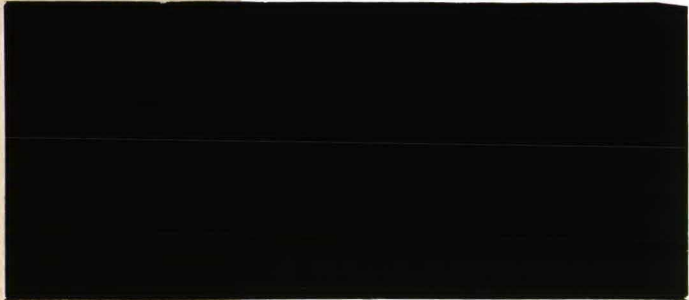**CentER**
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TRADE REFORM, POLICY UNCERTAINTY AND THE CURRENT ACCOUNT: A NON-EXPECTED UTILITY APPROACH

by Sweder van Wijnbergen

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Trade Reform, Policy Uncertainty and the Current Account:

a Non-Expected Utility Approach

by

Sweder van Wijnbergen[*]

Rapid and comprehensive reduction in barriers to international trade has often been followed by a sharp deterioration in the current account (Dani Rodrik, 1990; Rudiger Dornbusch, 1987[1]/). The steep, \$9 bUS deterioration in Mexico's current account the 2 years after the trade reform process was accelerated in 1987 is only the most recent example. The macroeconomic counterpart of the deterioration has typically been a decline in private savings; no clear response pattern has been observed for private investment. Economic theory has in recent years reached clear conclusions on these matters; the problem with these conclusions is that they seem counterfactual.

The problem does not really reside with investment. The investment response will depend on relative capital intensity of the industry whose protection is removed compared to the sectors favored by trade liberalization. Putty-clay considerations would tend to strengthen the investment response, as old capital gets scrapped more quickly in response to changing relative prices. On the other hand, policy uncertainty bestows an option value on assets more liquid than physical capital (Sweder van Wijnbergen, 1985) and thus tends to depress investment. But with no clear prediction emerging from economic theory, the ambiguous empirical record on this score is only to be expected.

But the situation is different with savings. In an elegant analysis, Assaf Razin and Lars Svensson (1983) pointed out that a permanent reduction in tariffs affects current and future goods in the same way, leaving intertemporal relative prices and private savings unchanged. Gradual tariff reduction in fact raises the price of current goods in terms of future goods and would thus tend to improve private savings (Sebastian Edwards and van Wijnbergen [1986] make a case for gradualism in the presence of capital market imperfections on this basis). It is this body of theory that, for all its theoretical elegance, seems firmly at variance with the facts.

This paper starts from the observation that anticipated policy reversal may explain a decline in private savings for the same reason gradual tariff reduction causes private savings to go up. Temporarily low tariffs lower the relative price of current goods in terms of future goods and thus tend to depress private savings.

However, the possibility of policy reversal does more than skew intertemporal relative prices towards today rather than tomorrow; it also increases policy uncertainty per se. Is it possible that this increase in uncertainty reinforces the private savings impact of an anticipated reversal of trade reform? This cannot really be analyzed in the standard expected utility framework because risk aversion and intertemporal substitution, two very different attributes of consumer preferences, are arbitrarily confined to be inversely related in that framework. I show that, in the context of imperfectly credible trade reform, this inverse relation implies that policy uncertainty is unimportant when it would reduce private savings, and, when important, would tend to increase private savings.

But this conclusion depends entirely on the inverse relation between risk aversion and intertemporal substitution elasticity imposed arbitrarily by the framework

of expected utility maximization. The "Ordinal Certainty Equivalence" (OCE) approach introduced by Larry Selden (1978) offers a way out of the straightjacket imposed by expected utility maximization. The OCE approach allows independent parametrization of risk aversion and intertemporal substitution. Within the OCE framework, I show that, with positive risk aversion, policy uncertainty will in fact reinforce the negative savings impact of an anticipated policy reversal especially when that negative impact is strong. This suggests that with high risk aversion and high intertemporal substitution, a rapid trade reform that is not fully credible may depress private savings significantly, with attendant negative impact on the current account. This conclusion seems to accord well with actual experience.

I.   The Model

There are two periods, 0 and 1. Thus the time consistency problems that naive applications of the OCE approach lead to in multi-period setting (cf Philippe Weil, 1990) do not arise. Consumers consume home and foreign goods in each period. We choose the home good as numeraire; and the exogenous world relative price of the foreign good in terms of the home good is normalized to one. There is no tariff in period zero; we have just entered a period of complete trade liberalization. But π, the probability that the old tariff $(t_1 - 1)$ will be restored in the next period, is larger than zero. Thus the future local price of the foreign good, T_1, follows a binomial distribution:

$$
\begin{aligned}
T_1 &= t_1 \text{ with probability } \pi \\
&= 1 \text{ with probability } 1-\pi
\end{aligned}
$$

(1)

To simplify the structure of income effects, we assume that consumers have no within period income, just wealth at the beginning of period 0, W_0. Wealth is spent today or tomorrow, and within each period on home goods h and imports m. Wealth not spent in period 0 earns a certain rate of return R (the world rate of interest) between period 0 and 1.

We assume homothetic, unit-elastic preferences accross goods within a time period.[2] Consumers know the within period tariff at the beginning of the period, before allocating expenditure over home and foreign goods. We can therefore define real consumption expenditure C_1 and the associated dual price index p_1 (a "*" indicates an optimally chosen quantity):

(2)
$$
\begin{aligned}
C_1 &= (h_1^* + m_1^* T_1) / p_1 \\
p_1 &= T_1^\alpha
\end{aligned}
$$

C_0 is defined similarly. By assumption the first period tariff is zero: $T_0 = 1$. α is the budget share of foreign goods in each period; α is constant because of the assumption of a unitary within-period substitution elasticity.

Under these assumptions, the within-period budget identities are:

(3)
$$
\begin{aligned}
W_2 &= 0, \quad pC_1 = W_1 \\
W_1 &= (W_0 - C_0) R
\end{aligned}
$$

The consumer choice problem presented here involves both intertemporal

choice for given intertemporal prices, and response to risk. The standard expected utility framework is unsatisfactory for this problem, because risk aversion and intertemporal substitution, two very different attributes of consumer preferences, are necessarily inversely related in that framework. This follows from the controversial assumption, made axiomatically, of consumer indifference with respect to the timing of resolution of uncertainty about consumption lotteries (cf Larry Epstein and Stanley Zin, 1989; and Weil, 1990).

We use the "Ordinal Certainty Equivalence" framework (Selden, 1978) to disentangle risk aversion and intertemporal substitution. Under this approach, utility is defined over the certain period zero consumption level and a certainty equivalent measure of the uncertain period 1 consumption level. This utility function is characterized by an intertemporal substitution elasticity $\sigma = 1/\rho$. The certainty equivalent of second period consumption is based on risk aversion parametrized by the coefficient of relative risk aversion, γ, which we assume to be strictly positive. This results in a welfare function:

(4)
$$V = (C_0^{1-\rho} + \beta \ (EC_1^{1-\gamma})^{\frac{1-\rho}{1-\gamma}})^{\frac{1}{1-\rho}}$$
$$= (C_0^{1-\rho} + \beta \ C_{1,RA}^{1-\rho})^{\frac{1}{1-\rho}}$$
$$with \ C_{1,RA} = (E(C_1^{1-\gamma}))^{\frac{1}{1-\gamma}}$$

$C_{1,RA}$ can be interpreted as the certainty equivalent of the uncertain second period aggregate consumption level, with γ as the relevant risk aversion parameter. Using (2) and (3) one can derive a simplified expression for C_1:

$$(5) \quad \begin{aligned} W_0 &= C_0 + \left(\frac{T_1^s}{R}\right) C_1 \\ &= C_0 + \frac{C_1}{R_{CRI}}; \quad R_{CRI} = \frac{R}{T_1^s} \\ &\rightarrow C_1 = R_{CRI}(W_0 - C_0) \end{aligned}$$

R_{CRI} is the ex post consumption rate of interest: the terms on which consumption today can be substituted for consumption tomorrow. Since T_1 is stochastic, R_{CRI} is stochastic too; define R_γ, the risk adjusted consumption rate of interest, as the ex ante certainty equivalent of R_{CRI}:

$$(6) \quad R_\gamma = (ER_{CRI}^{(1-\gamma)})^{\frac{1}{1-\gamma}}$$

Then the certainty equivalent of C_1, $C_{1,RA}$ equals:

$$(7) \quad \begin{aligned} EC_1^{1-\gamma} &= (W_0 - C_0)^{1-\gamma} E(R_{CRI}^{(1-\gamma)}) \\ &= (W_0 - C_0)^{1-\gamma} R_\gamma^{1-\gamma} \end{aligned}$$

Maximizing V as defined in equ. (4) subject to the budget constraints (3) and using equ.(7) yields for first period consumption C_0:

$$(8) \quad C_0 = \frac{1}{1+A} W_0$$

or first period consumption is proportional to wealth. The proportionality factor $1/(1+A)$ depends on the risk adjusted rate of interest R_γ, the subjective time preference discount factor β and the intertemporal substitution elasticity:

$$(9) \quad A = \beta^{\frac{1}{\rho}} R_\gamma^{\frac{(1-\rho)}{\rho}}$$

Trade policy reversal thus affects private consumption in period 0 entirely through its impact on the risk-adjusted consumption rate of interest, R_γ. An increase in this rate affects first period consumption:

$$
(10) \qquad
\begin{aligned}
\frac{\partial C_0}{\partial R_\gamma} &= -\frac{1}{(1+A)^2} \frac{A}{R_\gamma} \frac{(1-\rho)}{\rho} \\
&= \varphi(\rho-1); \quad \varphi > 0
\end{aligned}
$$

If the intertemporal substitution is larger than one ($\rho < 1$), a higher risk adjusted consumption rate of interest depresses private consumption.

II.   Trade Reform, Future Policy Reversal and Private Savings

Since all the effects of potential policy reversals work through the risk adjusted consumption rate of interest, we first calculate this rate for the binomial distribution over future tariff rates of equ. (1):

$$
(11) \qquad
\begin{aligned}
R_\gamma &= \left(E\left(\frac{R}{T_1^a}\right)^{1-\gamma} \right)^{\frac{1}{1-\gamma}} \\
&= R \left(1+\pi\left(t_1^{-a(1-\gamma)}-1 \right) \right)^{\frac{1}{1-\gamma}}
\end{aligned}
$$

Obviously, for $\gamma = 0$ this rate equals the expected rate:

$$
(12) \qquad
\begin{aligned}
R_{\gamma=0} &= (1-\pi) R + \pi t_1^{-a} R \\
&= R \left(\pi \left(t_1^{-a}-1 \right) +1 \right)
\end{aligned}
$$

It is instructive to separate the effect of potential future tariff increases through

their impact on the _expected_ consumption rate of interest from their impact on

savings through increasing the variance of the consumption rate of interest. We

therefore look at the case of a fully anticipated trade policy reversal first, before

introducing uncertainty about it in the next subsection.

A.   Anticipated Future Trade Policy Reversal and Private Savings

With full anticipation ($\pi = 1$), the risk adjusted rate of interest R_γ collapses

into the expected rate for $\pi = 1$:

(13)
$$R_\gamma = R \left(1 + \left(t_1^{-\alpha(1-\gamma)} - 1 \right) \right)^{\frac{1}{1-\gamma}}$$
$$= R t_1^{-\alpha}$$

From (13), one can derive the impact of a fully anticipated trade policy reversal

(higher future tariffs) on R_γ:

(14)
$$\frac{\partial R_\gamma}{\partial t_1} = -\alpha R t_1^{-(1+\alpha)}$$

(14) establishes the first point of this paper: an anticipated trade policy reversal (i.e.

an anticipation that future tariffs will exceed current tariffs) lowers the risk-adjusted

consumption rate of interest. Combining (10) and (14) then indicates how an

anticipated trade liberalization reversal (higher future tariffs) affects current

consumption:

$$\frac{\partial C_0}{\partial t_1} = \left(\frac{\partial C_0}{\partial R_r}\right)\left(\frac{\partial R_r}{\partial t_1}\right)$$

(15)

$$= -\varphi\,(\rho-1)\,\alpha\,R\,t_1^{-(1+\alpha)}$$

$$> 0 \; iff \; \frac{1}{\rho} > 1$$

Equ. (15) establishes the following proposition:

Proposition 1 (IT effect): An anticipated rollback of trade liberalization leads to an increase in current consumption (a decline in private savings) if the intertemporal substitution elasticity exceeds 1 ($\rho < 1$).[3]/

B.   Private Savings and Uncertainty about Future Trade Policy

Does uncertainty on future trade policy per se, for any given expected value of future tariffs, [4]/ have an impact on first period consumption? Such an effect would open up a second channel through which a trade reform with less than complete credibility could affect private savings. This could be assessed by manipulating π and t_1 so as to increase the variance for given expected value of the future dual price index, p_1. However, the particular structure of the model is such that this approach is a difficult route towards establishing the link between trade policy uncertainty and private savings. The first problem is that an increase in the variance of the expected consumption rate of interest that preserves the mean would imply a complicated non-linear restriction on t_1 and π (it requires keeping expression (12) constant). The second problem is more serious, since it is more than just a technical complication that could in principle be dealt with, like the first. The problem is that the relation between the variance and π is quadratic under the binomial assumption made in equ.

(1) and has an interior maximum (the variance is proportional to $\pi(1-\pi)$). This relation can thus not be inverted to write R_v as a function of the variance rather than of π itself. Different values of π can yield the same variance of the expected consumption rate of interest, so there is no way π can be substituted out of the expression for R_v to write R_v as a function of the variance instead. Moreover, changes in π will have effects on the variance of the expected rate of interest that differ in their sign depending on the initial value from which π is changing. We therefore follow a different approach.

In the OCE framework, assuming $\gamma = 0$ eliminates all impact of uncertainty, obviously without any impact on the <u>expected</u> consumption rate of interest. Thus an analysis of the case for $\gamma = 0$ isolates the pure expected reversal effect, with no pollution by uncertainty per se. The impact of uncertainty can then be assessed by looking at the impact of increasing γ. Increasing γ leaves the expected consumption discount rate unaffected, since it only involves a change in preferences, not in the objective environment. It therefore does not have any effect on the impact of an <u>expected</u> reversal analysed in Section 3.1; in the OCE approach risk aversion and intertemporal substitution can be separated. Therefore the impact of increasing γ from 0 is the impact of uncertainty at the value γ has been increased to. Finally, since the only uncertainty in the model is the uncertainty related to future tariffs, the entire impact of the increase in γ is due to the existing uncertainty about future trade policy: The impact of an increase in γ would be zero if there was no tariff uncertainty.

Consider how an increase in γ would affect first period consumption given the stochastic structure outlined in (9). Once again, the entire impact of both uncertainty and of increases in γ runs through the impact on the risk adjusted interest rate. Thus

consider the derivative of R_γ with respect to γ. To this end we introduce some simplifying notation. Define first the consumption discount rate in case of a zero future tariff as R_H, and in the case of a positive future tariff as R_L. Also, define k as $k = 1-\gamma$. This yields:

(16)
$$R_\gamma = (\pi R_L^k + (1-\pi) R_H^k)^{\frac{1}{k}}$$
$$= (ER_i^k)^{\frac{1}{k}}; \quad i = L, H$$

E is the expectations operator over the distribution specified in equ. (1). Taking logs and bringing k to the other side yields:

(17)
$$k \log R_\gamma = \log(ER_i^k)$$

Log-differentiation yields:

(18)
$$\frac{k}{R_\gamma} \frac{dR_\gamma}{dk} + \log R_\gamma = \frac{E(R_i^k \log(R_i))}{E(R_i^k)}$$

Multiply both sides by k and rearrange terms to get:

(19)
$$E(R_i^k) \frac{k^2}{R_\gamma} \frac{dR_\gamma}{dk} =$$
$$= E(R_i^k \log(R_i^k)) - E(R_i^k) * \log(ER_i^k)$$
$$> 0$$

The inequality in (19) obtains because of convexity of the function $f(z) = z\log(z)$. Since $k = 1 - \gamma$, equ. (19) establishes what we are after: [5]/

(20)
$$dk = -d\gamma - \frac{dR}{d\gamma} < 0 \ for \ all \ \gamma$$

Thus introducing risk aversion in the presence of uncertainty about future trade reform will unambiguously lower the risk adjusted consumption rate of interest, something that it would not have done without the trade related uncertainty (since there is no other source of uncertainty). We can therefore conclude that uncertainty about future trade policy reversal will lower the risk adjusted consumption rate of interest. But (10) states that a cut in the risk adjusted rate of interest will depress private savings if the intertemporal substitution elasticity is larger than one ($\rho < 1$). Thus combining equ. (10) and (20) yields proposition 2:

Proposition 2 (Uncertainty effect): Uncertainty about future trade policy per se (i.e. for given expected value of the tariff) will depress private consumption today if   the intertemporal rate of substitution exceeds one ($\rho < 1$).

Thus under the OCE approach the intertemporal substitution effect (IS) of proposition 1 reinforces the uncertainty effect (UE) of proposition 2 for all values of ρ. If intertemporal substitution is high ($\rho < 1$), both the IS effect and the UE effect increase private consumption; if intertemporal substitution is low ($\rho > 1$), both depress private consumption. Moreover, this holds for all values of the risk aversion parameter γ. This contrasts with the expected utility approach, where the two effects reinforce each other only when $\gamma < 1$, i.e. when uncertainty is relatively unimportant because risk aversion is low.

III.   Conclusions

This paper starts from the observation that trade liberalization is often followed by a strong surge of imports and an accompanying current account deterioration. The macro-economic counterpart of this CA deterioration is typically a decline in savings rather than an investment boom. We show first of all that anticipation of reimposition of tariffs in the future lowers the expected consumption rate of interest (makes current goods cheaper in terms of future goods). Therefore an anticipated future tariff increase will increase current consumption if the intertemporal substitution elasticity is larger than one. If consumers internalize the impact of future tariff revenues on their after-tax income, the savings impact will always be negative, even for an intertemporal substitution elasiticity below one.

The second result concerns the impact of policy uncertainty per se on private savings. We separate the impact of expected shifts in intertemporal relative prices from risk aversion by using the Ordinal Certainty Equivalence approach pioneered by Selden (1978) and, for infinite horizons, by Epstein and Zin (1989) and Weil (1990). This approach relaxes the rigid inverse relationship between intertemporal substitution and risk aversion that characterizes the expected utility approach to consumer choice under uncertainty. Within the OCE framework, we establish that policy uncertainty per se will further reduce private savings if: (a) there is positive risk aversion; (b) the intertemporal substitution elasticity exceeds one.

This is an interesting result for two reasons. First it shows how policy uncertainty about future tariffs will reinforce the negative savings impact of the direct anticipated reversal effect exactly when the latter is large (intertemporal substitution

elasticity is high). The two effects thus go into the same direction exactly when they matter most. The second observation is more academic. In the standard expected utility approach, risk aversion is low when intertemporal substitution is high, because the relevant elasticities are each other's inverse. The consequence of this is that whenever the uncertainty effect is important, the direct anticipation effect is not and vice versa. This result is reversed in the non-expected utility approach, as we found out: the two effects are complementary in the case where the direct anticipation effect is important.

How relevant is all this from an empirical point of view? There is after all a widely held belief that the intertemporal substitution elasticity is very low (ρ very high), with some setting ρ as high as around 10 (Robert Hall, 1988). More recent evidence using the Epstein-Zin approach to consumer choice under uncertainty has however tended to come up with different results. Most relevant in this case are maybe the results reported for Mexico in Patricio Arrau and van Wijnbergen (1991); and Gil Bufman, Leo Leidermann and van Wijnbergen (1991), since Mexico's experience with trade reform was in fact what triggered this paper.

Arrau and van Wijnbergen (1991) and Bufman, Leiderman and van Wijnbergen (1991) find values for ρ between 0.24 and 0.8 depending on whether money services are accounted for in the measure of consumption or not, indicating a substitution elasticity well in excess of 1. With money services incorporated, the implicit estimate of the intertemporal substitution elasticity is 4.2, significantly in excess of 1. Similar results are reported by Epstein and Zin (1991) for the US. Whether the channels explored in this paper were in fact behind the sharp deterioration in the trade balance that followed Mexico's trade reforms requires a more in depth analysis than the

evidence just mentioned; but these empirical results suggest that the channels explored in this paper could conceivably have played an important role.

These results have important policy implications. If the trade reform will not be reversed, but the Government cannot credibly communicate that to the private sector, consumers effectively trade off the wrong intertemporal prices. As a consequence, private savings will be suboptimally low; this justifies policy intervention to increase private savings. This is a special case of a more general point made by Guillermo Calvo (1988): mistaken beliefs about future policy act like a distortion and therefore justify policy intervention in principle. Increasing private savings should preferably be done through a temporary increase in consumption taxes. If that is not feasible, a case can be made for temporary tariffs as a second best response; this would be equivalent to gradual rather than "cold turkey" trade liberalization.

A magnifying impact could come about if the private savings response leads to such a large current account deficit that the trade reform itself does in fact get reversed, a case of self-fulfilling prophecy. [6]/ This very real possibility further strengthens the case for policy intervention to increase private savings, and, arguably, for external support in the early periods of trade reform, possibly through institutions like the World Bank.

REFERENCES

Arrau, Patricio and van Wijnbergen, Sweder, "Intertemporal Substitution, Risk
    Aversion and Private Savings in Mexico", mimeo, World Bank, 1991.

Bufman, Gil, Leiderman, Leo and van Wijnbergen, Sweder, "Consumption and
    Velocity during Stabilization Programs", mimeo, World Bank, 1991.

Calvo, Guillermo, "Credibility and Economic Policy", presented at the conference:
    Spain and the European Monetary System, 1988.

Diamond, Peter and Stiglitz, Joseph, "Increases in Risk and Risk Aversion", Journal of
    Economic Theory, 1974, 8, 337-60.

Dornbusch, Rudiger, "External Balance Correction: Depreciation or Correction?",
    Brookings Papers on Economic Activity, 1987, (1), 249-71.

Dornbusch, Rudiger, "Credibility and Stabilization", mimeo, MIT, 1989.

Edwards, Sebastian and van Wijnbergen, Sweder, "The Welfare Effects of Trade and
    Capital Market Liberalization", International Economic Review, 1986, 27,
    141-149.

Epstein, Larry and Zin, Stanley, "Substitution, Risk Aversion and the Temporal
    Behavior of Consumption and Asset Returns: a Theoretical Framework",
    Econometrica, 1989, 57, 937-69.

Epstein, Larry and Zin, Stanley, "Substitution, Risk Aversion and the Temporal
    Behavior of Consumption and Asset Returns: an Empirical Analysis", Journal
    of Political Economy, 1991.

Hall, Robert, "Intertemporal Substitution in Consumption", Journal of Political
    Economy, 1988, 96, 339-57.

Razin, Assaf and Svensson, Lars, "An Asymmetry between Import and Export Taxes",
    Economic Letters, 1983, 13, 55-57.

Rodrik, Dani, "Trade Policies and Development: Some New Issues", mimeo, Kennedy
    School of Government, Harvard University, 1990.

Selden, Larry, "A New Representation of Preferences over "Certain X Uncertain"
    Consumption Pairs: The "Ordinal Certainty Equivalence" Hypothesis",
    Econometrica, 1978, 46, 1025-45.

Weil, Philippe, "Non-Expected Utility in Macroeconomics", Quarterly Journal of
    Economics, 1990, CV, 29-43.

van Wijnbergen, Sweder, "Trade Reform, Capital Flight and the Value of
    Information", Economics Letters, 1985, 19, 369-72.

1. Dornbusch (1987) makes the point in a different context: he argues that an increase in tariffs would improve the US current account. By symmetry (not an innocuous assumption..), this supports the view that a decrease would deteriorate the CA.

2. The assumption of unit intra-temporal elasticity is made to simplify the expression for the exact period 2 consumer price index and the consumption rate of interest. Qualitatively similar results would come out with any positive intra-temporal substitution elasticity.

3. The impact on savings will be unconditionally negative if consumers anticipate the income effects of a second period rebate of tariff revenues.

4. or, more precisely, for any given expected value of the consumption discount rate.

5. This result is a special case of a general proposition in Peter Diamond and Joseph Stiglitz (1974).

6. Dornbusch (1989) discusses the possibility of such self-fulfilling equilibria in the context of stabilization programs.

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