Endogenous trade uncertainty
Why countries may specialize against comparative advantage

Charles van Marrewijk

Department of Economics, H8-13, Erasmus University and TRACE, P.O. Box 1738, 3000 DR Rotterdam, Netherlands

Peter A.G. van Bergeijk*

Ministry of Economic Affairs, AEP, P.O. Box 20101, 2500 EC Den Haag, Netherlands

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Using an approach where the probability of trade is a function of the volume of trade, we show that uncertainty in international trade may force a small economy to specialize in the production of the good in which it has a comparative disadvantage. This reversal in the pattern of incomplete specialization in production is not reflected in the trade pattern. The first-best policy response in the presence of endogenous uncertainty is not the imposition of tariffs or subsidies but a reduction of trade uncertainty itself, possibly through clear commitment to free trade or GATT rules and procedures.

JEL classification: F10; F13

1. Introduction

Uncertainty is a fact of life in international economic relations. Volatility of exchange rates, of (relative) prices and of trade flows in general influences the decisions of private firms and consumers and, consequently, determines (the possibilities for) foreign trade [see, for example, Ruffin (1974), Pomery (1984) and Kofman et al. (1990)]. Most of this literature considers uncertainty as an exogenous phenomenon, at least as unrelated to the levels of consumption, production, trade, etc. Bhagwati and Srinivasan (1976), however, argue that the possibility of quantitative restrictions (import restrictions,

Correspondence to: Charles van Marrewijk, Department of Economics, H8-13, Erasmus University, P.O. Box 1738, 3000 DR Rotterdam, Netherlands.

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voluntary export restrictions, boycotts, and embargoes) being imposed on one's exports are affected by the volume of one's exports.

Our model extends earlier work by Bhagwati and Srinivasan (1976, 1983, Ch. 34), Arad and Hillman (1979) and Van Marrewijk and Van Bergeijk (1990) as we deal with the assumptions of a small country, exogenous and endogenous trade uncertainty and allow for both risk neutrality and risk aversion. The conclusions from our model differ from the existing literature in four respects. First, we derive a relationship between the production structure and the extent of uncertainty. Second, we limit the range of possible production points and hence the range for international specialization. Third, as we restrict ourselves to a small country we may assume that the probability of trade is a function of the level of exports although this country does not have the power to influence its terms of trade. Since we are interested in endogenous trade uncertainty this setting has the advantage that any conclusions we draw cannot be caused by monopoly power. Fourth, earlier studies show that endogenous trade uncertainty forces countries to specialize to a lesser extent in accordance with their comparative advantage. We prove that the optimal policy in the wake of endogenous trade uncertainty may be to specialize against comparative advantage, i.e. in the production of the 'wrong' good (with comparative disadvantage). This reversal in the pattern of incomplete specialization in production, however, is not reflected in the trade pattern. Hence comparative advantage still governs foreign trade. This is in accordance with, for example, Whitesell's (1990) observation that Soviet performance in foreign trade has always been consistent with neoclassical trade theory. (This somewhat unexpected result is an empirical finding across methodologies.) Clearly a paradox exists as the Soviet Union's domestic relative prices differed considerably from the price structure of the world market. It is relevant for our argument to point out that the Soviet Union has quite often been the target of embargoes [Hufbauer and Schott (1985)] and that the level of its foreign trade is well below its potential [Van Bergeijk and Olderma (1990)].

The importance of economic sanctions appears to be increasing at this point in history; see Van Bergeijk and Van Marrewijk (1993). The U.S. sanctions against Nicaragua and Poland, the Soviet sanctions against Lithuania, the U.N. sanctions against Iraq, South Africa and Libya and the EC sanctions against Yugoslavia suggest an increase in the use of economic sanctions as an instrument of foreign policy in the 1990s. Indeed, the new world order that is a potential consequence of the present East-West detente could imply enhanced reliance on economic sanctions vis-à-vis military force.

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1 One can, however, easily extend this analysis to incorporate monopoly power by defining \( f(x) = g(p(x), Y(x)) \). Further note that an embargo, even against a small country, will not be effective unless the level of its foreign trade exceeds a certain threshold level [see Van Bergeijk (1989)].
and, consequently, could be of increased importance for the world trade system. In addition, economic sanctions are increasingly being considered as a means to enforce international environmental protection conventions [Subramanian (1992)], while strategic trade policy considerations may increase the demand for foreign trade sanctions too [Carter (1988)].

Our analysis, however, does not restrict itself to the impact of politically inspired trade restrictions because it also covers economically motivated government intervention such as quantitative ('voluntary') export restrictions, like those studied in the seminal paper by Bhagwati and Srinivasan (1976), as well as uncertainty that results from strategic behavior by private competitors.

In the case of economically inspired trade uncertainty it seems reasonable to assume that the more you trade the higher the probability of trade disruption [fueled by lobby groups abroad; see, for example, Bhagwati (1982)]. In addition, recent literature on the integration of politics and economics by Frey (1984) and Van Bergeijk (1992) theoretically and empirically supports this particular assumption as well.

First the settings and the model will be introduced. In section 3 we analyze the relationship between the production level and the probability of trade. Next we get to the heart of the matter and discuss optimal production in relation to comparative advantage for the case of endogenous trade uncertainty. In order to clarify the analysis (and to prove Proposition 4) we give a numerical example which highlights the impact of (systematic) shocks in exogenous trade uncertainty vis-à-vis shocks in (the perception of) endogenous trade uncertainty.

Since it can be optimal for a country to specialize in the production of the good in which it has a comparative disadvantage, our analysis could erroneously be interpreted as suggesting that trade policy instruments such as tariffs and export subsidies are first-best instruments to tackle the challenge to policy posed by endogenous trade uncertainty. In the final section, however, we explain that reducing trade uncertainty is a first-best solution, e.g. by a firm commitment to an open multilateral trade system.

2. The model

We investigate a small trading economy which cannot influence its terms of trade. This assumption answers the critique by Helpman and Razin (1978) concerning the difference between ex ante and ex post trading decisions. The international price level is given for the small economy and, consequently, the shortcoming of the traditional ex ante analysis, which assumes that trading decisions are made before the resolution of uncertainty, is avoided. In our model the economy a priori decides on the pattern of specialization (i.e. production), but, as will become clear, an export or import commitment will only be made once the uncertainty concerning the trading possibilities is resolved.
We distinguish between two goods, $x$ and a numéraire, $y$. The production possibility curve, $\phi(x)$, is strictly concave. Therefore $\phi_x(x) < 0$ and $\phi_{xx}(x) < 0$, where subscripts refer to derivatives. We assume preferences to be homothetic. The consumed quantities are $C_x$ and $C_y$ and the concave utility function of the representative consumer is $u(C_x, C_y)$. Uncertainty arises through the possibility of a full trade disruption (with probability $1 - \pi$), in which case no trade at all takes place. As argued in the introduction we assume that the probability of trade, $\pi$, is a decreasing function of the volume of trade, $\pi = \pi(|C_x - x|)$. At the first stage a decision has to be made about the production combination $(x, \phi(x))$. This decision cannot be changed. In the second stage it becomes clear whether the free trade regime occurs, with probability $\pi$, or not, with probability $(1 - \pi)$. If the free trade regime materializes, the economy can trade any quantity it wants at the world’s relative price $p$ and it can spend its income $Y = px + \phi(x)$. Consequently, the maximum utility it can achieve is given by the indirect utility function $\mathcal{U}(p, Y(x)) = f(x)$, which will be called the undisrupted trade welfare function. If, however, trade cannot take place unhampered, the maximum utility level is given by $u(x, \phi(x)) = g(x)$, which will be called the isolation welfare function.

We reserve the term ‘autarky’ for a country that freely chooses not to engage in free trade. It optimally produces at the point $x_a$. The term ‘isolation’ then refers to an economy that wants to engage in trade but is a victim of a trade disruption. Both the function $f$ and the function $g$ are, under our assumptions that allow for both risk neutrality and risk aversion, strictly concave [see Van Marrewijk and Van Bergeijk (1990)].

Throughout this analysis we will not take foreign direct investment or capital flows into account, although Smith (1986) is right when he points out that direct investments may be an important channel through which expectations decrease the effectiveness of sanctions. Olson (1979) even argues that manipulation of capital flows and aid may be more effective than trade sanctions. We will, however, limit ourselves to trade in the absence of capital flows as this would distract from our main point. Moreover, the empirical evidence for this particular hypothesis is not convincing.²

Without loss of generality we assume that the country has a comparative advantage in the production of good $y$.³ Consider fig. 1 which introduces the respective production points that feature in our analysis. The free trade production point, $x_r$, is the point of production that prevails when the probability of trade, $\pi$, equals one. It shows the outcome in the free trade


³To sum up, we have the following assumptions: (i) a strictly concave production possibility curve; (ii) a concave homothetic utility function; (iii) the probability of trade is a decreasing function of the volume of trade; and (iv) a small country with a comparative advantage in the production of good $y$. 
Fig. 1. The economy has a comparative advantage in the production of good $y$. $x_t =$ free trade production, $x_a =$ autarky production, $x_{ac} =$ autarky comparable production, and $x_n =$ no-trade production.

regime with $p = -\phi_s(x_t)$ and $f_s(x_t) = 0$, a condition well known from traditional neoclassical trade theory. The autarky production point, $x_a$, is the point where the marginal rate of substitution equals the marginal rate of transformation. This is the maximum of the isolation welfare function and so $g_s(x_a) = 0$. From our assumption that the economy has a comparative advantage in the production of $y$, it follows that $x_t < x_a$. Because of homothetic preferences $Cy = \delta(p)Cx$, with $\delta(p) > 0$. The non-trade production point, $x_n$, requires $\phi(x_n) = \delta(p)x_n$.

Next we define the autarky comparable production level, $x_{ac}$, in order to investigate endogenous uncertainty. At $x_{ac}$ the undisrupted trade welfare function $f$ acquires the maximum level of utility in isolation, while the economy specializes in the production of the good with comparative
disadvantage, so \( f(x_{ac}) = g(x_a) \wedge x_{ac} > x_a \). Note that we use the term specialization, as is customary in the literature, to refer to autarky production. So, for example, if \( x < x_a \), we say the economy specializes in the production of good \( y \). Finally, the maximum production point, \( x_m \), by definition satisfies \( \phi(x_m) = 0 \). Obviously, then, \( x_m > x_a \) and – on our assumption that the economy has a comparative advantage in \( y \) – it follows that \( 0 < x_f < x_a < x_{ac} < x_n < x_m \).

3. Trade uncertainty and optimal production

The starting point of our analysis is the relation between the production point, \( x \), and the probability of trade, \( \pi \).

**Proposition 1.** The probability of trade is increasing for \( 0 \leq x < x_n \) and decreasing for \( x_n < x \leq x_m \).

**Proof.** Homothetic preferences imply \( C_y = \delta(p) C_x \). Hence \( C_x = Y(x) / [p + \delta(p)] \). Let \( I \) be the imports of good \( x \), i.e. \( I(x) = C_x - x = Y(x) / [p + \delta(p)] - x \). Then \( I_x(x) = [p + \phi_x(x)]/[p + \delta(p)] - 1 < 0 \) iff \( 0 < -\phi_x(x) + \delta(p) \), which is clearly the case. The imports of good \( x \) are therefore a monotonically declining function of \( x \) (provided trade against price \( p \) is possible). The volume of trade is commensurate with the absolute value of the imports of good \( x \). At \( x_n \), the no-trade production point, we start to export good \( x \) instead of importing it. Since there is a positive relation between trade volume and the possibility of trade disruption, we get \( \pi = \pi(x) \) with \( \pi_x(x) \geq 0 \) iff \( x \leq x_n \). Obviously \( 0 \leq \pi \leq 1 \).

When the economy (its government, an 'omniscient central planner', etc.) maximizes Von Neumann–Morgenstern (1944) expected utility we have to solve the optimality problem:

**Optimality problem**

\[
\max_\pi \pi(x) f(x) + [1 - \pi(x)] g(x) = g(x) + \pi(x) [f(x) - g(x)].
\]

The right member contains the term \([f(x) - g(x)]\) which reflects the potential gains from trade, well known from traditional neoclassical trade theory. Introducing uncertainty implies that the marginal expected utility from a change in \( x \) equals the certain pay-off in isolation, \( g(x) \), which by means of intervention can be increased with the mathematically expected potential gains from trade. The first-order condition is \(^4\)

\(^4\)Given our assumptions, both goods will be produced. So the optimal production of good \( x \) will have to fulfil eq. (1). Furthermore, because we do not have to distinguish between ex ante and ex post trading decisions, this is the first-best policy.
Here \( g_x(x) + \pi(x)[f_x(x) - g_x(x)] \) is the same as in the exogenous case: in the absence of endogenous uncertainty the marginal potential gains from trade, \( f_x(x) - g_x(x) \), need to be balanced against the marginal gains from isolation. The second term in eq. (1), \( \pi_x(x)[f(x) - g(x)] \), reflects the impact of endogenizing \( \pi \). Under these conditions of uncertainty the assumption of firms maximizing their stock market value is equivalent to that of firms maximizing the expected value of national income taking real prices as given [Diamond (1967) and Van Marrewijk (1992)]. This leads to \( g_x(x) + \pi_x(x)[f(x) - g(x)] = 0 \), which does not take the endogeneity of \( \pi \) into account.

Note that for \( x < x_{on} \), the endogenous effect is positive, because \( f(x) > g(x) \) and \( \pi_x(x) > 0 \). To compensate for this positive effect we would either need larger negativity of \( f_x \) and/or smaller positivity of \( g_x \). This implies an increase in \( x \) and a smaller extent of specialization.

The next question is the effect of endogenous uncertainty on the optimal level of production (and consequently specialization). Let \( \pi^* \) be an exogenous trade probability and let \( x_{ox} \) be the optimal production of good \( x \) with respect to \( \pi^* \). The endogenous trade probability, \( \pi(x) \), is said to be comparable with \( \pi^* \) iff \( \pi(x) = \pi^* \).

**Proposition 2.** Let \( \pi^* > 0 \) be an exogenous trade probability and \( \pi(x) \) a comparable endogenous trade probability, with \( x_{ox} \) and \( x_{on} \) as the respective optimal production points. Then \( x_{ox} < x_{on} \).

**Proof.** Since \( \pi^* \) is exogenous, the last term on the left-hand side of eq. (1) drops out [as shown in Van Marrewijk and Van Bergeijk (1990)]; hence, \( \pi^* f_x(x_{ox}) + (1 - \pi^*) g_x(x_{ox}) = 0 \). For endogenous uncertainty, eq. (1), including the last term, has to hold. This means, in particular, that \( x_{ox} \neq x_{on} \). We also know \( x_{on} < x_{on} \) is impossible. Assume, in order to obtain a contradiction, that \( x_{on} < x_{on} \). Then \( g_x(x_{on}) > 0, f_x(x_{on}) < 0 \) and \( \pi(x_{on}) < \pi(x_{ox}) = \pi^* \). We now have

\[
\{ \pi(x_{on}) f_x(x_{on}) + [1 - \pi(x_{on})] g_x(x_{on}) \} + \pi_x(x_{on})[f(x_{on}) - g(x_{on})] \\
\geq \pi(x_{on}) f_x(x_{on}) + [1 - \pi(x_{on})] g_x(x_{on}) \\
> \pi(x_{ox}) f_x(x_{ox}) + [1 - \pi(x_{ox})] g_x(x_{ox}) \\
> \pi(x_{ox}) f_x(x_{ox}) + [1 - \pi(x_{ox})] g_x(x_{ox}) \\
- \pi^* f_x(x_{ox}) + [1 - \pi^*] g_x(x_{ox}) < 0,
\]

which contradicts the fact that \( x_{on} \) solves eq. (1). We can therefore conclude that \( x_{on} > x_{ox} \). \( \square \)

So we have shown that if the probability of trade disruption in the endogenous case is comparable with that in the exogenous case, we have a lower optimal level of trade in the endogenous case; the more we trade the
more likely trade disruption becomes. Since $\pi(x_{on}) > \pi^*$, it appears that an

economy may increase the probability of free trade by specializing against its

comparative advantage.

4. Endogenous trade uncertainty and comparative advantage

It can be shown that exogenous trade uncertainty implies a one-to-one

correspondence between the optimal level of production of good $x$ and the

probability of trade [Van Marrewijk and Van Bergeijk (1990)]. If the

probability of trade is identically zero, optimal production obviously equals

autarky production, i.e. $x_0 = x_a$. The closer the probability of trade to one,

the closer the optimal production point to the free trade production point. In

the limit, when the probability of trade identically equals one, optimal

production equals free trade production, i.e. $x_0 = x_f$. Under the assumption of

exogenous trade uncertainty, the optimal production of good $x$ (with

comparative disadvantage) can never be less than the free trade level, $x_f$, and

never exceed the autarky level, $x_a$.

If the probability of trade disruption is endogenous, however, the range for

the optimal level of production shifts to $x_f < x < x_{ac}$.

Proposition 3. The optimal production of good $x$ is in between the free trade

level and the autarky comparable level, i.e. $x_f \leq x_0 < x_{ac}$.

Proof. Define $\psi(x) = \{\pi(x)f_x(x) + [1 - \pi(x)]g_x(x)\} + \pi_x(x)[f(x) - g(x)]$. For

$x < x_f$ we have $f_x, g_x$ and $\pi_x$ all positive and hence $\psi(x) > 0$. So this $x$ cannot

fulfil eq. (1). Similarly, for $x > x_a$ all of $f_x, g_x$ and $\pi_x$ are negative, hence $\psi(x)$ is

negative. Therefore such an $x$ cannot fulfil eq. (1) either. In order to further

restrict the possible range of the optimal production of good $x$, suppose that

$x_{ac} \leq x$. Then

$$g(x) + \pi(x)[f(x) - g(x)]$$

$$\leq g(x_a) + \pi(x)[f(x_a) - g(x_a)]$$

$$\leq g(x_a) + \pi(x)[f(x_{ac}) - g(x_a)]$$

$$= g(x_a) + \pi(x)[g(x_a) - g(x_a)]$$

$$= g(x_a) \leq g(x_a) + \pi(x_a)[f(x_a) - g(x_a)].$$

Obviously, at least one of these inequalities must be strict. Hence such an $x$

cannot be optimal because production at the autarky level would result in

higher expected utility. □

Proposition 3 restricts the possible range of the optimal production point. In

particular it shows that $x_0 \notin [0, x_f]$ and $x_0 \notin [x_{ac}, x_m]$. It remains to show that,
in general, further limitations are not possible. For clarity this is stated explicitly as Proposition 4 below.

**Proposition 4.** Endogenous trade uncertainty can make it optimal for a country with a comparative advantage in the production of good $y$ to specialize in the production of good $x$.

**Proof.** See the example in section 5. $\square$

Fig. 2 shows why it may be beneficial for the economy to produce more of good $x$ (with comparative disadvantage) than the autarky level. At the autarky comparable production level of good $x$ the economy produces at $B$.
and, if trade takes place, consumes at $A$, reaching the same utility level as the autarkic situation when no trade takes place. So for $x$ in between $x_a$ and $x_{ac}$ potential gains from trade can be reaped in comparison with producing at the no-trade autarky level. Suppose that the optimal production is at point $D$ in fig. 2 and $x_a$ of good $x$ is produced. Compare this with autarky production. If no trade takes place in both situations, utility would be given by the isolation welfare function, and since $g(x_a) < g(x_s)$, the economy would seem to be better off in autarky. If, however, trade does take place in both situations utility would be given by the undisrupted trade welfare function, and since $f(x_a) < f(x_s)$, the economy would again seem to be better off at the autarky production level. The conclusion is that the gain from producing at $x_s$ must lie in the fact that the volume of trade is smaller and it is therefore more likely for undisrupted trade to occur, i.e. $\pi(x_a) > \pi(x_s)$.

To be more precise, let $\pi(x_a) = \pi$ and let $\epsilon$ be the increase in the probability of trade if we produce at $x_a$, i.e. $\pi(x_a) = \pi + \epsilon$, with $\epsilon > 0$. The expected utility from producing at $x_a$ minus the expected utility from producing at $x_a$ can be written as

$$\pi(x_a) = (1 - \pi)[g(x_a) - g(x_s)] + \pi[f(x_a) - f(x_s)] + \epsilon[f(x_a) - g(x_s)].$$

This expression has to be positive if $x_a$ is to be optimal. The increase, $\epsilon$, of the probability of trade at the optimal level of production therefore has to be substantial to compensate for the first two negative effects as described above. One might be tempted to argue intuitively that the endogenous derivative effect of a sufficiently small amount of trade should be arbitrarily close to zero. This may be true, but is of no consequence to our analysis since the argument only holds at the point $x_a$, whereas it is clear from both figs. 1 and 2 that at $x_n$ and at $x_{ac}$ we do trade a substantial amount if trade takes place.

Two important facts should be stressed at this point. First of all, gains from trade still exist, even though they are substantially smaller than in the case of trade certainty (see also section 5). Second, it can be optimal for an economy with a comparative advantage in the production of good $y$ to specialize in the production of good $x$, but if trade takes place the economy still exports the good in which it has a comparative advantage.

### 5. A numerical example

In order to clarify our general findings the following mathematical example may be illuminating. Obviously we need some restricting assumptions and we will use functions with standard properties. Let utility be of the Cobb–Douglas type
\[ u(Cx, Cy) = (Cx)^{1/2}(Cy)^{1/2}, \]  
(3)

and let the production possibility frontier be

\[ \phi(x) = (1 - x^2)^{1/2}. \]  
(4)

Furthermore, let the probability of trade be given by

\[ \pi(x) = 1 - \left\{ 1 + \exp\left[ -\theta |I(x)| + \tau \right] \right\}^{-1}. \]  
(5)

This specification is chosen for convenience and fits in with empirical logit specifications deployed, e.g. in studies on the efficacy of economic sanctions [Van Bergeijk (1989)].

The 'trade inclination' parameter, \( \tau \), can be either positive or negative. Shifts in \( \tau \) reflect shifts in exogenous uncertainty. An active embargo policy, political instability, failure to reach agreement in the GATT negotiations, unbalanced capital flows or the reputation of the trading partners may decrease the trust in free trade and, consequently, reduce the potential for trade and shift \( x \) in the direction of \( x_a \). Obviously, the larger is \( \tau \), the smaller is the probability of trade and the smaller the extent of specialization.

Second, there is the focus of this article, i.e. the 'responsiveness of trade' parameter, \( \theta \), which is positive by assumption. An increase in \( \theta \), for instance in the wake of increasing trade frictions or an active 'voluntary' export restraint policy, ceteris paribus, decreases the probability of trade and reduces the extent of specialization. Specialization in the production of good \( x \) when there is a comparative advantage in the production of good \( y \) is possible. Of course, if \( \theta \) becomes too large, the probability of trade becomes negligible and the optimal production point is at autarky, as shown in fig. 3. Larger values of \( \tau \), and hence more intrinsic uncertainty in the trading system, tend to reduce the optimal extent of specialization against comparative advantage, as was to be expected.

Table 1 in addition shows expected utility, \( E(u) \) which always exceeds the expected utility of autarky \( E(u_a) = 0.707 \). So trade is always beneficial. \( E(u) \), however, always remains (substantially) below the level of expected utility in the free trade case as \( E(u | \pi = 1) = 1.0308 \). Hence, as argued in the conclusion below, reducing uncertainty is the first-best policy instrument.

To give an illustration of Proposition 2, let the exogenous trade probability, \( \pi^* \), equal one-half. Then \( x_{ox} = 0.533 \). Imports of good \( x \) are 1.426. If, under endogenous trade probability, \( \theta = 1 \) and \( \tau = -1.426 \), it follows that \( \pi(0.533) = 1/2 \), therefore this endogenous trade probability is comparable with \( \pi^* \). Optimal production, \( x_{on} \), then equals 0.592 > 0.533.

\(^{1}\)For \( \theta = 0 \) the model reduces to the case of exogenous trade uncertainty studied in Van Marrewijk and Van Bergeijk (1990). In fig. 2 this shows as \( x_t < x_a < x_s \).
6. Conclusions

In a small two-good trading economy with endogenous trade uncertainty and a comparative advantage in the production of good $y$, an increase in the production of good $x$ increases the probability of trade up to the point where good $x$ is exported instead of imported and decreases the probability of trade.
Endogenous trade uncertainty tends to decrease further the extent of specialization and to reduce the volume of trade (as compared with exogenous trade uncertainty) and can make it optimal for a country with a comparative advantage in the production of good y to specialize in the production of good x.

As proved by our numerical example, it may pay to change the relative pattern of production in favor of the good in which the economy has a comparative disadvantage when trade relations are governed by quantitative uncertainty. In a market economy this would seem to vindicate the use of export subsidies and tariffs as first-best instruments, as argued by Bhagwati and Srinivasan (1976), since this particular externality (i.e. the endogenous trade uncertainty) will not be incorporated into the decisions of the private sector. A general argument based on endogenous trade uncertainty can hardly be distinguished empirically from trade interventionism which is guided by the 'new trade theory' proposed by Krugman, Helpman and Razin, etc. This is especially the case when endogenous trade uncertainty is a consequence of commercial activities by foreign competitors on the world market. However, as our example also clearly shows, first-best government action should be aimed at reducing uncertainty per se, possibly through GATT membership and strict adherence to conflict settlement procedures. This tackles the source of the problem from which the uncertainty externality arose in the first place. It may be especially relevant for small countries as GATT seeks to protect their interests in open and multilateral trade against the (market) power of the large economies. Indeed, if international politics

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### Table 1

Changes in the responsiveness to trade parameter $(\tau = -6)$.

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<th>$\theta$</th>
<th>$x_0$</th>
<th>$\pi(x_0)$</th>
<th>$E(u)$</th>
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</tbody>
</table>

*Note: $x_\tau = 0.243$, $x_0 = 0.707$, $x_{ac} = 0.966$, $x_c = 0.970$ and $p = 1/4$. 

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were to resort to economic warfare and economic surveillance, more often this would impose substantial costs on the world economic system.

So our paper should not be interpreted as giving credence to those who claim that trade interventionism may be a means to achieve maximum welfare. Our argument shows that trade uncertainty is an additional argument to strive for greater security for trade and so this paper supports efforts to arrive at an open multilateral trading system, guided by GATT rules as a clear commitment to free trade.

References

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