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Free Entry and Government Revenue Under Trade Liberalization

by

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Abstract

We examine whether the market under free entry with a certain entry cost can recover the revenue loss following tariff reduction on an intermediate input. We show that there are four possible ranges of entry cost, from high to low, with four different revenue implications following a reduction in tariff: (i) both tariff revenue and profit tax revenue increase without raising the rate of profit tax; (ii) tariff revenue declines but total revenue increases as the increase in profit tax revenue dominates the reduction in tariff revenue; (iii) revenue loss can be compensated by increasing the rate of profit tax; (iv) compensation is not possible with a non-distortionary profit tax.

JEL Classification: F12; H20

Key Words: Free Entry; Entry Cost; Trade Liberalization

Outline

Non-technical Summary

Recovering any revenue loss due to the reduction in import duties has been one of the major concerns of many developing economies as most of them have relied historically on import duties as a primary source of government revenue. For instance, in Seychelles, Madagascar, Swaziland and Maldives, in 2000, import duties accounted for more than 50% of total tax revenue. While developing countries have, over the years, undertaken significant cuts in tariffs, their average tariff rates are still quite high. Pakistan, for example, cuts its maximum tariff from 45% to 30% in 1999, having reduced the ratio of import duties to import value over the previous decade from 42% to 22%; substantial reductions, but clearly far from full liberalization. The major concern of these countries towards full trade liberalization is how to make up the shortfall in tariff revenue (if there is any) through other compensatory taxes while making neither producers nor consumers worse-off in the post-liberalization period.

While there are some attempts to address this question, pervious literature has mainly focused on perfectly competitive product markets, aiming at uncovering the kinds of tax reform along with tariff reductions that will raise welfare with or without looking into the revenue implications. Further, despite the large share of intermediate inputs in the developing countries imports, what little effort has been paid on the imports of intermediate goods while devising tariff-tax reform strategies again mostly occurs under perfectly competitive settings. Therefore, the pervious works may not be appropriate in markets where the firms have significant market power.

The purpose of this paper is to overcome these above-mentioned limitations of the previous works. Specifically, we consider revenue implications of tariff reduction on the intermediate goods in an imperfectly competitive product market. Though, we consider that the firms have market power in the product market, we allow for entry in our analysis and determine the equilibrium number of firms endogenously. In this framework, we seek to examine when the government needs to rely on another form of taxation to compensate any shortfall in tariff revenue and if needed, whether profit tax on firms can be used as a compensatory measure or the government needs a more distortionary forms of taxation.

We show that depending on the cost of entry, from high to low, there are four different revenue implications following a tariff reduction on the intermediate product: (i) both tariff revenue and profit tax revenue increase without raising the rate of profit tax; (ii) tariff revenue declines but total revenue increases as the increase in profit tax revenue dominates the reduction in tariff revenue; (iii) total revenue loss can be compensated by increasing the rate of profit tax; (iv) compensation is not possible with a non-distortionary profit tax.

We consider endogenous entry of firms in the product market and show that it alters the results of those previous works. So, while those works may be relevant for a short-run analysis, this paper provides a long-run effect of the problem. Our result suggests that in the long-run, the market itself might take care of the consequences of tariff reduction and the government does not need to rely on any other forms of taxation to maintain its total revenue while making neither producers nor consumers worse-off in the post-liberalization period.

Finally, we look at the available data on average tariff rate, tariff revenue and total tax revenues in countries ordered with a proxy of entry cost (i.e., corruption) and find that our results are broadly consistent with empirical evidence.

1. Introduction

Recovering any revenue loss due to the reduction in import duties has been one of the major concerns of many developing economies as most of them have relied historically on import duties as a primary source of government revenue. For instance, in Seychelles, Madagascar, Swaziland and Maldives, in 2000, import duties accounted for more than 50% of total tax revenue, while these figures were 26% for India and 20% for Philippines (see Table 1 below). While developing countries have, over the years, undertaken significant cuts in tariffs, their average tariff rates are still quite high. Pakistan, for example, cuts its maximum tariff from 45% to 30% in 1999, having reduced the ratio of import duties to import value over the previous decade from 42% to 22%; substantial reductions, but clearly far from full liberalization (Keen and Ligthart, 2002). The major concern of these countries towards full trade liberalization is how to make up the shortfall in tariff revenue (if there is any) through other compensatory taxes while making neither producers nor consumers worse-off in the post-liberalization period.

Table 1: Import duties (% of tax revenue) in 2000

Country	2000
Philippines	20.65
Vietnam	20.73
Congo, Rep.	22.87
Jordan	23.71
India	26.67
Bahrain	26.74
Nepal	31.13
Mauritius	31.55
St. Vincent and the Grenadines	42.43
Bahamas, The	47.41
Seychelles	52.05
Madagascar	53.53
Swaziland	54.70
Maldives	63.71

Source: World Development Indicators CDROM 2002

While there are some attempts to address this question, pervious literature has mainly focused on perfectly competitive product markets (see, e.g., Michael et al, 1993, Hatzipanayotou et al, 1994 and Keen and Ligthart, 2002, Emran and Stiglitz, 2004). This literature aims at uncovering the kinds of tax reform along with tariff reductions that will raise welfare with or without looking into the revenue implications[1]. Further, despite the large share of intermediate inputs in the developing countries imports (see López and Panagariya, 1992), little effort has been paid on the imports of intermediate goods while devising tariff-tax reform strategies. What little effort has been made in this direction again mostly occurs under perfectly competitive settings (see e.g., López and Panagariya, 1992; Panagariya, 1992). Therefore, the pervious works may not be appropriate in markets where the firms have significant market power.

The purpose of this paper is to overcome these above-mentioned limitations of the previous works. Specifically, we consider revenue implications of tariff reduction on the intermediate goods in an imperfectly competitive product market. Though, we consider that the firms have market power in the product market, we allow for entry in our analysis and determine the equilibrium number of firms endogenously. In this framework, we seek to examine when the government needs to rely on another form of taxation to compensate any shortfall in tariff revenue and if needed, whether profit tax[2] on firms can be used as a compensatory measure or the government needs a more distortionary forms of taxation.

We show that depending on the cost of entry there are four different revenue implications following a tariff reduction on the intermediate product: (i) both tariff revenue and profit tax revenue increase without raising the rate of profit tax; (ii) tariff revenue declines but total revenue increases as the increase in profit tax revenue dominates the reduction in tariff revenue; (iii) total revenue loss can be compensated by increasing the rate of profit tax; (iv) compensation is not possible with a non-distortionary profit tax.

Recently, Mujumder (2004) and Haque and Mukherjee (2004) have also considered revenue implications of tariff reduction in an imperfectly competitive market with a given number of firms. However, unlike them, the present paper considers entry of firms in the product market and show that entry of firms significantly alters the results of those previous

[1] In an interesting paper, Emran and Stiglitz (2004) looks at the welfare worsening implications of revenue-neutral increase in VAT along with a reduction in trade taxes in the presence of an informal economy.

[2] As argued in Mujumder (2004), consumers may oppose to more distortionary forms of taxation as a compensatory measure since firms appropriate a substantial share of benefit of the tariff reduction through higher profit. This may justify the government's reliance on profit tax as a compensatory measure.

works.[3] So, while those works may be relevant for a short-run analysis, this paper provides a long-run effect of the problem. Our result suggests that in the long-run, the market itself might take care of the consequences of tariff reduction and the government does not need to rely on any other forms of taxation to maintain its total revenue while making neither producers nor consumers worse-off in the post-liberalization period.

The remainder of the paper is organized as follows. The next section develops a very simple model to show the free entry equilibrium. Section 3 analyzes the effect of tariff reduction. In Section 4, we seek to provide some empirical evidence consistent with our results. Section 5 concludes.

2. The model

Consider a small open economy with an industry with large number of firms. We assume that the firms are symmetric. That is, they all have the same cost function and import a certain key input. For simplicity, we assume that one unit of output requires one unit of input. The cost of assembling each unit is assumed to be identical across firms and for simplicity, assumed to be zero.[4]

Let p^f denote the import price of the input. Since we consider a small open economy, this input price remains constant irrespective of the amount of imports by the firms. There is an ad valorem tariff t imposed on each unit of input. Let q_i denote output of firm i, where $i = 1,2,...,n$. Therefore, marginal cost of the ith firm is $MC_i = p^f(1+t)q_i$. We assume that the aggregate demand for the industry's product is represented by the inverse demand function:

$$P = a - Q, \tag{1}$$

where the notations have usual meanings. We assume that the firms produce in a market with free entry and each producer incurs certain cost of entry, k^2. Firm's profit is taxed at a rate $T \in (0,1)$. Firms will continue to enter the market until the profit-after-tax equals the entry cost.[5] So, the free-entry equilibrium, which determines the equilibrium number of firms in the industry, is given by the following zero-profit condition:

[3] Though Buffie and Spiller (1986) and Eldor and Levin (1990) had also considered trade liberalizaion in an imperfectly competitive market, their focus were not on the revenue implications of trade liberalization.
[4] Needless to say, this assumption of zero cost of assembly does not affect our qualitative results.
[5] Note that the entry cost in our analysis does not fall under profit tax. Hence, this cost of entry can be thought of as the opportunity cost or the disutility associated with investment in this industry, which may be due to corruption in

$$(1-T)\pi_i = k^2, \tag{2}$$

where $i = 1,2,...,n$. The optimal output and gross profit of the ith firm, $i = 1,2,...,n$ are respectively

$$q_i = \frac{a - p^f(1+t)}{n+1} \tag{3}$$

$$\pi_i = \left(\frac{a - p^f(1+t)}{n+1}\right)^2 \tag{4}$$

Using the free entry equilibrium in (2), we get the equilibrium number of firms, total output and the industry profit respectively as:

$$n = \frac{\sqrt{1-T}\left(a - p^f(1+t)\right)}{k} - 1 \tag{5}$$

$$Q = nq_i = \frac{\sqrt{1-T}\left[a - p^f(1+t)\right] - k}{\sqrt{1-T}} \tag{6}$$

$$\Pi = n\pi_i = \frac{\left[\sqrt{1-T}\left(a - p^f(1+t)\right) - k\right]k}{(1-T)}. \tag{7}$$

It is clear from (3) and (4) that tariff reduction increases both output and profit of each firm and reduces price of the product as long as the number of firms remain fixed. As we allow for free entry into the market, new firms will continue to enter the market until the industry reaches its equilibrium where profit after tax remains equal to the entry cost, k^2, and individual producer's welfare in the equilibrium would remain unchanged. This will increase the equilibrium number of firms, total output and the gross industry profit as shown in (5) – (7), leaving equilibrium output and profit of each producer unaffected.

3. Effect of tariff reduction

Following the foregoing results, we can say that tariff reduction would make the consumers better off. Hence, the government can confine its attention only on its revenues: tariff revenue, profit tax revenue and total revenue. Hence, the government's objective is to satisfy the following: tariff revenue, profit tax revenue and total revenue in the post-liberalization are at least no less than their respective pre-liberalization level. Below, we establish the conditions under which the government may, or may not, need to turn to non-distortionary taxation (here, we consider profit tax) to recover the revenue loss, if there is any, due to tariff reduction.

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the economy that creates positive disutility to the producers. There may be certain types of fixed costs, which fall under profit tax. However, inclusion of those fixed costs does not affect our qualitative results.

First, we see whether there is any possibility that tariff revenue might increase or stay the same due to the reduction in tariff (from t_B to t_A) even without changing the profit tax, *T*. This gives us the following condition:

$$p^f t_A Q_A \geq p^f t_B Q_B \tag{8}$$

where the subscript A (B) is attached to a variable to denote its post-liberalization (pre-liberalization) state. Tariff reduction implies $t_A < t_B$.

Note that tariff reduction reduces tariff revenue for a given number of firms (i.e., $n_A = n_B$) if and only if

$$a > p^f (1 + t_A + t_B) \tag{9}$$

We assume that condition (9) holds throughout our analysis. Note that if (9) is satisfied, it ensures positive output of the entering firms (see (3)). Writing out the expressions for $Q_A = n_A q_{iA}$ and $Q_B = n_B q_{iB}$, and utilizing (5), (6) and (9), the condition of increase in tariff revenue due to the tariff rate reduction (as in (8)) provides us with a critical level of entry cost, k^t, as follows:

$$k \geq \sqrt{1-T}\left[a - p^f\left(1 + t_A + t_B\right)\right] \equiv k^t.^6 \tag{10}$$

Proposition 1. *(i) For any given profit tax rate, there always exists a level of entry cost, $k \geq k^t$ such that tariff revenue will always increase following a reduction in tariff rate.*

(ii) As the profit tax rate increases, it increases the range of the entry costs for which the government always gets higher tariff revenue.

The reason for the above result is simple. Due to reduction in tariff, marginal cost of each firm declines, which leads to increase in profit and more firms enter into the market and it continues until profit-after-tax equals the entry cost. This leads to increase in import demand and hence tariff revenue increases. However, for all $k \in \left(0, k^t\right)$, tariff revenue would decline.

Now we consider whether the reduction in tariff revenue is compensated due to automatic increase in industry profit for all entry costs $k \in \left(0, k^t\right)$, leaving the profit tax rate, *T*, unaffected. As shown in (7), gross industry profit unambiguously increases due to tariff reduction for a given profit tax. This always leads to increase in profit tax revenue. If the

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[6] Note that some firms always enter the market at k^t if $\frac{a - p^f(1+t_A)}{2} > a - p^f(1 + t_A + t_B)$.

increase in profit tax revenue (keeping T fixed) dominates the reduction in tariff revenue for $k \in (0, k^t)$, the total revenue increases, i.e.,

$$p^f t_A Q_A + T\Pi_A \geq p^f t_B Q_B + T\Pi_B$$

or, $$T(\Pi_A - \Pi_B) \geq p^f (t_B Q_B - t_A Q_A). \quad (11)$$

Again utilizing (9), and writing out the expressions for $\Pi_A = n_A \pi_{iA}$ and $\Pi_B = n_B \pi_{iB}$, the condition above gives us a value of the entry cost beyond which government does not need to take any compensatory measure by raising profit tax. Keeping the profit tax rate, T, at the same level, total revenue increases as long as the entry cost is beyond a critical level (k^{TR}):

$$k \geq \frac{\sqrt{1-T}\left[a - p^f(1 + t_A + t_B)\right]}{T + \sqrt{1-T}} \equiv k^{TR}. \quad (12)$$

It is easy to verify from (10) and (12) that $k^{TR} < k^t$.

Proposition 2. *(i) For any given profit tax rate, there always exists a level of entry cost, $k \in [k^{TR}, k^t)$ such that tariff revenue will decline but total revenue will increase following a reduction in tariff rate due to the fact that increase in profit revenue dominates the reduction in tariff revenue.*

(ii) As the profit tax rate increases until $T \leq \frac{2}{3}$, it increases the range of the entry costs for which the government always gets higher total revenue.

In the foregoing analysis, we have established that for any entry cost, $k \geq k^t$, the government does not need to increase profit tax. Rather, the market itself compensates and total revenue increases due to tariff rate reduction. On the one hand, given a profit tax rate, equilibrium number of firms increases while individual firm's equilibrium profit remains the same, which causes gross industry profit and profit tax revenue to increase. On the other hand, negative effect of tariff reduction is offset by increase in import demand due to higher profitability arising from cost reduction and more firms are producing in the industry. However, for $k \in [k^{TR}, k^t)$ import demand does not increase sufficiently to offset the negative effect of tariff reduction and thus tariff revenue falls. But as increase in profit tax revenue offset the reduction in tariff revenue overall total revenue unambiguously increases for this range of entry cost.

Now consider the case for any $k \in \left[0, k^{TR}\right)$. It is clear from the above analysis that for any $k < k^{TR}$, total revenue falls, as the increase in profit tax revenue cannot offset the reduction in tariff revenue due to reduction in tariff rate. In this case, the government can make up the shortfall in its revenue by raising profit tax rate (from T_B to T_A) only if the increase in the industry's profit tax revenue is greater than the shortfall in tariff revenue, i.e.,

$$T_A \Pi_A - T_B \Pi_B \geq p^f \left(t_B Q_B - t_A Q_A\right). \tag{13}$$

where, T_A and T_B are pre- and post-liberalization level profit tax rates respectively and $T_A > T_B$. Using $Q_A = n_A q_{iA}$, $Q_B = n_B q_{iB}$, $\Pi_A = n_A \pi_{iA}$ and $\Pi_B = n_B \pi_{iB}$ in (13), and assuming $k = 0$, we get the following condition:

$$\sqrt{1-T_A}\sqrt{1-T_B}\, p^f \left(t_B - t_A\right)\left[a - p^f \left(1 + t_A + t_B\right)\right] \leq 0. \tag{14}$$

Condition (14) asserts that if the entry cost is zero, the condition would never hold as all the terms in LHS are positive. Thus, government would never be able to sufficiently recover the loss in revenue by imposing higher profit tax if $k = 0$. On the other hand, we have found that for the level of entry cost $k \geq k^{TR}$, government does not need to look for any changes in profit tax for compensation. By continuity assumption, we can argue that there exists entry cost, say k^{TA}, such that for $k \in (k^{TA}, k^{TR})$, government can go for deliberate attempt of compensating the loss in total revenue by imposing higher profit tax.

Proposition 3. *There always exists a level of entry cost, $k \in \left[0, k^{TA}\right)$ such that the government can never compensate the reduction in tariff revenue following a reduction in tariff rate by imposing higher profit taxes.*

Proposition 4. *There exists a level of entry cost, $k \in \left[k^{TA}, k^{TR}\right)$ such that the government can compensate the reduction in tariff revenue following a reduction in tariff rate by imposing higher profit taxes.*

The reason for the above finding is easy to understand. For very low levels of entry cost closed to zero, reduction in tariff does not change the profit scenario since the corresponding equilibrium profit is also closed to zero, leaving the economy with a negligible increase in profit tax revenue that would never be sufficient to recover the loss in tariff revenue. In this situation, the government can never compensate even by increasing a non-distortionary tax. But, as the entry cost gets bigger, profits start increasing leading to increase

in profit tax revenue, and beyond a certain entry cost increase in the profit tax rate would lead to sufficient increase in profit tax revenue that would compensate any loss in tariff revenue. So, in this situation, the government can recover the losses by increasing the profit tax rate.

4. Some Evidences

In the foregoing analysis, we examine whether the market under free entry with a certain entry cost can recover the revenue loss following tariff reduction on an intermediate input. We show that there are four possible ranges of entry cost, sufficiently high to low, with four different revenue implications following a reduction in tariff: (i) both tariff revenue and profit tax revenue increase without raising the rate of profit tax; (ii) tariff revenue declines but total revenue increases as the increase in profit tax revenue dominates the reduction in tariff revenue; (iii) revenue loss can be compensated by increasing the rate of profit tax; (iv) compensation is not possible with a non-distortionary profit tax. In this section, we look at the available data and see whether our results are empirically consistent.

In Table 2, we report the data for average tariff rate, tariff revenue and total tax revenue (deflated by GDP deflator) for 1980 and 2000 from World Bank CDROM 2002. We compare the data points with 20-year gap for two reasons: *first*, most of the liberalizing countries have started tariff reduction during the early 80's (Greenaway *et al*, 2002); *second*, tariff reduction needs long time-lag to have impact on both tariff revenue and tax revenue. In the last three columns of Table 2, we report the direction of movements of tariff rate, tariff revenue and total tax revenue, where 'up' means the increase and 'down' means the decline in the value from 1980 to 2000.

Table 2: Corruption, Tariff rate, Tariff Revenue and Tax Revenue

	ICRG [a] 1984-2000	Tariff rate 1980	Tariff rate 2000	Tariff Rev 1980	Tariff Rev 2000	Tax Rev 1980	Tax Rev 2000	Tariff Rate (1980-2000)	Tariff Rev (1980-2000)	Tax Rev (1980-2000)
		(%)	(%)	(millions)	(millions)	(millions)	(millions)	up/down	up/down	up/down
Pakistan	2.08	25.34	11.97	13329	13539	34362	84777	down	up	up
Philippines	2.29	13.43	7.08	19490	27470	76343	133026	down	up	up
Jamaica	2.44	2.3	5.57	121	413	3783	4455	up	up	up
India	2.80	25.66	20.05	99781	336383	402343	1261278	down	up	up
						30500277	110060470			
Turkey	2.81	8.93	1.38	20740189	18710280	5	6	down	down	up
Thailand	2.86	11.09	3.77	26174	51663	120339	421397	down	up	up
Venezuela, RB	2.97	9.63	11.32	6657	8502	83525	75170	up	up	down
Peru	2.99	17.14	11.18	2277	1861	14004	16129	down	down	up
Tunisia	3.00	20.55	7.83	567	559	1821	4475	down	down	up
Uruguay	3.00	19.29	4.58	7	2	45	71	down	down	up
Bahamas, The	3.03	2.67	21.56	120	148	180	312	up	up	up
Sri Lanka	3.27	9.59	4.8	16600	18062	72238	137461	down	up	up
Argentina	3.35	0	7.97	0	1848	21479	35744	up	up	up
Iran, Islamic Rep.	3.41	20.86	26.45	228906	243841	649011	1694518	up	up	up

Jordan	3.42	21.25	8.57	233	255	380	1077	down	up	up
Madagascar	4.00	17.58	23.57	61926	141429	240489	264204	up	up	up
Singapore	4.53	0.91	0.28	573	534	5761	21633	down	down	up
Israel	4.59	4.45	0.95	2546	941	60768	120677	down	down	up
Nicaragua	4.61	8.13	3.11	962	536	4224	6910	down	down	up
United States	4.78	2.97	1.63	12762	18288	862282	1810710	down	up	up
South Africa	4.88	2.95	3.85	3190	5134	92472	159925	up	up	up
New Zealand	5.74	4.42	2.25	660	594	20187	29707	down	down	up
Canada	6.00	4.59	0.77	5692	2622	88386	191403	down	down	up

Source: World Bank CDROM 2002. a. Higher ICRG index means lower corruption.

We order the countries according to corruption, from high to low, which we consider to be a reasonable proxy for entry costs in an economy[7]; where lower score means the higher corruption and vice – versa. The data for corruption are taken from International County Risk Guide (ICRG) and averaged over 1984 - 2000[8]. These are indices that assess the corruption level by ranking countries according the extent to which corruption is perceived to exist within the political system. After collecting the data for all the relevant variables for our analysis without any missing observations, we end up having only 23 countries in our sample (see in Table 2).

We find that for the countries with higher levels of corruption, i.e., 2.08 – 2.80 (e.g., Pakistan, Philippines, and India with the exception of Jamaica), tariff reduction (increase) from 1980 to 2000 is followed by the increase (decline) in both tariff revenue and tax revenue. For an intermediate but relatively large corruption level, i.e., 2.81 – 3.00 (e.g., Turkey, Thailand, Peru, Tunisia, and Uruguay with the exception of Venezuela), tariff reduction (increase) from 1980 to 2000 is followed by the decline (increase) in tariff revenue but increase (decline) in total tax revenue. For the ranges of low corruption 3.03 – 6.00, we get a mixed picture where for some countries (e.g., Singapore, Israel, Nicaragua, New Zealand, and Canada) tariff reduction (increase) from 1980 to 2000 is followed by the decline (increase) in tariff revenue but increase (decline) in total tax revenue and for other countries (e.g., Bahamas, Argentina, Iran, Madagascar, and South Africa) tariff reduction (increase) from 1980 to 2000 is followed by the decline (increase) in both tariff revenue and tax revenue, again with some exceptions (Sri Lanka, Jordan, and USA).

It may be noted that our empirical analysis has got several qualifications. *First*, as we seek to show the evidence consistent with our analyses in Sections 3 and 4, we do not deeply explore the countries with exceptions[9], which needs further research. Rather we show that there is a broad indication that our analyses can explain the implications of tariff reduction in different countries with different market entry costs. *Second*, ideally we should look at the data for input tariff rate, input tariff revenue and the summation of input tariff revenue and profit tax revenue in order to find the empirical consistency of our results. But none of these data are available to the best of our knowledge and instead we end up with collecting average tariff rate and tariff revenue (both of which include imports of intermediate goods, capital

[7] There might be some other components of entry costs in an economy, e.g., cultural costs, lack of infrastructure, bureaucratic inefficiency, or institutional rigidity. However, we believe that corruption is a major component of entry costs.

[8] 1984 is the starting year for ICRG Corruption Index.

[9] Jamaica, Venezuela, Sri Lanka, Jordan, and USA

goods and output), and total tax revenue (that includes tariff revenue, profit tax revenue and other revenues). *Third*, the entry costs may be high in the countries with lower corruption (e.g., Jamaica) due to the other possible components of entry costs (e.g., cultural costs, lack of infrastructure, bureaucratic inefficiency, or institutional rigidity). For example, most of the countries with exception (Jamaica, Venezuela, Sri Lanka, and Jordan) other than USA are developing countries leading us to believe that Infrastructural and other costs may play a vital role in these countries. Thus, both the second and third qualifications may explain the countries with exceptions.

5. Conclusion

While the tariff revenue forms a significant of government revenue in developing countries, the literature on trade liberalization does not pay attention on revenue consequences of a tariff rate reduction when there is entry in the market. We examine the effect of tariff reduction on government revenue under free entry.

We show that for sufficiently large entry cost, a tariff reduction will always accompany higher tariff revenue and profit tax revenue due to the entry of new firms in the industry. So, in this situation, the market will itself compensate for any shortfall in revenue due to tariff reduction. For intermediate but relatively large entry costs, tariff reduction will reduce tariff revenue but will increase profit tax revenue in way so that total revenue increases. Hence, even in this situation, government does not need to interfere with other compensatory taxes. For intermediate but relative low entry costs, we find that tariff reduction reduces total revenue of the government which can be compensated by increasing the rate of profit tax. Lastly, if the entry cost is very small, we show that the government cannot compensate the loss of total revenue following a tariff reduction with a non-distortionary profit tax. Hence, in this situation, the government may need to depend on other distortionary taxes to compensate its loss of revenue.

The novelty of our analysis, though very simple, is that it shows some new policy implications. The early literature has mainly dealt with the possible conditions where non-distortionary taxes may be sufficient to recover any revenue losses due to tariff reduction. In this paper, we show that in the long run, the market may compensate the loss of tariff revenue by attracting new firms in the industry. So the government may not need to use other taxes as a compensatory measure. We find that only if the entry cost is very small, the government needs to rely on other distrotionary taxes to compensate the loss of revenue following tariff reduction.

Finally, we look at the available data on average tariff rate, tariff revenue and total tax revenues in countries ordered with a proxy of entry cost (i.e., corruption) and find that our results are broadly consistent with empirical evidence.

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