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INCIDENCE OF THE VALUE- ADDED TAX ON MEN AND WOMEN IN NICARAGUA

MASTER THESIS

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1. Abstract

This research pretends to be a contribution to the growing literature on the differentiate incidence effects of indirect taxation in developing countries on men and women. By using data from the Household Survey (EMNV) of Nicaragua from 2014 (INIDE, 2014), the research develops an indirect tax incidence analysis to determine the differences in the magnitude of tax income paid in concept of Value- Added Tax (VAT) as a proportion of their total income, based on the sex composition of the household. The results suggest that there is implicit gender bias in the established VAT structure for preferential treatment of goods and services which, together with different pattern of consumptions within households for men and women associated with gendered social roles, results in a higher incidence of the tax against female majority households compared to male majority ones, for both, rural and urban areas.

A revision of the structure of preferential VAT treatment of important household consumption goods and services, via either exemptions, zero-rating or differentiated rates, may have important effects in reducing the gender differences in the incidence of the VAT, as well as in protecting poor households, which otherwise bears disproportionate higher share of the tax burden.

2. Introduction

This research aims to explore the possible differentiated effects of taxation on women and men due to the gendered nature of economic and social life in Nicaragua by examining the Value- Added Tax, which is the most important indirect tax in the country representing approximately 60% of the total tax revenues.

The main question of the research is "what are the gender equity implications of the Value-Added Tax in Nicaragua?". To explore this question, the following hypothesis is proposed: *"differences in consumption expenditures by gender, together with the lack of preferential treatment to basic household consumption goods and services, results in a higher incidence and burden of the VAT on women, compared to men in Nicaragua"*.

The tax policy is one of the most important policy tool of governments to reduce inequality in a country, mainly because it defines what groups and to what extent those groups are going to contribute to sustain the economy and the wellbeing of a society.

The tax policy in Nicaragua is based on a body of laws and resolutions issued by the legislative branch of the State. During the last two decades, the tax legal framework of the country has been reshaped in many occasions by tax reforms aiming mainly to increase its tax base and progressivity. The tax structure is concentrated in five types of taxes which are, the Personal Income Tax (PIT), the Value- Added Tax (VAT), the Selective Consumption Tax (ISC), the Import Tariff Rights (DAI) and the Tax Stamps (ITF).

Due to its magnitude and importance to the tax structure of Nicaragua, this research concentrates its analytical efforts on exploring the VAT. According to Flores (2015) the tax revenues as a proportion of the

Gross Domestic Product (GDP) increased from 13% to 14.8% between 2005 and 2013. Flores (2015) states that jointly the PIT and VAT represented 76% of the tax revenue in 2014.

The two most important changes in the tax structure of Nicaragua in the last two decades are, first the significant decrease in the share of indirect taxes, and second, the increase in the tax base due to better controls and reductions in the number of exceptions and exonerations. Additionally, Acevedo (2011) states that after the reforms of 2003, the tax policy achieved a better definition of its principles related to generality, neutrality and equity, as well as decreased its anti-export bias, and strengthen the institution in charge of the tutelage, enforcement and regulation of the national tax system.

Despite the many tax reforms undertaken by governments during the last two decades, which leaded to the above-mentioned improvements, many important problems persist. According to Hanni, Martner & Podestá (2015) in 2008 the Gini coefficient of Nicaragua before tax was 0.51 and, increased to 0.69 after taxes, this is a clear indication of persistent regressive elements in the tax system.

How to achieve progressive taxation is an issue that has been broadly studied around developing countries, mainly because of its central importance in reducing inequality. Nevertheless, its study has been mainly related to income inequality. Gender and taxation have rarely been discussed together even when for ensuring substantive equality, policy interventions in taxation cannot have negative effects on gender. For purposes of this research, gender analysis is conceived from a binary perspective, which means that the research only looks at the asymmetries derived from the socially constructed models of male and female, without taking into account other socially constructed genders.

Plethora of empirical work shows that men and women tend to have different patterns of consumption. Additionally, Stotsky (2005) broadly agrees that the incidence of indirect tax falls on the final consumer. Consequently, the structure of preferential treatment of good, services and producers of the VAT is shifted to the final consumer. For instance, when studying the gender differentiated incidence of the VAT, it is crucial to understand how, because of differentiated patterns of consumption for men and women, the structure of preferential treatment of goods and services of the VAT may induce implicit gender bias.

For analyzing the above mentioned, the research develops an indirect tax incidence analysis which helps determine the magnitude of tax income paid by household as a proportion of their total income. Because expenditure data is only available at the household level, and, gender indirect tax incidence analysis assumes that each members of a household do not consume goods equally. Gender dynamics are therefore captured by a sex composition ratio, which is a measure of the number of women over the total number of individuals per household.

Finally, the third section of the document develops the literature review and conceptual framework that supports and guide the research, followed by section four which describes the main methodology used for the analysis as well as a description of the data selection and variables. Section five presents the main

results, then the conclusions are presented in section six, the main recommendations proposed in section seven and finally the bibliography and appendix are presented in section eight and nine respectively.

3. Literature Review and Conceptual Framework

The literature review presents the conceptual categories used for analyzing the tax policy in Nicaragua, specifically the Value- Added Tax, and its possible effects on gender.

General measures of equity in taxation

Ariwodola (2001) defines tax as a compulsory levy imposed by governments on their subjects or property to ensure government funding. In addition, according to Okoye & Gbegi (2013) taxation can also be used as a policy instrument for wealth redistribution, as well as induce specific behavior—particularly in terms of consumption, labor, and investment preferences. Elson (2006) states that for the fiscal policy to help governments achieve socially desirable goals of poverty and inequality reduction, it must follow five principles: i) generality in contributory capacity and equity, ii) simplicity, iii) neutrality, iv) ease of administration and, v) equality. This research focuses on analyzing the principle of equity.

Over the last decades, scholars interested in evaluating equity in tax policies have found that the most important category for analyzing equity is to identify who bears tax's economic burden (Younger, Sahn, Haggblade & Dorosh, 1999; Stotsky, 1997; Okoye & Gbegi, 2013). Therefore, when operationalizing equity for analysis, two dimensions are important: i) incidence of the tax, and, ii) fairness of the tax.

Elson (2006) defined tax burden as the mandated tax payment obligation as a percentage of tax payers' disposable income, while tax incidence is a measure of who actually pays the tax. For evaluating the fairness component, it is important to identify and evaluate the progressive structure of the tax, which consists ultimately in making "those with higher income pay a larger share of the tax compare to those with lower incomes" (Elson, 2006:72).

Direct and Indirect Taxes

Taxes can be classified into two categories, direct and indirect. Direct taxes levy the contributory capacity of individuals and companies, which is based on their income, whether it is from wages, wealth, among others, the PIT is a type of direct tax. Indirect taxes levy consumption of products and services, and therefore depend on the purchasing power of individuals or companies; the VAT is a type of indirect tax. According to Grown & Valodia (2010) the VAT is the most popular indirect tax because it is easy to collect and difficulty to evade. The tax rate of the VAT in Nicaragua is equal to 15% of the sales price of the products or services. Different countries have different rate structures, but generally all countries have a broad base structure where some goods or services are either zero-rated or exempt. Zero rates are when

sales have a tax rate of zero.

Barnett & Grown (2004) and Aizenman & Jinjarak, (2009) argues that it is a common pattern among developing countries to derive a majority of the total tax revenues from indirect taxes, as it is more difficult to tax companies and individuals due to the increased mobility of labor and capital, the high share of informal economy and, weak institutional capacity to enforce compliance.

In harmony with these findings Acevedo (2011) argues that the tax structure of Nicaragua is composed by a higher percent of indirect taxes, which levied consumptions and transaction, and a lower burden on direct taxes which levied wealth. Acevedo (2011) also maintains that for the year 1994, indirect tax (mainly VAT and ISC) represented 80% of total tax revenues for Nicaragua, meanwhile direct taxes (PIT) represented 17%, nevertheless in 2013 the direct taxes increase to 33% and indirect taxes decrease to 63%. According to Flores (2015) even when tax reforms undertaken by different administrations in the last two decades helped decrease the gap between direct and indirect taxes. According to Martinez-Vazquez, Vulovic & Yongzheng (2011) the share of indirect taxes as a percentage of total tax revenues is still high compared to developed countries.

Important Concepts and Theories for Gender Analysis in Taxation

It is broadly agreed that the way governments collect their revenues through taxes have different effects depending on the demographic group (Stotsky, 1997; Grown & Valodia, 2010). For purpose of this research, women are the relevant demographic groups to analyze. Conducting an analysis through a gender lens can illuminate the asymmetries that exist in the tax incidence and fairness of the VAT, based on the social roles assigned to men and women.

To analyze gender social roles Kabbeer (2012) introduces the concepts of "gender-specific constraints". These constraints defined by Kabeer, assign different roles and responsibilities to men and women, influencing individuals to make certain choices, and imposing, in some cases, institutional and legal constraints as well.

According to Grown & Valodia (2010) "women are less likely to be inside the personal income tax net in developing countries because they tend to earn less labor income and are more likely to work in the informal economy, often as self-employed or in unpaid family worker, where their earnings are not otherwise reported and therefore more likely to escape tax" (Grown & Valodia, 2010: 24). INIDE (2014) states that it exists a persistent gender wage gap in Nicaragua in the majority of the economic sectors, this means that women on average earn less compared to men for working in the same type of job and having the same qualifications, see table 1. of the appendix section. Finally, 79.2% of employed women worked in a business with less than five employees, while this percentage decreased to 70.5% for men.

As it was described above, because of the above-mentioned constraints, women tend to face

disadvantages, as they tend to earn incomes that are well below the income tax threshold and therefore fall outside the income tax net. Therefore, Elson (2006) argues that indirect taxes tend to be more important for poor women in poor countries than personal income tax.

Building upon the above mentioned, INEC (1998) analyzed data about time allocation in Nicaragua. They found that men and women tend to allocated time according to their gendered socially assigned roles. Accordingly, men tend to spend a greater amount of time, compared to women, in productive and paid work, and women tend to allocated greater amount of time in reproductive work and unpaid activities. Martínez Franzoni & Voorend (2012) found that because of the way care is conceived in Nicaragua, despite of several reforms regarding public policy and the legal framework related to the status of women, women still tend to burden a disproportionately higher share of the responsibilities associated with care and social wellbeing in the country compared to men.

It is also broadly agreed that due to gendered social roles, men and women tend to have different patterns of consumption (Barnett & Grown, 2004; Elson, 2006; Stotsky, 1997) as LeMay argues "data and results also allow us to underline differences in patterns of expenditures between husband and wife.... women spend additional income in a manner regarded as socially desirable, meaning more for the welfare of her family and thus more in public goods" (LeMay, 2006: 13-14).

Therefore, because of the gendered social roles, it can be stated that even when men and women share the same household, they obtain different utility from consumption of goods and services. Hence, developing a gender analysis of taxation necessarily introduces elements that question the basic assumptions of the standard neoclassical view where household decision making is treated and studied as a single economic agent (Stotsky, 2005; LeMay, 2006). Plethora of theoretical and empirical literature sustaining the importance of conceiving households as collective entities can be found (Strauss & Beegle, 1996; Hoddinott et al, 1997; Vermeulen, 2002). Building upon the above developed argument, Stotsky (2005) argues that the study of the decision making process and behavioral responses within a household also demands a careful attention to the household composition and size.

Because men and women derive different utilities from consumption, and tax policies are one of the most powerful policies for shaping social behavior, including social attitudes specially about the respective roles of men and women, Stotsky (1997) states that tax systems may exhibit gender bias since they can shape and determine individual' decisions and preference.

Therefore, Grown & Valodia (2010) states that when analyzing the distributional impact of tax systems, the categories used for analyzing the phenomena must go beyond women as a different demographic group in relation to men, instead gender analysis must be introduced, and conceived as a political category of analyzing power dynamics.

Consequently, when studying the gendered incidence of indirect taxes, it is useful to introduce the

concept of 'bias' in taxation systems proposed by Stotsky (1997). According to this author two main types of gender bias can be identifies in tax systems, explicit and implicit. For Stotsky the explicit forms of gender bias are related to specific regulation and notations in legislation that treat men and women differently and therefore cause gender implication on taxation. On the other hand, implicit forms of gender bias, are more difficult to detect because they are related to the differentiated effect of tax for men and women because the gendered social and economic customs and arrangement.

Finally, the VAT can exert a gender bias because of both, women's different consumption patterns and the disadvantaged position of women in the social and economic life of Nicaragua. Therefore, according to Valodia (2009), unless the structure of the VAT is not reviewed and designed to zero-rate basic consumption goods, it might result in reducing the wellbeing of women in general and poor women in particular to a greater extent compared to men.

4. Methodology

The research develops an indirect tax incidence analysis to identify the possible differentiated gender effects of the VAT on men and women. The goal of indirect tax incidence analysis in this research is to evaluate the association between gender and the magnitude of tax income paid by household as a proportion of their total.

Stostky (2005) argues that most important methodological challenge for the estimation of gender incidence in indirect taxation is to be able to address both individual and household-level dynamics. This challenge emerges because even if sex is a characteristic inherent to individuals, expenditure occurs at the household level.

Most of studies that analyze the incidence of indirect taxes focused on income inequality and race, uses the neoclassical standard theory of the household as a single economic agent where it is assumed equal sharing of expenditure and burden of taxation across individuals. However, this theoretical approach is problematic for studding the gender incidence of taxation given the assumptions of indivisibility in the intra-household allocation of resources. For solving this problem, the research tries to captured the effect of gender by using a proxy of sex households' composition. In statistical analysis, a proxy is a variable that is used in place of another immeasurable variable for mimicking its effect on a model.

The chosen proxies of gender are sex composition ratios. Since it is broadly agreed that men and women tend to have different expenditure patters, as well as income, it is expected that the household's expenditure on VAT as a share of their income is different according to the household sex composition.

Additionally, since indirect taxes are hard to identify because they are not levied on persons but on goods and services consumption. The Nicaraguan government does not provide information about VAT tax revenues in a disaggregate format, hence it was not possible to obtain a primary source of tax information

for each person. Nevertheless, the research uses a simulation technique for obtaining an estimation of the total tax paid per household in concept of VAT.

The simulation is based on the data of the EMNV for 2014 (INIDE, 2014), in which each family provides information about their expenses and income. The survey was conducted by the Nicaraguan National Institute of Development Information (INIDE) and provides information about a total of 6, 851 households. The technique consists on estimating the total imputed paid by each household from all the reported household expenses on the survey, based on the assumption that consumers bears the final burden of the total VAT.

The research uses, for the econometrics analysis a multivariate linear regression model. The focal relationship is expressed through two variables, the incidence of the VAT by household and, the sex household's composition for individuals over 12 years, where the incidence of the VAT is the dependent variable and the sex composition of households for individuals over 12 is the independent variable. As covariates, three variables where included: sex household's composition for individuals under 12 years old, as well as the dependency rate and the average years of education of women over 25 years.
The variables were generated according to the following:

1. *Focal relationship: VAT incidence and sex composition ration for individuals over 12 years*

The VAT incidence is estimated using the ratio of the estimated household expenses in concept of VAT, as a proportion of the estimated total household income. The information about the reported expenses by family was classified using the typology of the "classification of Individual Consumption by Purpose (COI/COP). The following categories were used for the classification of expenditures by household:

- Food
- Non- alcoholic beverages
- Alcoholic beverages
- Tobacco
- Clothing and footwear
- Housing expenditures, divided into housing, and utilities.
- Household equipment

Once all the household expenditures were classified into the above mentioned categories, the duty was applied, according to what is mandated in the "Tax Agreement Law" or law No. 822 and its reform, law No. 891 of Nicaragua. The following formula is applied in order to obtain the total amount paid[1] in concept of VAT each family paid:

[1] All the information is in Córdobas. Córdoba's exchanges rate for 03/05/2017 equals 29.9 (NIOxUSD)

$$TaxpadSij = Expij * Dutyj$$

Once the total paid by household in concept of VAT was found, the following formula was used to obtain the incidence of the VAT per household:

$$VAT\ incidence = \frac{TaxpadSij}{Estimated\ total\ Household\ Income} * 100$$

Where:

- TaxpadSij: Is the tax S paid by household i on item j.
- Expij: Is the reported expenditure for the household i on item j.
- Duttyj: Is the per unit duty on item j.

The household sex composition ratio for individuals over 12 years old estimates the ratio of women over 12 years as a proportion of total individuals over 12 years per household. The variable was generated by the following equation:

$$Household\ sex\ composition\ ratio\ (over\ 12) = \frac{Number\ of\ Women\ over\ 12\ years\ per\ huusehold}{Total\ number\ of\ people\ over\ 12\ per\ household}$$

Household with a sex composition ratio of individuals greater than 0.5 are treated as "women majority" and households with a ratio smaller than 0.5 were classified as "male majority". The age of 12 was selected because this is the age where elementary school normally finishes in the country. In Nicaragua, the mandated levels of education by law are three years of kinder garden and 6 years of elementary school, therefore the mandated education by law finishes at 12 years. Once kids reach this level of education, continuing in the educational system is voluntary, for instances the age of 12 represents an important inflection moment for kids in Nicaragua, after which either they continue studying, start working and assuming responsibilities within the household, or both.

2. *Control variables:*

In order to be able to isolate in a better way the unique association between the focal variables, three more variables were included, resulting in a multivariate linear model. The control variables chosen are:

i) the household sex composition ratio for individuals under 12 years which helps to isolate the possible gender differentiated effects for having boys and/or girls as children, the reason why the age of 12 was selected is explained above. The variable was generated using the following formula:

$$Household\ sex\ composition\ ratio\ (under\ 12) = \frac{Number\ of\ Women\ under\ 12\ years\ per\ huusehold}{Total\ number\ of\ people\ under\ 12\ per\ household}$$

ii) the dependency rate by household which controls for the number of people working in the

household who can support the dependent ones. In this case a high ratio could reflect financial stress within the household. The variable was generated using the following formula:

$$Dependency\ rate\ = \frac{Number\ of\ people\ between\ 0-14\ and\ 60\ and\ above}{Number\ of\ people\ between\ 15\ and\ 59} * 100$$

iii) the average years of education of women over 25 years per households which controls for women's agency and therefore their bargaining power within the household as well as their economic independence. The variable was generated using the following formula:

$$Average\ year\ of\ education\ of\ women\ over\ 25\ = \frac{Sum\ of\ the\ years\ of\ education\ of\ women\ over\ 25}{Total\ of\ women\ over\ 25}$$

The geographic area of residence is also an important factor to control since consumption and income composition is highly related by whether the household are from rural or urban areas, therefore the model controls for it by separating the data by area or residences (urban and rural) and running two different regressions for each of them. The following equation represent the above described model for the research.:

$$\boldsymbol{VAT\ Incidence = \beta 0 + \beta 1 ratiosexover12 + \beta 2 sexratiounder12 + \beta 3 dependencyrate + \beta 4 averageyearsofeducationwomenover25 + u}$$

Finally, the study uses the *ordinary linear least squares method (OLS)* that minimizes the sum of squared residuals, and leads to a closed-form expression for the estimated values of the unknown parameters βs.

5. Results

The main question of the research was responded by a mix of descriptive, qualitative and quantitative analysis of the data. Therefore, the results section aims to presents the main arguments and findings of the mix analysis.

a. Descriptive analysis of the data: patterns related to gender and area of residence

Household data was analyzed to identify the possible presence of differentiated patterns within households based on gender. For doing this the variable of sex composition ratio of individuals over 12 years old was used.

Significant variations across all the analyzed variables was found when analyzing data by both, area of residence and sex composition, see table 2. and 3. on the appendix section. On average households from urban areas tend to have higher annual income, as well as lower dependency rate and more years of formal education of women over 25 years. Regarding sex composition, also significant variations were found. On average, male majority household tend to have higher annual income than female majority ones. In rural areas male majority household have 63.8% more annual income than female majority ones, the percentage decrease to 23.1% for urban areas. This finding are explained by the gender- constraint in the labor market

which position women in a disadvantage position compared to men in terms of wage and, occupational segregation.

Regarding the dependency ratio, it was found that male majority household on average have a lower dependency rate compared to female majority ones, for both urban and rural areas. This finding is consistent with broad theoretical and empirical evidence about the gender roles which assign care responsibilities disproportionately to women compared to men. It was also found that women over 25 years old have on average more years of education in female majority households compared to male majority ones, Therefore, the description of the data supports the conceptual framework of the research which argues that women tend to move within the economic and social live within gender- constraints.

Tables 1. and 2. describe the incidence of the VAT for female and male majority household by type of expenditure for both rural and urban areas.

Table 1. Incidence of the VAT by expenditure and household type- Rural areas

Type of VAT expenditure	Female majority	Male Majority
Food	1.11	1.04
Beverages	0.13	0.12
Clothing	0.31	0.29
Home improvements	0.28	0.33
Household care	0.95	0.68
House equipment's	3.65	0.38
Cigarettes	0.02	0.77
Alcohol	0.01	0.03

Source: Self elaboration based on EMNV, 2014

Table 1. shows that in rural areas the incidence of the VAT is on average greater for female majority households compared to male majority. Expenses related to home equipment and care, like for example personal hygiene and cleaning products for the house, are the products with greater VAT incidence for women, as well as the ones with higher differentiated incidence compared to male majority household. On the other hand, male majority households exhibit a greater incidence of the VAT in expenses related to cigarettes, alcohol and home improvements. This finding is consistent with what empirical and theoretical evidence that states are expenses patters are associated with gender-models.

Table 2. show the different figures that represents the incidence of the VAT for female and male majority household by type of expenditure for urban areas.

Table 2. Incidence of the VAT by expenditure and household type- Urban areas

Type of VAT expenditure	Female majority	Male Majority
Food	2.1	1.43
Beverages	0.53	0.13
Clothing	0.61	0.25
Home improvements	3.23	0.57
Household care	1.52	2.46
House equipment's	1.5	0.85
Cigarettes	0.05	0.06
Alcohol	0.01	0.06

Source: Self elaboration based on EMNV, 2014

For urban areas on average the incidence of the VAT is also greater for female majority households compared to male majority ones.

Male majority households have higher incidence of the VAT for household care, which is related to expenses in personal hygiene and cleaning of the house. But, besides this type of expenses, the rest of the figures reflects incidence of the VAT consistent with the gender pattern expenses explained in the empirical and theoretical framework. The incidence of the VAT is greater for female majority households for those expenses related with public households good, clothing and food, compared to greater incidence of the VAT for male majority households for expenses related with cigarettes and alcohol.

Finally, the descriptive figures of the data appear to support the hypothesis that the VAT has differentiated effect based on gender, mainly because of the gender- related pattern of consumption. As well as because of the disadvantages position of women in the cultural and economic life of Nicaragua.

b. Qualitative Analysis of the structure of preferential treatment of the VAT: identifying the presence of gender implicit bias.

Since indirect taxes are levied on consumption and not on individuals, they tend not to show explicit gender bias, nevertheless Stotsky (1997) argues that implicit biases might be present because, given the differential expenditure patterns by gender, the choice of VAT rate liable on goods and services may affect women and men differently. Additionally, as it was already discussed in the conceptual framework, since the incidence of broad-based consumption tax falls on final consumer, it is central for the analysis of gender bias of indirect tax to focus on how preferential treatment affects consumers in general and men and women in particular.

In Nicaragua the VAT substituted a previous tax called the General Sales Tax (IGV) created in 1975

with an initial rate of 6%, latter modified to 10% and finally set at 15% in year 2000. According to IEEPP (2016) indirect taxes represents 60% of the total tax revenues in Nicaragua.

The most important taxation Laws in Nicaragua are the law No. 822 or "Tax Concertation Law" and law No. 891 which reformed to the law No. 822. Table 3. shows the VAT rate liability of goods and services at May 2017, according to what both law establish for the VAT.

According to Flores (2015) Nicaragua assign the equivalent of 6.7% of its GDP in concept of exemptions and exonerations, being the highest rate in Latin America. The taxation laws define that exports, fertilizers, agricultural tools and, rent of residential building are zero rate.

Stotsky (2005) claims that a common characteristic of the VAT is that preferential treatment is generally applied to necessity goods and services as well as to those that are difficult to tax, such as many financial services. According to the Laws 822 and 891 (Asamblea Nacional de Nicaragua, 2012 and 2014), effectively, financial services, as well as some basic consumption goods are exempt of VAT in Nicaragua, which consists mainly of consumption goods such as food and the majority of products contained in the basic consumption basket, as well as important services like education and health.

Table 3. VAT rate liable of goods and services at May 2017

VAT rate	Applied to
15%	- Most goods and services supplied within Nicaragua (standard rate).
0%	- Exports, fertilizers, agriculture tools, rent of residential building.
Exemptions	- Agricultural unprocessed products produced within the country. Some food products of basic necessity (rice, coffee, oil, corn flour, cereals, eggs, bread, milk, fish, meet, fruits and vegetables, sugar, salt, butane and propane gas. - Books and newspapers, medicine health equipment and services, education, books. - Financial and banking services. - Public water supply, supply of electricity for agricultural purposes.

Source: Self elaboration base on the Laws No. 822 and No. 891. Law of Tax Concertation and its reform.

Law No. 891 took away the exemptions to nationally produced clothe items, therefore no clothing product is currently exempt or zero rate in Nicaragua. It was also found that neither any good or service

related to home improvement, house basic equipment and care is exempted or zero rate from VAT. As it was discussed previously in tables 1. and 2., those types of goods have the largest incidences for both male and female majority household, this could indicate the presence of income implicit bias. Means that not having any preferential treatment for important good for household consumption, may have important regressive effects because it may affect to a great extent poor families.

Tables 1. and 2. also show that home improvement, house basic equipment and care household products, have a greater VAT incidence for female majority household, indicating that not having any preferential treatment for those goods may also result in implicit bias.

Therefore, the analysis of the structure of the preferential treatment of the VAT on goods and services indicates the presence of gender and income implicit bias, mainly because some important household consumption goods such as clothing, household public goods, as well as basic care household goods, which are good that both women and poor household tend to allocate a larger portion of their income on basic, are neither exempt of zero rate.

a. Empirical Results: differentiate gender incidence of the VAT

Even when both, the descriptive analysis of the data and the qualitative analysis of the preferential structure of the VAT, resulted in clear indications of the presence of differentiated effects of the VAT for men and women, mostly because of the presence of gender implicit bias. The research also develops a quantitative analysis using statistics for estimating the relationships among incidence of the VAT and gender. Since correlation does not imply causation, the research intends to infer the possible positive association between the established focal relation in the models by using a linear regression analysis and, therefore provide more significant conclusions about the hypothesis and research question.

Tables 4. and 5. report the results of the standard errors and levels of statistical significance of the estimated coefficients for each one of the regression models. Four models were estimated for both rural and urban areas, as expressed in the regression equation explained in section 4.

Table 4. OLS Coefficients of model predicting the Log VAT Ratio (VAT as a proportion of Income in Nicaragua) for 2014- Rural Areas

	Model 1	Model 2	Model 3	Model 4
Ratio Women Over 12 (#W/ #M+#W)	0.335***	0.60***	0.54***	0.53***
	(0.126)	(0.176)	(0.18)	(0.187)
Ratio Women Under 12 (#W/ #M+#W)		0.087	0.084	0.075
		(0.072)	(0.072)	(0.078)
Dependency Rate (dependent/active) *100			0.001	0.0013***
			(0.00046)	(0.00047)
Average years education women over 25				0.046***
				(0.0081)
Intercept	0.534	0.337	0.272***	-0.0003
	(0.067)	(0.102)	(0.10)	(0.116)
R^2	0.0053	0.0142	0.021	0.065

Notes: N= 1321; EMNV 2014; Standard errors in parentheses

*p<0.1, **p<0.05, ***p<0.01.

For the rural areas in Nicaragua, it can be stated that for all the models the coefficients β_1, which represents the relationship between the sex composition ratio of individuals over 12 years within households and the incidence of the VAT in 2014, are statistically significant at 99 percent. The coefficient β_1 indicates that for each additional increase of women as a proportion of the total number of individuals over 12 years old in a household, the incidence of the VAT increases on average by 0.53 percent point, holding the sex composition ratio of individuals under 12 years, dependency rate and the average years of education of women over 25 years, constant.

Statistically significant estimates at 99 percent are generated in the four models for β_3 indicating that the dependency rate is important predictors of the incidence of the VAT in a household. The regressions also demonstrate that sex composition ratio of individuals under 12 years is not a statistically significant predictor of the incidence of VAT. The estimate of β_3 in model (4) indicates that for each additional unit increase in the dependency rate, the incidence of the VAT in the household increases by 0.0013 percent points.

For the estimate of β_4, even when statistically significant estimates at 99 percent are generated in the four models. Since years of education was included as a proxy of women's agency and therefore of women bargaining power within the household and economic independence, it was expected the estimate to present a negative relationship with VAT incidence. As it can be observed in model (4) the coefficient presets a

positive relationship between the variables. Meaning that for each additional year of education of women over 25 years, the incidence of the VAT increases by 0.046 percentage point. This could indicate either that years of education is not a sufficient indicator of women's agency, bargaining power within the household or economic independence, or that the returns to additional years of education are low for women, and therefore not significant to contribute to reduce the incidence of the VAT on women.

Regarding urban areas, table 5. Shows that for all the models, the coefficients of β_1 are statistically significant at 99 percent. For urban areas β_1 in model (4) indicates for each additional increase in the of women as a proportion of the total number of individuals over 12 years old in a household, the incidence of the VAT increases on average by 0.47 percent points, holding the sex composition ratio of individuals under 12 years, dependency rate and average years of education of women over 25 years, constant.

Table 5. OLS Coefficients of model predicting the Log VAT Ratio (VAT as a proportion of Income in Nicaragua) for 2014- Urban Areas

	Model 1	**Model 2**	**Model 3**	**Model 4**
Ratio Women Over 12 (#W/ #M+#W)	0.337***	0.523***	0.478***	0.47***
	(0.048)	(0.07)	(0.072)	(0.075)
Ratio Women Under 12 (#W/ #M+#W)		0.01	0.004	0.025
		(0.03)	(0.032)	(0.033)
Dependency Rate (dependent/active) *100			0.001***	0.001***
			(0.0002)	(0.0002)
Average years education women over 25				0.027***
				(0.003)
Intercept	0.831***	0.73***	0.67***	0.426***
	(0.028)	(0.04)	(0.045)	(0.052)
R^2	0.01	0.0124	0.0185	0.041

Notes: N= 1321; EMNV 2014; Standard errors in parentheses

*p<0.1, **p<0.05, ***p<0.01.

The coefficient β_1 for urban areas indicates that the differentiated effect of the VAT is lower in urban area compared to rural ones. The lower β_1 coefficient for urban areas compared to rural ones could be reflecting the differences in income for both residential areas, since on average the income in urban areas is higher comparted to rural areas, this may be reducing the burden of the VAT as a share of the total income, therefore reducing its incidence.

In general terms, for urban areas the same pattern of β_2, β_3 and, β_4 estimates were found in terms of

significant and relationship compared to rural. β_2 was found to be statistically insignificant. The estimates of $\beta_3$were found to be significant at 99 for all the proposed models, indicating that each additional percentage point in the dependency rate, the incidence of the VAT in the household increases by 0.001 percent points. Regarding the estimates for β_4, the same conclusions were achieved for rural areas, either years of education is not a good proxy for women's agency or, the returns to additional years of education for women are low and therefore not significant to contribute to reduce the incidence of the VAT on women.

Robustness check were made for both rural and urban areas, to identifies if the results holds when using different ages for the sex composition ratio. The results are explained in tables 4. and 5. of the appendix section and confirms the consistency of the results.

Finally, the statistical significance of the results shown in the above-mentioned models for rural and urban areas in Nicaragua could indicate that the gender and VAT incidence have a causal relationship, and therefore, this in addition with the descriptive and qualitative analysis of the preferential treatment of the VAT, confirms the hypothesis of the research that "Due to gender differences in consumption expenditures, the incidence and burden of the Value-Added Tax is higher for women compared to men in Nicaragua

Conclusions

The results of the research suggest that there is implicit bias in VAT structure of Nicaragua which results in a positive association between the sex ratio composition and the incidence of the VAT, therefore the tax represents heavier burden for female majority households, both, in rural and urban areas. These results hold significant when controlling for the sex composition ratio of children, the dependency rate and the average years of education for women over 25 years old, as well as when robustness checks were implemented.

The analysis of the descriptive statistics of the data confirms that men and female tend to present different pattern of consumptions associated with their gendered social roles. Households characteristics such as household annual income, dependency rate and years of education, varies for female and male majority household, which were found to be important explanatory factors for the differentiate incidence of the VAT for both type of sex composition families.

Finally, even when preferential treatment of some products of the consumption basket, mainly related to food is observed, which certainly is an important element that reduced the incidence of the VAT and therefore protect households from carrying a high share of the indirect tax burden. Other important products for household consumption such as clothe, home equipment, home improvement and basic care and cleaning household's goods, were not subjects to this preferential treatment, even when according to the data, those types of expenses represents a very high share of household spending, especially in female-majority household which suggest the presence of gender implicit bias.

Recommendations

The findings suggest that, either zero-rating, exempting or promoting differentiated rates, would result in a decrease in the differentiated incidence of the VAT between female and male majority households, as well as improve the purchasing power of poorer quintiles.

The results of the research suggest that there are four important determinant of the differentiated incidence of the VAT by gender, which are house improvements, house equipment, clothes and house care products. Therefore, in order to promote substantial decrease in the differentiated incidence of the VAT by gender, the research suggest to revisits the preferential treatment of the VAT, with special attention to the above mentioned four type of expenses.

In a similar vein to reducing taxes on necessities or merit goods that are consumed relatively more intensively by female-majority households, one could estimate that by raising taxes on luxury or demerit items where incidence falls more heavily on male-majority households to finance the policy changes suggested above. However, one needs to be very cautious here given that we are not able to estimate the gender incidence of indirect taxes within the household or to measure any behavioral change following a tax policy adjustment.

However, any change to the indirect tax system that benefits female-type households needs to be evaluated against the trade-off introducing further horizontal inequity (and complexity) into the indirect tax system.

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7. Appendix

Table 1. Average monthly salary by type of economic activity

Description	Men	Women
Community, social and personal health services	9, 220	8, 490
Manufacture and industry	7, 938	5, 998
Commerce	9, 012	7, 126
Agriculture, sylviculture, and fishery	5,178	4, 184
Financial services	9, 653	12, 543

Monthly salary in current cordobas (29.8 cordobas per 1 US dollar)

Source: INIDE, Annual Statistics 2014.

Table 2. Average dependency rate and years of education by sex for rural areas

Household Averages	Female Majority	Male Majority
Dependency Rate	98.6	73.72
Years of education for women over 25	4.41	3.68

Source: INIDE, Annual Statistics 2014.

Table 3. Average dependency rate and years of education by sex for urban areas

Household Averages	Female Majority	Male Majority
Dependency Rate	90.62	71.4
Years of education for women over 25	7.55	6.41

Source: INIDE, EMNV, 2014.

Table 4. Robustness Checks. OLS Coefficients of model predicting the Log VAT Ratio (VAT as a proportion of Income in Nicaragua) for 2014- Rural Areas.

	Model 1	Model 2
Ratio Women Over 10 (#W/ #M+#W)	0.51**	
	(0.18)	
Ratio Women Under 10 (#W/ #M+#W)	0.07	
	(0.07)	
Ratio Women Over 15 (#W/ #M+#W)		0.70***
		(0.20)
Ratio Women Under 15 (#W/ #M+#W)		0.10
		(0.10)
Dependency Rate (dependent/active)*100	0.001***	0.001***
	(0.00)	(0.00)
Average years education women over 25	0.05***	0.05***
	(0.01)	(0.01)
Intercept	0.05	-0.08
	(0.12	(0.12)
R^2	0.10	0.10

Notes: N= 1321; EMNV 2014; Standard errors in parentheses

*p<0.1, **p<0.05, ***p<0.01.

Table 5. Robustness Checks. OLS Coefficients of model predicting the Log VAT Ratio (VAT as a proportion of Income in Nicaragua) for 2014- Urban Areas.

	Model 1	Model 2
Ratio Women Over 10 (#W/ #M+#W)	0.26***	
	(0.11)	
Ratio Women Under 10 (#W/ #M+#W)	-0.01	
	(0.03)	
Ratio Women Over 15 (#W/ #M+#W)		0.41***
		(0.01)
Ratio Women Under 15 (#W/ #M+#W)		0.005
		(0.04)
Dependency Rate (dependent/active)*100	0.002***	0.001***
	(0.00)	(0.00)
Average years education women over 25	0.01	0.012***
	(0.004)	(0.00)
Intercept	0.75***	0.64***
	(0.10)	(0.06)
R^2	0.02	0.02

Notes: N= 1321; EMNV 2014; Standard errors in parentheses

*p<0.1, **p<0.05, ***p<0.01.