PROTECTION THROUGH GOVERNMENT PROCUREMENT

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SUMMARY

Preferential government procurement results in increased output and employment in the favoured domestic industry provided the goods or services it produces are not perfect substitutes for imports available in infinitely elastic supply. Nevertheless, in common with protection by means of tariffs, this form of protection typically results in a reduction of output and employment elsewhere in the economy, despite the existence of aggregate unemployment, and also results in a reduced volume of trade. This occurs through real cost increases in other industries.

As protective measures, government procurement policies which discriminate in favour of suppliers from the home country appear to have the advantage over tariffs that they lead to a smaller loss of employment elsewhere in the economy per unit increase in the price of the home-produced good or service receiving the preferential treatment, and per unit increase in employment in the protected industry, than occurs with tariffs. There is also a smaller decline in the total volume of trade per unit of protection achieved under preferential government procurement in comparison with tariffs.

Despite this, preferential government procurement will not represent a first-best policy instrument for achieving a higher level of aggregate employment. It leads to an inefficient allocation of labour between protected and non-protected sectors of the economy and to an inefficient allocation of resources within the public sector.
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1. Introduction

Recognition of the importance of government procurement as an instrument of protection led to the 1979 Agreement on Government Procurement under the Central Agreement on Tariffs and Trade. This agreement, which came into effect at the beginning of 1981, aims to limit the degree to which government purchasing practices are used to discriminate in favour of domestic suppliers relative to foreign suppliers.¹ The agreement makes an exception in the case of procurements which are essential for national security. By 1982 roughly 20 countries had signed the GATT agreement, including the United States, Japan, Canada, the U.K., France and several other northern European countries. Australia has not signed.

The purpose of this paper is to analyze the economic effects of protection by means of preferential government procurement and to compare this with the effects of tariffs. We present a theoretical discussion with the aid of a simple general equilibrium model and an empirical illustration of the results using the ORANI general equilibrium model of the Australian economy.

¹See General Agreement on Tariffs and Trade (1979). On the importance of discriminatory government procurement and its protective effects see Baldwin (1976), where international action to curb this form of protection is proposed. For discussions of the phenomenon in Australia see Lloyd (1973) and Joos (1979).
The effects of tariffs have been analyzed extensively by economists. The desired effects of increasing the prices received by producers in protected industries, and of increasing employment in those industries are achieved at the cost of, among other things, reducing imports from other countries and reducing employment in other domestic industries. These employment effects are obvious under conditions of full employment, but they have been found to hold even when downward rigidity of real wages from levels above those which would clear labour markets causes aggregate unemployment. But how does protection by means of preferential government procurement compare with this?

In this paper, preferential government procurement will be interpreted to mean a shift in government purchasing away from imported goods and towards domestically produced goods and services. This shift is to be understood as a shift away from the pattern of expenditure which would be dictated by purely commercial considerations – the pattern which would minimize the cost of delivering a given level of government services.

We ask two questions about the general equilibrium effects of this form of protection in comparison with the effects of tariffs. First, for a given amount of protection of an import-competing industry, achieved through preferential government procurement on the one hand and a tariff on the other, which
instrument has the more unfavourable effect on employment in other industries? Second, under the same conditions, which instrument has the greater effect on the volume of imports? We shall attempt to answer these questions when the phrase "a given amount of protection" is taken to mean a given increase in the price received by the import competing industry and also when it means a given increase in employment in that industry.

2. The Model

We shall analyze these issues with the aid of a simple general equilibrium model. We have attempted to construct the simplest model capable of capturing the central economic phenomena involved. There are three commodities. One is exported but not consumed domestically, one is produced domestically and also consumed, and the third is imported for domestic consumption but is not domestically produced. We shall call these the export good, e, the home good, h, and the import good, i.2 There is only a single mobile factor of production, labour. All other factors are assumed to be industry specific and will thus be disregarded for the purposes of our analysis. The production functions of the export and home industries are \( f^e(L^e) \) and \( f^h(L^h) \), respectively, where \( L^e \) and \( L^h \) denote employment in these industries. The consumer's utility function is \( U(c^b, c^d) \), where \( c^b \) and \( c^d \) denote consumption of the

\[2\] It may be helpful to think of these goods as, say, coal, domestically produced cars and imported cars, respectively. Domestically produced cars and imported cars must be thought of as different but related commodities.
home good and the import good, respectively. These functions have the usual neoclassical properties.3

The domestic prices of the export good and the import good are determined by their international prices, assumed given to the country concerned, and any tariffs or subsidies which may be present. The price of the home good is determined by the usual market clearing forces. Producers and consumers behave as competitive profit and utility maximizers, respectively, but to simplify the analysis we shall have a single producer of the export good, a single producer of the home good and a single consumer.4 The home good and the import good are net substitutes in consumption,5 but the degree of substitution between them will prove to be important for the issues we wish to examine.

We choose units of measurement such that both the f.o.b. price of the export good and the c.i.f. price of the import good are unity. The domestic price of the import good is thus \( p^e = 1 + t \), where \( t \) is the ad valorem rate of any tariff which may be

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3 Production functions are strictly concave and the utility function is increasing in both variables and strictly quasi-concave.

4 In order for a tariff on imports to make sense as a device for protecting the home good industry it is necessary that private consumption of the home good be positive. That is, the government cannot be the sole purchaser of the home good. Since our aim is to compare tariffs with preferential government procurement, we therefore assume that \( C^0 \) is positive. A considerable amount of government spending, including a high proportion of defence spending, is consequently excluded from the coverage of our analysis.

5 In a model with only two consumer goods it is in fact impossible that they be not complements.
present, and the price of the export good is \( p^e = 1 \). The trade balance constraint is now

\[
Q^0 - C^i - G^i = 0, 
\]

where \( Q^0 \) denotes production of the export good, and \( C^i \) and \( G^i \) denote consumption and government purchase of the import good, respectively. The market clearing condition for the home good is

\[
Q^h - C^h - G^h = 0, 
\]

where \( Q^h \), \( C^h \) and \( G^h \) denote production, consumption and government purchase of the home good.

The wage is institutionally determined. It is indexed to the prices of the two consumer goods, \( p^h \) and \( p^i \), through the function \( w = \Gamma(p^h, p^i) \), with positive derivatives \( \Gamma_h \) and \( \Gamma_i \) respectively.\(^6\) This indexing function may or may not be such as to maintain a fixed real income for workers. Our qualitative results do not depend on the precise details of this indexing function; but to capture the spirit of the employment problem we assume that the initial wage level exceeds its market clearing value and that in the neighbourhood of this wage labour is available in infinitely elastic supply.

\(^{6}\)It should be noted that the tariff-inclusive price of the import good enters the wage indexing function even though the tariff revenues will be assumed to be redistributed in lump sum form. In fact, additional tariff revenues lead to a combination of additional government services and reduced taxes in other forms, but given the wage fixing process in Australia, where wages are indexed to the consumer price index, the assumption that tariff-inclusive prices for import goods enter the indexing function is clearly appropriate.
3. Intuitive Expectations

Before proceeding with the formal analysis of this model it is helpful to pause to consider the features of the model we expect, at an intuitive level, to be most important for our results. We briefly discuss two issues. The first is the degree of substitution between the import good and the home good. Suppose the two were perfect substitutes. The protective effects of a tariff imposed on the import good in such a case are well known to all students of international economics. They arise from the fact that the tariff raises the domestic price of the home good as well as the import good. But preferential government procurement would have no protective effects at all.

When the home good and the import good are perfect substitutes the price of the home good is determined by the international price of the import good. This is depicted in Figure 1. The demand function faced by producers of the home good, $p^h$, is horizontal at this price. This determines the output of the home good industry at, say, $Q^h_2$. When government procurement of the home good rises from $Q^h_0$ to $Q^h_1$ at the expense of imports of equal value, all that happens is that private consumption of the home good falls from $Q^h_0 - Q^h_0$ to $Q^h_0 - Q^h_1$ and this expenditure shifts to imports instead, replacing the imports previously purchased by the government. Total imports are unchanged. There are no protective effects because there are no relative price changes. For government procurement to be protective it must cause the price of the home good to rise, and
FIGURE 1: Government Procurement with Home Good and Import Good Perfect Substitutes
for this to occur the home good cannot be a perfect substitute for imported goods available at fixed prices.

The second issue is the degree to which changes in the domestic price of the home good and the import good are reflected in the costs of the export sector relative to the price of the export good (i.e. real cost changes). This is obviously central to any possible effects on employment in that sector. Recalling that we have normalised the price of the export good, the issue in our model is simply the degree to which changes in the home good and import good prices are reflected in changes in the wage and this involves the properties of the wage indexing function.\footnote{In models in which the home good and/or the import good are themselves direct inputs into the production of the export good a second and more direct avenue of real cost effect arises.}

If wages did not rise in response to a rise in the price of home goods, whether or not this was accompanied by a rise in the price of imports as well, employment and output in the export industry would be unaffected. Protection of the home goods industry could be achieved without the loss of employment elsewhere. Moreover, since total exports would be unaffected, total imports would be unchanged also. This seems odd in view of the fact that both preferential government procurement and tariffs affect relative domestic prices in this case and it is worthwhile to review the adjustment mechanism involved.

When government expenditure shifts from imports to the home good the immediate effect (at the existing value of $p^h$) is to
produce a balance of payments surplus and excess demand for home goods. The latter causes $p^h$ to rise, but the former is equivalent to an excess of income over expenditure. This leads to additional consumer spending on imports and home goods, the latter causing $p^h$ to rise further, until the balance of payments surplus is eliminated. But since exports have not changed (we have ruled out any changes in the relative prices facing producers in this sector) the process continues until total imports have returned to their former level and additional private purchases of imports have therefore exactly replaced the decline in government purchases.

In the case of a tariff, holding government procurement constant, the rise in the price of imports induces (at the existing price of home goods) a shift of private expenditures from the import good to the home good. The price of home goods rises, but the decline in imports (with exports constant) again implies a balance of payments surplus and an excess of income over expenditure. Spending on both goods rises and $p^h$ continues to rise until private sector imports return to their previous level. Of course, the new equilibrium under preferential government procurement and/or a tariff will correspond to higher real output and higher total employment, still assuming that wages do not rise in response to the attendant price increases, but neither instrument will be a first-best mechanism for reaching this higher level of aggregate employment. We shall return to this issue in the final section.
4. Formal Results

We shall now compare the effects of two policy measures. The first is a shift in government expenditure from the import good to the home good, such that total government expenditure remains constant (i.e. $p^b q^b - d^i$), and the second is the imposition of a tariff (with lump sum redistribution of tariff revenues). In analysing the effects of a shift in government procurement we shall disregard any effects of this shift on the value of government services provided. Any such effects will be of second-order importance for the issues we wish to examine, although they could well be important for other questions.

We impose the equality of aggregate income and expenditure. This implies that either the trade balance constraint (eq.(1)) or the market clearing condition for the home good (eq.(2)) is redundant (Walras' Law). Either equation can be dropped because it is implied by the remaining equations of the system. For our purposes it is more convenient to retain the market clearing condition for the home good.6

6A sufficient condition for our assumption to be strictly correct is that the government is initially allocating its expenditures between home-produced goods and imported goods so as to minimize the cost of providing government services. The decline in government output when purchases of imported goods decline by one dollar is then matched exactly by the rise in output when that dollar is spent on home goods.

The reader may readily confirm that our results are not altered if the trade balance equation is retained instead.
We differentiate the market clearing condition for the home good and the wage indexing function to obtain

\[(q^h - c^h)\dot{p}^h + q^h \dot{w} = c^h \dot{t} + d^h\]  \hspace{1cm} (3)

and

\[-I_h \dot{p}^h + \dot{w} = I_h \dot{t},\]  \hspace{1cm} (4)

where \(c^h\) and \(c^h\) denote the partial derivatives of the income compensated demand function for home goods with respect to the price of home goods and the price of imports, respectively, and \(q^h\) and \(q^h\) denote the derivatives of the supply function for home goods with respect to the price of home goods and the wage, respectively.\(^{10}\)

From these equations it is now possible to solve for the price and wage effects of changes in government procurement and tariffs. From this we can solve for the effects on employment in the home goods and export industries by reference to the demand functions for labour in these industries. These functions are simply the inverse functions of the profit maximizing conditions \(f^h(L^h) = w/p^h\) and \(f^h(L^o) = w\). We shall write these labour demand functions as \(L^h = L^h(w/p^h)\) and \(L^o = L^o(w)\). Differentiating them,

\[dL^h = L^h_w dw + \frac{dp^h}{p^h}(p^h)^2\]  \hspace{1cm} (5)

and

\[dL^o = L^o_w dw.\]  \hspace{1cm} (6)

\(^{10}\) For details on the derivation of equation (3), refer to Dornbusch (1974, pp. 178-9). The simplified form of (3) assumes that the initial values of \(p^h\) and \(t\) are both zero. This makes the mathematics easier but is not essential for our qualitative results.
Now consider the effects of a shift in government procurement with tariffs held constant. We have

\[ dp^h = \frac{dq^h}{D} \]  
(7)

and

\[ dw = \frac{dq^h}{I_h/D}, \]  
(8)

where \( D = I_h q^h_w + q^h_h - C^*_h \). From this,

\[ dl^h = \frac{dq^h}{I_w} \left( I_h - \frac{w}{p^h} \right) / p^h D \]  
(9)

and

\[ dl^e = \frac{dq^h}{I_w} I_h / D. \]  
(10)

Note that as the home good and the import good become perfect substitutes \( C^*_h \) approaches minus infinity and \( dp^h \) and \( dw \) approach zero.

The change in employment in the export industry per unit increase in the price of home goods is now

\[ \frac{dl^e}{dp^h} = I_h < 0, \]  
(11)

and the change in export industry employment per unit increase in home goods industry employment is

\[ \frac{dl^e}{dl^h} = \frac{I_h}{I_w} \left( I_h - \frac{w}{p^h} \right) / p^h \frac{\eta_{wh}}{I_w (1 - \eta_{wh})}. \]  
(12)

where \( \eta_{wh} = (\partial w / \partial p^h) / (w / p^h) \) is the elasticity of the wage.
(through the wage indexing function) with respect to the price of home goods. We expect $0 < \eta_{wh} < 1$. For example, an indexing function which maintained the real incomes of workers would have $\eta_{wh}$ equal to the share of home goods in workers' expenditure. This implies $dL^h/dL^w < 0$, but as $\eta_{wh}$ approaches unity the ratio of the two employment effects approaches minus infinity.

Whether total employment rises or falls depends on the absolute value of (12). It is readily shown that (12) becomes

$$
\frac{dL^w}{dL^h} = \frac{Q_w^e \eta_{wh}}{Q_w (1 - \eta_{wh})} = \frac{Q_w^e \xi_{wh}}{Q_h (1 - \eta_{wh})},
$$

where $\xi_{wh}$ denotes the elasticity of supply of the export good with respect to the wage. From this we see that preferential government procurement is more likely to raise total employment - expression (13) is more likely to be small in absolute value: (a) the lower the responsiveness of wages to the price of the home good, and (b) the lower the responsiveness of the output of the export good industry to increases in the wage in comparison with the home good industry, that is, for given sizes of the two industries, the more labour intensive is the home good industry relative to the export industry.

Now consider a tariff, with government procurement held constant. Since the method of analysis is now clear it is
possible to proceed directly to the central results.

\[
\frac{dI^*}{dP^*} = \frac{I^*_w (I^*_h + I^*_i, P^*_h / Q^*_i)}{1 - I^*_1 Q^*_w / Q^*_i}
\]  

(14)

and

\[
\frac{dI^*}{dI^*} = \frac{I^*_w p^h [I^*_h + I^*_i, P^*_h / Q^*_i]}{I^*_w [I^*_h - w / p^h + (Q^*_w w / p^h + P^*_h / Q^*_i) 1 / Q^*_i]}
\]  

(15)

where \( P^*_h = C^*_h - Q^*_h \) is the own price derivative of the income compensated excess demand function for home goods. We know that \( P^*_h < 0 \) is necessary for stability of the system and \( Q^*_w < 0 \) follows from the concavity of the home goods' production function. We also know that \( Q^*_i > 0 \) (home goods and imports are substitutes) and that \( I^*_1 > 0 \) (raising the tariff causes wages to rise) and this implies that the absolute values of expressions (14) and (15) exceed the values of (11) and (12), respectively.

The fact that imports and home goods are (imperfect) substitutes and the fact that wages respond positively to the prices of imports imply that the negative effect on employment in the export sector of a given level of protection of the home goods (import-competing) sector is larger in the case of tariffs than in the case of preferential government procurement. This is so whether the two instruments of protection are set so as to achieve the same increase in the price of home goods or the same increase in employment in the home goods industry.
What about the effects on imports from other countries? These effects can be inferred directly from our results already. From eq. (1), \( dQ^o = dQ^i + dQ^h \). The change in total imports must obviously be equal to the change in total exports. But the export effects are proportional to the export industry employment effects described above, since \( dQ^o = dL^o + dL^o \). For a given amount of protection of the home goods sector (defined in terms of home good price effects or home industry employment effects), the negative effect on imports from other countries is smaller in the case of protection through preferential government procurement than protection through tariffs.

5. Diagrammatic Illustration

These results are illustrated, perhaps in more digestible form, in Figure 2. The key is panel A. This panel depicts supply and demand for home goods, as follows. The demand function for home goods is \( Q^h = D^h(p^h, p^i) = Q^h(p^h, 1 + t) \) and the supply function is \( Q^h = Q^h(p^h, w) \). We substitute the wage indexing function \( w = I(p^h, 1 + t) \) into the supply function to obtain \( Q^h = Q^h(p^h, 1 + t) \). Variations in the tariff thus induce shifts in the supply and demand schedules depicted in panel A. From the equality of income and expenditure, equilibrium in the market for home goods implies equilibrium in the market for traded goods and Figure 2 therefore depicts a general equilibrium rather than a partial equilibrium.

The initial equilibrium is at the intersection of \( D_o \) and \( S_o \). Government procurement of \( G \) shifts the demand schedule to \( D_o + G \).
FIGURE 2: Government Procurement versus Tariffs
and this causes the price to rise from \( p_0^h \) to \( p_1^h \). From panel D, which shows the production function in the home goods industry, employment in that industry rises from \( L_0^h \) to \( L_1^h \). Panel B depicts the wage indexing function. Without a tariff the relevant wage indexing schedule is \( I_0 \) and the price rise from \( p_0^{e} \) to \( p_1^{e} \) implies a wage increase from \( w_0 \) to \( w_1 \). In conjunction with panel C, depicting the demand for labour in the export industry, this implies a decline in employment in the export industry from \( L_0^e \) to \( L_1^e \).

The absolute magnitude of this decline in export industry employment relative to the gain in employment in the home goods industry, as depicted in the diagrams, reflects the particular way the schedules are drawn and is not of interest here. We wish now to compare this loss of employment in the export sector due to government procurement, with the effects of a tariff which has similar protective effects on the home goods sector.

A tariff shifts the demand schedule for the home good to the right, by raising the price of a substitute, and shifts the supply schedule to the left, by raising costs. Suppose we have a tariff which shifts the demand schedule to \( D_1 \) and the supply schedule to \( S_1 \), raising the price of home goods from \( p_0^h \) to \( p_1^h \), as before. Since this also shifts the wage indexing schedule (\( w \) as a function of \( p^h \) from \( I_0 \) to \( I_1 \), the wage rises from \( w_0 \) to \( w_2 \) and employment in the export industry falls more than it did under preferential government procurement having the same price.
effect. If the tariff is sufficiently large to have the same effect on employment in the home goods industry as under government procurement the home goods price rises to $p^b$ and export industry employment falls further still to $L^e$.

6. **Empirical Illustration for Australia**

We have simulated the effects of preferential government procurement on the one hand and tariffs on the other, using the ORANI general equilibrium model of the Australian economy. This model has been fully described elsewhere (Dixon, et al. (1982). Although it is a large model specifying 115 commodities its basic structure is broadly consistent with the small-scale theoretical model we have discussed. Import goods and home-produced goods are imperfect substitutes and the prices of home-produced goods are determined by domestic supply and demand conditions. In our simulations there is a single mobile primary factor of production and trade balance is imposed. The wage is fully indexed to the consumer price index and labour markets are slack at this fixed real wage.

The most important structural difference between the two models is that ORANI has a full input-output structure based on the 1974-75 Australian input-output tables. This means that changes in the prices of home-produced goods and import goods enter the cost conditions of other domestic industries directly, through the role commodities play as intermediate goods, as well as through the effect on wages that we have discussed.
Nevertheless, in most simulations, transmission through wage effects tends to play a dominant role. In addition, the ORANI model incorporates econometrically estimated export demand elasticities which are finite and these export goods are also consumed. This does not play a major role in the types of simulations we are discussing here.

Table 1 presents a sample of the results of our simulations. For both the government procurement and the tariff instrument we give ratios of the employment change outside the protected sector to the employment change inside the sector. Results are presented for selected individual import-competing industries and for the import competing sector as a whole. In the latter case we are comparing the effects of a switch of government spending from imports to domestic supplies (aggregate government spending held constant) with the effects of a uniform percentage change in the tariff rates levied on the relevant competing imports. The commodity composition of the government-expenditure switch is determined by the weights (computed from the 1974-75 input-output tables used in constructing the ORANI data base) of the commodities in the aggregate value of imports. The details of the simulations results and the results obtained are described in detail elsewhere (Pawmanter and Warr, forthcoming) so the present discussion will be confined to indicating the flavour of the results.
<table>
<thead>
<tr>
<th>Industry</th>
<th>Share of total employment</th>
<th>Change in employment elsewhere per job created</th>
<th>Government procurement</th>
<th>Tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial chemicals (27.02)</td>
<td>0.0038</td>
<td>-0.31</td>
<td>-4.68</td>
<td></td>
</tr>
<tr>
<td>Motor vehicles and parts (32.01)</td>
<td>0.0176</td>
<td>-0.17</td>
<td>-1.28</td>
<td></td>
</tr>
<tr>
<td>Aircraft building (32.04)</td>
<td>0.0030</td>
<td>-0.33</td>
<td>-10.99</td>
<td></td>
</tr>
<tr>
<td>Scientific equipment (33.01)</td>
<td>0.0018</td>
<td>-0.26</td>
<td>-38.53</td>
<td></td>
</tr>
<tr>
<td>Other machinery (33.07)</td>
<td>0.0110</td>
<td>-0.01</td>
<td>-1.79</td>
<td></td>
</tr>
<tr>
<td>Import-competing sectora</td>
<td>0.1867</td>
<td>-0.13</td>
<td>-2.41</td>
<td></td>
</tr>
</tbody>
</table>

*aThe import-competing sector is defined as all of manufacturing except industries which, according to the OMAI database, export more than 20 per cent of their total output or face an import share in their domestic market of less than 1 per cent.*
The results presented confirm our theoretical expectations in relatively dramatic fashion. In each case, preferential government procurement causes a loss of employment in other industries which is smaller than the gain in employment in the target sector.\(^{11}\) Total employment rises. But aggregate employment falls in the case of tariffs. The large loss of employment in other industries which occurs when tariffs are used to stimulate employment in the aircraft building and scientific equipment industries occurs because imports of these goods are large in relation to the size of the home good industry and because the home good and import good are relatively weak substitutes. This implies that the term \(I_1 \frac{p_h^s}{c_h^s}\) in eqs. (14) and (15) is large in relation to \(I_h\) for these industries and the negative employment effects of tariffs are large relative to those of preferential government procurement.

They key to understanding the tariff result for the import-competiting sector as a whole is to realise that the net effect that the sector-wide tariff increase has on employment is very small even within the import competing sector itself. Thus, although the results indicate that, using the tariff instrument, 2.41 jobs are lost outside the import-competiting sector for each

\(^{11}\) Cases arise where preferential government procurement actually causes a gain in employment elsewhere. Examples tend to be industries: (a) whose output prices do not enter the consumer price index, and so do not influence wages, (b) whose output is not used significantly as an intermediate good elsewhere in the economy, and (c) which use labour-intensive intermediate goods produced elsewhere.
job created within it, the net job loss for the economy as a whole is very small: a one per cent tariff increase across the import-competing sector as a whole is projected in these simulations to result in only a 0.01 per cent fall in economy-wide employment.

7. Conclusions

Preference government procurement results in increased output and employment in the favoured domestic industry provided the goods or services it produces are not perfect substitutes for imports available in infinitely elastic supply. Nevertheless, in common with protection by means of tariffs, this form of protection typically results in a reduction of output and employment elsewhere in the economy, despite the existence of aggregate unemployment, and in a reduced volume of trade. This occurs through real cost increases in other industries.

As protective measures, government procurement policies which discriminate in favour of suppliers from the home country appear to have the advantage over tariffs that they lead to a smaller loss of employment elsewhere in the economy per unit increase in the price of the home-produced good or service receiving the preferential treatment, and per unit increase in employment in the protected industry, than occurs with tariffs. There is also a smaller decline in the total volume of trade per unit of protection achieved under preferential government procurement in comparison with tariffs.
We have derived these results using a simple general equilibrium model in which there is a disequilibrium real wage and aggregate unemployment and in which the wage is indexed to the prices of imported goods and home-produced goods. We have also illustrated our results using the ORANI general equilibrium model of the Australian economy. The source of the advantages we have attributed to preferential governmental procurement is that a tariff achieves the desired effect of raising the price of the home-produced good indirectly by increasing the domestic price of the imported good, which is a partial substitute. Both these price increases raise real costs elsewhere in the economy. Preferential government procurement raises only the price of the home good, leaving the prices of imported goods unaffected and so for a given amount of home-good protection achieved it results in smaller real cost increases elsewhere in the economy.

In common with protection through tariffs, preferential government procurement may cause aggregate employment to rise or fall. This depends on the degree to which wages and other costs respond to an increase in home goods prices and the elasticity of demand for labour in the home goods industry compared with the rest of the economy. But even if aggregate employment rises, preferential government procurement will not be a first-best instrument for reaching this higher level of employment.

To see this it is useful to note, first, that in its price effects the policy is equivalent to a production (or employment)
subsidy in the home goods industry. This raises total employment but leads to an inefficient allocation of labour between sectors. The first-best policy is a uniform production (or employment) subsidy in both sectors, lowering the real cost of employing a worker in each sector. Alternatively, it is a uniform reduction in the real wage. Second, a preferential government procurement policy differs from a production (or employment) subsidy in the home goods sector in that the price rise is achieved by diverting the pattern of government purchasing away from the efficient mix of imported and home goods. This will lead to deadweight costs which are to be compared with the deadweight costs of financing a production subsidy having the same price effects.

A further unpleasant feature of protection through preferential government procurement is that it lacks the "transparency" of protection though tariffs. It is not possible to see at a glance how much protection, in "tariff-equivalent" terms, results from preferential government procurement. This is a genuine problem, but it is as much a reflection of the current state of development of empirical economic analysis as it is an intrinsic feature of preferential government procurement itself. Progress with general equilibrium modelling of the economy can be expected to make a useful contribution by raising the "transparency" of non-tariff distortions of this kind.
REFERENCES


General Agreement on Tariffs and Trade (1979) Agreement on Government Procurement (Geneva: Central Agreement on Tariffs and Trade).


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