Tariffs vs. Quotas over the Business Cycle[**]

Robert M. Dunn, Jr.[*]

Abstract

This paper extends the literature on tariffs vs. quotas by comparing their impacts in a world of macroeconomic shocks and trade account imbalances with fixed exchange rates. The effects of tariffs and quotas on output, prices, import volumes, and profits are compared both when business cycles originate in the importing country and when they start in the exporting country. In the former case the maintenance of a tariff reduces the domestic effect of a business cycle by passing some of its effects through to exporters, while a quota contains the effects of such shocks within the importing economy. When business cycles originate in the exporting country, most of the earlier conclusions are reversed. Countries wishing to minimize the disruptive impacts of domestic business cycles should choose tariffs rather than quotas as the primary tool of commercial policy, while those worried primarily about the domestic effects of foreign macroeconomic shocks should rely on quotas rather than tariffs.

I. Introduction

During the 1960's and 1970's there was a long academic debate as to the circumstances under which tariffs and quotas produced equivalent results.[1] That debate took place largely under traditional barter assumptions, and excluded macroeconomic

---

* Department of Economics, The George Washington University, 2201 G. Street, NW, Washington, DC, 20052, U.S.A

1. An attempt to list all of the significant contributions to this literature would consume more space than the text of this paper, but a few articles might be viewed as central. Jagdish Bhagwati was a major contributor to this debate, and his 1983 revision of an earlier paper might be viewed as summarizing where the subject stood when the academic discussion largely ceased ("On the Equivalence of Tariffs and Quotas," in *Essays in International Economic Theory,*

variables. This is not surprising since international economics has traditionally been divided into trade and finance halves, with the two sides seldom interacting. The equivalence of tariffs and quotas was a pure trade theory topic so there was no apparent reason to consider how these two tools of commercial policy might compare in a world of macroeconomic shocks.

Blejer and Hillman's (1983) article is an exception in that they compare the performance of tariffs and quotas when demand shocks occur, concluding that quotas tend to bottle up demand shocks while tariffs let such shocks spill out through changes in import volumes.[2] They operate within a monetarist framework and also consider the relative impacts of tariffs and quotas on balance of payments behavior and on the stability of foreign exchange reserves. Although this paper was developed without prior reference to the Blejer and Hillman effort, it might be viewed as an extension of that analysis ; more sources of macroeconomic shifts are considered, and the comparisons between the impacts of tariffs and quotas are made for more aspects of tradable goods markets.

In the following pages the comparative impact of tariffs and quotas will be discussed both when business cycles originate in the importing country and when they start in the exporting country. The effect of the choice between tariffs and quotas on the volatility of markets in both importing and exporting countries will be considered for business cycles originating on both sides of trade, meaning that a total of four comparisons will be made :

1. the effect of the choice between tariffs and quotas on the impact of business cycles orignating in the *importing* country on :

   A. markets in the importing country.

   B. markets in the exporting country.

2. the effect of the choice between tariffs and quotas on the impact of busi-

---

MIT Press, Cambridge, 1983). See also, Rachel McCulloch, "When Are a Tariff and a Quota Equivalent?", *Canadian Journal of Economics*, November 1973, pp. 503-511 ; Mordechai Kreinen, "More on the Equivalence of Tariffs and Quotas," *Kyklos*, #1, 1970, pp. 75-78 ; and Wendy Takacs, "The Nonequivalence of Tariffs, Quotas, and Voluntary Export Restraints," *Journal of International Economics*, November 1978, pp. 565-573.

2. Marie Blejer and Ayre Hillman, "On the Dynamic Non-equivalence of Tariffs and Quotas in the Monetary Model of the Balance of Payments", *Journal of International Economics,* vol. 13, 1982, pp. 163-169. Claus Vastrup deals with the subject of uncertainty in demand shifts in "On the Choice between a Tariff and a Quota under Uncertainty", *Weltwirtschaft Archiv.*, #4, 1979, pp. 729-734.

ness cycles originating in the *exporting* country on :

    A. markets in the importing country.

    B. markets in the exporting country.

These comparisons are made not only for impacts on prices and output, but also for effects on domestic profits, tariff revenues (or monopoly rents for quotas), and for the dead weight efficiency losses resulting from protectionism. The purpose of this effort is to suggest whether tariffs or quotas are preferable when a government's goal is to minimize the impact of cyclical shocks on the domestic macroeconomy.[3] Unsurprisingly, the conclusion is *It depends.* In particular, it depends on whether business cycles originate in the importing or the exporting country. It also depends on whose preferences are to dominate the choice between commercial policy tools, those of exporters or those consumers in the importing country. The commercial policy tool which will protect an importing country from the effects of macroeconomic shocks will typically increase the impact of these cycles in the exporting country. Since policy makers in the importing countries actually make the choices between tariffs and quotas, stability in import markets is likely to dominate. Choices between policy tools would reasonably be made to minimize instability in the importing country, rather than to protect exporters who are not in the country where the decision are made. As a result the following discussion will stress the comparative impacts of tariffs and quotas on importing countries, although references will be made to effects on exporting sectors.

    The following analysis will assume that a fixed exchange rate is maintained, so that there are no repercussions from shifts in trade flows, through the exchange rate, back to exports and imports. It is also assumed that the monetary impacts of balance of payments shifts are sterilized, so that the cyclical shocks under discussion do not affect the money supply through shifts in the trade balance. The lack of these assumptions would excessively complicate the analysis.

II. Business Cycles Originating in the Importing Country

    A cyclical expansion in an importing country that is already at its desired level of aggregate demand and output would both shift the demand for imports to the

---

3. It is assumed that the economy is operative at the preferred level of output before the cyclical shock occurs, and therefore that the impacts of the shock on the economy are undesirable.

right and move the supply of import substitutes to the left. The latter effect would be the result of inflationary pressures on wages and other domestic input costs. *Figures 1* and *2* present a comparison between the effects of tariffs and quotas in the case of such a macroeconomic expansion in the importing country :

If the goal of a government in choosing commerical policies is to minimize the internal macroeconomic disruptions generated by domestic business cycles, then an importing country should prefer tariffs over quotas. As can be seen in *Figure 1*, the maintenance of a tariff allows the rest of the world to play the role of residual supplier. Although the volume of imports rises from M to M' because of both the demand increase and the domestic supply decline, the price of imported goods remains unchanged. The increased volume of imports causes tariff revenues to rise by area *abcd* plus *efgh*, but the dead weight losses resulting from the tariff do not change. Domestic production of import substitutes declines, as does the profitability of such production, but this can be viewed as desirable because it occurs during an excessive macroeconomic expansion, and therefore is counter cyclical and eases inflationary pressures. In this case the role of foreign trade is to reduce the macroeconomic impact of a domestic cyclical shock.

Under a quota, in contrast, the rest of the world cannot play the role of residual supplier, and the effects of a domestic cyclical expansion are largely contained within the economy of the importing country. Domestic prices of importables rise in a boom, and the profitability of the import-competing industry is also affected. As can be seen in *Figure 2*, the dead weight losses resulting from the quota rise in an expansion (by area *cdge* plus *jfhe*) and fall in a recession, as does the monopoly rent resulting from the allocation of the quota (by area *fegh*), which would be government revenue if the quota rights were auctioned. Profits in the domestic industry were area *ufl* but become area *thm*, so they rise by area *lnhm* minus area *ufnt*. This might be negative, which is to say profits might fall in a domestic expansion and rise in a recession.[4] Domestic output, which is shown as unchanged in the graph, can either rise or fall, depending on the relative size of the shifts of D and S_{dom}. If the shift of D is greater, domestic output rises, but if the leftward shift of the sup-

---

4. This would be the case if the leftward shift of the supply function was large relative to the rightward shift of the demand function. This situation might be expected in an industry for which the income elasticity of demand for output is very low, i.e. a non-cyclical industry such as food. The increase in costs during an expansion would thus dominate the small demand increase and profits would fall.

Figure 1

Impact of a Macroeconomic Expansion in the Importing Country
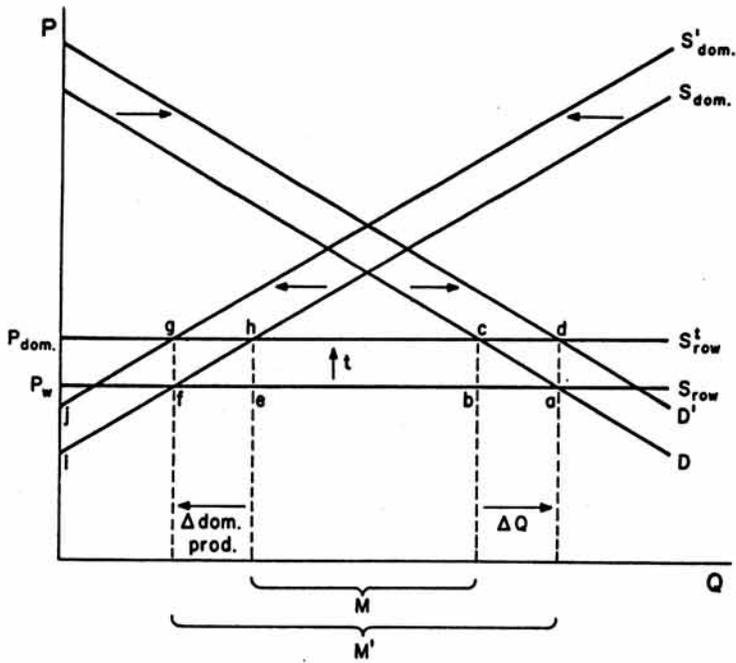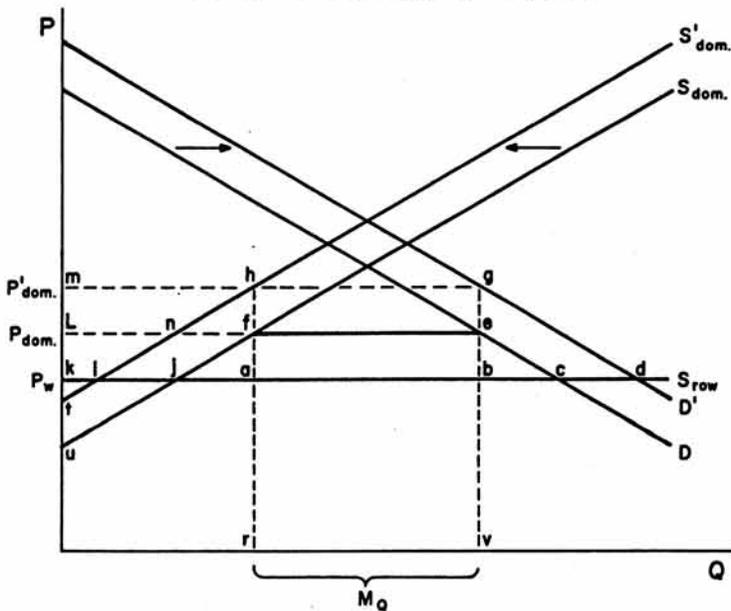with the Maintenance of a Tariff

Figure 2

Impact of a Macroeconomic Expansion in the Importing Country
with the Maintenance of a Quota

ply line is greater, output falls.

Within the importing country, only import volumes remain unchanged over the business cycle. Prices, dead weight losses, and the value of the quota rights for imports (which may accrue to exporters) all rise in a domestic expansion and fall in a recession. From the perspective of the import-competing firm, which is interested in stable profits, there is no clear reason to prefer one protectionist measure over the other. Profits vary over the business cycle with either approach. If a tariff is maintained, they fall during a domestic expansion and rise in a recession while they can move cyclically or counter-cyclically under a quota. The government, however, is interested in minimizing the macroeconomic instability resulting from domestic cyclical shocks, and therefore should have a clear preference for tariffs over quotas. If a tariff is maintained, prices are stable and output in the import competing industry varies counter-cyclically, thereby stabilizing production and employment in the economy as a whole. With a quota, in constrast, prices rise sharply and production is likely to increase during a domestic expansion.

The following table may be useful as a summary of the differences between the impacts of a tariff and a quota that have been discussed thus far :

Table 1

Effects of a Macroeconomic Expansion Originating in the Importing Country on the Import Competing Inudustry
With the Maintenance of a :

	Tariff	Quota
Production and Employment	fall	unclear
Prices	stable	rise
Profits	fall	unclear
Tariff Revenue or Quota Rents	rise	rise
Dead-weight Efficiency Losses	stable	rise

It is assumed throughout this discussion that economy was operating at the desired level of aggregate demand before the internal cyclical shock occurred, and that its effects on the economy are therefore unwelcome. Such a shock might result from an investment boom, an unexpected increase on the proportion of personal incomes that are spent on current comsumption, or an unwise shift toward a more

expansionary government budget. If the goal of a government is to use the regulation of imports to minimize the impact of such internal shocks, tariffs have clear advantages over quotas.

From the perspective of the exporting country, however, the choice between tariffs and quotas is less clear. If quotas are allocated to exporting firms, as is typically the case under current Voluntary Export Restraint (VER) programs, business cycles in the importing countries produce changing export prices and profits for local industries, but leave production and export volumes unchanged, while tariffs imply stable prices and profits, but unstable production and export volumes. It is unclear which types of volatility the exporting country would prefer, but as a practical matter it does not matter what the exporting country wants, because the choice between tariffs and quotas is made by the importing country on the basis of its preferences.

There may appear to be an inconsistency between the assumption of a horizontal supply curve facing the importing country, meaning that it is a *small* country, and the conclusion that export prices can rise if a quota is maintained when the importing country has a macroeconomic expansion. World prices of the commodity being traded do not rise (P_w in *Figure 1* does not change), but instead the monopoly rent associated with the quota increases. This may accrue to the exporter, whose revenues per unit increase only on those sales, but that depends on how the quota is administered. If quota rights are assigned to the exporting country, which then allocates them to individual firms, this increase in export revenues per unit does occur, but if the quotas are instead assigned to importing firms, the monopoly rents remain within the importing country as additional profits of those holding the quota rights.

In recent years such quotas have typically been assigned to exporting countries, so the resulting monoply rents accrue to exporting firms. This means that export revenues per unit and profits rise, but the world price does not increase. It is common, particularly in the textile and garment business, for an exporting firm to sell the same product at a low price in unprotected markets and at a higher price in countries where it has a quota allocation, which explains why such quota allocations are so valuable.

This pattern of assigning quotas to exporting countries is in part the result of a need to evade GATT rules which prohibit most quotas that are maintained by importing countries. If the exporting countries enforce such quotas, they are not

prohibited by the GATT. Exporting countries are frequently willing to accept such arrangements as preferable to other protectionist policies, because they allow their firms to earn far higher profits, which are then subject to domestic corporate profits taxation. The Voluntary Export Restraint on Japanese cars of the early 1980s, for example, was estimated by Robert Crandell to have produced approximately $2 billion per year in additional profits for Japanese car companies, some of which they chose to share with their U.S. dealers.[5]

To summarize thus far, when the government of an importing country faces business cycles which originate domestically rather than abroad, it has clear reasons to choose tariffs over quotas as a means of protecting domestic industries. Tariffs produce counter-cyclical changes in output and profits, and stability in domestic prices in import-competing industries. Quotas, in contrast, cause volatility in prices, profits, and possibly in output in these industries, as well as in the dead weight losses caused by the protectionist measures. For a government that wishes to minimize the disruptions caused by *domestic* macroeconomic shocks, tariffs have advantages over quotas.

This discussion has assumed that the level of tariffs or quotas was not changed over the business cycle, that is, that the level of protectionism was constant. If countries tighten limits on imports during recessions and ease them during macroeconomic expansions, some of the earlier conclusions are changed. Returning to *Figure 1*, a reduction in tariff rates during an expansion would reduce internal prices and further reduce domestic production. Since domestic costs are increasing, as indicated by the leftward shift of S_{dom}, import competing firms are going to experience sharp reductions in profits and will be strongly opposed to any proposed reduction in tariff rates. In any event, tariffs are usually part of the revenue code and are frequently subject to GATT commitments, so they are not easily changed over short-term business cycles. Quotas, however, can sometimes be changed quickly in response to cyclical problems. The U.S. VER on Japanese automobiles, for example, was imposed during the recession of the early 1980s and eased when the U.S. economy was well into a strong recovery. Such an easing of quota restrictions in a mac-

5. Robert W. Crandell, "Import Quotas and the Automobile Industry : The Costs of Protectionism", *The Brookings Review*, Summer 1984.

roeconomic expansion would be stabilizing. Returning to *Figure 2*, an increase in the volume of imports allowed under the quota produces an increase in the horizontal distance in S'_{row}. This has the effect of reducing the price and domestic profit increases that would otherwise occur and would increase the likelyhood that domestic production will decline. All of these impacts of expanded quotas during a macroeconomic expansion would tend to stabilize the economy.

III. Business Cycles Originating in the Exporting Country

The primary impact of business cycles originating in exporting countries on international trade should be on the prices at which goods are offered. A domestic expansion within exporting countries increases the local demand for exportables, increasing their prices, and shifts the supply curve facing importers vertically. The importing country will again be assumed to be small relative to the world economy, so it faces perfectly elastic supply functions for its imports. The following graphs illustrate the impacts of such cyclical expansions in the exporting countries.

When business cycles originate in exporting countries and shift the export supply function vertically, as shown in *Figures 3* and *4*, many of the earlier conclusions with regard to the relative impacts of tariffs and quotas are reversed. As can be seen in *Figure 3*, the existence of a tariff means that prices, domestic output, consumption, domestic profits, and tariff revenues in the importing country are all affected by a cyclical expansion in the exporting countries. Prices, domestic output, and profits (by area *dhij*) all rise, while declines occur in consumption and tariff revenues (from area *abcd* to *efgh*). If a quota were maintained instead, as shown in *Figure 4*, the foreign cycle has virtually no impact on the importing country. As the foreign component of the supply function shifts vertically, output, prices, and profits all remain unchanged. The monopoly rents resulting from the quota fall from rectangle *abde* to the smaller area *cdef*, but under typical quota arrangements of the VER variety, such rents accrue to exporters, so there is no impact whatever within the importing country. If importing countries wish to avoid internal disruptions from business cycles that originate abroad, quotas are clearly preferable to tariffs.

Figure 3
Impact of a Macroeconomic Expansion in the Exporting Country
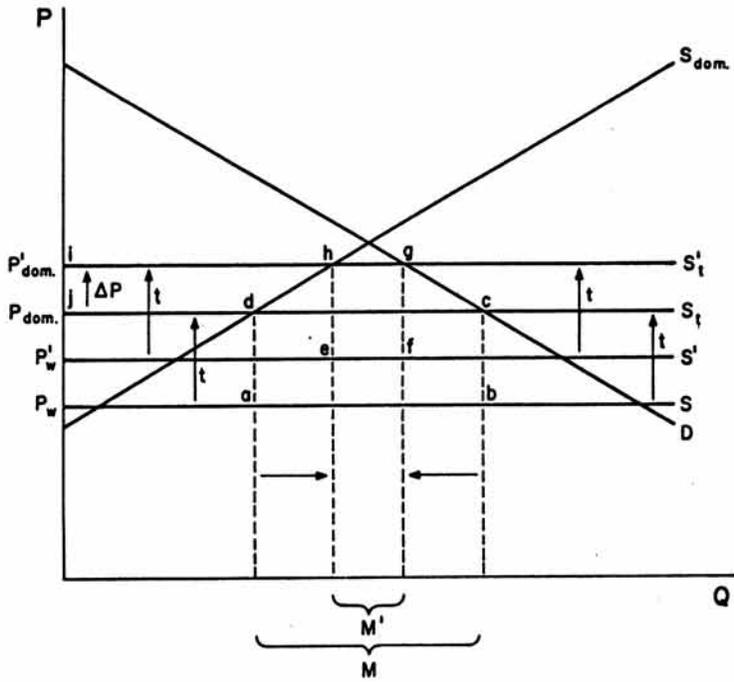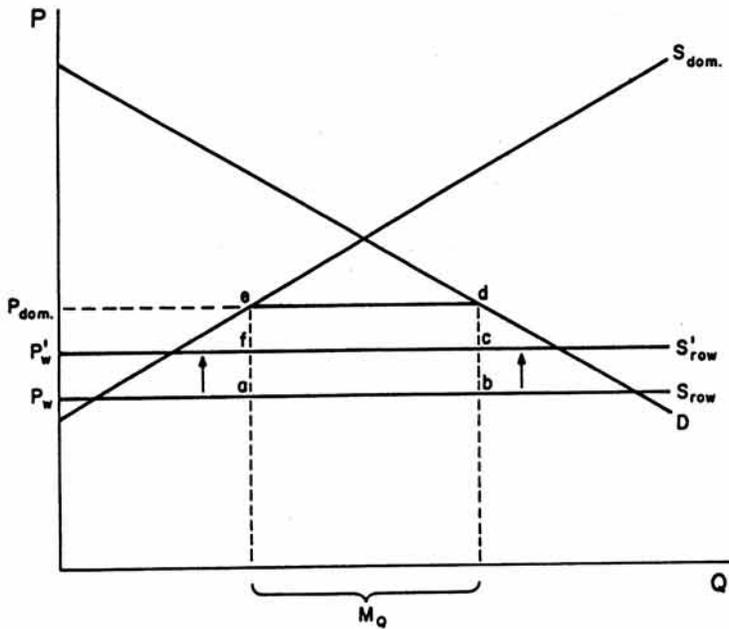with the Maintenance of a Tariff

Figure 4
Impact of a Macroeconomic Expansion in the Exporting Country
with the Maintenance of a Quota

A table will again be used to summarise the results for this case :

Table 2
Effects of a Macroeconomic Expansion Originating in the Exporting Country on the Import Competing Inudustry
With the Maintenance of a :

	Tariff	Quota
Production and Employment	rise	stable
Prices	rise	stable
Profits	rise	stable
Tariff Revenue or Quota Rents	fall	fall
Dead-weight Efficiency Losses	stable	fall

From the perspective of the exporting country things become more complicated. The maintenance of tariffs by importers means a counter-cyclical variation in output, as export volumes shrink during domestic expansions and rise in recessions, and stable profits. Quotas, in contrast, mean constant volumes of exports over the business cycle, and domestic profits (assuming that quota rents accrue to export firms) that fall during domestic expansions and rise during recessions. Since counter-cyclical variations in export volumes would tend to stabilize the economy as a whole, governments of exporting countries should prefer that importers maintain tariffs rather than quotas when cycles originate in the exporting economies. The preferences of exporting countries, however, are of little practical importance, because as was noted earlier, the choice between quotas and tariffs is made by importing countries, whose economies would be far better protected from foreign business cycles by quotas than by tariffs.

IV. Conclusion

If the goal of the government of an importing country is to minimize the internal macroeconomic disruptions caused by business cycles, the choice between tariffs and quotas depends on where such cycles typically originate. If such government are most concerned about *internal* macroeconomic shocks, and would like to use foreign trade as a means of reducing the domestic disruptions caused by such dom-

estic cycles, tariffs have advantages over quotas. The maintenance of a tariff allows the rest of the world to act as a residual supplier, thus stabilizing prices, and producing counter-cyclical changes in output and profits during a domestic business cycle. Quotas, in contrast, contain most of the effects of such domestic shocks within the economy, and increase the resulting macroeconomic volatility.

If, however, governments of importing countries are less concerned about domestic cycles, and instead fear instability resulting from *foreign* macroeconomic shocks, quotas become much more attractive. The maintenance of a tariff means that supply shifts in exporting countries are fully passed through to the importing economy in the form of changes in prices, output, consumption, domestic profits, and tariff revenues. The maintenance of a quota, however, means that an importing country is virtually unaffected by business cycles that originate abroad. In summary, tariffs are preferable for countries that primarily fear domestic business cycles, while quotas should be used by countries for whom macroeconomic shocks usually originate abroad.

References

Bhagwati, Jagdish, "On the Equivalence of Tariffs and Quotas," in *Essays in International Economic Theory*, MIT Press, Cambridge, 1983, pp. 196-213.

Blejer, Marie and Ayre Hillman, "On the Dynamic Non-Equivalence of Tariffs and Quotas in the Monetary Model of the Balance of Payments," *Journal of International Economics*, Vol. 13, 1982, pp. 163-169.

Crandell, Robert W., "Import Quotas and the Automobile Industry : The Costs of Protectionism", *The Brookings Review*, Summer 1984.

Kreinen, Mordechai, "More on the Equivalence of Tariffs and Quotas", *Kyklos*, #1, 1970, pp. 75-78.

McCulloch, Rachel, "When Are a Tariff and a Quota Equivalent?", *Canadian Journal of Economics*, November 1973, pp. 503-511.

Takacs, Wendy, "The Nonequivalence of Tariffs, Import Quotas, and Voluntary Export Restraints," *Journal of International Economics*, November 1978, pp. 565-573.

Vastrup, Claus, "The Choice between a Tariff and a Quota under Uncertainty," *Weltwirtschaft Archiv.*, #4, 1978, pp. 729-734.