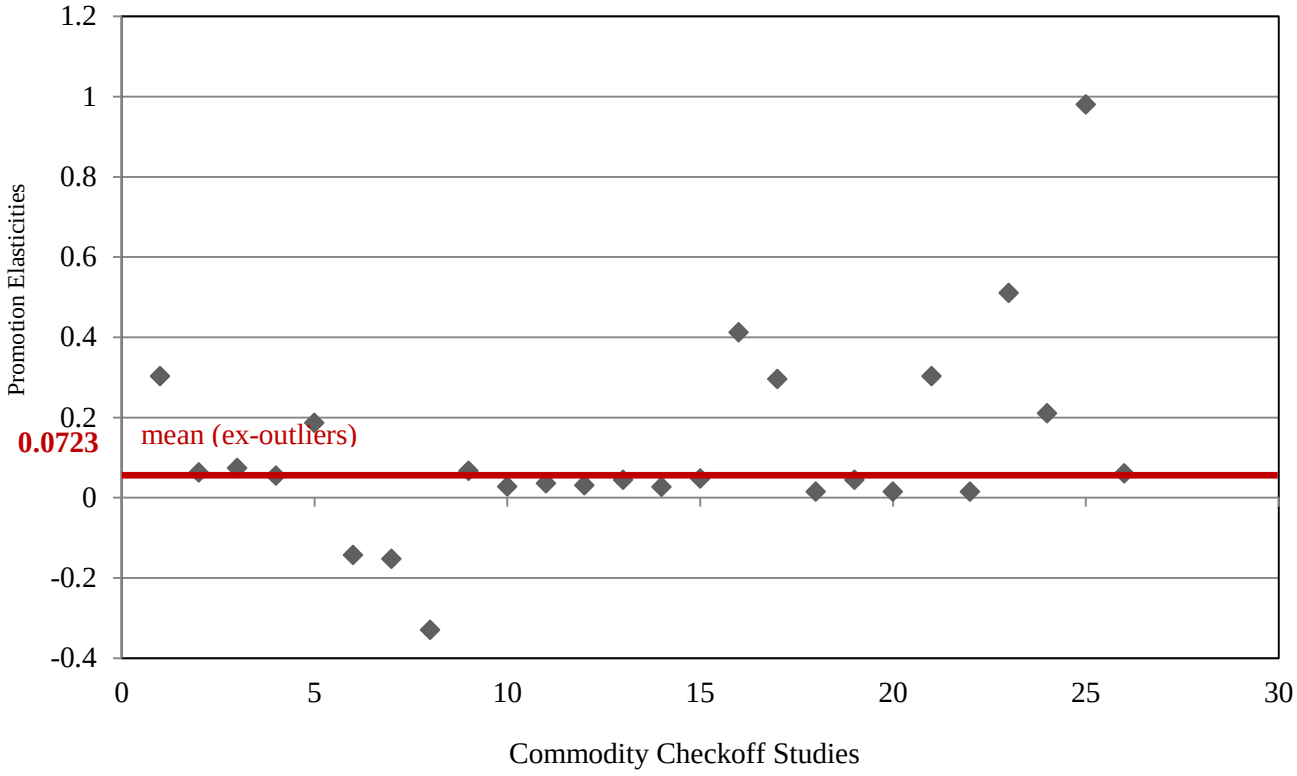

Table 1: Selected Generic Commodity Promotion Studies: BCRs and Promotion Elasticities

Commodity	Study	Benefit-Cost Ratio	Promotion Elasticity*
		average $ earned per $ spent on promotion	% demand change from a 1% expend. change
Almonds[e]	Crespi and Sexton (2005)	6.2[b]	0.13
Cotton	Williams et al. (2011)	Producer 5.7 Importer 14.4	Retail 0.05 Mill 0.03
Dairy	USDA (2012)	All Dairy 3.05 Fluid milk 2.14 Cheese 4.26 Butter 9.63 Exports 5.12	0.078 0.071 0.033 0.042 0.066
Dried Plums[e]	Alston et al. (1998)	2.7[b]	0.05
Eggs	Schmit and Kaiser (1998)	0.54-6.33[a]	0.006
Hass Avocados	Carman, Li, and Sexton (2009)	2.5-4.0[a]	0.148-0.372[a]
Highbush Blueberries	Kaiser (2010b)	9.12	0.109
Honey	Ward (2008)	6.02-7.91[a]	0.082
Meat: Beef	Kaiser (2014)	11.2	0.018
Pork	Kaiser (2012b)	17.4	0.006-0.046[d]
Lamb	Ghosh and Williams (2016)	14.44	0.037
Mushrooms	Richards (2011)	Retail 9.4-18.3[g] Food Ser. 1.41-5.35[g]	0.008-0.089[g] 0.039-0.058[g]
Orange Juice[f]	Williams et al. (2004)	2.9-7.0[a]	0.127-0.428[a]
Potatoes	Richards and Kaiser (2012)	5.17	0.32-0.116[g]
Raisins	Kaiser, Liu, and Consignado (2003)	5.1-15.3[a]	0.029-0.133[a]
Rice	Rusmevichientong Kaiser (2009)	6.21-14.48[a]	0.21
Sorghum	Capps, Williams, Málaga (2013)	Food/ind. Use 8.48 Exports -0.144[c]	0.046-0.048[a] -0.33-0.066[c,g]
Soybeans	Williams, Capps, and Lee (2014)	6.5	0.023-0.047[g]
Strawberries[e]	Carter et al. (2005)	44.0[b]	0.16[h]
Table Grapes[e]	Alston et al. (1997)	44.9	0.16
Walnuts[e]	Kaiser (2005)	1.65-9.72[a]	0.005
Watermelon	Kaiser (2012a)	27.73	0.098[h]
Wheat	Kaiser (2010a)	Exports 9.51-20.00[a]	0.295-0.412[a]
MEDIAN		6.5	0.049
MEAN		9.8	0.093

* Includes both domestic and export demand promotion elasticities.

[a] Depending on the model used or elasticities assumed. [b] Marginal BCR . [c] Not statistically different from zero.

[d] Long-run and depending on the market segment analyzed. [e] California. [f] Florida. [g] Depending on market segment and/or program type. [h] Expenditure flexibility.

Table 2: Additional Wheat Checkoff Collections at Alternative Additional Assessment Levels using FAPRI Wheat Production Forecast, 2012/13-2019/20

	FAPRI Forecasts			Additional Wheat Checkoff Collections at Alternative Additional Assessment Rates				
Year	**U.S. Wheat Production**	***U.S. Wheat Farm Price***	**U.S. Wheat Revenue[a]**	**$0.01/bu**	**$0.015/bu**	**$0.02/bu**	**0.4% of value**	**0.5% of value**
	million bu.	$US/bu	$US million	---------- $US million ----------				
2012/13	2,266	7.77	17,606.8	22.7	34.0	45.3	70.4	88.0
2013/14	2,130	6.87	14,633.1	21.3	31.9	42.6	58.5	73.2
2014/15	2,030	6.27	12,728.1	20.3	30.5	40.6	50.9	63.6
2015/16	2,160	5.73	12,376.8	21.6	32.4	43.2	49.5	61.9
2016/17	2,130	5.72	12,183.6	21.3	31.9	42.6	48.7	60.9
2017/18	2,146	5.79	12,425.3	21.5	32.2	42.9	49.7	62.1
2018/19	2,154	5.87	12,644.0	21.5	32.3	43.1	50.6	63.2
2019/20	2,166	5.90	12,779.4	21.7	32.5	43.3	51.1	63.9
Total			**107,377.1**	**171.8**	**257.7**	**343.6**	**429.5**	**536.9**
Mean			**13,422.1**	**21.5**	**32.2**	**43.0**	**53.7**	**67.1**

[a] Production x price.
FAPRI forecast source: FAPRI (2014)

Table 3: Additional Wheat Checkoff Collections at Alternative Additional Assessment Levels using USDA Wheat Production Forecast, 2012/13-2019/20

	USDA Forecasts			Additional Wheat Checkoff Collections at Alternative Additional Assessment Rates				
Year	**U.S. Wheat Production**	**U.S. Wheat Farm Price**	**U.S. Wheat Revenue[a]**	**$0.01/bu**	**$0.015/bu**	**$0.02/bu**	**0.4% of value**	**0.5% of value**
	million bu.	$US/bu	$US million	---------- $US million ----------				
2012/13	2,266	7.77	17,606.8	70.4	88.0	45.3	70.4	88.0
2013/14	2,130	7.00	14,910.0	59.6	74.6	42.6	58.5	73.2
2014/15	2,220	4.90	10,878.0	43.5	54.4	44.4	50.9	63.6
2015/16	2,205	4.35	9,591.8	38.4	48.0	44.1	49.5	61.9
2016/17	2,145	4.30	9,223.5	36.9	46.1	42.9	48.7	60.9
2017/18	2,080	4.45	9,256.0	37.0	46.3	41.6	49.7	62.1
2018/19	2,100	4.60	9,660.0	38.6	48.3	42.0	50.6	63.2
2019/20	2,120	4.75	10,070.0	40.3	50.4	42.4	51.1	63.9
Total			**91,196.1**	**172.7**	**259.0**	**345.3**	**364.8**	**456.0**
Mean			**11,399.5**	**21.6**	**32.4**	**43.2**	**45.6**	**57.0**

[a] Production x price.
USDA forecast source: Westcott and Trostle (2014)

Table 4: Potential BCRs for an Enhanced Wheat Checkoff Based on FAPRI Forecasts

Additional Assessment Levels	Domestic Demand Promotion			Export Demand Promotion			Total Demand Promotion		
	Low	Mean	High	Low	Mean	High	Low	Mean	High
	net revenue per checkoff $			net revenue per checkoff $			net revenue per checkoff $		
$0.01/bu	6.44	21.28	36.12	3.25	20.99	43.88	5.00	21.15	39.64
$0.015/bu	3.96	13.86	23.75	1.84	13.66	28.92	3.00	13.77	26.10
$0.02/bu	2.72	10.14	17.56	1.13	9.99	21.44	2.00	10.08	19.32
0.4% of value	1.98	7.91	13.85	0.70	7.80	16.96	1.40	7.86	15.26
0.5% of value	1.38	6.13	10.88	0.36	6.04	13.36	0.92	6.09	12.01

Table 5: Potential BCRs for an Enhanced Wheat Checkoff Based on USDA Forecasts

Additional Assessment Levels	Domestic Demand Promotion			Export Demand Promotion			Total Demand Promotion		
	Low	Mean	High	Low	Mean	High	Low	Mean	High
	net revenue per checkoff $			net revenue per checkoff $			net revenue per checkoff $		
$0.01/bu	5.35	18.04	30.72	2.55	17.35	36.36	4.10	17.73	33.30
$0.015/bu	3.24	11.69	20.15	1.37	11.23	23.97	2.40	11.49	21.87
$0.02/bu	2.18	8.52	14.86	0.78	8.18	17.73	1.55	8.36	16.15
0.4% of value	2.01	8.01	14.01	0.68	7.69	16.73	1.41	7.87	15.23
0.5% of value	1.41	6.21	11.01	0.35	5.95	13.18	0.93	6.09	11.99