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International Trade and Tax Evasion in Benin: An Assessment Based on Imports from France and China

by

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In this study, we analyzed the drivers of tax evasion occurring through international trade between Benin and its major import partners, namely France - a Western country - and China, a non-Western country. To this end, we scrutinized the co-movement between tax rates and tax evasion, and investigated whether tax evasion in Benin is driven by misclassification behavior or not. Unobservable by nature, tax evasion was measured by missing imports. The results show a positive relationship between tax rates and missing imports expressed in value and in quantity on products from China. Concerning France, the relationship is positive in value but negative in quantity. These two effects combined together result in a weak tax evasion on products imported from France compared to those from China. There is evidence of misclassification only on products imported from France.

Keywords: Tax evasion, tax rate, missing imports, misclassification

1. Introduction

In most countries, tax revenue is the greatest source of government revenue (Yalama & Gumus, 2013) and no government can set a tax system and then rely on taxpayers' sense of duty to remit what is owed (Slemrod, 2007, p. 25). In African countries, there are lots of challenges regarding tax revenue mobilization. As it is known to be a stylized fact, tax revenues collected in African countries remain far less than the ones collected in high-income countries (Godin & Hindriks, 2015). A closer look at available data suggests that while the average share of tax revenue with respect to GDP in OECD *(Organization for Economic Co-operation and Development)* countries is 34.3% in 2015, that of African countries is around 19% (OECD, 2017). In the specific case of Benin, it was not more than 15%, according to the African Development Bank (2015). This low performance of Benin's tax administration as a driver of low tax revenue could be explained by the growing informal sector as well as other factors such as fraud, smuggling of goods, corruption (e.g. bribery of tax officials) and profit shifting, which all pertain to tax evasion.

Agriculture, industry and trade are the main activities which shape the formation of Benin's GDP. Though the primary sector accounts for 35% of the GDP, it barely generates tax revenue for the government, and this is due to the dominance of the informal sector. The secondary sector contributes to tax revenue but is still less dynamic and accounts for only 15% of the GDP. Thus, the industrial sector has not yet matured enough to generate significant resources for the tax administration. Moreover, the

government's policy aims at granting tax incentives to promote industrial development and entrepreneurship in the country. Hence, the tertiary sector which accounts for around 50% of the GDP has become a strategic sector in terms of tax revenue collection. However, this sector is still subjected to two challenges: informal sector dominance, and tax evasion, which is defined as illegal deeds to avoid taxation. According to Chiza (2006), tax evasion happens when taxable income, profits liable to tax, or other taxable activities are concealed. It also happens when tax-reducing factors like deductions or exemptions are deliberately overstated and the sources of income are highly misrepresented, thus undermining the capacity of government to provide public goods (Cowell & Gordon, 1998).

This paper is interested in assessing the occurrence of tax evasion in Benin with a focus on the tertiary sector, especially in international trade between Benin and its major partners. The study of tax evasion becomes even more interesting when one of the partners involved is a non-Western country (China) and the other is a Western country (France), as is the case in this work. Given the structural differences in their exports to Benin, assessing tax evasion based on imports from these different countries allows for comparison. That being stated, two objectives are pursued in this paper. The first one is to analyze the relationship between tax rates and the tax evasion that occurs in Beninese imports from France and China. The second objective is to establish whether tax evasion is driven by misclassification of higher-taxed products as lower-taxed products or not.

The paper is outlined as follows: the first section summarizes the literature review and posits the hypothesis to be tested. The second section deals with the research methodology and data source. The third section is about descriptive statistics while the fourth section presents the regressions' results followed by a discussion of our findings.

2. Literature Review and Hypothesis

2.1. Impact of Tax Rates on Tax Evasion

In the literature, the effect of tax rates on tax evasion is not easy to determine. Allingham & Sandmo (1972) who published the first and seminal work on the subject find an ambiguous relationship existing between tax rates and tax evasion. In the model of Allingham & Sandmo (A-S model), an amoral economic agent is considered to be risk-averse and has a utility function explained by his income declared in part because of income tax evasion. According to that model, the effect of tax rates on tax evasion is driven by the competition between the substitution effect which is negative (an increase in tax rates increases the marginal return of successful evasion less than the marginal cost being detected, leading to less income evasion) and the income effect which is positive (an increase in the tax rate reduces taxpayers' disposable income and wealth, and then increases tax evasion under decreasing absolute risk aversion) based on the assumption that the tax rate is proportional to the income understated.

Thus, it turns out that the effect of tax rates on tax evasion is ambiguous. The A-S model was met with some criticisms that led some authors to reexamine it. Chen & Chu (2002) point out that the A-S model is flawed since it analyses tax evasion on account of only indirect tax, neglecting corporate tax and drawing conclusions on a basis which skips separate ownership and control. An extension of the A-S model, with some alteration to fit an oligopolistic framework (Marrelli & Martina, 1988) yields the same result as the A-S model, which is that there is an ambiguous relationship between tax evasion and tax rates. In the reexamination of the A-S model, Eide (2002) replaces the expected utility function by a rank-dependent utility function known as the dual theory of choice under uncertainty. However, doing so has not changed the outcome that much. The ambiguous relationship between tax rates and tax evasion is confirmed by Cebula (2014) when analyzing the impact of income tax rates on aggregate tax evasion in the USA over the period 1975–2008. The nature of the tax rate-tax evasion relationship depends on people's

attitudes toward risk, and the penalty rate (Lee, 2015). It also depends on their perception about public goods provided by the government (Gordon, 1998). Indeed, an increase in tax rates increases tax evasion if the provision of public goods does not follow tax collection. In fact, economic agents prefer to maximize their utility by spending tax evaded more on private consumption. However, there is a negative relationship between tax rates and evasion if the government is fair by using tax revenue to provide public goods.

Yitzhaki (1974), in a theoretical study, discovers that the substitution effect and the income effect turn respectively positive and negative (and the income effect stands out) if the A-S' assumption changes. When the tax rate is now proportional to understated tax, the cost of detecting the understatement of tax and the reward from successful understatement increase in the same proportion as tax increases. A higher tax rate leads to lower tax evasion which indicates a negative relationship between these variables. In the same vein, Alm & Jackson (1992) not only find a negative relationship between tax compliance and tax evasion, but also state that tax compliance is determined by fiscal instruments such as income, audit rates, tax rates and public goods. Income, public goods, and audit rates do positively affect tax compliance whereas the tax rate is negatively linked to it.

Contrary to Alm & Jackson (1992), a number of studies such as Yaniv (2013), Boryana (2011), Goerke (2015) and Bayer (2006) supported a positive relationship between tax rates and tax evasion. Similarly, examining tax evasion in China based on imports from Hong Kong, Fisman & Wei (2004) find that a 1% increase in the tax rate results in a 3% increase in evasion. The positive relationship between tax rates and tax evasion is confirmed by Weerasekera (2018) in an empirical investigation of the border tax evasion in Sri Lanka, and by Chiarini *et al* (2013) when analyzing the long-run aspects of tax evasion in Italy. Bouët & Roy (2012) also support the positive relationship between tax rate-tax evasion and show that an increase in tariff rates by one point increases tax evasion by approximately 1.4 in Kenya and Mozambique. Investigating tax evasion determinants, Hnnemann & Pommerehne (1996) discover a positive correlation between non-compliance and marginal tax burden in Switzerland, whereas Mansor & Gurama (2016) report an insignificant impact of tax rates on tax evasion in Nigeria. Measured by evaded taxes, taxable income gap, and adjusted gross income gap, according to Crane & Nourzad (1990) on a case study in California, not only is tax evasion determined by tax rates, income, audit probability, and taxpayers' characteristics (age, race, occupation, marital status), but also by a higher marginal rate and higher incomes of individuals, which in turn make them more likely to evade tax. In studies on other countries, for example, China (Fisman & Wei, 2004), Mozambique (Levin & Widell, 2014; Dunem & Arndt, 2009; Bouët & Roy, 2012), and Tanzania (Mpango, 1996), tax evasion measured by missing imports is found to be positively related to tax rates. Indeed, in the case of Tanzania, an increase in tax rates leads to an increase in tax evasion by 20%, and 1.4% in the case of Mozambique, following a rise in tax rates by one unit.

From the above, it emerges that tax rates affects tax evasion in three patterns: ambiguous, positive, and negative. The first seminal work of Allingham & Sandmo (1972) and its further extension (Eide, 2002; Chen & Chu, 2002), instead of solving the puzzle, leave the ambiguity in the model that clearly puts forth the competition between the substitution effect (which is negative) and the income effect (which is positive). It is not until Yitzhaki (1974), that theoretically, a unified negative relation of tax evasion to tax rates is drawn. However, a number of empirical studies (Levin & Widell, 2014; Bouët & Roy, 2012; Weerasekera, 2018; Chiarini *et al*., 2013) are inclined towards a positive relationship between tax rates and tax evasion. Indeed, in light of the A-S model, an increase in tax rates increases the marginal rate of successful evasion much less than the marginal cost of being detected, which in turn inflates tax evasion. Based on the aforementioned, the following hypothesis is formulated:

Hypothesis 1: ***An increase in tax rates on products imported from Benin's trade partners occasions an increase in tax evasion on these products.***

2.2. Tax Evasion Driven by Under-Invoicing, Underreporting, and Misclassification

Defined as an illegal act, tax evasion can be driven by under-invoicing, underreporting, and misclassification of imported goods (Weerasekera, 2018). From a survey conducted by Mpango (1996) in Tanzania, the magnitude of deliberate under-invoicing had been estimated at 20% of total imports. Among factors responsible for this are high tariff rates, corruption, low salaries, and lower incentives offered to customs staff. According to Mwinyimvua (1996), tax evasion is driven by other factors such as smuggling, use of tax exemptions, use of complex tax schedules, and excessive documentation, apart from corruption and under-invoicing. According to the results obtained by Fisman & Wei (2004), the evasion gap is not only correlated to the tax rates on the same products but is also correlated negatively with tax rates on closely related products in the case study of China, which characterized a case of misclassification of higher-taxed products as lower-taxed products. A similar result was also derived from a study conducted by Dunem & Arndt (2009) in Mozambique. Having used the same methodology as Fisman & Wei (2004), Levin & Widell (2014) find that in Kenya, the coefficient of the tax rate was 2.6 in 2000 and 3.5 in 2004, which means that tax evasion in Tanzania has increased over time, and is almost similar to the findings by Levin & Widell (2014, p. 157) in the case of China. But no evidence of underreporting in unit values was obtained in the case of Kenya in 2000 and 2014. This suggests that tax evasion happens less in Kenya than in Tanzania. Assessing mislabeling as a driver of tax evasion, the results show that tax evasion is due to mislabeling in Kenya but not in Tanzania.

From the literature, it can be deduced, in a nutshell, that tax evasion that is facilitated by customs authorities occurs in several ways: under-invoicing or underreporting the value and the quantity of imported goods or products, and misclassification which means mislabeling of higher-taxed products as lower-taxed products. It is worth mentioning that these behaviors happen because of high tax rates on products; which means that higher-taxed products are much more subjected to underreporting or misclassification (Dunem & Arndt, 2009; Levin & Widell, 2014; Fisman & Wei, 2004; Zhang, 2012a). This leads us to formulate the following hypothesis:

Hypothesis 2: ***Tax evasion in Benin is driven by the misclassification of higher-taxed products as lower-taxed products***

3. Methodology and Data Source

3.1. Methodological Approach

The first objective of this paper is to assess the impact of tax rates on missing imports in Benin using data on imports and exports reported both in value and quantity. When dealing with tax evasion, the fundamental problem really being faced is how to measure its occurrence. On this issue, there is no reliable data since tax evasion is unobservable. To capture tax evasion, or to a lesser extent, tariff evasion, E and B are presumed to be hypothetical countries. For all goods imported by E from B, Expqb is the quantity reported by B and Impqe is the quantity reported by E. Equally, expressed in value, the imports of E from B reported by E is Impve, and Expvb when it is reported by B. From the approach developed by Levin & Widell (2014) based on the findings of Fisman & Wei (2004), and following Dunem & Arndt (2009) and Zhang (2012b) there is no tax evasion if Expqb = Impqe (respectively Expvb = Impve).

In a sense, $\mathrm{Log}\left(\frac{\mathrm{EXP_Q}}{\mathrm{IMP_Q}}\right)_{\mathrm{j}} = 0.$

This means that tax evasion is captured by a trade gap. However, using a trade gap as a tax evasion proxy raises some issues, as a trade gap may arise from both evasion-oriented behaviors or other

factors unrelated to tax evasion. First, the underreporting and misclassification that drive trade gaps may occur at the exit port as well as at the entry port. As Bhagwati (1964) points out, it is important to isolate the countries in which the transacting parties reported the actual invoice value to customs officials. If trade data on both sides is not sophisticated, using the discrepancy may be biased. However, given that Benin is relatively less regulated than France and China, we can assume that a large part of the underreporting happens at Benin ports rather than in France and China. Furthermore, it is proven in the literature that large exporting countries tend to report the actual value or quantity exported (Kellenberg & Levinson, 2019). The other issue associated with the use of the discrepancy as a proxy for tax evasion relates to differences in the reporting systems of exporting and importing countries (Guo, 2009). Indeed, exports are reported free-on-board (FOB) while imports include cost-insurance and freight (CIF). These differences may drive a systematic trade gap unrelated to tax evasion. To cope with this bias, we exclude 10% from the imports reported by Benin as recommended by the Global Financial Integrity report (2014).

The following model is used to analyze the relationship between tax rates and tax evasion. It is based on the implications of Allingham & Sandmo's (1972) research, and is drawn from the empirical models of Levin & Widell (2014) and Fisman & Wei (2004).

The value-based model is:

$$Log\left(\frac{EXP_V}{IMP_V}\right)_j = \gamma + \delta Tax\_rate_j + \varepsilon_j \quad (1)$$

In terms of quantity reported, the previous equation becomes:

$$Log\left(\frac{EXP_Q}{IMP_Q}\right)_j = \gamma + \delta Tax\_rate_j + \varepsilon_j \quad (2)$$

Where the tax rate is the sum of the tariffs and the value added tax[1]. δ is expected to be positive if evasion is due to an increase in tax rates. A significantly positive coefficient means that tax evasion occurs on highly taxed products or that if tax rates increase by one unit, trade gaps or missing imports increase by δ%. Levin & Widell (2014) suggest that value added and tax duties are less likely to be endogenous most of the time, if the country is a member of a regional integration zone[2]. This justifies why the tax rate is presumed to be exogenous here too.

Usually, things do not work as expected when it comes to tax evasion. The imports reported by country E may be different from those coming from country B due to the fact that the imports reported by E take into account direct imports from B and indirect imports or transshipments through B. For example, Benin's imports from France reported by Beninese customs authorities may include direct imports from France and imports from China passing through France, whereas France reports its sole exports to Benin. In this situation, it is difficult to disentangle indirect imports (MII) from genuine imports (IMP). In other words, Benin may have reported imports from France and China (Imp*) containing some share of misclassified indirect imports (MII) as direct imports such that $IMP_j^* = IMP_j + MII_k$.

Assuming that IMP_J is the true import of Benin from its partner and IMP_j^* the misclassified direct import[3]. IMP_j^* can be expressed as following:

$$IMP_j^* = (1 + \varphi_j) IMP_J \quad (3)$$

1 Tax rate is computed as sum of tariff and VAT by Fisman & Wei, (2004).
2 Then this holds because Benin is a member of WAEMU (West African Economic Monetary Union).
3 This terminology has been used by Dumen & Arndt (2009) and by Levin & Widell (2014).

where φ_j is greater than 0 and less than 1. φ_j can be interpreted as the share of indirect imports in the true imports.

From (3), the following is derived:

$$IMP = IMP_j^*/(1+\varphi_j) \tag{4}$$

When the equation (4) is plugged into the equation (1) and transformed, one gets:

$$Log\left(\frac{EXP_V}{IMP_V{}^*}\right)_j = \gamma^* + \delta Tax\_rate_j + \mu_j \tag{5}$$

where $\gamma^* = \gamma + E(\varepsilon_j - \log(1+\varphi_j))$ and $\mu_j = \varepsilon_j - \log(1+\varphi_j) - E(\varepsilon_j - \log(1+\varphi_j)) \rightarrow N(0,\sigma^2)$.

What's more, μ_j and γ^* are assumed to be white noise. This final transformation – the equation (5) – is used to capture the effect of tax rates on tax evasion.

To access whether tax evasion is driven by misclassification of higher-taxed products as lower-taxed products, another variable (Atax_rate_sim) has been added to the previous equations as a regressor. For a particular good j, its similar goods are defined to be those belonging to the same four-digit category. Atax_rate_sim is then defined to be the average tax rate of (k-j) products similar to product j at the four-digit level. The following equations have then been regressed both in value and in quantity.

$$Log\left(\frac{EXP_V}{IMP_V{}^*}\right)_j = \gamma^* + \delta Tax\_rate_j + \emptyset Atax\_rate\_sim + \mu_j \tag{6}$$

$$Log\left(\frac{EXP_Q}{IMP_Q{}^*}\right)_j = \gamma^* + \delta Tax\_rate_j + \emptyset Atax\_rate\_sim + \mu_j \tag{7}$$

Tax evasion will appear to be caused by the misclassification of higher-taxed products as lower-taxed products if δ and $\emptyset$ have opposite signs. For example, a positive coefficient of Tax_rate_j associated with a negative coefficient of $atax\_rate\_sim$ indicates that the higher the tax rate on the similar products, the lower the incentive for mislabeling the imports of product j. In other words, the higher the tax rate of product j, the higher the incentive to label or to classify product j as similar products.

To make sure whether the relationship between tax rates and a trade gap is linear or not, the following equation has been estimated both for the value and the quantity reported:

$$Log\left(\frac{EXP_{v\ or\ Q}}{IMP_{v\ or\ Q}{}^*}\right)_j = \gamma^* + \delta Tax\_rate_j + \emptyset atax\_rate\_sim + \tau Tax\_rate_j{}^2 + \mu_j \tag{8}$$

3.2. Data Collection

The data used for our analysis in this paper were derived from the 2014 Comtrade database. This data on trade flows (imports and exports) and tariff rates used is recorded at the six-digit level, four-digit level, and two-digit level Harmonized Commodity Description and Coding System (HS 1996). Since the study is based on tax evasion on all goods imported by Benin from its major trade partners (China and France), imports from France and China reported by Benin in quantity and value (Imp), and exports of France and China to Benin, in value and quantity, reported by these two countries as well as tariff rates

applied by Benin on all goods imported from those trade partners were collected. Value added tax fixed in Benin has been added to tariff rates to obtain the tax rate.

3.3. Descriptive Analysis

Table 1 below gives a description of the main characteristics of the variables used in this study. It shows that the average measurement errors (trade gap) in imports from China and France are different at the 6-digit level. In terms of quantity (0.8 for China and -4.253 for France) as well as value (1.8 for China and 0.39 for France), the average trade gap on products imported from China is greater than the one on imports from France. From the same table, it will be noted that the tax rate and the tariffs applied to products imported from these two import partners display the same pattern. The minimum tariff is 5% whereas the maximum is 20%, and the minimum tax rate is 23% whereas the maximum is 38%, due to the fact that Value Added Tax applied in Benin is 18%. What is more, the average tax rate on products imported from China (32.60%) is greater than the average tax rate applied to products imported from France (30.73%) as shown in Table 1.

Figure 1 (in the annex) shows the frequency distribution of tax rates applied to products imported by Benin from China (panel1a) and France (panel1b). Clearly, low variability is observed on tax rates applied by Benin to its major import partners at the 6-digit level. Also, the density distributions of the logarithm of the evasion ratio in trade flows from China and France have been plotted in Figure 2 (in the annex). The density distributions of the trade gap in China and France, on value, are centered around the means. This implies a normally distributed pattern of value trade gap.

Table 1: Summary of the Descriptive Statistics of the Trade Flows Between Benin and its Major Import Partners at the 6-digit level in 2014.

Panel 1a: China

Tax evasion in Benin on goods from China	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation
Log(EXPv)	4.164	4.340	-6.214	13.412	2.692	1666
Log(IMPv)	3.148	3.153	-2.956	10.876	2.299	780
$\log(\frac{EXPv}{IMPv})$	1.805	1.859	-9.898	12.103	2.689	780
Log(EXPq)	8.645	9.224	0	21.901	3.729	1629
Log(IMPq)	9.182	9.572	0	17.506	3.142	609
$\log(\frac{EXPq}{IMPq})$	.8001	0.7160	-10.70	11.523	2.973	602
Tarrif	14.601	20	5	20	6.480	717
Tax rate	32.601	38	23	38	6.480	717

Panel 1b: France

Tax evasion in Benin on goods from France	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation
Log(EXPv)	6.658	6.816	0	17.078	3.188	1048
Log(IMPv)	2.301	2.280	-5.521	10.836	2.343	1605
$\log(\frac{EXPv}{IMPv})$	.3921	4.322	-6.499	14.343	3.148	1048
Log(EXPq)	3.085	3.02	-4969	11.059	2.332	1159
Log(IMPq)	6.895	6.181	0	17.041	3.112	1240
$\log(\frac{EXPq}{IMPq})$	-4.253	-4.462	-14.373	6.365	3.116	900
Tarrif	13.092	10	5	20	6.931	1470
Tax rate	30.729	28	23	38	6.931	1470

Analyzing the data, the import structure of Benin based on the two selected import partners has been studied. Table 2 in the annex displays the results. One can see from Panel 2a (in the annex) that Benin's imports from China are mainly textiles and clothing (12.55%), stone and glass (5.84%), metals (16.22%) and transportation (25.9%). From panel 2b, it is noted that animal products (20.41%), food items (5.5 %), vegetables (7.217%), chemicals (28.8%), and mechanical and electrical devices (17.64%) constitute Benin's major imports from France. Looking closely at the average trade gap of each product imported by Benin from its two partners, it can be noted that the average trade gap values on hides and skins, textiles and clothing, footwear, miscellaneous, and electrical equipment imported from China are higher. In the case of France, the trade gap is higher on footwear, stone and glass, and hides and skins than the rest of the products under consideration (see Table 2 in the annex). Overall, footwear is more subjected to tax evasion in Benin on products imported from China and France. According to the descriptive statistics, we can assume that missing imports are much higher on products from China than on products from France. On top of that, the bigger chunk of the evasion on products from both countries occurs on footwear.

4. Regressions' Results and Discussion

4.1. Tax Rate-Tax Evasion Relationship

The results regarding the transformed baseline model on value (equation 5) are summarized in Table 3 and the ones on quantity are shown in Table 4. From Table 3, we notice that the coefficient of the tax rate (δ) is positive and significant at the level of 1% in every equation estimated therein, on products imported from France as well as from China. In the case of products imported from China, an increase in the tax rate by 10% increases tax evasion by 1.28%, whereas on products imported from France, the findings suggest that a 10% increase in the tax rate in turn increases tax evasion by 0.52% (first lines). This positive relationship between tax evasion and tax rates fits what is expected. Whence the results converge to the ones obtained by Levin & Widell (2014) on assessing tax evasion in Tanzania, and by Fisman & Wei (2004) on tax evasion in China. The results are consistent and robust although there are no outliers (line 1 is the same thing as line 3) and because the coefficients of the tax rate from lines 4 to 6

and line 2 are quite similar. These results underscore underreporting in value due to an increase in the tax rate on imported products from France as well as from China.

Table 3: Results of the Transformed Baseline Model on Value4

Tax evasion on products from France	Constant	Tax rate	R^2	N
	γ	δ		
Total sample	-0.193 (0.502)	0.052 (0.015)***	0.021	717
excluding products whose trade gap is lower than 10th percentile	0.016 (0.425)	0.071 (0.012)***	0.044	651
excluding outliers from the trade gap	-0.193 (0.502)	0.062 (0.015)***	0.023	717
excluding products lacking tax on similar products	-0.117 (0.552)	0.064 (0.0165)***	0.025	591
excluding products lacking observation on quantities	-0.2944 (0.543)	0.053 (0.018)***	0.020	552
excluding products lacking observation on quantity and similar products	-0.219 (0.726)	0.065 (0.021)***	0.021	447
Tax evasion on products from China	Constant	Tax rate	R^2	N
	γ	δ		
Total sample	-.229 (0.485)	0.128 (0.014)***	0.070	956
excluding products whose trade gap is lower than 10th percentile	2.350 (.414)***	0.0685 (0.012)***	0.033	858
excluding outliers from the trade gap	-.229 (0.485)	0.128 (0.014)***	0.070	956
excluding products lacking tax on similar products	-0.571 (0.541)	0.135 (0.016)***	0.074	810
excluding products lacking observation on quantities	1.506 (0.523)***	0.085 (0.015)***	0.034	815
excluding products lacking observation on quantity and similar products	1.392 (0.60)**	0.0864 (0.018)***	0.032	677

***Significant at 1%, ** significant at 5%, *significant at 10% and () = robust standard error

As far as the transformed baseline model on quantity (Table 4) is concerned, there is an analogy with the previous results, which is that there is a positive relationship between tax evasion and tax rates (since the coefficient δ of the tax rate is statistically significant at the 1% level) on products imported from China (row 2). An increase in tax rates by 10% increases underreporting on quantities by 0.51%. However, on products imported from France, a fall in tax evasion by 0.7% follows an increase in the tax rate by 10%. In fact, from the literature review perspective, though counterintuitive, these outcomes are explainable. From the point of view of Sandmo (1974), this happens when the substitution effect which is negative takes the lead. This may suggest that an increase in tax rates increases the marginal return of successful evasion less than the marginal cost of being detected, leading to less income evasion. Another explanation from Cowell & Gordon (1998) points out that if the government is sincere in using tax revenue to provide public goods, an increase in tax rates may justify a decrease in tax evasion.

On the baseline model results, an increase in tax rates causes underreporting both on the quantity and the value of products imported from China. Paradoxically, an increase in tax rates on products imported from France increases underreporting in value, and decreases it on the quantities imported. These two effects combined together could have lowered tax evasion on products imported from France. However, when the outcomes displayed in Tables 3 and 4 are confronted with the ones in Table 5 (in the annex), it becomes clear that tax rates affects tax evasion through a linear relationship. These results partially support hypothesis 1 about the nature of the relationship between tax rates and tax evasion

4 The econometric estimations displayed in the tables above show weak R2. The nature of the data and the non-availability of other variables on imported goods may explain this. However, this does not affect the quality of the results since these models are not used for predictions. Levin & Widell (2014) and Fisman & Wei (2004) observe the same thing in their papers.

through Benin's imports from China and France. As previously mentioned, an increase in tax rates by 10% generates an increase in tax evasion by 0.51% (model on quantity) and by 1.28% (model on value) on products imported from China, whereas the same increase (10%) in tax rates causes a decrease of 0.7% (model on quantity) and an increase of 0.52% (model on value) on products imported from France. The magnitude of tax evasion recorded by Benin in its imports from China is higher than the one from France. This result can be explained by the fact that products imported from China are relatively more taxed (32.60% on average) than those imported from France (30.73% on average). Thus, compared to importers of products from France, those who import from China are more likely to intentionally misclassify their products to avoid tax.

The results show evidence of tax evasion on Benin's imports from France and China which represent its major trading partners from Western and non-Western countries. But the losses recorded on products from China are higher than those on products imported from France. Benin should therefore put necessary measures in place so as to strengthen the efficiency of its tax administration system with a view to limiting underreporting on its imports. These measures should particularly target products from China, as tax evasion on imports from this partner is more significant. To this end, technological means could be used to reinforce the verification of imports. Additionally, Benin's tax administration should also introduce reforms to simplify its tax regime.

Table 4: Results of the Transformed Baseline Model on Quantity

Tax evasion on products from China	Constant	Tax rate	R^2	N
	γ	δ		
Total sample	-0.029 (0.707)	0.020 (0.206)	0.002	550
excluding products whose trade gap is lower than 25th percentile	0.271 (0.547)	0.051 (0.001)***	0.020	418
excluding outliers from the trade gap	-0.029 (0.707)	0.020 (0.206)	0.002	550
excluding products lacking tax on similar products	0.368 (0.791)	0.018 (0.023)	0.001	445
excluding products lacking observation on value	-0.029 (0.707)	0.025 (0.020)	0.002	550
excluding products lacking observation on quantity and similar products	0.368 (0.791)	0.018 (0.023)	0.001	445
Tax evasion on products from China	Constant	Tax rate	R^2	N
	γ	δ		
Total sample	-2.10 (0.559)***	-0.069 (0.017)***	0.02	821
excluding products whose trade gap is lower than 90th percentile	4.32 (0.959)***	-0.09 (0.031)***	0.08	78
excluding outliers from the trade gap	-2.10 (0.559)***	-0.069 (0.017)***	0.02	821
excluding products lacking tax on similar products	-1.034 (0.623)*	-0.096 (0.188)	0.04	683
excluding products lacking observation on value	-2.139 (0.562)***	-0.066 (0.170)***	0.02	814
excluding products lacking observation on value and similar products	-0.069 (0.628)*	-0.0963 (0.019)***	0.03	676

***Significant at 1%, ** significant at 5%, *significant at 10% and () = robust standard error

4.2. Misclassification Evidence

In the previous section, the relationship between tax rates and tax evasion (underreporting the quantity and value) has been addressed. In this section, we will shed light on mislabeling higher-taxed products as lower-taxed products as a way of evading tax on imported goods. As it emerges from Table 6, no evidence of misclassification of higher-taxed products as lower-taxed products on imports from France

is found, since the coefficients of Tax rate (the tax rate on a particular product) as well as the one of Atax_rate_sim (the tax rate on similar products) are not significant. However, in the case of products imported from China, there is evidence of misclassification. Indeed, the coefficients of Tax_rate and Atax_rate_sim are significant and of opposite signs. This means that if the tax rate on similar products increases, tax evasion decreases on the product under consideration. This kind of result is a case of misclassification since the decrease in the tax rate of a particular product causes the increase of tax evasion on similar products. So, in the case of imports from China, importers tend to misclassify higher-taxed products as its similar goods which are lower-taxed.

Conclusively, there is no evidence of misclassification on products imported from France, whereas there is evidence of misclassification on imports from China. Thus, hypothesis 2 of this study is partially supported. The result of our study confirms that, compared to France, Benin's tax administration should pay more attention to the inspection of products from China. Indeed, tax evasion occurs on products imported from China through misclassification, whereas there is no evidence of misclassification behavior on imports from France. Inspecting imports from China will benefit Benin as China is its largest source of imports. More than 33% of Benin's imports come from China. So, loss of tax revenues through imports from this country may be high and very significant for Benin's tax administration.

Table 6: Assessment of Misclassification of Higher-Taxed Products as Lower-Taxed Products

Tax evasion on products from France	Constant	Tax_rate	*Atax_rate_sim*	R^2	N
	γ	β	$\emptyset$		
Omitting *Atax_rate_sim*	-0.029 (0.707)	0.025 (0.020)		0.002	550
Full regression	0.431 (0.795)	0.015 (0.023)	2.7e-08 (3.2e-07)		
Excluding products lacking observations on *Atax_rate_sim*	0.388 (0.793)	0.017 (0.023)		0.001	444
Tax evasion on products from China	Constant	Tax_rate	*Atax_rate_sim*	R^2	N
	γ	β	$\emptyset$		
Omitting *Atax_rate_sim*	-2.1 (0.559)***	-0.069 (0.016)***			
Full regression	-1.53 (0.609)***	0.095 (0.018)***	-1.8e-05 (2.68e-06)***	0.09	683
Excluding products lacking observations on *Atax_rate_sim*	-1.034 (0.623)*	-0.097 (0.018)***		0.04	683

***Significant at 1%, ** significant at 5%, *significant at 10% and () robust standard error

5. Conclusion

This paper assessed tax evasion in Benin by (1) addressing how sensitive tax evasion is with respect to tax rates, and (2) checking whether tax evasion on imports is caused by misclassification of higher-taxed products as lower-taxed products. Regarding the first objective, there is a case of quantity-based underreporting on goods imported from either China or France, based on the positive linear relationship found between tax evasion and tax rates, whereas a value-based underreporting is only found on products from China. Our results also show that the magnitude of tax evasion is higher on products from China than on the ones from France. Concerning the second objective of the study which addresses the issue of misclassification, whereas there is evidence in the case of China, we found no evidence of quantity-based misclassification of higher-taxed products as lower-taxed products on imports from France. Due to the positive relationship between tax rates and tax evasion which lowers tax revenue, as

Fisman & Wei (2004) contend in the case of China, it could be alleged that Benin's average tax rate is already on the wrong side of the Laffer curve, meaning that an increase in tax rates results in a fall in tax revenue. Tax evasion in Benin may certainly explain why tax revenue is so low, thereby undermining the capacity of the government to provide public goods. In order to enhance state-building and strengthen state-citizen relationships (Lieberman & Evan, 2002), and improve the capacity of Benin to mobilize more tax revenue, the phenomenon of tax evasion needs to be decisively dealt with. The country should undergo some reforms such as simplifying the tax regime, broadening the tax base, and improving the efficiency of the tax administration system.

One of the limitations of this work relates to the use of a trade gap as a proxy for tax evasion. Differences in the reporting systems of both exporting and importing countries as well as the timeframe between shipping and arrival could affect the discrepancy, even though they are unrelated to tax evasion. Following the recommendations of the Global Financial Integrity report (2014), we tried to solve the issue concerning the differences in reporting systems. But the available data did not allow us to control the timeframe between shipping and arrival. The second limitation is that since we worked at the micro level, we were unable to control the role of institutions in explaining the magnitude of tax evasion. However, it is important to note that these two limitations open the bracket for further research on the subject.

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Annex

Table 2: Summary of Benin's Import Structure at the 2-digit Level from its Major Partners in 2014

Panel 2a: China

Section	*Code and Products*	*Import value in 1000 USD*	*Tariff in %*	*Tax rate in %*	*Gap value*	*Import share in %*
1	*01-05_Animal*	3404.72	16.04	34.04	1.801	1.22
2	*06-15_Vegetable*	2892.66	13.33	31.33	1.314	1.036
3	*16-24_Food Products*	14485.9	18.41	36.41	1.784	5.191
4	*25-26_Minerals*	369.19	11.43	29.43	0.844	0.132
5	*27-27_Fuels*	9466.96	8.64	26.64	-3.387	3.392
6	*28-38_Chemicals*	17229	9.69	27.69	1.547	6.174
7	*39-40_Plastic or Rubber*	12029.8	13.05	31.05	1.827	4.311
8	*41-43_Hides and Skin*	4110.89	13.33	31.33	2.748	1.473
9	*44-49_Wood*	5186.1	15.59	33.59	1.555	1.858
10	*50-63_Textiles and Clothing*	35018.4	17.79	35.79	3.771	12.549
11	*64-67_Footwear*	10281.2	18.49	36.49	4.236	3.684
12	*68-71_Stone and Glass*	16293	18.29	36.29	1.080	5.838
13	*72-83_Metals*	45247.1	16.53	34.53	1.316	16.215
14	*84-85_Mechanical and Electric Equipment*	24759.1	10.4	28.4	2.845	8.872
15	*86-89_Transportation*	72291.4	7.39	25.39	0.2468	25.907
16	*90-99_Miscellaneous*	5975.62	16.29	34.29	3.253	2.141

Panel 2b: France

Section	*Codes and Products (2-digit HS-numbers)*	*Import value in 1000 USD*	*Tariff in %*	*Tax rate in %*	*Gap value*	*Import share in %*
1	*01-05_Animal*	60657.1	12.96	30.96	-0.2469301	20.412
2	*06-15_Vegetable*	21448.1	13.19	31.19	-0.0507441	7.217
3	*16-24_Food and Products*	16356.2	17.09	36.09	0.7439127	5.504
4	*25-26_Minerals*	373.105	7.73	25.73	-0.244678	0.126
5	*27-27_Fuels*	3232.67	6.21	24.21	0.0022516	1.088
6	*28-38_Chemicals*	85610.5	9.48	27.48	0.0374346	28.809
7	*39-40_Plastics and Rubber*	11678	12.80	30.80	-0.1518717	3.93
8	*41-43_Hides and Skin*	113.201	20	38	1.508689	0.038
9	*44-49_Wood*	6248.96	10.41	28.41	0.0142431	2.103
10	*50-63_Textiles and Clothing*	1956.69	18.46	36.46	0.4115853	0.658
11	*64-67_Footwear*	843.376	18.3	36.3	1.698137	0.284
12	*68-71_Stone and Glass*	2234.11	17.71	35.71	1.254474	0.752
13	*72-83_Metals*	9725.82	15.08	33.08	0.1445503	3.273
14	*84-85_Mechanical and Electric Equipment*	52414.7	9.55	37.55	-0.2469301	17.638
15	*86-89_Transportion*	17134.4	7.29	25.29	-0.0507441	5.766
16	*90-99_Miscellaneous*	7141.8	16.21	34.21	0.7439127	2.403

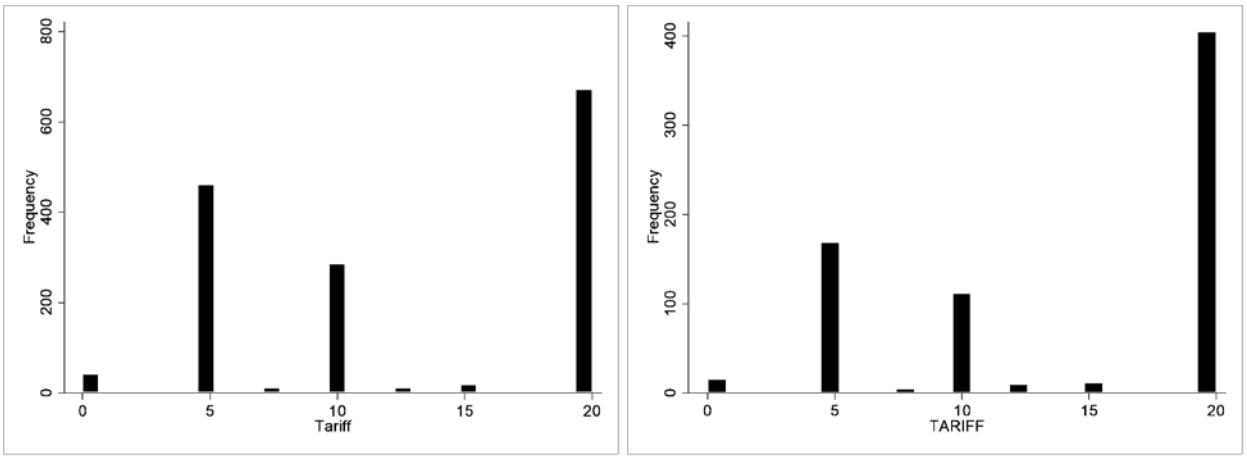
Table 5: Assessment of the Linearity in Relation to Trade Gap-Tax Rate on Quantity Model

Tax evasion on products from China	constant	tax_rate	tax_rate^2	*atax_rate_sim*	R^2	N
	γ	B	τ	$\emptyset$		
Omitting Tax_rate^2 and atax_rate_sim	-0.029 (0.707)	0.025 (0.020)			0.002	550
Omitting atax_rate_sim	-6.77 (6.267)	0.476 (0.417)	-0.007 (0.006)		0.001	550
Full regression	-7.998 (7.149)	0.580 (0.476)	-0.009 (0.007)	2.69e-08 (3.25e-08)	0.006	444
Excluding products lacking observations on value	-7.998 (7.149)	0.580 (0.476)	-0.009 (0.007)	2.69e-08 (3.25e-08)	0.006	444
Tax evasion on products from France	constant	tax_rate	tax_rate^2	*atax_rate_sim*	R^2	N
	γ	B	τ	$\emptyset$		
Omitting Tax_rate^2 and atax_rate_sim	-2.1 (0.559)***	-0.069 (0.016)***			0.019	821
Omitting atax_rate_sim	-1.246 (4.93)	-0.126 (0.329)	0.0009 (0.005)		0.019	821
Full regression	3.732 (5.258)	-4.48 (0.350)	0.005 (0.005)	1.77e-07 (2.68e-06)***	0.09	683
Excluding products lacking observations on value	3.076 (5.278)	-0.406 (0.351)	0.004 (0.006)	1.8e-06 (2.68e-06)***	0.09	676

***Significant at 1%, ** significant at 5%, *significant at 10% and robust standard error in parentheses

Figure 1: Frequency distribution of tariff rates at the 6-digit HS category on products from China (1a) and France (1b) 2014.

Panel 1a **Panel 1b**



Source: Authors, based on WITS data, 2016

Figure 2: Density distribution of the logarithm of evasion ratio in the trade flow from China (2a) and France (2b) to Benin in 2014.

Panel 2a **Panel 2b**

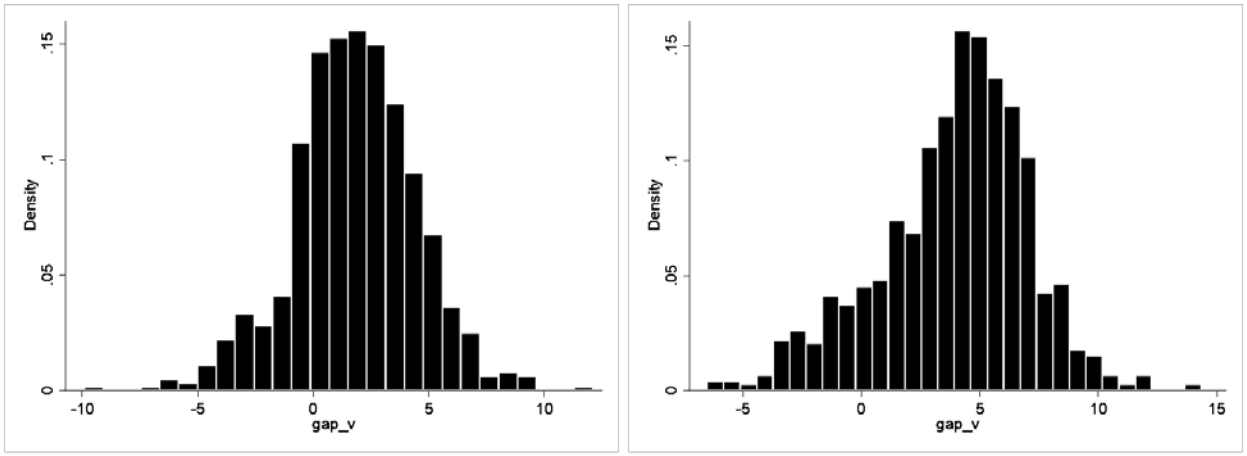


Table 6: Definition of the Variables

Variables	Definition
Imp_v	Value of imports (1000 US. Dollars) from the two import partners (China and France) as reported by Benin's Customs in 2014. This data was collected at the 4 and the 6-digit level. (Source: WITS derived from the Comtrade database of the United Nations).
Exp_v	Value of exports (1000 US. Dollars) of the two import partners (China and France) to Benin as reported by each of the partners' customs in 2014. This data was collected at the 4 and 6-digit level. (Source: WITS derived from the Comtrade database of the United Nations).
Imp_q	Quantity of imports (1000 US. Dollars) from the two import partners (China and France) as reported by Benin's Customs in 2014. This data was collected at the 4 and 6-digit level. (Source: WITS derived from the Comtrade database of the United Nations).
Exp_q	Value of exports of the two import partners (China and France) to Benin as reported by each of the partners' customs in 2014. This data was collected at the 4 and 6-digit level. (Source: WITS).
Tax_rate	Total tax levied on imported goods by Benin authorithies in 2014 calculated as the sum of tariff and value added tax (VAT).
Tax_rate_sim	Total tax levied on similar products at the 4-digit level.
Gap_v	$log\left(\frac{\exp\_v}{imp\_v}\right) = \log(\exp -_v) - \log(imp\_v)$
Gap_q	$log\left(\frac{\exp\_q}{imp\_q}\right) = \log(\exp -_q) - \log(imp\_q)$