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The Economics of Generic Income Stabilization Schemes

by

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Abstract

Generic income stabilization schemes, which resemble an actual NISA policy adopted recently in Canada, encourage farmers to set aside funds in high income year for use in low income years through a formal procedure. Their economic effects are investigated using the prudent farm household model. The effects of generic income stabilization schemes are hinged on the interaction between generic stabilization schemes and precautionary saving. It is also found that the designs of generic income stabilization schemes are fundamentally important for their potential supply effects. Conditions for characterizing various generic income stabilization schemes as either production neutral or decoupled are derived. Generic income stabilization scheme operated as a pure stabilization program has little stabilizing value for the optimal prudent farm household.

Key Words: Generic income stabilization, NISA, prudent farm household model, consumption, production neutrality, decoupled, and agricultural policy.

The Economics of Generic Income Stabilization Schemes

The observation that existing agricultural policies have been ineffective in promoting the efficient allocation of resources (Gardner 1992) has not resulted in the complete deregulation of agriculture. Rather budgetary pressure and international trade negociation have led governments in developed countries to look for new policies that provide farmers with reasonable income protection for the lowest possible cost and which are also considered *decoupled*[1] from the production process, at least in the context of the multilateral trade negotiations. One recent policy innovation in Canadian agriculture is the introduction of the Net Income Stabilization Account (NISA) program[2]. Intended as decoupled and budget-effective, the NISA represents a fundamental shift in Canadian agricultural policy and a new approach to stabilizing farm incomes.

The principal of NISA is to encourage farmers to set aside funds in high income years for use in low income years through a formal procedure. NISA allows farmers to deposit a certain percentage of their income into their own NISA account and receive a matching contribution from government. The farmer's own deposit also earns a bonus interest rate. In years of declining income, farmers can withdraw money from the NISA account through trigger mechanisms. NISA is therefore a dynamic form of stabilization that smooths income over time, and is closely related to the concept of precautionary saving. The success of the program as a stabilization program is crucially contingent on

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[1]*Decoupling* is a concept which originated in the Organization for Economic Co-operation and Development (OECD). There is, however, no agreed definition of *decoupling* among agricultural economists and policy-makers. While the formal discussion of *decoupling* will be taken up later, it is sufficient for the time-being to see the concept as suggesting a situation where government support provided to farmers causes minimal distortions on production, consumption, and trade.

[2] After a long negociation between federal and provincial government, NISA has finally endorsed as a major policy for Canadian agriculture in September 1995. Its operation is described in the Policy handbook published by the NISA administration committee.

household's well-being, it is important to examine the effect of NISA type stabilization schemes on the household's consumption patterns.

The term 'NISA type' is used to signal that the stabilization schemes analyzed in this paper are not identical to any actual policy, in practice, but are stylized versions thereof. Our intention is to capture the main characteristics of actual net income stabilization plans while still allowing analytical tractability. But, despite the real world motivation for this research, we do not provide comments on any specific NISA proposal. Rather we intended to make general observations on the possible effects of particular types of generic income stabilization schemes. This paper begins with a presentation of generic income stabilization schemes which resembles the actual NISA. Following a presentation of the prudent farm household model (PFHM), it proceeds to investigate the economic effects of various generic income stabilization schemes. The implications for *decoupling* are then discussed. Conclusions are finally drawn.

Generic Income Stabilization Schemes

To generate a generic income stabilization scheme, several features of the actual NISA program are considered.

First, NISA is not a pure stabilization program as it involves direct income transfers from taxpayers to farmers. It is important to recognize the distinction between the stabilization and income transfer components of the so-called stabilization policy. To do so, two types of generic income stabilization policies are considered: mean-preserving and mean-augmenting. The former is a pure stabilization scheme that effects the dispersion of farm income across time but not its (discounted) mean, while the latter is an income transfer scheme that increases the mean while reducing the dispersion of farm income.

Second, NISA is currently commodity group-specific. To qualify as a *decoupled* program, a program should be available for all agricultural commodities. It is thus

to use a two-period model, rather than a multi-period model, to examine NISA-related policies. It can be shown in that a multi-period model incorporating a moving average trigger mechanism is the same as a simple two-period model as long as all NISA balances are eventually returned to farm households. This feature allows the effects of generic income stabilization schemes to be examined in a two-period model.

The Model

Chen *et. al.* (1995) shows that precautionary savings impinges in a non-trivial fashion on the decision of how much to produce. By facilitating stable consumption over time, precautionary savings enables prudent farm households to absorb more risk than it could in the absence of precautionary saving. This insurance aspect of precautionary savings results in farm households reacting differently towards risk. An expected utility-maximizing, prudent farm household may find it optimal to produce either more, less or the same level of output as that which maximizes expected utility of terminal wealth, or profits. While details on the development of the model can be found in Chen *et. al.* (1995), its basic structure is laid out below

A prudent farm household is assumed to know its first period (the present) farm income, but not its second period (the future) farm income.[5] This feature of the model allows for the examination of the production behavior of prudent farm households and relevant policies in both deterministic and stochastic settings. The decision problem faced by the farm household is to decide at the end of the first period, prior to the realization of the second period's income shock, how much to save and how much to produce in order to maximize the expected value of utility. Formally, the two-period expected utility maximization problem of the ith farm household can be written as

[5]Stochastic farm income can result from many sources such as wealther, insect, prices and idiosyncramatic factors.

The second order conditions (SOCs) are assumed to be satisfied.

Equations (4a) to (4c) indicate a linkage between precautionary savings and production decisions. Optimal precautionary savings requires holding income back from current consumption such that the marginal utility of current consumption is equal to the present value of future consumption, so that expected lifetime utility is maximized. The condition for optimal output in the first period is similar to that in the deterministic setting. The farm household chooses the optimal output y_1^* by equating the marginal cost to output price, as indicated by (4b), implying a separability between savings and the first period production decision. Equation (4c) shows that optimal output in the second period may be affected by the farm households' prudent behavior. The optimal amount of precautionary savings to be kept for next year depends on expected income and thus production next year, but optimal production next year depends on the amount of income saved.

Economic Effects of Generic Income Stabilization Schemes

The introduction of a generic income stabilization scheme in to above model may change not only the expected value but also the variability of the underlying parameters. Consequently, it may induce changes in the equilibrium levels of precautionary saving and output as well as farm household welfare.

Effects of a Whole Farm MPPB Scheme

A whole farm MPPB is introduced as a formal procedure to induce or force farm households to save more in a good year for a bad year. A distinguishing feature of a whole farm MPPB is that there is no public subsidy involved. MPPB is thus an actuarially fair scheme which can be either mandatory or voluntary. We begins the discussion with a mandatory MPPB and then moves to examine the implications of a voluntary MPPB.

The FOCs for this problem are similar to equations (2a) to (2c), which are reintroduced below

$$EU_{S_1} = EU'(C_2) - U'(C_1) = 0 \tag{7a}$$

$$EU_{y_1} = \left[(1-t^0)U'(C_1) + t^0 EU'(C_2)\right](p_1 - c_1') = 0 \tag{7b}$$

$$EU_{y_2} = \beta EU'(C_2)(p_2 - c_2') = 0 \tag{7c}$$

Let us first restrict the attention to the case of interior solutions, such that there is positive private precautionary savings in the presence of a mandatory MPPB. Denote this saving as $\left[(S_1^*)^{mmp}\right]$. Equation (7a) shows that the previous condition regarding the optimal level of precautionary savings remains the same qualitatively. Equation (7b) indicates that the presence of a mandatory MPPB has no effect on first period output. In other words, a mandatory MPPB is production-neutral in a deterministic setting. Similarly, equation (3.9) still applies. As a result, only the effects of a mandatory MPPB on the optimal y_2 and S_1 are the concern of comparative static analysis. Totally differentiating equations (7a) and (7c) with respect to t^0 and solving gives

$$\frac{\partial S_1^*}{\partial t^0} = -\frac{EU_{S_1 t^0} EU_{y_2 y_2} - EU_{y_2 t^0} EU_{S_1 y_2}}{H} \tag{8a}$$

and

$$\frac{\partial y_2^*}{\partial t^0} = -\frac{EU_{y_2 t^0} EU_{S_1 S_1} - EU_{S_1 t^0} EU_{y_2 S_1}}{H} \tag{8b}$$

where $H > 0$, $EU_{S_1 t^0} = \left[(1+r)EU'(C_2) + U'(C_1)\right]\pi_1$ and

$EU_{y_2 t^0} = \beta EU'(C_2)(p_2 - c_2')\pi_1$.

MPPB, the farm household simply moves the funds used for private precautionary savings, into the mandatory MPPB stabilization account. The total contingency fund is thus unchanged. Consequently, changes in t^0 have no effect on the farm household's output in the second period. By the same token, it has no effect on either the first or second period consumption and thus on the household's welfare. To conclude, a mandatory MPPB does not alter the consumption and production behavior of the optimal prudent farm household when the program is designed in a way that leaves the total contingency fund equal to the optimal private savings level for the prudent farm household without a mandatory MPPB. Mathematically, $\left(S_1^*\right)^{mmp} + t^0\pi_1 = S_1^*$, where $\left(S_1^*\right)$ is the private precautionary savings made in the absence of a generic income stabilization scheme.

Suppose that a farm household behaves myopically before the introduction of a mandatory MPPB. The introduction of a mandatory MPPB forces farm households to save more for future contingencies, improves the efficiency of the household's intertemporal allocation, and increases the welfare of the farm household. Moreover, a supply-enhancing effect may be observed since an MPPB may reduce the risk faced by farm households in the second period. This potential positive supply response, however, is beneficial as it flows from the pure stabilization effect of the program. For a nondistortionary mandatory MPPB, the following condition must hold:

$$\left(S_1^*\right)^{mmp} + t^0\pi_1 \leq S_1^* \tag{11}$$

These results, however, cannot hold when $\left(S_1^*\right)^{mmp} = 0$. $\left(S_1^*\right)^{mmp} = 0$ arises when the optimal private precautionary savings without a mandatory MPPB is less than the public precautionary savings with a mandatory MPPB. Mathematically, $S_1^* < t^0\pi_1$. Since a mandatory MPPB forces the farm household to save more than its optimal level, it results in an inefficient intertemporal consumption bundle (consuming too little today and too much tomorrow) and lowers farm household welfare.

$$\underset{(S_1,t,y_1,y_2)}{\text{Max}} \; EU(\cdot) = U\left[(1-t)(p_1y_1 - c_1) - S_1\right] + \beta EU\left[(p_2y_2 - c_2) + (1+r)t(p_1y_1 - c_1) + (1+r)S_1\right] \tag{13}$$

While equations (2a), (2b), and (2c) carry through, there is an additional FOC related to the optimal choice of t

$$EU_t = \pi_1\left[EU'(C_2) - U'(C_1)\right] = 0 \tag{14}$$

Equation (14) is actually the same as (2a). It shows that a farm household is indifferent between private precautionary savings and a voluntary MPPB in this model. If farm households behave prudently before the introduction of a voluntary MPPB it will have no effect on the farm household's consumption and production. In other words, a voluntary MPPB generates neither benefits nor costs and is an unnecessary policy for the prudent farm household which optimizes. If farm households behave myopically before the introduction of a voluntary MPPB, then the program can serve as an education tool for farm households. The existence of a voluntary MPPB may encourage farm households to save for a rainy day. If one believes that a voluntary MPPB would induce myopic farm households to save, then there will be positive effects on the farm household's consumption and production patterns.

Effects of a Whole Farm MAPB Scheme

The feature separating MAPB from MPPB is whether they involve a public subsidy. Under MAPB, governments contribute to the stabilization account by a certain percentage, say δ, of the farm household's own contribution. In reality, Canadian governments also subsidize NISA through interest rates and administration costs and these

differentiating the first order conditions (2a) and (2c) with respect to t^0 and solving to obtain equations similar to (8a) and (8b). However, expressions for $EU_{s_1t^0}$ and $EU_{y_2t^0}$ are slightly different

$$EU_{s_1t^0} = \left[(1+r)(1+\delta)EU''(C_2) + U''(C_1)\right]\pi_1 \tag{17a}$$

and

$$EU_{y_2t^0} = \beta EU''(C_2)(p_2 - c_2')\pi_1(1+\delta). \tag{17b}$$

As before, algebraic manipulation yields $EU_{s_1t^0} = \pi_1 EU_{s_1s_1} + \pi_1\delta(1+r)EU''(C_2)$ and $EU_{y_2t^0} = (1+\delta)\pi_1 EU_{y_2s_1}$; substituting into (8a) and (8b) yields

$$\frac{\partial s_1^*}{\partial t^0} = -(1+\delta)\pi_1 + \delta\pi_1 \frac{U''(C_1)EU_{y_2y_2}}{H} \tag{18a}$$

and

$$\frac{\partial y_2^*}{\partial t^0} = -\delta\pi_1 \frac{U''(C_1)EU_{y_2s_1}}{H}. \tag{18b}$$

The sign of equation (18a) is ambiguous, while the sign of (18b) depends on the sign of $EU_{x_2s_1}$, where $\frac{\partial y_2^*}{\partial t^0} > 0$ if DARA is assumed and $\frac{\partial y_2^*}{\partial t^0} = 0$ if CARA is assumed.

Dividing equation (4.16) by $(1+\delta)\pi_1$ gives

$$\frac{\partial s_1^*}{\partial(1+\delta)t^0\pi_1} = -1 + \frac{\delta}{1+\delta}\frac{U''(C_1)EU_{y_2y_2}}{H} \tag{19}$$

What happens to the farm household's consumption? Since the total contingency fund is increased, so is second period consumption. However, first period consumption could also increase if the stabilization fund is less than the private precautionary savings without the program. Mathematically, $\left(S_1^* + t^0\pi_1\right)^{mma} < S_1^*$, where *mma* stands for a mandatory MAPB. This condition is implied by $\left(S_1^* + t^0\pi_1\right)^{mma} < \left(S_1^* + t^0\pi_1\right)^{mmp}$ since $\left(S_1^* + t^0\pi_1\right)^{mmp} = S_1^*$. Similar to equation (20),

$$\frac{\partial S_1^*}{\partial t^0\pi_1} < -1 \tag{21}$$

which shows that private precautionary savings decreases less than public precautionary savings increase. This result implies that $\left(S_1^*\right)^{mma} < \left(S_1^*\right)^{mmp}$. Since $\left(t^0\pi_1\right)^{mma} = \left(t^0\pi_1\right)^{mmp}$ is given by policy, one has $\left(S_1^* + t^0\pi_1\right)^{mma} < \left(S_1^* + t^0\pi_1\right)^{mmp}$. Therefore, a mandatory MAPB increases consumption in both periods and thus increases the household's welfare with a positive $\left(S_1^*\right)^{mmp}$. In other words, a mandatory MAPB is no longer consumption neutral even with a positive $\left(S_1^*\right)^{mmp}$. Similarly, this positive consumption effect is solely caused by the subsidy. To see this, $\delta = 0$ implies $\frac{\partial S_1^*}{\partial t^0} = -1$.

The effects of a mandatory MAPB on myopic farm households are similar to those of a mandatory MPPB. Unlike the case of a mandatory MPPB, however, the potential positive supply response induced by a mandatory MAPB may contain both beneficial and harmful components.

When $\left(S_1^*\right)^{mma} = 0$, the effects of a MAPB on optimal output is

$$\frac{\partial y_2^*}{\partial t^0} = -\frac{EU_{y_2 t^0}}{EU_{y_2 y_2}} = -(1+\delta)\pi_1 \frac{EU_{S_1 y_2}}{EU_{y_2 y_2}} \tag{22}$$

$$\underset{(S_1,t,y_1,y_2)}{\text{Max}}\ EU(\cdot) = U\left[(1-t)(p_1y_1 - c_1) - S_1\right] + \beta EU\left[(p_2y_2 - c_2) + (1+r)(1+\delta)t(p_1y_1 - c_1) + (1+r)S_1\right] \tag{25}$$

subject to (24).

The Kuhn-Tucker conditions for this problem are

$$EU_{S_1} = EU'(C_2) - U'(C_1) = 0 \tag{26a}$$

$$EU_{y_1} = \left[(1-t)U'(C_1) + t(1+\delta)EU'(C_2)\right]\left[p_1 - c_1'(y_1)\right] = 0 \tag{26b}$$

$$EU_{y_2} = \beta EU'(C_2)\left[p_2 - c_2'(y_2)\right] = 0 \tag{26c}$$

$$EU_t = \pi_1\left[(1+\delta)EU'(C_2) - U'(C_1)\right] - \lambda = 0 \tag{26d}$$

$$EU_\lambda = t^0 - t \geq 0;\ t^0 - t > 0 \text{ if } \lambda = 0 \tag{26e}$$

where λ is a Kuhn-Tucker multiplier.[7] Due to the presence of the inequality (24), there are two cases which must be considered:

<u>Case 1: $\lambda = 0$</u>

This implies that contribution limit is not binding. In this case, t is no longer an exogenous policy parameter but an endogenous variable. Equation (26d) can be rewritten as

$$(1+\delta)EU'(C_2) - U'(C_1) = 0, \tag{26d)'}$$

and combining (26a) and (26d)' gives

[7]Note that the Kuhn-Tucker multiplier is non-negative.

the optimal y_2 and t can be determined by totally differentiating (4.25d) and (4.25b) with respect to δ and solving to obtain

$$\frac{\partial t^*}{\partial \delta} = -\frac{EU_{t\delta}EU_{y_2y_2} - EU_{y_2\delta}EU_{ty_2}}{H} \tag{29a}$$

and

$$\frac{\partial y_2^*}{\partial \delta} = -\frac{EU_{y_2\delta}EU_{tt} - EU_{t\delta}EU_{y_2t}}{H} \tag{29b}$$

where $EU_{t\delta} = (1+r)(1+\delta)t\pi_1 EU'(C_2) + EU'(C_2)$

$EU_{y_2\delta} = t\pi_1 EU'(C_2)(p_2 - c_2') = \frac{t}{1+\delta}EU_{ty_2}$.

Using the expression for EU_{tt} in equation (28) gives

$$EU_{t\delta} = \frac{t}{(1+\delta)}EU_{tt} - \frac{t}{(1+\delta)}U'(C_1)\pi_1 - EU'(C_2) \tag{30}$$

Substituting (30) into (28) and (29) gives

$$\frac{\partial t^*}{\partial \delta} = \frac{t}{1+\delta}\left(\frac{\pi_1 U'(C_1)EU_{y_2y_2}}{H} - 1\right) - \frac{EU'(C_2)EU_{y_2y_2}}{H} \tag{31a}$$

and

$$\frac{\partial y_2^*}{\partial \delta} = \left[EU'(C_2) - \frac{t}{1+\delta}\pi_1 U'(C_1)\right]\frac{EU_{s_1y_2}}{H} \tag{31b}$$

between gross revenue and profit. Suppose a farm household contributes to a mandatory whole farm MARB by a percentage of its gross revenue instead of their profit. Net income in the first and the second periods are

$$C_1 = \left(1 - t^0\right)p_1 y_1 - c_1 - S_1 \tag{32a}$$

$$C_2 = \left(p_2 y_2 - c_2\right) + (1+r)(1+\delta)t^0 p_1 y_1 + (1+r)S_1 \tag{32b}$$

The maximization problem faced by the farm household is

$$\begin{aligned} \underset{(S_1, y_1, y_2)}{\text{Max}}\ EU(\cdot) = {} & U\left[\left(1 - t^0\right)p_1 y_1 - c_1 - S_1\right] \\ & + \beta EU\left[\left(p_2 y_2 - c_2\right) + (1+r)(1+\delta)t^0 p_1 y_1 + (1+r)S_1\right] \end{aligned} \tag{33}$$

While equations (2a) and (2c) carry through, the FOC related to the optimal choice of first period output becomes

$$EU_{y_1} = U'\left(C_1\right)\left[\left(1 - t^0\right)p_1 - c_1\right] + t^0 p_1 (1+\delta) EU'\left(C_2\right) = 0 \tag{34}$$

Combining equations (2a) and (34) gives

$$p_1 - c_1 = -t^0 \delta p_1 < 0 \tag{35}$$

This shows that the farm household would produce more in the first period in response to a mandatory MARB. As shown previously, this distortion would not occur with a mandatory MAPB. In other words, the inefficient use of resources in the first period occurs when the contribution base in a mandatory MAPB departs from a pure economic profit base. It is important to note that this result has nothing to do with risk.

profit-based income stabilization plans on precautionary saving and output in the second period.

Effects of Commodity-Specific MAPB

The empirical significance of this issue is obvious since the current net income stabilization plan is commodity-specific. To examine portfolio effects,[9] we consider a farm household with two production activities, A and B, and with a joint limitation on production capacity. Assume that the output of each technology can be characterized by constant returns to scale. Suppose λ^A is capacity allocated to activity A, and λ^B is capacity allocated to activity B. The jointness in production is due to a physical capacity constraint which can be represented, without loss of generality, as $\lambda^A + \lambda^B = 1$. This model formulation is common in agricultural problems (i.e. Just and Zilberman 1986, Famchamps 1992). Assume that a mandatory mean-augmenting net income stabilization plan is in effect for production activity A. We have

$$C_1 = (1-t)\lambda_1\pi_1^A + (1-\lambda_1)\pi_1^B - S_1 \tag{37a}$$

$$C_2 = \lambda_2\pi_2^A + (1-\lambda_2)\pi_2^B + (1+r)(1+\delta)t\pi_1^A + (1+r)S_1 \tag{37b}$$

Formally, the maximization problem of the farm household can be written as

$$\begin{aligned}\underset{(S_1,\lambda_1,\lambda_2)}{\text{Max}}\ EU = {} & U\left[(1-t)\lambda_1\pi_1^A + (1-\lambda_1)\pi_1^B - S_1\right] \\ & + \beta EU\left[\lambda_2\pi_2^A + (1-\lambda_2)\pi_2^B + (1+r)S_1 + (1+r)(1+\delta)t\pi_1^A\right]\end{aligned} \tag{38}$$

[9]The typical portfolio choice problem in a consumer study refers to the following situation: a consumer allocates the sum of assets and labor income between consumption and a menu of assets in the first stage and decides how many assets to hold in the second stage. The allocation problem in the second stage refers to portfolio choice. However, when we talk about portfolio choice in a farm household model, we refer to the choice of output mix in production.

household's consumption and production behavior. A scheme is said to be production neutral if it does not affect a farm household's production behavior and is said to be consumption neutral if it does not affect a farm household's consumption behavior. An observation is that no general conclusions regarding whether generic income stabilization programs are neutral can be drawn without imposing certain restrictions. One exception is a whole farm voluntary MPPB, which is neutral. Even an actuarially fair mandatory MPPB is not necessarily neutral. It is neutral, however, when a farm household still has a positive private precautionary saving in the presence of the program. It is clear from Table 1 that no other generic income stabilization schemes are both consumption and production neutral. Nevertheless, when certain restrictions are met, some schemes may be production-neutral. Under CARA, for example, whole farm MPPB and MAPB are production neutral but not consumption neutral. Programs such as MARB and commodity-specific schemes are not neutral in any circumstances.

Policy Implications

An interesting question is what the implications of above results are for decoupled farm policy as decoupled farm policy is considered to be the most desirable. *Decoupled* is one of these comfortable short-hand expressions which people tend to use without close examination of its precise content. No entry under decoupling or decoupled is contained in "The New Palgrave Dictionary of Economics" or the "The Penguin Dictionary of Economics." People seem to have different definitions in mind when they refer to decoupling. In fact, the terms decoupled and neutrality are sometimes used interchangeably by agricultural economists and policy makers, at least implicitly.

Although *decoupled* is closely related to the economic concept of neutrality, they differ in one important aspect. While neutrality is an economic concept, decoupled is not. In the real world, whether a specific farm policy in a country is decoupled or not is determined by international trade negotiations. The negotiations are summarized in the

It has been shown that generic income stabilization programs are, in general, not production-neutral except in a few limited cases. However, it has not been proven that those schemes are not *decoupled*. A program, to be *decoupled* program, must meet the above criteria.

Generic income stabilization is a taxpayer-funded government program and thus meets the first basic criteria. Does it meet the second criteria? The answer depends on the form of the income stabilization scheme being considered. It has been shown that an MPPB and an MAPB are production-neutral in a deterministic setting but not in a stochastic setting. As the risk-reducing effect of farm policy is not a factor in the GATT criteria for a decoupled program, both MPPB and MAPB meet the second criteria. MARB and commodity-specific schemes are shown to be production-distorted in either a deterministic or stochastic settings and hence do not meet the second criteria.

There are several specific policy criteria that must be met as well for a farm policy to be considered *decoupled*. The most relevant criteria for generic income stabilization schemes are those set out in paragraphs 6 and 7 in Annex 2 of the GATT Agreement on Agriculture. While the former sets out conditions for *decoupled* income support, the latter sets out conditions for a *decoupled* safety net program. Is a generic income stabilization scheme a *decoupled* income support program? As an MPPB does not involve income support, it cannot be classified as an income support program. The remaining three forms of generic income stabilization schemes appear to violate two of the five criteria, articles (ii) and (v), for a *decoupled* income support:

(ii) the amount of support in any given year shall not be related to, or based on, the type or volume of production undertaken by the producer in any year after the base period; and

(v) no production shall be required to receive such payments.

commodity specific net income stabilization plans, for example, are clearly not production neutral. Whether a profit based net income stabilization plan is production neutral hinges on the structure of risk preferences. If farm households exhibit constant absolute risk aversion, a profit based net income stabilization plan will be production neutral. If farm households exhibits decreasing absolute risk aversion, a profit based net income stabilization plan will not be production neutral. Its degree of non neutrality, however, depends on the level of precautionary savings, the level of subsidy, and the nature of participation. A voluntary value added whole farm net income stabilization plan, for example, is likely to be *near* production neutral so long as the subsidy is small. The reason is that the supply effects of the net income stabilization plan on prudent farm households are smaller than that of the net income stabilization plan on the farm firm which maximizes the terminal wealth.

An income stabilization plan operating as a pure stabilization program has little stabilizing value for the optimal prudent farm household. In other words, it cannot be rationalized in a world of the prudent farm households even with an absence of complete markets. When an income stabilization scheme is subsidized, a positive effect on the farm household's well-being becomes possible but is not guaranteed. The reason is that while the net income stabilization plan unambiguously increases second period consumption, it has an ambiguous effect on first period consumption, depending on the magnitudes of public precautionary savings. Realistically, however, the positive effect on the household's well-being is likely to occur so long as the discount factor is in a reasonable range. In a world of myopic farm households, the story is quite different. An income stabilization plan operated as either a pure stabilization program or income transfer program could increase the household's well-being.

This study limited itself to examine generic income stabilization schemes, which resemble NISA. Among the large number of questions that the adoption of NISA in Canadian agriculture raises for economic analysis, only a select few were addressed. The

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Table 1 Supply Effects of Generic Income Stabilization Policy Schemes on Prudent Farm Households

Policy Schemes	Effects on Production		Production-Neutral (Yes/No)	Decoupled (Yes/No)
	1st Period Output (Deterministic case)	2nd Period Output (Stochastic Case)		
Whole farm mandatory MPPB	0[b]	0 if $\left(s^*\right)^{mp}$ >0[c] + if $\left(s^*\right)^{mp}$ =0 & DARA 0 if $\left(s^*\right)^{mp}$ =0 & CARA	Yes either if $\left(s^*\right)^{mp}$ >0 or if $\left(s^*\right)^{mp}$ =0 & CARA No if $\left(s^*\right)^{mp}$ =0 & DARA	Yes
Whole farm voluntary MPPB	0	0	Yes	Yes
Whole farm mandatory MAPB	0	+ if DARA 0 if CARA	No if DARA Yes if CARA	Yes
Whole farm voluntary MAPB	0	+ if DARA 0 if CARA	No if DARA Yes if CARA	Yes
Whole farm mandatory MARB	+	+ if DARA 0 if CARA	No -	No
Commodity-specific mandatory MAPB	+	+ if DARA 0 if CARA	No	No

[a]MPPB=mean-preserving-profit-based scheme, MAPB=mean-augmenting-profit-based scheme, and MAGR=mean-augmenting-gross-revenue-based scheme.

[b]0 means no effects and + means positive effects.

[c]Term $\left(s^*\right)^{mp}$ stands for the private precautionary saving under a mandatory MPPB scheme.