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The Net Index of Protection and the Flight from Tradeable Sector

by

*Raul V. Fabella**

**Professor, School of Economics,
University of the Philippines

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R.V. Fabella
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Abstract

We propose the Net Index of Protection that subsumes the Balassa "Net Effective Protection Rate," Michaely's "Net Effective Protective Rate," and Corden's "pure exchange rate protection." Under special circumstances, this depends only on off-the-shelf indicators, the effective protection rate and the real exchange rate, to reflect resource pull among tradeables and between tradeables and nontradeables. We estimate NIP for Manufacturing and subsectors for the period 1991 to 1997 which suggests why domestic capital fled the tradeable sector. We finally derive the exchange rate adjustment required to restore the level of protection accorded sector j when tariffs are being reduced (the iso-protection tradeoff).

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I. INTRODUCTION

Tariff reduction programs in pursuit of globalization is an important ongoing feature of the 90's, especially in East Asia. Frequently these are associated with WTO or some regional agreements such as NAFTA or AFTA. Since many of the economies involved start out with trade deficits, the tariff reductions result in worsening trade imbalances that threaten to derail the process. The concomitant reason is the failure to adjust the exchange rate to cushion the impact on the trade and current account in a world of managed float (see, e.g., Edwards, 1989). Indeed, due to considerable foreign capital inflows that characterized the 90's which saw widespread liberalization of the capital account, the domestic currencies in East Asia and elsewhere tended to appreciate adding to the pressure. The confluence of these forces led to the progressive disengagement of domestic capital from the traded goods sector and to the embrace of the nontraded goods sector, especially property, finance and distribution. In the competition for domestic resources, the tradeable sector is left far behind.

The Asean, as a whole, in the mid-90's confirms this story with Thailand representing the extreme end of the spectrum. The Mexican debacle in 1994 was the first incidence of the kind in the 90's. In the Philippines, the cases of VICMICO and EYCO-NIKON, traded goods companies that got sucked into stock market and real estate spiral reinforce this story in no uncertain terms. The possible shakedown in the property market remains the sword of Damocles over the banking sector which acted as conduits for foreign resources. The flight from traded goods to the nontraded goods sector was never so pronounced as in the 90's. Why so?

Among resource pull indicators, the Effective Rate of Protection (EPR) has held pride of place since the publication of Corden's (1971) The Theory of Protection after an incubation period that included contributions by Balassa (1965, 1967, 1971), Johnson (1969), and Corden (1966a, b). While it has admittedly many drawbacks associated especially with its partial equilibrium nature, as resource pull indicator it is easier criticized than replaced. Nonetheless, its failure to include nontraded goods sector in its resource pull orbit is a real problem.

The best way to take the nontraded goods sector on board is to introduce the exchange rate which in combination with the ratio of price indices, may represent the relative price between traded and nontraded goods. Michaely (1977) proposed the "net effective protective rate" g which replaces t_j and t_i's in the EPR formula by $e_j = [(E_j/E_0) - 1]$ and $e_i = [(E_i/E_0) - 1]$, where E_j and E_i are nominal exchange rates applying to output j and input i, respectively, and E_0 is the equilibrium exchange rate. If $E = E_{ji} = E_i$ (a unified exchange rate) the Michaely "net effective protective rate", g_j, is simply $[(E/E_0) - 1]$, respectively, which is simply the overvaluation ($E < E_0$) or undervaluation ($E > E_0$) of the domestic currency. He calls g_j the protective effect of all measures of government interference in foreign trade. Tariffs are subsumed in (E/E_0). Even under free trade ($t_j = t_i = 0$), the government can fix $E > E_0$ and protection remains, i.e., "exchange rate protection" which Corden has advocated (e.g., 1985).

Our own position is very simple. For as long as there is an arbitrary element in the determination of the value of the domestic currency, the exchange rate and the tariffs are independent, sometimes conflicting, sometimes reinforcing, measures to affect trade. The ratio of the exchange rates in Michaely "net effective protective rate" is not a sufficient summary of the overall protective structure. Independent measures must be accounted for explicitly as in Johnsons' (1966) "iso-output formula" and in Corden's (1971) "net effective rate".

One extension of EPR which does this is Balassa's (1971) Net Effective Protection Rate (NEPR) (see also Medalla, 1979; Tan, 1979). It is defined as:

$$NEPR_j = ((E/E_0) - 1) + (E/E_0)EPR_j$$

where E is the official exchange rate, E_0 the BOP equilibrium exchange rate and EPR_j is j's EPR. After its 1970's appearance, NEPR curiously receded from the horizon. We can only surmise some of the reasons: (i) the practice at that time of estimating the shadow exchange rate to measure E_0 was and is a tedious task which discouraged continuing work and which Balassa and Schydlowsky (1968) criticized due to formidable practical and theoretical difficulties of the required measurement; (ii) the distraction it presented to the task of demonstrating the considerable degree of protection (viz., Tan's (1979) calculation that the majority of sectors had negative

$NEPR_j$'s could have been used by opponents to call for higher tariffs); (iii) a limited interest in the role of nontradeables in resource allocation; and (iv) the lingering confusion over the role of the exchange rate in the protective structure exemplified by Michaely's "net effective protective rate". I suggest a fifth reason which deserves a separate discussion.

Tan's (1979) calculation which showed negative NEPRs for many tradeable sectors in the 1970's should, indeed, have initiated an outcry from the manufacturers on the ravages of overvaluation of the exchange rate in the face of the tariff reductions being contemplated. In fact, the sector loudly protested the impending tariff reductions of the Tariff Reform Program I but left exchange rate policy well enough alone. This meant that they were not unhappy with status quo. Tan's calculation did not apparently reflect the sentiment of the tradeable sector. The reason that it shouldn't is because the NEPR left out a crucial factor that may have effectively reversed the peso overvaluation's assault on tradeables. This was the control on the access to foreign exchange that distorted the price of the dollar. Michaely's index despite its drawbacks takes these into account. We will attempt to bring this out.

This paper proposes the Net Index of Protection which subsumes known indices such as the Balassa's NEPR and some of Michaely's NEPR and which can account for the lukewarmness with which the tradeables sector greeted actual NEPR estimates 20 years ago showing the cost of overvaluation. Furthermore, it requires only off-the-shelf indicators under certain circumstances which make NIP eminently easy to implement under these circumstances. In II, we derive the net index of protection (NIP) and discuss its properties. In III, we estimate NIPs for Manufacturing and subsectors for the period 1991-'97. In IV, we derive the iso-protection tradeoff formula which gives the exchange rate adjustment required to preserve the protection level of a sector j in the face of a tariff reduction program. Exchange rate levels for various sectors are estimated to compensate for tariff reductions due to EO 470 and EO 264 from 1991 to 1997.

II. THE MODEL AND THE INDEX

We consider a small perfectly competitive economy with a several traded goods sector and a composite nontraded goods sector. The economy employs a domestic currency distinct from the foreign currency and they are linked by a managed parity. The presence of the nontraded goods sector implies that the domestic inflation can differ from foreign inflation. We now define the "Net Index of Protection" for industry j (NIP_j) as

$$NIP_j = (V_{jd} - V_{jf}) / V_{jf} \qquad (1)$$

where V_{jf} is foreign value-added in industry j, V_{jd} is the domestic value-added in j incorporating a possible misalignment between the nominal and the equilibrium value of the domestic currency. For industry j with a single input i, V_{jf} in turn is defined as

$$V_{jf} = P_j - P_i \qquad (2)$$

where P_j and P_i are world prices of j and i, respectively. Let t_j and t_i are tariff rates on imports of j and i. The domestic value-added is defined as

$$V_{jd} = [RER] [(1+ d_j) P_j (1 + t_j) - (1 + d_i) P_i (1+ t_i)] \qquad (3)$$

where RER is the current PPP real exchange rate (note that REER or DARER (Fabella, 1995) are acceptable alternatives), d_j (d_i) is the additional cost due to distortions in foreign exchange market of foreign exchange to be used in the import of j (i). If, for example, foreign exchange is rationed so that only 50% of the forex requirement for import of j is met by the Central Bank and, therefore, has to be supplemented by purchases from the parallel market where the price is higher by 50%, then the additional burden d_j is 25%. On the other hand, if forex requirement for imported input i is met by the Central Bank 100% everytime, then $d_i = 0$. The actual price of j in foreign currency is RER $(1 + d_j)$ $(1 + t_j)$ P_j that of i is RER $(1 + d_i)$ $(1 + t_i)$ P_i. Clearly, RER $(1 + d_j)$ and RER $(1 + d_i)$ echo Michaely's E_j and E_i, i.e., nominal exchange rates applying to j and i.

The ordinary value-added falls out of (3) if RER = 1 and $d_j = d_i = 0$. Thus, (3) combines the effects of currency value (RER), forex market distortions (d_j, d_i), and tariffs (t_j, t_i).

Substituting (2) and (3) into (1) and simplifying gives:

$$NIP_j = (RER - 1) + RER\,[d_j - a_{ij}d_i] / [1 - a_{ij}] + RER\,[(1 + d_j)\,t_j - a_{ij}t_i\,(1 + d_i)] / [1 - a_{ij}] \quad (4)$$

where $a_{ij} = (P_i/P_j)$ which under fixed proportion production function and the zero profit assumption, becomes the proportion of j's per unit cost accounted for by input i.

NIP has three distinct parts: (i) (RER – 1) reflects the pure currency-embodied attractiveness of the domestic tradeable sector as a whole vis-à-vis its foreign counterpart and the domestic nontradeable sector; (ii) RER $[d_j - a_{ij}d_i]$ $(1 - aij)^{-1}$ reflects the subsidy extended to j value-added implied by distortion in foreign exchange market, i.e., d_j, d_i. Note that if $d_j = d_i = d > 0$, i.e., there is uniform additional cost to accessing forex above the official rate, this subsidy is just (RER)d. Note also that $(d_j - a_{ij}d_i) / (1 - a_{ij})$ is just the "forex distortion-based (Corden-Balassa) effective protection rate." Furthermore, $RERd_j$ is NIP's counterpart to e_i in Michaely's NEPR. Finally (iii) RER $[(1 + d_j)t_j - a_{ij}\,(1 + d_i)t_i] / (1 - a_{ij})$ is really (RER) x (extended Corden-Balassa EPR_j) where the extension hinges on additional distortion in the forex market (d_j, d_i). In general, NIP combines the effects of the currency value-embodied protection (RER), the forex market distortion and tariffs in an explicit manner.

Obviously, NIP subsumes most known protection indices as special cases:

(i) If RER = 1 and $d_j = d_i = 0$, $NIP_j = EPR_j$, the Corden-Balassa EPR.
(ii) If $d_j = d_i = 0$, $NIP_j = (RER - 1) + RER\,(EPR_j)$, the Balassa NEPR.
(iii) If RER = 1 and $t_j = t_i = 0$, $NIP_j = (d_j - a_{ij}d_i) / (1 - a_{ij})$, the Michaely NEPR with forex distortion but without currency-based subsidy (penalty) and tariffs.

(iv) If $d_j = d_i = d > 0$ and $t_j = t_i = 0$, $NIP_j = (RER - 1) + RERd - RER(1 + d)$ $= -1$ which is the Michaely NEPR if we let $(E/E_o) = RER(1 + d)$

(v) If $d_j = d_i = t_j = t_i = 0$, $NIP_j = (RER - 1)$, the Corden "pure exchange rate protection."

Where the forex market is distorted ($d_j > 0$, e.g.), NIP suggests why the tradeable sector may not be too concerned with overvaluation of the domestic currency. Even were $RER < 1$ and $(RER - 1) < 0$, if d_j is sufficiently high, the effect of overvaluation can be mitigated or even reversed so that the first two expressions in (4) together is positive. That is there is sufficient distortions in the forex market that makes the effective cost of accessing forex for imports of j very high. We suggest that it is this angle (the forex market distortion in the 70's) that Tan's (1979) estimates of Balassa's NEPR overlooks and which explain the nonchalance with which the tradeable sector treated overvaluation in the 70's. In the 90's, however, where these distortions in the forex market have been largely lifted, the attitude toward currency overvaluation among tradeable businessmen is beginning to shift.

In general, implementing NIP requires knowledge of the battery of d's apart from the t's and RER. Thus, the information requirement of NIP is heavier than in any of the special cases. There is, however, a case where NIP depends only on RER and EPR's. This is when the forex market has been liberalized, i.e., when $d_j = d_i = 0$, or the official nominal rate is the true cost of acquiring dollars. This is the case in the first half of the 90's in the Philippines when the parallel market all but disappeared.

The instrument that renders overvaluation compatible with true import substitution is foreign exchange controls which effectively raised the price of foreign exchange for imports of finished goods. Absent these, it is very highly likely that among those economies that came under the label "import substitution" because of high tariffs were economies that actually penalized all tradeables, including importables, and incentivized nontradeables. They were, in other words, outwardly or even publicly "import substituting" but were really revealed nontradeable-oriented due to substantial overvaluation of the domestic currency. Observe that a "cheap forex policy" often accompanied high tariffs on finished goods in order to allow import substituting assembly access to cheap imported

inputs. The basic conflict may not have been between importables and exportables but between tradeables and nontradeables.

The advantage of NIP_j is that it explicitly integrates tariff, forex market distortion and exchange rate protection in one encompassing formula. Thus, piecemeal liberalization (say of forex market alone) can be reflected directly. Likewise, exchange rate adjustment can readily be allowed for.

III. NIP in the 90's

As observed, the forex market was largely liberalized in the 90's so that not only differential treatment of commodities stopped but also the effective cost of acquiring foreign exchange came to be the official exchange rate. We now estimate NIP for Manufacturing and its subsectors. Note that when $d_j = d_i = 0$, (3) becomes:

$$NIP_j = (REER - 1) + REER\ (EPR_j) \qquad (5)$$

where we have replaced RER by REER (base year 1986) and we use EPR estimates by Manasan and Querubin (1996). Note that by our REER estimates, the Philippine peso was overvalued by 33% in 1997. The World Bank's own estimate of appreciation (base year 1990) was higher (40%).

Table 1 shows the estimated NIP given in 5 for Manufacturing as a whole and its subsectors. The NIP for Manufacturing retreated from 37% in 1990 to 0% in 1996 to –5.8% in 1997. The NIP for "Food Processing" moved from 47.1% in 1980 to 9.6% in 1997. Most of the manufacturing subsectors went from positive NIPs in 1991 to negative starting in 1995. "Beverages and Tobacco," "Paper, Rubber, etc." started having negative NIPs in 1996. "Textile, Garments & Footwear," "Wood and Wood Products," "Furnitures and Fixtures," "Chemicals" and "Non-Metallic Mineral Products" all had negative NIPs since 1995. This largely explains the flight of business from tradeables to nontradeables in the Philippines and elsewhere in the Asean and the perceptible shift in the business attitude towards overvaluation.

IV. THE BASE YEAR ISO-PROTECTION TRADEOFF

When an economy liberalizes by reducing its tariffs it may decide to leave the net protective veil over the traded sector at its base year level by engineering exchange rate adjustment. The question is how much exchange rate adjustment will compensate for tariff reduction and restore the protective veil at base year level. Equation (5) gives this tradeoff.

Totally differentiate (5) to get

$$d(NIP_j) = (dRER) + (dRER)(EPR_j) + (RER)d(EPR_j). \quad (6)$$

Setting (6) to zero for the preservation of the protective veil gives

$$(dRER)(1 + EPR_j) = -(RER)\, d(EPR_j).$$

Simplifying gives:

$$d(RER)/RER = -d(EPR_j) / (1 + EPR_j). \quad (7)$$

(7) gives the "iso-protection tradeoff" between the real exchange rate and the effective protection rate. It is couched in terms of EPR's which, of course, change as tariffs are liberalized. If EPR estimates are already available, (7) gives the most convenient short-cut to exchange adjustment required to preserve the protection accorded an industry j. If EPR estimates are unavailable, this formula could be tedious in that it requires estimating EPRs for two periods.

How does the rate of change in the real exchange rate translate into a change in the nominal exchange rate E. We know that $RER = EP^w/P^d$, where P^w is the world price index and P^d the domestic consumer price index. Letting P^w be fixed,

$$(dRER/RER) = (dE/E) - (dP^d/P^d).$$

The fall in t's pushes P^d downwards via falling tradeable goods prices but the rise in the nominal exchange rate to compensate for reduction in t's pushes P^d upwards. No

switching effect in favor of nontraded sector occurs. If the tradeoff means that $dP^d/P^d \approx 0$, $(dRER/RER) \approx (dE/E)$, and

$$dE/E \approx -dEPR_j/(1 + EPR_j). \quad (8)$$

This approximates the "iso-protection tradeoff" between the nominal exchange rate and the EPR change. If $(dP^d/P^d) > 0$, $(dRER/RER) < (dE/E)$ and (8) underestimates the needed exchange rate adjustment, i.e., ">" replaces "≈" in (8). Incidentally, a formula similar to (8) appeared in a footnote in Balassa and Schydlowsky (1968).

The Philippines has since 1991 implemented tariff reform programs (TRP II from 1991 to 1995 and TRP III from 1996 to 2003). This section will estimate using (8), the exchange rate levels that should have obtained in pre-devaluation 1997, to restore the 1991 protection level to Manufacturing in view of the tariff reductions. We again use the EPR estimates in Manasan and Querubin (1996). Table 1 below gives the relevant EPRs for Manufacturing and subsectors and the required exchange rate level. Note that the official rate then was P26.40 for one US dollar.

For Manufacturing as a whole, the ER level required in pre-devaluation 1997 to compensate for tariff reductions (as reflected in average EPR reduction) is P29.32 per US dollar. By Manufacturing sectors, the highest required level was for Non Metallic Mineral Products which required an exchange rate level of P33 per US dollar and the lowest is for Wood and Wood Products at P26.55. None below the P26.40 level just before the July devaluation.

Since our ER is unified, there is the question of which pre-devaluation level should have prevailed. For Manufacturing as a whole it is P29.32. But at this rate, 8 subsectors would not have been adequately compensated. On the principle that all subsectors should have been adequately compensated then the ER level that would have prevailed is P33 per one US$.

IV. SUMMARY

In this paper we propose the concept of the Net Index of Protection (NIP) which integrates the effects of the currency value, the forex market distortion and the tariffs on the protective structure. This subsumes other known indices such as the Balassa-Corden Effective Protection Rate (EPR), the Balassa NEPR, the Michaely NEPR and Corden's Exchange Rate Protection. Under special circumstances of a liberalized foreign exchange market, NIP depends only on off-the-shelf indices, the EPRs and the RER.

We estimate NIP for one such period (the 90's) and suggest why (a) the tradeable sector was comfortable with overvaluation in the 70's and (b) why there was a stampede from tradeable to nontradeable sector in the 90's accompanied by a perceptible shift in business attitude towards overvaluation.

Finally, a base-year "iso-protection tradeoff" formula is deduced which gives the exchange rate adjustment required to maintain protection to domestic value-added when tariffs are being reduced. This turns out to be based on EPR changes due to tariff reduction.

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Table 1 : NIP for Manufacturing and Subsectors : 1991 - 1997 S

		Manufacturing		Food Processing		Beverages and Tobacco		Textile Garments & Footwear	
	REER	EPR	NIP	EPR	NIP	EPR	NIP	EPR	NIP
1991	95.42	0.308	0.370	0.411	-0.479	0.520	0.593	0.244	0.304
1992	106.89	0.370	0.282	0.580	0.478	0.492	0.396	0.243	0.162
1993	104.48	0.328	0.271	0.488	0.424	0.488	0.424	0.222	0.170
1994	111.28	0.302	0.170	0.429	0.284	0.483	0.333	0.222	0.098
1995	117.98	0.231	0.043	0.323	0.121	0.483	0.257	0.133	-0.039
1996	127.92	0.282	0.002	0.516	0.185	0.264	-0.012	0.136	-0.112
1997	133.25	0.256	-0.058	0.460	0.096	0.278	-0.041	0.085	-0.185

	Wood and Wood Products		Furnitures and Fixtures		Paper, Rubber, Leather and Plastic Products		Chemicals & Chemical Products	
	EPR	NIP	EPR	NIP	EPR	NIP	EPR	NIP
1991	0.204	0.262	0.272	0.333	0.320	0.384	0.185	0.242
1992	0.205	0.127	0.227	0.148	0.289	0.205	0.183	0.106
1993	0.201	0.150	0.192	0.141	0.264	0.210	0.179	0.128
1994	0.202	0.080	0.152	0.035	0.252	0.125	0.180	0.060
1995	0.164	-0.014	0.132	-0.041	0.207	0.023	0.113	-0.057
1996	0.226	-0.041	0.150	-0.101	0.203	-0.060	0.119	-0.125
1997	0.227	-0.079	0.158	-0.131	0.202	-0.098	0.106	-0.170

	Non-Metallic Mineral Products.		Basic Metals & Metal Products		Machinery		Miscellaneous Manufactures	
	EPR	NIP	EPR	NIP	EPR	NIP	EPR	NIP
1991	0.131	0.185	0.204	0.262	0.237	0.297	0.193	0.250
1992	0.153	0.079	0.203	0.125	0.223	0.144	0.179	0.103
1993	0.154	0.104	0.196	0.145	0.198	0.147	0.168	0.117
1994	0.167	0.049	0.190	0.069	0.164	0.046	0.146	0.030
1995	0.119	-0.051	0.155	-0.021	0.113	-0.056	0.103	-0.065
1996	0.053	-0.177	0.142	-0.108	0.107	-0.135	0.105	-0.136
1997	0.058	-0.206	0.140	-0.144	0.108	-0.169	0.104	-0.171

Table 2
Exchange Rate Level for Pre-Devaluation 1997
Required to Compensate Manufacturing for
Tariff Reductions since 1991.

Sectors	ERPs 1991	ERPs 1997	$\frac{\Delta ERPs}{1+ERP97}$	ER LEVEL REQUIRED PRE-DEV. '97
Manufacturing	34.64	25.64	6.7	29.32
1. Food Processing	44.65	45.99	-0.9	27.23
2. Bev and Tobacco	47.06	22.78	13.2	31.10
3. Text., Gar, Footwear	23.73	8.54	12.3	30.8
4. Wood & Woods Prods.	18.72	22.70	-3.3	26.55
5. Furniture & Fix.	26.68	15.81	8.6	29.84
6. Paper, Rubber, Leather	31.44	20.17	8.6	30.23
7. Chemicals	22.54	11.52	10.0	33.08
8. Non Metallic Min.	32.79	5.75	20.4	33.08
9. Basic Metals	19.53	14.03	4.6	28.74
10. Machinery	23.95	10.84	10.6	30.39
11. Misce Man.	18.94	10.39	7.1	29.43