

# How do remittances impact domestic taxes revenues in countries affected by ethnic conflict?

BANAO FAWZI DJARAZEMI YVES<sup>1</sup>

*Preliminary version, please do not quote or share*

## ABSTRACT

This paper analyzes the impact of remittances inflows and ethnic conflict onset on domestic taxes in African countries. We find a positive marginal effect of the onset of ethnic conflict on remittances impacts both direct and indirect taxes revenues. Indeed in countries affected by war, the government raises state capacity to levy more tax revenues. Consequently, the remittances inflows are more absorbed in domestic taxes revenues through direct and indirect taxes during the war. Also, our findings show that globalization improves the impact of remittances inflows on domestic taxes in countries affected by ethnic conflict.

JEL Classification: F24; H20; H70; D74.

Keywords: Domestic taxes revenues, Indirect taxes, Direct taxes, Remittance inflows, Ethnic conflict onset

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<sup>1</sup> Ph.D. candidate. Université Clermont Auvergne, CNRS, IRD, CERDI, F-63000 Clermont-Ferrand, France /Université Libre de Bruxelles, DULBEA CP 140, avenue F.D. Roosevelt 50, 1050 Bruxelles, Belgium

# I. INTRODUCTION

The World Bank estimated migrant remittances in 2019 to be around \$551 Billion to low and middle countries and \$105 Billion to Africa. Due to the raising of remittances inflows over the past decade, scholars have studied the impact of remittances in terms of economic growth, poverty, and taxation. In this way, there is emerging literature about the relationship between remittances and tax mobilization. Indeed, authors as *Gnagnon et al. (2020)* have argued that remittances inflows increase the fiscal space in developing countries. Also, *Ebeke (2011)* showed that remittances increase tax revenue by VAT. Findings were confirmed by *Asatryan et al. (2017)*, who demonstrated that Remittances strongly increase VAT revenues. In sum, most studies have shown a positive relationship between remittances and taxes.

Tax mobilization is a challenge, especially to countries affected by conflict. However, the impact of conflict on tax revenues is ambiguous. At first, the onset of conflict may encourage the government to collect more taxes, (*Addison et al., (2002)*). During the conflict, the state must raise the tax revenue to face the cost of war. On the contrary, the war could lower the state's capacity to mobilize taxes revenues by the deterioration of fiscal administration and the losing of territory, (*Tilly, (1985)*). Consequently, the conflict can enhance or inhibit tax revenues and, in the same way, the link between remittances and domestic taxes through the transmission channels such as direct and indirect taxes.

In this framework, we formalized a research question: How do remittances impact direct and indirect taxes revenues in countries affected by ethnic conflict?

We contribute to improving theoretical literature, empirical literature, and public policy literature. In a first literature contribution goal, the study explains both mechanisms and channels of the conditionals effect of ethnic conflict onset on remittances impact in domestic taxes. Notably, African countries are faced with three challenges. At first, domestic resources mobilization is an aims challenge of most African countries to reduce their vulnerabilities to macroeconomics shocks as the variability of natural resources revenues. Secondly, with more than 3.000 ethnic groups, African states are frequently confronted with ethnic clashes. Moreover, we improve the empirical literature contribution on tax mobilization, by using updated and disaggregated domestic tax (indirect taxes and direct taxes) for 53-panel African countries from 1997 to 2019. Lastly, in a public policy goal contribution, we implement a sensitivity test by comparing our estimates countries with a trade openness policy against countries with autarky trade policy.

Our results reveal that the marginal effect of ethnic conflict is positive on remittances inflows impact on domestic taxes. Countries affected by conflict are more constraint to mobilize taxes revenues. Consequently, the remittances inflow is more captured by domestic taxes revenues through indirect and direct taxes during the conflict. Moreover, we show that in countries affected by ethnic conflict and high trade openness, the impact of remittances on domestic taxes is more significant than in autarky countries.

The remaining of the paper is organized as follows. Section 2 reviews literature and a theoretical assumption on the relationship between remittances and tax mobilization; and explain the transmission channel of the conditional effect of conflict on migrant remittances. Data description and identification strategies are presented respectively in Section 3. In Section 4, we present the main findings. Section 5, presents a sensitivity test. In Section 6 presents some robustness checks and Section 7 concludes.

## **II. Theoretical Framework: Mechanisms and contribution to the literature**

First, this section undertakes a brief review of related studies from empirical standpoints on the channels through remittances impact on domestic taxes revenues. Secondly, we present the theoretical assumption of the conditional effect of conflict on the link remittances-domestic taxes revenues.

### **1. Remittances and Domestic taxes Revenues**

Migrant remittances operate on domestic taxes revenues through two main channels.

Firstly, remittances affect tax revenues through households' consumption. Indeed, migrant remittances are mainly spent on food, clothing, and health expenses by households (*Savage et al., (2007)*). For instance, *Castalado et al. (2012)* have investigated Ghanaian households. They attested that remittances are primarily used for consumer needs. In this way, remittances are captured by tax revenues through VAT and excise tax (*Combes and al., (2011)*). Indeed, by studying the relationship between remittances inflows and tax revenues, *Ebeke (2012)* used empirical tools to show that remittances positively affect tax if there is VAT.

The second channel of remittances' effect on tax revenues concerns households' investment. Indeed, remittances increase the private savings of households (*Adams et al., (2008)*). *Baldé (2011)* has shown that raising 1 percent of remittances increases households' private savings by 0, 65 percent in Sub-Saharan countries. To support this point of view, *Munir et al., (2011)* have argued empirically that remittances positively impact private savings in countries affected by conflicts such as Pakistan both in the long run and the short run. In the same way, *Koska et al. (2013)* have found that remittances increase private savings for households. The raising of private savings generates by remittances encourages households to invest. Indeed, as remittances are received directly by households, poor households invest in entrepreneurship and small businesses for poor households (*Kakhkharov. J, 2019*). The investment effect of remittances raises firms' performance and positively impacts direct tax revenues by income taxes. *Kabinet et al., (2021)* prove that international remittances positively affect manufacturing and non-manufacturing firms, respectively, by the share of capital and sales. Moreover, rising remittances inflows increase the banking sector by the higher liquidity and money deposits. The involvement of residues accounts and transactions by households raises bank and tax revenues from the banking sector.

## **2. Remittances and domestic taxes revenues in countries affected by conflict**

In countries affected by conflict, the relationship remittances-domestic taxes revenues is mixed.

Firstly the war may increase the impact of remittances on domestic taxes revenues. During the conflict, the government raises the tax rate to be faced with war, such as military spending, (*Ertman, (1997)*). Indeed, the government must involve the total amount of tax revenues to finance the cost of war, (*Ertman (1997)*). To do it, the government can call to 'fiscal sacrifice'. For instance, during World War II American congress instituted a war tax policy to significantly involve government revenues, (*Bank et al., (2008)*). The participation of citizens in fiscal sacrifice encourages tax obligation and taxpayers' willingness to the war effort. *Feldmand and Slemrod (2009)* proved a positive relationship between tax compliance and conflict to support this point of view.

Moreover, *Addison et al. (2002)* found that intra-state conflicts encourage tax collection. *Brewer, (2001)* attested that taxation increased the efficiency of state administration during the war. Consequently, the remittance inflows received by

households can be more absorbed by domestic tax revenues through the consumption tax revenues in countries affected by conflict compared to countries in peace.

In the same way, the raising of the tax rate in a goal of tax mobilization, absorb more income tax revenues during conflict: remittances sent by migrants positively affects firms performances (sales and the share of capital) and is more captured by tax revenues through income taxes payments in countries affected by conflict compared to countries without conflict.

In sum, 1\$ sent by migrant remittances will be more captured on domestic tax revenues through direct and indirect taxes in countries affected by conflict than countries in safe because the government implements tax policy to raise revenues.

Conversely, the conflict can decrease the impact of remittances on domestic taxes. *Besley et al. (2007)*; *Van Den Boogaard et al. (2016)*, attested that civil war reduces the state capacity to collect tax compared to countries without conflict. In the same way, *Dama, (2021)* shows that the outbreak of violent conflict generates a losing of 1.5 percent of tax revenues in Sub-Saharan countries. Moreover, *Gupta and al., 2002* have evaluated that conflict decreases tax effort<sup>2</sup>. Also, domestic tax revenues can decrease because the government relies on resources taxes revenues (*Jensen, 2011*). The war hindered tax reform, especially at customs administration, to raise fiscal capacity (*Tilly, (1985)*). Consequently, the consumption tax revenues generated by remittances will be less captured in countries affected by conflict.

Moreover, war generates infrastructures deterioration and economic activities, recession, and fall in investment. This harmful effect of war on the economy decreases firms' performance and social affairs. In this way, the negative impact of conflict may reduce the impact of remittances on direct taxes revenues through investment.

Overall, conflicts have an ambiguous effect on the relationship between remittances and domestic taxes revenues. On the one hand, war can boost the impact of remittances on domestic taxes because governments increase tax rates to mobilize more revenues. On the other hand, the effect of conflict may decrease the state's fiscal capacity.

The goal of the paper is to respond to this issue.

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<sup>2</sup> The tax effort is defined as the ratio of resources collected by the government compared to resources produced domestically (*Brun et al., (2011)*).

### III. DATA DESCRIPTION AND EMPIRICAL STRATEGY

#### 1. EMPIRICAL STRATEGY

To answer questions about how migrant remittances impact domestic taxes revenues (indirect and direct taxes) during the onset of ethnic conflict, this article adopts the empirical approach of *Zareh and al. (2017)* specified as

$$\ln DOMTAX_{it} = \alpha + \eta_i + \theta \ln DOMTAX_{it-1} + \beta_1 REMIT_{it} + \beta_2 ETH_{it} + \beta_3 (REMIT_{it} \times ETH_{it}) + \sigma' X_{it} + \varepsilon_{it}$$

DOMTAX= INDIRECT TAXES or DIRECT TAXES

Where DOMTAX represents the dependent variables (DIRECT or INDIRECT TAXES); REMIT represents personal remittances received in percent of GDP of the country  $i$  at time  $t$ .  $ETH_{it}$  is a binary variable indicating ethnic conflict onset, it takes 1 where ethnic conflict onset and 0 otherwise. It has been extracted from UCDP Armed Conflict Dataset. The term  $\eta_i$  is the country-specific effect,  $\varepsilon_{it}$  is the unobserved random error term. The vector  $X$  represents the set of control variables and  $\sigma'$  is the associated vector of parameters.

Note the signs of the coefficients of the interaction term, evaluate if the interaction of conflict on remittances enhances or distorts the impact of remittances on domestic taxes revenues.

$$\frac{\partial \ln DOMTAX}{\partial \ln REMIT} = \beta_1 + \beta_3 ETH$$

So, if  $\beta_3 > 0$  it implies that ethnic conflict is an enhancer of remittances on domestic taxes. However, if  $\beta_3 < 0$  the overall impact of remittances on domestic tax depends on the magnitude of the negative. If the negative sign of  $\beta_3$  outweighs the positive sign of  $\beta_1$  then ethnic clashes distort the impact of remittances on Indirect or Direct taxes. On the contrary, if the negative sign of  $\beta_3$  is less than the positive sign of  $\beta_1$  it implies that the distortionary influence of ethnic conflict is not sufficient to inhibit the positive

effect of REMITTANCES on DOMESTIC TAXES REVENUES. Finally, if  $\beta_3 = 0$  it is an indication that the interaction of ETHNIC CONFLICT with REMITTANCES has no significant impact on DIRECT or INDIRECT TAXES.

Concerning our empirical specification, it may be existing some endogenous issues. Firstly, about the relationship between domestic taxes and remittances, the government can implement some fiscal policies on consumption to capture more remittances inflows. Nevertheless, when fiscal space increases, the government increases social spending and therefore may reduce migrants' incentives to send remittances, (*Gnagnon and al, (2020)*). Also, as mentioned above, remittances act on domestic taxes through indirect and direct taxes.

Likewise, a better tax mobilization can improve public spending on the social goods of the government. The raising of public goods may reduce grievances and the likelihood of ethnic onset. However, conflict could act on domestic taxes revenues by leading the government to raise taxes revenues for war spending, (*Besley, (2008)*).

To deal with the endogeneity issue between domestic taxes and remittances, and domestic taxes and conflict we use unbalanced panel data from 1997 to 2019 with a two-step system Generalized Methods Moments (GMM) estimator *from Blundell and Bond (1998)*. The two-step system GMM estimator contains equations in differences and levels with the first-difference equation. The validity of the model is confirmed by Hansen/Sargan Test and Blundell and Bond test of the presence of first-order serial correlation in the error term and no second-order autocorrelation in the error term respectively denoted AR (1) AR (2). This estimator is more useful for large cross-sections. It helps to address endogeneity issues and omitted variables bias/reverse causality issues. Moreover, the GMM estimator is more adapted in presence of heteroskedasticity problems compared to instrumental variables (*Baum and al. 2003*). In this way, after a Breush-Pagan test, we detect a presence of arbitrary heteroskedasticity<sup>5</sup>.

Also, to deal with the endogeneity issue between domestic taxes and remittances, and domestic taxes and conflict we additive some controls variables.

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<sup>5</sup> TABLE 10

## 2. VARIABLES AND DATA DESCRIPTION

In this section, we describe variables of our database

Data on Remittances Inflow come from the World Bank database, which measures Personal's remittances per capita, received (% GDP) noted "**REMITTANCES**". Data on Domestic tax have been extracted from International Centre for Tax and Development (ICTD) and UNU-WIDER dataset. We use both Indirect taxes and Direct Taxes as government domestic taxes revenues. Indirect tax measures total taxes on goods and services, which include sales taxes, excise taxes (% GDP) noted "**INDIRECT TAXES**". Direct tax measures Total taxes on income, profits, and capital gains, including taxes on natural resource firms (% GDP) noted "**DIRECT TAXES**". We have an interaction term between civil fatalities and personal remittances). The variable "**REMITTANCES\*ETHNIC ONSET**" is an interaction between ethnic conflicts and personal remittances. The ethnic conflict onset noted "**ETHNIC ONSET**" is a binary variable indicating ethnic conflict onset. It takes 1 where ethnic conflict onset and 0 otherwise. It has been extracted from UCDP Armed Conflict Dataset.

As control variables, we use trade openness which is the sum of exports and imports of goods and services (% GDP) noted "**TRADE**". According to previous studies, trade openness positively influences tax. Indeed, some authors as *Cage and al. (2018)* showed that trade openness in developing countries involves a falling of tax by fiscal space. However, there is a positive relationship between remittances inflows and trade openness: trade openness boosts the consumption of foreign goods. It stimulates households' demand for migrant remittances (*Miao et al., (2021)*).

Moreover, we additive the Exchange Rate, extracted from the World Bank database: real official exchange rate (LCU per US\$); noted "**EXCHANGE**". The exchange rate is one of the variables considered a determinant of taxation. However, the effect of the exchange rate on domestic tax is mitigated. Indeed, a depreciation of the currency increase imports and international trade tax. On the contrary, the currency's appreciation leads to a decrease in excise taxes (*Fishlow, (2014)*).

We use the corruption index to proxy institutional quality noted "**CORRUPTION**". It measures transparency, accountability, and corruption in the public sector rating noted. Indeed, *Gnangnon et al. (2020)* found that more institutional quality is better, more tax is collected with the raising of the fiscal base. The access to remittances inflows raise the effortlessness of government and increase the inefficiency of public investment (*Berdiev et al., (2013)*).



Also, we use a measure of inflation by consumer price index (annual %) noted **“INFLATION”**. The relationship between inflation and tax is ambiguous. Indeed, inflation can increase tax and decrease public debt by appreciating the real exchange rate. On the contrary, inflation can generate a Tanzi effect. The Tanzi effect is an economic situation where the inflation rate reached thresholds that involve the deterioration of tax collection volume (*Tanzi, (1980; 1997)*). In addition to the relationship between inflation and tax, there is a link between inflation and remittances. Indeed, the devaluation of domestic currency involves raising remittances demand by households in developing countries (*Barua, (2007)*). The control variables also include the indicator of gross domestic product per capita (constant 2010 US\$) noted **“GDP”** .

We additive, a variable of democratic accountability noted **”DEMOCRATIC ACCOUNTABILITY”**: it measures the level of the democratic political regime of government. Data have been extracted from the International Country Risk Guide (IRCG). Concerning the relationship between domestic taxes and political regimes, government revenues rise with democratic regimes than dictatorships (*Mitra et al., (2002)*). Moreover, we can note a link between remittances and political regimes. The adoption of democratic governance involves government spending; in consequence, it decreases the demands of migrant remittances (*Deonanan et al., (2017)*).

To finish, we also use as control variable Agriculture value added (% of GDP) **“AGRICULTURE”**. The harder to tax the agriculture sector caused by the dispersion of farmers and the shadow economy reduce the taxpayers in Africa (*Leuthold, (1991)*). Consequently, we expect that the size of the agricultural sector reduces tax. It existing a reversibility causality between remittances and agriculture sharing. The raising of remittances inflows increases the income of households and agriculture productivity by the investment in agriculture input by households. However, the raising of agriculture productivity involves the living standard of households and reduces the demands of remittances inflows (*Kapri and al., (2020)*).

Table 1 reports descriptive statistics. It shows that the average of remittances inflows in Africa is 3.447 percent of total GDP. Data reveals that Indirect taxes are more collected than Direct taxes. Indeed, the mean value of Indirect taxes is 0,085 percent of GDP against 0,049 percent of GDP for Direct taxes. Concerning the ethnic onset database, we note 953 observations where 1 means that country is affected by ethnic conflict onset, and 0 otherwise.

**TABLE 1: Descriptive Statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
INDIRECT TAXES	963	.085	.05	.004	.486
DIRECT TAXES	801	.049	.034	.001	.171
REMITTANCES	1111	3.447	6.543	0	87.56
ETHNIC ONSET	953	.025	.157	0	1
INFLATION	1126	9.595	29.73	-9.798	513.907
AGRICULTURE	1154	20.897	14.335	.893	79.042
TRADE	1125	73.114	39.703	16.141	347.997
DEMOCRATIC ACCOUNTABILITY	851	3.07	1.233	0	5.5
CORRUPTION	851	2.008	.784	0	5
EXCHANGE RATE	1242	66.332	12.232	42.39	90.34
GDP PER CAPITA	1188	2477.243	3097.82	187.517	20532.98

**Note:** The variables and data source are described

### 3. Stylized Facts

This section discusses some stylized facts that characterize the domestic taxes revenues in times of peace and during ethnic conflict times. The statistic covers 53 African countries from 1997 to 2019. We use 53 African countries because African countries are both affected by a growing of remittances inflows and ethnic conflict incidence. Also, the choice of 1997 to 2019 is influenced by the fact that remittances and domestic taxes data have been less missing in this temporal scale. Moreover, according to the “*Global Economic Prospect report*” to the World Bank Group, the quality of remittances data has improved since 1997.

Figure 1 below shows the higher direct taxes revenues during ethnic conflict (3%) than countries without conflict (1%). Moreover, we note a raising of direct taxes revenues to 1,7 percent contrary to 0,5 percent in times of peace. Data shows that domestic taxes are more captured in war than peace times. The war economy is an incentive for

a state to collect more domestic revenues. The raising of tax rates affects both the weight of direct and indirect taxes.

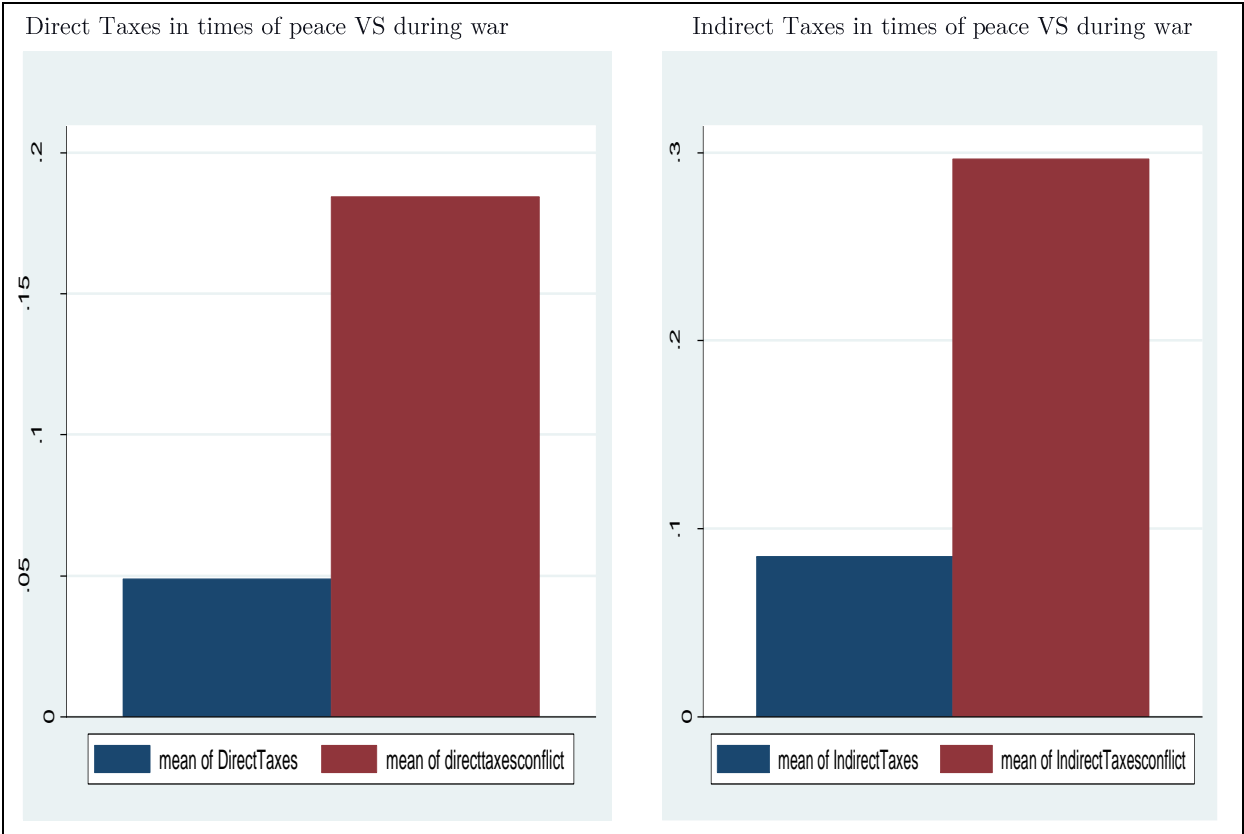


FIGURE 1: Domestic Taxes Revenues in times of peace VERSUS during war

## IV. RESULTS AND DISCUSSION

This section<sup>7</sup> presents the empirical findings which fill gaps about migrant remittances and conflict impact on domestic tax literature in Africa.

The results of first column (1) show that remittances are a statistically and significant positive predictor of indirect taxes: raising 1 percent of remittances inflows increases indirect taxes to 0,017 percentage points. Like the results of *Ebeke (2011)* and *Abdig et al. (2012)*, remittances are generally spent for consumption. Most of the remittances received are invested in consumer channels in food or clothing. Also, *Ebeke (2014)* confirmed that remittances affect government revenue more in the presence of VAT.

For ethnic conflict onset, the results are consistent with previous studies. We find that a one percent increase in ethnic conflict lowers indirect taxes to 0,23 percent.

Indeed, ethnic conflicts can be interpreted as struggles for the collective goods of the nation-state. Ethnic clashes reduce indirect taxes because ethnic polarization influences the vulnerability of the tax effort<sup>8</sup> by reducing both GDP per capita and real per capita income (*Youyou, (2017)*). Moreover, *Bestley and al (2007)* indicated that conflict reduces the state capacity to collect tax compared to countries without conflict. Also, some authors have attested that conflict decreases tax effort. For instance, *Gupta and al., (2002)* argued that conflicts significantly reduce tax mobilization. The second column shows that migrant remittances positively impact direct taxes during ethnic conflicts. A raising of one percent of remittances involves 0,046 percent of direct taxes. In the same way as previous studies, our findings confirm the positive relationship between direct taxes and remittances. The financial support of migrant support household's savings and investment.

Concerning controls variables, we found that agriculture value added, corruption significantly reduce indirect and direct taxes. However, we discovered that inflation increases direct taxes in the second column. Indeed, the inflation rate decreases the budget deficit and may increase the tax effort of the state. In consequence, it encourages investment and entrepreneurship that enhance direct taxes collection.

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<sup>7</sup> Results are grouped in column (1) for indirect taxes and column (2) for direct taxes.

<sup>8</sup> Tax effort is defined by the ratio between the share of actual tax revenues in GDP and the taxable capacity (*Le et al., (2012)*).

**TABLE 2:** EFFECT OF REMITTANCES AND ETHNIC CONFLICT ON DOMESTIC TAXES

	(1)	(2)
	INDIRECT TAXES, log	DIRECT TAXES, log
INDIRECT TAXES (-1),log	1.0022*** (0.0245)	
REMITTANCES, log	0.0179** (0.0066)	0.0460*** (0.0154)
REMITTANCES*ETHNIC ONSET	0.0452** (0.0192)	0.0981** (0.0457)
ETHNIC ONSET	-0.2394* (0.1256)	-0.5173* (0.2830)
CORRUPTION, log	-0.0947** (0.0397)	-0.1705** (0.0710)
AGRICULTURE, log	-0.0971*** (0.0249)	-0.1275 (0.0882)
GDP, log	-0.0967*** (0.0281)	0.2268* (0.1146)
INFLATION, log	-0.0085 (0.0069)	0.0371** (0.0168)
DEMOCRATIC ACCOUNTABILITY, log	0.0060 (0.0077)	0.0269** (0.0115)
EXCHANGE RATE, log	-0.2217** (0.0862)	-0.1185 (0.2334)
TRADE, log	0.0301 (0.0451)	-0.0271 (0.0639)
DIRECT TAXES (-1),log		0.7301*** (0.0724)
_cons	1.8460*** (0.6253)	-1.3228 (1.7386)
<i>OBSERVATIONS</i>	435	354
Arellano-Bond test for AR (1)	0.0111	0.0018
Arellano-Bond test for AR (2)	0.3609	0.4261
Hansen test	0.7205	0.2669
Number of id	31	29

### Interpretation of marginal effect of ethnic conflict on migrant remittances:

Taking partial derivatives of the estimates reported in column (1) of Table 1 with respect to remittances:

$$\frac{\partial \ln \text{INDIRECT TAXES}}{\partial \ln \text{REMITTANCES}} = 0,017 + 0,04 \text{ ETHNIC CONFLICT}$$

This equation implies that at zero ethnic conflict, the estimates in column (1) predict a positive response of indirect taxes to remittances; moreover, the equation suggests a positive and significant response when ethnic conflict takes 1. Results of column (1) have been complemented by plotting the marginal effect of ethnic conflict on migrant remittances as a function of indirect taxes for each observation in the sample. The plot shows that the marginal impact of ethnic conflict increases with migrant remittances.

It means that the ethnic conflict onset is an enhancer of remittances' impact on domestic taxes revenues. Moreover it suggests that in countries affected by ethnic conflict, remittances inflows are more captured by indirect taxes.

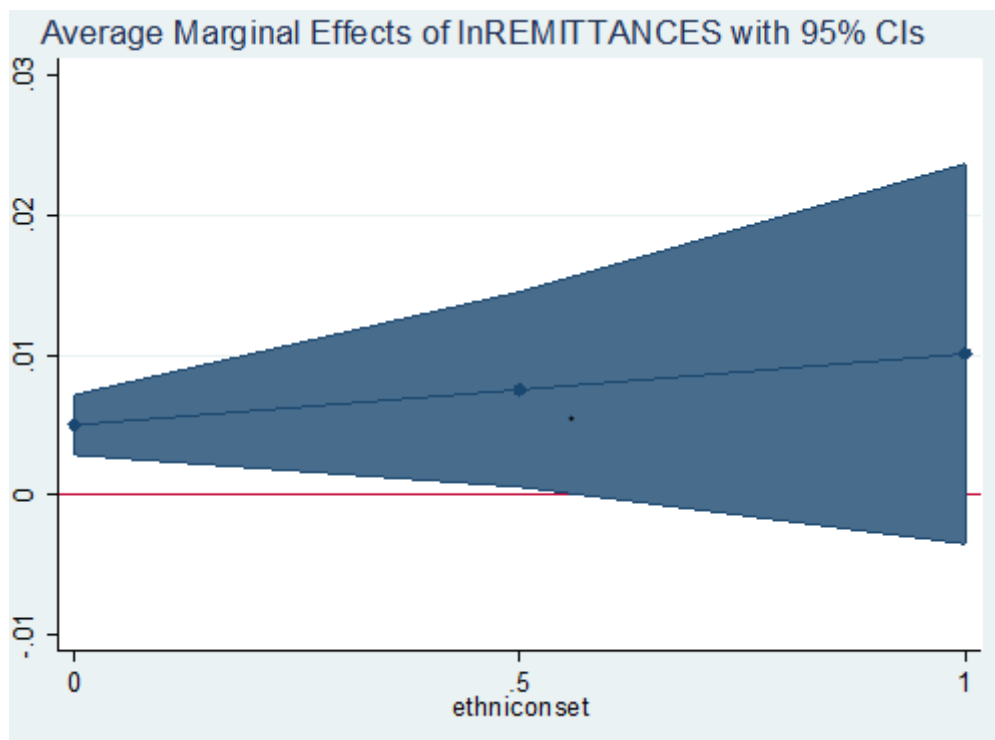


Figure 3: Plotting of Marginal effect of ethnic conflict on migrant remittances

## V. SENSITIVITY TEST: OPENNESS COUNTRIES VERSUS AUTARKY COUNTRIES

Globalization plays an essential macro-economic role both on tax mobilization and remittance inflows. Indeed, globalization can positively affect remittances inflow because it improves the liquidity and bank system, especially in developing countries, *Dastidar et al., (2017)*. In consequence, the growth of the banking sector raises the capital allocation and efficiency of investment. Also, some authors have attested that trade openness improves tax mobilization. For instance, *Cameroon(1998)* showed that between 1960 and 1975, trade openness have positively impacted the government's tax revenue in OCDE<sup>12</sup> countries. Moreover, Miao and al, (2021) have attested a positive relationship between trade and migrant remittances.

In contrast, a trade openness policy can decrease resources mobilization in developing countries caused by the falling of customs and tariff duties.

In looking at the challenge of openness of globalization to African countries, we will apply our estimate on both a sample with a high trade openness policy and countries with a trade policy of autarchy. The sample of countries that promote openness comprises 50% of countries with a high value of the trade variable. Likewise, the sample of countries with trade autarchy policy is 50% of countries with a low weight of the same variable.

Table 3 & Table 4 report the results of the present sensitivity test. Table 3 shows a positive and significant effect of remittances on indirect taxes in countries with an open trade policy and autarky countries. Moreover, we found a positive and significant impact of interaction terms such as remittances and ethnic conflict on indirect taxes, only in countries that promote high openness trade. It means that in countries with a high trade openness policy and affected by ethnic conflict, the effect of remittances on indirect taxes is positive. The trade openness increases the availability of consumer goods, which enhances households to consumption. The raising of domestic consumption enhances tax revenues. Indeed, in high openness countries, the availability of goods, associated with remittances inflow, improves households' income and generates indirect taxes in conflict-affected by ethnic conflict. The war economy reduces the domestic production by firms. In this way, in times of conflict, the raising of remittances inflows demands caused by the falling of household consumption enhances foreign goods' demands. Consequently, the raising of importation and remittances

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<sup>12</sup> Organization for Economic Co-operation and Development (*OECD*).

inflows involves customs duties and tariff taxes. Also, Remittances inflows improve the tax revenues of indirect taxes by the international trade tax.

Table 4 shows a positive and significant impact of migrant remittances on direct taxes in countries with high openness. Moreover, we found that remittances and ethnic conflict impact direct taxes in countries with high economic openness than autarky countries. Globalization improves the technology transfer to firms in developing countries, (*Redor et al., (2011)*). To support this point of view, *Karadagli (2012)* has shown that globalization increases firms' performance in developing countries. In this way, firms will be more resilient to shock in countries with high economic openness in countries affected by conflict. The openness improves income redistribution and reduces the risk of ethnic clashes onset.

To finish, the economic openness improves the income redistribution and the risk of ethnic clashes onset. We can conclude that openness is a lubricant of remittances impact on domestic taxes in countries affected by ethnic conflict.



**TABLE 3: EFFECT OF REMITTANCES AND ETHNIC CONFLICT ON INDIRECT TAXES**

	(1)	(2)
	OPENESS COUNTRIES	AUTARKY COUNTRIES
INDIRECT TAXES (-1),log	0.9909*** (0.0287)	1.0119*** (0.0474)
REMITTANCES, log	0.1018*** (0.0205)	0.0187** (0.0087)
REMITTANCES* ETHNIC ONSET	0.1383*** (0.0387)	-0.2949 (0.3891)
ETHNIC ONSET	-0.9055*** (0.2451)	-0.1608 (0.1212)
CORRUPTION, log	0.0075 (0.0865)	-0.0541 (0.0430)
AGRICULTURE, log	-0.1145* (0.0598)	-0.0227 (0.0858)
GDP, log	-0.1037 (0.0627)	-0.0038 (0.0908)
INFLATION, log	0.0115 (0.0077)	-0.0047 (0.0109)
DEMOCRATIC ACCOUNTABILITY, log	0.0523*** (0.0163)	-0.0132 (0.0091)
EXCHANGE RATE, log	-0.1752 (0.2358)	0.0982 (0.1108)
TRADE, log	-0.2148 (0.1351)	0.0592 (0.0619)
<b>_cons</b>	2.3435 (1.5766)	-0.4435 (1.2249)
<i>OBSERVATIONS</i>	212	223
Arellano-Bond test for AR (1)	0.043	0.0177
Arellano-Bond test for AR (2)	0.8877	0.2817
Hansen test	0.7574	0.7828
Number of id	28	28

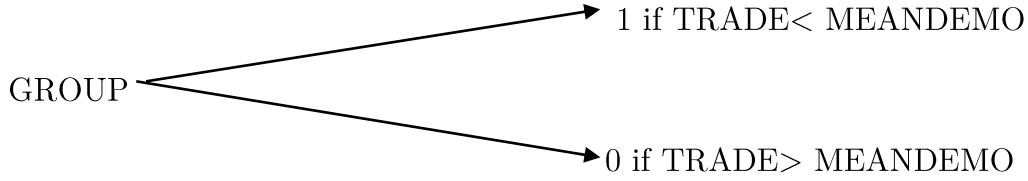
**TABLE 4:** EFFECT OF REMITTANCES AND ETHNIC CONFLICT ON DIRECT TAXES

	(1) OPENESS COUNTRIES	(2) AUTARKY COUNTRIES
DIRECT TAXES (-1),log	0.5100*** (0.1314)	1.0598*** (0.0788)
REMITTANCES, log	0.1244*** (0.0299)	-0.0140 (0.0185)
REMITTANCES*	1.1251*	0.0706**
ETHNIC ONSET	(0.5734)	(0.0279)
ETHNIC ONSET	-0.6017 (0.3668)	-0.5495*** (0.1504)
CORRUPTION, log	-0.2884 (0.2022)	0.0234 (0.0303)
AGRICULTURE, log	-0.1225 (0.1948)	0.0659 (0.0548)
GDP, log	0.3121 (0.2179)	-0.0387 (0.1050)
INFLATION, log	0.0224 (0.0330)	0.0088 (0.0059)
DEMOCRATIC ACCOUNTABILITY, log	-0.0068 (0.0231)	0.0256* (0.0128)
EXCHANGE RATE, log	-0.4146 (0.3416)	-0.2434 (0.2722)
TRADE, log	0.2715 (0.2061)	0.0018 (0.0938)
_cons	-2.6856 (2.2784)	1.1991 (2.0561)
<i>OBSERVATIONS</i>	175	179
Arellano-Bond test for AR (1)	0.0077	0.0173
Arellano-Bond test for AR (2)	0.7086	0.4175
Hansen test	0.8634	0.6173
Number of id	25	25
<i>OBSERVATIONS</i>	18	23

## VI. ROBUSTNESS - STABILITY TEST

This section performs a robustness stability test. To do it, we perform a *Chow test (1960)*. We evaluate the stability of columns (1) and (2) of baseline results (Table2) with the *Chow test (1960)*. We use the empirical strategy adopted by Gould (2005) and *Gaies's (2017)*. In this way, first, we create a group of two binary variables with a trade median. Indeed, to implement this test, we must choose a median of a variable between controls variables as the threshold. We employ "**TRADE**" to assess a potential non-linearity of the association of remittances and conflict on taxation. We use trade because, as mentioned above, openness can increase international trade tax and raise households' consumptions received remittances by involving foreign goods imported.

### STEP 1



Meandemo represents the trade median.

### STEP 2

In the second step of the test, we must estimate two tests with least-squares ordinary estimator:

$$\begin{aligned} \diamond \ln \text{Indirecttax}_{it} = & \alpha + \eta_i + \theta \ln \text{Indirecttax}_{it} + \beta_1 \text{REMIT}_{it} + \beta_2 \text{CONF}_{it} + \\ & \beta_3 (\text{REMIT}_{it} \times \text{ETH}_{it}) + \sigma' X_{it} + \beta_4 \text{MEANDEMO} \times \text{REMIT}_{it} + \\ & \beta_5 \text{MEANDEMO} \times \text{ETH}_{it} + \beta_6 \text{MEANDEMO} \times (\text{REMIT}_{it} \times \text{ETH}_{it}) + \\ & \sigma' \text{MEANDEMO} \times X_i + \varepsilon_{it} \quad (1)^{13} \end{aligned}$$

$$\begin{aligned} \diamond \ln \text{Indirecttax}_{it} = & \alpha + \eta_i + \theta \ln \text{Indirecttax}_{it-1} + \beta_1 \text{REMIT}_{it} + \beta_2 \text{CONF}_{it} + \\ & \beta_3 (\text{REMIT}_{it} \times \text{ETH}_{it}) + \sigma' X_{it} + \beta_4 \text{MEANDEMO} \times \text{REMIT}_{it} + \\ & \beta_5 \text{MEANDEMO} \times \text{ETH}_{it} + \beta_6 \text{MEANDEMO} \times (\text{REMIT}_{it} \times \text{ETH}_{it}) + \\ & \sigma' \text{MEANDEMO} \times X_i + \varepsilon_{it} \quad (2) \end{aligned}$$

---

<sup>13</sup> The model (2) is the dynamic model of (1)

Lastly, After least squares ordinary estimation findings<sup>14</sup>, we must implement the fisher test with  $\beta_4, \beta_5, \beta_6, \theta, \sigma''$  coefficients. To show coefficient stability, Fisher's null hypothesis<sup>15</sup> must be accepted.

**TABLE 5:** FISHER'S TEST RESULTS

<p><b>INDIRECT TAXES ETHNIC WITH LAG</b></p> <p>meandemo = 0  meandemolag_INDIRECT TAXES = 0  meandemoETHNIC ONSET*REMITTANCES = 0  meandemoGDP PER CAPITA = 0  meandemoINDIRECT Taxes = 0  meandemoINFLATION = 0  meandemoEXCHANGE = 0  meandemoCORRUPTION = 0  meandemoREMITTANCES= 0  meanETHNICONSET = 0  meandemoDEMOCRATIE = 0  meandemoAGRICULTURE= 0  meandemoTRADE=0  F( 11, 441) = 38.06  Prob &gt; F = 0.0000</p>	<p><b>INDIRECT TAXES WITHOUT LAG</b></p> <p>meandemo = 0  meandemoETHNICONSET*REMITTANCES= 0  meandemoGDP PER CAPITA = 0  meandemoINDIRECT TAXES= 0  meandemoINFLATION = 0  meandemoEXCHANGES RATE = 0  meandemoCORRUPTION = 0  meandemoREMITTANCES= 0  meanETHNICONSET = 0  meandemoDEMOCRATIE = 0  meandemoAGRICULTURE= 0  meandemoTRADE=0  F( 11, 442) = 46.81  Prob &gt; F = 0.0000</p>
<p><b>DIRECT TAXES WITHOUT LAG</b></p> <p>meandemo = 0  meandemoETHNIC ONSET*REMITTANCES = 0  meandemoGDP PER CAPITA = 0  meandemoDIRECTTAXES = 0  meandemoINFLATION = 0  meandemoEXHCHANGE RATE = 0  meandemoCORRUPTION = 0  meandemoREMITTANCES= 0  meanETHNICONSET= 0  meandemoDIRECT TAXES = 0  meandemoDEMOCRATIE= 0  F( 11, 355) = 33.48  Prob &gt; F = 0.0000</p>	<p><b>DIRECT TAXES WITH LAG</b></p> <p>meandemo = 0  meandemoETHNIC ONSET*REMITTANCES = 0  meandemolag_DIRECTTAXES = 0  meandemoGDP = 0  meandemoDIRECTTAXES = 0  meandemoINFLATION = 0  meandemoEXH = 0  meandemoCORRUPTION = 0  meandemoREMITTANCES = 0  meandemoETHNIC ONSET = 0  meandemoDEMOCRATIE = 0  F( 12, 349) = 16.80  Prob &gt; F = 0.0000</p>

Results confirm the null hypothesis of the fisher test and the stability of coefficients.

<sup>14</sup> TABLE

<sup>15</sup> Null hypothesis confirm coefficients stability

## VII. CONCLUSION

In this paper, we jointly studied the relation between migrant remittances, ethnic conflict, and domestic tax in 53 African countries from 1997 to 2019. Using the GMM-system estimator, first, we found a positive marginal effect of ethnic conflict onset on remittances' impact on domestic taxes. In a theoretical framework, ethnic conflict enhances remittances' impact on direct and indirect taxes. Also, our findings have attested that trade openness increases domestic tax collection in countries affected by ethnic conflict. In sum, results are robustly confirmed by the Chow stability test.

In conflict times, the government's ability to tax collection is limited. In this way, our analysis shows how migrant remittances impact indirect and direct taxes during the ethnic conflict. Results reveal that remittances play a positive role in the tax policy of African countries affected by conflict. Consequently, to better capture remittances inflows, states must increase the domestic tax rate. In this goal, some countries such as Cameroon, Burkina Faso are implanting reforms to tax remittances inflows. The taxation of remittances is considered redistributive taxes. Indeed, migrant remittances involve households income inequalities, especially in rural areas (*Jones et al., (1998)*). In this point of view, the direct taxation of remittances inflows will improve the public investment of states in a redistribution goal. Redistributive taxes on remittances are justified to achieve poverty and inequality, (*Barry et al., (2009)*).

To contribute to the discussion, our findings show that government revenues primarily capture remittances by direct and indirect taxes. It justifies the argument that the state does not need to tax directly migrant remittances.

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## APPENDIX

### MATRIX OF CORELATION

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Direct Taxes	1.000								
(2) Indirect Taxes	0.667	1.000							
(3) Democratic Accountabilty	0.286	0.119	1.000						
(4) inflation	-0.102	-0.294	0.097	1.000					
(5) ethnic onset	-0.069	-0.064	-0.123	-0.039	1.000				
(6) agriculture	-0.676	-0.559	-0.019	0.231	0.007	1.000			
(7) trade	0.190	0.249	-0.023	0.111	0.018	0.093	1.000		
(8) Real exchange rate	-0.385	-0.502	0.146	0.205	0.012	0.403	-0.167	1.000	
(9) GDP per capita	0.835	0.644	0.169	-0.116	-0.039	-0.694	0.194	-0.462	1.000

## CHOW TEST

**TABLE 6 : EFFECT OF ETHNIC ONSET ON REMITTANCES IMPACT ON INDIRECT TAXES WITHOUT LAG**

lnIndirectTaxes	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
REMITTANCES	0.013	0.006	2.32	0.021	0.002	0.024	**
Ethnic Onset	-0.799	0.269	-2.97	0.003	-1.328	-0.270	***
agriculture	-0.008	0.002	-4.49	0.000	-0.012	-0.005	***
GDP per capita	0.000	0.000	0.75	0.453	0.000	0.000	
Exchange rate	-0.002	0.002	-1.12	0.265	-0.007	0.002	
inflation	-0.015	0.003	-4.36	0.000	-0.022	-0.008	***
Trade	0.002	0.001	3.06	0.002	0.001	0.003	***
DEMOCRATIE ACCOUNTABILIT Y	0.053	0.017	3.13	0.002	0.020	0.086	***
REMITTANCES	0.568	0.250	2.27	0.024	0.075	1.060	**
CORRUPTION	0.158	0.028	5.73	0.000	0.104	0.212	***
MEANDEMO	-1.286	0.240	-5.36	0.000	-1.757	-0.815	***
MEANDEMOET	-0.564	0.253	-2.23	0.026	-1.062	-0.066	**
MEANDEMOGDP	0.000	0.000	-4.72	0.000	0.000	0.000	***
meandemoIndirectTa x	20.485	2.541	8.06	0.000	15.492	25.479	***
meandemoINFLATI ON	0.020	0.005	4.04	0.000	0.010	0.030	***
meandemoEXH	0.006	0.003	1.94	0.053	0.000	0.012	*
meandemoCORRUP T	-0.155	0.039	-3.96	0.000	-0.232	-0.078	***
meandemoremittanc es	-0.043	0.009	-4.61	0.000	-0.061	-0.024	***
meanethniconset	0.777	0.337	2.30	0.022	0.114	1.440	**
meandemoIndirect	0.397	2.452	0.16	0.871	-4.423	5.217	
meandemodemocrati e	-0.104	0.025	-4.17	0.000	-0.154	-0.055	***
Constant	-2.782	0.146	-19.04	0.000	-3.069	-2.495	***
Mean dependent var		-2.513	SD dependent var			0.477	
R-squared		0.698	Number of obs			464.000	
F-test		48.560	Prob > F			0.000	
Akaike crit. (AIC)		118.720	Bayesian crit. (BIC)			209.798	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**TABLE 7 : EFFECT OF ETHNIC ONSET ON REMITTANCES IMPACT ON INDIRECT TAXES WITH LAG**

LnINDIRECT TAXES	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
INDIRECT TAXES (-1)	8.921	0.429	20.79	0.000	8.077	9.764	***
REMITTANCES	0.007	0.004	1.68	0.093	-0.001	0.015	*
Ethnic onset	-0.237	0.193	-1.22	0.222	-0.617	0.143	
AGRICULTURE	-0.001	0.001	-0.73	0.463	-0.004	0.002	
GDP PER CAPITA	0.000	0.000	0.07	0.943	0.000	0.000	
EXCHANGE RATE	0.001	0.002	0.67	0.503	-0.002	0.004	
Inflation	-0.004	0.002	-1.47	0.144	-0.009	0.001	
Trade	0.000	0.000	0.33	0.745	-0.001	0.001	
DEMOCRATIE	0.006	0.012	0.49	0.625	-0.018	0.030	
ETHNIC ONSET*REMIT	0.194	0.179	1.08	0.280	-0.158	0.546	
CORRUPTION	-0.009	0.021	-0.41	0.685	-0.050	0.033	
MEANDEMO	-1.031	0.171	-6.03	0.000	-1.367	-0.695	***
MEANDEMOINDIRECT TAXES(LOG)	-7.709	1.788	-4.31	0.000	-11.223	-4.196	***
MEANDEMOETHN	-0.189	0.181	-1.04	0.298	-0.545	0.167	
MEANDEOMOGDP	0.000	0.000	-3.40	0.001	0.000	0.000	***
MEANDEMOINDIRECT TAXES	21.148	1.808	11.70	0.000	17.594	24.701	***
meandemoINFLATION	0.010	0.004	2.78	0.006	0.003	0.017	***
MeandemoEXCHANGE	0.003	0.002	1.50	0.134	-0.001	0.007	
MeandemoCORRUPTION	0.016	0.029	0.56	0.573	-0.041	0.073	
MeandemoREMITTANCES	-0.032	0.007	-4.84	0.000	-0.045	-0.019	***
MeandemoETHNIC ONSET	0.174	0.242	0.72	0.472	-0.301	0.649	
MeandemoINDIRECT TAXES	0.000	.	.	.	.	.	
MeandemoDEMOCRATIE	-0.070	0.018	-3.93	0.000	-0.105	-0.035	***
Constant	-3.315	0.107	-30.97	0.000	-3.525	-3.105	***
Mean dependent var		-2.513	SD dependent var			0.477	
R-squared		0.847	Number of obs			464.000	
F-test		111.206	Prob > F			0.000	
Akaike crit. (AIC)		-196.202	Bayesian crit. (BIC)			-100.984	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**TABLE 8: EFFECT OF ETHNIC ONSET ON REMITTANCES IMPACT ON DIRECT TAXES WITHOUT LAG**

LnDIRECTTAXES	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
REMITTANCES	-0.011	0.006	-1.84	0.066	-0.023	0.001	*
ETHNIC ONSET	-1.130	0.277	-4.09	0.000	-1.674	-0.586	***
AGRICULTURE	-0.019	0.002	-8.86	0.000	-0.024	-0.015	***
GDP	0.000	0.000	4.93	0.000	0.000	0.000	***
EXCHANGE	-0.006	0.002	-2.78	0.006	-0.011	-0.002	***
INFLATION	-0.005	0.003	-1.48	0.140	-0.012	0.002	
TRADE	0.003	0.001	4.84	0.000	0.002	0.005	***
DEMOCRATY	0.154	0.018	8.51	0.000	0.119	0.190	***
ETHNIC ONSET*REMITTANCES	1.383	0.399	3.46	0.001	0.597	2.169	***
CORRUPTION	-0.022	0.035	-0.62	0.533	-0.091	0.047	
Meandemo	3.096	0.406	7.63	0.000	2.299	3.894	***
meanethicremitt	-1.385	0.401	-3.45	0.001	-2.174	-0.596	***
meandemoGDP	0.000	0.000	-5.34	0.000	0.000	0.000	***
Meandemo DIRECT TAXES	0.843	0.054	15.49	0.000	0.736	0.950	***
Meandemo INFLATION	0.004	0.005	0.73	0.464	-0.006	0.014	
Meandemo EXCHANGE	0.004	0.003	1.31	0.191	-0.002	0.011	
Meandemo CORRUPTION	-0.005	0.045	-0.12	0.908	-0.093	0.083	
Meandemo REMITTANCES	0.000	0.010	0.03	0.977	-0.019	0.020	
Meandemo ETHNIC ONSET	1.222	0.339	3.60	0.000	0.555	1.889	***
Meandemo INDIRECT TAXES	-1.642	1.411	-1.16	0.245	-4.418	1.133	
Meandemo DEMOCRATIE	-0.122	0.027	-4.55	0.000	-0.174	-0.069	***
Constant	-3.008	0.167	-18.05	0.000	-3.336	-2.681	***
Mean dependent var		-3.067	SD dependent var			0.662	
R-squared		0.857	Number of obs			377.000	
F-test		101.339	Prob > F			0.000	
Akaike crit. (AIC)		68.540	Bayesian crit. (BIC)			155.049	
*** $p < 0.01$ , ** $p < 0.05$ , * $p < 0.1$							



**TABLE 9: EFFECT OF ETHNIC ONSET ON REMITTANCES IMPACT ON DIRECT TAXES WITH LAG**

lnDirectTaxes	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
DIRECTTAXES (-1)	0.906	0.025	35.56	0.000	0.856	0.957	***
REMITTANCES	0.008	0.003	2.69	0.008	0.002	0.014	***
ETHNIC ONSET	-0.229	0.132	-1.74	0.083	-0.488	0.030	*
AGRICULTURE	-0.001	0.001	-0.99	0.321	-0.003	0.001	
GDP	0.000	0.000	1.76	0.079	0.000	0.000	*
EXCHANGE	0.004	0.001	3.70	0.000	0.002	0.006	***
INFLATION	0.000	0.002	-0.12	0.906	-0.003	0.003	
TRADE	0.001	0.000	2.45	0.015	0.000	0.001	**
DEMOCRATIE	-0.006	0.010	-0.62	0.536	-0.025	0.013	
ETHNIC ONSET*REMITTANCES	0.180	0.190	0.95	0.342	-0.193	0.554	
CORRUPTION	-0.019	0.016	-1.13	0.257	-0.051	0.014	
Meandemo	0.536	0.211	2.54	0.011	0.121	0.950	**
Meandemo REMITTANCE*ETHNIC ONSET	-0.181	0.191	-0.95	0.342	-0.556	0.193	
MeandemoGDP	0.000	0.000	-1.37	0.173	0.000	0.000	
Meandemo DIRECTTAXES	0.983	0.076	12.87	0.000	0.833	1.133	***
Meandemo INFLATION	0.000	0.002	-0.01	0.993	-0.005	0.005	
Meandemo ECXHANGE	-0.004	0.002	-2.73	0.007	-0.007	-0.001	***
Meandemo CORRUPTION	0.015	0.021	0.71	0.476	-0.026	0.056	
Meandemo REMITTANCES	-0.009	0.005	-1.90	0.058	-0.018	0.000	*
MeandemoETHNIC ONSET	0.239	0.161	1.49	0.138	-0.077	0.556	
Meandemo INDIRECT TAXES	-0.239	0.713	-0.34	0.737	-1.641	1.162	
Meandemo DEMOCRATIE	0.008	0.013	0.60	0.549	-0.018	0.034	
Meandemo lag_DIRECT TAXES	-0.902	0.081	-11.15	0.000	-1.061	-0.743	***
Constant	-0.545	0.104	-5.24	0.000	-0.750	-0.341	***
Mean dependent var		-3.066	SD dependent var			0.661	
R-squared		0.969	Number of obs			373.000	
F-test		472.426	Prob > F			0.000	
Akaike crit. (AIC)		-497.900	Bayesian crit. (BIC)			-403.782	

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**TABLE 10:** Breush-Pagen Test

BREUSH-PAGAN TEST

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lnIndirectTaxes

chi2(1) = 187.07

Prob > chi2 = 0.0000

The value is less than 0.05, we can reject the null hypothesis and conclude that heteroscedasticity is present.