GEORGE MORRIS CENTRE

Opening the Throttle and Applying the Brakes: The Disconnected Policy to Support (Stifle) the Canadian Pork Sector

Al Mussell and Ted Bilyea[1]

August, 2009

[1] Al Mussell is a Senior Research Associate at the George Morris Centre. Ted Bilyea is a Research Fellow of the George Morris Centre.

1. Introduction

The languishing red meat sector in Canada is entering a particularly desperate phase. Nowhere is this more evident than in pork. Canadian hog producers have been suffering losses said to be in the range of $40/hog, and are now seeking a lifeline from governments in order to continue. The beef segment has also struggled through a prolonged period of difficult losses, now being exacerbated by significant droughts in parts of Western Canada. The pork industry has requested a total of $400 million in support, and has articulated a strategy to move forward and restore the prospect of profitability in Canadian hog production. Beef has not yet forwarded a comparable request but, unless conditions change (especially in the cattle feeding segment), an analogous request for support can only be expected.

How do such assistance plans fit into the wider set of policies affecting agriculture and the broader public policy sphere? In fact, in critical aspects, policies are not aligned within the sector or across elements of the Canadian economy. At worst, policies pit segments directly against one another, in effect applying the brakes and opening the throttle simultaneously. In the case of pork, a lifeline is being contemplated at the same time subsidies and mandates are being used to establish a grain-based ethanol industry that acts directly against the strategic advantage of Canadian pork, and will logically result in its demise. Precisely the same logic exists regarding beef. Rarely have two elements of Canadian public policy been so profoundly at odds with one another.

The purpose of this paper is to provide an analysis of the proposal to support the pork sector (and by inference an anticipated forthcoming package for beef) in the context of the broader policy environment. Section 2 provides an overview of the Canadian pork situation and its recovery plan. Section 3 gives an overview of grain-based ethanol in Canada. Section 4 discusses the (adversarial) link between pork production and ethanol production from grain. Section 5 concludes the paper.

2. Canadian Pork Industry Situation

The situation facing Canadian hog producers is somewhat bleak, and follows a prolonged period of losses. This is illustrated below, based on a model of Saskatchewan hog production costs and returns. A technical description of the model is contained in the appendix.

Figure 2.1 provides an overview of revenue, variable costs, and total costs for Saskatchewan hogs. The figure shows that hog production costs turned sharply higher in late 2006 and remain high. In late 2007, hog prices declined precipitously, and remained very low until a seasonal rally in the spring of 2008. Since then, hog prices have broadly dampened, and the anticipated seasonal strengthening in the spring of 2009 did not occur due to the fallout from H1N1. The figure would appear to essentially validate estimates of a $40/hog loss quoted in various media.

Figure 2.1 Saskatchewan Hog Production Costs and Returns

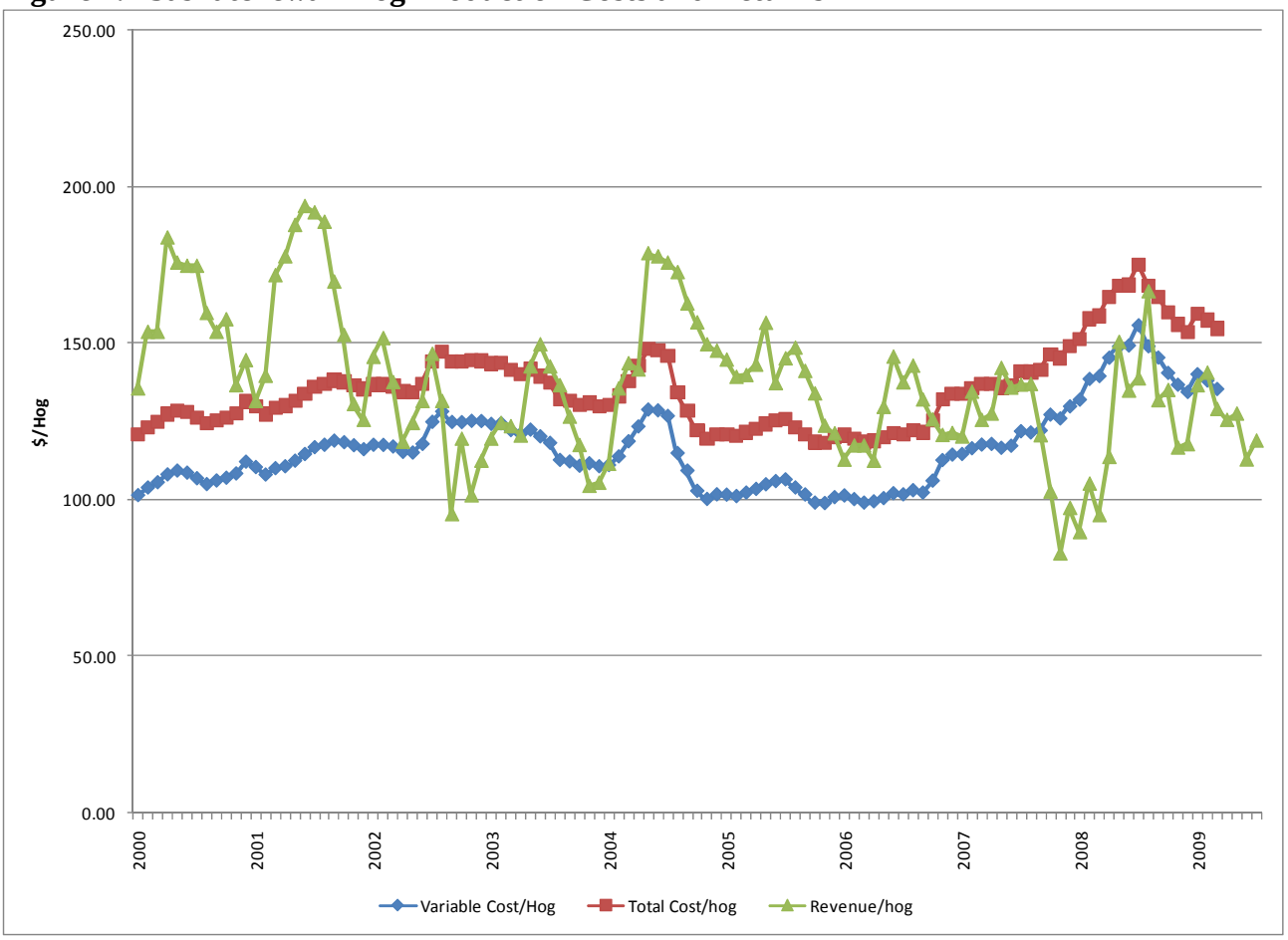


Table 2.1 provides a different summary of these conditions. While hog production has been profitable in Saskatchewan (and Canada), with variability in costs and returns consistent with the 4-year hog cycle, the period since 2007 appears to be an outlier in terms of both the severity and persistence of losses. The table shows 2007 and 2008 as years of very low prices, coupled with high and sharply rising feed costs (especially in 2008). The first quarter of 2009 did not see marked increases in hog prices to offset the feed cost situation, and H1N1 influence dampened a seasonal second quarter rally.

Thus, the Canadian pork segment finds itself in an extraordinarily difficult position, and immediate prospects for improvement are dim, with US Country of Origin Labeling (COOL) limiting the market for live hog exports, a glut of pork in world markets with demand dampened by the recession, and a structurally stronger Canadian currency reducing revenue.

Table 2.1 Saskatchewan Hog Production Costs and Returns

	Market Hog Revenue/hog	Feed Cost/hog	Variable Cost/hog	Contribution Margin	Total Cost/hog	Net Profit/hog
2000	158.70	55.57	106.76	51.94	126.03	32.66
2001	163.47	62.96	114.20	49.27	133.48	29.99
2002	126.39	72.32	121.04	5.34	140.32	-13.93
2003	126.14	68.70	117.49	8.64	136.77	-10.63
2004	154.51	64.69	114.93	39.58	134.21	20.30
2005	139.57	53.08	102.39	37.18	121.66	17.91
2006	126.30	54.56	103.44	22.86	122.72	3.58
2007	121.93	71.68	120.67	1.26	139.95	-18.01
2008	124.66	93.95	143.00	-18.35	162.28	-37.62
2009 1st Quarter	135.41	88.84	137.86	-2.45	157.14	-21.73

Source: George Morris Centre Hog Costs and Returns Model

2.1 Canadian Pork Industry Recovery Plan

In response to the above conditions, the Canadian pork segment has requested a range of assistance measures from government (Canadian Pork Council, 2009) to mitigate the situation:

- An H1N1 recovery loan
- Adjustments to the Advance Payments Program (APP) that facilitate emergency assistance
- A hog farm transition program to facilitate exit and asset transfer in swine operations

As a component of the recovery assistance requested, the Canadian Pork Council (CPC) has unveiled a broad strategy for pork industry, including the following:

- A Canadian pork industry competitiveness strategy, with several components
- Initiatives to improve the penetration of Canadian pork products in Canadian and export markets
- Initiatives to manage pork value chain integrity
- Development of a National Swine (Pork) Science Cluster

Thus, the CPC strategy contains a range of measures that provide emergency assistance, along with a plan for the future. It is important to understand that this plan and request for assistance implies a smaller Canadian pork industry in the future. Specifically, the APP request is a loan made at a rate of 50% of an Agriculture and Agri-Food Canada forecast under clear repayment terms; the adjustment requested by CPC relates to the term. Similarly, the H1N1 request is clearly a loan. Finally, the hog farm transition program makes payments contingent on producers culling sows and not replacing them for a period of three to five years.

That the CPC strategy is designed to shrink the Canadian pork segment appears to have been lost on some critics of the CPC plan. For example, the US National Pork Producers' Council seems to interpret the CPC strategy as a threat. Remarkably, an expert hired by NPPC asserts that the CPC strategy will reduce US hog prices by 7%. It is truly difficult to understand how a Canadian strategy based on loans at 50% of forecast market value and payments contingent on culling of sows and remaining out of the industry for 3-5 years could somehow result in the supply response required to materially reduce US hog prices.

3. Grain-based Ethanol production in Canada

Ethanol production from feed grains (corn in Eastern Canada and feed wheat in Western Canada) is a nascent but very rapidly growing industrial segment. The industry is based heavily on mandated use in fuels and production subsidies for ethanol plants. A federal blend mandate of 5% exists in gasoline for motor vehicles, and a range of provincial blend mandates exist. Ethanol plants in Canada are the recipients of federal direct subsidies, along with capital grants for ethanol plant construction. Individual provinces also offer operating assistance (up to $.11/litre in Ontario, for example) and capital assistance for new plants. Ethanol also benefits from protection through a tariff of 4.92¢/litre.

Table 3.1 puts Canadian ethanol expansion into context, based on existing and planned ethanol development as of January 2009. Production capacity exists or is in development to manufacture about 1.7 billion litres of ethanol. Almost all of this capacity is based on feed grains as a feedstock.

Table 3.1 Ethanol Production Capacity in Canada, January 2009

Plant Name	City	Province	Feedstock	Capacity*
Collingwood Ethanol LP	Collingwood	ON	Corn	50
Enerkem Inc.	Westbury	PQ	Wood Waste	5
GreenField Ethanol	Johnstown	ON	Corn	200
GreenField Ethanol	Varennes	PQ	Corn	120
GreenField Ethanol	Tiverton	ON	Corn	26
GreenField Ethanol	Chatham	ON	Corn	150
GreenField Ethanol**	Hensall	ON	Corn	200
GreenField Ethanol - Enerkem Inc.**	Edmonton	AB	Municipal Landfill Waste	36
Husky Energy	Lloydminster	SK	Wheat	130
Husky Energy***	Minnedosa	MB	Corn	130
IGCP Ethanol Inc.	Aylmer	ON	Corn	150
Iogen Corporation	Ottawa	ON	Straw from wheat, barley, and oats	2
Kawartha Ethanol**	Havelock	ON	Corn	80
NorAmera BioEnergy Corp.	Weyburn	SK	Wheat	25
North West Bio-Energy**	Unity	SK	Wheat	25
Permolex International, L.P.	Red Deer	AB	Wheat	40
Pound-Maker Agventures Ltd.	Lanigan	SK	Wheat	12
Suncor St. Clair Ethanol Plant****	Sarnia	ON	Corn	200
Terra Grain Fuels Inc.	Belle Plaine	SK	Wheat	150
Total Capacity				1,731
Total Grain-based Capacity				1,688

Source: Canadian Renewable Fuels Association
* capacity noted in MM litres.
** plant currently under construction
*** 10 MM litres plant originally started in 1981
**** producing at 200 MM litres, planning to double capacity

4. Linking Pork and Ethanol Production in Canada

In the main, pork production and processing remains a commodity business in which Canada has been a world class competitor and leading exporter. The key strategic component of Canadian pork has been relative abundance of feed grains - corn in Ontario and grains in Western Canada. As discussed extensively by Mussell, Hedley, and Hedley (2009), it is the pricing of feed grains in Canadian regions *relative to regions elsewhere* that determines the profitable locations for livestock feeding and meat processing. Thus, hog production in Ontario and Western Canada was established based on feed grains that were priced low relative to the US, or the prospect thereof. Indeed, one way to interpret the expansion of the weanling pig export segment in Canada earlier in this decade was an erosion of precisely this feed cost advantage.

The development and expansion of ethanol in Canada and its consequent increase in feed grain demand will have little, if any, influence of world feed grain prices; the volumes of feed grains in Canada are simply too small to be material. Rather, the effect is on the terms of trade for feed grains in Canada *relative to the US*. So, where Canada has historically been surplus feed grains such that Canadian feed grain pricing is a US reference price less the freight cost, as ethanol demand in Canada increases and less domestic feed grain is available for feeding uses, Canada must import feed grains to satisfy its needs and pricing becomes US reference price *plus* the freight cost.

As illustrated by Mussell, Hedley and Hedley, under an import pricing regime for feed grains, the viability of the export-based livestock feeding segments becomes compromised based on relative feed costs. The logic is that with a cost disadvantage to the US on feed grains, Canadian feeders will be less competitive for weanling pigs and these pigs will be finished and processed in the US, leading to the decline of hog finishing and pork processing in Canada. However, under US COOL this adjustment via arbitrage in weanling pigs cannot occur. Rather, the customers for Canadian weanlings will be Canadian finishers, with structurally lower budgets available to purchase weanlings than customers in the US. With the North American market arbitraging in pork (not hogs), the ultimate transfer is to lower weanling pig prices in Canada, with a structural decline in the sow herd and a concomitant decrease in hog finishing and pork processing.

Thus, the pork segment should see the grain-based ethanol industry for the menace it is. However, it goes further. In general, food and read meat processing are significant components of the Canadian manufacturing sector. This is illustrated in Figures 4.1 and 4.2 below. Food manufacturing sales in 2007 (the most recent year available) were about $70 billion, significantly exceeding that of motor vehicle manufacturing. Red meat manufacturing was among the most significant contributors of food manufacturing, generating $15.8 billion in sales. On the basis of value added, the relative importance of food and red meat processing is even more evident. As shown in Figure 4.2, food processing value added was about $23 billion in 2006, of which red meat processing constituted about $4.6 billion. This compares with value added in vehicle manufacturing of $10.6 billion, so food and red meat processing is a very significant part of the Canadian manufacturing economy, and factors that threaten food manufacturing should be a source of broad public policy concern.

Figure 4.1 Industry Sales- Red Meat Processing, Food Processing, Auto Assembly

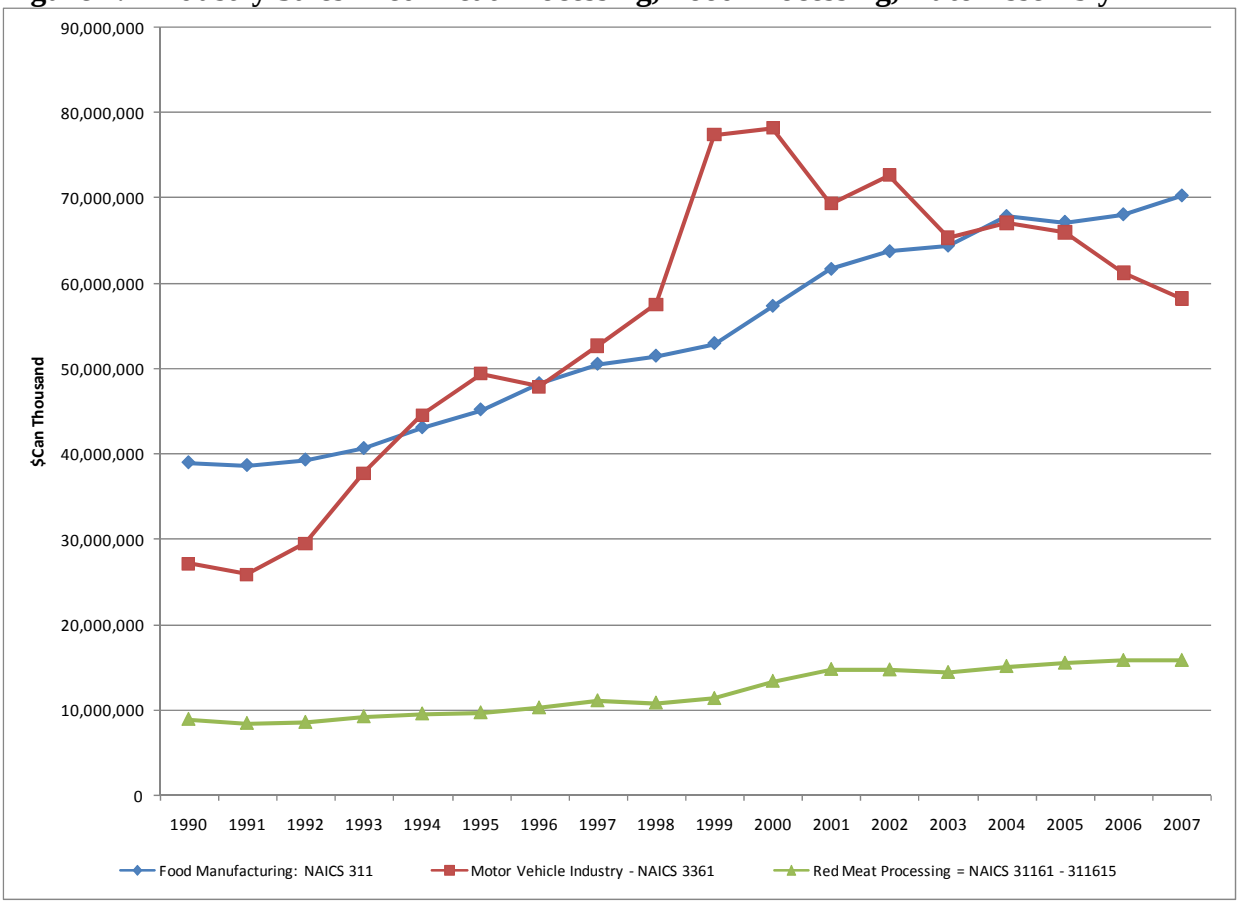
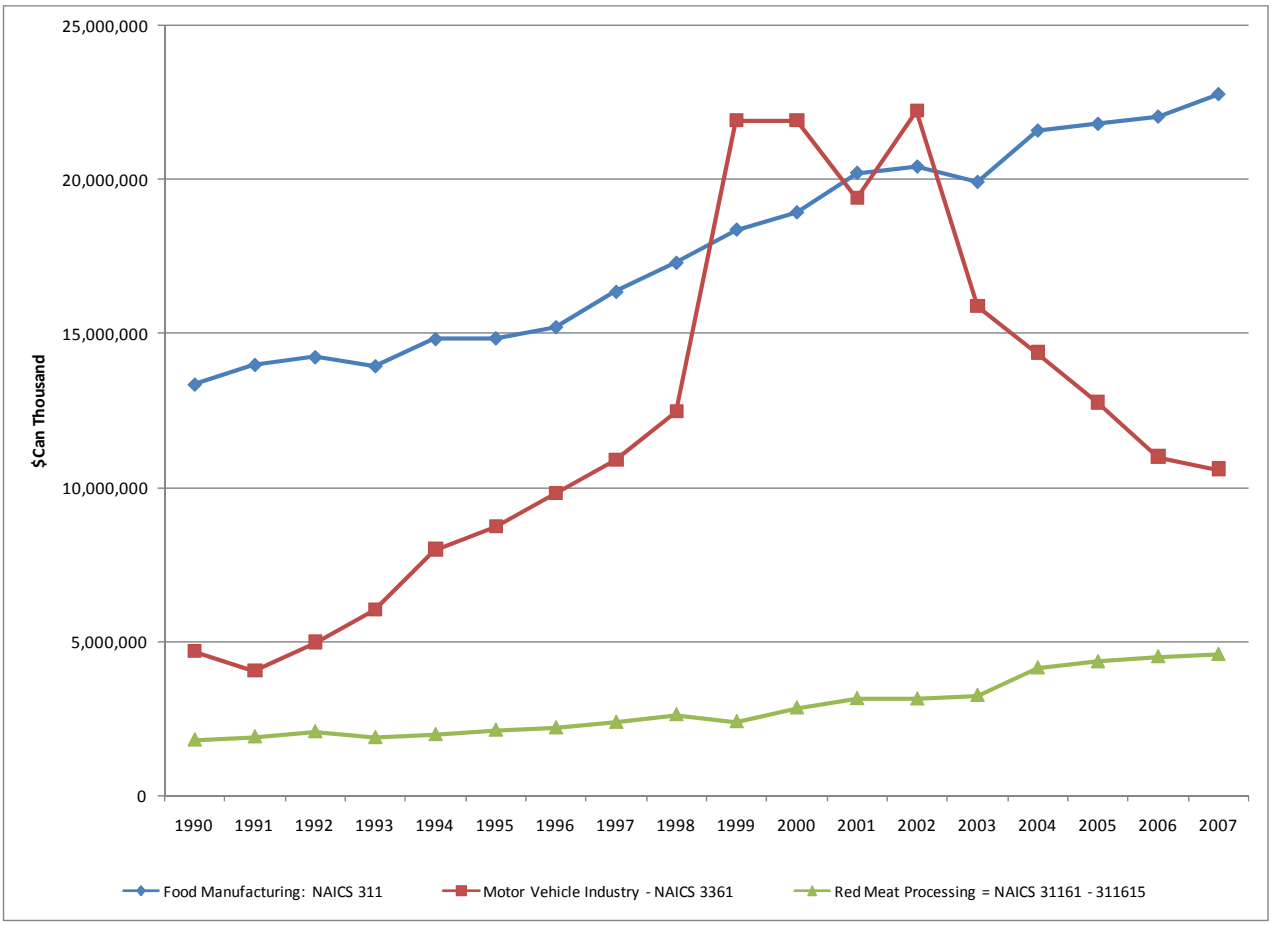


Figure 4.2 Industry Value Added- Red Meat Processing, Food Processing, Auto Assembly



These data do not yet reflect the suffering of Canadian manufacturing in 2008-09, especially in automotive. Surely the food processing segment is being counted on to stabilize and bolster Canadian manufacturing, as automotive and other manufacturing declines. But, in order for this to occur, an environment that allows for farm products that supply food processing to be produced as efficiently as possible is necessary. In the case of pork, grain-based ethanol policy works directly against efficient farm production and weakens the efficiency of production to supply processors.

5. Conclusions

In addition to fundamental public policy precepts stating that specific policies ought not to contradict one another, there is something singularly perverse about giving false hope and setting an industry up to fail. Based on the assistance package, some people who have been losing money in the pork sector may feel comforted, and they (along with lenders and investors) may even begin to reinvest in the pork segment. But when the natural comparative advantage is being structurally eroded by policy backing ethanol mandates and subsidies to make ethanol from grain, the investments in pork will later prove less profitable, magnifying existing losses and probably driving a demand for future public assistance.

The ramification is that by simultaneously assisting the pork segment to recover and underwriting grain-based ethanol production with subsidy and mandates, governments are paving the way for future losses in pork and increased industry support measures in the future. Consistency would demand that pork (and beef) policy and bio-fuel policy be coordinated; to do otherwise is disingenuous to pork and beef producers and a waste of public money. A means of recognition and implementation of this is to stop further funding of new grain-based ethanol development in consideration of the pork strategy, and for that which can be anticipated in beef.

The notion of opening the throttle and applying the brakes at the same time is that something must give, eventually. Simultaneously assisting the pork and beef segments on one hand, and legislating and subsidizing grain-based ethanol on the other puts policies at odds with themselves. Beyond the insincere treatment of hog producers and the future demand for public support created, the Canadian manufacturing sector is not in a position to tolerate the fallout in food manufacturing that will be created. The recognition of these dichotomies appears not to have reached senior political levels.

The Canadian pork segment is grappling with a range of factors outside Canadian control – exchange rates, burgeoning red meat supply, H1N1, etc. The CPC strategy anticipates much of this, and presents a cohesive approach that warrants public support. There are others for which Canadian governments bear direct responsibility. The CPC strategy makes reference to the enormous problems created by US COOL, which was allowed to occur on the foreign affairs watch of the federal government. The CPC strategy does not acknowledge the detrimental impact of Canadian ethanol policy; nevertheless, it has seriously weakened the competiveness of hog production. These failings, among the several challenges facing Canadian pork and beef, fall within the control of Canadian policy makers, and the pork segment is justified in requesting compensation for them. Moreover, disconnected policies relating to bio-fuels and trade must be resolved with the red meat strategy if a cost-competitive Canadian pork segment is to reemerge as envisioned.

References

Canadian Pork Council. *Strategic Transition Plan: The Canadian Hog Industry's Plan for Success*. June 26, 2009.

Mussell, Al, Graeme Hedley, and Douglas Hedley. *Feed Grains and Livestock in Canada: A Reconciliation*, George Morris Centre, January 2009.

National Pork Producers' Council. *Canadian Pork 'Bail Out' Would Hurt U.S. Pork Producers*. July 20, 2009.
http://www.nppc.org/News/PressRelease.aspx?DocumentID=25089

Appendix

George Morris Centre Hog Production Costs and Returns Model

To simulate costs and returns in hog production, a model of an efficient-scale 3 stage unit with technology was developed that is relevant to Saskatchewan conditions. Within the structure of the model farm, we simulate the monthly levels of feed costs, variable production costs, and total costs as well as market hog revenues. These are reported on a per-hog marketed basis. The principal components of variable costs that vary by region are feed costs, labour costs, and replacement gilt and boar costs. The variable costs are reported monthly, with total variable costs and returns summarized over the time period in terms of averages and standard deviations.

Table A1 below summarizes the general structure of the hog farm model. It is benchmarked to a 1,200 sow scale. The base agronomic assumptions in the table are taken from Manitoba Agriculture's Cost of Production Guidelines for Swine Farrow-Wean, Swine Nursery, and Swine Finishing, updated September 2000.

Variable Costs

Feed Ration

Simple feed rations representative of those typically fed in Western Canada were developed by a swine nutritionist[2] and converted to total amounts of feed consumed per litter. This ration includes feed for sows, boars, and market pigs on a per-litter basis. The structure of the rations is presented in Table A2. The starter, grower, and finisher diets are presented in terms of kg/pig, and the lactation and gestation diets are kg per sow per year. Based on the above production parameters, these are converted to a per litter basis. It is important to note that these ingredients form a basic ration; in reality, rations are more complex. However, the rations used here are illustrative of the basic feed costs faced by hog producers.

[2]Janet Boychuk, M.Sc., Feed Rite

Table A1 Production Assumptions

HERD ASSUMPTIONS	
Number of Sows	1200
Litters / Sow / yr	2.35
Total Litters	2,820
Mortality Rate (pre-weaning)	12%
Pigs Weaned per Mated Female	22.54
Mortality Rate (post weaning)	3%
Average Weaning Age	20 days
Post-Weaning Days (nursery)	52 days
Grow-Finish Mortality Rate	3%
Pigs Marketed per Sow	21.2
Dressed Weight for rating feed cost, kg	93
Days on Feed	122 days
Total Days to Market	194 days

Table A2 Farrow-Finish Feed Ration, kg

	Starter	Grower	Finisher	Lactation	Gestation	Total Per Litter	Ration %
Wheat	18.21	48.5	13.3	116.4	157.8	866.08	30.08
Barley	0	22.8	95.5	109.6	402.3	1317.93	45.8
Soymeal	9.24	23.7	16.4	104.9	43.3	524.2	18.2
Tallow	1.35	2	3.3	16.2	6.4	72.08	2.5
Premix	1.2	3	4.5	13.3	26.7	98.5	3.4
Total/Pig (kg)	30	100	133	360.4	636.5	2878.8	

Monthly prices of the feed ingredients are used to calculate and update the monthly cost of the ration. For Saskatchewan, feed costs are based on the following:

- Saskatoon barley price (Agriculture and Agri-Food Canada)
- Saskatoon feed wheat price (Agriculture and Agri-Food Canada)
- Saskatoon 48% soymeal price (Agriculture and Agri-Food Canada)
- The cost of the "other feeds" (vitamins, minerals, and concentrates) and tallow portions of the ration are fixed at $700/tonne.

The labour requirements of the operation are based on the following. The farrow to finish operation has a manager, an assistant manager, three senior labourers (Production Assistant I) and four junior labourers (Production Assistant II). The salaries for these employees are calculated in the following way. We start with the industry "minimum" wage based on conversations with industry contacts. This minimum wage over a 40 hour/week on a yearly basis was used as the base salary for the Production Assistant II category. The salary for the Production Assistant I position is a premium of 30% over the minimum, Assistant Manager is a 50% premium, and manager is 150% premium. Benefits are taken as 15% premium over base salary for each position. The wage rates for labour and management applied in this model are presented in Table A3. These are obtained from regional data, exclusive of benefits. An hourly wage rate for livestock workers representative of the 2006 period was used, as reported by Human Resources and Social Development Canada, National Occupation Code 8253 for Saskatchewan.

Table A3 Total Labour Cost (Salary and Benefits)

	Saskatchewan ($Can/Year/employee)	
Manager (1)	$	89,413
Assistant Manager (1)	$	53,648
Production Assistant I (3)	$	139,484
Production Assistant II (4)	$	143,060
Total Annual Cost		**$425,604**

Replacement Livestock

Replacement gilt and boar costs result from scheduled culls and mortality. Gilts are purchased at breeding age based on a sow culling rate of 42% and a death loss of 5%. Gilts are priced at 2.5 times the 100 index market hog price. The ratio of boars to sows is 5%, so at 1200 sows there are 60 sows.

Operating Interest

Operating interest is charged against variable costs using the following formula taken from *Guidelines for Estimating the Swine Farrow-to-Finish Costs* by Manitoba Agriculture:

(Feed Cost + Replacement Livestock Cost + Labour + Other Costs)*177/365*Interest Rate/2

This formula associates interest costs with pigs sold per month; the ratio 177/365 is the approximate portion of the year in which pigs are in inventory. Since the value of the hogs grows steadily while we have them in inventory, we take the interest charge against the average value and by dividing the interest in half. In Manitoba, the interest rate is the chartered business prime loan rate plus 1 percentage point. For Southern Minnesota, the interest rate is the monthly bank prime loan rate quoted by the Kansas City Federal Reserve Bank, plus 1 percentage point.

Other Variable Costs

Estimates of other variable costs were taken from *Guidelines for Estimating the Swine Farrow-to-Finish Costs* by Manitoba Agriculture. These are presented in Table A4.

Table A4 Other Operating Costs Used in the Model

Other Operating Costs		
Veterinary, Medicine & Supplies	$/sow/year	$ 48.00
Maintenance & Repairs	$/sow/year	$ 80.00
Hydro	$/sow/year	$ 100.00
Insurance	$/sow/year	$ 25.00
Manure Haulage	$/sow/year	$ 70.00
Office Supplies	$/sow/year	$ 5.00
Marketing & Transportation	$/sow/year	$ 135.00
Property Tax	$/sow/year	$ 25.00
Subtotal Operating Costs	$/sow/year	$ 488.00

Revenues

Revenues are based on market hog sales. Hog prices are based on weekly Saskatchewan averages, transformed into monthly averages and adjusted to a 108 index.

Fixed Costs

Fixed costs associated with barn and equipment investments in the farrow to finish operation include:

- 1200 sow farrowing barn
- 3900 space nursery facility
- 10,500 space finishing facilities.

The model is built around the 1200 sow facility. Given that 9.59 pigs/litter are weaned, and that there are 54 litters/week, there are 520.2 weanlings transferred to the nursery each week. The weanlings remain in the nursery for 52 days. On this basis, nursery space for just under 3,900 piglets is required at any one time. In the nursery, there is a death loss of 3%, so that the equivalent of 9.3 pigs/litter, or 504.6 pigs/week are transferred from the nursery to the finishing barn. In the finishing barn, pigs are kept on feed for 122 days. Thus, space is required for 8,794 pigs at any one time, with additional space built in to account for "tail-end" pigs.
Fixed costs for these facilities include the following:

- Building costs
- Manure storage costs
- Site establishment costs
- Equipment costs
- Initial breeding livestock costs.

These costs are broken down into investment and depreciation costs. Annual investment costs are computed by multiplying the prime interest rate plus two points by the midpoint of new cost and salvage value. The salvage value of buildings and equipment is taken as 10% of original cost. Land costs are omitted from facilities costs because of inherent

difficulties in quantifying the quality of land used for the site, the size of the parcel of land used for the site, and the variability of land values within the region.
Because replacement gilts and boars are monthly variable costs, breeding stock is not depreciated. However, there remain investment costs on the initial inventory of boars and sows. Investment costs are calculated based on the opportunity cost of gilts at 2.5 times the 100 index hog price and boars at 7 times the 100 index hog price, based on 2000-2007 average hog prices.

Farrowing Barn

The farrowing barn is adapted to 1,200 sows based on a the design of 600 sow operation obtained from *Guidelines for Estimating Swine Farrow-Wean to 5 kg Costs* by Manitoba Agriculture[3], September 2000. An industry source[4] confirmed that similar technology is applied at the 600 sow and 1,200 sow levels, so that the only significant difference is scale. Thus, the dimensions of the 600 sow facility are adjusted for the 1,200 sow design. Table 5 below summarizes the dimensions and costs of the facility, as adapted from the Manitoba Agriculture guidelines. To these costs, site preparation costs of $30,000 and manure storage costs of $28,000 are added, as well as initial investment in sows and boars. Buildings, site improvements and manure storage are depreciated over a 20 year period, and equipment is depreciated over 10 years.

Nursery Facilities

The nursery facility is based on *Guidelines for Estimating Weaner Pig (Nursery) Costs 5-23kg* by Manitoba Agriculture, September 2000. The facility is adapted from a capacity of 4,800 pig spaces to the 3900 pig space nursery required by the 1,200 sow operation. Table 6 presents the dimensions and costs of the facility, based on Manitoba Agriculture estimates. To these costs, site preparation costs of $30,000 and manure storage costs of $28,000 are added.

Finishing Barn

The costs of establishing finishing facilities are taken from *Guidelines for Estimating Swine (23-113 kg) Finishing Costs* by Manitoba Agriculture, September 2000. The guidelines are adapted to facilities that will accommodate 10,500 hogs at any one time from the 4,000 hog standard in the Manitoba Agriculture model. The finishing facilities description and costs are presented in Table 7 below. At over 96,000 square feet and 10,500 head capacity, a single finishing facility would be very large (over 2 acres). Thus, it is more likely that finishing capacity would be broken up into multiple sites. However, since land costs are removed from the model, there is essentially no difference between a single 10,500 head facility and (for example) three separate 3500 head facilities. In other

[3]All of the Manitoba Guidelines are available as downloadable spreadsheets at http://www.gov.mb.ca/agriculture/financial/farm/software.html

[4]Dana Moroz, Quality Swine Systems

words, because there is no "lumpy" cost associated with purchasing a lot for the site, the facilities in Table A7 can be divided up arbitrarily, so nothing is lost by applying the budget for a single 10,500 head facility. To account for site preparation and manure storage costs, an additional $85,000 is added to the cost estimates in Table A7.

Table A5 Farrowing Building and Equipment Costs

Buildings	**Sq.Ft. [1]**	**$/Sq.Ft.**	**Total**	**/Sow**
Gestation	32,400	**$17.10**	$554,040	$461.70
Farrowing	12,400	**$19.45**	$241,179	$200.98
Office & Loading	**200**	**$25.00**	$5,000	$4.17
Standby Generator			**$25,000**	$20.83
Total Building Cost			**$825,219**	**$687.68**
Equipment [1]				
Gestation		**$15.25**	$494,100	$411.75
Farrowing		**$20.00**	$247,999	$206.67
Fire Alarm System			**$3,000**	$2.50
Feed Bins (4 bins)			**$4,000**	$3.33
Ingredient Bins			**$0**	$0.00
Total Equipment Cost			**$749,099**	**$624.25**
Total Buildings and Equipment Cost			**$1,574,318**	**$1,311.93**

Table A6 Nursery Building and Equipment Costs

					$/Sq. Ft.	$/Pig Place	Total
Buildings							
	Barn	7,800	sq ft	**$43.75**	$87.50	$341,250
	Office & loading						**$5,000**
	Feed Mill (building only)						**$0**
	Total Building Cost						**$346,250**
Equipment							
	Nursery barn						**$285,000**
	Generator						**$12,000**
	Electrical & other						**$90,000**
	Fire Alarm System						**$1,000**
	Feed Bins						**$4,000**
	Ingredient Bins						**$0**
	Total Equipment Cost						**$392,000**
Total Buildings and Equipment Cost							**$738,250**

Table A7 Finishing Building and Equipment Costs

Buildings						
Barn	96,600	ft.^{2}	**$14.20**	$1,371,720	$130.64
Office & Loading	**200**	ft.^{2}	**$25.00**	$5,000	$0.48
Standby Generator				**$20,000**	$1.90
Feed Mill (building only)				**$0**	$0.00
Total Building Cost				**$1,396,720**	**$133.02**
Equipment					
Finishing Barn				**$391,600**	$37.30
Other				**$0**	$0.00
Fire Alarm System				**$1,000**	$0.11
Storage Bins				**$30,000**	$2.86
Feed Mill (equipment only)				**$0**	$0.00
Total Equipment Cost				**$422,600**	**$40.25**
Total Buildings and Equipment Cost				**$1,984,320**	**$188.98**

Building Costs

The costs of the various farm buildings and equipment for the eastern Prairies are given by the Manitoba Agriculture budget in Table A8. These show initial system start-up costs of about $4.8 million.

Table A8 Start-up Capital Costs

	Manitoba ($Can)
Sow Facilities	1,623,318
Initial Livestock	442,144
Nursery	796,250
Finishing	1,904,320
Total	4,775,032