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TARIFF-TAX REFORMS AND MARKET ACCESS

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Tariff-Tax Reforms and Market Access

By

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Abstract: Reducing tariffs and increasing consumption taxes is a standard IMF advice to countries that want to open up their economy without hurting government finances. Indeed, theoretical analysis of such a tariff-tax reform shows an unambiguous increase in welfare and government revenues. The present paper examines whether the country that implements such a reform ends up opening up its markets to international trade, i.e. whether its market access improves. It is shown that this is not necessarily so. We also show that, comparing to the reform of only tariffs, the tariff-tax reform is a less efficient proposal to follow both as far as it concerns market access and welfare.

JEL code: F13, H20.
Keywords: Market access; tariff reform, consumption tax reform.

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1 Introduction

A main focus of the piecemeal reform literature is to find simple and easily implementable rules for tariff changes that lead to an unambiguous welfare improvement. Two such rules have been very prominent: the proportionality rule, where all tariffs are reduced proportionally, and the concertina rule, where the highest tariff is reduced to the second highest level; see among others Hatta (1977a and 1977b).[1]

'Welfare improvement' is undoubtedly a natural target to have, but this does not preclude policy makers to also have other targets. An example of such a target – that arguably has more political visibility than 'welfare improvement' – is the government budget. As Falvey (1994) has shown, imposing the constraint that tariff reductions must not lower government revenue — which, needless to say, is a highly legitimate target to have when government's finances depend heavily on trade taxes — weakens the welfare results that the proportional and concertina rules were so good in delivering.

To the rescue of simple reform rules, a recent paper by Keen and Ligthart (2002) revives (and extends) a result first proven in Hatzipanayotou et al. (1994): a proportional tariff reduction combined with a point-by-point consumption tax increase delivers both a welfare and a revenue improvement. As Keen and Ligthart (op.cit) explain, this proportional tariff-tax reform leaves consumer prices unchanged, and affects only the production sector of the economy. Facing a reduction of implicit production subsidies (due to the reduction of tariffs), the production sector will allocate resources more efficiently, which in turn will lead to a 'production efficiency'-driven welfare gain. At the same time, the reduction of implicit production subsidies will unambiguously increase government revenue

[1] A large part of this literature focuses in testing the robustness of these two rules in less simplistic models (see, among others, Fukushima, 1979; Diewert et.al., 1989, 1991; Anderson and Neary, 1992; Turunen-Red and Woodland, 1992; and Lopez and Panagariya, 1992).

— obviously, a "win-win" advice.[2] More interestingly, and perhaps more importantly, it is an advice that currently the IMF and the World Bank have widely adopted in their conditionality agendas.[3]

Having such an impact, this simple reform rule clearly deserves further investigation. The present paper focuses on the impact that this reform has on the economy's import volume (in world price value), i.e. the so-called market access issue. Market access is something that policy makers care about when negotiations for tariff reductions are taking place, and it is something that the IMF and World Bank advisors expect to happen when they advice tariff reductions — after all, advising trade liberalization should end up increasing the value of imports!

Unfortunately, as this paper shows, the coordinated tariff-tax reform rule presented above does not necessarily increase the trade of the country. While there will exist a (non-linear) tariff-tax reform that unambiguously increases trade, we are uncertain whether that reform would increase welfare. Finally we show that the trade increase that one gets from implementing the (non-linear) tariff-tax reform is unambiguously smaller from the trade increase that we get from a reform of only tariffs. This ranking also applies with respect to the welfare effects of the two reforms. In that sense, and as far as it concerns market access and welfare, coordinating tariff-tax reforms are doing worse than isolated tariff reforms. Indeed, these are not attractive properties of an otherwise popular strategy.

Ju and Krishna (2000) are the first to focus on the market access effects of tariff reforms. They show that the implementation of the two well-known tariff reform rules (proportional and concertina) may easily reduce market access. More recently Anderson and Neary (forthcoming) show that, in general, tariff reforms that lead to welfare im-

[2]Naito (2006) has recently added a third "win" by showing that the above reform also facilitates growth.

[3]Raising a cautious voice to this practice and advocating for a more country-by-country adoption of this reform rule, Emran and Stiglitz (2005) show that the existence of an informal sector that avoids the collection of consumption taxes can render this reform welfare reducing.

provements do not coincide with tariff reforms that lead to market access improvements. The present paper shows similar results but for the coordinated tariff-tax reform — a reform that, as mentioned above, is widely used in IMF's and World Bank's stabilization and structural adjustment packages.

2 The Framework and its Analysis

Consider a small open economy that trades $N+1$ goods, with good 1 being the numeraire good. While commodity world prices p^w are fixed, domestic prices are affected by per unit import tariffs t and consumption taxes τ (no taxes are applied to the numeraire good). We denote producer prices of the non-numeraire goods by $p = p^w + t$ and consumer prices by $q = p + \tau$.[4]

The equilibrium condition for the economy is described by the budget constraint that the representative consumer faces, expressed below by using standard expenditure and revenue functions:[5]

$$E(q, u) = R(p) + G \tag{1}$$

where $E(q, u)$ denotes the minimum expenditure necessary to achieve the utility level (u) given consumer prices (q), and $R(p)$ is the maximum output produced by competitive producers that face prices (p).[6] G is the tax revenue from import tariffs and consumption taxes and it is assumed to be distributed back to the consumers in a lump-sum fashion. Moreover, it is defined as

$$G = t'(E_q(q, u) - R_p(p)) + \tau' E_q(q, u), \tag{2}$$

where the partial derivatives of the expenditure and revenue functions ($E_q \equiv \partial E/\partial q$ and $R_p \equiv \partial R/\partial p$) represent the compensated demand vector and the supply vector in

[4] All vectors are column vectors with N rows. Transposition is indicated by a prime.

[5] The price of the numeraire good is suppressed in both the expenditure and revenue functions.

[6] Producers use K inputs of production that are inelastically supplied and therefore suppressed as arguments in the revenue function.

the economy. The difference of the two $(E_q - R_p)$ represents the compensated import demand. Market access (M) is defined as the world price value of this import volume:[7]

$$M = p^{w\prime}(E_q(q,u) - R_p(p)). \tag{3}$$

The tariff-tax reform that this paper considers is exactly the same as in Hatzipanayotou et al. (1994) and Keen and Ligthart (2002) and it is compactly written as

$$dt = -\theta t,\ \theta > 0 \qquad \text{and} \qquad d\tau = -dt, \tag{4}$$

i.e. a radial reduction of all tariffs by a small amount θ accompanied by an equal increase of all consumption taxes. Since $q = p^w + t + \tau$, this reform will leave consumer prices unaffected $(dq = 0)$.

We proceed by showing first the (known) effects that this reform rule has on welfare and government revenues. We then investigate the implications that this reform has on market access.

2.1 Welfare

Totally differentiating (1) and (2) keeping in mind that $dq = 0$ leads to:

$$(E_u - (t+\tau)'E_{qu})du = E_q'dt + E_q'd\tau - t'R_{pp}dt$$

[7] Clearly, defining market access in this way, and examining how a reform affects it, makes sense only if a numeraire good is explicitly defined and removed from the reform. If not, then $p^{w\prime}(E_q - R_p)$ represents the world price value of the full trade vector which is naturally zero in equilibrium. By explicitly defining a numeraire good, the balance of trade equation is $p^{w\prime}(E_q - R_p) + (E_1 - R_1) = 0$, with $-(E_1 - R_1)$ defining the net exports of the numeraire good.

It should also be noted that market access is defined in terms of the world prices as these are the prices that exporters get when they sell their products in a country and, thus, these are the prices that negotiators use when negotiating market access.

Imposing the reform (4) gives

$$\begin{aligned}(E_u - (t+\tau)'E_{qu})du &= -t'R_{pp}dt \\ &= \theta t'R_{pp}t > 0\end{aligned} \tag{5}$$

The positive sign is due to the fact that the production substitution matrix (R_{pp}) is positive definite, provided there is some substitutability between the numeraire and non-numeraire goods, and hence $t'R_{pp}t > 0$. Assuming the so-called Hatta normality, $E_u - (t+\tau)'E_{qu} > 0$ and thus the welfare change is also positive ($du > 0$).

2.2 Revenue

It is just as straightforward to show that $dG > 0$. Differentiating (2), keeping in mind that $dq = 0$, gives:

$$\begin{aligned}dG &= (t+\tau)'E_{qu}du - t'R_{pp}dt - R_p'dt \\ &= E_u du - R_p'dt \\ &= E_u du + \theta R_p't > 0\end{aligned} \tag{6}$$

where we use (5) in line two to simplify, and we apply the reform rule (4) in line three. The positive sign to the government revenue change is due to the welfare increase proven above ($du > 0$) and due to the assumption that tariffs are non-negative, i.e. $t \geq 0$. Alternatively, and looking at the three terms in the right hand side of (6), we can induce that the first term is the combined change in tax and tariff revenue due to an income effect; the second term is the change in tariff revenues at given prices (lowering tariffs tends to increase imports even with no demand adjustment because supply falls); while the third term is the net change in tax and tariff revenues at constant quantities (replacing tariffs by consumption taxes for given quantities widens the tax base and hence increases revenue).

These are exactly the results derived in Hatzipanayotou et.al (1994) and Keen and Ligthart (2002). Basically, while the reform leaves consumers unaffected, it leads to a production efficiency effect that increases welfare. With respect to the revenues, one just has to realize that while revenues from taxing consumers have been left unchanged, the production subsidy expenses (indirectly imposed by tariffs) have fallen. The net effect is higher government revenues.

2.3 Market Access

We now proceed to the effects that such a tariff-tax reform has on market access. Differentiating (3) and keeping in mind that $dq = 0$, gives:

$$dM = p^{w\prime} E_{qu} du - p^{w\prime} R_{pp} dt. \tag{7}$$

Before we proceed we note that the above equation expresses the determinants of a change in market access in terms of the responses of the non-numeraire (importable) goods as a whole, which makes it difficult to get a clear intuition. We can, however, easily re-write Eq. (7) in terms of the numeraire (exportable) good using the linear homogeneity properties of the expenditure and revenue functions.[8] This yields

$$\begin{aligned} dM &= \left[E_u - (t+\tau)' E_{qu} - E_{1u}\right] du + \left[t' R_{pp} + R_{1p}\right] dt \\ &= R_{1p} dt - E_{1u} du \end{aligned} \tag{8}$$

[8]By definition it is true that $E = qE_q + E_1$. Thus, we can write

$$\begin{aligned} E_u &= \left[p^w + t + \tau\right]' E_{qu} + E_{1u} \Longrightarrow \\ p^{w\prime} E_{qu} &= E_u - (t+\tau)' E_{qu} - E_{1u} \end{aligned}$$

Moreover, and due to the linear homogeneity of the revenue function $(p^w + t)' R_{pp} + R_{1p} = 0$, we can write

$$p^{w\prime} R_{pp} = -t' R_{pp} - R_{1p}.$$

where we have used (5) in line two to simplify. According to Eq. (8) the change in market access is affected by the reaction of the exportable good's supply to tariff changes, and by the exportable good's income effect. Making standard assumptions, viz. that the exportable good is normal and that its supply increases as the supply of the importable goods decreases (production substitutability), leads to a conflict of the two terms: while lower tariffs will increase the output of the exportable good and thus exports, a welfare increase due to lower tariffs increases the demand for the exportable good and thus reduces exports.

Returning to (7) and substituting for du by using (5), we get:

$$\begin{aligned} dM &= -\frac{p^{w\prime}E_{qu}}{E_u-(t+\tau)'Equ}t'R_{pp}dt - p^{w\prime}R_{pp}dt \\ &= -\left(p^w+\beta t\right)'R_{pp}dt \end{aligned} \tag{9}$$

where $\beta = \frac{p^{w\prime}E_{qu}}{E_u-(t+\tau)'Equ}$ is the marginal propensity to spend on importable assumed to be between 0 and 1. It is straightforward to see that a radial reduction of all tariffs by a θ amount, as it is prescribed by (4), will not necessarily lead to a market access improvement, i.e. $\theta\left(p^w+\beta t\right)'R_{pp}t$ cannot be signed. Hence, the proportional tariff-tax reform does not perform better in this respect than the tariff-only reform analyzed by Ju and Krishna (2000).

The welfare effects of both reforms can be compared by subtracting (5) above from the corresponding equation when only tariffs are reformed (which can easily be shown to be $(E_u-(t+\tau)'E_{qu})du = t'(E_{pp}-R_{pp})dt$). This gives:[9]

$$\begin{aligned} \left(E_u-(t+\tau)'E_{qu}\right)\left[du|_{Tariff}-du|_{Tariff-Tax}\right] &= t'(E_{pp}-R_{pp})dt + t'R_{pp}dt \\ &= -\theta t'E_{pp}t > 0 \end{aligned}$$

Thus, the coordinated proportional tariff-tax reform gives rise to smaller welfare gains

[9]Note that we envisage an economy that at equilibrium has both tariffs and consumption taxes. The policy makers can then choose either a reform of only tariffs, or a reform of both tariffs and taxes. Since the effects of these reforms depend on the pre-reform equilibrium values, we can easily compare them.

than the identical reduction of tariffs in isolation. Intuitively, the tariff-tax reform replaces tariff revenue by a distortionary tax, which is worse in welfare terms than just reducing the lump-sum transfer to consumers (which is what happens when tariff revenue falls as a consequence of a reduction in tariff rates). Proposition 1 summarizes the above:

Proposition 1. *A proportional reduction of tariffs together with a point-by-point increase in consumption taxes may lower the value of imports. The resulting increase in welfare is smaller than in the case where consumption taxes are held constant.*

Ju and Krishna (2000) have shown that a tariff reform of the type $dt = -\theta\left(p^w + \beta t\right)$ will increase market access unambiguously. As pointed out by Anderson and Neary (forthcoming), this "Ju-Krishna rule" is special in that it is the only reform rule that does not require any assumptions on substitutability between goods, and it is in this sense analogous to the proportional reduction rule (where welfare effects do not depend on substitutability). We now show that combining tariff changes according to the Ju-Krishna rule with consumption tax increases to hold consumer prices constant increases market access. To this end, substitute for dt in (9) to give

$$\theta\left(p^w + \beta t\right)' R_{pp}\left(p^w + \beta t\right) > 0$$

because R_{pp} is a positive definite matrix. However, this "modified Ju-Krishna reform" is neither simple — it both requires information about β and constitutes a non-linear reduction of tariffs[10] — nor can it guarantee a welfare improvement, as can be seen by substituting for dt in (5).

Assume now that policy makers were to disregard the welfare issue and that we could easily implement the modified Ju-Krishna reform. In that advantageous (for market access) situation we are able to compare the tariff-tax reform with the reform of only tariffs. In doing that we compare (9) with Eq. (15) in Ju and Krishna (2000), re-written

[10]To see this, we can write $dt_i = -\theta\left(p_i^w + \beta t_i\right) = -\lambda t_i$ where $\lambda = \theta\left(\tau_i^{-1} + \beta\right) > 0$ is the non-linear reduction term with $\tau_i = t_i / p_i^w$ representing the ad valorem rate.

here for convenience (and in our notation): $dM = (p^w + \beta t)' (E_{pp} - R_{pp})dt$. Taking the difference of the two leads to

$$dM|_{Tariff} - dM|_{Tariff-Tax} = -\theta (p^w + \beta t)' E_{pp} (p^w + \beta t) > 0$$

That is, the increase of imports under the market access increasing tariff reform is larger than the increase in imports of the corresponding integrated tariff-tax reform. The intuition is straightforward: Given that a tariff is equivalent to a consumption tax and a production subsidy, the removal of tariffs removes two reasons for importing less (lower consumption and higher production) while the removal of tariffs and the increase of consumption taxes ends up removing only the production subsidy. The reform of tariffs alone therefore increases imports by more than the tariff-tax reform. Proposition 2 follows:

Proposition 2. *A reduction of tariffs according to the Ju-Krishna rule that is accompanied by a point-by-point increase of consumption taxes increases market access by less than a reduction of tariffs alone.*

Both propositions show that preserving government revenue (by increasing consumption taxes) comes at a cost: In the case of (welfare increasing) proportional tariff reductions, the offsetting tax increase lowers the welfare gain. In the case of the (market access increasing) Ju-Krishna reform, the tax increase lowers the market access gain. Increasing consumption taxes furthermore does not help to remove the potential conflict between welfare and market access targets. Whether the cost of preserving government revenue is worthwhile is an interesting issue that can, however, not be addressed in the current framework.[11]

[11] These sort of issues, viz. the ranking of alternative reform proposals in a given setup, can be addressed by applying the framework in Raimondos-Møller and Woodland (2006).

3 Conclusions

Recently, a new tariff-tax reform strategy has become popular among academics and policy makers. It is a reform that reduces tariffs and increases consumption taxes by the same amount. Such a combination has been shown to have positive effects on two important targets: welfare and revenues. On the basis of this, the strategy has been used extensively as advice to developing countries by institutions like the IMF and the World Bank.

The present paper has shown that such a strategy may have an unintended negative effect on the market access of the country, viz. that the volume of trade may fall. Even when we assume that we can find a tariff-tax reform that will raise market access, this rise will be smaller than the rise a reform of tariffs alone will lead to. A similar observation is also noted for the welfare gain. In that sense, the tariff-tax reform proposal is less efficient than the standard reform of only tariffs. These drawbacks ought to be taken into account by policy advisors in the IMF and the World Bank when incorporating this reform in their stabilization and structural adjustments programs.

References

[1] Anderson, J. and P. Neary, 1992, Trade reform with quotas, partial rent retention and tariffs, Econometrica 60, 57-76.

[2] Anderson, J. and P. Neary, 2006, Welfare versus market access: The implications of tariff structure for tariff reform, Journal of International Economics, forthcoming.

[3] Diewert, W., A. Turunen-Red, and A.D. Woodland, 1989, Productivity and Pareto-improving changes in taxes and tariffs, Review of Economic Studies, 56, 199-215.

[4] Diewert, W., A. Turunen-Red, and A.D. Woodland, 1991, Tariff reform in a small open, multi-household economy with domestic distortions, International Economic Review, 32-4, 937-957.

[5] Emran, S.E. and J. Stiglitz, 2005, On selective indirect tax reform in developing countries, Journal of Public Economics 89, 599-623.

[6] Falvey, R. 1994, Revenue enhancing tariff reform, Weltwirtschaftliches Archiv 130, 175-189.

[7] Fukushima, T., 1979, Tariff structure, nontraded goods and theory of piecemeal policy recommendations, International Economic Review, 20-2, 427-435.

[8] Hatzipanayotou, P., M. Michael, and S. Miller, 1994, Win-win indirect tax reform, Economics Letters 44, 147-151.

[9] Hatta, T., 1977a, A recommendation for a better tariff structure, Econometrica, 45-8, 1859-1869.

[10] Hatta, T., 1977b, A theory of piecemeal policy recommendations, Review of Economic Studies, 44, 1-21.

[11] Ju, J. and K. Krishna, 2000, Welfare and market access effects of piecemeal tariff reform, Journal of International Economics, 51-2, 305-316.

[12] Keen, M. and J. Ligthart, 2002, Coordinating tariff reduction and domestic tax reform, Journal of International Economics 56, 489-507.

[13] Lopéz, R. and A. Panagariya, 1992, On the theory of piecemeal tariff reform: the case of imported intermediate inputs, American Economic Review 82, 615-625.

[14] Naito, T., 2006, Growth, revenue, and welfare effects of tariff and tax reform: win-win-win strategies, Journal of Public Economics 90, 1263-1280.

[15] Raimondos-Møller, P. and A. Woodland, 2006, Steepest ascent tariff reforms, CEPR DP5782, London.

[16] Turunen-Red, A.H. and A.D. Woodland, 1992, Strict Pareto improving reforms of tariffs, Econometrica, 59, 1127-1152.