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Assessment of tax evasion in Benin

MAGBONDE, Gildas

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ASSESSMENT OF TAX EVASION IN BENIN

Gildas Kadoukpè MAGBONDE

Promoter: Professor Romain HOUSSA

Tutor: Kelbesa MEGERSA

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ABSTRACT

The purpose of this study is to assess the tax evasion in Benin. By its nature, tax evasion is not observable. It has been measured by trade gap defined as measurement error in trade flows. Both descriptive statistics and econometrical tools have been used as methodological tools. Using statistics descriptive on trade gap between Benin and its major import partners the results show that tax evasion is high on products imported from China and India than on products imported from France. The chunk of the evasion on products from China and France happens on footwear imported, whereas the chunk of the evasion on products imported from India occurs in textiles. This unlawful deed causes a billion of dollars of revenue losses to the government. Examining the relation between tax rate and tax evasion, a positive relation between tax rate and tax evasion has been found through a linear relation. The magnitude of tax evasion is higher on products imported from China and India than on products imported from France. Analyzing the nature of tax evasion, there is evidence of underreporting both on value and on quantity on products imported from China and India and only underreporting on value of the products imported from France due to high tax rate. Eventually it is found a case of mislabeling higher-taxed products as lower-taxed products on products imported from France whereas no evidence is found of mislabeling on products imported from China and India.

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TABLE OF CONTENT

ABSTRACT i

ACKNOWLEDGEMENTS iii

TABLE OF CONTENT iv

LIST OF TABLES v

LIST OF FIGURES..... v

ABBREVIATIONS AND ACRONYMS vi

INTRODUCTION..... 1

1-SHORT INSIGHT ON CUSTOM AND TAX ADMINISTRATION AND BENIN’S
MAJOR IMPORT PARTNERS 3

 1.1-Custom and tax administration..... 3

 1.2-Snapshot of Benin’s majors import partners 5

2-LITERATURE REVIEW 6

 2.1-Theoretical literature review 6

 2.2-Empirical literature review 8

3-METHODOLOGY AND DATA..... 10

 3.1-Methodology 10

 3.2-Data 13

4- EMPIRICAL RESULTS..... 16

CONCLUSION 19

ANNEX 20

REFERENCES..... 33

LIST OF TABLES

Table 1: Summary of descriptive statistics of the trade flows between Benin and its majors import partners at 6-digit level in 2014.....	14
Table 2: Summary of Benin import structure at 2-digit level from its major partners in 2014	21
Table 3: Summary of the descriptive statistics of the trade flows between Benin its import partners at 4-digit level in 2014.....	22
Table 4: Results of the transformed baseline model on values.....	23
Table 5: Results of the transformed baseline model on quantity	24
Table 6 : Assessment of the linearity in relation trade gap-tax rate on value model	25
Table 7 : Assessment of the linearity in relation trade gap-tax rate on quantity model	26
Table 8 : Assessment of mislabelling higher-taxed products as lower-taxed products on the quantity model.....	27
Table 9: Results on the impact of electronical control on trap gap between Benin and France in 2011	28
Table 10: Computation of import misinvoicing and revenue loss.....	28
Table 11: Summary import misinvoicing and revenue loss.....	30
Table 12: definition of the variables	30

LIST OF FIGURES

Figure 1: Benin's Imports - million US\$	6
Figure 2: Share of the imports by country in total imports	6
Figure 3: Frequency distribution of the tariff rate at 6-digit HS category on products from China (2a), France (2b) and India (2c) in 2014.....	15
Figure 4: Density distribution of the logarithm of the evasion ratio in the trade flow from China (1a) France (1b) and India (panel 1c) to Benin in 2014.	31
Figure 5: Tax revenue in percentage of GDP in some selected developing countries.....	31
Figure 6: Benin's taxes structure.....	32

ABBREVIATIONS AND ACRONYMS

CIF	:	cost-insurance and freight
ECOWAS	:	Economic Community of West African States
FCFA	:	Franc de la Communauté Financière Africaine
FOA	:	free-on-board
GDP	:	Gross Domestic Product
GIZ	:	Gesellschaft für Internationale Zusammenarbeit
HS	:	Harmonized System
IMF	:	International Monetary Funds
OECD	:	Organization for Economic Cooperation and Development
PCV	:	Program of Certification of values
PVI	:	Program of Verification of imports
US	:	United-States
USD	:	United-States Dollar
VAT	:	Value Added Tax
WAEMU	:	West African Economic and Monetary Union

INTRODUCTION

Tax revenue in most countries is the greatest source of government's revenue (Yalama & Gumus, 2013, p. 15) 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). Either for the developing countries or for the developed countries, taxes appear to be the most important source of government's revenue, excepted for the countries endowed with an outstanding amount of natural resources from which they get some rents (Nigeria, Saudi Arabia, Qatar, Libya etc.). In a sense, in those countries, government's expenditure is based on the tax revenue. But in terms of tax collection, there is a remarkable difference between developing countries and developed countries. A closer look at data suggests that tax revenue in OECD-countries is about 36 % of national income in 2007 while it is respectively in Africa in 2007 and in Latin America in 2004, 23% and 17.5 % (GIZ, 2010). To the lesser extent, based on some countries precisely, the facts are more obvious, cogent and more eloquent. For example, from 2004 to 2012, the tax revenue in percentage of GDP in some selected developing countries (Benin, Côte d'Ivoire, Kenya, Mali and Togo) evolves below 20% (see annex, figure 5). Contrary to that scenario, the OECD-countries have the tax revenue expressed in percentage of GDP above 20 %. This difference is very striking because developing countries have lower GDP compared to the developed countries.

Then, it is undoubtedly clear that the noticeable difference between developing countries and developed countries is not only based on dissimilitude in the income per capita, the life expectancy, the level of education, the physical capital accumulation, however also in the tax collection. Where does that difference stem from – in term of tax collection? Probably from lower production or gross national product. But this doesn't stand as more convincing. For sure lower tax revenue in developing countries is the direct results of the conspicuous presence of the tax evasion and the striking extension of the informal sector. According to a report of GFI¹ developing countries have lost from 858.6 billion to 1.06 trillion dollars in illicit financial outflows in 2006 (GIZ, 2010, p. 20). And what's more, they are some facing unproductive activities such trade mispricing, VAT fraud, misclassification of commodities and smuggle of goods, bribery of tax officials and profit shifting that fall into tax evasion. Accordingly, most of them have their actual tax revenues far less than their potential tax revenue and have lower tax effort² compare to developed countries (Godin & Hindriks, 2015).

Tax evasion is defined as illegal deeds to avoid taxation, and should not be confused with tax avoidance which is defined as legal activities taking advantages of the tax codes and loopholes to reduce liabilities and to counter the purpose of the tax law. According to Chiza (2006), tax evasion happens when taxable income, profit liable to tax or other taxable activities are concealed, tax reducing factors like deductions, exemptions are deliberately overstated and the source of income are highly misrepresented (GIZ, 2010, p. 9) and undermine the capacity of government to provide public goods (Cowell & Gordon, 1998).

¹ Global Financial Integrity

² Tax effort is measured as the ratio between actual tax revenue and potential tax revenue

Then, to enhance state building and strengthen the state-citizen relationships (Lieberman & Evan, 2002), and to improve the capacity of low-income countries to mobilize more tax revenue (Levin & Widell, 2014), tax evasion need to be root out. Developing countries should undergo some reforms that are the simplification of the tax regime, broadening of tax base and improving the efficiency of administration. For example, Rwanda Revenue Authority is using sound education to reinforce the tax compliance of constituents by organizing tax payer week, an occasion where people are formatted to tax-paying citizen and receive awarding. In the same line Peru had set E-learning, video lessons, education programs at school and so on, so as to educate citizens in the field of taxation. The list is far from to be closed. Kenya had also undergone an important and successful reform. In 1998 Kenya Revenue Authority has reduced the cost of compliance just by setting one-stop-service for tax collection³.

In an article publish in 2013 by the Centre for Tax Policy and Administration, Benin is not a case of country responded to tax morale question. In the same survey, in term of people who agree that the tax department always has the right to make people pay taxes, Benin is ranked below 3.5; meaning that a great share of people disagree. Tax education appears to be the root of this problem. Although Benin is facing tax evasion, it is doing well relatively to certain countries. In 2008 in term of tax effort, Benin is ranked the second country with score near 1.7 after Ghana with a score near 2.1 within developing countries. But despite of numerous reforms in the tax administration, the tax revenue in percentage of GDP is still lower than 20%. Estimating the shadow economy in 192 developing countries, Benin has been ranked 90 by the World Bank. Indeed, the average of the shadow economy in Benin from 1999 to 2006 is estimated at 49.6⁴. This level is a bit high and gives room to the fact that the level of shadow economy in Benin could have lowered the country's tax collection level. According to International Transparency, the corruption index has increased in Benin in 2014 (39) compared to the ones of 2012 and (36). But this increment cannot be taken as a great achievement since in 2014 the corruption index for Denmark is 92, the highest of the year. Benin institutions are not doing so well. So tax collection which depends on the quality of institutions might be underpinned and particularly taxes on the imported goods. Benin has numerous import partners, and would have got enough revenue if institutions (rules, norms) are well-structured and efficient.

This paper is aiming at assessing tax evasion in Benin, in 2014, based on imports products from India, France and China, standing as the important import partners of Benin. The objectives are: to evaluate, which Benin's import partners overall is facing more tax evasion in Benin; to evaluate which goods are subjected to tax evasion; to assess the impact of tax rate on tax evasion and to study the kind of relationship between them; to also study the different aspects of tax evasion which are under-reporting of unit value, under-reporting of taxable quantities and mislabeling a higher-taxed products as a lower-taxed products and to

³ More information about these reforms can be found on the publication of GIZ, a commissioned organization by the International Tax Compact (ITC), an international organization fighting against tax evasion and inappropriate tax practices in developing countries.

⁴ See Schneider and al. *Shadow Economies All over the World; New Estimates for 162 Countries from 1999 to 2007*. The World Bank Development Research Group Poverty and Inequality Team & Europe and Central Asia Region Human Development Economics Unit July 2010.

estimate the overall level of revenue losses due to the tax evasion. To achieve these objectives, the methodology outlined by Fishman and Wei (2004) and used also by Levin & Widell (2014), and Dunem & Arndt (2009) have been made of use. The trade gap is used as a proxy of evasion, by comparing the discrepancy, the difference on imports reports by Benin and the exports to Benin reported by India, France and China; because in absence of tax evasion no difference can be found among the trade data reported. In the literature, Morgenstern (1950) and Bhagwati (1964) have suggested that the discrepancy between trade flows could be an explanation of tariff evasion. Recently a lot of works have taken into account these gaps (Fishman and Wei (2004), Dunem & Arndt (2009); Levin & Widell (2014)). The following lines are the outline of the paper. The first section presents a snapshot of Benin's tax and custom administration and its major import partners; the second section summarizes the literature on the tax evasion, both empirical and theoretical. The third session deals with the methodology and data and the fourth session exposes the main results.

1-SHORT INSIGHT ON CUSTOM AND TAX ADMINISTRATION AND BENIN'S MAJOR IMPORT PARTNERS

1.1-Custom and tax administration

Benin is a member State of ECOWAS and is also a member state of WAEMU⁵ which is a common market, a single currency and a custom union. In the framework of WAEMU, the country applies common exterior tariff with the others members states. Benin's government revenue is especially tax-based. The government's tax revenue is composed of direct and indirect taxes collected by tax administration, and taxes on international trade collected by custom administration. From 2011 to 2015, the average tax revenue in percentage of GDP is 14.6 % composed respectively of 7.58 % of direct and indirect taxes and 7.6 % of taxes on international trade⁶. In the same period, the economic growth rate moves about 5%, which is still low regarding the target of 7% necessary to reduce poverty through the Growth and Poverty Reduction Strategy⁷ (see the figure 6 in the annex).

Benin's custom administration (*La Direction Générale des Douanes et Droits Indirects*) is working under the ministry of finance. It has three missions: fiscal mission (fiscal resource mobilization), economics mission (promotion of external exchange, control of trade regulation etc.) and mission of surveillance and repression (Goods and commodities' circulation control). Through fiscal mission, it collects taxes on international trade for the state. It contributes to about 50 % of the necessary resources needed by the government for the implementation of economic policies. However, Benin's custom administration is still

⁵ Member's states of the West African Economic and Monetary Union are Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo.

⁶ These statistics are generated from Benin's Consolidated Central Government Operations, reported in IMF Country Report No. 16/6.

⁷ The GPRS aims at reducing poverty through the following pillars: sustainable acceleration of growth, Infrastructure development, strengthening of human capital, improving the qualities of governance, promotion of the sustainable development.

weak and plagued with unfair deeds consisting of corruption, theft, missinvoicing etc. These unfair deeds are due to the lack of sophisticated way of collecting taxes at the borders.

According to the US Department of State, corruption in the customs service is still a serious problem in Benin. In 2011, the government had reported that the country loses each year almost 3 billion due to tax evasion. Business Executives gives the efficiency of customs procedures (formalities regulating the entry and exit of merchandise) in Benin a score of 3.7 on a 7-point scale (1 being 'extremely inefficient' and 7 'extremely efficient')⁸ and in term of irregular payments and bribes, and the diversion of public fund Benin is ranked respectively 124/142 and 115 over 142. In a survey conducted by the World bank in 2009, 24.5% of the surveyed companies reported that they expect to give gifts in order to obtain an import license⁹. Also the World Bank and African Development Bank in a 2007's survey have reported that 79% of the household respondents consider the custom administration to be the most corrupted institution in Benin¹⁰. Clearly the Benin's custom administration is extremely plagued with wrong doings that contribute to lower government's tax revenue. Being aware of such unlawful deeds, the government had initiated some reforms. The first one is the upgrading of the tax system and the establishing of a risk management system for good selection. The second but unsuccessful reform is the purchasing of scanner in 2011. Indeed, Benin Control¹¹ was appointed by the Government for the execution of a new generation PVI. The control implemented through PVI concerns all imports of private and public sectors, irrespective of the customs tariff, excluding the regimes of transit, re-export and temporary admission. It's implemented through multiple processes. First goods are subjected to a pre-shipment inspection, itself subjected to documentary verification by Benin Control. This control is compulsory because it helps to check the price and the customs code of the transaction. After all the Risk has been analyzed and taken into account, Bureau Veritas, a Benin control's partner, administrates a physical inspection of the imported goods in order to check if they match with the description given by the importer. Having been controlled in each step of the import process, the importer has less incentive to evade taxes. The purchasing of the scanners during the PVI reforms was a wonderful achievement. But unfortunately the contract has been resigned. In 2014 the PCV has been introduced as another reform so to increase the government revenue¹².

Benin's tax administration (Direction Générale des Impôts et des Domaines) like custom administration, is working also under the control of the Benin's ministry of finance. It is responsible of the collection of taxes on personal income, corporation taxes which are direct taxes and value added tax that is an indirect tax on consumption, for the public treasury. The corporation taxes vary according to the nature of the operation. Industries are taxed at a proportional rate of 25 % while legal persons other than the industries are subjected to a tax rate of 30%. Regarding the benefits from the research, exploitation, production and sale of natural hydrocarbons, including transportation operations, the corporation tax is between 35%

⁸ World Economic Forum: The Global Competitiveness Report 2011-2012

⁹ The World Bank & IFC: Enterprise Surveys 2009:

¹⁰ La corruption et la gouvernance au Benin rapport des résultats de l'enquête diagnostique, Juin 2007

¹¹ It is the private institutions appointed by the government for the execution of a new generation Program of Verification of Imports

¹² <<http://www.douanes-benin.net/>>

and 45 % depending on the contract terms¹³. Taxes on personal income vary from 0% to 45% according to the source of the income. Regarding the VAT which is tax on consumption, Benin adopted a single rate¹⁴ of 18%. Benin has a well-structured tax rate system. However, the tax collection technique is not sophisticated since it is done manually. This gives rise to some unlawful practices. Tax collection agents are plagued with corruption and the taxpayers have low fiscal civism. Services delivered by Benin's tax administration have low quality. And this has increased a lot the institutionalization of non-official payments. In a survey directed by World Bank and African Bank for development, services like taxes have high percentage of frequency of corruption. In the same survey, 28% of the surveyed have declared that tax administration is plagued with corruption¹⁵. Many reforms have been introduced. In 2015, the unique tax payment number (unique tax identification number) has been adopted and the one-stop business and tax registration for micro and small firms is developed. In the last reform set in 2016, electronic tax payments have been introduced. The tax payer has the possibility to transfer his fiscal payment via his bank account.

Though a couple of reforms have been introduced in both tax and custom administration, the lack of coordination between tax and customs administration has prevented the coherent and full efficient use of the unique tax identification number according to IMF¹⁶.

1.2-Snapshot of Benin's majors imports partners

Many countries export their products toward Benin. After its independence, in 1960, the major import partner of Benin was France. But gradually China comes into the scene as an import partner and then surpassed France. From 1995 to 2013 China and France are the major partners of Benin. Until 2005, the imports of Benin from China and France were closed. But after 2005, the export of china in direction to Benin has exploded and turn around 800 millions of dollar (US) where the France's exports toward Benin remains below 200 million of dollars (US)(see figure 1 below). Figure 2 displays the share of imports by countries in total imports. For exemple, in 2013 the shares of Benin's import from its majors import partners are: China(33.5%), France (8.5%), United-state (7.2%), Malaisia (6.5%), Thailand (4.7%), Netherland (4.5%), United-Kingdom (3.8%), India (3.6%), Belgium (2.6) and Togo(2%)¹⁷. But since 2014, based on data from Benin National Institute of Statistics and Economics Analysis, India and Thailand have become the majors import partners. Since data on Thailand are not enough available, the study will be focused on France, India and China. From these countries, Benin imports variety of products such as animals, vegetables, foods, minerals, fuels, chemicals, plastics, hides and skins, woods, textiles, metals, miscellaneous, and electric equipments. In 2014, the majors Benin's products imported from France, India and China are respectively chemical, vegetable and transportation¹⁸.

¹³< <http://www.impots.finances.gouv.bj/systeme-fiscal/is/>>

¹⁴ See art 232 of the CGI (Code Genaral de l'Impôt) of Benin and <http://www.impots.finances.gouv.bj/systeme-fiscal/tva/>

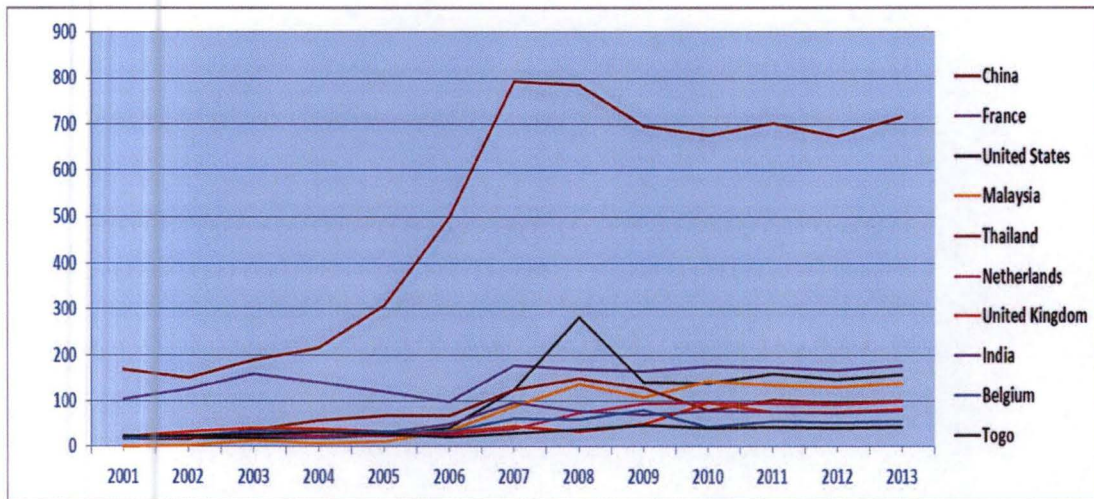
¹⁵ La corruption et la gouvernance au Benin rapport des résultats de l'enquête diagnostique, Juin 2007

¹⁶ IMF Country Report No. 16/6

¹⁷ Merchandise trade matrix, imports and exports of total all products, annual, 1995-2013.

¹⁸ See in the annex the import structure of Benin

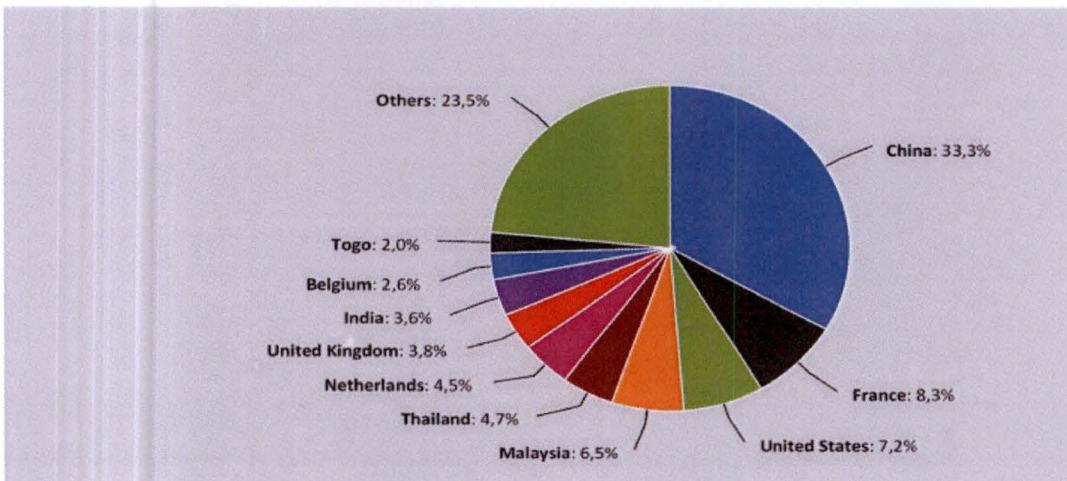
Figure 1: Benin's partners imports - million US\$



Source: Merchandise trade matrix, imports and exports of total all products, annual, 1995-2013

Figure 2: Share of the imports by country in total imports

Share of imports by country in total imports



Source: Merchandise trade matrix, imports and exports of total all products, annual, 1995-2013

Source: Merchandise trade matrix, imports and exports of total all products, annual, 1995-2013

2-LITERATURE REVIEW

2.1-Theoretical literature review

The concept of tax evasion is a complex multidimensional issue. It is a complex issue by its unobservable nature. More or less theoretical studies have been developed on the question of tax evasion.

The first and seminal work is the one developed by Allingham and Sandmo (1972). In this classic 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. The model has suggested that, when the probability of being detected by authorities and the penalty rate are high, tax evasion tends to be reduced or low, and when the tax rate increases, the tax evasion tends to increase or to decrease due to the competition between the substitution effect and the income effect. The substitution effect is negative and the income effect is positive. The substitution effect is negative because an increase in tax rate increases the marginal return of successful evasion less than the marginal cost of being detected and the income effect is positive because an increase in the tax rate reduces the taxpayer's disposable income and wealth and increases tax evasion under decreasing absolute risk aversion. The outcome depends on the individual risk aversion (Crane & Nourzad, 1990) or depends on the particular assumption of risk aversion and the punishment for evasion (Fishman & Wei, 2004). The impact of tax rate on income evasion, regarding the Allingham's model is then ambiguous. The model had been exposed to the lens of critics and recent studies have questioned either, the ambiguous relation between the tax rate and the tax evasion or its private economics-based aspect or the expected utility function used. Based on the A-S model, if the substitution effect is greater than the income effect, the outcome of the model may be strange since it may lead to negative relation between tax rate and tax evasion. Yitzhaki (1974) solve the problem of ambiguous relation¹⁹. He assumed that if the penalty rate is proportional to the tax underreported (instead of income underreported), the tax rate has no effect on evasion game. Then when the tax rate increases, the cost of a detected understatement of taxes increases in the same proportion as the reward obtained from a successful understatement of taxes, so the ratio reward-to-risk remains unchanged. In this situation, only the income effect will prevail. For instance, if the tax payer's absolute risk aversion increases when after-tax income decreases, a higher tax rate will lower tax evasion (Slemrod, 2007). After, Clotfelter (1983) had stressed on the fact that an increase in the tax rate will result in an increase in the propensity to evade tax. (Yalama & Gumus, 2013). The A-S model has been extended by Marrelli M.(1984) and Marrelli & Martina (1988) on a risk-averse firm in general and on a risk-averse oligopolistic firm respectively (Levin & Widell, 2014) since tax evasion is not only about individual taxpayers but also about firms.

Cowell & Gordon (1998) consider tax evasion as a public economics' issue and developed a public theory of tax evasion. the model developed is not only about how tax rate impacts tax evasion but also how the production of public goods is influenced. The production of public goods is in the interest of the taxpayer and when it is not produced, the taxpayer changes his or her behavior. Based on the outcome of this model, an increase in tax rate increases tax evasion if the provision of public goods doesn't follow tax collection. Economic agents prefer to maximize their utility by spend tax evaded more on private consumption. But

¹⁹ The ambiguous relation is both the positive and the negative relation between tax evasion and tax rate. Contrary to Allingham and Sandmo who consider that tax rate is proportional to the income understated, Yitzhaki (1974), suggests that if tax rate is proportional to the tax understated, the a higher tax rate has only an income effect. The substitution effect vanishes. This can be explained by the fact that the cost of the detected understatement of the tax and the reward from successful understatement of tax, increase in the same proportion as tax increases. Then an increase in tax rate will reduce tax evasion. this is contrary to common empirical evidences and economic intuition See, Slemrod (2007).

there is a negative relationship between tax rate and evasion if the government is sincere when using tax revenue to provide public goods. This model is very critic vis-à-vis of the classic model of tax evasion of Allingham and Sandmo. According to this model, the factors that determine the tax evasion are moral rules, the taxpayer's perception of the fairness of the tax system and the burden; and the last one is the degree of satisfaction that taxpayers have with respect to the provision of public good and services (Christie & Holzner, 2006).

Eide (2002) reexamined the A-S model by replacing the expected utility function by Rank-dependant utility function²⁰ known as the dual theory of choice under uncertainty. The outcome displayed that rank-dependant utility function is a particular case of the expected utility developed in the A-S model. In term of comparative statics, the results are the same. In the same line, Sandmo (2005) has cast a retrospective view on the A-S model by examining the contribution of the black labor market on tax evasion. This extension has also introduced both the evasion by firms and the analysis of tax incidence. The results suggest that firms not only evade the payment of indirect taxes; they also evade corporate income taxes. And also, when labor black market is integrated, private gains from tax evasion is divided between employers and workers. According to Chen & Chu (2002) criticizing the A-S model, tax evasion is not only about indirect tax, but also about corporate tax; what's more A-S model is inadequate in the sense that it fails to separate ownership and control, which is a very important step in understanding corporate tax evasion. Their model, in the frame of separating managers and shareholders, yields interesting results: any policy tempting to control evasion may essentially be affected by the penalized actor, the corporation or the manager.

Clearly in the aforementioned theoretical literature, models are based on simplified assumptions and, therefore, are oversimplified. It's then important to shed light on more empirical literature.

2.2-Empirical literature review

Numbers of studies have addressed the question of tax evasion either in poor countries or in developing countries. Based on the theoretical works, individuals' true income, tax rate, the probability of the evader to be detected and the penalty rate are the main factors usually cited as determinants of tax evasion (Crane & Nourzad, 1990). Other factors such tax burden, source of income, public services, tax mentality, tax morale, age, gender, marital status, education tax system, democracy, bureaucracy, tax administration are summarized by Yalama & Gumus (2013, p. 18). In the following development, studies that have sought to test some theoretical aspects of tax evasion are presented.

Crane & Nourzad (1990) examine the impact of the tax rate on the income tax evasion using California Tax Amnesty Program data. To do so, they regress tax evasion on the range of determinants such tax rate, income, audit probability (as a proxy for probability to be detected which is a dummy variable), taxpayer characteristics (age, race, occupation, marital status). Tax evasion is measured by evaded taxes, taxable income gap, and adjusted gross

²⁰ The rank-dependent expected utility model is a generalized expected utility model of choice under uncertainty. It explains the observation that many people both purchase lottery tickets (risk-loving preferences) and insure against losses (risk aversion).

income gap, used as regressands for three equations. Those equations have been estimated by ordinary least square. Their findings contend that the higher the marginal rate, the higher the tax evasion and the higher the incomes of individuals are, the more likely they evade income. What's more, the study asserts that absolute effect of the income and the tax rate changes are larger for the income-based measures of the evasion.

In the same line, in a study, Hnnemann & Pommerehne (1996), have analyzed the determinants of the tax evasion in Switzerland. The study is an empirical analysis of the income tax noncompliance. Their results suggest that there is a positive correlation between noncompliance and marginal tax burden and a negative relation between noncompliance and probability of the audit. What's more, their findings suggest that the penalty rate has no impact on income tax rate evasion.

Studying the relation between the tax rate and the tax evasion at the individual level, Alm & Jackson (1992), regressed the tax compliance on fiscal instruments such income, audit rate, tax rate and public goods. Their results suggest that tax compliance is positively related to the income, the audit rate, and the public goods, but negatively related to the tax rate.

Fishman & Wei (2004) have assessed tax evasion in China using missing imports (trade gap) as a proxy of tax evasion. Their results suggest that tax evasion is positively related to the tax rate. That an increase in the tax rate of one unit increases the tax evasion by three units as Clotfelter (1983) had documented, but contradicted the results of Alm & Jackson (1992). They also assessed if tariff evasion captured as missing imports is driven by mislabelling higher-taxed products as lower-taxed products. They found that the evasion gap and the tax rate on closely related product are negatively correlated. Thus in China, tax evasion is not only caused by an increase in tax rate but also driven by mislabelling higher-taxed products as lower-taxed products. The same results have been found by Levin & Widell (2014) who have used the same methodology based on Kenya and Tanzania. Using the trade flows between the two countries, they found that the coefficient of the tax rate in Tanzania in 2000 is 2.6 and 3.5 in 2004. Tax evasion in Tanzania thus has increased over time and is nearer to that found in the case of China by Levin & Widell (2014, p. 157). But no evidence in underreporting in unit value is got in the case of Kenya in 2000 and 2014. This suggests that tax evasion is less in Kenya than in Tanzania. Assessing mislabelling as a driver of tax evasion, the results show that tax evasion is due to mislabelling in Kenya but not in Tanzania.

Before Levin & Widell (2014), Dunem & Arndt (2009) have assessed the relation between border tax rate and evasion in Mozambique, using the methodology used by Fishman & Wei (2004). Their findings suggest that a positive relation between missing import and tax rate leading to a positive relation between tax evasion and tax rate. What's more misclassification or "fraudulent classification" drives tax evasion in Mozambique.

Other studies emphasizing on the positive relation between tax evasion and tax rate (or tariff rate) have been documented. Bouët & Roy (2012) found that an increase in tariff rate by one point increases tax evasion by 1.4 in the same way approximately in Kenya and Mozambique through a very comparative study. In Tanzania, Mpango (1996) documented

that high tariff rate commands about 20 % increment of under-invoicing import (Levin & Widell, 2014).

3-METHODOLOGY AND DATA

3.1-Methodology

This paper is aiming at four objectives. The first objective is to estimate the overall level of tax evasion in Benin and where the chunk of this evasion occurs basing on its major import trade partners (India, France and China), and to show which specific imported commodities and which specific trade partners face more tax evasion in Benin. The second objective is seeking to assess the impact of the tax rate on measurement error which represents the ratio between exports in Benin relatively to its major import partners. To do so, imports and exports reported both in value and in quantity will be made of use. The third objective is to analyze whether the trade gap is a consequence of mislabeling higher-taxed products as lower-taxed products basing on both the quantity and the value of the trade flows. The fourth is to assess the difference in magnitude of tax evasion on products imported from these partners. When dealing with tax evasion the fundamental problem really faced is how to measure tax evasion. On this issue, there is no reliable data since tax evasion is unobserved. To capture tax evasion, or to the less extent tariff evasion, E and B are supposed to be hypothetical countries. For all good imported by E from B, Exp_{qb} is the quantity reported by B and Imp_{qe} is the quantity reported by E. Equally, expressed in value, the import of E from B reported by E is Imp_{ve} , and Exp_{vb} when it is reported by B. From the approach developed by Levin & Widell (2014) based on the findings of Fishman & wei (2004) and Dunem & Arndt (2009) there is no tax evasion if $Exp_{qb} = Imp_{qe}$ (respectively $Exp_{vb} = Imp_{ve}$). In a sens, $\text{Log}\left(\frac{Exp_{qj}}{Imp_{qj}}\right) = 0$. For this work, tax evasion is captured by trade gap. Indeed, the

discrepancy between the value of exports recorded by the exporting country and the value of imports recorded by the importing country may be caused by the underreporting the unit value, the underreporting the quantity, mislabeling or misclassification of higher-taxed products as lower-taxed products or by smuggling. On top of that, the discrepancies in the trade flows, in the literature, are explained also by other factors. The first one is related to the fact that exports are reported at FOA whereas imports are reported at CIF and this may create discrepancy. Different trade recording systems for imports and exports, differences in definitions of trade partners; differences in thresholds for recording international trade which, by extension, differences in timing of measurement and re-export between countries are also good candidate for explaining the trade gap (Guo, 2009).

Since the trade gaps are considered as measurement errors in a whole, and searching to document if, in the case of Benin, they are high for highly taxed products, the problem is solved. Another caveat pointed out by Bhagwati is related to the necessity to isolate the country in which the transacting parties reported the actual invoice value to customs officials. If trade data on both sides are not sophisticated, using the discrepancy may be biased²¹. This

²¹ GFI (2014), Hiding in Plain Sight: Trade Misinvoicing and the Impact of Revenue Loss in Ghana, Kenya, Mozambique, Tanzania, and Uganda: 2002-2011. Page 5.

problem also is solved since the three import partners have more solid custom administration than Benin. It follows that the discrepancies are biased towards Benin.

For the first objective, tax evasion is measured by the logarithm of the ratio exports-import between Benin and its major trade partners. To evaluate which country faces more tax evasion, making use of descriptive statistics, the average trade gap at the six-digit level both in value and in quantity for all imports from India, France and China has been compared. Tax evasion is thought to be higher on products that Benin imports from country X, compared to country Y if the average trade gap is higher on all products from X than the average trade gap on all imports from Y. To assess which product is exposed to tax evasion in all imports from India, France and China, trade gap for each category of products has been calculated in value at the two-digit level for the year 2014. Estimating the level of import invoicing in developing countries when importing from developed countries and losses of tax revenue the methodology used by GFI²² (2014) has been utilized. Contrary to the formula used by GFI (2014), the following formula generates the agregat import invoicing on each good imported by Benin from France, India and China.

Import misinvoicing = $\sum_{i=1}^k MiBc/CIF - XicB$ where Where M are imports, X are exports, CIF is the cost of freight and insurance, taken to be 10 percent of the imports reported by Benin, used to deflate the cost of imports. $MiBc/CIF$ is the import reported by Benin net of the cost of freight and insurance. The subscripts i, B, and c stand for goods, Benin and country from which a given good i is imported from (China, France and India). For example, M_{iBc} represent Import of Good i from Country c reported by Benin, X_{icB} is the export of good i by country c (China or France or India) toward Benin reported by c. The import invoicing is calculated on imports from the three countries (France, China and India), From which revenue losses has been generated.

For the second objective, to examine whether tax rate has an influence on tax evasion, , tax evasion is still measured by the ratio between logarithm of exports and imports measured in quantity as well as in value. It is intuitive, in the sense that, in the absence of tax evasion, the ratio is supposed to be equal to one, put another way, the logarithm of the ratio is supposed to be equal to zero. And when there is difference in trade gap in value and in quantity, tax evasion can be seen as a mispricing (underreporting in unit value) and underreporting in quantity. Then a linear relation has been specified using the logarithm export-import ratio as a dependent variable and tax rate as dependent variable. The following empirical models are based on the intuition behind Allingham and Sandmo (1972) and the empirical models of Levin & Widell (2014) and Fishman & wei (2004).

In terms of value reported, the linear equation²³ is:

²² Global Financial Integrity

²³ To control for electronic control of goods imported from France in 2011, a dummy variable has been introduced. It takes the value 1 if a good has been controlled trough a scanner and 0 if not. Then the gap either in value or in quantity has been regressed on tax rate and on pvi, as the dummy variable. We would have also controlled for the electronic control (Programme de certification des valeurs) introduced by the government in 2014. But we lack information on goods really controlled. The good exempted from electronic control are: Precious stones and metals; Objects of art; Explosives and pyrotechnic articles, ammunitions and arms other than for hunting and/or sport, similar materials and equipment imported by Army itself; Live animals; Scrap metals and used tyres; Plants, seeds and products of floriculture; Cinematographic films,

$$\text{Log} \left(\frac{\text{EXP}_V}{\text{IMP}_V} \right)_j = \gamma + \delta \text{Tax_rate}_j + \varepsilon_j \quad (1)$$

In terms of quantity reported, the previous equation becomes:

$$\text{Log} \left(\frac{\text{EXP}_Q}{\text{IMP}_Q} \right)_j = \gamma + \delta \text{Tax_rate}_j + \varepsilon_j \quad (2)$$

Where the tax rate is the sum of the tariffs and the value added tax²⁴. δ is expected to be positive if evasion is due to an increase in tax rate. This coefficient can be interpreted as following: if tax rate has been increased by one unit, the gap between imports and exports due to tax evasion increases by δ %. Levin & Widell (2014) have suggested 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 zone²⁵. Then, in the same way, tax rate is supposed to be exogenous.

Usually thing doesn't work as it is thought about tax evasion. The imports reported by E may be different from those coming from country B. Actually the imports reported by E take into account direct imports from B and indirect import or transshipments through B. For example, indirect imports to Benin may be exports of US to Benin passing through China or France. It is difficult to disentangle indirect imports to genuine imports. To be clear, Benin may have reported imports from France or China (IMP^*) contain some share of imports misclassified as direct imports such that $\text{IMP}_j^* = \text{IMP}_j + \text{Misclassified indirect import}_k$.

Assuming that IMP_j is the true import of Benin from its partner and IMP_j^* the misclassified direct import²⁶. IMP_j^* can be expressed as following:

$$\text{IMP}_j^* = (1 + \varphi_j) \text{IMP}_j \quad (3)$$

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

$$\text{From (3), the following is derived: } \text{IMP} = \text{IMP}_j^* / (1 + \varphi_j). \quad (4).$$

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

$$\text{Log} \left(\frac{\text{EXP}_V}{\text{IMP}_V^*} \right)_j = \gamma^* + \delta \text{Tax_rate}_j + \mu_j \quad (5)$$

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 a white noise. This finale

exposed and developed; Current newspapers and periodicals; Medicines and pharmaceuticals; Personal effects and domestic products including one second-hand car; Post parcels; Gifts to physical and moral persons of public law; Imports of Administrations for their own account; Goods for diplomatic and consular missions, and organisms depending on UNO, imported directly by themselves or for their own needs; Commercial samples; Goods totally exempted from taxes (fiscal tax and VAT). Due to the information that is at disposal we control only for: live animals, plant and seeds, scrap metal, stones and metals.

²⁴ Tax rate is compute as sum of tariff and VAT by Fishman & wei, (2004).

²⁵ Then this holds, because Benin is member of WAEMU.

²⁶ This terminology has been used by Dumen and Arndt (2009) and by Levin & Widell(2014).

transformation – the equation (5) – will be used to capture the effect of tax rate on tax evasion.

About the third objective, seeking to assess if tax evasion is due to mislabeling or misclassification of higher-taxed products as lower-taxed products, another variable has been added to the previous equations as a second regressor. For a particular good j , its similar goods are defined to be those belonging to the same four-digit category. To do so, $atax_rate_sim$ is then defined to be the average tax rate of $(k-j)$ products similar to product j at four-digit level weighted by the export value reported by France import partners. The following equations have then been regressed both in value and in quantity.

$$\text{Log} \left(\frac{EXP_V}{IMP_V^*} \right)_j = \gamma^* + \delta Tax_rate_j + \phi atax_rate_sim + \mu_j \quad (6)$$

$$\text{Log} \left(\frac{EXP_Q}{IMP_Q^*} \right)_j = \gamma^* + \delta Tax_rate_j + \phi atax_rate_sim + \mu_j \quad (7)$$

Tax evasion will appear to be caused by mislabeling or misclassification of higher-taxed products as lower-taxed products if ϕ is negative. To investigate this kind of tax evasion, negative coefficient of $atax_rate_sim$ means that, the higher the tax rate on the similar products, the lower the incentive for mislabeling the import of product j ; put another way, the lower the tax rate of product j , the higher the incentive to label product j as similar products.

To be sure whether the relation between tax rate and trade gap is linear or not, the following equation has been estimated both for value or quantity reported.

$$\text{Log} \left(\frac{EXP_{v \text{ or } Q}}{IMP_{v \text{ or } Q}^*} \right)_j = \gamma^* + \delta Tax_rate_j + \phi atax_rate_sim + \tau Tax_rate_j^2 + \mu_j \quad (8)$$

For the last objective, to assess the difference in magnitude of tax evasion on products imported from China, France and India the coefficients of tax rate in the equation (5) estimated have been compared.

3.2-Data

The data used in this paper source from World Integrated Trade Solution (WITS), also derived from Comtrade database. These data on trade flow (imports and exports) and tariff rate used are recorded at 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 in Benin on all goods imported from its major partners – China, France, and India –, imports from France, India and China reported by Benin in quantity and value (Imp) and exports of France, China and India to Benin, in value and quantity, reported by France, China and India are collected as well as tariff rate applied by Benin on all goods imports from those imports partners. To generate the tax rate, value added tax, fixed in Benin, has been added to tariff rate to obtain the tax rate. The years used in this paper are 2011 and 2014.

Table 1: Summary statistics of the trade flows between Benin and its majors imports partners at 6-digit level in 2014.

Table 1 gives a description of the main characteristics of the variables used in this study. Although quite important numbers of observations are available, it is important to point out that the numbers of observations are lower in the case of India than in the ones of China and France which have more diversified exports towards Benin. This suggests that the structure of imports of Benin from India is less diversified than the structure of Benin's import from China and France (Table 2 in the annex). The table 1 suggests that the average measurement errors (trade gap) in imports from China, France, and India are different at 6-digits level. In term of quantity, the average trade gaps on products imported from China (0.800) and India (0.410) are greater than the one on import from France (-4.253) and relatively higher on products from China. But in terms of value at 6-digit level, the average measurement error is higher on products from France (3.921) than on products from China (1.805) and India (0.705). At the more aggregated level, 4-digit level, the pattern of average trade gap is quite different. The table 3 in the annex shows that both on quantity and on value, tax evasion is higher in China and India than in France. The average measurement errors in value, on products from China, France and India are respectively 1.908, 0.252 and 1.026 and the average measurement errors in quantity imported are respectively 0.775, -0.407 and 0.651 on products from China, France, and India. This suggests that on average, tax evasion is much higher on products imported from the two Asian countries (China and India) than on the products imported from France and is much higher on products from China than on products from India.

Table 1: Summary statistics of the trade flows between Benin and its majors imports partners at 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
$\log(\frac{EXPq}{IMPq})$	0.8001	0.7160	-10.70	11.523	2.973	602
Tariff	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
$\log(\frac{EXPv}{IMPv})$	3.921	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
Tariff	13.092	10	5	20	6.931	1470
Tax rate	30.729	28	23	38	6.931	1470

Figure 3: Frequency distribution of tariff rate at 6-digit HS category on products from China (2a), France (2b) and India (2c) in 1994.

Panel 1c: India

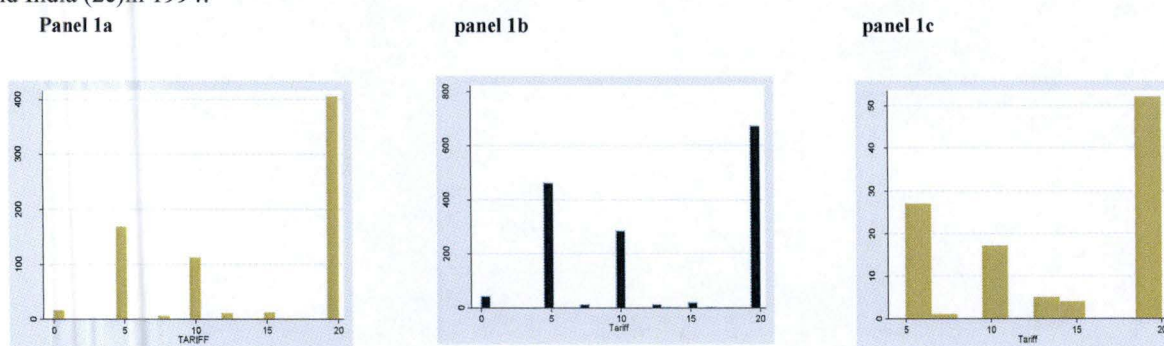
Tax evasion in Benin on goods from France	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation
Log(EXPv)	2.150	2.503	-6.907	12.447	3.664	607
Log(IMPv)	3.022	2.987	-2.995	12.932	2.773	129
$\log(\frac{EXPv}{IMPv})$	0.705	0.558	-7.247	2.266	2.904	129
Log(EXPq)	6.920	7.138	0	20.219	3.766	597
Log(IMPq)	8.606	8.927	0.693	20.094	3.281	129
$\log(\frac{EXPq}{IMPq})$	0.410	0.132	-7.854	11.023	2.969	128
Tariff	19.907	15	5	20	6.463	106
Tax rate	31.907	33	23	38	6.463	106

Source: Authors, based on WITS data, 2016

Beside the fact that the average measurement errors on trade flows at the more aggregated level are higher on the products imported from China and India than on the ones imported from France, the difference in the average trade gap in value and in quantity gives room to existence of many kind of tax evasion which are underreporting the quantities and underreporting per units values of imported goods.

Studying the data, it has been noted that the tax rate and the tariff applied on products imported from these three imports partners display the same pattern. The minimum 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's more, the average tax rate on products imported from China (32.60 %) and from India (31.90 %) are larger than the average tax rate applied to products imported from France (30.73 %) as it is mentioned in table 1. The following figure 1 is showing the frequency distribution of tax rate applied on products imported by Benin from China (panella), France (panellb) and India (panellc). Clearly, low variability is observed on tax rate applied by Benin on its major import partners at the 6-digit level. Also, the density distributions of the logarithm of the evasion ration in trade flows from China, France, and India have been plotted (See annex, figure 4). The density distributions of the trade gap in China, France and India, on value, are centered about the means. This implies a normally distributed pattern of value trade gap.

Figure 3: Frequency distribution of tariff rate at 6-digit HS category on products from China (2a), France (2b) and India (2c) in 1994.



Source: Authors, based on WITS data, 2016

In the analysis of the data, the import structure of Benin, basing of the three import partners has been made. The table 2 in the annex displays the results. One can see that Benin imports from China more foods products (5.19 %), chemicals (6.17 %), textiles and clothing (12.55 %), Stone and glass (5.84 %), metals (16.22 %), mechanical and electric devices (8.72 %) and transportation (25.9 %) (panel2a). From the panel 2b, one can see that animal product (20.41%), Foods (5.5 %), vegetable (7.217 %), Chemicals (28.8 %), the mechanical and electric device (17.64%) and transportation (5.76 %) are more imported from France whereas 93.34 % of Benin imports from India are vegetables. Looking closely at the average trade gap of each product imported from the three countries it clearly can be noted that the average trade gaps value on hides and skins, textiles and clothing, footwear, miscellaneous, and electric equipment, imported from China are high; and footwear, stone and glass, hides and skins imported from France have high measurement error whereas, textiles and clothing, foods and products, plastics and rubbers, footwear and metals are more subjected to tax evasion when they are imported from India (see table 2 in the annex). Overall, based on the higher average trade gap, footwear is more subjected to tax evasion on products imported from China and France whereas textiles and clothing are facing more tax evasion among products imported from India.

From this descriptive statistics, the first objective of the paper can be concluded. Between China India and France, as the major's imports partners of Benin, tax evasion is too high on products from China and India than products from France. The chunk of the evasion on products from China and France happens on footwear imported whereas the large chunk of evasion on products from India occurs in textiles and clothing; the import misinvoicing incurred by the country is estimated at 3.261.518.890 USD. This generates revenue losses for government estimated to 1.122.523.330 USD.. (See table 11 and table 12).

4- EMPIRICAL RESULTS

The results on the baseline model on value (equation 5) are presented in table 4. The results suggest that the coefficients of tax rate (δ) are positive and significant at the level of 1% on all equation estimated on tax evasion on products imported from France, India and China. This positive relation between tax evasion and tax rate fits what is expected. In the case of products imported from China, an increase in tax rate by 10 % increases tax evasion by 0.52 % and In the case of products imported from France and India, an increase of tax rate by 10 % increases respectively tax evasion by 1.28 % and 0.73 % (first lines). This positive relation between tax evasion and tax rate fits what is expected. These results converge to the one obtained by Levin & Widell (2014) on Tanzania tax evasion and by Fishman & Wei (2004) on tax evasion in China. The results appear to be robust although there are no outliers (line 1 is the same thing with line 3) because the coefficients of the tax rate from line 4 to 6 and the line 2 are quite the same thing. These results are underlying underreporting in value due to an increase in the tax rate on products imported from China, France, and India. Controlling for the electronic verification of good imported from France only in 2011, the gap trade both in quantity and in value have been regressed on tax rate and pvi, the dummy variable capturing the effect of electronic control. The results displayed in table 9 in the

annex, suggest that the tax rate has no effect on the value gap trade (equation 1, 2 and 3) whereas the electronic control have a negative impact (equation 2 and 3). In the equation 3, Tax_{pvi} has a positive impact on the measurement error in value since its coefficient (0.048) is positive and significant at the level of 5%. This coefficient is very low compared to the one obtained in case of no control for electronic verification (0.0685). However, in terms of quantity, the electronic control has no effect on the trade gap as well as the tax rate. Meaning that in 2011, on products imported from France, higher tax rate was not a determinant of underreporting in quantity. Comparing the results obtained on trade gap in value in table 4 for 2014 and table 9 for 2011, one can see first that, the discrepancies on trade flow are structural, secondly, that the discrepancies used as a proxy of evasion have evolved over time. That being said, this problem should be regarded as a great problem of the century in international trade flows and accordingly should be mitigated.

The same regression is also performed on quantity (transformed baseline model on quantity, table 5). The results show also a positive relationship between tax evasion and tax rate since the coefficient δ of the tax rate is statistically significant at 1 % level for the case of China (row 2) and statistically significant at 10 % level in the case of India. An increase of the tax rate applied on products from China by 10 % increases underreporting on quantities by 0.51 % and an increase of the tax rate on products imported from India by 10 %, increases the quantity measurement error by 0.6 %. However, on the contrary an increase of tax rate by 10 % on products imported from France reduced tax evasion by 0.7 %. Although this result is counterintuitive, it fits with theoretical results of Yitzhaki (1974) and Cowell & Gordon (1998). On the baseline model's results, an increase of tax rate causes underreporting both on quantity and value of products imported from China and India, and paradoxically, an increase of tax rate on products imported from France increases the underreporting in value and decreases the tax evasion on quantities imported. This two effect combine together could have lowered tax evasion on products imported from France.

Assessing if tax evasion, other than underreporting the quantity and mispricing, in Benin on products imported from China, France, and India, could have been triggered by mislabelling higher-taxed products as lower tax products, the equation 7 (augmented model) have been estimated and the results are presented in table 8. From the table 8, no evidence of mislabelling higher-taxed products as lower-taxed products on products imported from China and India is found since the coefficients of the tax rate on similar products weighted by the value of imports are not significant. However, in the case of France, to mean on products imported From France, there is evidence of mislabelling. The evasion gap is positively correlated to the tax rate on similar products and negatively correlated with the tax rate of the products. This means that if the tax rate on other products increases by one percent, tax evasion decreases on the products. This kind of results is also a case of mislabelling since the comovement between tax rate and tax evasion on one hand, and the comovement between tax rate and tax rate on similar products weighted by export value, on the other evolve in different direction. Based on the augmented model, one can draw the conclusion of a mislabelling on products imported from France.

Studying the nature of the relation between tax evasion and tax rate, evasion gap has been regressed on tax rate squared (equation 8). The results presented in table 7 show that the coefficients of tax rate squared are not significant in the cases of France, China, and India. This drives the conclusion that an increase in tax rate increases evasion gap through a linear relation. And so far, it is found that on products imported by Benin from France and China footwear is more hit by evasion and on products imported from India, textile and clothing are more subjected to tax evasion.

Assessing the magnitude of the tax evasion on products from the three important import partners of Benin, the coefficients of tax rate have been compared (tables 4). From this table in the annex, based on the positive trade gap (row 2) the coefficient of the tax rate is 0.071 on products from China and significance at one percent, and respectively 0.068 and 0.128 on products from France and India, also significant at one percent. This shows that the magnitude of tax evasion is higher on products from China and India than on product from France. This is very coherent and consistent with the evidence provided on the average evasion higher on products from China and India, than the one of goods coming from France. This result could be explained by the fact that France is more regulated than China and India.

CONCLUSION

This paper assesses tax evasion in Benin and how sensitive the tax evasion is with respect to the tax rate in one side and in the other, it has addressed the other main causes of tax evasion. Along the study, tax evasion has been captured by trade gap between Benin and its major import partners, China, France, and India. Using descriptive statistics and econometrics regression, the study yields great findings.

Descriptive statistics shows that on average tax evasion is higher on the products imported from China and India than on products from France, at the 4-digit level. Trade gap has been regressed on tax rate generated as the sum of tariff rate and value added tax both on product's value and quantity. The results suggest a high correlation between tax rate and tax evasion using both quantity trade flows and value trade flows on products imported from France, India and China. From these results, one can see that, based on the equation on the value trade flows, Benin average tax rate on import is already on the wrong side of Laffer curve as the situation of China (Fishman & Wei, 2004). That an increase of the tax rate increases tax evasion which likely is the main cause of low tax revenue in Benin. The results also hold that there is a case of underreporting both on values and on the quantities of goods imported from France and only underreporting on the values of products imported from China and India. No evidence of mislabeling higher-taxed products as lower-taxed products on products imported from China and India. But in the case of the France, there is evidence of mislabeling. On top of that, magnitude of tax evasion is higher on products from China and India than on products from France, and the average revenue losses by the Benin's government in 2014 due to tax evasion on products imported from these three countries is estimated at around one billions of dollars US²⁷.

The results are a good contribution to the literature review on tax evasion since such research has never been yet done in Benin. It will be helpful for Benin's authorities in that, it provides evidence for tax evasion in Benin, identifying imported products from its majors import partners, subjected to more to tax evasion and the country from which they are imported.

This study had been based only on the taxpayer behavior when tax rate changes. But, from the literature review, besides fiscal factor, many other factors such as economic, demographic and administrative factors influence the tax evasion or the tax-payers' behavior. These factors could be controlled for on the further studies when the individual will no longer be products in one country but developing countries in a given year. And besides this since institutions matter for development, it will be interesting in further research, based on developing countries, to control for corruption, the rule of law, regulation and other institutions' quality measurement²⁸.

²⁷ These losses are not exaggerate since according to a report of GFI developing countries have lost from 858.6 billion to 1.06 trillion dollars in illicit financial outflows in 2006 (GIZ, 2010, p. 20).

²⁸ In this work, we were not able to control for corruption, rule of law, regulation and other institutions' quality measurement for the fact that only yearly data are available in World Bank data whereas the individuals here are goods imported from

ANNEX

Table 1: Summary of the descriptive statistics of the trade flows between Benin and its majors imports partners at 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
Tariff	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
Tariff	13.092	10	5	20	6.931	1470
Tax rate	30.729	28	23	38	6.931	1470

Panel 1c: India

Tax evasion in Benin on goods from France	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation
Log(EXPv)	2.150	2.503	-6.907	12.447	3.664	607
Log(IMPv)	3.022	2.987	-2.995	12.932	2.773	129
$\log(\frac{EXPv}{IMPv})$	0.705	0.558	-7.247	2.266	2.904	129
Log(EXPq)	6.920	7.138	0	20.219	3.766	597
Log(IMPq)	8.606	8.927	0.693	20.094	3.281	129
$\log(\frac{EXPq}{IMPq})$	0.410	0.132	-7.854	11.023	2.969	128
Tariff	19.907	15	5	20	6.463	106
Tax rate	31.907	33	23	38	6.463	106

France, India and China. Meaning that, those data are not available at imported good level. Thus in a further research, generating the trade gap for each developing countries for a year, could have made it possible to control for them.

Table 2: Summary of Benin import structure at 2-digit level from its major partners in 2014

Table 2: Summary of Benin import structure at 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 FoodProducts	14485.9	18.41	36.41	1.784	5.191
4	25-26 Minerals	369.19	11.43	29.43	.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 Electric Equipment	24759.1	10.4	28.4	2.845	8.872
15	86-89 Transportation	72291.4	7.39	25.39	.2468	25.907
16	90-99 Miscellaneous	5975.62	16.29	34.29	3.253	2.141

Panel 2b: France

section	Codes and Product (2-digit HS-numbers)	Import value IN 1000 USD	Tariff in %	Tax rate in %	Gap value	Import sahare in %
1	01-05 Animal	60657.1	12.96	30.96	-.2469301	20.412
2	06-15 Vegetable	21448.1	13.19	31.19	-.0507441	7.217
3	16-24 Food and Products	16356.2	17.09	36.09	.7439127	5.504
4	25-26 Minerals	373.105	7.73	25.73	-.244678	0.126
5	27-27 Fuels	3232.67	6.21	24.21	.0022516	1.088
6	28-38 Chemicals	85610.5	9.48	27.48	.0374346	28.809
7	39-40 Plastics and Rubber	11678	12.80	30.80	-.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	.0142431	2.103
10	50-63 Textiles and Clothing	1956.69	18.46	36.46	.4115853	0.658
11	64-67 Footwear	843.376	18.3	36.3	1.698137	0.284
12	68-71 Stone and Glasse	2234.11	17.71	35.71	1.254474	0.752
13	72-83 Metals	9725.82	15.08	33.08	.1445503	3.273
14	84-85 Mechanical and Electic Equipments	52414.7	9.55	37.55	-.2469301	17.638
15	86-89 Transportation	17134.4	7.29	25.29	-.0507441	5.766
16	90-99 Miscellaneous	7141.8	16.21	34.21	.7439127	2.403

Panel 2c: India

Section	Codes and Product (2-digit HS-numbers)	import value	tariff in %	tax_rate in %	gap value	import share in %
1	01-05 Animal	392.13	15	33	1.9511	0.082
2	06-15 Vegetable	446335.477	16.25	34.25	-0.5513	93.3456
3	16-24 Food and Products	1252.347	18.68	36.68	2.5648	0.2619
4	25-26 Minerals	280.593	5	23	-0.4212	0.0587
5	27-27 Fuels	50.486	9.04	27.04	0.164	0.0106
6	28-38 Chemicals	8655.678	9	27	1.5651	1.8102
7	39-40 Plastics and Rubber	276.914	14.58	32.58	3.2896	0.0579
8	41-43 Hides and Skin	9.485	20	38	-1.4773	0.002
9	44-49 Wood	665.473	13.75	31.75	0.8406	0.1392
10	50-63 Textiles and Clothing	1431.821	19.55	37.55	4.059	0.2994
11	64-67 Footwear	44.976	15	33	2.7702	0.0094
12	68-71 Stone and Glasse	940.023	14.95	32.95	1.1292	0.1966
13	72-83 Metals	9083.176	14.99	32.99	2.1317	1.8996
14	84-85 Mechanical and Electic Equipments	6273.599	9.185	27.185	1.4872	1.312
15	86-89 Transportation	1935.796	10.63	28.63	1.6679	0.4048
16	90-99 Miscellaneous	525.85	17.18	35.18	1.1559	0.11

Table 3: Summary of the descriptive statistics of the trade flows between Benin its imports partners at 4-digit level in 2014

Table 3: Summary of the descriptive statistics of the trade flows between Benin its imports partners at 4-digit level in 2014

Panel 3a: China

Tax evasion in Benin	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation
Log(EXPv)	5.914	6.140	-1.714	13.654	2.649	428
Log(IMPv)	3.705	3.688	-2.645	10.883	2.385	513
$\log(\frac{EXPv}{IMPv})$	1.908	2.010	-7.056	9.480	2.493	428
Log(EXPq)	10.988	11.332	0.931	17.384	3.197	320
Log(IMPq)	10.307	10.587	0	17.530	2.855	374
$\log(\frac{EXPq}{IMPq})$	0.775	0.841	-8.656	10.487	2.664	275
Tariff	13.98	16.46	0	20	6.405	506
Tax rate	31.88	34.46	18	38	6.405	506

Panel 3b: France

Tax evasion in Benin	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation s
Log(EXPv)	3.942	4.023	-4.961	11.138	2.450	522
Log(IMPv)	3.173	3.215	-5.521	11.184	2.587	652
$\log(\frac{EXPv}{IMPv})$	0.252	0.199	-7.328	7.239	1.925	521
Log(EXPq)	8.053	8.200	0	17.078	3.130	416
Log(IMPq)	8.209	8.414	0	17.041	3.203	480
$\log(\frac{EXPq}{IMPq})$	-0.407	0.125	-10.084	7.928	2.456	372
Tariff	12.986	11.670	0	20	6.525	642
Tax rate	30.986	29.670	18	38	6.525	642

Panel 3b: India

Tax evasion in Benin	Mean	Median	Minimum	Maximum	Standard Deviation	Number of observation s
Log(EXPv)	2.552	2.844	-6.907	12.453	3.463	340
Log(IMPv)	3.094	3.345	-2.764	13.004	2.677	139
$\log(\frac{EXPv}{IMPv})$	1.026	1.049	-6.587	9.972	2.861	139
Log(EXPq)	7.596	8.071	0	20.224	3.789	266
Log(IMPq)	9.297	9.546	1.791	20.194	3.101	95
$\log(\frac{EXPq}{IMPq})$	0.651	0.604	-8.277	12.534	3.187	92
Tariff	13.22	12.5	2.5	20	6.514	323
Tax rate	31.22	30.5	20.5	30	6.514	323

Table 4: Results of the transformed baseline model on value

Tax evasion on products from China	Constant	Tax_rate	R ²	N
	γ	δ		
Total sample	-0.193 (0.502)	0.052 (0.015)***	0.021	717
excluding products which trade gap is lower than 10th percentile	0.016 (0.425)	0.071 (0.012)***	0.044	651
excluding outliers from 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 product	-0.219 (0.726)	0.065(0.021)***	0.021	447

Tax evasion on products from France	Constant	Tax_rate	R ²	N
	γ	δ		
Total sample			0.070	956
	-.229(0.485)	0.128 (0.014)***		
excluding products which trade gap is lower than 10th percentile	2.350 (.414)***	0.0685 (0.012)***	0.033	858
excluding outliers from 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 product	1.392(0.60)**	0.0864(0.018)***	0.032	677

Tax evasion on products from India	Constant	Tax_rate	R ²	N
	γ	δ		
Total sample	-1.459	0.073(0.043)*	0.03	126
excluding products which trade gap is lower than 25th percentile	-2.024(1.195)	0.128(.0369)***	0.13	78
excluding outliers from trade gap	-1.459(1.416)	0.073(0.043)*	0.03	126
excluding products lacking tax on similar products	-1.351(1.833)	0.068(0.055)	0.02	64
excluding products lacking observation on quantities	-1.438(1.423)	0.072(0.437)*	0.03	105
excluding products lacking observation on quantity and similar product	-1.313(1.84)	0.067(0.056)	0.023	63

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 5: Results of the transformed baseline model on quantity

<i>Tax evasion on products from China</i>	Constant	Tax_rate	R ²	N
	γ	δ		
Total sample	-0.029 (0.707)	0.020 (0.206)	0.002	550
excluding products which trade gap is lower than 25th percentile	0.271 (0.547)	0.051(0.001)***	0.020	418
excluding outliers from 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 product	0.368(0.791)	0.018 (0.023)	0.001	445

<i>Tax evasion on products from France</i>	Constant	Taxe_rate	R ²	N
	γ	δ		
Total sample	-2.10 (0.559)***	-0.069 (0.017)***	0.02	821
excluding products which trade gap is lower than 90th percentile	4.32 (0.959)***	-0.09 (0.031)***	0.08	78
excluding outliers from 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 product	-0.069 (0.628)*	-0.0963 (0.019)***	0.03	676

<i>Tax evasion on products from India</i>	Constant	Tax_rate	R ²	N
	γ	δ		
Total sample	-1.365 (1.466)	0.060 (0.045)	0.01	105
excluding products which trade gap is lower than 25th percentile	-0.406 (1.32)	0.067 (0.04)*	0.03	78
excluding outliers from trade gap	-1.365 (1.466)	0.060 (0.045)	0.02	105
excluding products lacking tax on similar products	-0.747 (1.839)	0.04 (0.055)	0.01	63
excluding products lacking observation on value	-1.365 (1.46)	0.06 (0.45)	0.02	105
excluding products lacking observation on value and similar product	-0.7472 (1.839)	0.04 (0.055)	0.01	63

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 6 : Assessment of the linearity in relation trade gap-tax rate on value model

Tax evasion on products from China	constant	Tax_rate	Tax_rate ²	atax-rate_sim	R ²	N
	γ	β	τ	ϕ		
Omitting tax_rate ² and atax_rate_sim	-0.193 (0.502)	0.0622(0.015)***			0.023	717
Omitting atax_rate_sim	-6.657(4.73)	0.50(0.319)	-0.007(0.005)		0.025	717
Full regression	-8.40(5.37)	0.627(0.362)	-0.009(0.058)	2.16e-11(2.65e-11)		
Excluding products lacking observations on quantity	-7.66(6.42)	0.566(0.427)	-	4.46e-09(1.25e-09)		
			0.0081(0.006)			
Tax evasion on products from France	constant	tax_rate	tax_rate ²	atax_rate_sim	R ²	N
	γ	β	τ	ϕ		
Omitting tax_rate ² and Atax_rate_sim	-0.229(0.485)	0.128 (0.014)***			0.070	956
Omitting atax-rate_sim	-6.85(4.39)	0.576(0.296)*	-0.002(0.004)		0.073	956
Full regression	-7.224(4.85)	0.593(0.326)*	-0.007(0.005)	-4.02e-06(5.8e-06)	0.088	810
Excluding products lacking observations on quantity	-0.245(5.199)	0.174(0.346)	-0.001(0.055)	-6.08e-06(2.64e-06)**	0.043	677
Tax evasion on products from India	constant	tax_rate	tax_rate ²	atax_rate_sim	R ²	N
	γ	β	τ	ϕ		
Omitting tax_rate ² and atax- rate_sim	-1.459	0.073(0.043)*			0.03	126
Omitting atax_rate_sim	-0.215(12.05)	-0.011(0.811)	0.001(0.013)		0.03	106
Full regression	0.902 (16.13)	-0.091(1.089)	0.002(0.017)	3.42e-7(7.02e-7)	0.03	64
Excluding products lacking observations on quantity		0.001(1.13)	0011(0.0184)	3.25e-07(7.10e-07)	0.023	63

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 7 : Assessment of the linearity in relation 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	β	τ	ϕ		
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	β	τ	ϕ		
Omitting Tax_rate ² and atax_rate_sim	-2.1(0.559)***	-			0.019	821
		0.069(0.016)***				
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
Tax evasion on products from India	constant	tax_rate	tax_rate ²	atax_rate_sim	R ²	N
	γ	β	τ	ϕ		
Omitting Tax_rate ² and atax_rate_sim	-1.365(1.466)	0.060(0.045)			0.02	105
Omitting atax_rate_sim	6.237(12.676)	-0.453(0.853)	0.008(0.014)		0.02	105
Full regression	5.228(16.759)	-0.365(1.133)	0.006(0.018)		0.01	63
Excluding products lacking observations on value	5.22(16.759)	-0.365(1.13)	0.006(0.018)	3.78e-08(7.07e-07)	0.01	63

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 8 : Assessment of mislabelling higher-taxed products as lower-taxed products on the quantity model

Table 8 : Assessment of mislabelling higher-taxed products as lower-taxed products on the quantity model

Tax evasion on products from China	Constant	Tax_rate	Atax_rate_sim	R ²	N
	γ	β	ϕ		
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 France	constant	Tax_rate	Atax_rate_sim	R ²	N
	γ	β	ϕ		
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
Tax evasion on products from India	Constant	Tax_rate	Atax_rate_sim	R ²	N
	γ	β	ϕ		
Omitting atax_rate-sim	-1.365(1.466)	0.609(0.045)		0.02	105
Full regression	-0.749(1.872)	0.04(0.056)	6.39e-09(6.96e-07)	0.01	63
Excluding products lacking observations on Atax_rate_sim	-0.747(1.84)	0.04(0.055)		0.01	63

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 9: Results on the impact of electronical control on trap gap between Benin and France in 2011

Table 9: Results on the impact of electronical control on trap gap between Benin and France in 2011

Dependent variables	Gap_v			Gap_q		
Equations	(1)	(2)	(3)	(1)	(2)	(3)
constant	-.0289(.319)	.223(.35)	1.31(.580) **	0.209(0.383)	0.107(.423)	.31(.695)
Tax_rate	.008(.01)	.005(.01)	-.027(.016)	-.0126(.017)	-.011 (0.332)	-.017(.02)
pvi		-.235 (.13) **	-1.85 (.698) ***		.094(.166)	-.207(.83)
Pvi*tax_rate			.048 (.0206) **			.009(.0248)
Numbers of oservations	1001	1001	1001	982	982	982
R ²	.001	.004	.01	.001	.002	.002

***Significant at 1%, ** significant at 5% and *significant at 10%

Table 10: Computation of import misinvoicing and revenue loss

Panel 10a: China

section	Code and Products	import value in 1000 USD	Imports deflated	Export in 1000 USD	Import misvoicing	Tax rate in %	revenue loss
1	01-05_Ainimal	3404,72	3064,248	0	-3064,248	34,04	-1043,07
2	06-15_Vegetable	2892,66	2603,394	10,921	-2592,473	31,33	-812,22179
3	16-24_FoodProducts	14485,9	13037,31	10790,10588	-2247,2041	36,41	-818,20702
4	25-26_Minerals	369,19	332,271	859,278	527,007	29,43	155,09816
5	27-27_Fuels	9466,96	8520,264	320,033	-8200,231	26,64	-2184,5415
6	28-38_Chemicals	17229	15506,1	80944,55	65438,45	27,69	18119,9068
7	39-40_Plastic or Rubber	12029,8	10826,82	74806,637	63979,817	31,05	19865,7332
8	41-43_Hides and Skin	4110,89	3699,801	64186,138	60486,337	31,33	18950,3694
9	44-49_Wood	5186,1	4667,49	24564,314	19896,824	33,59	6683,34318
10	50-63_Textiles and Clothing	35018,4	31516,56	1521299,033	1489782,47	35,79	533193,147
11	64-67_Footwear	10281,2	9253,08	711451,504	702198,424	36,49	256232,205
12	68-71_Stone and Glass	16293	14663,7	47995,96	33332,26	36,29	12096,2772
13	72-83_Metals	45247,1	40722,39	168784,092	128061,702	34,53	44219,7057
14	84-85_Machanical Electric Equipment	24759,1	22283,19	425926,166	403642,976	28,4	114634,605
15	86-89_Transportation	72291,4	65062,26	92528,228	27465,968	25,39	6973,60928
16	90-99_Miscellaneous	5975,62	5378,058	154592,931	149214,873	34,29	51165,78
	total	279041,04	251136,94	3379059,891	3127922,95		1077431,74

Panel 10b: France

section	Codes and Product (2-digit HS-numbers)	Import value IN 1000 USD	Imports deflated	Export in 1000 USD	Import misinvoicing	Tax rate in %	Revenue loss
1	01-05_Annual	60657,1	54591,39	0	-54591,39	30,96	-16901,494
2	06-15_Vegetable	21448,1	19303,29	19337,385	34,095	31,19	10,6342305
3	16-24_Food and Products	16356,2	14720,58	34415,898	19695,318	36,09	7108,04027
4	25-26_Minerals	373,105	335,7945	292,125	-43,6695	25,73	-11,236162
5	27-27_Fuels	3232,67	2909,403	3239,959	330,556	24,21	80,0276076
6	28-38_Chemicals	85610,5	77049,45	88876,002	11826,552	27,48	3249,93649
7	39-40_Plastics and Rubber	11678	10510,2	10032,569	-477,631	30,8	-147,11035
8	41-43_Hides and Skin	113,201	101,8809	511,759	409,8781	38	155,753678
9	44-49_Wood	6248,96	5624,064	6338,596	714,532	28,41	202,998541
10	50-63_Textiles and Clothing	1956,69	1761,021	2953,056	1192,035	36,46	434,615961
11	64-67_Footwear	843,376	759,0384	4608,002	3848,9636	36,3	1397,17379
12	68-71_Stone and Glasse	2234,11	2010,699	7832,78	5822,081	35,71	2079,06513
13	72-83_Metals	9725,82	8753,238	11238,379	2485,141	33,08	822,084643
14	84-85_Machanical and Electic Equipments	52414,7	47173,23	74103,215	26929,985	37,55	10112,2094
15	86-89_Transportion	17134,4	15420,96	21669,09	6248,13	25,29	1580,15208
16	90-99_Miscellaneous	7141,8	6427,62	16306,374	9878,754	34,21	3379,52174
total		297168,7	267451,8588	301755,189	34303,3302		13552,3727

Panel10c: India

Section	Codes and Product (2-digit HS-numbers)	import value in 1000 USD	imports deflated	Exports value in 1000 USD	imports misinvoicing	tax_rate in %	revenue losses
1	01-05_Annual	392,13	352,917	2759,134	2406,217	33	794,05161
2	06-15_Vegetable	446335,477	401701,9293	257167,05	-144534,9	34,25	-49503,2
3	16-24_Food and Products	1252,347	1127,1123	16277,923	15150,81	36,68	5557,3174
4	25-26_Minerals	280,593	252,5337	184,148	-68,3857	23	-15,72871
5	27-27_Fuels	50,486	45,4374	59,483	14,0456	27,04	3,7979302
6	28-38_Chemicals	8655,678	7790,1102	41399,808	33609,7	27	9074,6184
7	39-40_Plastics and Rubber	276,914	249,2226	7430,302	7181,079	32,58	2339,5957
8	41-43_Hides and Skin	9,485	8,5365	2,165	-6,3715	38	-2,42117
9	44-49_Wood	665,473	598,9257	1542,359	943,4333	31,75	299,54007
10	50-63_Textiles and Clothing	1431,821	1288,6389	82926,22	81637,58	37,55	30654,912
11	64-67_Footwear	44,976	40,4784	717,905	677,4266	33	223,55078
12	68-71_Stone and Glasse	940,023	846,0207	2907,656	2061,635	32,95	679,30883
13	72-83_Metals	9083,176	8174,8584	76566,705	68391,85	32,99	22562,47
14	84-85_Machanical and Electic Equipments	6273,599	5646,2391	27758,059	22111,82	27,185	6011,0982
15	86-89_Transportion	1935,796	1742,2164	10261,548	8519,332	28,63	2439,0846
16	90-99_Miscellaneous	525,85	473,265	1670,589	1197,324	35,18	421,21858
total		478153,824	430338,4416	529631,05	99292,61		31539,218

Table 11: Summary of import misinvoicing and revenue loss

Countries	Imports misinvoicing*1000USD	Revenue losses*1000USD
France	34303330,2	13552372,7
India	99292610	31539218
China	3127922950	1077431740
total	3261518890	1122523330

Table 12: Definition of the variables

Variables	Definition
Imp_v	Value of import (1000 US. Dollars) from the three import partners (China, India and France) as reported by Benin's Customs in 2014. This data has been collected at 4 and 6-digit level: source: WITS derived from Comtrade database of United Nation.
Exp_v	Value of export (1000 US. Dollars) of the three import partners (China, India and France) to Benin as reported by each of the partners' customs in 2014. This data has been collected at 4 and 6-digit level: source: WITS derived from Comtrade database of United Nation.
Imp_q	Quantity of import (1000 US. Dollars) from the three import partners (China, India and France) as reported by Benin's Customs in 2014. This data has been collected at 4 and 6-digit level: source: WITS derived from Comtrade database of United Nation.
Pvi	A dummy variable measuring electronical control of the goods imported from France in 2011. It takes the value 1 if the good is electronically controled and 0 if not.
Exp_q	Value of export of the three import partners (China, India and France) to Benin as reported by each of the partners' customs in 2014. This data has been collected at 4 and 6-digit level: source: WITS.
Tax_rate	Total tax levied on imported good by Benin authorities in 2014 calculated as the somme of tariff and value added tax (VAT).
Tax_rate_sim	Total tax levied on similar products at 4-digit level multiplied by the value of imports.
Gap_v	$log\left(\frac{exp_v}{imp_v}\right) = log(exp_v) - log(imp_v)$
Gap_q	$log\left(\frac{exp_q}{imp_q}\right) = log(exp_q) - log(imp_q)$

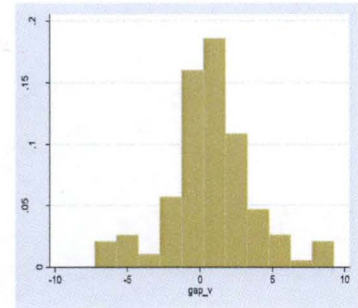
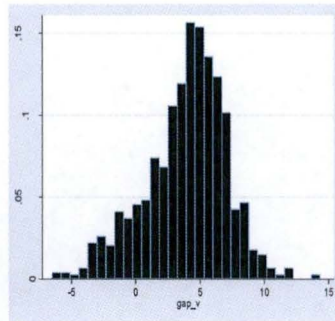
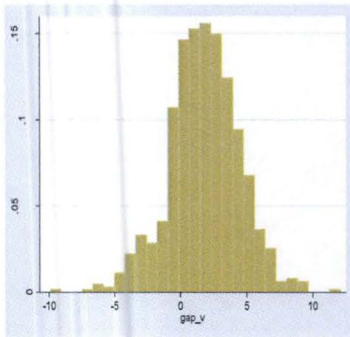
Figure 4: Density distribution of the logarithm of the evasion ratio in the trade flow from China (1a) France (1b) and India from (panel 1c) to Benin in 2014.

Figure 4: Density distribution of the logarithm of the evasion ratio in the trade flow from China (1a) France (1b) and India from (panel 1c) to Benin in 2014.

Panel 2a

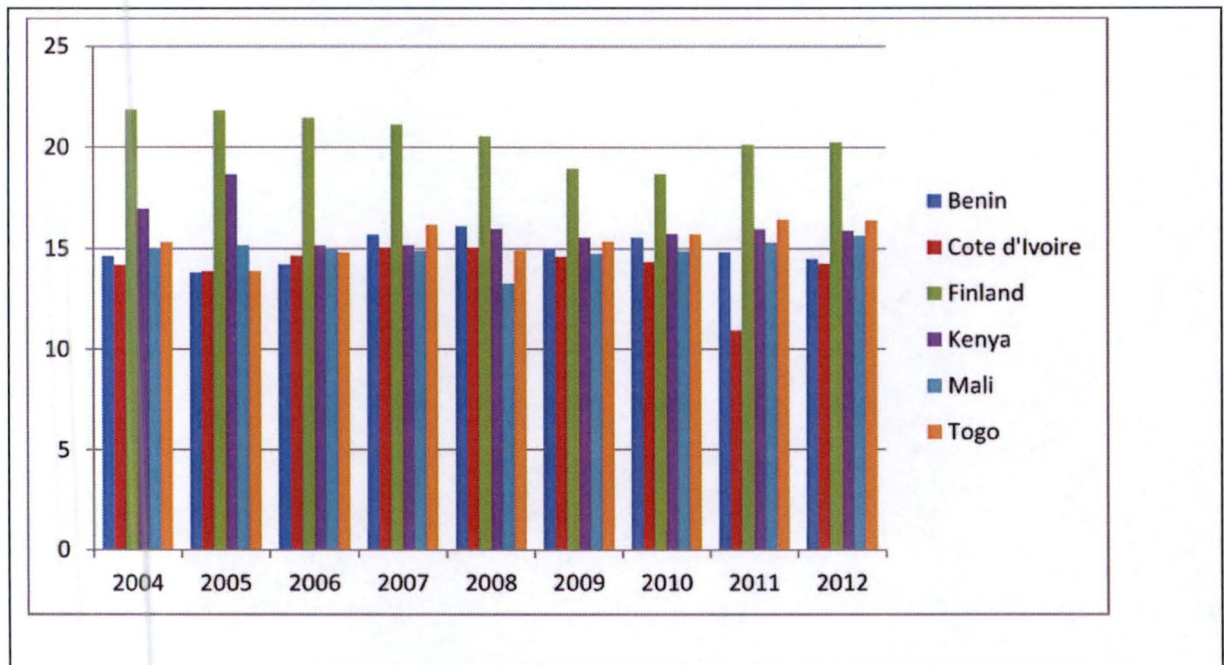
panel 2b

panel 2c



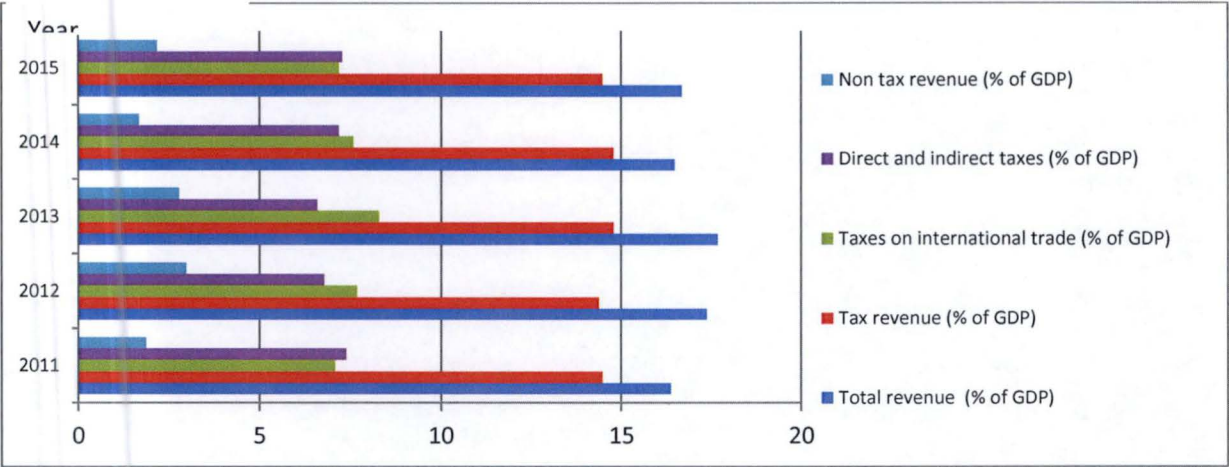
Source: Author, based on WITS data, 2016

Figure 5: Tax revenue in percentage of GDP in some selected developing countries



Source: Author, based on World Bank data, 2016

Figure 6: Benin's taxes structure



Source: Author, based on IMF data, 2016

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