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Incidence of the WTO Anti-Discrimination Rules on Corporation Income Taxation

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Abstract

Many countries with free trade zones or export processing zones now exempt from corporate income taxation the income of firms exporting from these areas. The WTO has attempted to eliminate this exemption through its rules to promote the non-discrimination of fiscal systems with respect to export production. In particular, these rules do not allow countries to exempt the income of firms exporting from Free Trade Zones from corporate income taxation.

This paper examines both theoretically as well as empirically the incidence of removing this corporate income tax exemption. The empirical analysis is carried out for the case of the Dominican Republic. The findings indicate that in the case of the Dominican Republic the removal of the corporate income tax exemption would inflict a burden on labour equal to about 6 times the amount of additional corporate tax revenue collected from the companies operating in its free trade zones.

Keywords: WTO, tax incidence, Free Trade Zones, corporate taxation.

JEL Code: H 22, F13

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1. Introduction[1]

The World Trade Organization (WTO) is the premier international organization dealing with the global rules of trade between nations. Its main function is to ensure that international trade flows as smoothly, predictably and freely as possible.[2] Its effective means of operation are the promotion of regulatory policies that are in favour of non-discriminatory and fair competition. This paper is concerned with the impact of the WTO regulations that require the removal of export subsidies in developing countries. In particular, it addresses the issues arising from the corporation income relief that some countries give to firms operating in export processing zones. These regulations are part of the WTO's Agreement on Subsidies and Countervailing Measures and it directly affects the operation of Export Processing Zones (EPZ).[3]

Export processing zones and Free Trade Zones (FTZ) are created by governments to promote export-oriented strategies in order to achieve growth and prosperity.[4] The purpose of FTZs in most countries is to provide a more suitable environment for export production until the whole economy restructures in a way that would encourage export production on a larger scale. Some countries have been successful in achieving this objective and were able to reform their economies, i.e. Taiwan and Singapore. Other countries are still at an initial stage where many

[1] In preparing this paper a number of people assisted us greatly. In the Dominican Republic, Mr. Magin Diaz and Hector Guiliani played a critical role in helping us understand the operation of the FTZs and the fiscal system of the country. Mr. Hasan Ulas Altiok, Ms. Maida Hamzic and Ms. Blerina Mucaj provided outstanding research assistance. Any errors or omissions remaining are the responsibility of the authors.

[2] World Trade Organization (2005), "*Understanding the WTO*", third edition.

[3] Daly Michael (2006), "WTO Rules on Direct Taxation", The World Economy, vol. 29, issue 5, pages, 527-557.

[4] The term Export Processing Zones (EPZ) will be used interchangeably with Free Trade Zones (FTZ), setting aside the slight differences in these concepts (Watson, 2001). The WTO treats both of them in an identical manner in the regulations on export subsidies.

changes need to be done in terms of their customs and trade administration to improve the general policy and administration environment for international trade. An example of such a country is the Dominican Republic (DR), the focus of the empirical investigation reported in this study.

According to WTO rules, if there is a corporation income tax exemption of firms operating in EPZs or FTZs, it constitutes an export subsidy.[5] In the Dominican Republic, the firms operating in its FTZs are not subject to the corporation income tax, and therefore, consistent with the WTO they are recipients of an export subsidy. In the case of the Dominican Republic, about 85 percent of the country's total exports are produced in the FTZs.[6] Hence, any policy change that affects the FTZs has the potential of greatly affecting the whole economy.

One of the central concerns of the WTO is the existence of specificity in the application of economic policies. According to WTO, specificity occurs when a government measure is designed to benefit a particular industry or enterprise or a group of industries and enterprises. It occurs in cases where government limits access to certain subsidies to a particular group of industries or to a particular geographic region. In these cases subsidies are not equally available to everyone. Such policies, according to the WTO, are unfair interventions that create a distortion in the market. This is precisely the situation in the Dominican Republic with the exemption from the corporation income tax that applies only to firms operating in the FTZs.[7] The WTO insists on

[5] World Trade Organization (1994), "Agreement on Subsidies and Countervailing Measures".
[6] World Trade Organization (2002), "Trade Policy Review, Dominican Republic", Report by Secretariat, WT/TPR/S/105.
[7] Granados, J. (2003) "Export Processing Zones and Other Special Regimes in the Context of Multilateral and Regional Trade Negotiations", Intal ITD-STA, Occasional Paper 20.

the imposition of the corporate tax on firms operating in the FTZs in order to create a non-discriminatory tax environment with respect to exports.

2. The Model

The model developed in this study to analyze the impact of extending the corporate income tax to the firms in the FTZs is based on the model of the incidence of the corporation income tax in an open economy developed by Harberger (1990, 1995). He showed, Harberger (1990), that in an open economy, the full burden of corporate tax on the tradable goods sector is borne by labour in that sector by suppressing its wage rate. The downward pressure on wage rates paid to labour in the taxed tradable sector has a further impact on wages in the entire economy that increases the burden on labour. This movement of wages in the economy also will have an impact on the domestic prices of non-traded goods, and on the distribution of income within the country.

We begin our analysis by taking the existing pattern of taxes as given, and now apply the same corporation income tax system incrementally to firms operating in the free trade zones that were previously exempted from the corporation income tax.

The key assumptions of this analysis are as follows:

a) Capital is set to be perfectly mobile and its net of tax return is fixed by the international capital markets.

b) The prices of traded goods are set by the international market and cannot be changed by any single country.

c) The prices of non-traded goods are determined by their demands and supplies in the domestic market.

d) Labour supply is limited and not mobile across countries.

For the Dominican Republic there is little doubt that these assumptions hold in reality. Furthermore, we can classify the industries in the DR into three broad categories. The three sectors are defined as follows:

- Traded Taxed: The traded taxed sector refers to all companies operating in the FTZs that will now have the corporation income tax levied on their profits under the new WTO rules.
- Traded Non-taxed: The traded non-taxed sector includes all those companies that are operating outside the FTZs, but whose workers have similar skills to those working in the FTZs and where production is traded internationally. In the case of the Dominican Republic this sector consists mainly of the tourism and import substitution activities. It should be noted that this sector might already be subject to the corporation income tax, but our model will focus on the impact of the new or incremental tax being imposed due to the WTO regulation. The incremental tax here is the one imposed on the firms operating in the FTZs. No change in tax policy is being made to the corporate income tax that is already implemented on corporations outside the FTZs.
- Non-traded Non-taxed: The non-traded and non-taxed sector employs similar types of labour skills as the FTZs, but its output is not traded internationally. This includes domestic services, transportation, bars and restaurants, and the manufacturing of non-traded domestic goods.

Under these assumptions, when a corporate tax is imposed on the FTZ corporations, there can not be a change in the net of tax return to capital. Furthermore, the prices of the tradable goods these

firms produce will not adjust to accommodate the higher cost of capital because these prices are set in the international market[8]. Hence, capital (firms) will simply move out of the FTZs in the DR to seek investments elsewhere that will yield its "normal" return. As the firms start to close down in the zones, they will lay off their workers. If labour is not internationally mobile, the reduction in its demand will result in a decrease in the wage rates for these types of labour skills across the entire labour market of the DR.

This process will continue until either all the firms operating in the FTZs leave the country or wage rates fall enough so that the reduction in the wage bill for a firm operating in the FTZ completely offsets the amount of corporation income tax it now has to pay. In this situation the net of tax rate of return on capital will again be restored to its "normal" international competitive level. Thus, the full burden of the corporation income tax imposed on the FTZ firms will be borne by the labour employed by the same FTZ firms. This relationship can be expressed as,

$$T_{KZ}\, K_Z = \Delta P_L\, L_Z \quad \rightarrow \quad \Delta P_L = T_{KZ}\, K_Z / L_Z \qquad (1)$$

Where K_Z and L_Z are the amount of capital and labour employed in the FTZs. T_{KZ} is the rate of corporation income tax paid per unit of capital in the zones, and ΔP_L is the change in the wage rate paid to the types of labour employed in the zones.

The non-traded non taxed sector will also employ some of the same types of labour whose wages have been depressed. In this case, the fall in the wage rates will lower their cost of production, hence inducing an increase in the supply of non-traded goods. This increase will lead to a fall in the price of non-traded goods ($P_{NT)}$, and the quantity consumed of these items will rise. If the firms in the non-traded sector are competitive, we can assume that the industry is characterized

[8] The items produced in the FTZs of the Dominican Republic are mainly garments and electronic goods.

by constant marginal costs, hence, the change in the price of non-traded goods and services times the quantity supplied ($Q_{NT)}$, must be equal to the fall in the wage bill for that sector. This relationship can be expressed as:

$$\Delta P_L \; L_{NT} = \Delta P_{NT} \; Q_{NT} \qquad (2)$$

Now, turning to the case of the tradable goods sector operating outside of the zone, we find that it can be broken into three components: agriculture, tourist hotels, and import substitution manufacturing. As the agricultural sector in the Dominican Republic obtains much of its labour from temporary workers from Haiti, the assumption is made that this labour is not substitutable for the types of labour used by the FTZs and hence the sector is not affected by the changes in the wage rates of the zone employees. Workers in the tourism industry have basically the same skill mix that one finds employed in the FTZs, therefore, it is expected that as the wages are reduced in the FTZ they will also fall in the tourism sector (H). This sector in the Dominican Republic has not only labour and capital in its production function but also land (B) that is particularly suited for the production of such services, i.e. beach front properties.

When the price of labour falls due to the tax on firms in the zones, it means that the labour cost associated with the provision of tourism related services will also fall, but because the prices of tourist services are determined internationally they will not fall. This sector will now be more competitive and will attempt to expand. As it expands it will increase its demand for land. Because the quantity of such beach front land is fixed, in the final equilibrium we will expect that the cost savings from a lower price of labour will be capitalized into the prices for beach front real estate. If the price of land is denoted as P_B and the amount of beach front land employed by the tourism

sector is B_H , then the relationship between the change in the price of labour and the change in the price of land, ΔP_B can be expressed as,

$$\Delta P_L \; L_H = \Delta P_B B_H \qquad (3)$$

A feature of the industrial sector in the Dominican Republic is that the import substitution firms (I) operate almost entirely outside of the FTZs. This is primarily due to the fact that firms operating in the FTZs are restricted from selling their production into the domestic market. However, the labour used by these firms is likely to be very similar, in terms of skills, to those in the FTZ. This being the case, we would expect that the labour costs for these firms would fall by $\Delta P_L \; L_I$, where L_I is the quantity of labour employed in the domestic production of importable goods. This will provide an incentive to expand the production of import substitutes. The reduction in labour costs is assumed to accrue inframarginally to the owners of these production facilities.

Over the entire economy the loss to labour can be expressed as,

$$\text{Labour Loss} = \Delta P_L \; (L_Z + L_{NT} + L_H + L_I) \qquad (4)$$

Increment corporate income tax (1) is equal to

$$\text{Tax revenues} = T_Z K_Z \qquad (5)$$

$$\text{Labour's share of burden} = \Delta P_L \left(L_Z + L_{NT} + L_H + L_I\right) / T_Z K_Z$$

As $\Delta P_L L_Z = T_Z K_Z$ labour's share of burden can be expressed as,

$$\text{Labour's share of burden} = 1+(L_{NT}+L_H+L_I)/L_Z \qquad (6)$$

It is clear from (6) that through the reduction in wage rates, labour must bear more than 100% of the burden of the corporation tax revenues collected from the firms operating in the FTZs. How much larger than 100% is the burden of labour is an empirical question that we will explore further. An element that will somewhat offset the affect on labour's wages is the reduction in the prices of non-traded goods. This fall in prices will increase the real income of all consumers who purchase these items including the labor groups whose wages have been depressed. The question is, how much will the lower prices of the goods purchased by labour offset the burden borne by labour from lower wages? Fortunately, the Dominican Republic has a recent National Household Survey of Expenditures and Incomes (1999) that allows us to explore this question empirically.

3. Empirical Analysis

The rate of income tax for taxable corporations in manufacturing, utilities and selective services in the DR is 25%. An exemption is given to the firms operating inside the FTZs. We want now to examine the effect of this tax measure on labour income and the prices of other goods and services produced in the country if it were removed.

3.1. Estimation of The Potential Taxable Income of Corporation Operating in the FTZs.

Until the present time, no records have been kept of the corporate profits generated by the firms operating in the FTZs. An estimate, however, can be made of the potential taxable income of the FTZ firms, by first estimating the net value added of capital invested by firms in the FTZs. This

value must than be reduced by the amount of interest expenses allowed as an expense in the calculation of taxable income (TP). The value added of capital (VA_K) for the firms operating in FTZ as a group is estimated by the following accounting expression for the activities carried out by FTZ firms.

Value added
of Capital (VA_K)
for firms in FTZs = Exports of Firms – Imports – Purchase of Domestic Inputs – Cost of Labour – Overheads –Depreciation Allowances (7)

Taxable Income for FTZ firms = VA_K – Interest Expense (8)

Exports include all the sales made abroad by the FTZ firms plus the domestic sales by the firms.[9] Imports into the FTZs include all purchases of the FTZ firms from outside the country for goods and materials. We see from Table 1 that by subtracting imports and purchases of domestic inputs and overheads from exports, we will get the gross value added (row 7) of the firms in the FTZs. The value added of labour, (row 8) is measured by the total labour compensation paid by the FTZ firms in the same year. It is then subtracted from row 7 to obtain the gross value added of capital (row 9). In order to obtain the net value added of capital (row 11) the annual depreciation expenses of the firms must be subtracted.

Interest expenses (row 12) are the interest payments made on the loans acquired to finance the business activities. They are deducted from the value added of capital (T) to give us a measure of the taxable income of FTZ corporations (expression 8).

[9] Domestic sales amount to not more than 2% of total exports (Free Zone National Council, 2003)

Table 1: Estimation of the Potential Taxable Income and Income Tax Liabilities of Corporations Operating in the Free Trade Zones (million US $)

Year	2001	2002	2003
1. EXPORTS	4,482	4,317	4,399
2. (-) IMPORTS	2,826	2,600	2,618
3. (-) IMPORTS of COMMERCIAL SERVICES	30	25	25
4. (-) INPUTS from LOCAL MARKET	46	47	72
5. (-) SERVICES from LOCAL MARKET	242	230	237
6. (-) OTHER LOCAL COSTS	124	104	105
7. GROSS VALUE ADDED	1,214	1,311	1,342
8. (-) VALUE ADDED of LABOR[a]	488	439	284
9. GROSS VALUE ADDED of CAPITAL	726	872	1,058
10. (-) DEPRECIATION EXPENSE[b]	290	349	423
11. VA of CAPITAL after DEPRECIATION	436	523	635
12. (-) INTEREST EXPENSE[c]	218	262	318
13. TAXABLE INCOME[d]	**218**	**261**	**317**
14. Corporation Income Tax Liability @25%	**54**	**65**	**79**

Source: Free Zone National Council, www.cnzfe.do

a. Value added of labor is estimated by taking the values of employment in the zones and multiplying by the average wage paid

b. Depreciation expense is estimated to 40 percent of the gross value added of capital.

c. In the base case it is assumed that interest for firms will be 50 percent of Income before interest and taxes

d. Taxable income is row 9 minus rows 10 and 12

From the Table 1 (row 13), we see that the estimated taxable income for the firms operating in the FTZ ranges from $ 218 million in 2001 to $317 million in 2003. These estimates have been made using the assumption that the depreciation expense allowed as a tax deduction is approximately 40% of the gross value added of capital.[10]

[10] The share of the gross return to capital that is estimated to be depreciation expense for the Dominican Republic is taken from (Jenkins and Kuo, 2003).

Furthermore, it is estimated that the interest expense is equal to 50% of earnings before interest and taxes.[11] The contribution of labour to value added in the zones decreased dramatically in 2003 due to the sudden increase in the rate of inflation to about 50 percent, hence, causing real wages to fall. Part of this unexpected drop in labour compensation accrued to capital. If the normal corporation income tax rate of 25 percent is applied to the estimate of the taxable income of FTZ firms, then the Dominican Republic Treasury would have gained $54 million in 2001, $65 million in 2002 and $79 million in 2003, in tax revenues.

3.2 Labour's share of the Burden of Corporation Tax on FTZs

From equation 1 we know that in these circumstances the labour employed in the FTZs must have their wage rates reduced by an amount equal to the reduced amount of corporation income taxes paid by the FTZ firms, unless all the firms operating in the FTZ leave the DR. Using 2002 as a representative year, and applying a 25% corporate tax rate, the total wage bill would need to fall by 65 million US$. This tax burden will spread over all the workers employed by the companies in the FTZ.[12] Using 2001 as the reference year, the burden per worker per year would be $308, Table 2 row 3. Using labour rates for 2002 and 2003 the average burden of corporation income tax would be $380 and $456 per worker per year, respectively.[13]

[11] The amount of financing cost allowed as a deduction by the foreign investors is largely a tax policy and tax administration issue. Foreign owned companies will try to transfer as much of their income as possible out of the Dominican Republic to tax haven countries such as Panama. This is often done through excessive interest expenses on non arms-length loans from financial institutions abroad.

[12] In 2001 the average number of individuals employed in the FTZs was 173,633 in 2002 an average of 169.712 were employed, in 2003 an average of 172,489 were employed, Free Zone National Council, www.cnfe.do.

[13] If imposing the corporation income tax on the firms in the FTZ would cause some of them to leave the Dominican Republic, we assume that there would a proportional reduction in both total taxable income of the FTZ corporations and in the size of the FTZ labour force.

Table 2: Corporation Income Tax and Its Impact on Labour Income in FTZs

	Year	2001	2002	2003
1.	Total Number of Employees in Free Trade Zones	**175,078**	**170,833**	**173,367**
2.	Corporation Income Tax Liability @25% (millions of US$)	**54**	**65**	**79**
3.	Corporate tax per Worker[b] (US$)	**308**	**380**	**456**
4.	Corporate Tax as % of Value Added of Labour	**11.06%**	**14.81%**	**27.82%**

Source: Central Bank of Dominican Republic and Free Zone National Council, Annual Report, 2003.
a. Calculated in Table 1.
b. Corporate tax per worker is row 2 / row1.

In Table 2 row 4 the amount of potential corporation income tax liabilities is expressed as a percentage of value added of labour. The corporate income tax using 2001 values would amount to 11.06 percent of the value added of labour. In 2002 and 2003 with the same corporation income tax rate it would be 14.81 and 27.82 percent, respectively, of the value added of labour. The high value of taxes as compared to the value added of labour in 2003 is a result of the sudden temporary drop in real wages rates due to the high rate of inflation in 2003.

3.3 Consequences of FTZ Corporate Income Tax on Industries outside of Zones

An important ramification of the fact that the FTZs employees are hired from the same pool of labour supply as the non-FTZs labour force is that the drop in wages of those working in the FTZs will be reflected in the wages earned by similar types of workers employed outside the FTZs. Using equation 4, we can then estimate the total burden on labour caused by the new corporation income tax imposed on FTZ firms. The average drop in wages experienced by the zone workers amounts to $380.00 per year. This drop in wages will also be experienced by similar labour employed outside the zones. The ultimate incidence of this fall in wages will depend on whether the sector is producing traded goods or non-traded goods. The industries in the Dominican Republic can be categorized for the purpose of this analysis as shown in Table 3.

Table 3: Categorization of Industries in the Dominican Republic

Traded and Taxed	Traded and Non-Taxed	Non-Traded and Non-Taxed
Manufacturing in the FTZs	Manufacturing Domestic Traded	Transportation
	Tourist Hotels	Services
		Bars and Restaurants
		Manufacturing Domestic Non-Traded

The Traded Non-Taxed Sector

The producers in the traded non-taxed sectors will initially benefit from this policy due to its effect on lowering the wages of labour. In the DR, the traded non-taxed sector consists of the import substitution manufacturing firms who operate outside of the FTZs, and Tourist Hotels that are exporting services. The paths that these two sectors take to reach their new equilibriums are somewhat different.

In the case of the import substitution firms we would expect them to expand into additional lines of production whereas previously due to the small scale of the Dominican Republic market it was unprofitable for them to expand into. They can be expected to expand into these new lines until they reach the point where,

$$MC' = P_{cif}(1+T) \qquad (9)$$

Where, MC' is the marginal cost of the import substitution activity after the fall in the wage rate, and $P_{cif}(1+T)$ is the tariff inclusive domestic price of the importable good that now will be produced domestically.

Table 4: Employment, Wages and Labour Income Impacts in the Traded Non-Taxed Sector

		2001	2002	2003
Employment				
1.	Manufacturing Domestic Traded	183,558	165,331	174,025
2.	Tourist Hotels	71,156	73,318	94,191
3.	**Total**	**254,714**	**238,649**	**268,216**
Total Wage Bill (millions of US$) [a]				
4.	Manufacturing Domestic Traded	709	569	319
5.	Tourist Hotels	273	254	175
6.	**Total**	**982**	**823**	**494**
Reduction in Labour Cost (millions of US$) [b]				
		2001	**2002**	**2003**
7.	Manufacturing Domestic Traded	57	63	80
8.	Tourist Hotels	22	28	43
9.	**Total**	**79**	**91**	**123**
Proportional Decrease in Total Wage Bill [c]				
10.	Manufacturing Domestic Traded	0.08	0.11	0.25
11.	Tourist Hotels	0.08	0.11	0.25
12.	**Average**	**0.08**	**0.11**	**0.25**

Source: Central Bank of Dominican Republic.
a. It is calculated by multiplying the number of employees in each sector (row 1 and 2) by the yearly wage rate in the specific market.
b. It is calculated by multiplying the number of employees in each sector (rows 1 and 2) by the corporate tax per worker (Table 2, row3).
c. It is calculated by dividing the reduction in labour cost (rows 7 and 8) by the total wage bill (rows 4 and 5).
Note: Only 25% corporate tax rate was taken into account.

From Table 4 we can see that in 2003 there were 174 thousand people employed in the import substitution manufacturing sector while there were 94 thousand employed in the tourist hotels. The amount that total costs will fall in the import substitution firms is estimated by the decrease in the wage, (Table 2, row 3) times the number of people employed in this sector (Table 4, row 1). Using 2002 as the base for employment and wage reduction, the loss incurred by labour working in these import substitution firms would be equal to US$ 63 million (Table 4, row 7). This amount will be transferred from the labour compensation to the producer surplus of these firms.

The adjustment of tourist hotels is somewhat different. This sector faces a world demand for its tourism services whose price is essentially fixed by suppliers in the DR. Inputs in this sector are labour, capital and land. After labour costs are decreased, there would be an incentive for the supply of tourist hotels services to increase. The increase in supply will cause an increase in demand for land (beach land). Since beach land is in limited supply, its price will be bid up. This relationship is shown in equation 3. Given the level of employment in this sector (Table 4, row 2), the amount of this transfer from labour to the owners of such real estate is approximately US$ 28 million (Table 4, row 8).

Non-Traded Non-Taxed Sector

The decline in wage rates also affects the labour employed in the non-traded sectors. In this case, the prices of the non traded goods or services produced are set by the domestic demand and supply of the items. Since wages are lower, the marginal costs of the firms will fall; the firms will have an incentive to increase their supply causing the prices of products to decline. The final consequence of the price decrease is that some of the wage reductions will be offset by the lower prices labour now pays for the domestically traded goods and services they consume.

The impact on labour compensation in the non-traded sectors is shown in Table 5, rows 1 to 20 below.

Table 5: Employment, Wages and Labour Income Impacts in the Non-Traded Non-Taxed Sector

	Year	2001	2002	2003
Employment				
1.	Transportation	170,450	163,724	170,283
2.	Services	618,838	675,087	706,757
3.	Bars and Restaurants	90,768	93,340	69,432
4.	Manufacturing Domestic Non-traded	99,762	102,937	104,149
5.	**Total**	**979,818**	**1,035,088**	**1,050,621**
Total Wage Bill (millions of US$) [a]				
6.	Transportation	829	702	375
7.	Services	2,525	2,559	1,739
8.	Bars and Restaurants	358	334	133
9.	Manufacturing Domestic Non-traded	400	367	198
10.	**Total**	**4,112**	**3,962**	**2,445**
Reduction in Labour Cost (millions of US$) [b]				
11.	Transportation	52	62	78
12.	Services	191	257	322
13.	Bars and Restaurants	28	35	32
14.	Manufacturing Domestic Non-traded	31	39	48
15.	**Total**	**302**	**393**	**480**
Proportional Decrease in Total Wage Bill [c]				
16.	Transportation	0.06	0.09	0.21
17.	Services	0.08	0.10	0.19
18.	Bars and Restaurants	0.08	0.11	0.24
19.	Manufacturing Domestic Non-traded	0.08	0.11	0.24
20.	**Average**	**0.075**	**0.10**	**0.22**

Source: Central Bank of Dominican Republic.
a. It is calculated by multiplying the number of employees in each sector (rows 1 to 4) with the yearly wage rate in the specific market.
b. It is calculated by multiplying the number of employees in each sector (Table 5, rows 1 to 4) with the corporate tax per worker (Table 2, row3).
c. It is calculated by dividing the reduction in labour cost (rows 11 to 14) by the wage bill for each sector (rows 6 to 9).

Services comprise the biggest share of this category with 675,087 employees in 2002, while bars and restaurants are the smallest with 93,340 workers, Table 5 rows 2 and 3. The total estimated decrease in labour compensation in the non-traded sector is reported in row 15. It ranges from 302 million US$ in 2001 to 480 million US $ in 2003.

These reductions in labour compensation are then expressed as proportions of the wage bill of each of these industries. The results are presented in Table 5 rows 16 to 20 for the years from

2001 to 2003. In 2002, the reduction in wages ranges from 9 percent for transportation to 11 percent for workers in bars and restaurants.

Combining the wage reductions for workers in the zones, with the reduction in the wages of workers in the non- taxed traded and the reduction of wages earned in the non-taxed non-traded sectors we find that the weighted average loss is 10.5 percent of wages, Table 6 row 9.

Table 6: The Labour Burden for the Year 2002

	2002
Total Reduction in Labour cost (Million US $)	
1.Tradable Taxed Sector	65
2.Tradable Non-Taxed Sectors	91
3.Non-tradable Non-Taxed Sector	393
4. Total Loss in Wage Income	**549**
Total Wage Bill (Million US $)	
5.Tradable Taxed Sector	439
6.Tradable Non-Taxed Sectors	823
7.Non-tradable Non-Taxed Sector	3,962
8. Total Wage Bill of Affected Labour Markets	**5,224**
9. Average Decrease in the Price of Labour Due to the Corporation Income Tax on Firms in the FTZs [a] (row 4 ÷ row 8)	**0.105**
10. Ratio of Loss in Wage Income to Additional Tax Revenues (Table 6 row 4 ÷ Table 2 row 2)	**8.4**

The loss in labour income over the economy can also be expressed as a ratio of the total additional corporation incomes gained from the firms operating in the FTZs. This is "labor's share" as shown in equation 6. In Table 6 row 10, we find that labour bears a loss of income equal to 8.4 times the amount of additional corporation income taxes raised. Given that the overall objective of the WTO is to make people better off, in both developing as well as developed countries, the effects of this policy seem to run counter to this objective. There is, however, an offsetting effect to the reduction in wage income due to the fall in the prices of a number of non-traded goods purchased by consumers, both wage earners as well as capitalists.

4.0 Estimation of Change in Real Income of Labour from Output Price Effects of Reduced Labour Costs

Assuming that the non-traded goods and services industries in the Dominican Republic can be characterized as being constant cost, the effect of changes in the price of labour on the price of the output of an industry can be expressed as,

$$\frac{dP_i}{P_i} = \frac{dP_L^j}{P_L^j} \times C_{Li}^j \qquad (10)$$

Where, P_i is the price of the output of sector i, P_L^j is the price of labour of type j and C_{Li}^j is the share of total cost of producing output i that make up the wage bill of labour of type j. In this case type j of labour refers to labour types that are similar to those being employed in the FTZs. Once the changes in the change in the prices of the goods are estimated, then the impact on labour's real income can be evaluated.

By definition, the total income of labour of type j, Y_L^j, will be equal to the total expenditures these wage earners make each period plus the amount of their net savings, S_L^j. Hence, the real income of labour of type j is expressed as,

$$Y_L^j = \sum_{i=1}^{n} P_i X_i + S_L^j \qquad (11)$$

The proportionate change in real income of labour caused by the change in the prices of the goods and services they purchase can be expressed as,

$$\frac{dY_L^j}{Y_L^j} = \sum_{i=1}^{n} \frac{dP_i}{P_i} E_i^j + \frac{S_L^j}{Y_L^j} \qquad (12)$$

where E_i^j is the share of income spent by labours of type j on goods and services of type i. As the prices of goods and services purchased by labour decreases, its real income will be increased. This real income effect will serve to partially offset the fall in wages caused by the reduction in the demand for labour by the FTZ firms.

To estimate equation 10 for the price reductions of non tradable goods, we apply the estimated changes in labour compensation reported in Table 5 row 16 to 19, by the shares of labour costs in total value added in each of the sectors.[14] The resulting estimates of the price reduction are presented in Table 7, rows 1 to 5.

Table 7: Price Reductions Due to Decreased Wages

Decreases in prices due to the lower wages (Proportion of Price)			
	2001	**2002**	**2003**
Non-Traded Non Taxed			
1.Transportation	0.03	0.05	0.10
2.Services	0.05	0.07	0.13
3.Bars and Restaurants	0.05	0.06	0.14
4.Manufacturing Domestic Non-traded	0.04	0.06	0.12
5.Average Non-Traded Non Taxed	**0.04**	**0.06**	**0.12**
Traded Non Taxed			
6.Retail Wholesale Trade Margins	0.06	0.07	0.13
7. Impact on Prices of Traded Goods	**0.02**	**0.02**	**0.04**

Using 2002 as our reference year the lowest decrease in prices of non traded goods and services would be 5 percent in the case of the transportation sector. The largest decrease would be 7 percent in the case of services, with an overall average of 6 percent.

For tradable goods the decrease in the wage rate will only influence the cost, and hence the prices of the retail and wholesale trade services that are needed to market tradable goods in the economy. These retail and wholesale services are considered to be part of the non-traded domestic sector in the Dominican Republic. They represent approximately 30 percent of the value of the final sale prices of importable goods.[15]

[14] In the Dominican Republic labor's share of value added for the non-traded non-taxed sectors is as follows: transportation 50%, services 68%, bars and restaurants 59 % and manufacturing domestic non-traded 51%.
[15] Barbados Investment & Development Corporation (March 2001), "Market Research – Dominican Republic", Research, Planning & Information Division (RPID).

Applying the estimated decline in labour income for domestic services as shown in Table 5 row 17, to the share of labour in the costs of supplying retail and wholesale trade services gives us the potential decrease in the trade margins Table 7 row 6.[16]

With the estimated decline in the cost of the trade margins, the decrease in the prices of the tradable goods will therefore be 30 percent of this amount. These estimates, varying from 2 percent to 4 percent, are shown in Table 7, row 7.

Effects on Income Distribution

So far we have shown how the imposition of the 25 percent tax on FTZ firms in the Dominican Republic would lead to a lower price of labour throughout the economy for those types of labour that are employed by the FTZs. We have also shown how the lower wage costs lead to a lower level of prices for non-traded goods and services. The decrease in prices will raise the level of real income for consumers of these items, both wage earners as well as recipients of income from capital. To know exactly how much labour will benefit from the price decreases, we need to know the amount of expenditures consumers make on the items whose prices are decreased. Using these expenditure values, we then estimate using equation 12 the change in real income that arises via the decline in the prices of items in the expenditure basket.

The values for the amounts spend on various items by households of different income and expenditure levels were obtained from the 1998 Household Expenditure and Income Survey for the Dominican Republic.[17] The total number of households is divided into five quintiles where each quintile includes 20 percent of the households in the sample ranked according to their level

[16] Labour` s share in the value added of retail and wholesale trade is about 70 percent in the Dominican Republic.
[17] Dominican Republic (1999), Department of National Accounts and Economic Statistics, National Household Survey of Expenditures and Incomes, October 1997 to September 1998.

of personal expenditures.[18] For the purpose of this study we classify consumption items into those made on traded and those made on non-traded goods as shown in Table 8.

Table 8: Expenditure Allocations by Quintile (Million US $)

Quintile	1	2	3	4	5
Expenditures in Non-Tradable Goods					
1.Transportation	116	198	306	543	2,002
2.Services	77	139	224	364	1,061
3.Hotels, Bars and Restaurants	35	120	210	346	705
4.Manufacturing Domestic Non-traded	116	251	366	522	911
5.Health, Education and Entertainment	50	121	230	477	1,570
Expenditures in Tradable Goods					
6.Food	378	791	1,065	1,327	1,785
7.Clothing	42	95	170	319	643
8.Furniture, Textiles and House Equip.	23	59	124	209	553
9.Diverse Goods	24	55	108	232	664
10. Total Expenditures by Quintile	**861**	**1,829**	**2,803**	**4,339**	**9,894**
11.Estimated Savings @ 15 % of Income[19]	**155**	**329**	**505**	**781**	**1,781**
12.Estimated Income	**1,016**	**2,158**	**3,308**	**5,120**	**11,675**
Shares of Income Spent on Non-Tradable Goods and Services					
13.Transportation	0.11	0.09	0.09	0.11	0.17
14.Services	0.08	0.06	0.08	0.07	0.09
15.Hotels, Bars and Restaurants	0.04	0.06	0.06	0.07	0.06
16.Manufacturing Domestic Non-traded	0.11	0.12	0.11	0.10	0.08
17.Health,Education and Entertainment	0.05	0.06	0.07	0.09	0.13
18.Total Share of Income Spent on Non-Tradable Goods	**0.39**	**0.39**	**0.41**	**0.44**	**0.53**
Shares of Income Spent on Tradable Goods and Services					
19.Food	0.37	0.37	0.32	0.26	0.15
20.Clothing	0.04	0.04	0.05	0.06	0.06
21.Furniture, Textiles and House Equip.	0.02	0.03	0.04	0.04	0.05
22.Diverse Goods	0.03	0.02	0.03	0.05	0.06
23.Total Share of Income Spent on Tradable Goods	**0.46**	**0.46**	**0.44**	**0.41**	**0.32**
24.Estimated Share of Income Saved	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**
25.Total of Shares	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

Source: Dominican Republic (July 1999), Department of National Accounts and Economic Statistics, National Household Survey of Expenditures and Incomes, October 1997 to September 1998.

[18] People tend to try to maintain their past level of consumption over time in the face of changes in current income caused by temporary fluctuations of income caused by illness, unemployment or retirement. Thus, current household expenditures are a better measure of the permanent or long run income of a household as compared to the observed household income for the period.

[19] As the information on the household incomes, and hence savings, was rather weak in this survey, we applied the national savings rate of 15 % of income for 1998, or 18 % of expenditures, to each of the quintiles of households. While we could expect that the saving rates will differ across the quintiles of households, the error created by making this assumption for the purpose of our analysis will be very small.

Using equation 12, we are able to estimate the gain in real income that consumers of these items obtain from the lower prices of the goods and services they buy.

Table 9: Estimated Net Change in Real Income from Price Reductions

Quintile	1	2	3	4	5
Non-tradable Goods and Services					
1.Transportation	0.006	0.005	0.005	0.006	0.009
2.Services	0.006	0.004	0.005	0.005	0.006
3.Hotels, Bars and Restaurants	0.002	0.004	0.004	0.004	0.004
4.Manufacturing Domestic Non-traded [20]	0.007	0.007	0.007	0.006	0.005
5.Health, Education and Entertainment [21]	0.000	0.000	0.000	0.000	0.000
6.Total Estimated Change in Income from the Reduction in the Price of Non-tradable Goods	**0.021**	**0.020**	**0.021**	**0.021**	**0.024**
Tradable Goods					
7.Food	0.007	0.007	0.006	0.005	0.003
8.Clothing	0.001	0.001	0.001	0.001	0.001
9.Furniture, Textiles and House Equip.	0.000	0.001	0.001	0.001	0.001
10.Diverse Goods	0.000	0.001	0.001	0.001	0.001
11. Total Estimated Change in Income from the Reduction in the Price of Tradable Goods	**0.008**	**0.010**	**0.009**	**0.008**	**0.006**
12.Total Estimated Change in Real Income (row 6 + row 11)	**0.029**	**0.030**	**0.029**	**0.029**	**0.030**

This estimated change in income is equal to the proportional price declines due to lower wages for the year 2002 Table 7, (rows 1 to 4 for the non-tradable sectors, and row 7 for the tradable goods) multiplied by the shares of income spend on the corresponding category of goods and services by quintile, Table 8 (rows 13 to 16 for the non-tradable sector and rows 19 to 22 for the tradable goods). The results are presented in Table 9.

From Table 9, we found that the average benefit received by consumers from the lower prices of products is equal to about 3 percent of their total expenditure irrespective of which quintile the

[20]Manufacturing domestic non-traded is made up of 20 % of the expenditures made on food, clothing, furniture, textiles and house equipments and durable goods.
[21]The prices of health, education and entertainment services do not change because the labour employed in these sectors is not likely to be affected by the changes in the wage rates of the types of labour employed in the FTZs.

household falls into. Hence, it is not necessary to match the level of income of the labourers whose income has been decreased to their corresponding quintile of expenditure to find out the impact of prices on their real income. With this estimate we can now derive the net impact of broadening the base of the corporation income tax to include the firms operating in the FTZs.

From Table 6, the estimated potential decline in the total wage bill due to the reduced demand for labour in the FTZs is approximately 10.5%. Taking into consideration the offsetting increase in real income from the decrease in the price of tradable and non tradable items of 3.0 percent, the final burden of the labour is approximately 7.5 percent of their total compensation. Hence, the net loss in income to labour amounts to 7.5 percent of the total wage bill of the affected labour markets or $5,224 million (Table 6 row 8) in 2002. When comparing this loss in labour income of $392 million for 2002, to the increased tax revenue of $65 million we find that labour bears a net burden equal to 6 times the tax revenue collected.

The next question we need to address is who benefits from the difference between the gross loss of income suffered by labour of US$ 549 million (Table 6 row 4) and the gain in the tax revenues of US$ 65 million. This reconciliation is presented in Table 10.

Table 10: Allocation of Gains and Losses Due to Levying of Corporation Income Tax on Firms in FTZs

AFFECTED GROUP	US$ MILLIONS
LOSERS	
1.Gross Income Loss to Labour Affected by Reduced Employment (Table 6, row 4)	**549**
2. Gain by Affected Labour Through Reduction in Prices of Non-traded Goods and Services (Table 6 row 8) (Table 9 row 12)	**157**
3.Net Loss to Labour Affected (row 1 – row 2)	**392**
GAINERS	
4.Gain in Tax Revenue (Table 2 row 2)	**65**
5.Gains to Owners of Land (Hotels) , Owners of Capital (Producers of Import Substitutes) and Consumers (Excluded the Affected Labour from Lower Prices of Non-Traded Goods and Services) (row 3 – row4)	**327**
6.Total	**392**

From Table 10 we find that while the labour whose wages are affected suffers a net loss in real income of $ 392 million, those who obtain their income from capital, land and from non-affected occupations will gain a total of $ 327 million, either as recipients of factor income or as consumers. The amount of tax revenue gained from this policy is a modest $65 million. As shown above, labour's burden is 6 times the additional revenue collected from the corporations while the owners of capital of domestic firms, owners of beach front land, and the categories of labour whose wages are not affected, gain an amount equal to approximately 5 times what the government gains in additional revenues.

5. Conclusion

While the motivation of the WTO to create a level playing field for all firms within a country might be a worthy endeavour in principle, in practice the outcome is not so attractive. In fact, the evil as perceived by the WTO of a country giving a corporation income tax exemption to manufacturers of exports turns into a virtue when it is understood that it is the labour force of the

country (often women and low wage groups) that are the ultimate beneficiaries of the exemption policy; not the owners of the firms operating in the FTZs. To inflict a net burden on labour of 6 times the amount of the additional revenue collected via the corporation income tax on FTZ firms, would be viewed by most policy makers in the Dominican Republic as a tragedy.

If the WTO was motivated to produce a level playing field for exporters, then it should require that the same uniform effective rate of corporation income tax be levied internationally on all corporations. It is only in this way that labour can be potentially shielded from the possibility of bearing a multiple burden of the additional corporation income tax revenues. With a single universal corporation income tax rate then our analysis would revert back to the original model of Harberger (1962) for the incidence of the corporation income tax in a closed economy. In this case the available capital to the world would be fixed. The world is our closed economy. Only in this situation it is possible for the owners of capital rather than labour to bear the burden of the corporation income tax.

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