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REVENUE MOTIVES AND TRADE LIBERALIZATION IN AN ENDOGENOUS TARIFF MODEL*

Abstract

Governments in more developed economies partially compensate import-competing industries when world prices fall, i.e. they lean against the wind. In less developed economies we often observe liberalization in response to the same shock. We use a political-support maximization model with revenue motives to derive conditions under which a rational policy-maker would respond to lower world prices by reducing tariff protection for an import-competing industry. An initial tariff that exceeds the maximum revenue level proves necessary but not sufficient for politically optimal liberalization following a fall in the world price of the importable good.

1. Introduction

An important result in the endogenous protection literature is Hillman's proposition that "world and domestic prices should move in the same direction when protectionist decisions are based on motives of political support (Hillman 1990, p. 29)." Thus industries in secular decline--those whose comparative disadvantage vis-a-vis the world market is worsening--will be permitted to shrink. Hillman uses a modified Stigler-Peltzman political support function to derive this result.¹ Long and Vousden (1991) find the same outcome likely, under reasonable assumptions, in a three-sector Ricardo-Viner economy. These papers offer no firm conclusions about the propensity of governments to change their existing trade policy following terms of trade shocks. In practice, policy-makers in more developed economies (DCs) often partially compensate import-competing domestic industries when world prices fall, i.e. they lean against the wind. Common

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tools of compensation include voluntary export restraints imposed on one's trading partners and loosened rules governing anti-dumping or countervailing duty procedures. In less developed economies (LDCs) the pattern is less clear, and liberalization may follow a lower world price for importables.

In this paper we use a policy-maker welfare function in which producer profits, policy revenue, and consumer welfare interact to determine the politically optimal response to a terms of trade shock. Revenue motives prove necessary, though not sufficient, for liberalization to be a politically optimal response to a decrease in the world price of importables. Since LDCs rely heavily on border taxes to finance government budgets, our model offers a plausible way to differentiate the behavior of DC and LDC policy-makers in response to the same external shock.

The propensity to liberalize following a change in world prices is governed in part by where the initial level of protection (summarized by a tariff) is set relative to the maximum revenue level. We show that tariffs exceeding the maximum revenue level are necessary (but not sufficient) for politically optimal liberalization following a terms of trade shock that lowers importables prices. Intuitively, at the initial level of protection the lower world price reduces the tariff-induced profit wedge from which the government earns support from producer interests. If the initial politically optimal tariff exceeds the maximum revenue level, the policy-maker may *not* choose to compensate producers with a higher tariff since that would erode revenues. Thus, in our model LDCs with the most inward-looking trade policy regimes are the most likely to liberalize.

Political support from producer interests can easily sustain a highly protectionist tariff structure that yields less than maximum revenues. For example, many developing nations have

pursued policies that effectively grant prohibitive protection to newly started industries. They may do this by invoking a "law of similars" under which firms choosing to import products when similar domestic goods are available lose valuable government contracts or subsidized credit. Others use control of import licenses to ban imports of goods for which a domestic substitute is available.²

2. Model

We assume a policy-maker welfare function in which industrialists, policy revenues, and consumers interact to shape state decisions. Formally, we write the welfare function as

$$M = M[\Pi(p, p^*), R(p), p-p^*] = M[\pi(p) - \pi(p^*), R(p), p-p^*], \quad (1)$$

$$M_1 > 0, M_2 > 0 \text{ and } M_3 < 0,$$

where $\Pi(p, p^*)$ is the industry profit function, $R(p)$ is the policy revenue function, $p-p^*$ captures consumer preferences, p is the domestic price and p^* is the world price (the free trade reference point). All functions are assumed continuous and differentiable. The subscripts in the partial derivatives M_1 , M_2 , and M_3 refer to the three arguments in the welfare function respectively. Industry support depends on the policy-induced wedge between profit at the domestic tariff-inclusive price and the free trade world price.³ Consumer hostility depends directly on the tariff wedge. Revenue enters the welfare function directly. States may have different motives for acquiring revenue. Kleptocratic regimes, for example, behave differently than bureaucratic states that maximize public expenditure, though both need revenue.⁴

An appropriately chosen p will maximize policy-maker welfare. The first order condition is,

$$dM/dp = M_1\pi_p + M_2R_p + M_3 = 0, \quad \pi_p > 0 \text{ and } R_p \geq 0. \quad (2)$$

If $M_1\pi_p$ is large or M_2 and M_3 are small, $R_p < 0$ may be optimal. By pushing the tariff beyond the maximum revenue level the policy-maker may gain more at the margin from higher industry support than it gives up in foregone utility from revenue or from consumer hostility.

To see how the optimal endogenous tariff responds to changes in the world price we totally differentiate (2) to get,

$$dp/dp^* = -\mathbf{M}_{pp^*}/\mathbf{M}_{pp}, \quad (4)$$

where,

$$\mathbf{M}_{pp} = M_1\pi_{pp} + \pi_p^2 M_{11} + 2\pi_p M_{13} + 2M_{12}R_p\pi_p + 2M_{23}R_p + M_{22}R_p^2 + M_2R_{pp} + M_{33},$$

and,

$$\mathbf{M}_{pp^*} = -[M_{11}\pi_p\pi_{p^*} + \pi_p M_{13} + M_{33} + M_{13}\pi_{p^*} + M_{23}R_p + M_{12}R_p\pi_{p^*}],$$

We assume a convex revenue function, so $R_{pp} < 0$, and $R_p \geq 0$. Also, $\pi_p > 0$, $\pi_{pp} < 0$, $\pi_{p^*} > 0$ and $\pi_{pp^*} = 0$ since $\pi = \pi(p) - \pi(p^*)$.

Hillman assumes $M_{13} = M_{31} < 0$. Higher industry profit increases the marginal effectiveness of consumer pressure, while higher prices reduce the marginal effectiveness of industrialists' support. This is the profit envy effect. With revenue in the welfare function, the policy-maker may also be subject to revenue envy. If $M_{23} = M_{32} < 0$, consumer hostility to price hikes rises as revenue increases, or the marginal benefit of increased revenue falls as the

deviation between domestic and world price worsens. Lastly, we assume $M_{12} = M_{21} = 0$ in equation (4). Revenue levels are presumed unrelated to industry support.

If dp/dp^* is positive (Hillman's case) then lower world prices are transmitted into lower domestic prices. This need not reflect liberalization since $dp/dp^* > 0$ is consistent with either rising or falling tariffs. We assume the link between domestic and world price is a specific tariff, so $p = p^* + T$. Thus $dT/dp^* \geq 0$ as $dp/dp^* \geq 1$. Liberalization is a reduction in tariffs. Thus for a favorable terms of trade shock (p^* falls) liberalization occurs if $dp/dp^* > 1$.

3. Consequences of the Revenue Motive

To highlight the role of revenue (and revenue envy) we rewrite (4) to separate the revenue envy component (all terms containing M_{23}) from the remaining terms in the expressions for \mathbf{M}_{pp} and \mathbf{M}_{pp^*} , or

$$\mathbf{M}_{pp} = Y + 2M_{23}R_p, \text{ and}$$

$$\mathbf{M}_{pp^*} = -(X + M_{23}R_p).$$

Thus,

$$dp/dp^* = -\mathbf{M}_{pp^*}/\mathbf{M}_{pp} = (X + M_{23}R_p)/(Y + 2M_{23}R_p), \quad (5)$$

where $X < 0$ and $Y < 0$. With a revenue motive $dp/dp^* < 0$ is possible, though unlikely.⁵ Absent convincing evidence for this we will explore within Hillman's case ($dp/dp^* > 0$) how revenue affects the propensity to liberalize.

Since $\mathbf{M}_{pp} = (Y + 2M_{23}R_p) < 0$ for local maximization, $dp/dp^* > 0$ implies that the

numerator of equation (5) is negative as well. Liberalization requires $dp/dp^* > 1$. If the numerator and denominator of (5) are both negative, liberalization occurs if and only if $(X + M_{23}R_p) - (Y + 2M_{23}R_p) < 0$. Simple manipulation yields $dp/dp^* > 1$ if

$$Z - M_{23}R_p < 0 , \quad (6)$$

where

$$Z = M_{11}(\pi_p\pi_{p^*} - \pi_p^2) + M_{13}(\pi_{p^*} - \pi_p) - M_1\pi_{pp} - M_2R_{pp} - M_{22}R_p^2 . \quad (7)$$

Since $p > p^*$, Hotelling's lemma implies that $\pi_p > \pi_{p^*}$.⁶ Thus Z is positive.

From equations (6) and (7) we see that in order for a lower world price to induce liberalization, a revenue motive must be included in the policy-maker's calculus. Without a revenue motive (i.e. with $M_2 = M_{22} = M_{12} = M_{23} = 0$) the remaining terms are unambiguously positive, so the politically optimal response to a lower price of importables is to lean against the wind and grant the domestic industry partial compensation in the form of a higher tariff. Furthermore, since $M_{23} < 0$, liberalization requires $R_p < 0$. The initial tariff must exceed the maximum revenue level. In less developed economies the revenue motive for protection is typically much stronger than in more developed economies that have access to other broad based sources of tax revenue.⁷ The model suggests that policy-makers in these two environments will exhibit different behavior. In developed economies policy-makers may lean against the wind, while in LDCs they may instead choose to lower tariffs.

We can interpret this result intuitively. At the initial level of protection the lower world price reduces the profit wedge, $\pi(p) - \pi(p^*)$, from which the government earns support from

producer interests. This is true as long as the firm experiences increasing marginal production costs.⁸ At the margin, this could lead the policy-maker to raise the tariff (and suffer increased consumer hostility) in order to compensate producers. This outcome is less likely if the initial endogenous tariff exceeds the maximum revenue level since that would erode revenues. Moreover, if the world price shock itself lowers revenue the government may opt to reduce tariffs to recoup some lost income.

Revenue envy also influences the likelihood of liberalization. From equations (5) and (6), and given an initial tariff that exceeds the maximum revenue level, increasing the magnitude of revenue envy (the absolute value of M_{23}) raises dp/dp^* . This is independent of the initial value of dp/dp^* (greater than one is the liberalization threshold) and implies an *increase in the propensity to liberalize* in response to a fall in the world price. From its definition, revenue envy means the marginal political benefit of a dollar of revenue (M_2) rises as p falls. This change in M_2 alters the political equilibrium between revenue and profit to favor revenue. Since the specific tariff (T) initially exceeds the maximum revenue level the policy-maker will reduce further the domestic price (lower T) to reap the benefit of the higher M_2 .

What sort of states in the developing world are more likely than others to be subject to revenue envy as a constraint on decision-making? Recall that revenue envy also measures the rate at which public hostility to a price increase (M_3) increases as revenues rise. Two related characteristics may offer some insight. They are monitoring costs and width of the ruling coalition. Monitoring costs may play a significant role in developing nations in which the state's importance is exaggerated relative to "civil society." Control over the state's administrative apparatus allows elites to appropriate disproportionate economic rewards. Clapham's (1985)

concept of neo-patrimonialism effectively characterizes this process.⁹ Neo-patrimonialism refers to the use of the modern state's supposedly impersonal, universalistic rules and allocative systems (its rational-legal forms) for private purposes. A traditional patrimonial leader uses his personal resources to develop and strengthen ties between him and his followers. The neo-patrimonial ruler or elite can use the power of the state to apportion jobs, import licenses, or scarce foreign exchange.

Even within this framework, nations whose citizens can monitor government behavior at lower cost may have regimes that are more constrained by revenue envy (and profit envy) effects than countries whose ruling elites preside over a disorganized populace. In a principal-agent framework, high monitoring costs allow more latitude for the agent (government) to pursue policies that are inconsistent with the implied social contract. This is a first order effect, i.e. nations with a more extensive civil society are less likely to have regimes that are overtly kleptocratic. For any *given* level of protection (which may exceed the maximum revenue level), ease of monitoring may be associated with a marginal political cost of price hikes that increases rapidly as revenues rise (high M_{23}). These states would be more likely to liberalize in response to a fall in p .

Revenue envy may also be related to the width of the ruling coalition. A coalition that embraces a wide slice of the society may successfully propagate an ideology of national development. Decision-making may be less affected by revenue envy if the public perceives that revenues are used in ways that promote social goals. A narrow ruling coalition is less likely to be viewed as a credible agent of development. Those on the outside of the coalition may view trade policy (tariffs, quotas, and other licensing constraints) as another device to transfer rents

to the ruling groups. In this case, the rate at which public hostility to price hikes increases as revenues rise may be quite large.

4. Conclusion

Krueger (1993), among others, argues that reform programs often emerge at the end of a long dynamic process of political and economic changes beginning from bad initial policies and culminating in an economic crisis. We have shown that liberalization can also occur endogenously in a political support maximization model. In our model, revenue motives prove crucial in determining the politically optimal response to an exogenous decrease in the world price of importables. Without revenue motives the policy-maker will raise the tariff and partially compensate the producer interest for its losses. With a revenue motive, liberalization is a possible outcome (the tariff shrinks), but for this to occur the initial tariff must exceed maximum revenue levels.

Our framework is thus consistent with the observation that governments in more developed economies usually lean against the wind while governments in less developed economies may liberalize in response to the same shock. Further, our model suggests a testable hypothesis: LDCs whose initial tariff structure exceeds the maximum revenue threshold are more likely to liberalize than are those whose tariffs are lower. Lastly, we show that revenue envy affects the propensity to liberalize. Policy-makers who face public hostility to price hikes that increases rapidly as revenues rise may be more prone to liberalize following a decline in the world price of protected importables.

NOTES

1. The model appeared earlier in Hillman (1982).
2. See Krueger (1993, ch. 5). Political support models can also yield water-in-the-tariff, which is another common phenomenon in developing nations (Feldman, 1993).
3. We assume, as does Hillman, that the profit function is additively separable, or $\Pi(p, p^*) = \pi(p) - \pi(p^*)$. This simplification insures $\pi_{pp^*} = 0$.
4. See Findlay's excellent application of political-economy modeling to the circumstances of developing nations.
5. Since $M_{pp} = (Y + 2M_{23}R_p) < 0$ for local maximization, $dp/dp^* < 0$ requires $R_p < 0$ and a revenue envy effect that is large relative to the other parameters of X.
6. Since $\pi(q) = pq - C(q)$, where q is firm output and $C(q)$ is the cost function, profit maximization yields $p = C'(q)$. Since q is a function of p , $\pi_p = q(p) + [p - C'(q)](dq/dp) = q(p)$, which is an increasing function of price. Thus $p > p^*$ implies $\pi_p > \pi_{p^*}$.
7. In 1985, customs duties comprised 1.6 percent of total revenue in the U.S. but the percentages in Ghana, Egypt, and India were 40.9, 15.2, and 26.4, respectively (IMF, 1990).
8. As a special case, imagine a firm with an upward sloping linear marginal cost curve. For a given specific tariff the profit wedge is the standard trapezoid. This trapezoid is an increasing function of the world price. Note also that an *ad valorem* tariff reinforces this result.
9. Findlay (1990) uses this idea to develop a useful typology of states in the developing world.

References

- Clapham, C., *Third World Politics*, Madison: University of Wisconsin Press, 1985.
- Feldman, D. H., "Redundant Tariffs as Rational Endogenous Protection," *Economic Inquiry*, 31 (1993): 436-447.
- Findlay, R., "The New Political Economy: Its Explanatory Power for LDCs," *Economics and Politics*, 2 (1990): 193-221.
- Hillman, A.L., "Declining Industries and Political-Support Protectionist Motives," *American Economic Review* 72 (1982): 1180-1187.
- Hillman, A.L., *The Political Economy of Protection*, Chur: Harwood Academic Publishers, 1989.

International Monetary Fund, *Government Financial Statistics Yearbook*, 1990.

Krueger, A. O., *Political Economy of Policy Reform in Developing Countries*, Cambridge: The MIT Press, 1993.

Long, N.V., and N. Vousden, "Protectionist Responses and Declining Industries," *Journal of International Economics* 30 (1991): 87-103.