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CAIS Program Structure and Performance: Evidence from Ontario[1]

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The Issue

The Canadian Agricultural Income Stabilization (CAIS) program was approved in late 2003. It now serves as Canada's sole farm safety net program, having replaced the Net Income Stabilization Account (NISA), Canadian Farm Income Program (CFIP), and provincial companion programs. However, the mechanisms of operation and actual performance of CAIS in providing stability to farm incomes are relatively unknown. In particular, to develop expectations of future farm costs and returns and to determine their support for CAIS as the sole safety net under the federal-provincial Agricultural Policy Framework (APF), farmers and their representatives need a concrete understanding of how CAIS can be expected to work relative to its predecessors.

Implications and Conclusions

CAIS has a number of differences relative to its predecessors as a safety net program. First, a producer must experience a loss before a payment can be claimed. CAIS requires producer deposits to finance a portion of the payment, with the deepest losses requiring

the lowest producer-cost share. The program uses the same measure of income (production margin) to determine deposits as it does to determine payments. The program suffers from moral hazard in its design for farms with supply-managed sales. Empirical simulation of the stability in production margin and gross margin using Ontario data under CAIS and under its predecessor programs showed that CAIS provided consistently lower variability.

Introduction

Under the business risk management pillar of the Agricultural Policy Framework (APF), previously existing federal-provincial farm income stabilization programs were combined into a single program. Thus, the Canadian Farm Income Program (CFIP), the Net Income Stabilization Account (NISA), provincial NISA top-up programs (such as Self-Directed Risk Management (SDRM) in Ontario), and other provincial companion programs (such as Market Revenue Insurance in Ontario and crop insurance enhancements in western Canada) were collapsed into a single program. This program is the Canadian Agricultural Income Stabilization (CAIS) program.

As of January 1, 2004 CAIS is officially the sole farm income stabilization program in Canada.[2] However, little research has been undertaken on the impacts or effectiveness of CAIS relative to the safety net programs it replaces. Brown-Andison et al. (2003) conducted a largely conceptual analysis of what is now CAIS in the final stages of program design and approval. That analysis found that CAIS offered design improvements over previous programs and was very likely to offer improvements in stabilization. Martin and Mussell (2003) conducted an empirical study of the CAIS program as it applied to Ontario agriculture; their study validated the findings of Brown-Andison et al. and offered suggestions for design improvements.

The purposes of this article are to outline the basic design and operational elements of CAIS and to interpret these design elements in the context of empirical research on the impacts of CAIS on Ontario agriculture.

Program Design

The CAIS program has three components that differ from previous income stabilization programs:

- The measure of farm income cushioned under the program is *production margin.* It serves as a trigger for both support payments and producer contributions.
- Producers make contributions to the program to share financing of triggered payments.
- Support under CAIS is layered, such that the producer share of triggered payments decreases as realized production margin decreases.

Production Margin

Under CAIS, the measure of income that is used to trigger payments is *production margin*, calculated using modified accrual accounting procedures. This differs from the cash-basis *gross margin* trigger used in NISA. Production margin is intended to consider revenues and expenses that are directly related to production. The revenue measured under production margin will tend to be structurally lower, and expenses structurally higher, compared with the accrual gross margin measure used as a trigger under CFIP. This is illustrated in table 1 (all tables appear at the end of the article). In particular, expenses related to capital equipment and buildings that were eligible under CFIP are not eligible under CAIS. In determining payments, the production margin is compared with a reference production margin, which is based on a five-year olympic average.[3] If the realized production margin falls below the reference, a claim is triggered for the difference.

Producer Contributions

Under CAIS, producers participate by making contributions that are used to finance claims. Producers make deposits proportional to their reference margins. The minimum deposit that a producer must make is that required to finance the producer's portion of payments to restore 70 percent of the reference production margin from a complete loss. This minimum deposit amounts to 14 percent of the reference production margin. Producers can choose to make deposits above this level to fund program payments. The deposit can be cash-flowed over a three-year period.

Layered Support

The shares of government and producer funding under CAIS are split according to the magnitude of production margin loss experienced. The magnitudes of loss are categorized under CAIS, with losses of less than 0–15 percent and 15–30 percent of reference allocated into two *stabilization* layers, and losses of greater than 30 percent of reference allocated under the *disaster* layer. The share of producer funds used to finance payments is inversely proportional to the extent of the loss. For losses of 0–15 percent, producer deposits must cover 50 percent of claims, with 50 percent provided by government. For the next 15 percent of losses (from 15 percent to 30 percent of reference) producer deposits must cover 30 percent of claims, with 70 percent provided by government. For losses in excess of 30 percent of reference, producer deposits must fund 20 percent of claims, with the balance coming from government. Claims are limited by the availability of producer matching funds, and the payments start in the layer representing the largest loss relative to reference (so the greatest government cost share is accessed). In addition, CAIS now includes provisions in which government covers 60 percent of "negative margins" (eligible revenue less than eligible expenses).

CAIS Program Operation

Figure 1 illustrates the basic parameters of the program. The minimum deposit is the producer's share of a complete loss below 70 percent; as shown, this is 20 percent of 70 percent, or 14 percent. If the farmer wishes to have a higher level of deposit and move to the second stabilization layer, the deposit required is the minimum (14 percent) plus 30 percent of the next 15 percent (or 4.5 percent), for a total of 18.5 percent. If the producer wishes to have a deposit sufficient to finance claims following a 100 percent production margin loss, the deposit is the above 18.5 percent plus 50 percent of the remaining 15 percent (or 7.5 percent), for a total of 26 percent of reference production margin. Finally, there is a program cap of $3,000,000 per farm, and a structural cap such that government cannot finance more than 70 percent of total losses.[4]
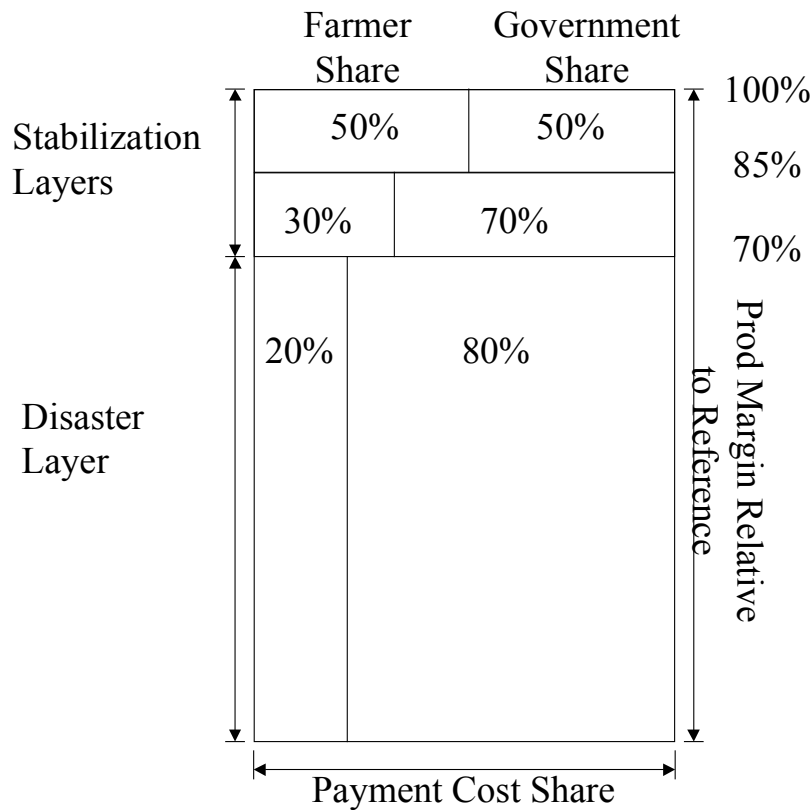
Figure 1 CAIS payment cost shares by level of production margin loss

To understand the program better, consider a farm with a reference production margin of $100,000. The farm will have the choice to contribute anywhere from 14 percent to 26 percent of its reference margin.

- If the farmer chooses 14 percent, the deposit is $14,000. This follows from the fact that the cost-shares are 20 percent producer and 80 percent government below 70 percent of the reference margin. The farmer's 20 percent is $14,000.

Looked at differently, if a farm whose reference margin is $100,000 had $0 in a given year, then the farm's deposit of $14,000 would be matched 4:1 by the government in the disaster tier, and the farm would be restored to $70,000 of margin.

· If the farmer chooses 18.5 percent deposit, then the farmer's deposit is $18,500. If this farm had a complete loss to $0 margin in a year, then the farm would be restored to 85 percent of the reference margin – $70,000 as above, and $15,000 from the lower stabilization tier. Of this $15,000, $4,500 is from the producer deposit, $10,500 is from the government, and the ratio is 30/70. If the farmer chooses 100 percent coverage, (i.e., $100,000) then the farmer's deposit is $26,000 (i.e., $18,500 from above and 50 percent of the next $15,000).

· If the farmer chooses the 26 percent deposit, (i.e., a $26,000 deposit), and if the farm has a complete loss of the reference margin, then the farm should be restored to 100 percent of the reference margin (subject to the 70 percent cap), 85 percent as above and the remainder shared half and half between the farmer and the government.

Except for changes in the reference margin, deposits do not change until there is a claim; in other words, *the deposit is not a premium*. If there is no claim for ten years, and the reference margin stays at $100,000 for the entire time, the farmer's total deposit is a one-time total of $14,000 (assuming the 14 percent deposit). Also, an important aspect of the proposed program design is that payouts will be done on a "bottom up" basis. Payments start at the level of loss and work up until either the producer's deposit is used up or the producer's margin is brought back up to the reference margin. This means that the greatest proportion of government risk sharing is accessed first. Returning to the farm in the example above, assume in a given year the farm's production margin is 60 percent of the reference (i.e., the farm has a 40 percent loss), which in the example is a $40,000 loss. With deposits of 14, 18.5, and 26 percent, the farmer will receive the following:

· The farmer with a 14 percent deposit will receive $26,000 (or 65 percent of the total loss) in government payment and receive the return of the entire $14,000 of his or her own deposit. This is calculated as follows:

  • For the $10,000 loss between 60 percent and 70 percent, the producer's share is $2,000 (20 percent), and the government's is $8,000.

  • For the $15,000 loss between 70 percent and 85 percent, the producer's share is $4,500 (30 percent) and the government's share is $10,500.

  • At this point, the producer has received $6,500 of the original deposit, which leaves $7,500. Therefore, government pays another $7,500 to match this part between 85 percent and 100 percent.

- The total government contribution from the three portions is $26,000, while the farmer's share is $14,000, and all of the loss is covered.
- Farmers with 18.5 percent and 26 percent deposits would not need to use their additional deposits. Therefore, these deposits could be used to secure subsequent levels of protection. In this example, a farmer with an 18.5 percent deposit has $4,500 left on deposit, while the farmer with a 26 percent deposit has $12,000 left. This money can then be used as part or all of the deposit for subsequent years' coverage under the program.

These examples make clear the important economic question on program deposits. In the example, deposits of 18.5 percent or 26 percent were clearly excessive (at least in the static sense), leaving deposit funds in the account over and above the amount required to match the government funding. The 14 percent producer deposit was just sufficient to leverage the needed government funding; had the loss been greater, the farmer would not have received a program payment to restore the reference margin because he or she would have lacked the sufficient deposit.

CAIS and Supply Management

As opposed to the case under NISA, farms with sales of supply-managed commodities are eligible for CAIS, although under an altered design. This eligibility is based on a farm's percentage of supply-managed sales relative to total farm sales. In the stabilization layers, triggered CAIS payments are prorated according to the percentage of farm sales from non–supply managed commodities. So, for example, if a farm had non–supply managed sales that were 25 percent of farm sales, the farm would be eligible for 25 percent of triggered stabilization-layer payments. However, if losses penetrate into the disaster layer, *all* prorating disappears. Thus, if the same farm had losses in excess of 30 percent, the prorating would disappear on all payments.

The pattern is illustrated in figure 2 for a farm with a reference production margin of $100,000, the minimum deposit, and 25 percent of sales from non–supply managed product. The horizontal axis plots realized production margin, and the vertical axis plots the cushioned production margin accounting for the government portion of the CAIS payment. The figure shows that moving from right to left, as production margin decreases, CAIS payments are made on 25 percent of the loss. In the stabilization layers, the cushioned production margin is linear in production margin losses. However, once the losses penetrate the disaster layer ($70,000 on the horizontal axis in the figure) the cushioned production margin kinks upward as the prorating on payments is removed. This creates a moral hazard problem in the program. For purposes of illustration, suppose this farm experienced a production margin of $75,000 (on the horizontal axis). The farm would receive a cushioned production margin of $78,625. However, at a realized
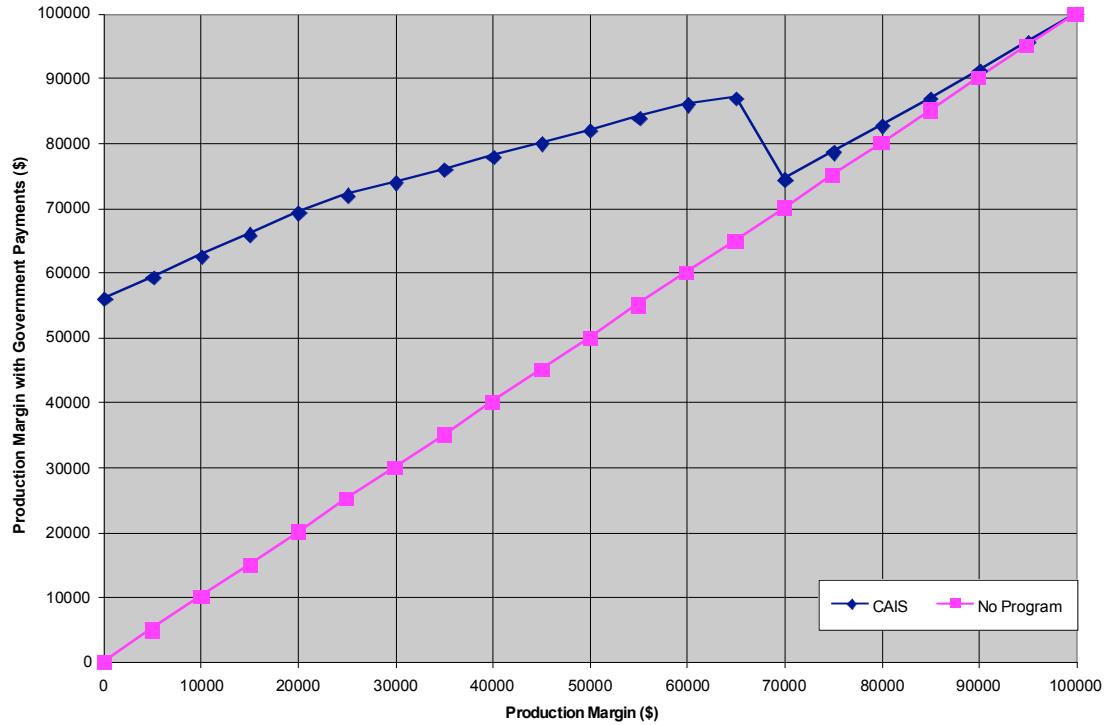
Figure 2 CAIS and the stabilization "kink" under supply management
Source: Adapted from Martin and Mussell (2003)

production margin of $65,000, the cushioned production margin is $87,000. Hence the moral hazard problem on farms with supply managed sales.

Performance of CAIS

As indicated above, the purpose of CAIS is to stabilize farm income, as represented by production margin. To test the extent to which CAIS can be expected to be successful in stabilizing farm income relative to the programs it replaces, the following analysis was conducted:

- Income data were collected from 11,034 continuous Ontario NISA participants from 1994 to 2001. Table 2 describes the structure of farms in the database. The period of the analysis was 1998 to 2004.
- The data were grouped according to farm type and farm sales range.
- In each case, the actual payments from NISA, CFIP (in Ontario, the Ontario Farm Income Disaster Program, or OFIDP), Ontario companion programs, and crop insurance were determined.
- For the same farms, the implied CAIS program payments were simulated and combined with actual crop insurance payments. It was assumed that producer deposits were sufficient to cover loss claims under CAIS.

- Based on the streams of gross margins and production margins resulting from the former set of programs and from CAIS, variability in gross margins and variability in production margins were compared between the two sets of safety net programs.

For the simulations, NISA government matching contributions were measured as program payments under NISA; this included any SDRM benefits and any other NISA top-ups.[5] Crop insurance benefits were assumed to be the same under current and proposed programs. Beef operations were divided into cow-calf and feedlot by sorting reported "cattle" farms into those with sales greater than $1 million, which were put into the feedlot category, and those with sales less than $1 million, which were put into the cow-calf category. In 1998 and 1999, additional payments outside the set program parameters were made under the auspices of OFIDP. These included a rebate of 3 percent of eligible net sales and coverage for negative margins for the federal government portion of funding. For the purposes of comparison between prior programs and CAIS, these payments were removed. Also, under OFIDP adjustments were made for farm expansions of 15 percent or more. These adjustments were not removed from previous programs, and the simulation of CAIS did not contain provisions for expansions. Thus, as it pertains to farm expansions, the comparison is somewhat biased in favour of prior programs. Finally, the analysis was conducted prior to the addition of negative margin coverage under CAIS and the expansion of the payment cap from $975,000 per farm to $3,000,000, so these components were not considered.

The key aspect in measuring the stabilization ability of a safety net program is the extent to which it decreases variation in margins below the average. It is less relevant to measure the overall variation in margins (using a measure such as variance or standard deviation) because variations in margins above the average have the same influence on the measure as variations in margin below the average; meaningful stabilization relates to reduction in variation *below* the average under no safety net programs. The measure applied in this analysis is a variant of semi-variance in which the standard deviation of the semi-variance is computed to give a result measured in dollars (rather than dollars squared); this measure is referred to as semi-deviation. This semi-deviation is measured relative to average gross margin or production margin with no programs. Thus, the comparison of stabilization between previous programs and CAIS starts with the average margin with no programs. The safety net program set that gives the smallest semi-deviation provides the best level of stabilization.

Results

Tables 3 to 11 present the results for Ontario cash crop, hog, beef cow-calf, feedlot, fruit and vegetable, greenhouse, poultry, dairy, and tobacco farms, respectively. In each table, the top panel presents results stated in terms of gross margin and the bottom panel shows

the results in terms of production margin. The rows in each table refer to sales categories. The columns in the first group report the margin based on no programs, the prior programs, and CAIS. The columns in the second group represent the semi-deviation in margins under no programs, the prior programs, and CAIS.

The tables show that, across a broad cross-section of farm types and sizes, production margin is larger and generally more variable than gross margin. That production margin is structurally larger than gross margin can be seen by comparing gross margin under no programs for a given sales level with production margin under no programs for that same sales level. The difference in variability can be seen by comparing "normal deviation below average, no programs", for a given sales level under gross margin, with its counterpart under production margin. This is a critical finding because, in order for the trigger under CAIS to be more sensitive than under the prior programs, production margin must be more variable than gross margin. There are sporadic exceptions in which gross margin is more volatile than production margin, notably fruits and vegetables and tobacco. However, these appear to be exceptions to a visible trend.

The tables also report average margin after support under the prior programs and CAIS. Broad generalizations with regard to average margins between the prior programs and CAIS are difficult to make. For the most part, at the lower levels of sales, margins under CAIS are higher. In many cases, at higher levels of sales, the margins under prior programs are higher. Particularly on this latter point, the results are somewhat inconsistent.

Finally, the tables almost universally report semi-deviations in margin that are lower under CAIS compared with the prior program set. Very few exceptions to this were observed. In many farm types, feedlots for example, the reduction in margin variability compared with previous programs is quite significant. Indeed, CAIS appears to provide better stability regardless of whether margins are measured as gross margins or production margins. The only exceptions to this are greenhouse farms and farms in supply managed commodities. Interestingly, the degree of reduction in variability under CAIS relative to previous programs appears to narrow for larger farms.

Discussion

The results of the empirical analysis suggest that CAIS provides an improvement in stabilization relative to the programs it replaces. This is evident from the broad finding that CAIS decreases the semi-deviation in margins relative to previous programs, measured as either production margin or gross margin. However, a clear trend in average margins, according to either farm type or size, fails to emerge. Some aspects of the design of CAIS relative to the programs it replaces help explain this pattern.

First, under CAIS, in order for a producer to receive government payments, a loss must occur. Under NISA in the previous set of programs, government payments (matching contributions) were triggered by producer contributions rather than actual

losses, so payments occurred regardless of loss. Thus, the timing of payments and losses are better matched under CAIS than under the prior programs, which will naturally lend itself to improved stability.

Second, smaller farms had less eligibility to contribute to NISA, and thus less eligibility for government payments, so fewer payments were received in periods when losses occurred. Under CAIS, participation is based on the same measure as the trigger (production margin) rather than on sales, so low levels of sales limiting eligibility for payment should not be the same problem. Conversely, large farms were limited in terms of the stabilization they could receive by the contribution cap of $250,000 in eligible net sales under NISA. Since deposits are proportional to production margin under CAIS, and there are no limits on deposits, this is far less likely to occur under CAIS.[6]

Conclusions

This article presents the basic design and operation of the CAIS program and some empirical evidence of its effectiveness in stabilizing production margins and gross margins. The discussion of the CAIS design shows that it differs in key aspects relative to its predecessor programs. First, farmers must experience a loss in order to receive a payment; this differs from NISA. Second, deposits are made relative to the same measure as the trigger for program payments (production margin). Third, the leveraging of producer deposits to finance the producer share of program payments is dependent upon the level of loss, with producer deposits used to fund payments with the greatest proportion of government share first. Unlike prior programs, access is granted to supply managed commodities, although the program is poorly designed in this regard.

Empirical simulation of CAIS compared with previous programs based on records from continuous Ontario NISA participants shows the following. First, production margin is structurally higher and more variable than gross margin as a payment trigger. Second, clear conclusions cannot be drawn on the magnitudes of average gross margins and production margins under CAIS as compared to these margins under the previous programs. Finally, the results are robust in showing that variability in margins, as measured by semi-deviation, was lower under CAIS than under the programs that it replaces. Thus, if the purpose of farm safety net programs is to stabilize either gross margin or production margin, Ontario data suggest that CAIS is an improvement over previous programs.

Table 1 Eligible Income and Expenses under Production Margin and Gross Margin

NISA code	Income	Gross margin	Production margin
Total A	NISA qualifying commodities and program payments	X	X
Total B	NISA non-qualifying commodities and program payments	X	X
9540	Other program payments*		
9544	Disaster assistance payments		
9574	Rebates for eligible expenses	X	X
9575	Rebates for non-eligible expenses		
9601	Contract work	X	
9605	Patronage dividends		
9607	Interest		
9610	Gravel		
9611	Trucking	X	
9612	Resales of commodities purchased		
9613	Leases		
9614	Machine rentals		
9600	Other		
	Deductible expenses	**Gross margin**	**Production margin**
Total D	NISA qualifying commodity purchases	X	X
9661	Containers and twine	X	X
9662	Fertilizers and lime	X	X
9663	Pesticides	X	X
9665	Insurance premiums (crop)	X	X
9713	Veterinary fees, medicine, AI fees	X	X
9714	Minerals and salts	X	X
9760	Machinery (repairs, licences, insurance)	X	
9764	Machinery (gasoline, diesel fuel, oil)	X	X
9792	Advertising and marketing costs	X	
9795	Building and fence repairs	X	
9798	Agricultural contract work	X	
9799	Electricity	X	X
9801	Freight and trucking	X	X
9802	Heating fuel	X	X
9804	Other insurance premiums	X	
9807	Memberships/subscription fees	X	
9808	Office expenses	X	
9809	Legal and accounting fees	X	
			(continued…)

Table 1 Eligible Income and Expenses under Production Margin and Gross Margin *(…continued)*

	Deductible expenses	Gross margin	Production margin
9815	Salaries (other than spouse)	X	X
9816	Salaries paid to dependants	X	
9819	Motor vehicle expenses	X	
9820	Small tools	X	
9821	Soil testing	X	
9822	Storage/drying	X	X
9823	Licences/permits	X	
9824	Telephone	X	
9828	Salaries paid to spouse or common-law partner	X	
9830	Prepared feed (35 percent of non-itemized invoices)	X	X
9831	Custom feeding (50 percent of non-itemized invoices)	X	X
9897	Other	X	
Total E	NISA non-qualifying commodity purchases	X	X
9765	Machinery lease/rental		
9796	Land clearing and draining		
9805	Interest (real estate, mortgage, other)		
9810	Property taxes		
9811	Rent (land, buildings, pastures)		
9825	Quota rental (tobacco, dairy)		
9826	Gravel		
9827	Purchases of commodities resold		
9829	Motor vehicle interest and leasing costs		
9935	Allowance on eligible capital property		
9936	Capital cost allowance		
9937	Mandatory inventory adjustments - prior year		
9938	Optional inventory adjustments - prior year		
9896	Other		

* The following program payments are not included as revenue in the production margin calculation: Canada-Ontario Grain and Oilseed payment; Canada-Ontario Grain Stabilization payment; Dairy Subsidy; Permanent Cover Practices; Industry Transition Production Assistance Program; Market Revenue Insurance payments for grain, oilseeds, special crops, edible horticulture, and non-edible horticulture; Transitional Financial Assistance Program; Production Insurance Premium Adjustment.

Source: Agriculture and Agri-Food Canada

Table 2 Composition of Ontario Farms in the NISA Database

Farm type	Number of farms
Field crops	6,158
Vegetables and fruit	993
Green house (F&V)	123
Poultry	101
Dairy	435
Swine	900
Beef cow-calf	1,452
Feedlot	163
Tobacco	709
Total	11,034

Table 3 Stability in Ontario Cash Crop Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Cash crops	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	4,181	7,532	10,569	4,824	3,165	844
25,000 - 50,000	9,967	17,139	18,530	7,126	3,627	1,284
50,000 - 100,000	22,360	34,478	34,360	10,542	4,520	1,963
100,000 - 250,000	50,771	72,064	71,262	19,595	8,820	3,702
250,000 - 500,000	110,913	146,053	145,446	37,622	19,845	9,405
500,000 - 1,000,000	197,773	258,974	252,261	64,154	30,989	14,283
> 1,000,000	405,806	459,486	488,837	132,939	100,466	49,441

Cash crops	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	10,553	13,912	16,949	4,692	3,100	411
25,000 - 50,000	20,736	27,893	29,284	6,973	3,580	782
50,000 - 100,000	37,532	49,650	49,532	10,363	4,585	1,274
100,000 - 250,000	73,211	94,503	93,702	18,640	8,296	2,332
250,000 - 500,000	149,238	184,378	183,771	34,620	17,480	5,978
500,000 - 1,000,000	248,236	309,437	302,724	62,865	30,794	9,812
> 1,000,000	474,829	528,509	557,861	121,689	90,094	25,590

Table 4 Stability in Ontario Hog Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Hogs	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	9,402	14,565	24,232	7,370	5,014	189
25,000 - 50,000	6,054	11,458	14,273	6,032	4,314	1,447
50,000- 100,000	14,844	23,048	23,515	9,337	5,552	1,968
100,000 - 250,000	32,111	46,420	44,494	12,740	6,091	2,929
250,000 - 500,000	66,399	88,034	82,895	22,021	11,865	7,400
500,000 - 1,000,000	112,574	144,023	136,019	44,692	28,468	20,155
> 1,000,000	314,838	359,052	356,719	143,412	115,094	87,351
Hogs	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	17,885	23,049	32,716	9,226	7,076	135
25,000 - 50,000	16,636	22,040	24,855	6,670	4,793	1,454
50,000- 100,000	28,424	36,628	37,095	9,040	5,277	1,415
100,000 - 250,000	53,391	67,700	65,774	13,386	6,698	2,778
250,000 - 500,000	105,792	127,426	122,288	24,511	14,321	8,684
500,000 - 1,000,000	188,093	219,541	211,538	46,405	30,332	20,170
> 1,000,000	532,062	576,275	573,942	166,924	134,809	108,089

Table 5 Stability in Ontario Beef Cow-Calf Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Cow-calf	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	2,566	5,118	7,999	5,414	4,316	1,637
25,000 - 50,000	8,015	11,034	12,226	5,470	3,951	2,270
50,000- 100,000	15,149	20,111	20,841	8,771	6,270	3,363
100,000 - 250,000	24,203	33,519	35,051	14,252	9,752	4,353
250,000 - 500,000	38,100	53,649	55,340	26,029	17,980	10,310
500,000 - 1,000,000	55,540	73,768	77,136	29,416	21,591	8,988
Cow-calf	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	9,509	12,061	14,942	5,307	4,278	1,131
25,000 - 50,000	17,846	20,864	22,056	5,455	4,026	1,988
50,000- 100,000	27,887	32,849	33,579	8,718	6,251	2,883
100,000 - 250,000	41,243	50,559	52,090	14,248	9,867	3,820
250,000 - 500,000	63,794	79,343	81,034	26,149	17,981	8,475
500,000 - 1,000,000	85,953	104,180	107,548	31,546	23,533	9,406

Table 6 Stability in Ontario Beef Feedlot Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Beef feedlot	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
> 1,000,000	138,880	175,950	204,718	113,717	94,181	42,716
Beef feedlot	**Average production margin ($)**			**Normal deviation below average ($)**		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
> 1,000,000	216,522	175,950	204,718	111,861	149,201	95,523

Table 7 Stability in Ontario Fruit and Vegetable Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Fruit & veg	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	6,239	9,771	15,484	7,946	6,562	1,694
25,000 - 50,000	8,564	13,743	17,721	8,153	4,984	2,494
50,000- 100,000	21,222	31,547	30,926	11,695	6,838	5,107
100,000 - 250,000	44,681	62,917	60,309	22,704	13,366	9,617
250,000 - 500,000	89,088	119,401	109,580	36,378	20,346	18,456
500,000 - 1,000,000	189,532	234,093	219,068	69,829	42,360	39,214
> 1,000,000	518,523	573,713	582,641	207,097	166,540	142,448
Fruit & veg	**Average production margin ($)**			**Normal deviation below average ($)**		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0-25,000	15,168	18,610	24,323	8,387	7,027	1,272
25,000 - 50,000	25,565	30,744	34,722	8,157	5,455	2,024
50,000- 100,000	41,679	52,004	51,383	11,156	6,601	3,827
100,000 - 250,000	88,362	106,868	104,260	24,274	14,794	9,161
250,000 - 500,000	162,586	192,899	183,079	35,531	19,639	16,086
500,000 - 1,000,000	338,490	383,050	368,025	65,693	39,952	32,634
> 1,000,000	912,283	967,472	976,400	205,923	169,601	130,933

Table 8 Stability in Ontario Greenhouse Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Greenhouse	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	8,557	11,436	19,643	6,497	5,133	1,367
25,000 - 50,000	21,142	29,343	33,590	11,445	9,081	1,587
50,000 - 100,000	17,784	26,309	26,430	8,240	4,241	2,767
100,000 - 250,000	60,515	76,808	76,463	28,483	19,215	14,312
250,000 - 500,000	86,644	123,996	122,073	36,923	15,353	10,652
500,000 - 1,000,000	177,964	217,572	209,403	63,743	38,577	32,238
>1,000,000	587,646	635,903	622,058	161,666	126,848	125,864
Greenhouse	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	18,596	11,436	19,643	8,598	12,725	6,620
25,000 - 50,000	33,722	29,343	33,590	11,841	17,804	9,077
50,000 - 100,000	38,396	26,309	26,430	8,660	18,245	16,728
100,000 - 250,000	104,376	76,808	76,463	32,177	51,459	47,270
250,000 - 500,000	160,036	123,996	122,073	39,895	65,718	59,790
500,000 - 1,000,000	305,314	217,572	209,403	64,626	128,258	126,278
>1,000,000	971,408	635,903	622,058	188,898	433,321	437,092

Table 9 Stability in Ontario Poultry Farms' Gross Margins and Production Margins, CAIS vs. Previous Programs

Poultry	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	1,395	4,649	18,600	8,123	6,572	517
25,000 - 50,000	32,950	40,042	47,731	19,774	16,398	6,180
50,000 - 100,000	40,421	50,158	83,299	16,854	11,095	1,240
100,000 - 250,000	55,748	62,176	63,493	9,873	6,896	4,971
250,000 - 500,000	101,899	109,509	112,544	26,099	21,174	17,885
500,000 - 1,000,000	177,733	189,126	191,008	32,662	24,198	18,987
>1,000,000	398,815	404,855	401,359	69,911	67,556	68,732
Poultry	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	12,349	15,602	29,553	8,401	7,058	68
25,000 - 50,000	51,894	58,986	66,675	21,162	17,633	5,083
50,000 - 100,000	63,894	73,631	106,772	23,421	18,022	1,691
100,000 - 250,000	85,748	92,176	93,492	11,763	8,748	4,822
250,000 - 500,000	147,594	155,204	158,239	23,449	19,446	14,303
500,000 - 1,000,000	259,954	271,347	273,228	36,943	29,646	21,399
>1,000,000	566,992	573,032	569,536	72,952	70,817	71,704

Table 10 Stability in Ontario Dairy Farms' Gross Margins and Production Margins,
CAIS vs. Previous Programs

Dairy	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	28,307	30,532	46,036	13,862	12,306	2,341
25,000 - 50,000	32,581	36,336	44,621	10,359	9,258	1,147
50,000 - 100,000	37,516	40,743	40,821	6,102	4,187	2,874
100,000 - 250,000	66,127	72,085	72,254	10,207	6,936	5,866
250,000 - 500,000	126,289	134,216	130,806	16,700	12,136	12,938
500,000 - 1,000,000	221,070	232,622	226,125	26,029	19,765	21,955
>1,000,000	453,408	465,076	464,246	67,446	59,513	51,403

Dairy	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	42,495	44,720	60,224	19,817	18,574	759
25,000 - 50,000	48,219	51,973	60,259	15,923	14,809	1,365
50,000 - 100,000	53,503	56,730	56,809	6,895	5,271	3,049
100,000 - 250,000	102,488	108,446	108,615	10,495	7,477	5,431
250,000 - 500,000	196,716	204,643	201,233	17,289	13,356	13,226
500,000 - 1,000,000	341,979	353,531	347,034	27,531	22,391	23,255
>1,000,000	758,944	770,612	769,781	79,563	73,448	61,124

Table 11 Stability in Ontario Tobacco Farms' Gross Margins and Production Margins,
CAIS vs. Previous Programs

Tobacco	Average gross margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	30,710	35,732	54,133	21,865	20,270	2,164
25,000 - 50,000	39,582	46,930	56,465	20,012	17,720	3,564
50,000 - 100,000	54,382	65,849	71,281	23,839	18,685	4,252
100,000 - 250,000	74,722	91,143	93,797	32,241	23,696	10,517
250,000 - 500,000	119,307	141,470	140,036	44,478	29,984	19,729
500,000 - 1,000,000	236,962	267,513	267,634	68,233	46,593	35,701
>1,000,000	504,925	569,019	582,884	181,208	136,582	103,008

Tobacco	Average production margin ($)			Normal deviation below average ($)		
Sales range ($)	No program	NISA, OFIDP, companions	CAIS	No program	NISA, OFIDP, companions	CAIS
0 - 25,000	46,941	51,962	70,363	25,821	24,361	3,003
25,000 - 50,000	57,195	64,543	74,078	21,553	19,366	4,022
50,000 - 100,000	74,190	85,658	91,089	25,560	20,445	5,148
100,000 - 250,000	108,016	124,437	127,091	31,510	23,324	8,761
250,000 - 500,000	180,498	202,661	201,227	42,176	28,530	15,761
500,000 - 1,000,000	363,322	393,872	393,993	63,734	43,377	28,101
>1,000,000	707,794	771,888	785,753	130,018	91,870	49,736

References

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Endnotes

[1] The authors wish to acknowledge funding from the Ontario Ministry of Agriculture and Food for this project, as well as extensive technical assistance from Mr. Steven Duff of the Ontario Ministry of Agriculture and Food.

[2] While CAIS is still treated as the sole farm income stabilization program, programs targeted for specific catastrophes such as BSE have since been developed.

[3] An olympic average is composed of five years' data, with the largest and smallest values removed and the average calculated from the median three years' records.

[4] The effect of this cap is to make deposits of 26 percent irrational, at least in a static sense. Given the 70 percent cap on total payments, it can be shown the maximum rational deposit is just over 20 percent of reference.

[5] NISA records were generally filed under cash-basis accounting, while CAIS records are strictly accrual; this is a limitation in the analysis. However, Martin and Mussell (2003) showed that this comparison biases results against CAIS. In other words, if CAIS were to provide better stability than previous programs on a cash basis, this conclusion would only be strengthened if the comparison were made on an accrual basis. Cash-basis records were found to understate actual (accrual) CAIS payments by approximately 18 percent.

[6] This is true despite the fact that the results reflect a cap of $975,000 per farm in payments, while CAIS was implemented with a $3,000,000 cap.