Trade Liberalization and the Dominican Republic

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Abstract

I examine the impact of modern day trade liberalization on the wages of workers in the Dominican Republic. The Central American Free Trade Agreement reduced nominal Dominican input tariffs from an average of 12.06% to 2.73% from member countries, particularly the United States, over the short period of 2006-2007. More pending.

1 Introduction

Pending.

The organization of the rest of the paper is as follows; I introduce the context of CAFTA in Section 2, present the theory and relevant literature in Section 4, elaborate upon whether CAFTA-DR presents a natural experiment in Section 5, overview the construction of my data set in Section 6 and discuss implications of the model in Section 7. Section 8 concludes.

2 Context

Over the last several decades, trade barriers have fallen substantially, and agreements promoting free trade between countries have proliferated. The Central American Free Trade Agreement (CAFTA, or CAFTA-DR), aimed to lower trade barriers between Central American countries and the United States. One of the explicit aims of CAFTA was to reduce

tariffs uniformly for United States imports into member Central American countries, and to "progressively eliminate customs duties on originating goods" [Office of the United States Trade Representative].

In 2003, negotiations began on the Central American Free Trade Agreement, with Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the United States taking part in the discussions. The Dominican Republic joined the negotiations in early January, retitling the agreement the Dominican Republic-Central America Free Trade Agreement. U.S. President George W. Bush signed CAFTA into law in 2005, but it took another two years for the Dominican Republic to fully implement the agreement, which it did on March 1, 2007. Based upon World Trade Organization data, I find CAFTA-DR reduced average Dominican Republic (D.R.) tariff rates on imports from member countries from 12.06% to 2.73% from 2006 to 2007[1]. The magnitude of this decrease on imported American goods is similar to the size of the decrease in Mexican tariffs on American goods as a result of the North American Free Trade Agreement [Goldberg and Pavcnik, 2007]. In recent history, other countries such as Brazil reduced tariff barriers more drastically [Kovak, 2013]; however, this is still economically meaningful, especially since the United States is the largest trading partner of the Dominican Republic, composing 38.6 percent of total imports into the D.R in 2013 [World Trade Organization, a][2].

Tariffs on most products exported to the United States from Central America were already duty-free as part of the Caribbean Basin Initiative, and so CAFTA largely removed ad-valorem taxes on American imports imposed by Carribean countries. The bill put a moratorium on establishing new tariff lines or raising customs duties between the parties involved, and explicitly defined a time table for each good to have its tariffs reduced. Of the goods that the Dominican Republic had formerly placed tariff barriers upon, 70.4% of goods originating from the United States became duty free in 2007, another 6.5% of goods became

[1]Using a import-weighted average of tariff rates for Harmonized System two-digit product codes, the unweighted average decrease is larger.

[2]The United States also receives 56 percent of total exports from the Dominican Republic.

duty free by 2012 (2013 being the year for which I have survey data for), with the remaining 22.9% of goods having partially reduced tariffs by 2013. In summation, many goods were to be declared duty free initially upon implementation of the agreement, but many more were to have their duties phased out in a period of generally 5-10 years (see Appendix 12 for more information). Due to the structure of this agreement, this allows me to examine the impact of reduced input tariff barriers on local Dominican import-competing producers, without largely having to consider the simultaneous changes in output tariffs.

3 Model

4 Literature Review

There is a considerable existing literature discussing the link between trade openness and changes in the wages of workers. The canonical model of international trade, the Heckscher-Ohlin (H-O) model, predicts that a country abundant in a given factor will specialize in the production of goods that use that factor relatively intensively. In the case of a developing country such as the Dominican Republic, the H-O model suggests that the country will specialize in the production of goods which use unskilled labor relatively intensively in relation to capital. The connection to the income distribution of a nation comes from the related Stolper-Samuelson Theorem, which asserts that as a nation moves from autarky to free trade, the owners of the relatively abundant factor, such as unskilled labor, will find their real incomes rising, while the owners of the relatively scarce factor will find their real incomes falling. Therefore, upon lowering trade barriers, and thus increasing the price of unskilled labor intensive good, unskilled workers may be expected to see their wages increase. However, this result is hard to empirically validate for two reasons. The Stolper-Samuelson Theorem refers to economy-wide factor returns [Goldberg and Pavcnik, 2007], not the incomes of workers in a given intra-country region, which is the focus of my study. Next, to my knowledge, there is little pre-existing data on the proportions of various factors in the

Dominican Republic.

One recent paper which explores the heterogenous impacts of trade upon domestic firms is Holmes and Stevens [2014], which develops a model for how international trade affects domestic plants of varying sizes. Examining the effects of a surge in Chinese manufactured goods on U.S. manufacturers, Holmes and Stevens find that import competing plants that were large or produced standardized goods either closed down or laid off many of their workers, while smaller firms that produced specialized goods fared better, even *within* a given industry classification. Further, the authors' model suggests that adverse wage impacts due to import competition should be more pronounced in areas where one industry is more concentrated. Although the data I have does not provide any indication of plants and their relative specialization, my firm level data allows one to infer how concentrated an industry/occupation is within a municipality. (I need to compute this as an extension to what I have already done).

Another paper which introduces a model of trade liberalization and wages is Amiti and Davis [2012], which finds heterogenous impacts of reduced trade barriers based upon the characteristics of firms. Their model suggests that a decline in input tariffs raises the wages of workers at firms using imported inputs, but reduces wages at firms that do not import inputs. Amiti and Davis find that a 10% point fall in input tariffs has an insignificant impact on wages in firms that do not import but increases wages in firms that do import. To replicate these findings, it is necessary to obtain plant-level information on workers' wages, and to determine the composition of inputs into the production process for each firm. My data set, however, does not allow me link workers to their respective firms, and thus only provides information regarding the average wages of workers in a given occupation.

Finally, Kovak [2013] examines the effect of trade liberalization on regional wage changes in Brazil. As a result of long standing import substituting industrial policies, in 1987 the average tariff level in Brazil was high; 54.9 percent. However, these were unsustainable, and by 1995, policymakers reduced average tariffs to 10.8 percent. The author calculates, for

each region, a measure for the share of regional production accounted for by each industry, and then for each of these industries estimates the effect tariff changes have had upon local wages in a region. To estimate these effects using reduced form equations relies upon the exogeneity of tariff changes to industry performance; that tariff changes have not been limited to only certain industries. The author argues that, in the context of Brazil, policy makers had explicit aims to cut tariffs uniformly, without prioritizing one industry over another, which is corroborated by showing that tariff cuts were largest in industries that had high barriers to trade initially. Ultimately, Kovak finds that a region facing 10 percentage point larger tariff-induced price decline experienced a 4.39 percentage point larger wage decline.

5 Exogeneity of Tariff Decreases

Before discussing the impact of tariff changes on labor markets in the Dominican Republic, it is first necessary to comment upon the political economy of tariff negotiations. Grossman and Helpman [1994], Brock and Magee [1978], as well as others, have observed the potential for special interest lobbies within a country to have a significant impact upon policymakers and their decisions, particularly when deciding which trade barriers to remove and which to leave in place (or, in rarer cases, increase). One consequence of this is that tariff rates and tariff rate reductions could be determined by endogenous factors; tariffs can be viewed as the result of a political process, which would obviously be intertwined with regional labor markets. If this is the case, then estimates for the effect of tariffs on labor market outcomes will suffer from omitted variable bias. Therefore, I discuss the qualitative and quantitative evidence available on the potential exogeneity of the initial level of trade barriers and tariff rate reductions as a result of CAFTA.

First, note that the level of Dominican trade protection in 2002 bears a large resemblance to tariff barriers in place in 1996[3] (see Figure 8). As many of the tariff barriers were set decades ago, it is less likely that their pre-CAFTA level was less reflective of forces attributed

[3]Detailed information on trade barriers is not available further back than this

to the political economy of tariff rates, and more likely to be due to institutional constraints and political difficulties in lowering tariffs without an intervention from another country (the United States, in this case). Second, I compare the relationship between pre-CAFTA tariff levels and the amount of tariff reduction in figures 5, 6 and 7. If policymakers had the interest in lowering tariffs uniformly, one would expect to see larger tariff reductions on products that initially had higher protection levels. Indeed, for average tariffs on Harmonized System 6 digit product codes (Figure 5), we see a fairly linear ($R^2 = 0.85$) relationship between the initial amount of protection for a good and the amount of tariff decrease. These results suggest that Dominican tariff protection was lowered more or less uniformly by CAFTA-DR.

Need to discuss qualitative evidence here, such as how policymakers and D.R. President Leonel Fernández stated that they did not want to cater to special interests. Need to pull citation from Hernández [2006], a key negotiator in the CAFTA process (I need to brush up on my high school Spanish). Although each country negotiated tariff rate reductions individually with the United States, as previously stated, the goal of the agreement was to lower tariffs on all incoming goods. Fortunately, after the agreement was adopted and ratified, the United States forbade the Dominican Congress from making any further modifications to the agreement, minimizing concerns of political influences [Dominican Today].

6 Data

Data for this project comes from combining several easily accessible databases, allowing for straightforward replication of my results[4]. To measure the extent of trade liberalization, I estimate the level of trade barriers in the Dominican Republic in 2002 and 2013. These years correspond with the years that household survey data is available for the Dominican Republic. Between 2001 and 2006, Dominican Republic duties on American goods remained largely constant until the passage of CAFTA (Figure 7), so the difference in duties between 2002 and 2013 is primarily a result of the free trade agreement. Furthermore, household

[4]Replication code for this paper is available at `https://github.com/jaysayre/cafta-dr`

survey results are available for July-October 2013; this implies that the later portion of my panel dataset was collected than six years after CAFTA-DR was implemented in March 2007. In theory, this should hopefully be long enough for local labor markets to adjust to new changes in tariff barriers.

For tariff data in 2002, I use the World Trade Organization [b] Tariff Analysis database, which provides tariff nformation at the Harmonized System (HS) six digit level[5]. To compute tariffs in 2013, I employ direct text from the CAFTA-DR bill, provided online by the Office of the United States Trade Representative at the HS eight digit level. The treaty provides information on the base tariff rates of each eight digit good, and the tariff phase out scheme for each good (Appendix 12). Using information on each phase out scheme, I calculate the estimated tariff for each good in 2013. To combine these sources, I aggregate the CAFTA-DR tariff information to the six digit level using an unweighted average, since, to my knowledge, trade volume statistics are not readily available at the HS eight digit level. I then need to match up industrial products to their respective occupations to calculate the estimated input tariff that a given occupation faces. To do this, I use a standard product to occupation concordance table[6] to convert duties from the Harmonized System 6 digit level to the International Standard Industrial Classification (ISIC) four digit level[7]. For obvious reasons[8], the concordance table matches product information for only some of the occupation codes found in my survey data. Following the convention employed by the literature, I set the corresponding tariff faced by these occupations to zero.

For the survey data previously alluded to, I use two sources. Dominican Republic household survey data for 2002 comes from the Integrated Public Use Microdata Series International (IPUMS) database, produced by the Minnesota Population Center [2015] and conducted by the Oficina Nacional de Estadística, República Dominicana (ONE). The IPUMS

[5]The same source also provides harmonized system two digit level information, which I use for Figure 7

[6]Found at World Integrated Trade Solution (WITS), provided by the World Bank.

[7]Specifically, a table from HS 1996 TO ISIC Rev. 3.1

[8]For example, it is unclear what effect various inputs tariffs have upon occupations in, say, the service sector.

data provides information on survey respondents' income (measured as monthly total income in 2002 Dominican pesos), municipality of residence, and occupation, provided at the ISIC two digit level, in addition to a host of other characteristics. Household level data for 2013 comes from the Demographic and Health Surveys (DHS) Program, and is produced by CESDEM and ICF International [2013]. Although the DHS dataset mostly provides information on the health characteristics of survey respondents, it also provides information on a respondent's occupation, place of residence, and occupational income (provided in weekly 2013 Dominican pesos), in addition to other factors. DHS occupational information is provided without reference to any existing occupational/industrial classification system (as far as I am aware), so I convert it manually to ISIC two digit codes (see Appendix 13). Although both sources provide weekly income data, I am primarily interested in data on the average wage rate of workers in a given occupation, so I divide this data by the amount of hours worked per week.

For my estimating equations at the municipal level, I use several sources to estimate the share of economic activity in a given municipality. Information on the number of firms by size (measured in terms of number of workers employed) in a given industry at the municipality level in the Dominican Republic is provided by the Directory of Companies and Establishments (Directorio de Empresas y Establecimientos) provided by ONE for 2010[9]. This information is provided at the International Standard Industrial Classification four digit level, which I sum up to the ISIC two digit level by municipality and number of workers employed. I then combine this plant level data with IPUMS survey data from 2002 and 2010 to provide clearer estimates of the number of workers employed in each industry. Recalling that occupational data for IPUMS is provided at the ISIC two digit level, I use this to compute the estimated share of industrial activity per municipality for both 2002 and 2010. Next, I merge each ISIC occupation code with the four digit ISIC duties computed above, and then estimate the average level of tariff in a municipality using a weighted average based

[9]Available online at ONE. Note: this page, in my experience, only works sporadically.

upon the estimated number of workers in a given occupation in that municipality[10]. Finally, I aggregate the wage rate for workers *listed as currently employed by the private sector* who have occupations for in the 2013 DHS and 2002 IPUMS survey data to the municipality level and merge this to the average tariff data. To accurately compare changes in wages, I convert 2002 and 2013 Dominican monthly wages in pesos to 2013 US Dollars using the nominal exchange rate.

Next, for my estimating equations at the occupational and municipal level, I aggregate the wage rate for workers listed as currently employed by the private sector in the the 2013 DHS and 2002 IPUMS survey data to the municipal and occupational (ISIC two digit) level, and as above, convert this income data to 2013 United States Dollars. This is then merged with the ISIC tariff data, which I aggregate to the ISIC two digit level using an unweighted average.

7 Results

The theoretical

My estimating equation should is

$$\ln(w_{2013}) - \ln(w_{2002}) = \beta_0\iota + \beta_1(\bar{t}_{2013,m} - \bar{t}_{2002,m}) + +Z_p\Gamma + \epsilon_m \tag{1}$$

At the municipality level, my estimating equation is

$$\Delta w_m = \beta_0 + \beta_1 \Delta t_m + \epsilon_m \tag{2}$$

where $\Delta w_m := \bar{w}_{2013,m} - \bar{w}_{2002,m}$ and $\Delta t_m := |\bar{t}_{2013,m} - \bar{t}_{2002,m}|$[11]$= \bar{t}_{2002,m} - \bar{t}_{2013,m}$. Above,

[10] i.e. Average Tariff$_m = \bar{t}_m = \dfrac{\sum_{\text{All occupations}_m} |workers_{o,m}| \cdot t_o}{\sum_{\text{All occupations}_m} |workers_{o,m}|}$, where o is the occupation, m is a municipality, and t is the tariff rate

[11] This is equivalent since all tariffs in 2002 were higher than those than 2013.

m stands for municipality, and average tariffs in a municipality, $\bar{t}_{y,m}$, are constructed as described in the data section, β_1 is my coefficient of interest, and ϵ_m are my disturbances. I also add province fixed effects (where province is one adminstrative level above the municipality level in the Dominican Republic) to some of my equations, although there should be no theoretical reason to do this. Figure 2 displays the results of this estimation.

Ultimately, I find that a one-unit decrease in the average tariff rate in a municipality is associated with a 108 dollar decrease in incomes within that municipality, a statistically significant result. Including province fixed effects neither changes the sign or relative magnitude of this estimate, although it becomes no longer statistically significant (although fairly close to being statistically significant).

Next, at the municipality and occupational level, my estimating equations take the form

$$\Delta w_{m,o} = \gamma_0 + \gamma_1 \Delta t_o + \nu_{m,o}, \tag{3}$$

where $\Delta w_{m,o} := \bar{w}_{2013,m,o} - \bar{w}_{2002,m,o}$ and $\Delta t_o := t_{2002,o} - t_{2013,o}$. Note that here, tariffs (t) are at the ISIC two digit occupational level, and wages have instead been aggregated to each occupation (o) for which there is corresponding tariff information within a municipality. As before, γ_1 is my coefficient of interest and $\nu_{m,o}$ are my error terms. I also include municipality level fixed effects to some of my equations, but as before, this only serves to provide "clearer" coefficient estimates. Figure 4 displays the results of this estimation.

Examining the results of these estimations, I find that a one unit decrease in the tariff rate is associated with a 330 dollar increase in average occupational income in a municipality, a result which is highly statistically significant. Adding municipal fixed effects does little to change this estimate, as expected. Adding an additional covariate, change in employment, estimated using IPUMS occupation data for 2002 and 2013, similarly does little to effect my main coefficient of interest.

8 Conclusion

Pending.

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A Tables

Summary statistics at the municipality level, 2002 and 2013

year	duty	income	employment	edu	pop	empop
2002	9.090764	1.550120	147.237795	9.140800	55242.200000	20481.251613
2010	1.751566	NaN	190.752946	8.977756	60937.296774	19544.870968
2013	1.542419	1.469766	NaN	8.177072	NaN	NaN

Figure 1

Income measured as average hourly wage rate for respondents in terms of 2013 USD, duty is average municipality level tariff (see data section for construction), edu is average years of education of survey respondents. 2013 education data comes from the DHS, whereas 2002 and 2010 education data comes from IPUMS International.

Municipality level effect of tariff changes on change in wage rate from 2002 to 2013 (measured in 2013 USD)

	(1)	(2)
Intercept	0.25	-0.38^{**}
	(0.17)	(0.15)
Change in tariff	-0.02	-0.01
	(0.02)	(0.02)
FE		
R^2	0.00	0.37
N	130	130

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$, Clustered-robust standard errors in parentheses

Figure 2

Observations are municipalities in the Dominican Republic (second administrative level), and tariffs are averages of estimated tariffs for ISIC 4 digit occupational codes, weighted by the number of workers in a given occupation in that municipality (see Data section for more details). Standard errors are clustered at the province level. Income measured as yearly income in 2013 USD.

Municipality level effect of tariff changes on migration and size of work force

	(1)	(2)	(3)	(4)
Intercept	472.76	47627.81***	−677.26	34009.69***
	(3114.25)	(3646.00)	(945.19)	(975.35)
Change in tariff	839.34	1265.78**	259.35	529.57***
	(724.52)	(629.08)	(168.03)	(168.29)
FE				
R^2	0.00	0.62	0.01	0.65
N	155	155	155	155

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$, Clustered-robust standard errors in parentheses

Figure 3

Observations are municipalities in the Dominican Republic (second administrative level), and tariffs are averages of estimated tariffs for ISIC 4 digit occupational codes, weighted by the number of workers in a given occupation in that municipality (see Data section for more details). Standard errors are clustered at the province level. "pop" is the estimated population in a given municipality, "empop" is the size of the work force employed by the private or public sector (excludes self-employment).

Effect of tariff changes on change in wage rate from 2002 to 2013 (measured in 2013 USD)

	(1)	(2)	(3)	(4)
Intercept	−1.65***	−0.85***	1.51***	2.01***
	(0.16)	(0.10)	(0.35)	(0.31)
Change in tariff	0.01	−0.04*	−0.01	−0.03
	(0.03)	(0.02)	(0.03)	(0.02)
edu02			−0.23***	−0.24***
			(0.02)	(0.02)
FE				
R^2	0.14	0.11	0.23	0.21
N	981	1188	981	1188

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$, Clustered-robust standard errors in parentheses

Figure 4

Observations are each occupation for each tariff information can be computed for each municipality in the Dominican Republic. Tariff rates are estimated duties for each ISIC 4 digit occupational codes, using a concordance table from HS1996 to ISIC Rev.3.1. Standard errors are clustered at the municipality level. Income measured as hourly wage rate in 2013 USD.

B Graphs

Figure 5

Source: Central American Free Trade Agreement, Office of the United States Trade Representative & World Trade Organization, author's calculations

Figure 6

Source: Central American Free Trade Agreement, Office of the United States Trade Representative & World Trade Organization, author's calculations

Figure 7

Source: Central American Free Trade Agreement, Office of the United States Trade Representative & World Trade Organization, author's calculations

Figure 8

Source: World Trade Organization

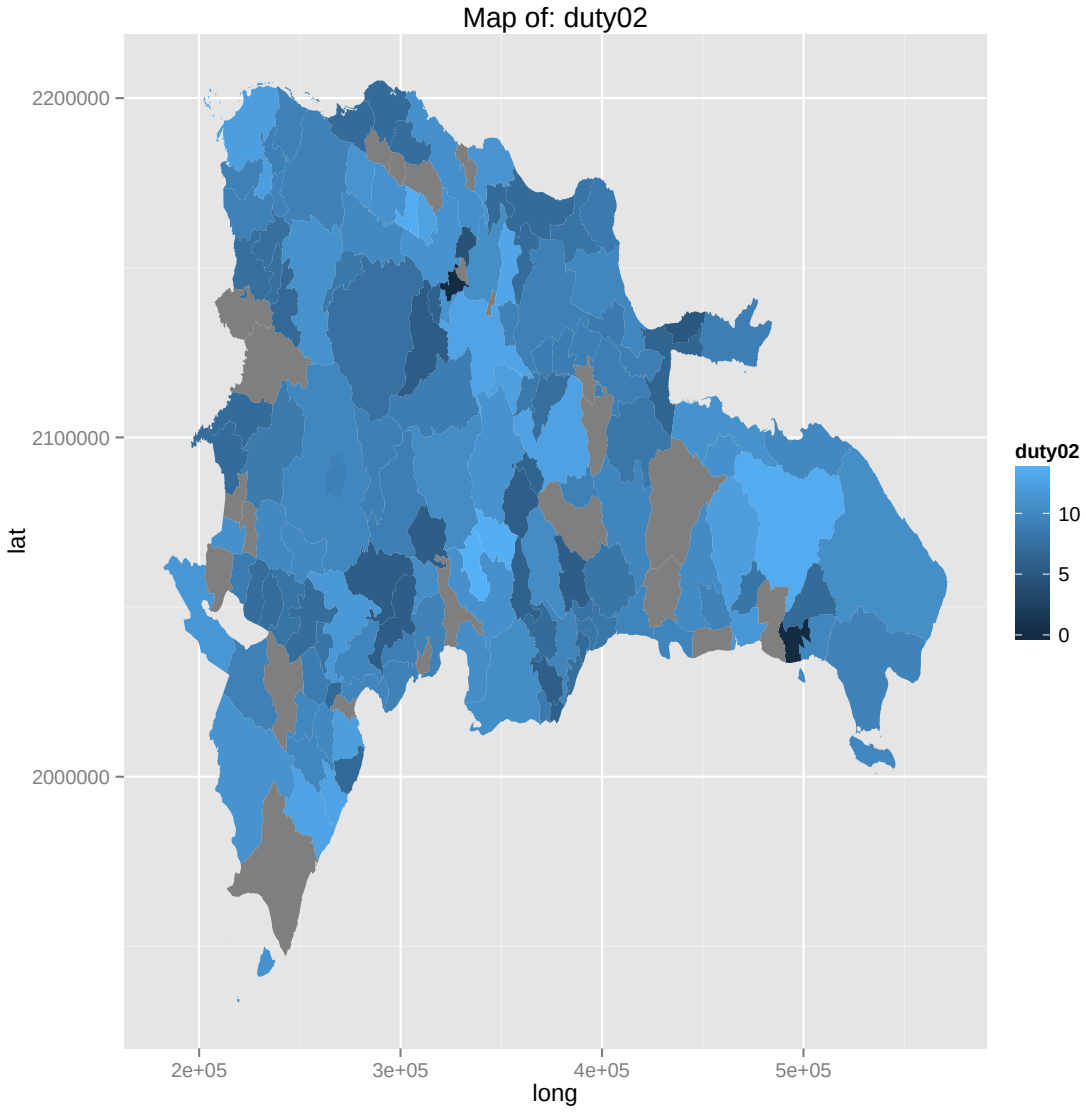

Figure 9
Source: Author's calculations

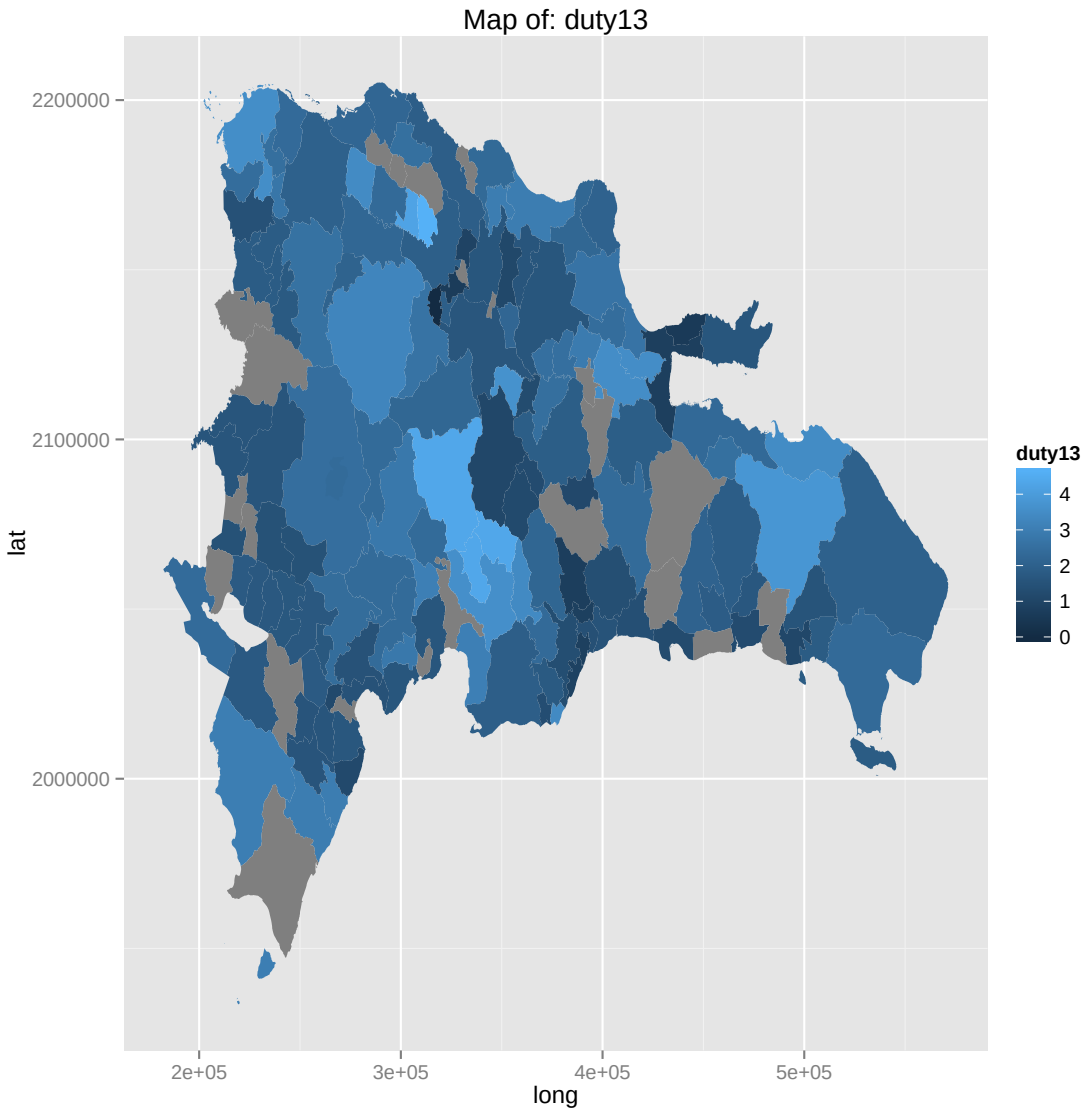

Figure 10
Source: Author's calculations

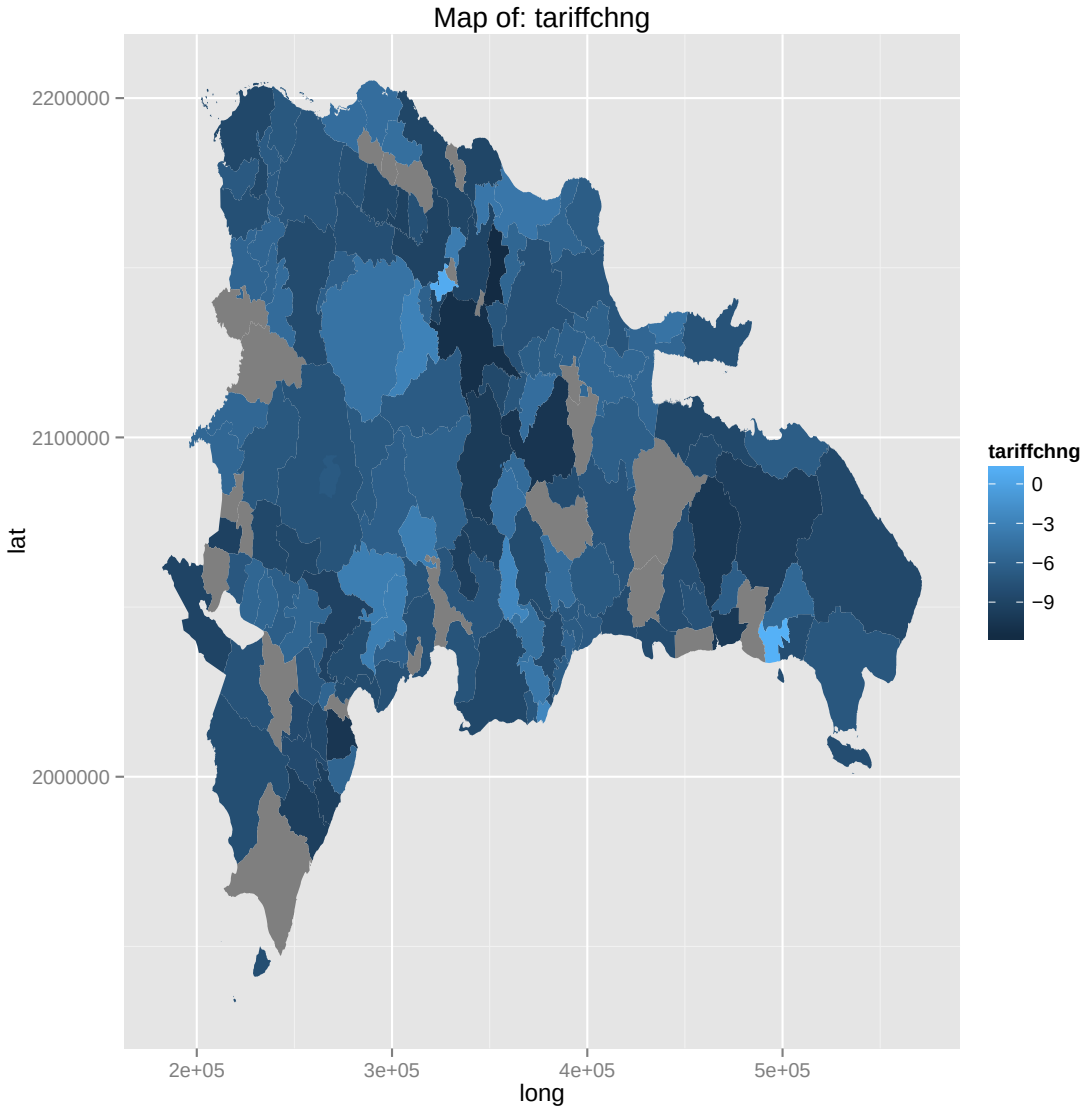

Figure 11
Source: Author's calculations

C Data Appendix

Estimated CAFTA-DR tariffs computed using the following scheme:

Cat.	Number of Goods	Phase Out Scheme
A	4326	Good is now duty free (0% tariff rate).
B	381	Good will be reduced to duty free in 5 equal annual stages, duty free by 2012.
C	692	Good will be reduced to duty free in 10 equal annual stages, duty free by 2017.
D	121	Good will be reduced to duty free in 15 equal annual stages, duty free by 2022.
G	903	Good remains duty free.
M	313	2007-2008 reduced by 2% of base rate. 2009-2013 reduced by 8% of base rate. 2014-2016 reduced by 16% percent of base rate. Duty free by 2017.
N	22	Good will have tariff rate reduced in 12 equal annual stages, duty free by 2019.
SP	48	Special exemption, usually means good has a non-tariff barrier such as a quota.
V	2	Good will remain at base rate until 2017. From 2017-2022 reduced by 8% of base rate, 2022-2026 reduced by 12 percent of base rate. Duty free by 2027.
W	2	Good will have tariff rate reduced in 4 equal annual stages, duty free by 2011.
X	21	Good will have tariff rate reduced in 4 equal annual stages (first year is exempt), duty free by 2012.
Y	2	Good will have duties reduced by 15 percent of base rate for first five years (2007-2012), 5% for next four years after that (2012-2016), duty free by 2017.

Figure 12
Source: Office of the United States Trade Representative, CAFTA-DR Annex 3.3

Conversion Table for DHS occupations to ISIC 2 digit code

Occupation	ISIC 2 digit
peones de la industria manufacturera	15,16,17,18,19,20,21,22,23,24,25 26,27,28,29,30,31,32,33,34,35,36,37
conductores de vehículos de motor	60
personal de enfermería y partería de nivel superior	85
profesionales de nivel medio de servicios de administración	74
médicos y profesionales afines (excepto el personal de enfermería y partería)	85,86
vendedores y demostradores de tiendas y almacenes	52
maestros de nivel superior de la enseñanza primaria y preescolar	80
vendedores de quioscos y de puestos de mercado	52
personal doméstico y afines, limpiadores, lavanderos y planchadores	90
profesionales en ciencias biológicas y otras disciplinas relativas a los seres o	73
otros directores de departamentos	74
oficiales y operarios de la construcción (obra gruesa) y afines	45
peones de la minería y la construcción	10,11,12,13,14
agricultores y trabajadores calificados de cultivos para el mercado	1
secretarios y operadores de máquinas de oficina	74
conserjes, lavadores de ventanas y afines	90
mecánicos y ajustadores de máquinas	50
mecánicos y ajustadores de equipos eléctricos y electrónicos	40
mensajeros, porteadores, porteros y afines	53,93
otros profesionales de la enseñanza	80
otros trabajadores de servicios personales a particulares	93
oficiales y operarios del tratamiento de la madera, ebanistas y afines	20,36
peones del transporte	63
personal de los servicios de protección y seguridad	75
productores y trabajadores agropecuarios calificados	1
técnicos en programación y control informáticos	72
profesionales de nivel medio en operaciones financieras y comerciales	65
oficiales y operarios de los textiles y de la confección y afines	17,18
oficiales y operarios de la construcción (trabajos de acabado) y afines	45
cajeros, taquilleros y afines	65
maestros de nivel medio de la enseñanza primaria	80
trabajadores de los cuidados personales y afines	93
don't know	99
peones agropecuarios, forestales, pesqueros y afines	01,05
operadores de equipos ópticos y electrónicos	72,33
vendedores ambulantes y afines	52
gerentes de empresa	74
personal de intendencia y de restauración	55
empleados encargados del registro de materiales y de transportes	60,63
herreros, herramentistas y afines	28,29
miembros del poder ejecutivo y de los cuerpos legislativos	75
directores de departamentos de producción y operaciones	74
técnicos en ciencias físicas y químicas y en ingeniería	74,24
operadores de instalaciones de vidriería, cerámica y afines	26
fuerzas armadas	75
pescadores, cazadores y tramperos	1,5
arquitectos, ingenieros y afines	74
empleados de servicios de información a la clientela	64,72
pintores, limpiadores de fachadas y afines	45,91
moldeadores, soldadores, chapistas, caldereros	28,29,3
otros operadores de máquinas y montadores	15,16,17,18,19,20,21,22,23,24,25,26 27,28,29,30,31,32,33,34,35,36,37

Figure 13

Occupation	ISIC 2 digit
operadores de máquinas para fabricar productos textiles y artículos de piel y cu	17,19
personal directivo de la administración pública	75
personal al servicio directo de los pasajeros	60
jefes de pequeñas poblaciones	75
inspectores de obras, seguridad y salud y control de calidad	74
profesionales de nivel medio de actividades artísticas, espectáculos y deportes	92
profesores de universidades y otros establecimientos de la enseñanza superior	80
operadores de instalaciones de procesamiento de la madera y de la fabricación de	20,21
oficiales y operarios del procesamiento de alimentos y afines	15,16
criadores y trabajadores pecuarios calificados de la cría de animales para el me	1
archiveros, bibliotecarios, documentalistas y afines	92
otros oficinistas	74
alfareros, operarios de cristalerías y afines	52
profesionales del derecho	75
operadores de maquinaria agrícola móvil y de otras máquinas móviles	1
sacerdotes de distintas religiones	91
recolectores de basura y afines	90
operadores de máquinas para fabricar productos de caucho y de material plástico	25
limpiabotas y otros trabajadores callejeros	52,93
astrólogos, adivinadores y afines	93
operadores de máquinas para fabricar productos químicos	24
operadores de máquinas para elaborar alimentos y productos afines	15
especialistas en ciencias sociales y humanas	73
oficiales y operarios de las pieles, cuero y calzado	18,19
operadores de máquinas de imprenta, encuadernación y fabricación de productos de	21,22
profesionales de nivel medio de la medicina moderna y la salud (excepto el perso	85
operadores de máquinas para trabajar metales y productos minerales	26,27,28
otros maestros e instructores de nivel medio	80
profesores de la enseñanza secundaria	80
maestros de nivel medio de la enseñanza preescolar	80
empleados de bibliotecas y servicios de correos y afines	92
especialistas en organización y administación de empresas y afines	74
oficiales y operarios de las artes gráficas y afines	92
operadores de instalaciones mineras y de extracción y procesamiento de minerales	10,11,12,13,14
operadores de instalaciones de producción de energía y afines	40
trabajadores y asistentes sociales de nivel medio	85
personal de enfermería y partería de nivel medio	85
físicos, químicos y afines	74,24
trabajadores forestales calificados y afines	2
other	99
agentes de las administraciones públicas de aduanas, impuestos y afines	75
escritores, artistas creativos y ejecutantes	92
montadores	29,30,31,32,33,34,35,36
directores generales y gerentes generales de empresa	74
agentes comerciales y corredores	70
mecánicos de precisión en metales y materiales similares	26,27,28
profesionales de la informática	72
técnicos de nivel medio en ciencias biológicas, agronomía, zootecnia y afines	1
auxiliares laicos de los cultos	91
marineros de cubierta y afines	61
dirigentes y administradores de organizaciones especializadas	74
técnicos en navegación marítima y aeronáutica	61,62
auxiliares contables y financieros	74
modelos de modas, arte y publicidad	92
maestros e instructores de nivel superior de la enseñanza especial	80

Figure 13

Average hours worked per week for a given economic activity in 2002

BANCO CENTRAL DE LA REPUBLICA DOMINICANA
DEPARTAMENTO DE CUENTAS NACIONALES Y ESTADISTICAS ECONOMICAS

DIVISION DE ENCUESTAS

Población Ocupada Perceptora de Ingresos y Horas Trabajadas a la Semana por Deciles de Ingresos según Rama de Actividad Económica, año 2002

Rama de Actividad Económica	Perceptores de Ingresos	Deciles									
		1	2	3	4	5	6	7	8	9	10
Población Ocupada	**3,029,681**	**302,968**	**302,968**	**302,968**	**302,968**	**302,968**	**302,968**	**302,968**	**302,968**	**302,968**	**302,974**
Agricultura y Ganadería	470,904	117,591	74,717	67,670	50,521	37,945	37,337	28,599	17,719	21,068	17,739
Explotación de Minas y Canteras	7,079	0	179	423	476	233	1,016	794	1,073	1,374	1,512
Industrias Manufactureras	434,876	16,550	34,653	58,936	58,252	55,673	48,252	43,102	46,110	36,711	36,640
Electricidad, Gas y Agua	24,289	281	421	1,393	3,155	2,524	4,335	4,345	3,146	2,108	2,583
Construcción	181,992	2,687	5,646	8,731	11,805	22,546	23,613	30,324	31,558	21,808	23,278
Comercio al por Mayor y Menor	628,953	57,536	68,558	53,524	63,888	64,079	63,943	64,695	60,539	58,920	73,274
Hoteles, Bares y Restaurantes	165,803	14,183	19,221	14,851	18,224	17,174	19,776	17,219	13,661	18,242	13,256
Transporte y Comunicaciones	229,431	8,541	15,513	20,491	19,367	23,110	26,518	36,017	29,138	29,218	21,520
Intermediación Financiera y Seguros	61,942	915	2,453	1,925	802	4,767	7,848	8,536	10,455	12,069	12,174
Administración Pública y Defensa	156,771	3,578	8,616	12,604	17,715	18,213	18,764	16,493	19,698	21,649	19,443
Otros Servicios	667,644	81,108	72,994	62,423	58,765	56,706	51,569	52,846	69,874	79,804	81,558
Horas Trabajadas	**41.85**	**44.16**	**45.20**	**43.60**	**43.58**	**42.63**	**41.29**	**41.38**	**40.00**	**39.28**	**37.37**
Agricultura y Ganadería	38.38	41.38	40.71	39.40	38.22	37.26	35.41	34.26	31.45	33.28	34.59
Explotación de Minas y Canteras	44.51	0.00	36.00	21.51	51.90	20.00	33.31	56.16	48.01	40.94	38.19
Industrias Manufactureras	44.20	40.68	45.88	46.09	45.85	43.65	42.45	44.03	44.22	44.35	41.72
Electricidad, Gas y Agua	44.14	36.00	29.00	47.32	42.78	44.98	44.96	44.11	42.71	41.43	40.20
Construcción	43.13	25.07	44.83	47.29	45.62	45.71	44.35	43.47	42.31	39.22	39.82
Comercio al por Mayor y Menor	44.54	46.04	47.56	47.71	46.81	46.21	45.40	43.06	42.91	41.23	39.17
Hoteles, Bares y Restaurantes	41.51	48.75	45.63	43.04	42.82	42.67	41.93	36.92	34.34	40.77	36.59
Transporte y Comunicaciones	47.61	50.24	50.44	50.82	48.28	49.15	47.51	50.01	45.82	46.38	39.92
Intermediación Financiera y Seguros	40.52	37.08	32.02	36.83	49.53	44.17	41.87	41.00	39.58	40.06	40.24
Administración Pública y Defensa	41.53	43.19	53.60	48.21	45.74	42.13	40.70	39.65	38.19	37.44	37.58
Otros Servicios	38.11	46.28	45.28	38.64	40.21	37.13	34.52	35.43	34.70	34.67	32.81

ESTIMACIONES AJUSTADAS EN BASE A LOS RESULTADOS DEL CENSO NACIONAL DE POBLACION Y VIVIENDA REALIZADO EN OCTUBRE DEL 2002

Figure 14
Source: Dominican Central Bank

Average hours worked per week for a given economic activity in 2013

BANCO CENTRAL DE LA REPUBLICA DOMINICANA
DEPARTAMENTO DE CUENTAS NACIONALES Y ESTADISTICAS ECONOMICAS
DIVISION DE ENCUESTAS

Población Ocupada Perceptora de Ingresos y Horas Trabajadas a la Semana por Deciles de Ingresos según Rama de Actividad Económica, año 2013

Rama de Actividad Económica	Perceptores de Ingresos	Deciles									
		1	2	3	4	5	6	7	8	9	10
Población Ocupada	**3,927,658**	**392,765**	**392,765**	**392,765**	**392,765**	**392,765**	**392,765**	**392,765**	**392,765**	**392,765**	**392,773**
Agricultura y Ganadería	547,196	106,774	72,638	70,521	73,839	59,696	50,062	39,501	30,244	26,686	17,235
Explotación de Minas y Canteras	12,561	645	923	356	178	1,268	813	3,517	1,692	787	2,382
Industrias Manufactureras	389,667	18,398	34,443	45,918	46,139	45,782	48,495	49,336	44,545	30,873	25,738
Electricidad, Gas y Agua	35,190	688	3,103	2,586	2,215	3,187	4,359	4,217	3,649	6,195	4,991
Construcción	224,832	6,854	8,768	12,796	13,995	26,231	31,750	31,375	46,357	29,124	17,582
Comercio al por Mayor y Menor	816,758	98,405	72,942	80,058	88,292	90,221	86,848	74,199	76,036	79,121	70,636
Hoteles, Bares y Restaurantes	235,051	26,701	24,564	25,344	24,647	26,928	20,613	23,628	21,303	18,637	22,686
Transporte y Comunicaciones	314,884	14,630	19,446	27,538	27,085	33,212	36,294	41,028	46,829	39,489	29,333
Intermediación Financiera y Seguros	105,233	2,880	1,551	3,679	5,155	4,891	10,686	10,790	15,777	17,204	32,620
Administración Pública y Defensa	194,720	4,494	21,093	16,043	13,618	16,726	21,791	22,217	20,212	24,963	33,563
Otros Servicios	1,051,566	112,296	133,294	107,926	97,602	84,623	81,054	92,957	86,121	119,686	136,007
Horas Trabajadas	**41.28**	**44.32**	**44.11**	**43.82**	**42.64**	**41.96**	**41.59**	**40.46**	**39.43**	**38.43**	**36.01**
Agricultura y Ganadería	39.62	43.26	42.48	41.07	39.53	38.92	37.05	37.02	35.19	34.32	31.30
Explotación de Minas y Canteras	44.95	51.33	46.41	45.60	40.16	44.34	44.11	40.56	49.41	49.05	45.48
Industrias Manufactureras	44.23	43.32	47.99	46.63	45.09	45.14	43.92	44.57	42.95	42.61	36.47
Electricidad, Gas y Agua	43.33	69.75	45.11	44.52	42.92	47.07	37.86	39.90	40.34	43.72	45.12
Construcción	41.97	47.43	44.65	43.56	43.74	43.70	44.33	43.56	39.64	38.33	38.42
Comercio al por Mayor y Menor	42.57	44.34	44.08	45.33	44.70	43.41	42.54	41.79	40.74	40.76	36.48
Hoteles, Bares y Restaurantes	42.03	41.54	44.48	44.45	44.59	44.87	43.23	40.80	36.24	38.87	39.35
Transporte y Comunicaciones	45.38	45.66	48.11	48.81	47.29	47.62	47.72	46.80	44.36	38.60	41.81
Intermediación Financiera y Seguros	41.30	39.54	44.23	43.96	45.45	44.23	44.81	44.01	44.07	40.96	36.71
Administración Pública y Defensa	40.70	62.82	46.91	46.94	42.80	41.07	40.10	38.71	37.79	37.69	35.51
Otros Servicios	38.49	44.95	42.83	41.43	39.86	36.96	37.88	34.79	35.23	36.08	33.62

Estimaciones ajustadas en base a los resultados de las proyecciones oficiales publicadas por ONAPLAN en 1999
Nota: A partir del año 2008 las muestras de viviendas son independientes lo que permite unir ambas bases en el año.
Cifras Rectificadas

Figure 15
Source: Dominican Central Bank