Income Redistribution Through Commodity Programmes and the Marginal Welfare Cost of Taxation

Ahmad Zubaidi Baharumshah

ABSTRACT

Most economic welfare analysis of farm programmes are usually computed based on the assumption that the social opportunity cost of a dollar of public spending is equivalent to a dollar of private income. The approach simplifies the analysis but ignores the welfare cost of distortion caused by collection of taxes to finance public expenditure. This study shows that when the marginal opportunity cost of a dollar of government spending is greater than one dollar then the net social cost of farm programmes involving public expenditure is greater than typically estimated. Four policy options were considered in this paper and we showed that output subsidy is less pareto superior than tariff as commonly thought. Further, our analysis shows the pareto superior program is the one that combines production control couple with target prices and output subsidy.

ABSTRAK

Kebanyakan analisis program ladang dikira dengan mengandaikan kos lepas sosial untuk seringgit perbelanjaan awam menyamai pendapatan persendirian. Pendekatan ini memudahkan analisis-analisis tersebut tetapi tidak mengambil kira kos kebajikan berkaitan dengan gangguan pungutan cukai untuk membiayai perbelanjaan awam. Kajian ini menunjukkan apabila kos sut melepas untuk seringgit perbelanjaan kerajaan lebih besar daripada satu ringgit maka kos sosial bersih program ladang yang melibatkan perbelanjaann awam adalah lebih besar daripada apa yang ditentukan terdahulu. Empat pilihan dasar diperhatikan dalam kertas kerja ini dan kami dapat menunjukan subsidi keluaran adalah kurang pareto atasan dari tarif seperti difikirkan dahulu. Tambahan pula, analisis kami menunjukan program yang pareto atasan adalah sesuatu yang menggabungkan kawalan pengeluaran dengan harga sasaran dan subsidi keluaran.

INTRODUCTION

As early as 1947, the government has intervened in the Malaysian rice market by setting import quotas and the guaranteed minimum price (GMP). The GMP was introduced to insulate the domestic prices from the world prices, to encourage domestic production and to provide an income support above its non-intervention level. It has significant effects on the various interest groups in the rice market. Since its implementation the GMP has never been revised downwards in response to the changing world market conditions. Only in four of the past twenty-five years were the support prices held below the border prices. The abnormally high world prices in these years obviated the need for one.[1]

The economic welfare consequences of the Malaysian rice policy have been analyzed and measured in many studies using different techniques and under different sets of assumption. Two most recent examples of such investigation are provided by Tan (1987) and Ahmad Zubaidi (1991a). The rice policy redistributes wealth internally from consumers and taxpayers to producers and National Paddy and Rice Authority (LPN), the sole importer of rice.[2]

The results from these studies suggest that the rice programme (1) is not promoting consumer welfare; (2) it is inefficient and incapable of eradicating poverty; (3) the food security concept is too narrow and the objective of saving foreign exchange cannot be justified because of the penetration of wheat and other cereals into the domestic market and (4) the imports quota/tariff do not constitute the least cost of providing fair income to the domestic producers. Because of these problems, reformers tend to prescribe the free trade option or output subsidy based on the least cost criteria.

Most of the empirical investigation on welfare consequences of farm programmes assume that the social opportunity cost of a dollar of government spending is one dollar (e.g. Ahmad Zubaidi (1991a); Tan 1987 and Ryland & Tan 1988). In this paper, the focus is on the implication of this assumption on the efficiency of income redistribution through commodity programmes and the ranking of alternative farm programmes in Malaysia. In particular, this paper intends to show that a move from tariff to output subsidy in rice programme cannot be justified in terms of efficiency criteria.

The analysis provided in this paper follows the concepts and approach provided by Gardner (1983, 1987 a,b) and Altson and Hurd (1990). The paper is organized as follows. In the subsequent section, a brief review of relevant literature is presented. This is followed by an analytical framework for analyzing the alternative farm polices for a small open economy that will confer an equivalent farm support to domestic producers. The third section presents the results of the empirical investigation. Finally, the concluding remarks is discussed.

LITERATURE REVIEW

Tan (1987) used the border price of rice as a reference to compute the consumer and producer costs between 1960 to 1985. The estimates on the consumer costs and producer gains were based on the difference between the world and domestic rice prices. The results indicated that the consumers loss around M$4.4 billion while the producers gained around M$524.6 million over an estimated period of 12 years. The estimated producers transfer for the fiscal year 1985 based on quota price premium of $248 per tonne was $271.1 million while the consumers cost was estimated at $683.3 millions using a price premium of $524 per tonne. When adjusted for import fees and revenue of $58.4 million, the net social cost of the programme amounted to about $353.8 million.

Tan argued that the current policy is costly and inefficient as a means of transferring income to domestic producers.[3] Although the approach used in the analysis is appropriate for a small country, however, the method do not consider deadweight-losses (production and consumption losses) associated with market distortion in the calculations. The author argued that current option is costly and favoured output subsidy (or deficiency payments) instead. The programme cost is lower for the case of output subsidy because the distortion on the consumption side is removed under the policy instrument.

In a related work, Ahmad Zubaidi (1991a) extended the partial equilibrium model by using the approach suggested by Just, Hueth and Schmitz (1982) and Lue et al. (1987) to estimate the surplus under alternative price regimes. The model accounts for the interaction between rice and wheat via substitution on the demand side. In this study, the consumer cost was estimated at $534.9 million while the producer gain was determined at $416 million for a quota price premium of $237 per metric ton (or an equivalent

support price of \$784 per metric ton). The quota rent under the same premium was \$23.1 million.[4] The high quota premium on rice over the years has reduced the quota rent partly because of substitution towards wheat and other grains. This study also showed that the net social cost of the current option using import tariff/quota is 11.2 times higher than output subsidy, thus favouring output subsidy.[5]

In both these papers, the authors examined two types of policy instruments, namely tariff (or an equivalent quota) and output subsidy. The alternatives were considered mutually exclusive, that is, all tariff or all output subsidy. Both authors found that the current policy is not the least cost method to support the domestic producers and they alternatively favoured output subsidy over tariff/quota. However, they could not provide an economic explanation as to why the existing policy regime prevails despite the high cost of the programme. Instead, they focussed on special interest groups and argued that fewer firms promote the political power of an industry by reducing costs of organising, preventing free-riding, and mitigating opposition.

Perhaps an important assumption maintained throughout the analysis of price policy in these studies is that the social opportunity cost of a dollar of government spending is one dollar so that the cost of market distortions can be determined directly from the Harberger's triangle (See Harberger, 1959).[6] This implies that the direct opportunity cost of subsidy payments is one dollar per dollar of government spending. The assumption is equivalent to treating the government spending through tax collection as a transfer payment where taxes itself cause no deadweight-loss in the economy. The problem with this over simplified assumption is that it assumes the welfare costs of distortion, caused by distortion elsewhere in the general economy to finance government spending on farm programmes is zero and that taxes can be imposed without administration costs.

The assumption is very restrictive since it is well known in the public welfare literature that the opportunity cost of dollar of government spending is not one dollar in general. For example, a recent article by Rousslang and Suomela (1988) pointed that the tax revenue has a greater opportunity cost than ordinary income.[7] Ballard et al. (1985) showed that the marginal excess burden of taxes can be substantial. The welfare loss from a one percent increase in all distortionary taxes rates for the US economy is in the

range of 17 to 56 cents per dollar of extra revenue. This implies that farm programme must produce marginal benefits of at least $1.17 per dollar of cost, if it has to be financed from taxes in order to be welfare improving.[8]

Economists in developed countries cannot agree on the magnitude of the welfare loss due to one percent increase in taxes. The estimates provided varies according to the method employed in the analysis. For example, Browning (1987) provides an estimate range between 1.10 to 3.00 percent, while Gardner (1983) showed the marginal social welfare cost of a dollar of government spending (MWC) is likely to be between $1.10 to $3.00 for the US economy. Altson and Hurd (1990), however, preferred the estimates to lie between $1.20 to $1.50.

Clarete (1984) showed that the cost of trade distrotion, in particular tariffs and export taxes, for the Philippines case range from 17 to 19 percent using the general equilibrium model. Using another approach (Diewerts Allais-Debreu measure of deadweight-loss), however, the study finds that 33 percent of the tax revenues is wasted because of trade distortions. These estimates, however, ignore the administrative cost of the distortions. These results suggest that trade liberalization offers the Philippines economy the opportunity to expand by improving economic efficiency.

The zero deadweight-loss assumption of taxes is often maintained in welfare analysis mainly because it simplifies and facilitates the analysis. Others argued that the distortion can be negligible and therefore, could be ignored from the analysis. However, Gardner (1978b) argued that even if the deadweight-loss per dollar of taxes is low, the cost per dollar transferred to producer is likely to be substantially greater. The reason is that part of the tax revenue is distributed back to consumers through lower prices. The taxpayers costs of farm programmes due to general taxation are unavailable for the Malaysian case. The policy implication of the assumption is that social cost of farm programmes that involve tax revenue should be greater than the estimates provide by earlier researchers since the external losses (subsidy) or gains (tariff) to the regulated market is ignored. Therefore, the analysis that follows based on this simple assumption is biased and tends to favour policies that involve government spending because it ignores the additional effects of distortionary taxes.

The exact magnitude of the MWC is not crucial to be argued here but what may be more important is the implication of these welfare

analysis when the marginal social welfare of a dollar of government spending (MWC) is greater than one. The focus of this paper is to show how the ranking of farm programmes change when the MWC is greater than zero. For this pupose the MCW between 0 to 2.0 is provided in the analysis. To show the importance of this assumption on the decision about farm programmes, we compare a range of policies which will confer an equivalent gain or support to the domestic rice producers when the zero deadweight-loss assumption is relaxed. The policy options considered in the analysis are (a) tariff, (b) output subsidy, (c) quota with an output subsidy, and (d) tariff combined with quota and subsidy. The distribution of the surplus under the alternative policy instruments are discussed below.

ALTERNATIVE FARM POLICIES FOR A SMALL OPEN ECONOMY

Figure 1 represents the rice market for a small country importer with domestic supply (S) and demand (D). Under the small country assumption the import supply curve which is perfctly elastic at P_0. The price $P_0 + T$ refers to the support price and Q_0 is the unregulated competitive output (in the absence of programme).
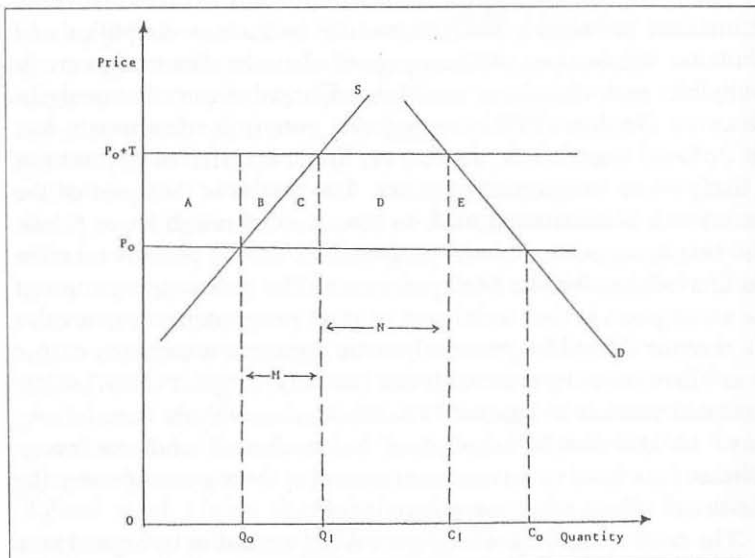

FIGURE 1. Income Redistribution Policies for a Small Importing Country

A range of policies that will confer an equivalent gain equal to the area (A + B) to the producer are considered and they are (a) a tariff of T per unit (equivalent to an import quota N with the government retaining the quota rents), (b) an output subsidy of T per unit, (c) a production quota of Q_0 with an output subsidy of (A + B)/Q_0 per unit and (d) a tariff of T per unit (or an import quota of N + M) combined with production quota of Q_0 and a subsidy of B/Q_0 per unit.

The surplus distribution effects and deadweight-loss from these alternative policies are summarized in Table 1 below. For example, a net gain to producers of area (A + B), a tariff of T costs the consumers area (A + B + C + D + E). It generates increase economic rent equal the area (1 + d)D, where d here is a constant and is the marginal deadweight cost of raising a dollar for subsidy payment. Thus, a dollar of subsidy costs (1 + d) dollars of taxpayer surplus. Adding up the gains to producers, consumers and government (i.e., taxpayers) we are left with the area C + E – dD as the net social cost of tariff. With ouput subsidy, consumer pay at free market price (P_0) and so there is no change in the consumer surplus. The programme costs the taxpayers measured by the area (1 + d) A + B + C. The net social cost for output subsidy is shown in figure 1 as area C + d(A + B + C). Note that under the usual assumption (d = 0) the costs of tariff and subsidy programmes are given by area C + E and C respectively.

As shown in Table 1, these programmes are accompanied by deadweight-losses which represent the net social cost to achieve the desired income support level. The most efficient (pareto superior) policy is the one with the smallest deadweight-loss. From the information provided in the Table, it is obvious that when d = 0 the most efficient means of income transfer to producer is production control (quota Q_0) and output subsidy. The outcome is equivalent to lump-sum transfer payment (zero deadweight-loss). However, the ranking of the other three options is less obvious and depend on the elasticities of supply and demand.

For values of d greater than 0, it is not possible to rank all the policies from theory alone. The ranking will depend on sizes of transfer (area A + B), elasticities of supply (ϵ) and demand (n), domestic production as a share of consumption (k) and the marginal deadweight cost per dollar of government spending (d). The detailed algebraic derivation of the surplus distribution and the social cost of the programmes relative to output subsidy for a small

importing country is provided by Altson and Hurd (1990) and the results are summarised in Table 2.

TABLE 1. Consumer, Taxpayer, and Net Social Cost of Surplus Redistribution Under Alternative Policies for a Small Importing Country

Policy	Consumer Cost	Taxpayer Cost	Net Social Cost
Tariff (T)	$A + B + C + D + E$	$-(1 + d)D$	$(C + E) - dD$
Output Subsidy (T)	0	$(1 + d)(A + B + C)$	$C + d(A + B + C)$
Quota (Q_0) & subsidy $\{(A + B)/Q_0\}$	0	$(1 + d)(A + B)$	$d(A + B)$
Tariff (T), quota & subsidy (B/Q_0)	$A + B + C + D + E$	$-(1 + d)(D + C)$	$E - d(D + C)$

Notes: The geometric area given in the table is derived from figure 1. A zero (0) indicates no effect. The capital letters refer to the areas in figure 1 and d represents the marginal deadweight cost per dollar of government spending. The net social cost is equal to the consumer cost plus taxpayer cost minus the benefit to producers (i.e., $A + B$). See text for further detail discussions.

TABLE 2. Net Social Cost Relative to Output Subsidy

Policy Option	Geometric Area	Algebraic Measure
Quota & subsidy	$-(1 + d)C$	$-(1 + d)*1/2*\tau^2 \epsilon k$
Tariff	$E - d(A + B + C + D)$	$1/2\tau^2 n - d\tau(1 - \tau n)$
Tariff, quota & Subsidy	$E - d(A + B + C + D) - (1 + d)C$	$1/2\tau^2[n - (1 - d)k\epsilon]$ $- d\tau(1 - \tau n)$

Notes: The geometric areas are derived from those given in Table 1 by subtracting the net social cost of the alternative policy option from output subsidy. The parameters specified in the Table are supply elasticity (ϵ), demand elasticity ($n > 0$), tariff rate (τ), domestic products as share of consumption (k) and the marginal deadweight cost per dollar of government spending (d).

The net social cost which is the consumer cost plus taxpayer cost minus benefit to producers are expressed per dollar of consumer expenditure in competitive equilibrium. Note that if the expression in the last column of Table 2 is positive then the net social cost of the programme is greater than an equivalent output subsidy.

To compute the cost of the alternative programmes, the results of previous studies are relied on for the parameters needed to calculate the surplus changes. Estimates of the demand elasticities range from − 0.14 (Ahmad Zubaidi 1990) to − 0.50 (Nik Fuad 1985). A value of − 0.31 (Ahmad Zubaidi & Muzafar Shah 1991b) was chosen for the anlysis, given that the estimates are current and that the model has been subjected to several specification tests.[9] The supply price elasticity estimates used in the analysis is 0.11 (Ahmad Zubaidi 1991c). The low own-price elasticity estimates is also in agreement with those reported by King (1987).[10] There are diffirences in these market parameters because of a different time period and model specification.

REDISTRIBUTION OF RICE PROGRAMMES

The relative efficiency of farm programmes in Malaysia when the cost of distortions caused by tax collection to finance the farm programme range from zero to $2.0 is provided in Table 3 below. From the Table, it is obvious that when the opportunity cost is one dollar per dollar of government spending (that is, $d = 0$), it is always better to specialise in output subsidy (rank 2) than a tariff (rank 3) or an equivalent quota as a means of transferring income to the producer. The result is consistent with those reported by Ahmad Zubaidi (1991a) and Tan (1987). It is obvious since output subsidy removes the distortion on the consumption side (area $A + B + C + D + E$ in figure 1).

The most efficient option would be to restrict output at the competitive quantity and use subsidy to achieve the desired income transfer. The outcome is equivalent of lump-sum transfer since there is no distortion both in resource use (area C) and on the consumption side (area E). The option is more efficient than any other single policy instrument (that is, all subsidy or all tariff). A tariff combine with quota and a subsidy is less efficient than output subsidy since for the Malaysian case the area E (consumption deadweight-loss) is greater than area C (production efficiency loss). For example, a quota price premium of $263 per metric tonne, the

consumption deadweight-loss is about $8.5 million while the production efficiency loss is $32.5 million (see Ahmad Zubaidi, 1991a).

TABLE 3. Ranking the Efficiency of Alternative Policy

Police Option	Efficiency Ranking Marginal deadweight cost of taxes (d)				
	0	0.5	1.0	1.5	2.0
Output subsidy	2	4	4	4	4
Production quota plus subsidy	1	3	3	3	3
Tariff	3	1	2	2	2
Tariff, quota and subsidy	4	2	1	1	1

Note: The production quota here refers to restricting output at non-intervention or competitive level. The ranking of the alternative options was based on ϵ (supply elasticity) = 0.1, n (demand elasticity) = 0.31, τ (tariff rate) = 0.55 and k (domestic production as share of consumption) = 0.76. For the further detail in the welfare triangles and computations, see Alston and Hurd, 1990. The most efficient policy i.e., rank 1 is the one with the smallest deadweight loss.

Thus, under the usual assumption (d = 0), production control with output subsidy would be the most efficient means of tansferring income to producers; the next most efficient means would be all output subsidy; third would be all tariff; least efficient of all is the one that combines tariff, output quota and subsidy.

Next, we consider the case when there is excess burden of taxes to finance farm programmes i.e., a dollar of government spending from tax financing reduces taxpayer surplus by more than a dollar. When d = 0.5, the most efficient policy would be a tariff (or an equivalent import quota) and no other policy instrument is needed. Thus unlike the case when d = 0, it is possible to use a single policy instrument in isolation as a means of redistribution of income to the producers.

As shown in Table 3, the ranking of the policy options does not change for values of d greater than one. For the Malaysian case, we expect the value of d to be grater than 1.0. Thus, a tafiff combined with a quota and a subsidy is more efficient than a single

instrument like output subsidy. The reason is that subsidy alone (or tariff) will induce overproduction. However, if this is combined with output quota then it would hold production at non-intervention level of output. The choice between all tariff and a combination of tariff, quota and subsidy become very obvious as the value of d increases (Table 4).[11]

TABLE 4. Ranking the Efficiency of Alternative Policy

Policy Option	Efficiency Ranking Marginal deadweight cost of taxes (d)			
	1.5	2.0	2.5	3.0
Output subsidy	4	4	4	4
Production quota plus subsidy	3	3	3	3
	(− 0.029)	(− 0.035)	(− 0.042)	(− 0.046)
Tariff	2	2	2	2
	(− 0.637)	(− 0.866)	(−1.094)	(− 1.322)
Tariff, quota and subsidy	1	1	1	1
	(− 0.648)	(− 0.888)	(− 1.127)	(− 1.367)

Refer to Table 3 for futher details. The figures in the paranthesis are the net social cost per dollar of consumer expenditure relative to output subsidy. A negative expression indicates the policy has a less net social cost than an equivalent output subsidy.

Note that it is possible that some tariff would be superior to the free trade option even in the small country case since it is possible that the society as a whole could gain. The situation could arise if d is fairly large or the distortion on both the consumption and production is small (that is, area C + E is less than area dD). Alternatively, one could argue that import tariffs reduce the need for other tax revenues and so there can be external gain from tariffs. Finally, for large values of d, tariffs (with ouput controls) is likely to be favoured over output subsidy as a means of distribution of surplus.

CONCLUDING REMARKS

The two main instruments of the Malaysian rice policy have been import quota and output subsidy. The economic welfare con-

sequences of the rice programme have been analyzed in many studies under different sets of assumption. The estimates of the economic surplus varies according to the market parameters used in the analysis and the method employed in the analysis. These studies showed that the least cost to support the domestic producers is by using output subsidy.

In this paper we showed that the result holds only when government spending is assumed as a transfer payment which implies that a dollar of government spending in farm programme cost a dollar to the society. The assumption ignores the deadweight cost of taxes to raise additional government revenue and has lead to policies favouring budgetary measures (government spending) relative to other regulative instruments that do not involve public expenditure. The recent increase in the output subsidy for rice from $165/tonne to $248/ tonne and the fast growing government expenditure to subsidise the agricultural sector are the reflection of the common view held by policy-makers. This movement has meant a shift in transfer mechanism, that is, a switched in the burden of income transfer from taxpayers to producers and reducing the need to increase the costs to consumers.

The main results from our analysis suggest that: (1) the net social cost of rice programmes that involves subsidies are greater than those reported earlier by Ahmad Zubaidi and Tan where the MWC is assumed to be zero; (2) when MWC is zero, it is always inefficient to use single policy instrument (i. e., either output subsidy or tariff/quota). This is also true if the MWC is greater than zero because it has been shown that policies may be combined efficiently for values of d grater than one and (3) finally, the efficiency ranking of alternative policies is somewhat sensitive to the value of MWC used in the analysis.

Our analysis shows that the Pareto-superior programme is one that combines production control coupled with the target price and output subsidy. Thus, this study finds that the most efficient programme tends to be the one that is politically popular. In other words we find that the most efficient program is close to the one already in used. Finally, in this paper we showed that the policy ranking depends not only on the deadweight losses from distortions in consumption and production (which depends on the market parameters) but also on the relative magnitudes of the marginal taxpayer costs of government spending. Thus, future research

INTRODUCTION

As early as 1947, the government has intervened in the Malaysian rice market by setting import quotas and the guaranteed minimum price (GMP). The GMP was introduced to insulate the domestic prices from the world prices, to encourage domestic production and to provide an income support above its non-intervention level. It has significant effects on the various interest groups in the rice market. Since its implementation the GMP has never been revised downwards in response to the changing world market conditions. Only in four of the past twenty-five years were the support prices held below the border prices. The abnormally high world prices in these years obviated the need for one.[1]

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Most of the empirical investigation on welfare consequences of farm programmes assume that the social opportunity cost of a dollar of government spending is one dollar (e.g. Ahmad Zubaidi (1991a); Tan 1987 and Ryland & Tan 1988). In this paper, the focus is on the implication of this assumption on the efficiency of income redistribution through commodity programmes and the ranking of alternative farm programmes in Malaysia. In particular, this paper intends to show that a move from tariff to output subsidy in rice programme cannot be justified in terms of efficiency criteria.

should determine the size of external distortion (d) so that it will help to make well-informed decisions on farm policies.

NOTES

[1]The producers are the primary beneficiaries of the price support programme but the degree of support has varied substantially over time. In general, the protection for rice has increased. However, the high border prices in 1973-75 and subsequently in 1981 resulted in net transfer from producer to consumer. The support prices became effective when world prices fell.

[2]For more detail discussion on the rice policy in Malaysia, see for example Tan (1987), Ahmad Zubaidi (1990) and Nik Fuad Kamil (1985).

[3]Here the word efficiency refers to an efficient redistribution of income in terms of total cost to consumers or taxpayers to achieve a given increase of producer surplus. This also means minimizing the burden to the society to achieve a given benefit to farmers.

[4]These estimates were based on 1980-1987 prices. The pragmatic Marshallian concepts were use to estimate the surplus. The Marshallian concepts has been criticized on several grounds. However, Ahmad Zubaidi (1989) has shown that the results obtained from the Marshallian methods differ from the Willig's approximation of compensating variation and equivalent variation by few percentage points.

[5]The deadweight-loss (net social cost) is measured as changes in producer surplus and consumer surplus minus costs to taxpayers.

[6]The cost of protection is measured by simply aggregating surplus changes over the affected groups. The criteria implies that every dollar loss by consumers is estimated to have the same social value as every dollar gained by producers or taxpayers.

[7]The point was raised by Gardner (see Gardner, 1989 p. 264). Gardner showed that subsidy cause external deadweight losses because additional tax revenue is needed to finance government expenditure. Import tariff, however, generates additional revenue and reduces the need for other tax revenue and therefore should generate external gain. For more discussion on the issue, see also the literature on welfare economics by Atkinson and Stiglitz (1980), Stiglitz (1986), and Altson and Hurd (1990).

[8]Other estimates on the marginal deadweight-loss per dollar of additional tax revenues are provided by Stuart (1984) and Findlay and Jones (1982). Stuart's estimates the marginal cost at 24 cents per dollar raised in the United States. Findlay and Jones placed the cost between 23% to 65% for Australia.

[9]The equations were estimated using the iterative Seemingly Unrelated Regression model with the demand restrictions imposed. In addition, the demand were tested for functional form and autocorrelation to determine the appropriate specification.

[10]Note that King, using a single equation approach estimated the price elasticity at 0.12.

[11]To hold output at the non-intervention level, some form of acreage control can be imposed based on past production. The prospects depends, however, on a low elasticity of substitution in production between land and non-land inputs. For more discussion on the issue, see Gardner, 1987b.

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Jabatan Ekonomi
Fakulti Ekonomi & Pengurusan
Universiti Pertanian Malaysia
43400 UPM Serdang, Selangor D.E.