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Goodlatte-Scott vs. the Dairy Security Act: Shared Potential, Shared Concerns and Open Questions

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Executive Summary

This paper reports our analysis, to-date, of expected short-term impacts of two major dairy safety net policy proposals popularly referred to as the Dairy Security Act (DSA) and the Goodlatte-Scott Amendment (G-S). Our results suggest that both DSA and G-S are very effective in providing catastrophic risk insurance and revenue enhancement for farms with stable and moderately growing milk marketings.

For sufficiently high DSA participation rate, and sufficiently low price-elasticity of demand for milk in aggregate, the Dairy Market Stabilization Program (DMSP) has the potential to reduce government outlays and accelerate margin recovery in low-margin states of the world, relative to outcomes expected under DSA with low participation rates and high price-elasticity. Furthermore, the DMSP is not likely to provide long-term obstacles to growth for participating farms with an aggressive growth plan unless generous margin insurance induces a long-term oversupply of milk. Our analysis suggests that under the provisions of G-S effective catastrophic margin insurance for aggressively growing farms is limited due to the fixed production history. However, more complete margin risk protection may still be possible using private risk markets to complement government provided insurance.

Both programs share contract design features that may result in strategic annual supplemental margin protection sign-up and reduce demand for private risk insurance products - inadvertently increasing policy cost.[1] Under DSA, this problem is somewhat reduced as DMSP provides disincentives for forfeiting supplemental margin insurance in years when anticipated margins are moderately above long run average.

The analysis is parsimonious in structural model assumptions and relies on expected market conditions as reflected in Chicago Mercantile Exchange futures and options prices. As such our primary focus is on expected short-run effects flowing from these alternative programs. The long-term impacts of these programs on the growth of milk supply, dairy exports, and liquidity of private dairy risk markets are among important open questions we do not attempt to address.

[1] Research evaluation on information asymmetry incentives, distributional effects of government payments, and expected government outlays associated with proposed U.S. dairy policy margin insurance programs are the ongoing doctoral research program of John Newton, Ph.D. candidate, and Cameron Thraen, research advisor. Funding for this program is provided, in part, by The Ohio Agricultural Research and Development Center (OARDC), The Ohio State University.

Introduction

Following unprecedented volatility in dairy income-over-feed-cost (IOFC) margins, a consensus has emerged among dairy farmers, processors, and elected representatives that the new Federal dairy safety net should focus on insuring IOFC margins, in contrast to existing policy instruments which place emphasis on milk price support. The policy proposal favored by large dairy cooperatives and promulgated by the National Milk Producers Federation was incorporated in the Dairy Subtitle of the 2012 versions of the House and Senate Farm Bills, which have not yet been passed into law. This reform package, referred to here as the Dairy Security Act (DSA), includes the Dairy Producer Margin Protection Program (DPMPP), and a coupled Dairy Market Stabilization Program (DMSP). The DPMPP is a subsidized IOFC margin insurance program (similar to an option contract) designed to pay an indemnity to a participating farm when the difference between the national average all-milk price and the formula-derived estimate of feed costs falls below a farmer-selected margin trigger. Although participation in the DPMPP is voluntary, those enrolled in the DPMPP are required to participate in the DMSP. The DMSP is a supply management-type program designed to enhance milk prices by occasionally and temporarily reducing the milk supply when IOFC margins fall below a specified threshold. The DMSP aims to reduce the milk supply and thereby enhance milk prices by imposing income penalties on dairy farmers shipping milk over their assigned production level. The DMSP portion of the DSA package has wide-spread support within the dairy farming community and its cooperative leadership, but this support is not nearly unanimous. Significant resistance has been registered by consumer groups, dairy food manufactures, and their trade associations. As a result of this lack of unanimity, an alternative dairy policy reform proposal was crafted that would include a standalone margin protection program and exclude the DMSP. This proposal is the Goodlatte-Scott (G-S) amendment (Goodlatte-Scott Amendment to HR 6083).[2]

Previous analyses of proposed programs include Nicholson and Stephenson (2011), Brown (2012), Stephenson and Novakovic (2012), and Newton and Thraen (2012).[3] In contrast to earlier analyses we develop a model that is focused on short-term policy effects and is based

[2] For a detailed description of Farm Bill provisions see: Schneph, R. Dairy Policy Proposals in the 2012 Farm Bill. Congressional Research Service. 2012.

[3] Nicholson and Stephenson found that the proposed programs may reduce average milk price in addition to margin volatility, and suggest that government expenditures depend critically on the participation decisions of dairy farmers. Brown measured the effects of the DSA on milk price distributions, U.S. milk production, dairy export opportunities, and program duration using aggregated annual data. He found that over the 2012-2022 period milk supply effects were insignificant, dairy product trade was slightly lower, and IOFC volatility was reduced. Stephenson and Novakovic analyzed expected returns from program participation for farms of different sizes over the years 2007-2012 and found that DSA would have improved farm IOFC margins during portions of 2009 and 2012. Newton and Thraen analyzed the DSA by simulating the milk marketings of 5,000 representative farms over the time period 2006-2012. Results of their analysis found that DSA benefits are strongly heterogeneous, and depend critically on the election of supplemental insurance and the success of the stabilization program.

on relevant information extracted from market-traded futures and options contracts. In our analysis, structural modeling is kept to the necessary minimum needed to account for DMSP impact on price trajectories in low-margin scenarios. Sensitivity analysis is presented to indicate how uncertainty regarding structural parameters affects results. In contrast to several previous studies, we completely avoid using historical realized prices, and focus instead on expected market conditions. In addition, ours is the first analysis that compares directly provisions of two alternative proposals side-by-side, using the same representative dairy farm.

The paper is split in three main sections. In the first section, we introduce the modeling framework used in our analysis. The second section evaluates proposed programs on four critical questions:

1. Do proposed programs provide effective catastrophic risk insurance?
2. Does DMSP reduce government costs?
3. Does DMSP present a long-term obstacle to farms with aggressive growth plans?
4. What is the impact of restrictions on insurable milk marketings under G-S for farms with aggressive growth plans?

In the third section we examine contract design features that may inadvertently and substantially increase government costs. Finally, in the fourth section we remind readers of important open questions that go beyond the scope of our analysis. The executive summary given at the beginning of the paper substitutes the concluding section.

Model Framework

We base our analysis on expected market conditions as reflected in Chicago Mercantile Exchange (CME) futures and options markets. Distribution of expected IOFC margins is created based on CME futures and options prices for Class III milk, corn, and soybean meal contracts, as well as historic conditional correlations between these futures prices. By facilitating faster margin recovery in the aftermath of low IOFC margins, DMSP disrupts the historical correlation patterns between prices for consecutive contract months, as well as between contracts for different commodities with the same expiration date. To account for this effect, structural parameters on dairy demand and supply are introduced to shock the milk price following a DMSP trigger event. Monte-Carlo experiments are then used to determine how these programs may affect expected farm risk profile and expected net benefits under different beginning-of-the-year margin risk scenarios. *It is important to note that our analysis does not rely on the use of historical IOFC margin patterns and the methodology upon which our conclusions are based does not utilize the realized prices to illustrate policy implications.*

IOFC Margins in the Policy Proposals

In both DSA and G-S proposals, the key variable that triggers both DPMPP and, in case of DSA, DMSP program is the national average formula-derived IOFC margin. The margin for a particular month is calculated by the following formula:

$$\begin{aligned}\text{Farm Bill IOFC} = {} & \text{USDA Announced All-Milk Price} \\ & -1.0728\times\text{NASS Corn price, per bushel} \\ & -0.00735\times\text{NASS Soybean Meal Price, per ton} \\ & -0.0137\times\text{AMS Alfalfa Hay Price, per ton}\end{aligned}$$

Historical IOFC margins over the 2000-2012 time periods are shown in Figure 1. The average IOFC margin over this period was $8.35 per hundredweight (cwt). In 22 out of 156 months margins were below $6.00/cwt, and on 11 occasions they were below $4.00/cwt.

Forecasting IOFC Margins

Rather than analyzing historical margins, we focus on *expected* margins. The forecast performance of agricultural futures markets has been extensively studied and reported on in the published literature (Tomek, 1996). A general conclusion which can be drawn from this literature is that detailed structural models do not succeed in outperforming futures prices as a short-term forecasting tool. Therefore, a logical conclusion is that a model that seeks to be based on expected margins should start with futures prices. A challenge with such an approach is that none of the four government reported prices that enter the Farm Bill IOFC margin formula correspond directly to any commodity that trades at a commodity exchange. As a consequence, futures price for All-milk price, NASS corn and alfalfa hay, or AMS soybean meal cannot be directly observed. As such, we need to investigate their relationship with commodities for which futures prices do exist.

To forecast All-milk prices we use Class III and Class IV milk futures prices. Due to thinness of Class IV milk futures markets, these prices are used for forecasting only the first six months of the year. To forecast NASS corn and AMS soybean meal prices we use CME corn and soybean meal price respectively. NASS alfalfa hay prices have no close counterpart at the CME but corn and soybean meal prices, together with previously observed hay prices, are jointly able to predict month to month variations in hay prices with a reasonable degree of precision.

To model price uncertainty we use observed option premiums to calculate expected price risk in each commodity. Historical conditional correlations are used to estimate risk to IOFC margins at each horizon. With this market based data, simulation methods are utilized to estimate margin trajectories.

The DMSP is designed to reduce U.S. milk production in low-margin states of the world. As such, if DMSP is effective, it would disrupt historical correlation patterns by accelerating

margin recovery. To account for this fact we identify scenarios under which DMSP would be triggered and use structural modeling to adjust milk price trajectories.

The only two structural parameters in our model are participation rate, and a measure of the own-price elasticity of demand for milk in all uses.[4] As with any structural modeling, the choice of a particular parameter value may end up driving the results. To account for uncertainty regarding participation rate and the magnitude of elasticity of demand, we identify policy impact under two extreme sets of parameter choices that would render policy either very effective, which we label *high-boost*, or ineffective, which we label *low-boost*. For a *high-boost* scenario we choose very favorable parameter values, setting elasticity of demand to be -0.2 and participation rate at 75% of milk volume. For a low-boost scenario, unfavorable parameter values are chosen: elasticity of demand is -0.4 and participation rate is only 25% of milk volume.[5] [6] Combining the parameters in a *low-boost* policy environment the percentage price change was given by 0.625 times the percentage change in the milk supply attributable to DMSP. In a *high-boost* policy environment the percentage price change was given by 3.75 times the percentage change in the milk supply attributable to DMSP. The *high-boost* simulation results in a price response to DMSP that is six times as strong as that in a *low-boost* environment.[7] Given the volatility observed in milk prices, if DMSP does become part of the law, the actual impact is likely to lie between these two multiplier values, and vary from year to year.

Representative Dairy Farm

In order to analyze the effects of various provisions on dairy farm risk protection and revenue enhancement it is critical to address the following questions: Would programs provide effective catastrophic margin risk management and revenue enhancement for farms with stable production? Would programs provide effective catastrophic margin risk management and revenue enhancement for aggressively growing farms?

Both questions can be answered by focusing on a representative dairy farm. The production pattern for this farm is one of stable monthly milk marketings followed by a rapid expansion as a result of doubling the herd size. The milk marketings for eight consecutive years are depicted in Figure 2. The farm is modeled as having long-term yield at 15% above national average. National yield is modeled as starting at 19,984 lbs/cow in the first year, and rising up to 22,130 in year eight. The model farm starts with 180 cows and maintains that herd size until

[4] In addition, if participating producers find a way to market the milk by utilizing loopholes in the program, total reduction in milk production will be smaller. We call such an effect "leakage" and will examine its impact in future versions of our model.

[5] Since G-S does not include DMSP provisions the first-stage simulated IOFC margins are used to estimate program benefits and insurance problems.

[6] In Schmidt et al. (2002) a price-elasticity of -0.24 was identified for fluid milk products and -0.65 for cheese products.

[7] The percentage price change is estimated by inverting the own-price elasticity of demand formula and using the percentage of milk participating in the program to estimate the change in milk supply.

month 59. At that point the farm doubles to 360 cows over three months with equal increases of 60 cows per month. Due to expansion, the model farm's yield advantage over national average temporarily disappears but the farm gradually recovers to its long-term yield path over the next 9 months.

In all our analyses we will use expected milk marketings in months 85-96 as shown in Figure 2. To examine the impact of restrictions on insurable milk pounds under basic margin protection and also for supplemental margin protection under G-S specification, we will examine the farm-level impact with two scenarios: *Pre- and Post-Expansion*. In the *Post-Expansion* scenario, we will assume that a specific dairy program, either DSA or GS, starts two years after the representative dairy has entered its expansion phase. In the *Pre-Expansion* scenario, the specific dairy provisions start two years prior to the production expansion. For the *Pre-Expansion* scenario expected milk marketings (those covering months 85-96) constitute production in the fifth year of the program.

Margin Scenarios at Annual Sign-up

Under provisions of both programs, participating producers can select once each year how much of their production to insure under supplemental margin protection program and at what margin level. Section 1415(a) of H.R. 6083 states that "*a participating dairy producer may annually purchase supplemental margin protection to protect, during the calendar year for which purchased, a higher level of income of a participating dairy producer than the income level guaranteed by basic margin protection under section 1414.*" In Goodlatte-Scott amendment Section 1511(f)(4)(D)(ii)(II) adds that the annual premium must be paid by no later than January 15 of the calendar year. In all of our analyses, we assume that producers must decide on coverage level and coverage percentage for the calendar year by the 15th of January of the year in question.

From Bozic et al. (2012) we know that expected margins are likely to be mean-reverting. As such we identify six beginning-of-the-year expected margin scenarios that should well cover the space of likely expected margin environments at annual sign-up:

(i) *Catastrophic Margins.* Expected margins are well below long-run average, but revert to mean by the end of the year.

(ii) *Below Average Margins*. Expected margins are rather flat, but below long-run average.

(iii) *Mean-Reverting Margins.* Expected margins for the first quarter of the year are well above historical average, but revert to close to long-run average quickly.

(iv) *Long-Run Average Margins.* Expected margins are very close to historical average, but expected volatility in milk prices is below average.

(v) *Moderately Above-Average Margins*. Expected annual average margin is almost $1 above average.

(vi) *January 15, 2013*. Expected margins derived using January 15, 2013 futures and options prices.

These scenarios, depicted in Figure 3, are based on actual expected margins, as expected on January 15 in one of the previous six years.[8] However, they are never treated as sequential events, and as stated before, our analysis is not an imposition of the provisions of DSA or G-S using historical price patterns.

Model Results

Effectiveness of DSA in Protecting Against Catastrophic Margin Risk

The debate on current income support in the dairy subtitle of the U.S. Farm Bill started in the dairy sector around the time of the Great Recession of 2008-2009. The average annual IOFC margin in 2009 was only $4.53, with a trough reached in June when margins were as low as $2.15/cwt. Long-standing milk support programs that protected milk price, but ignored the effect of rapid rise of feed prices over 2006-2008 period were found to be very ineffective in terms of providing supplemental income to dairy producers. To forward-looking producers that locked in milk and feed prices early enough, futures markets did offer an opportunity to completely avoid the 2009 decline in IOFC margins. However, given thinness of Class III and IV milk futures markets, private-market solutions to catastrophic risk prevention never was, and for the foreseeable future will likely not be a scalable solution that can accommodate the entire U.S. dairy sector.

When the DSA was first proposed by National Milk Producers Federation under the title *Foundation for The Future*, the postulated goal was to create a program that would protect dairy producers from "*severe and unsustainable loss of margin*". In other words, the focus was on catastrophic risk insurance. Therefore, the very first analysis we undertake is the performance of DSA and G-S proposals in effectively reducing catastrophic loss of net dairy farm revenue.

Consider the model dairy farm introduced in the previous section. In months 85-96 of the presented production trajectory, this producer anticipates shipping 9,161,787 lbs of milk. A financially supportive margin for this farm would be $8.00/cwt, resulting in desired annual revenue net of feed costs of $732,942.

Consider first a scenario in which the program (either DSA or G-S) start date corresponds to month 85 of production trajectory. The previous year's production (months 73-84) was 8,982,144 lbs and that was also the highest production of the previous three years. The Basic Production History and Annual Production History under DSA and the Annual Production History of G-S do not differ in this case.

[8] Catastrophic scenario corresponds to 01/15/2009, Below Average to 01/15/2012, Mean Reverting to 01/15/2008, Long-Run Average to 01/15/2007 and Moderately Above Average to 01/15/2010.

Tables 1 and 2 examine the effectiveness of DSA in providing catastrophic risk insurance. Let us examine first Table 1. To focus on catastrophic risk insurance aspect of DSA, we used the 2013 margin environment as expected based on futures and options prices observed on January 15, 2013. The results are then grouped according to average annual simulated margins. For example, in Table 1: 18.94% of the model outcomes ended up having average margin over $8.00; 30.06% of outcomes had an average margin between $7.00 and $8.00; 38.88% scenarios ended with an average margin between $6.00 and $7.00; 10.66% had an average margin between $5.00 and $6.00; and, finally, 1.46% of the scenarios ended with an average margin lower than $5.00.

In scenarios where the average margin was over $8.00, realized IOFC revenue for the farm that decided not to participate in DSA was on average $69,932 higher than the financially supportive revenue of $732,942. On the other hand, across scenarios where realized average margin was lower than $5.00, the milk check shortfall for a non-participating farm averaged -$301,509.

Now examine how participating in DSA with *high-boost* DMSP parameterization affected the farm's bottom line. In scenarios where average margin was over $8.00, realized IOFC revenue was $61,074 higher than the financially supportive revenue, or $8,858 *less* than for a non-participating farm. Notice that although each scenario in this category *averaged* margins in excess of $8.00, some of them still had DMSP activated and DPMPP paying out indemnities for some months. Consider now the catastrophic margin category with realized margins below $5.00. Average DPMPP indemnity for this category was $153,699. DMSP penalty is calculated as the forgone milk revenue, assuming no changes to feed rations or other farm management decisions such as culling lower producing cows, etc. For this analysis we assume that the representative farm follows a production pattern as if there was no DMSP, discarding milk production in excess of the stabilization base. A DMSP penalty is the highest in the category with simulated margins under $5.00, and averages -$23,881. Summing the premium paid for supplemental margin protection, indemnity received, and DMSP penalty paid, the milk check shortfall for the representative dairy farm is -$195,524. In other words, for a category where average margin was under $5.00, total revenue for a participating dairy farm was $115,985 higher than for a non-participating dairy farm.

We decompose the total milk check shortfall to "shallow" and "catastrophic" loss. By doing so we assume that the dairy farmer will use DSA to protect against catastrophic risks only. Therefore, a decline in the average margin from $8.00 to $6.50 is considered a "shallow" loss, and a further decline is considered "catastrophic". Given anticipated production, shallow loss can be calculated as -$1.50 times anticipated production (91,618 cwt), which equals -$137,427. Any shortfall in excess of that is labeled catastrophic. For example, for a non-participating farm, catastrophic shortfall, when average margin is under $5.00, is found as the difference between total and shallow-loss shortfall: -$311,509 – (-$137,427) = -$174,082. For a participating farm, catastrophic loss in the same margin category is -$195,524 – (-$137,427) = -$58,097.

Therefore, we conclude that DSA succeeded in removing 66.6% of catastrophic losses for the model farm.

Going forward to Table 2, we find that impact of *high-boost* DMSP vs. *low-boost* DMSP is substantial in terms of probability that a year would end in a below-$5.00 margin category. In addition, in Table 2, the program is assumed to have started before our representative dairy farm expanded. Hence, *Basic Production History* (BPH) is now less than 50% of anticipated milk marketings for the analyzed year. In some sense, this is the worst-case scenario for DSA: a participating farm has expanded rapidly, and DMSP is not very effective. Under such a specification, net benefits of participating, for under-$5.00 realized margin category, is still substantial and equals $109,253. Compare that with net benefit of $115,975 under the best case scenario for DSA where BPH covers almost entire anticipated production and DMSP is very effective. The difference is small compared to the actual realized net benefits in this category of margin scenarios.

Effectiveness of G-S in Protecting Against Catastrophic Margin Risk

Moving forward, we examine the performance of Goodlatte-Scott for the same representative dairy farm, same margin scenarios (before DMSP), and same set of starting dates for the program. Table 3 gives results for a situation where G-S started in month 85, after the farm had already expanded. Net benefits of participation in the under-$5.00 margin category is $136,806. G-S removes 71.2% of catastrophic risk (i.e. shortfall in excess of decline from $8.00 to $6.50 margin). The probability that the year ends in this category is 8.86%, which is higher than under DSA since the DMSP is not available to boost prices and push some scenarios to the higher margin category.

Now let us consider Table 4, where the only difference relative to table 3 is that G-S started in month 37, before model farm expanded. Under stated provisions of G-S, insurable milk marketings are fixed at the pre-program level. In this scenario, anticipated milk marketings are 91,618 cwt, but *Annual Production History* is only 42,220 cwt. Our calculated net benefit of G-S conditional on the year finishing with under-$5.00 average margin is $67,938. This covers only 35.4% of catastrophic risk experienced by this representative dairy farm. The margin protection program as set forth in the current version of the G-S amendment offers no protection for rapid expansion of milk production. It would be premature, however, to conclude that under G-S, catastrophic risk insurance is not *possible*. All table 4 tells us is that this representative farm would have to use private risk market instruments to protect margin on 49,398 cwt. Even if private sector is unable to satisfy the need for catastrophic risk protection for the entire U.S. milk production, it may well be capable of facilitating risk transfer for marginal milk pounds added by fast growing producers over the life of the program.

In conclusion, we find that both DSA and G-S programs offer effective catastrophic risk insurance for farms with stable and moderately growing marketings. Comparing scenarios most favorable to each program (Table 1 and 3), we find that for a participating farm experiencing

catastrophic margins, the difference in total milk check shortfall across two the programs is less than $3,000. Under G-S, the ability of farms with aggressive growth plans to effectively protect against catastrophic margin risk depends on the ability of private risk market to absorb the risk associated with production in excess of *Annual Production History*, fixed at the pre-Farm Bill level.

Revenue Enhancement

In this section we take up the following question: If a producer decides to participate in DSA or GS, can he or she expect to experience cumulative indemnities over many years to exceed cumulative premiums paid to the government? Previous studies that utilized historical analysis found that participation in proposed programs would have delivered substantial net benefits over the past several years. However, the time period 2008-2012 can be characterized as one of an unprecedented level of realized IOFC margin volatility. Therefore, if we accept historical analysis as definitive evidence, we are implicitly agreeing to an assumption that a year as extreme as 2009 will occur with a frequency not borne out by the historical record.

As an alternative, we can focus on net benefits expected the current calendar year. Doing so, we find that both programs would be expected to deliver substantial net benefits with the expected "return on investment" highest for $6.50 coverage level under DSA and $7.00 coverage level under G-S. An important consideration for DSA is that the net benefits in Tables 5 and 6 do not include the revenue from DMSP price enhancement. If the DMSP is effective in enhancing the all-milk price then all farmers, whether participating or not, will receive a higher milk price in a low-margin scenario. As such, this is considered a free-rider benefit, but when comparing the alternative policy proposals this benefit must be acknowledged and may be found in Table 10. During 2013, the ratio of expected net benefits to premiums for DSA $6.50 and G-S $7.00 coverage exceed 100%. With such a high ratio of benefits to premiums, arguments on relative affordability of one program vs. another become rather immaterial. Since 2013 would be one in a string of years for which programs would be authorized, it is possible that over an extended period net premiums paid would approach indemnities paid out thus lowering the aggregate ratio of net benefits to premiums. By examining Tables 5-8, we see that in several beginning-of-year margin scenarios expected net benefits indeed are negative for most, if not all coverage levels under both policy alternatives.

It will help us if we conceptually imagine benefits from participation as being a sum of benefits to *passive* and benefits to *active* participation. We define *passive* participation as one where producer ignores current market conditions when making the annual sign-up decision, committing instead for a default coverage level once and for all. For example, if a producer commits to buying precisely $6.50 margin protection over many years (assume for a moment we knew that DSA or G-S would actually be extended beyond the initial 5-year authorization period), is he or she likely to benefit from this program? Without employing historical analysis of some form, this question becomes harder to answer.

The prima facie evidence that passive participation will deliver positive net benefits in the long run comes from the very fact that both proposals envision two-tier premium system, with much lower premiums for the first four million pounds produced. Second, evidence that program designers were aiming for "sweet spot" where subsidy is maximized is found in the steep increase in premium necessary to buy $7.00 vs. $6.50 margin insurance under DSA, and likewise $7.50 vs. $7.00 margin insurance under G-S. However, can we even pretend that $7.00/cwt margin insurance is still *catastrophic* risk protection? That coverage level is only $1.35 lower than the average historical margin and as such it actually incentivizes producers to insure against shallow losses using government programs, elevating the risk of decimating liquidity in private risk markets.

Returns to *active* participation are much easier to identify and explain. A producer is said to be *actively* participating in the program if he uses information from futures and options markets, such as presented in Tables 5-8 to alter coverage level every year in order to increase his expected net returns to participation. As an example consider the net expected benefits for G-S and DSA in Tables 5 and 8 under the *Catastrophic Margins, Mean-Reverting Margins,* and the *Long-Run Average Margins* scenarios. When forward IOFC margins are the near *Long-Run Average Margins* the net expected benefits are the highest under the basic margin protection of $4.00 at -$807 and -$1,070 for DSA and G-S respectively. The reason for negative net benefits in this particular scenario is below-average expected milk price volatility. When expected margins correspond to the *Mean-Reverting* scenario, we see that coverage strategies of $6.50 and $7.00 have net benefits of $473 and $5,944 under DSA and G-S respectively. Insurance coverage levels above or below these thresholds would only lower net expected benefits. Finally, we see that the net expected benefits under *Catastrophic Margins* are the highest at $8.00 supplemental coverage. This coverage strategy provides $127,845 and $88,394 in benefits for G-S and DSA respectively (including *high-boost* DMSP revenue enhancement brings DSA net benefits equal $149,771). The ability to change coverage level to exploit current information to one's advantage constitutes a major part of expected revenue enhancements under current proposals. Such an ability on the part of participants in either of these programs should be a concern as to program design, as it may lead to a substantial increase in government outlays relative to a policy tool that provides effective catastrophic risk insurance without incentives to excessively 'game' the system through strategic changes to annual supplemental coverage level. We explore implications of this issue in the section Contract Design Features.

DMSP Effect on Government Outlays

The DMSP is designed to stabilize IOFC margins through demand enhancing programs or reductions in the supply of milk shipped to market with the desired effect of enhancing the price of milk. If the DMSP is effective in enhancing price, the frequency and severity of indemnities will be reduced and a portion of the benefit will come from DMSP-induced higher all-milk prices, thus reducing the taxpayer burden. To a degree this desired effect is demonstrated when comparing DSA indemnity payments in Tables 5 and 6 as well as the DMSP price enhancement

benefits in Table 10. Under the *high-boost* parameterization indemnity payments are lower and the DMSP price boost is higher, while under the low-boost scenario indemnity payments are higher and price boosts are smaller.

If the DMSP is not effective in enhancing IOFC margins the benefits of participation will come primarily through indemnity payments (Table 6). An ineffective DMSP makes DSA and G-S near identical programs in government liability as neither would have a mechanism which effectively improves margins. The only major difference between DSA with an ineffective DMSP and G-S, is the provision in G-S that caps the insurable pounds thus limiting government liability.

Does DMSP Deter Growth?

Does DMSP present a long-term obstacle to farm growth? DSA allows participating producers to choose one of the two offered methods for calculating their stabilization base. According to the first method, the stabilization base for a month in which DMSP is in effect is set to be equal to the recorded production in the same month of the previous year. The alternative method allows a producer to have his stabilization base calculated as the average monthly production for the three-month period immediately preceding the month in which DMSP will be in effect. In Figure 4, we plot milk marketings for the representative dairy farm for months 37 through 96, together with the stabilization base calculated under each method. Examining Figure 4, we can observe that this representative farm should choose "3-month" base calculation method during the expansion year and the one following it. While there is a small lag between actual milk marketings and the stabilization base, this lag is large only for several months during which additional milk cows are added to the herd. Additional provisions in the DSA guarantees that actual deductions from the milk check can never exceed 8% of the value of actual farm marketings, further reducing the obstacle of DMSP to farm growth.

In conclusion, we find no evidence that DMSP presents a long-term obstacle to farm growth, even for those operations with a very aggressive farm growth plan. The only scenario where DMSP would indeed be curbing further farm expansion comes about if average IOFC margins remain under or near to $6.00 for an extended period of time. That is not likely to occur, unless it so happens that a generous supplemental margin protection program induces chronic milk oversupply. Ascertaining the likelihood of such policy-induced market imbalance is beyond the scope of our current analysis.

Contract Design Features

Adverse Selection

A common feature of the DSA and G-S proposals is that the premiums for insuring IOFC margins are fixed at specific levels for the duration of the Farm Bill. This stands in stark contrast to exchange-traded risk management instruments such as call and put options whose premiums

change daily to reflect new information on expected prices and volatility. Results of the simulations indicate that the annual expected benefits from program participation are strongly influenced by the anticipated risk environment in the forthcoming 12 months and depend significantly on the farm's coverage decision. Due to the fixed premium structure the participation decisions and outcomes of each dairy margin insurance program are subject to *asymmetric information incentives* primarily in the form of *adverse selection*. *Adverse selection* arises when farmers are better informed about the distribution of expected benefits and are thus able to assess the actuarial fairness of their premiums better than the government. When the probability of indemnity payments is high, producers who recognize that their expected benefits exceed their premiums are more likely to purchase supplemental margin protection at a higher coverage level. Alternatively, when the anticipated margin risk is low producers who recognize that their expected benefits are less than their expected premiums are less likely to purchase higher supplemental margin coverage.

Under DSA, this adverse selection problem is somewhat reduced as participating producers remain subject to DMSP when margins for two consecutive months fall below $6.00. For example, in Table 9 we examine the consequences of participant's decision to insure at $4.00 level in *Long-Run Average Margins* scenario where expected net benefits for higher coverage levels are negative. We see that insuring at the basic coverage level carries a slight probability of DMSP penalties which exceed expected indemnities. As such, should producers choose to underinsure by choosing a coverage level below $6.00 when forward margins look close to historical average, they expose themselves to the possibility of DMSP penalties in terms of forgone milk revenue, without receiving any indemnities from the margin insurance component of the program. This feature may lead to annually chosen supplemental margin protection coverage levels which deviates less from the $6.00 or $6.50 level than under the G-S specification which contains no disincentives from fully exploiting this fragility of contract design.

Solutions to Adverse Selection Problem with Simple Contract Re-design

While the problem of adverse selection is indeed severe, and may substantially increase government costs of the new policy proposals, the identified solutions are rather simple, and need not involve increasing currently proposed premium schedules. In particular, two solutions appear feasible.

First, instead of offering annual coverage decisions, each program could require multi-year coverage level commitments. In making this change dairy producers could still alter their supplemental margin coverage level, but not as frequently as current policy design permits. Continuous insurance coverage would smooth the benefits identified in nearby moderate to catastrophic loss scenarios over a multi-year horizon reducing the adverse selection incentives.

An alternative solution that requires neither reduction in frequency of choice, nor changes in premiums found in the current proposals is to change the annual coverage period to

correspond to fiscal rather than a calendar year, and require that annual decisions for the forthcoming coverage period be submitted by the end of March. As can be seen from Figure 5, forward margins for September through December, based on information available on Jan 15, are much closer to the historical average margin than the margins expected for the six months immediately following the sign-up date. A March 15 information set does not substantially differ than Jan 15, as major USDA reports that reduce uncertainty regarding new-crop corn and soybeans are not yet published.[9] By introducing a 6 month window between the deadline for making the annual signup decision and the beginning of coverage period, most problems with adverse selection can be solved in a manner that is both easy to implement and is intuitive to those dairy farmers who have experience with crop insurance programs. With these suggested modifications the coverage decisions are more likely to be made based on an individual farm's risk tolerance and average margin insurance subsidy, not on anticipated year-specific financial gains from the program. These proposed solutions in contract design would allow the proposed margin insurance programs to move much closer to actuarial fairness while maintaining current premium structure and flexible margin coverage choices.

Open Questions

The analysis is parsimonious in structural model assumptions and relies on expected market conditions as reflected in Chicago Mercantile Exchange futures and options prices. As such our primary focus is on expected short-run effects flowing from these alternative programs. Such an approach makes our analysis more robust, and estimated short-term effects substantially more rich and trustworthy than what a stand-alone structural model can offer. The perspective from our analysis is that little is being said as to long-term effects, over repeated U.S. farm bill horizons, of the two competing proposals that we can state based on model results. As such, important questions to be addressed remain:

- Will there be a supply response to a program that provides affordable and effective catastrophic insurance? In capitalism, risk and reward are proportional. If risk in the dairy sector is effectively curbed, it would seem logical to speculate that the *average* long-term margins could also be reduced, a consequence of more aggressive farm expansions than under status quo.
- Effects of proposed policies on U.S. dairy exports are unclear. Any policy that is found in practice to be unsustainably generous or distracting to orderly milk marketing will ultimately need to be revised. Expectations that policy will be revised, without knowing what revisions will be, induce policy risk that is superimposed on IOFC margin risk and may hamper long-term relationships with buyers of U.S. dairy products abroad.
- What would be the effect of new programs on utilization of and innovation in private risk markets? Proposed programs were designed in response to a need for a new *catastrophic* risk insurance following the devastating 2009 year. However, both policy alternatives

[9] The first such document is the Prospective Plantings Report, issued at the end of March.

offer government sponsored margin insurance up to $8.00/cwt coverage, a level that stands only $0.35 cents below the average margin realized over the 2000-2012 period. As such, it is reasonable to ask whether the new programs could inadvertently reduce demand for dairy futures and options contracts, lowering market liquidity and ultimately the ability of dairy industry participants to offset their risk.

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Figure 1. Farm Bill Income-over-feed-cost margin, 2000-2012, $/cwt

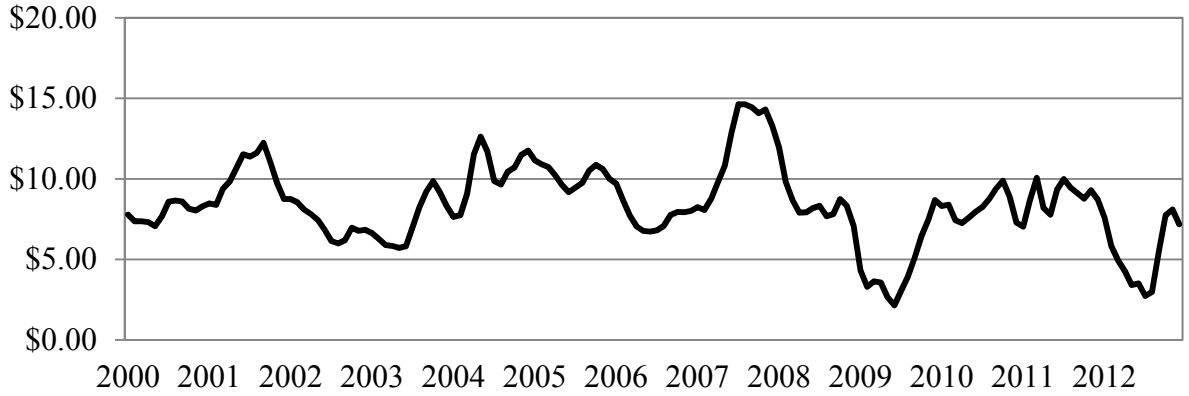


Figure 2. Simulated farm marketings for pre- and post-expansion scenario

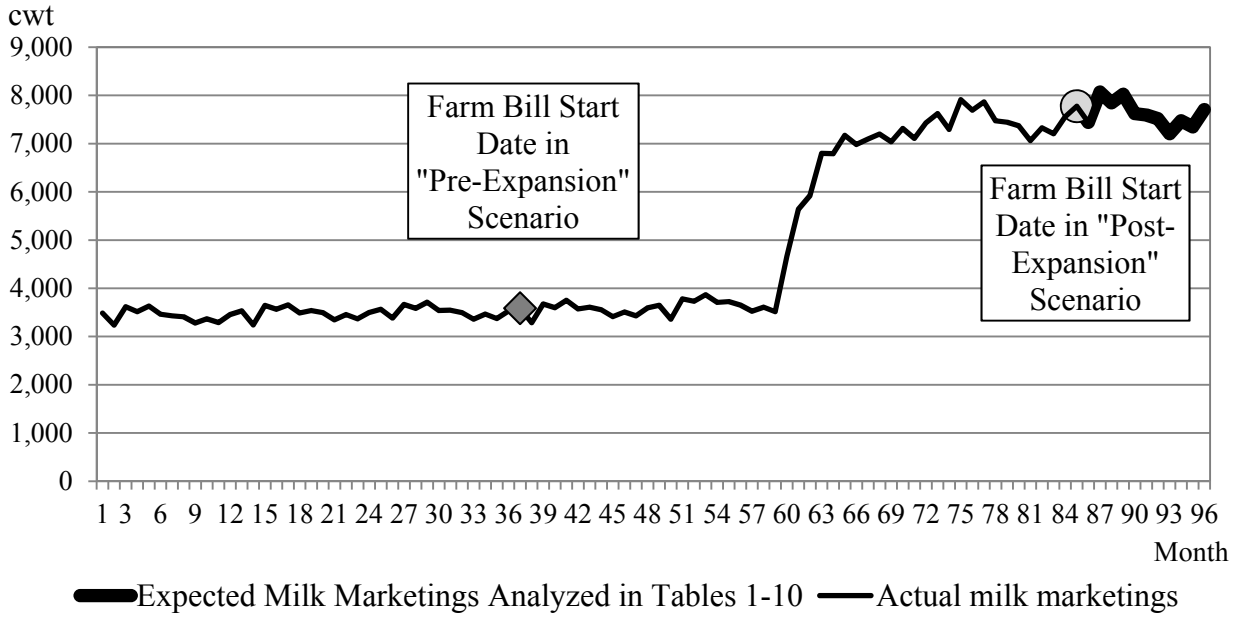
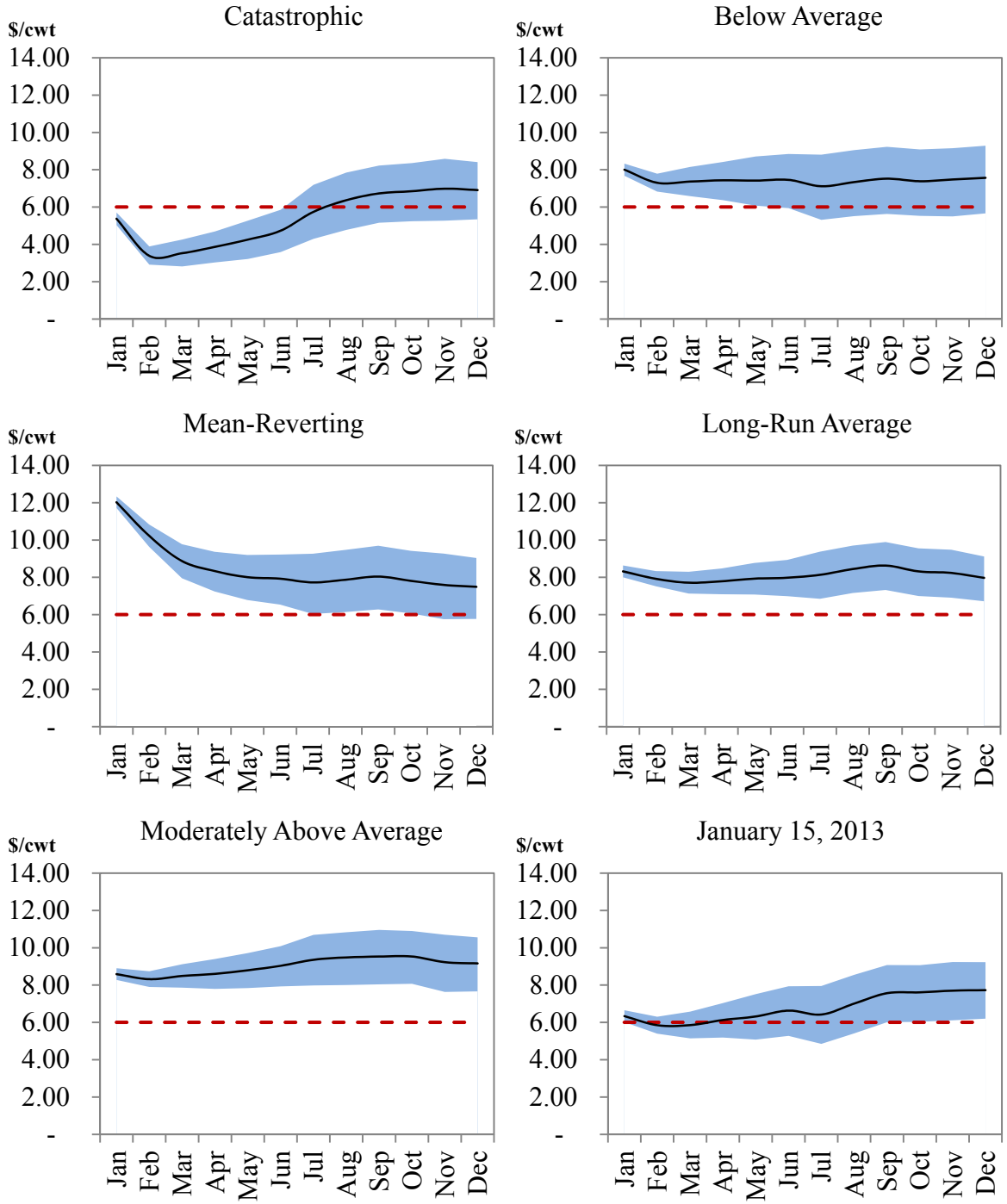


Figure 3. Simulated dairy IOFC margin scenarios



The solid black line represents the expected IOFC margin based on futures prices, the shaded region represents middle 50% of simulated IOFC margin trajectories, and the dotted red line represents the DMSP threshold of $6.00/cwt.

Figure 4. DMSP stabilization base dynamics for an aggressively growing dairy farm.

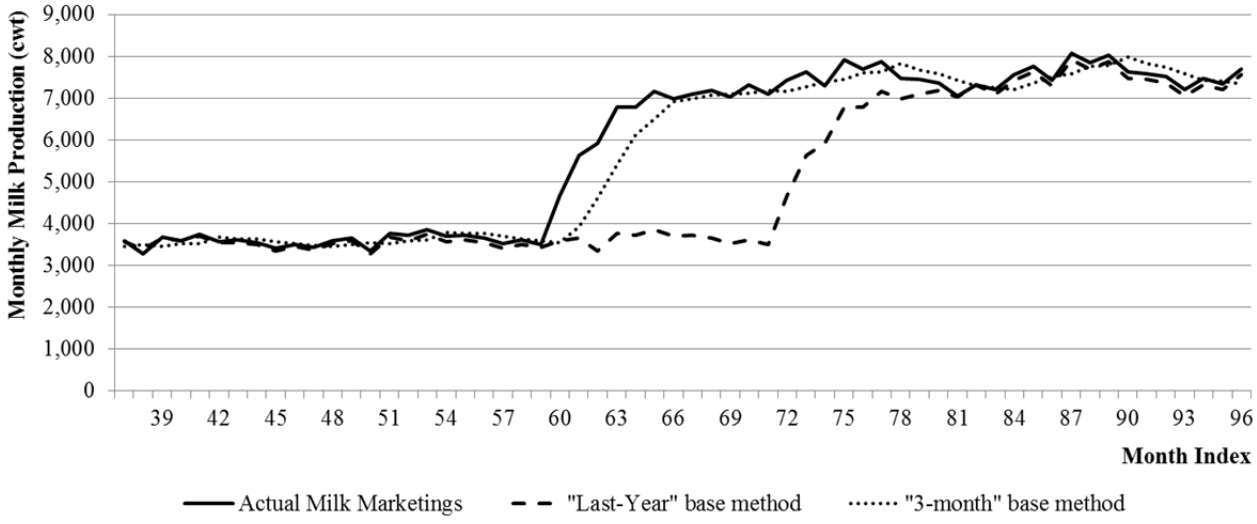
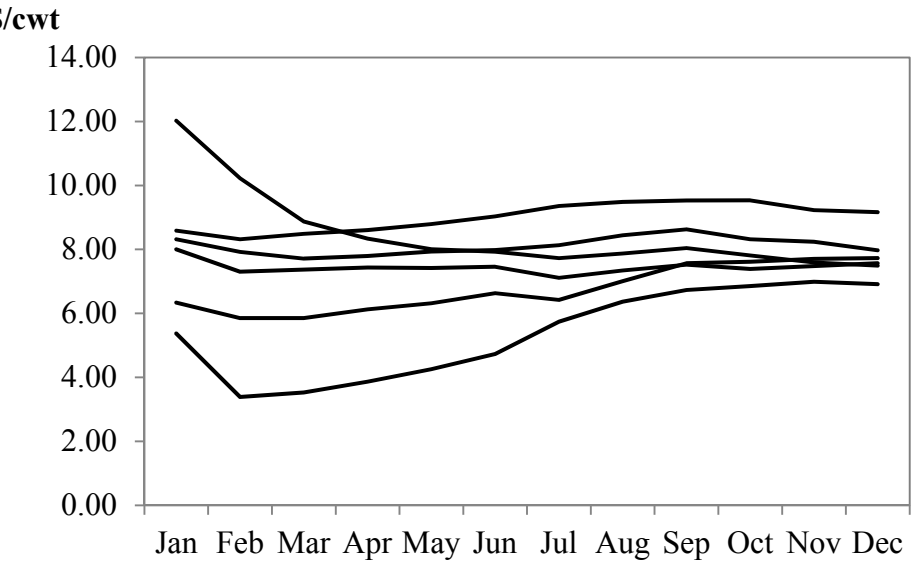


Figure 5. Mean-reversion in forward margins across six analyzed scenarios.



Presented lines correspond to forward IOFC margins in six analyzed beginning-of-year scenarios.

Table 1. Catastrophic risk protection under high-boost DMSP parameterization for $6.50 DSA supplemental coverage with Farm Bill start date after farm expansion (month 85) using Jan 15, 2013 simulated margins

Average Annual Per Cwt Simulated Margin	Probability	DMSP Revenue Boost	Milk Check Shortfall Relative to $8.00/cwt for **non-participating** farm	Premium for $6.50 margin	Average Simulated Indemnity	DMSP Penalty	Milk Check Shortfall Relative to $8.00/cwt for **participating** farm
Less than $5.00	1.46%	88,620	(311,509)	(13,803)	153,669	(23,881)	(195,524)
$5.00 to $6.00	10.66%	71,405	(214,702)	(13,803)	81,760	(14,348)	(161,092)
$6.01 per cwt to $7.00	38.88%	41,191	(134,956)	(13,803)	39,107	(7,807)	(117,460)
$7.01 per cwt to $8.00	30.06%	17,377	(50,761)	(13,803)	17,565	(4,267)	(51,266)
Greater than $8.00	18.94%	5,458	69,932	(13,803)	7,141	(2,195)	61,074

Notes: Basic Production History: 89,821 cwt, Annual Production History: 89,821 cwt, Anticipated Milk Marketings: 91,618 cwt, Supplemental Coverage Percentage: 90%, Stabilization Base Calculation Method: 3-month, Elasticity of demand: -0.20, Participation rate: 75% of milk volume.

Table 2. Catastrophic risk protection under low-boost DMSP parameterization for $6.50 DSA supplemental coverage with Farm Bill start date before farm expansion (month 37) using Jan 15, 2013 simulated margins

Average Annual Per Cwt Simulated Margin	Probability	DMSP Revenue Boost	Milk Check Shortfall Relative to $8.00/cwt for **non-participating** farm	Premium for $6.50 margin	Average Simulated Indemnity	DMSP Penalty	Milk Check Shortfall Relative to $8.00/cwt for **participating** farm
Less than $5.00	7.42%	15,899	(322,432)	(13,803)	147,842	(24,786)	(213,179)
$5.00 to $6.00	19.14%	10,515	(220,247)	(13,803)	81,044	(14,954)	(167,960)
$6.01 per cwt to $7.00	31.10%	4,729	(136,715)	(13,803)	37,064	(6,739)	(120,193)
$7.01 per cwt to $8.00	24.74%	1,786	(49,294)	(13,803)	15,052	(3,236)	(51,281)
Greater than $8.00	17.60%	520	71,750	(13,803)	6,014	(1,623)	62,337

Notes: Basic Production History: 42,220 cwt, Annual Production History: 89,821 cwt, Anticipated Milk Marketings: 91,618 cwt, Supplemental Coverage Percentage: 90%, Elasticity of demand: -0.40, Participation rate: 25% of milk volume.

Table 3. Catastrophic risk protection for $6.50 G-S supplemental coverage with Farm Bill start date after farm expansion (month 85) using Jan 15, 2013 simulated margins

Average Annual Per Cwt Simulated Margin	Probability	DMSP Revenue Boost	Milk Check Shortfall Relative to $8.00/cwt for **non-participating** farm	Premium for $6.50 margin	Average Simulated Indemnity	DMSP Penalty	Milk Check Shortfall Relative to $8.00/cwt for **participating** farm
Less than $5.00	8.86%		(329,350)	(14,439)	151,244		(192,544)
$5.00 to $6.00	19.96%		(222,392)	(14,439)	75,181		(161,650)
$6.01 per cwt to $7.00	29.68%		(136,595)	(14,439)	33,145		(117,889)
$7.01 per cwt to $8.00	23.98%		(49,389)	(14,439)	13,083		(50,744)
Greater than $8.00	17.52%		71,576	(14,439)	5,342		62,480

Notes: Annual Production History: 89,821 cwt, Anticipated Milk Marketings: 91,618 cwt, Supplemental Coverage Percentage: 80%.

Table 4. Catastrophic risk protection for $6.50 G-S supplemental coverage with Farm Bill start date before farm expansion (month 37) using Jan 15, 2013 simulated margins

Average Annual Per Cwt Simulated Margin	Probability	DMSP Revenue Boost	Milk Check Shortfall Relative to $8.00/cwt for **non-participating** farm	Premium for $6.50 margin	Average Simulated Indemnity	DMSP Penalty	Milk Check Shortfall Relative to $8.00/cwt for **participating** farm
Less than $5.00	8.86%		(329,350)	(3,395)	71,332		(261,412)
$5.00 to $6.00	19.96%		(222,392)	(3,395)	35,426		(190,360)
$6.01 per cwt to $7.00	29.68%		(136,595)	(3,395)	15,601		(124,390)
$7.01 per cwt to $8.00	23.98%		(49,389)	(3,395)	6,151		(46,633)
Greater than $8.00	17.52%		71,576	(3,395)	2,511		70,693

Notes: Annual Production History: 42,220 cwt, Anticipated Milk Marketings: 91,618 cwt, Supplemental Coverage Percentage: 80%.

Table 5. Dairy Security Act Insurance Costs and Benefits with a high-boost DMSP parameterization ($) with Farm Bill implementation after farm expansion, does not include DMSP price enhancement value

IOFC Margin Scenario as Anticipated at Annual Sign-up Deadline	Insurance Coverage Level								
	$4.00	$4.50	$5.00	$5.50	$6.00	$6.50	$7.00	$7.50	$8.00
Catastrophic Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	8,337	17,113	30,776	48,389	68,987	92,274	118,188	146,724	177,798
DMSP Penalty	14,620	14,620	14,620	14,620	14,620	14,620	14,620	14,620	14,620
Expected Net Benefit	(6,534)	1,210	13,392	28,447	44,826	63,851	68,233	84,159	88,394
Below Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	1,446	2,911	5,343	9,248	15,248	23,949	35,995	52,626	75,208
DMSP Penalty	3,494	3,494	3,494	3,494	3,494	3,494	3,494	3,494	3,494
Expected Net Benefit	(2,298)	(1,865)	(915)	433	2,214	6,653	(2,833)	1,187	(3,069)
Strongly Mean-Reverting Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	781	1,733	3,417	6,112	10,297	16,434	25,096	36,759	51,662
DMSP Penalty	2,158	2,158	2,158	2,158	2,158	2,158	2,158	2,158	2,158
Expected Net Benefit	(1,626)	(1,707)	(1,505)	(1,368)	(1,401)	473	(12,396)	(13,344)	(25,280)
Long-Run Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	65	198	513	1,228	2,788	5,890	11,514	21,010	36,305
DMSP Penalty	623	623	623	623	623	623	623	623	623
Expected Net Benefit	(807)	(1,707)	(2,873)	(4,717)	(7,375)	(8,535)	(24,443)	(27,558)	(39,102)
Moderately Above-Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	34	91	232	534	1,193	2,489	4,941	9,243	16,774
DMSP Penalty	246	246	246	246	246	246	246	246	246
Expected Net Benefit	(463)	(1,438)	(2,779)	(5,034)	(8,593)	(11,561)	(30,640)	(38,949)	(58,257)
January 15, 2013									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	959	2,260	4,785	9,552	18,260	32,797	52,873	77,081	104,676
DMSP Penalty	6,612	6,612	6,612	6,612	6,612	6,612	6,612	6,612	6,612
Expected Net Benefit	(5,903)	(5,634)	(4,591)	(2,382)	2,108	12,382	10,927	22,524	23,280

Notes: Basic Production History: 89,821 cwt, Annual Production History: 89,821 cwt, Anticipated Milk Marketings in Year 1: 91,618 cwt, Supplemental Coverage Percentage: 90%, Elasticity of demand: -0.20, Participation rate: 0.75, All-Milk price basis: $0.00.

Table 6. Dairy Security Act Insurance Costs and Benefits with a low-boost DMSP parameterization ($) with Farm Bill implementation before farm expansion, does not include DMSP price enhancement value

	Insurance Coverage Level								
IOFC Margin Scenario as Anticipated at Annual Sign-up Deadline	$4.00	$4.50	$5.00	$5.50	$6.00	$6.50	$7.00	$7.50	$8.00
Catastrophic Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	7,195	19,468	37,122	59,111	84,057	111,565	141,388	173,356	207,243
DMSP Penalty	16,020	16,020	16,020	16,020	16,020	16,020	16,020	16,020	16,020
Expected Net Benefit	(9,075)	2,165	18,338	37,769	58,497	81,742	90,034	109,390	116,439
Below Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	1,339	3,540	6,877	11,829	18,950	28,811	41,947	59,507	82,826
DMSP Penalty	4,106	4,106	4,106	4,106	4,106	4,106	4,106	4,106	4,106
Expected Net Benefit	(3,017)	(1,849)	7	2,401	5,304	10,902	2,507	7,455	3,936
Strongly Mean-Reverting Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	677	2,042	4,234	7,509	12,310	19,077	28,318	40,468	55,776
DMSP Penalty	2,432	2,432	2,432	2,432	2,432	2,432	2,432	2,432	2,432
Expected Net Benefit	(2,005)	(1,673)	(963)	(245)	338	2,842	(9,448)	(9,910)	(21,440)
Long-Run Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	50	241	671	1,553	3,318	6,644	12,503	22,216	37,677
DMSP Penalty	706	706	706	706	706	706	706	706	706
Expected Net Benefit	(906)	(1,748)	(2,799)	(4,475)	(6,928)	(7,865)	(23,537)	(26,435)	(37,813)
Moderately Above-Average Margins									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	18	100	272	616	1,345	2,718	5,249	9,631	17,208
DMSP Penalty	256	256	256	256	256	256	256	256	256
Expected Net Benefit	(489)	(1,438)	(2,748)	(4,962)	(8,451)	(11,341)	(30,342)	(38,570)	(57,832)
January 15, 2013									
Prem. & Admin. Fees	250	1,283	2,764	5,322	9,540	13,803	35,334	47,945	74,784
Expected Indemnity	1,197	3,598	7,696	14,518	25,650	42,791	65,458	92,042	121,640
DMSP Penalty	7,883	7,883	7,883	7,883	7,883	7,883	7,883	7,883	7,883
Expected Net Benefit	(6,937)	(5,568)	(2,951)	1,312	8,226	21,104	22,241	36,213	38,973

Notes: Basic Production History: 42,220 cwt, Annual Production History: 89,821 cwt, Anticipated Milk Marketings in Year 1: 91,618 cwt, Supplemental Coverage Percentage: 90%, Elasticity of demand: -0.40, Participation rate: 0.25, All-Milk price basis: $0.00.

Table 7. Goodlatte-Scott Act Insurance Costs and Benefits ($) with Farm Bill implementation after farm expansion

	Insurance Coverage Level								
IOFC Margin Scenario as Anticipated at Annual Sign-up Deadline	$4.00	$4.50	$5.00	$5.50	$6.00	$6.50	$7.00	$7.50	$8.00
Catastrophic Margins									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	17,424	29,137	45,676	66,046	88,984	114,104	141,178	170,035	200,493
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	16,228	27,023	42,405	60,542	80,170	99,665	120,273	117,753	127,845
Below Average Margins									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	3,297	5,418	8,599	13,212	19,768	28,719	40,535	56,261	77,077
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	2,102	3,305	5,329	7,708	10,954	14,281	19,629	3,980	4,429
Strongly Mean-Reverting Margins									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	1,662	2,977	5,026	8,048	12,432	18,553	26,849	37,715	51,368
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	467	864	1,755	2,544	3,618	4,114	5,944	(14,567)	(21,280)
Long-Run Average Margins									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	126	318	727	1,547	3,156	6,157	11,404	20,066	33,831
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	(1,070)	(1,796)	(2,543)	(3,958)	(5,657)	(8,281)	(9,502)	(32,216)	(38,817)
Moderately Above-Average Margins									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	43	122	281	600	1,263	2,495	4,760	8,663	15,406
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	(1,153)	(1,991)	(2,989)	(4,904)	(7,551)	(11,944)	(16,146)	(43,618)	(57,242)
January 15, 2013									
Prem. & Admin. Fees	1,196	2,114	3,271	5,504	8,814	14,439	20,906	52,281	72,649
Expected Indemnity	3,181	5,641	9,708	16,224	26,604	42,317	62,853	86,805	113,359
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	1,985	3,527	6,438	10,720	17,790	27,878	41,947	34,524	40,710

Notes: Annual Production History: 89,821 cwt, Anticipated Milk Marketings in Year 1: 91,618 cwt, Supplemental Coverage Percentage: 80%.

Table 8. Goodlatte-Scott Act Insurance Costs and Benefits ($) with Farm Bill implementation before farm expansion

	Insurance Coverage Level								
IOFC Margin Scenario as Anticipated at Annual Sign-up Deadline	$4.00	$4.50	$5.00	$5.50	$6.00	$6.50	$7.00	$7.50	$8.00
Catastrophic Margins									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	8,201	13,714	21,497	31,086	41,885	53,715	66,468	80,064	94,418
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	8,148	13,314	20,740	29,771	40,116	50,320	60,033	59,390	62,136
Below Average Margins									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	1,558	2,560	4,063	6,242	9,338	13,564	19,140	26,559	36,375
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	1,505	2,160	3,306	4,927	7,569	10,169	12,706	5,885	4,092
Strongly Mean-Reverting Margins									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	785	1,407	2,374	3,802	5,873	8,764	12,681	17,810	24,255
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	732	1,007	1,617	2,487	4,104	5,369	6,246	(2,864)	(8,027)
Long-Run Average Margins									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	60	150	344	731	1,491	2,907	5,383	9,468	15,957
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	6	(250)	(413)	(585)	(278)	(488)	(1,052)	(11,206)	(16,325)
Moderately Above-Average Margins									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	20	58	133	284	596	1,178	2,247	4,089	7,269
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	(33)	(342)	(624)	(1,032)	(1,172)	(2,217)	(4,188)	(16,585)	(25,013)
January 15, 2013									
Prem. & Admin. Fees	53	400	757	1,315	1,769	3,395	6,435	20,674	32,282
Expected Indemnity	1,499	2,658	4,575	7,646	12,535	19,936	29,609	40,892	53,403
DMSP Penalty	-	-	-	-	-	-	-	-	-
Expected Net Benefit	1,446	2,259	3,818	6,330	10,767	16,541	23,174	20,218	21,120

Notes: Annual Production History: 42,220 cwt, Anticipated Milk Marketings in Year 1: 91,618 cwt, Supplemental Coverage Percentage: 80%.

Table 9. Dairy Market Stabilization Program disincentives for strategic changes of annual sign-up

	Dairy Security Act					Goodlatte-Scott Amendment			
Average Annual Per cwt Simulated Margin	Probability	Premium for $4.00 margin	Average Simulated Indemnity	DMSP Penalty	Net benefit	Probability	Premium for $4.00 margin	Average Simulated Indemnity	Net benefit
Less than $5.00	0.08%	(250)	14,776	(19,484)	(4,958)	0.14%	(1,196)	14,776	13,580
$5.00 to $6.00	1.42%	(250)	4,740	(11,075)	(6,585)	1.67%	(1,196)	4,740	3,544
$6.01 per cwt to $7.00	11.80%	(250)	196	(3,708)	(3,762)	11.64%	(1,196)	196	(1,000)
$7.01 per cwt to $8.00	33.34%	(250)	14	(279)	(515)	33.22%	(1,196)	14	(1,182)
Greater than $8.00	53.36%	(250)	0	(5)	(255)	53.34%	(1,196)	0	(1,196)

Note: Average anticipated IOFC margin at signup is $8.12 per cwt. Where applicable: Basic Production History: 89,821 cwt, Annual Production History: 89,821 cwt, Anticipated Milk Marketings in Year 1: 91,618 cwt, DSA Supplemental Coverage Percentage: 90%, G-S Supplemental Coverage Percentage: 80%, Elasticity of demand: -0.20, Participation rate: 0.75.

Table 10. DMSP revenue enhancement under low- and high-boost parameterization ($)

	DMSP High-Boost	DMSP Low-Boost
Catastrophic Margins	61,377	10,230
Below Average Margins	14,889	2,481
Strongly Mean-Reverting Margins	7,851	1,309
Long-Run Average Margins	2,277	379
Moderately Above-Average Margins	755	126
January 15, 2013	31,178	5,196

Notes: For DMSP high-boost Elasticity of demand: -0.20, participation rate: 0.75. For DMSP low-boost Elasticity of demand: -0.40, participation rate: 0.25. Value estimated by multiplying change in all-milk price by the milk marketings. DMSP price boost is a free-rider benefit and is not included in net benefits of DSA participation. When comparing DSA and G-S DMSP revenue boost should be considered as a DSA program benefit.