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The Benefits of Tariff Reductions in the Presence of Psychological Adjustments Costs

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Abstract: The Benefits of Tariff Reductions in the Presence of Psychological Adjustments Costs.

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A model of a small trading economy is developed which introduces the notion of "psychological adjustment costs". This model is then employed to consider the welfare effects of tariff reduction. It is assumed that the government is only prepared to eliminate the existing tariff if this action generates a potential Pareto improvement. It is then shown that the policy which satisfies this restriction and which is implementable provides only consumption gains from trade.

Keywords: Psychology, Adjustment-Costs, Trade, Welfare

1. Introduction

The standard models of international trade theory assume that an economy can move costlessly from one equilibrium to another following some disturbance. At the same time it is widely recognised that this assumption is false. This raises the question: are the welfare conclusions reached by the standard models sensitive to the assumed absence of adjustment costs?

For example, what effects would the presence of such costs have on a policy of tariff reform that is anticipated by the private sector? For a small country with a pre-existing tariff on an import-competing good, and assuming the absence of any distortions, the standard view appears to be that the presence of adjustment costs does not affect the endpoint of the policy process, which is that the tariff should be completely removed. However, their presence may justify the staged reduction of the tariff. This is the conclusion Leamer (1980) reaches in a two-period model in which the goverment aims to maximise the discounted value of national income measured at world prices. Vousden (1990) extends Leamer's model to take into account consumer behaviour and reaches the same answer.[1] If the tariff policy is unanticipated, then the presence of adjustment costs in the Leamer-Vousden model are irrelevant. If the tariff should have been reduced to zero in their absence, then it should be reduced to zero when they are present.

Leamer models adjustment costs in two ways. In the first formulation workers who transfer experience a spell of unemployment, while his second approach assumes that new

entrants suffer a period of lower productivity because of on-the-job training.

The adjustment costs considered by Leamer and Vousden may be called "production adjustment costs". Thurow (1992, p. 83) has drawn attention to other adjustment costs:

"Despite what humans often say about themselves - "We like to change!" - humans like stability and order. They hate to be forced to change. Human security is more than a steady income. It is stability and knowing how one's immediate world functions. Even if changing jobs does not lower an employee's lifetime income, if she or he is well insured during the transition from one job to another, the personal stability of one's environment has disappeared. Old friends and workmates disappear; new ones have to be made. Exactly what one does at work and who one has to know to get promoted all suddenly change when one's job changes. To be fired or laid off is to be tossed out of one's pack. Why should that be any less traumatic to one's feeling of belongingness than being exiled from one's village in days gone by?"

I wish to highlight two aspects of this discussion. The first is the intangible lifetstyle adjustment costs to which Thurow refers as being another class of adjustment costs. I label these "psychological adjustment costs". The second aspect I want to highlight is the element of coercion in the job-change process. Individuals do not willingly change jobs. It is implicit in the Leamer-Vousden model that individuals are always able to work in the import-competing

industry provided that they are prepared to accept a reduction in their real wage. However as Markusen and Melvin (1988) point out, it is frequently the case that adjustment leads to plant closures. In such cases the individuals concerned would probably not see themselves as being faced with a choice between looking for new employment and continuing at their original place of work but at a lower wage. Now their perception could be wrong, but on the other hand it may not be. For example, an individual would not face such a choice if the wage they would have to accept is below the subsistence level, or if there is a minimum viable plant size and there are insufficient individuals prepared to accept the reduced wage.

The purpose of this paper is to construct a model which assumes both psychological adjustment costs and that workers in the contracting industry do not have the option of continuing to work in it following a tariff cut. I also construct a model in which this last assumption is dropped. It is also assumed throughout that there are no production adjustment costs. This model is then used to consider the welfare consequences of an unanticipated tariff reduction.

2. The Model

The starting point is the Ricardian trade model. Each individual is both a worker (producer) and a consumer, with the production frontier for each individual being:

$$y_p = k - x_p \qquad [1]$$

where y_p and x_p denote the output of the two goods, and k is some positive constant. Each worker must work in either the x industry or the y industry.

It is assumed that the economy is initially in autarky due to the existence of a prohibitive tariff. Setting the price of good y equal to one and letting p^h be the local price of good x, then with non-specialisation $p^h = 1$. The assumptions to be made later about tastes will ensure that the economy is non-specialised in autarky. It is also assumed that $p^f > 1$, where p^f is the world price of x.

What follows is a specification of the individual utility functions which incorporates the factors mentioned in the quotations from Thurow. It assumes that the individuals can be divided into two groups. Each member of the first group (A) has the following utility function

$$U(A) = [1/(a^a(1-a)^{(1-a)})]x^a y^{1-a} z, \quad 0 < a < 1 \qquad [2]$$

where x and y are the individual's consumption of the two goods, and z is a shift variable. If the individual works in the same industry in autarky and free trade then $z = 1$; if the individual works in a different industry in free trade from the one in which he or she worked in autarky then $z = v \leq 1$.

Change then is modelled by assuming that it will lead to a multiplicative reduction in the utility derived from any given bundle of marketable goods. This adverse shift in the utility function could occur for a variety of reasons. The individual might dislike firstly a change in routine: or secondly, the losing of established workplace

relationships: thirdly, he or she might dislike losing community identity brought about by any change in location.[2]

The utility function for members of the second group (B) is given by

$$U(B) = [1/(a^a(1-a)^{(1-a)})]x^a y^{1-a}, \qquad 0 < a < 1 \qquad [3]$$

The individuals in the second group are thus assumed to be unaffected by change. The number of individuals in this group may be zero.

Letting m be money income, then the indirect utility function for a member of group A (remembering the price of y is equal to one), is:

$$U(A) = mp^{-a} z \qquad [4]$$

In autarky m = k and p = 1, so the level of utility obtained by each individual in autarky, regardless of his or her group, is

$$U^* = k \qquad [5]$$

Solving [4] for m and using [5], we can find the income that a group A individual needs in order to obtain the autarky utility when in free trade. This is given by:

$$m^r(A) = (k/z)(p^f)^a \qquad [6]$$

Setting z = 1 in equations [4] and [6] gives the indirect utility function and the required income function for group B individuals

Let U^{ij} be the utility of an individual who worked in industry i in autarky, and who works in industry j in free trade, where i, j = x, y. It is easily verified for group B individuals who initially work in either industry, or for group A individuals who intially work in x, that $U^{xx} > U^* > U^{xy}$ and that $U^{yy} < U^*$. For group A individuals who initially work in y it is not possible to rank U^{yx} and U^{yy}, or U^{yx} and U^*, without knowing the size of v.

The standard Ricardian model is further modified by assuming that y is subject to an external economy. More specifically it is assumed that there is a viable minimum size for industry y.

[MS] For the y industry to be viable there has to be at least s active workers, where $s > 1$.

Let N(A, y) denote the set of members of group 1 who initially work in industry y. It will be assumed that:

[N] The set N(A, y) contains $0 < n_o < s$ members.

It can now be shown that:

Proposition (1): Assuming [1], [2], [3], [MS], [N] and $v \leq v^* = [n_o(p^f)^a/(n(p^f - (p^f)^a) + n_o(p^f)^a)]$, then if the tariff is eliminated:

(a) The economy will specialise in x;

(b) The removal of the tariff will not generate a potential Pareto improvement.

Proof

The proof of (a) is straightforward. The market income of all workers after the removal of the tariff will be kp^f. Consider first those individuals who are not members of N(A, y). Let t_i be the income that could be transferred from such a worker such that he or she is indifferent between the situation before and after the removal of the tariff, and let $T = \Sigma t_i$. To calculate t_i the individual's required income is subtracted from his or her market income. The required income is derived from [6] after setting $z = 1$. Summing over t_i gives $T = [n - n_o]k[(p^f - (p^f)^a]$, where n is the size of the labour force. Now consider the members of N(A, y). Let r_j be the income transfer required by a member of N(A, y) such that he or she is indifferent between the situation before and after the removal of the tariff, and let $R = \Sigma r_j$. To calculate r_j the individual's market income is subtracted from his or her required income. The required income is derived from [6] after setting $z = v$. Summing over r_j gives $R = n_o k[(p^f)^a/v - p]$. For any value of T there exists a value of v such that $R = T$. Letting v^* denote this critical value, then $v^* = [n_o(p^f)^a/(n(p^f - (p^f)^a) + n_o(p^f)^a)]$. For values of $v \leq v^*$ it will be the

case that $R \geq T$, and so the removal of the tariff will not generate a potential Pareto improvement.#

The assumption [MS] was introduced in order to provide a formalisation of Thurow's views which were quoted earlier. However it turns out that a propositon similar to Proposition (1) holds if [MS] is dropped and it is assumed that all individuals belong to Group A.

Proposition (2): Assuming [1], [2] and $v' < v < v''$, where $v' = 1/p^f$ and $v'' = [(1 - a)(p^f)^a/(p^f - (p^f)^a) + (1 - a)(p^f)^a)]$, then if the tariff is eliminated:

(a) The economy will specialise in x;

(b) The removal of the tariff will not generate a potential Pareto improvement.

Proof:

After the tariff is eliminated an individual who works in y will earn money income k, while an individual who works in x will earn kp^f. Using [4] and the relevant market incomes it can be shown that if $v > 1/p^f$ then $U^{yx} > U^{yy}$. This means that all workers initially in the y industry will transfer to the x industry. This demonstrates Part a of the proposition. Let $\lambda_y = n_y/n$, where n_y is the number working in the y industry in autarky, and note that $\lambda_y = (1\text{-}a)$. Consider first those individuals who initially worked in the x industry. Let t_i be the income that could be transferred from such a worker, such that he or she is indifferent between the situation before and after the removal of the tariff, and let $T = \Sigma t_i$. Now consider those individuals who initially worked in the y industry. Let r_j be the income transfer required by such a worker, such that he or she is indifferent between the situation before and after the removal of the tariff, and

let $R = \sum r_j$. The procedures for computing t_i and r_j have already been outlined in the proof for Proposition (1) and so will not be repeated here. Summing t_i and r_j over the relevant number of individuals gives $T = nak[p^f - (p^f)^a]$ and $R = n(1 - a)k[(p^f)^a/v - p^f]$. It follows from these expressions for R and T that if $v \leq v''$ then $R \geq T$ and so the removal of the tariff will not generate a potential Pareto improvement. Finally it is straightforward to show that $v' < v''$.#

Proposition (2) shows that for this model unwelcome welfare effects occur not when adjustment costs are very high (v very small) but rather when they fall into some intermediate range. It is straightforward to show that if the value of v were less than or equal to v' or greater than v'' then eliminating the tariff would generate a potential Pareto improvement.

Finally it can be shown that:

Proposition (3): Assuming either [1], [2], [3], [MS], [N] or [1], [2], [3], if the government eliminates the tariff and simultaneously announces that it will redistribute income to ensure that the post-transfer incomes of all workers will be equal, then this policy will:

(a) Lead to no change in the output of the two goods;

(b) Generate a Pareto improvement.

Proof:

If all workers know they will receive the same income regardless of their location then no worker will have any incentive to move when the tariff is eliminated. It is assumed that in these circumstances no worker will move and so the free trade production of both goods will equal their autarkic production. This demonstrates part a of the proposition. The market income of those who are in the x industry

after the removal of the tariff will be kp^f. Let t_i be the income that could be transferred from such a worker, such that he or she is indifferent between the situation before and after the removal of the tariff, and let $T = \Sigma t_i$. The market income of those in the y industry after the removal of the tariff will be k. Let r_j be the income transfer required by such a worker, such that he or she is indifferent between the situation before and after the removal of the tariff, and let $R = \Sigma r_j$. The procedures for computing t_i and r_j have already been outlined in the proof for Proposition 1 and so will not be repeated here. Though it should be noted that for the y industry workers the required income is now derived from [6] after setting $z = 1$. Summing t_i and r_j over the relevant number of individuals gives $T = nak[p^f - (p^f)^a]$ and $R = n(1 - a)k[(p^f)^a - 1]$. It follows from these expressions for R and T that $T > R$ and so the removal of the tariff accompanied by a scheme to equalise the post-transfer incomes of all workers will generate a Pareto improvement.#

3. Discussion

Kemp and Wan (1993) assert that it is not possible for the government to know in detail the preference functions of agents or the production technology. Hence a policy can only be implemented if it does not require the government to possess such information. For the model used to prove Proposition (1) this implies that a policy can only be implemented if (inter alia) it does not require the government to know the size of v, the identity of the members of the two groups, and the minimum size of y - that is s. For the model used to prove Proposition (2) a policy can only be implemented if

(inter alia) it does not require the government to know the size of v. In determining the government's optimal course of action, attention will be confined to policies that are capable of being implemented.

It is also assumed that the government will only wish to implement an active policy if it is certain that it will lead to an outcome which is potentially Pareto superior to the status quo, and that if there is no such policy it will retain the staus quo. Hence it is being assumed that the government is concerned only with efficiency, and that it has no concern with the distributional effects of its choices.

It is also assumed that the government will choose a policy from the following set: (1) reduce the tariff to zero; (2) retain the tariff; (3) reduce the tariff to zero and equalise the post-transfer incomes of all workers. All of these policies are capable of being implemented. However, as Propositions (1), (2) and (3), show only Policy (3) satisfies the requirement that the policy chosen must be known to generate a potential Pareto improvement. In fact Policy (3) will generate a Pareto improvement. Hence Policy (3) can be designated as the optimal policy.

Restricting attention to the three policies given above may seem to be somewhat arbitrary, but as far as I can tell there are no additional policies which are both capable of implementation and which will generate a potential Pareto improvement. The problem is that in trying to devise more elaborate compensation schemes the government will obtain very little information about the value of v just from observing market behaviour.

There are several points which arise from the conclusion reached above that Policy (3) is optimal. The first point to note is that this conclusion does not undermine the case for free trade provided that the abolition of the tariff is accompanied by what is, in effect, a production subsidy to the import-competing sector. This policy conclusion is similar to those which emerge from models of second-best worlds. However considering that the assumptions used to prove Proposition 2 involve only a mild form of indivisibility this suggests that conclusions reached for first-best worlds may have little practical relevance. Further, Proposition (3) holds under assumptions (1), (2) and (3); the model comprising these assumptions is a model of a first-best world. It follows that policies which may be thought to be relevant only for second-best worlds are also relevant in some first-best worlds.

The second point to note is that the optimal policy requires employing what is sometimes called an adjustment-resisting policy. Hence, for this model it is not necessary to justify such a policy by appealing to the distributional effects of the tariff elimination. Even if the government is only concerned with efficiency, as we assumed above, then it should use the adjustment-resisting policy.

Thirdly, the only gains from trade which will accrue from implementing Policy (3) are the "consumption gains from trade". Typically, empirical estimates of these gains are very small, so it is a matter of little consequence whether or not the tariff is eliminated.

The conclusion that tariff elimination should be accompanied by a production subsidy for the import-competing sector can be contested in three ways. Firstly, it can be argued that the

government can obtain the necessary information. Whether or not it can is a complex matter which depends in part on whether individuals would have incentives to misrepresent their preferences. Regardless of how this issue is resolved, the discussion suggests that estimates of the gains from trade using only observable data - that is almost all such estimates - should be treated with some scepticism.

The second escape route involves reconsidering the Pareto criterion which has been used to evaluate the various policies. One of the attractions to economists of the Pareto criterion is that they believe it to be widely acceptable. However it is far from clear that a majority of individuals, let alone all of them, would conclude that Policy (3) is preferable to either of the other two policies. Strong advocates of the market would probably rank Policy (1) above both Policies (2) and (3). Others, with a preference for social stability, might rank the policies from best to worst as (2), (3), (1). Others, possibly the majority, may not be able to make a decision in the abstract and would require further information before deciding. At the very minimum they would require estimates of the number of individuals affected. Using this information they might wish to make interpersonal comparisons of utility before deciding on which policy was desirable. This discussion suggests that the Pareto criterion is not as obviously acceptable as it is normally claimed to be. For a wide-ranging discussion of the need to make and use interpersonal comparisons of utility in second-best worlds see Blackorby (1990).

A third way to avoid the conclusion that Policy (3) is optimal would be to argue that it is implausible to assume that there exist individuals for whom the costs of dislocation are so high that it is

impossible to provide compensation for policy-induced changes. As economic assumptions go, it is difficult to believe that this one is particularly outrageous. For example, assuming [MS] and [N], if there is only one individual who is a member of N(A, y), provided that for this individual his or her value of v is almost equal to zero, then a policy of eliminating the tariff will not generate a potential Pareto improvement. In this connection it should be noted that there are cases in which individuals have reported that their costs of adjustment are infinite, see for example Mishan (1970). Hence, the assertion that psychological adjustment costs matter is one that has to be taken seriously.

Finally, a reader who does not believe that psychological adjustment costs are large enough to matter may be interested in the model as a possible explanation of the widespread suspicion with which the doctrine of free trade is regarded by non-economists. That there is such suspicion is accepted by many trade theorists. Mussa (1993) believes that such views are on a par with the idea that the earth is flat. What Propositions (1) and (2) demonstrate is that in models with psychological adjustment costs, a tariff reduction may appear to have been successful in raising welfare. Everyone's income rises and there is continous full employment, but at the same time the policy may leave some individuals feeling dissatisfied. If the models presented here more accurately reflect popular beliefs about the economy than do conventional ones, then it is not so surprising that there is hostility to the notion of free trade. This hostility then may not be the result of ignorance of the theory of comparative advantage as Mussa alleges; instead it may result from the fact that

non-economists hold different beliefs about the nature of the world.

Footnotes

1. The costs involved in adjustment would usually be thought of as those costs which workers incur when they switch from one sector to another. Vousden analyses the welfare effects of adjustment using the representative agent construct. This means the adjustment costs he analyses are those incurred by the representative agent when she decides to change the proportion in which she offers her labour to the two sectors. It is far from obvious that the welfare effects that follow from Vousden's formulation will be the same as those which follow from the formulation which assumes that some agents will be switching from one sector to another. This paper assumes that adjustment involves individual workers moving between sectors.

2. While Equation [2] can be interpreted as suggesting that the effects of change are permanent, there is an alternative interpretation which is intuitively more plausible. Consider an individual who has to decide between staying in his or her current job or moving to another one, and that this individual has a t period decision horizon. Let $c_iU(x,y)$, with $c_i \leq 1$ be the utility that the individual obtains in the ith period if the individual has in fact moved. Then the individual's average utility over the decision horizon is $[1/t]\sum c_iU(x,y) = U(x,y)\sum c_i/t$. Letting $\sum c_i/t = v$, the individual's average utility can be expressed as $U(x,y)v$. If the individual decides not to move, then the utility obtained by the individual in each period, and so the average utility over the decision period, is just $U(x,y)$. It may be the case that $c_i < 1$ for the early periods, but that after some point j, $c_j = c_{j+1} = \ldots\ldots c_n = 1$. Hence Equation [2] is consistent with the idea that the effects of change on

the individual's one-period utility function are transient. It is straightforward to introduce time discounting or decisions horizons of infinite length.

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