DISCUSSION PAPER / 2025.02

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December 2025

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Abstract

This study questions the 'stylized fact' (Olken & Singhal, 2011) that informal taxes are redistributive yet regressive by analyzing the redistributive nature of informal taxes in the education sector in the DRC. Although it has been argued that informal taxes, like other indirect taxes, are regressive since they disproportionately affect low-income families, we find that informal taxes are progressively distributed in the case of education sector in the DRC, with the 20% richest households paying four-fifths of the total tax burden in the sector. Although being progressive in the income space, informal taxation cannot be considered 'fair' or 'equitable' however: the richer households are financing a disproportionally higher part of total education costs, both because children of poorer households drop out of school earlier and because richer households can pay for higher quality schools. The redistributive nature of informal taxes disappears after controlling for both effects.

Key words: informal taxes, progressivity/regressiveness, access, quality education, DRC

1. Introduction

The concept of "informal tax" has triggered interesting debates on its definition and measurement, how it works and how it performs compared to formal homologues (Olken & Singhal, 2011; Van den Boogaard & Pritchard, 2016; Van den Boogaard et al., 2018).

Here, we want to focus on what Olken and Singhal characterized as a 'stylized fact' of informal taxes, namely that they are redistributive (in the sense that the rich pay more of them in absolute terms) but regressive, even "more regressive than formal taxes" (2011, p. 4). Making use of a fixed-effects logit model to analyse the distributional impact of informal taxes in 10 countries, they found that better-off households contributed indeed more in absolute terms, but less in percentage terms compared to less well-off households. Their observations are shared by others (Hillman & Jenkner, 2002; Beard, 2007; Olken & Singhal, 2011; Van Den Boogaard, Prichard, & Jibao, 2018; Moore, Prichard & Fjeldstad, 2018), even if they mobilize other models and operationalize the concept in a different way. Using tobit regressions to estimate the effects of income on the time taken to engage in community work (which was considered to be the payment in kind that individuals make), Beard (2007) for instance found that in Indonesia, individuals in the third and fourth quantiles took less time to engage in community work compared to those in the bottom two quantiles. The explanation he provides is that less affluent people are more interested in seeing community infrastructure maintained as they have no other alternative. Similar results were found by Van Den Boogaard, Prichard, and Jibao (2018) and Moore, Prichard, and Fjeldstad (2018) although they departed from a broader definition of informal tax.

In our study, we analyze whether this stylized fact also holds for the case of informal taxes in the education sector of the DRC.

In their country-wide general survey of informal taxes in the DRC, Paler et al. estimate informal tax revenue at roughly 4/5ths of the official state budget (Paler et al., 2017). True, these payments can be seen as a transfer of revenue to tax collectors and their superiors in government (Moore, Prichard & Fjeldstad, 2018), yet in the case of the education sector of the DRC, they have been documented to contribute significantly to the provision of public education (Prudhomme, 1992). A comparison of the state budget with the household survey in 2012 allowed to estimate the contribution by parents at about 2/3rds of the state's primary

education expenditure (De Herdt, Marivoet & Muhigirwa, 2015). Parents' contributions mainly covered school-related costs and teachers' salaries, whereas approximately one-third of school fees also filtered up to the higher levels of the education sector, including the national level (Titeca & De Herdt, 2011).

These taxes are likely to be regressive since, because they are standardly defined as a lump sum tax, we can expect them to take a larger percentage of low-income earners' income compared to middle- or high-income households for the same service (Stiglitz, 2000; Remler, 2004). Yet, this argument doesn't take into account that poorer households wouldn't have any alternative to paying such a tax: in the case of education, the most obvious alternative for paying the tax is to drop out of school: if the latter effect is relatively important, school fees might well be a progressive form of taxes: in this respect (and notwithstanding obvious differences in other respects), they would be similar to the observed progressivity of taxes on alcoholic beverages in Ethiopia (Inchauste & Lustig, 2017, p. 95). In any case, empirical analysis is necessary to figure out the importance of differences in school dropout between rich and poor.

An additional challenge to take up in such an exercise is to take into account the quality of education. Particularly in a context where informal taxes finance 2/3rds of the total education budget, and school fees are differentiated between schools so as to allow the schools at the high-end of the market to offer a higher quality service. Access to quality education is therefore conditional on households' ability to pay and consequently potentially excluding children from quality education (Oketch et al., 2010; Bold et al., 2011; Nechyba, 2020).

Previous studies in the DRC have suggested that parents are willing to pay for better quality education (Poncelet, André & De Herdt, 2010; De Herdt, Marivoet & Muhigirwa, 2015). Yet, the importance of the relationship between informal taxes and education quality has not been quantitatively evaluated. This is also difficult to do as we would need an independent measure of education quality. We try to do this by analysing the results of the PASEC survey, which includes measures of education quality, school fees and household wealth.

Below, we first of all check whether the financial burden related to education is progressive or regressive. We distinguish between the effective and structural progressivity approaches following Ataguba and Kabaniha (2022) and apply these to a data set of households from 2012 (the 1-2-3 surveys). Structural progressivity focuses on the importance of (in this case, informal) taxes in total household budgets. For a tax to be structurally progressive, households with higher incomes should contribute a larger proportion of their income compared to households with lower incomes (Stiglitz, 2000; Remler, 2004). Alternatively, for a tax to be effectively progressive, it needs to result in higher contributions of well-to-do households to the financing of the public service, compared to their income share. Effective progressivity can also be expressed in the Kakwani index (Kakwani, 1977). We find that, in the case of the DRC, informal taxation in the education sector is structurally and effectively progressive.

Second, we check to what extent this result is due to inequality in making use of the education service. Since education is a service whose access is conditioned by the user's ability to pay, non-payment of taxes implies non-use of the service or, better still, cessation of its use. If a parent is no longer able to pay the informal taxes for his or her child, the child will either not be able to attend school or will drop out. Comparing the number of school years achieved per income quantile, we show indeed that children of more affluent parents achieve higher levels of schooling than those of less affluent parents.

Third, we check on the hypothesis that these results can be explained by the fact that more well-to-do households can also buy better quality schools. To investigate this fur-

ther, we ran an ordinary least squares regression on the PASEC 2010 database. This approach enabled us to assess in more detail the effect of informal taxes on access to quality education. Although these two data sources were collected for different purposes and at different times, using them together facilitates the external validation of our results. Our findings do indeed suggest that the variation in the provision of quality education justifies the discrepancy in parafiscal charges imposed by them. Indeed, when we include the measure of quality of education in the regression model, informal taxes appear progressive; but as soon as we control for this aspect, the relationship with the proxy of income becomes insignificant. These results align with similar findings by Nechyba (2020), Oketch et al. (2010), Poncelet, André, and De Herdt (2010), Bold et al. (2011) and De Herdt, Marivoet, and Muhigirwa (2015).

This is also another reason why, while technically speaking informal revenue is progressive in the education sector of the DRC, this does by no means imply that informal revenue can be deemed "equitable", quite the contrary: the richer households are financing a higher part of total education costs, both because they can pay for higher quality schools and because children of poorer households drop out of school earlier. Income-progressivity is not to be confused with a more just society in this case. This points to the caution raised by Inchauste and Lustig (2017, p. 18) regarding the interpretation of results when the analysis of the impact of a tax reveals a progressive (or regressive) nature: although the results of the impact analysis of a tax may reveal it to be progressive, it does not necessarily mean that the tax is equitable, as the less well-off may bear a low burden of the tax but at the cost of poor access to quality service. This observation also applies to the analysis of informal taxation in the education sector of the DRC.

In what follows, we first define what we mean with 'informal taxation' and to what extent school costs paid by parents in public schools can be deemed indeed a form of informal taxation. After sketching a brief history of informal taxation in the education sector of the DRC, we then present the two datasets we will make use of to check whether informal taxes are progressive or regressive, and to check on the relationship between informal taxes, quality of schooling and household wealth.

2. What does informal taxation mean?

In countries like the DRC, households make substantial contributions to the public goods and services that are in principle provided or financed by the state. As discussed by Van den Boogaard, Pritchard, and Jibao (2018), these contributions have been labelled in different ways: informal taxes (Prud'homme, 1992; Olken & Singhal, 2011), small taxes (Moore, Prichard & Fjeldstad, 2018) and parafiscal revenue (Williams & Ghonda, 200X; De Herdt & Titeca, 2019).

The concept of 'informal tax' itself has also been defined in different ways by different authors. Olken and Singhal (2011, p. 2) describe informal taxes as "a system of local public goods finance coordinated by public officials but enforced socially rather than through the formal legal system". For them, the distinctive feature of the tax that makes it informal is the informal or social enforcement of the tax and they would consequently exclude contributions to local public goods or services that are legally mandated (Olken & Singhal 2011, p. 8). The data they present focus even more narrowly on "participation in the collective construction of community works (roads, schools, etc)" (Olken & Singhal, p. 7), thereby also explicitly excluding user fees paying for access to public services like water and schools. In contrast, Prud'homme (1992, p. 2), who was the first to introduce the concept, described informal taxes more generally as "all non-formal means used to finance the production and supply of public goods and services": the distinctive feature of an informal tax is, for Prud'homme, that it isn't

based on written law. In the same vein, Van den Boogaard, Prichard and Jibao (2022, p. 266) define informal taxation as "all payments made to state or non-state actors —either in cash, in-kind or through labour—that are outside of formal laws but related to the financing of public goods or broader state or nonstate governance functions". Government officials making use of their authority to enforce payments not based on written law would raise informal taxes. The tax would also include contributions to non-state community development projects, informal payments to traditional authorities, non-formal user fees and illegal payments to state agents.

With an eye on the context of the DRC, we tend to go along with the more general definition advanced by Prud'homme and Van den Boogaard and colleagues: the more restrictive definition of Olken and Singhal would exclude a large part of the financing of public goods and services. Yet we also recognize that the reference to "written law" not entirely convincing in distinguishing between formal or informal taxes, since written texts can easily be incoherent. For example, school fees are prohibited at primary level by the constitution, which stipulates that "primary education is obligatory and free in public establishments", yet this constitutional rule does not keep national-level, provincial-level authorities or the school management networks to write or refer to decrees that justify levying school costs. Parents' associations, at their level, also lack sufficient power to contest this reality (Poncelet et al., 2010). Thus, in actual reality, schools operate in an institutional twilight zone where public education blends features of the state, the market and civil society within the same establishment.

Moore, Prichard and Fjeldstad (2018) also mentioned another designation: small taxes. For them, the term 'small taxes' can mean many things including, among others, Informal taxes, 'comprising both: (1) illicit formal taxes - payments collected by official tax collectors, and other state officials, but which are either outside the law (bribes) or, more frequently, are collected under the guise of formality but are not remitted to government budgets (i.e. embezzlement); and (2) revenues collected by a wide range of non-state agents and organisations'. This definition highlights the fact that the taxes collected are not paid into the public treasury.

However, for the case of the Democratic Republic of the Congo, two elements need to be highlighted. First, informal taxation goes beyond the simple embezzlement of a single public official: the revenue generated by this taxation is redistributed throughout the administrative chain, from the lowest-ranking officials to the more senior civil servants (Paler et al., 2017; De Herdt & Titeca, 2019) and given the derisory base salary of public servants, the public sector wouldn't be able to function without such salary supplements (Prud'homme 1992). Second, even if none of these funds are transferred to the Treasury, they are not just financing local-level costs of keeping a school running: parents' payments are indeed partly paying (unregistered and unpaid) teachers' remuneration, but a portion of this revenue is percolating up to more senior levels of hierarchy – sometimes all the way to the central state administration. Elsewhere De Herdt, Marivoet, and Muhirigwa (2015) estimated that about 5% of school fees paid by parents of primary school children filter all the way up from parents' purses across the country to the central level of decision-making in Kinshasa. In this regard, they are not just regular 'user fees' but indeed 'taxes'.

It is in line with these arguments that De Herdt and Titeca (2019, p. 8) proposed to mobilize Williams and Ghonda's concept of "parafiscal revenue" to denote "revenues collected by government departments to be used for their own purposes rather than being transferred to the Treasury". Just as in the case of Moore et al. (2018), this term encompasses payments made by parents to various actors involved in providing education, including both non-state actors and state agents, and the crucial element remains that these are revenues that do not appear in public accounts even if they finance the provision of public goods and services.

3. A BRIEF HISTORY OF INFORMAL TAXATION IN THE PRIMARY EDUCATION SECTOR IN THE DRC

Public education in the DRC is provided by five types of actors: besides schools run by the state itself, the state also finances schools run by the Catholic church, the Kimbanguist church, Protestant ministries, and Islamic associations (Poncelet et al., 2010). Each network has its own administration, resulting in a complex administrative apparatus and increasing the number of players involved (Titeca & De Herdt, 2011). This system dates back to the colonial period.

In the 1980s, parents began making payments for their children's education due to economic challenges caused by Zairianisation and structural adjustment programs, which led to teacher strikes. Initially, parental contributions were meant to finance teachers' salary supplements, but they later expanded to cover schools' functioning and management costs. In 1992, the Conférence Épiscopale du Zaïre (CEZ) and the Association Nationale des Parents d'Elèves et d'étudiants du Zaïre (ANAPEZA) called for household contributions to address teacher strikes and prevent a "blank year" in education (Verhaghe, 2017; Poncelet et al., 2010).

Parental contributions to education have since become institutionalized, and the Congolese state has recognized its inability to provide education, allowing non-state actors to supplement its efforts. However, the legality of these contributions remains a question, as they may go beyond what is outlined in legal decisions made at general assemblies (Verhaghe, 2017; Poncelet et al., 2010).

The DRC's 2006 constitution guarantees free primary education, but due to the state's inability to provide education, parents make contributions to fund it. Official texts, including framework laws, ministerial decrees, and circulars, have legitimized the practice of parental contributions. However, there is ambiguity in the laws regarding which components of school fees should be borne by parents (Verhaghe, 2017; Titeca & de Herdt, 2011; Poncelet et al., 2010).

While the initial purpose of parental contributions was to support teachers' salaries and other school-level costs not financed by the state, numerous fees are now charged to parents for various aspects of school administration. Verhaghe (2017) has identified 130 types of fees, but only about 40% of them are mentioned in the governors' decrees, which set school fees. The remaining 60% are collected by faith-based organizations and education authorities and fund activities such as building offices, parent associations, travel expenses, workshops, and religious purposes.

To be sure, there often remains a large difference between the type, number and amount of school fees announced by schools and the amounts effectively paid by parents: what is announced can best be understood as the start of a negotiation process on the school fees that will be paid effectively. Qualitative research suggests that many factors come into play in this negotiation, varying from being in the school committee to ethnic identity or simply practical difficulty to pay. While a number of attempts have been made to estimate school fees *effectively* paid (and here we do in actual fact also make abstraction of payments in kind), we will follow the conclusion of Marivoet et al. (2015, p. 36) that the 123-household budget survey can be deemed to be one of the most accurate sources of information about school costs.

Since their institutionalization in the early nineties, there have been several attempts to abolish parafiscal taxation again in the education sector. Besides some interesting attempts at the provincial level, the Kabila government announced "free education" in 2010 in the run-up to the elections (Kodila-Tedika & Otchia, 2022; De Herdt & Kasongo, 2012), but Kinshasa and Lubumbashi, the biggest cities of the DRC, where school costs were also highest,

were able to negotiate an exemption. The Tshisekedi government made another attempt in 2019 as it was also an important election promise (Falisse et al., 2022). Both attempts largely failed because it proved financially and administratively impossible to compensate falling income of schools with increasing finance by the state. Both also arguably had a negative impact on education quality (Kodila-Tedika & Otchia, 2022; Falisse et al., 2022).

Research has further shown that parental contributions are crucial for the survival of primary education in the DRC but raises concerns about accountability and transparency in revenue collection and expenditure management (Verhaghe, 2017; Titeca & De Herdt, 2011; Poncelet et al., 2010). The management committees often make unilateral decisions without informing the parents' committees, and local trade unions struggle to ensure accountability and transparency (Poncelet et al., 2010). In rest of this paper, we focus on whether parafiscal revenue can in any way be deemed equitable.

4. Informal taxes and equity

In a context of dwindling state resources, informal taxes can be mobilized as a vital supplement to government funding, ensuring the provision of education. But as public goods provisioning by the state is often also justified as a means to equalize opportunities, the justification of complementary financing of public goods and services by parents crucially hinges on the impact of this financing mechanism on equality. In this respect, two distinct perspectives emerge.

As in a classroom or a school, school decision-makers frequently establish a uniform price for educational access. Regardless of their economic backgrounds, children from affluent and less affluent families are charged the same fees for attending school. Consequently, this creates a situation where financially disadvantaged families bear a greater burden compared to families with more resources. When taxes disproportionately affect those who are less well-off, as opposed to those who are better-off, such taxes can be considered regressive (Stiglitz, 2000; Remler, 2004).

This is also why many studies are qualifying informal taxes (close synonyms, or related types of payments) as regressive (Hillman & Jenkner, 2002; Beard, 2007; Olken & Singhal, 2011; Iscan, Rosenblum & Tinker, 2015; Van Den Boogaard, Prichard, & Jibao, 2018; Van Den Boogaard & Santoro, 2022). Although informal taxation is intended to help communities procure certain public goods or contribute to the provision of public services such as education, it might be regressive and contribute to inequality (Hillman & Jenkner, 2002; Beard, 2007; Olken & Singhal, 2011; Van Den Boogaard, Prichard, & Jibao, 2018; Van Den Boogaard & Santoro, 2022).

When access to quality education is contingent on the payment of informal taxes, another situation arises. Children from households less able to afford paying these taxes are more likely to be excluded, if not from school as such, at least from high-quality education (Fiske & Ladd, 2003; Oketch et al., 2010; Bold et al., 2011; Nechyba, 2020). In Kenya for example, Oketch et al. (2010) and Bold et al. (2011) found that wealthier households sent their children to schools with high-quality education, while less affluent households opted for schools with lower fees but also lower educational standards.

The specific impact of informal taxes on equity in the DRC has not been extensively analyzed. However, Poncelet et al. (2010) and De Herdt et al. (2015) reported a decline in education quality nationwide following the implementation of free primary education in the DRC, with some parents willing to pay additional fees for better-quality education.

Overall, the debate on the equity of informal taxes revolves around the potential

trade-off between ensuring quality education and promoting equal access. While proponents of user fees argue that these taxes can help maintain educational standards, critics raise concerns about their potential to exacerbate inequalities.

5. Are the informal taxes paid in the DRC's primary education sector progressive or regressive?

Tax progressivity can be analyzed in different ways. Some researchers study it at the level of the fiscal system as a whole (Inchauste & Lustig, 2017), while others focus on a specific tax (Remler, 2004). To do this, they use a variety of methods. Some compare the Gini index before and after state intervention (Inchauste & Lustig, 2017). Others use the effective progressivity approach (Ataguba et al., 2018). A more structural approach, with its variants, has also been employed by several authors (Van den Boogaard & Santoro, 2022; Van den Boogaard et al., 2018; Ataguba et al., 2018; O'Donnell et al., 2008). Furthermore, studies have used econometric regressions to interrogate the progressivity or regressive nature of a tax or tax system (Balan et al., 2022; Olken & Singhal, 2011; Beard, 2007). In this study, we combine effective and structural progressivity approaches in judging on school fees' effects on expenditures inequality. In a second step, we bring in other considerations of equity.

5.1. The 1-2-3 survey dataset

We use data from the 2012 wave of the 1-2-3 survey, which was carried out to evaluate the impact of the poverty reduction and growth strategy implemented by the DRC to attain its debt cancellation (Cassimon et al., 2019). Even if the dataset informs about the situation more than a decade ago, the 1-2-3 surveys remains one of the most comprehensive and systematic sources of information on people's livelihoods in the DRC. At the same time, the survey was coincidentally carried out more or less in the same period as the PASEC survey-2010, which makes it interesting to combine them. The 1-2-3 surveys cover the whole of the Congolese national territory and consist of three survey modules: individuals, production units, and households. Module 3, which focuses on households, is of interest to this study. It aims to estimate the standard of living, measure the weight of the formal and informal sectors in household consumption. Crucially, it also includes detailed data on school costs for all children in the household (INS, 2014).

The 1-2-3 survey is not free from methodological problems, to be sure. First of all, it has been questioned on its representativity. To address this issue, a post-stratification technique was adopted, aligning the sampling with demographic information based on the UNICEF Vaccination dataset (Marivoet & De Herdt, 2018). Another challenge is the diversity of measures and prices of food products across the DRC, which can bias comparisons. To solve this problem, Marivoet & De Herdt (2017) proposed a capability-based price deflator differentiating between rural and urban regions between all (new) provinces (Marivoet & De Herdt, 2018). Additionally, the underestimation of rental costs was resolved by imputing the costs based on household characteristics (Marivoet, De Herdt & Ulimwengu, 2018).

Informal taxes are operationalized as school fees. These are part of the total school expenses of households, together with school supplies, home-related fees, canteen fees, and transportation costs.

Table 1: Total daily households' expenditures and education related fees in 2012 (in CDF)

Variable	Obs	Mean	Std. dev.	Share of cost of schooling (%)
daily tuition	4,418	214.3	915.6	64.3
daily school supplies	4,418	83.4	356.5	25.0
daily related fees	4,418	3.7	15.9	1.1
daily cantine fees	4,418	8.5	36.1	2.5
daily transport fees	4,418	23.3	36.1	7.0
Total daily education fees	4,418	333.1	1423.4	100
Total daily expenditures	4,418	2505.7	1717.6	

Source: results generated based on 2012 1-2-3 surveys

We can observe from Table 1 that education expenditures constitute an important part of household expenditures. On average about 13% of daily household expenditures are devoted to education. Most of these concern tuition fees. It is these fees that cover the payment of board members, teachers and administrative staff -parafiscal revenue, in short. Tuition fees represent about 64% of education expenditures or about 11% of average daily household expenses. So, this is certainly not an unimportant component of household expenses in a context where 60-70% of households are living below the poverty line (Marivoet et al., 2018).

5.2. Measures of progressivity

We use the measures proposed by Ataguba et al. (2018) to analyze the equity of health system financing in South Africa, which covers effective and structural progressivity (see also O'Donnell et al., 2008). Almost similar approach can be found in the work of Remler (2004), Van den Boogaard et al. (2018) and Van den Boogaard and Santoro (2022). Remler (2004) used this method to analyze the progressivity of the formal cigarette tax, while Van den Boogaard et al. (2018) and Van den Boogaard and Santoro (2022) used it for informal taxes. Structural progressivity focuses on the importance of (in this case, informal) taxes in total household budgets. For a tax to be *structurally* progressive, households with higher incomes should contribute a larger proportion of their income compared to households with lower incomes (Stiglitz, 2000; Remler, 2004). In other words, an analysis of equity in education funding should impose the following criterion: "the share of household income devoted to funding education is low for the worst-off population groups compared with the share of household income devoted to funding education by the best-off population groups" (Ataguba and Kabaniha, 2022). Effective progressivity consists in a more 'formal' measure of progressivity which compares the distribution of expenditures (using the Lorenz curve) with the distribution of informal taxes (using concentration curves) to compute a composite index that gives information on a given informal tax progressivity. One of the indices proposed by Ataguba and colleagues to analyse effective progressivity is the Kakwani index of progressivity (Ataguba et al., 2018, p. 438). Applied to our case, the Kakwani index is calculated as the difference between the concentration index of informal taxes and the GINI-coefficient of inequality in household expenses (Kakwani, 1977). The value of the Kakwani index ranges from -2 to 1. When the value is zero, it implies that taxes are proportional, whereas taxes are regressive when the value is less than 0, and progressive when the index value exceeds 0.

5.3. Results

We checked on structural and effective progressivity of informal revenue in education for the DRC and major cities in Table 2, by dividing the sample in different quintiles. For each quintile, we calculated average household expenditures as well as average tax burden per head, both in FC (Francs Congolais) and as a share of total household expenses. In turn, this allowed us to calculate, for each quintile, its share in total expenditures and its share in financing education through informal tax revenue.

Table 2: Structural progressivity of informal taxes in education, DRC, 2012 (in CDF)

Quantiles	Average HH expenditure per head	Average education cost	% informal taxes of HH income	Share, % of total expenditures	Share, % informal taxes
DRC					
1	997	10	1.0%	8.0%	1.0%
2	1,579	34	2.2%	12.6%	3.1%
3	2,106	71	3.4%	16.8%	6.6%
4	2,842	157	5.5%	22.7%	14.7%
5	5,008	802	16.0%	39.9%	74.7%
Kinshasa					
1	1,513	131	8.7%	8.4%	3.4%
2	2,236	321	14.4%	12.5%	8.4%
3	2,935	527	18.0%	16.4%	13.9%
4	3,785	817	21.6%	21.1%	21.5%
5	7,480	2,002	26.8%	41.7%	52.7%
Lubumbashi					
1	984	48	4.9%	7.4%	1.6%
2	1,603	134	8.4%	12.0%	4.2%
3	2,125	263	12.4%	16.2%	8.5%
4	2,824	541	19.2%	22.1%	17.4%
5	5,457	2,220	40.7%	42.4%	68.4%
Other places					
1	914	6	0.6%	8.1%	1.5%
2	1,446	21	1.5%	12.9%	5.3%
3	1,937	41	2.1%	17.2%	10.6%
4	2,624	78	3.0%	23.3%	19.9%
5	4,325	247	5.7%	38.5%	62.7%

Source: results generated based on 2012 1-2-3 surveys

At the national level, results show that informal taxes in the education sector are progressive. Only households in quantile 5 have on average, a higher share of informal tax contributions (around 75%) than their share of income. According to Ataguba and Kabaniha (2022), an education financing system can be called 'fair' if the share of total contributions to education financing by poor groups is less than their share of expenditures. As it appears from this table that the share of contributions to informal taxes by less well-off households is less than their

share of expenditures, these results would mean that informal taxes are structurally equitable as the less well-off families feel the burden of the taxes less compared to the well-off families.

The results of the geographical decomposition of the analysis show similar trends. The data for Kinshasa indicate that the share of informal taxes borne by households in quantiles 1, 2, 3 and 4 is around 3%, 8%, 14% and 21.5% respectively, while their share of expenditures is about 8%, 12.5%, 16% and 21% respectively. In Lubumbashi, the share of informal taxes borne by households in quantiles 1, 2, 3 and 4 is about 2%, 4%, 8.5% and 17% respectively, while their share of expenditures is 7%, 12%, 16% and 22% respectively. For the "other" provinces and cities, the trend remains the same: only the share of informal taxes of households in the 5th quantile exceeds that of their expenditures. The share of informal taxes paid by households in the 5th quantile is around 63%, while the share of their income is around 38%. According to Ataguba and Kabaniha (2022), these results show that informal taxes are progressive in Kinshasa, Lubumbashi and other isolated areas of Kinshasa and Lubumbashi. The results demonstrate the robustness of the results obtained previously. The extent of structural progressivity can be read in the weight of informal taxes in total household expenditures. This percentage increases systematically from 1,1% for the lowest quintile to about 19% for the highest income quintile.

The data for Kinshasa allow to arrive at a similar conclusion, though in this case the discrepancy between the poorest (9%) and the richest (27%) quintile is a bit less pronounced. Education is probably deemed more necessary by the poorest, but also competing with many other urban needs in the capital city. In any case, education expenses are clearly a 'luxury good', in the sense that households will spend systematically more on their children's education to the extent they become richer. The results of Lubumbashi as well as of other places (the third earning zone) show that poorer families bear a lesser burden of informal taxes compared to richer ones. It is worthy to point out that if we exclude Kinshasa and Lubumbashi from the analysis, we keep the same conclusion but then we can notice that the shares of education expenses into households' income are really low. This result would mean that education is never valued as high in the rest of the country as in the two main cities of the DRC.

A comparison of the last columns in table 2 also allows to obtain an idea of the effective progressivity of informal taxes: Whereas the poorest 80% systematically contribute less to the total tax burden in relation to their share in total household expenditures, only the richest quintile contributes more: indeed, the richest quintile by itself already finances 4/5ths of total informal revenue in education (74,7%), whereas it only weighs for only about 40% in the total expenditures distribution.

These results are also summarized by the Kakwani index of progressivity (Table 3).

Table 3: Kakwani index of progressivity for DRC, Kinshasa, Lubumbashi and Other places of the DRC, 2012

	DRC	Kinshasa	Lubumbashi	Other places
Kakwani index	0.41	0.20	0.36	0.30

Source: results generated based on 2012 1-2-3 surveys

The Kakwani index is around 0.40, which means that informal taxes are progressive ($K > 0$). A geographical breakdown of the analysis shows that the Kakwani index is higher than 0 everywhere, although the index is higher in Lubumbashi and lower in Kinshasa. These results indicate that although the education financing system in the DRC is weighing less on poorer

budgets in all earnings zones, the extent of progressivity in informal taxes is more pronounced in Lubumbashi and less pronounced in Kinshasa.

Drawing on O'Donnell et al. (2008), Ataguba et al. (2018) and Ataguba and Kabaniha (2022), these results show that better-off households bear the brunt of informal taxes in the education sector in the DRC. These results run counter to most (if not all) studies that have analyzed the progressivity of informal taxes and according to which informal taxes were estimated to be regressive (Hillman & Jenkner, 2002; Beard, 2007; Olken & Singhal, 2011; Van Den Boogaard, Prichard, & Jibao, 2018; Van Den Boogaard & Santoro, 2022).

6. PROGRESSIVITY IS NOT EQUITY

So, in any case, in the education sector, the burden of informal taxation is mainly paid by the rich. School costs weigh more heavily in their purses. This being said, this does by no means imply informal taxation in the education sector can be deemed "fair" or "equitable", as argued in Ataguba and Kabaniha (2022): Indeed, we might only deem such progressivity also fair if the service provided would serve the poor and the rich *to the same extent*. This is not at all the case for education in the DRC, as we will show in the rest of this paper.

6.1. School dropout

First of all, one of the most important reasons for the lower burden of informal taxes is probably that school dropout is also concentrated in the poorer household layers. Children from less affluent households may find themselves in circumstances where they are forced to keep their children out of school due to financial constraints on school fees. The argument here then is that households whose children spend more time in school pay more informal taxes for their children than those whose children have dropped out because of financial difficulties. This is likely to increase the informal taxes borne by better-off households and increase their share of household expenditure on their children's education in relative terms. We verify this argument by analyzing the results in tables 4 and 5 below.

We construct these two tables on the basis of indicative variables on the level of education attained-the number of years of success of the child, as well as quantiles constructed on the basis of household expenditure. The figures in these tables show the average number of years of schooling for children (level of education for those not in school, current level for those in school) and their average age for each expenditure quintile.

We would draw readers' attention to the definition of the term "child" used here. Our calculations include only the children of the head of household or his/her conjoint, to the exclusion of other children in the household. This decision was taken because we were unable to distinguish between children in the family who are taken care of by the household and those who are not, as far as expenditure on education is concerned. Furthermore, it is important to note that the concept of a child extends beyond age, contrary to the definition in Law 09/001 of 10 January 2009 on child protection in the DRC, which defines a child as any person under the age of 18. For the purposes of this study, we have also considered as children certain individuals over the age of 18 who are still under the guardianship of their parents, in order to capture as plausibly as possible, the dynamics of expenditure and inequalities in education.

Table 4: Completed years of schooling and children age per household expenditure quintile

	Number of years of schooling				Children age
Quantiles	DRC	Urban regions		Rural regions	DRC
		All	*of which Kinshasa*		
1	2.59	2.92	4.58	2.41	10.17
2	3.11	3.55	4.83	2.75	10.65
3	3.39	4.19	5.27	2.67	10.78
4	3.66	4.39	5.22	2.88	10.64
5	4.08	4.82	6.54	3.19	10.95

Source: results generated based on 2012 1-2-3 surveys

The data presented in this table indicate that children from more affluent households spend more time in school compared to those from less affluent households. In DRC, children from households in the highest income bracket (fifth quantile) complete an average of approximately 4 years of schooling, whereas children from households in the lowest income bracket (first quantile) complete only about 2 years. There are obviously differences in the number of years spent in school by children at both quantile and spatial area levels. The inequalities observed in terms of the number of years spent in school by children in the different quantiles are even more pronounced in urban and rural areas, as well as in Kinshasa. There are several possible reasons for dropping out of school, but the burden of informal taxes is undoubtedly one of them. One might also think that these inequalities observed among children in their school years are caused by differences in their ages. However, our results show that the average age of children per quantile is almost the same: 10 years old. This plausibly suggests that the aforementioned differences are not driven by differences in the ages of the children.

Table 5: Distribution of children education attainment by social class

Quantiles	Percentage of children per school level			Average number
of household income	Primary	Secondary	Tertiary	of school years
1	21.73	14.32	2.18	2.59
2	21.08	18.8	6.99	3.11
3	20.12	20.87	13.1	3.39
4	19.83	22.7	22.71	3.66
5	17.24	23.31	55.02	4.08
Total in %	100	100	100	
Observations	6,536	3,436	229	

Source: results generated based on 2012 1-2-3 surveys

Table 5 shows that while children living in households belonging to higher income brackets are slightly under-represented in primary school, this trend is reversed from secondary school onwards. The dominance of the higher expenditures quintiles becomes even more pronounced at the level of higher education, where more than half of all students come from the fifth quantile, the most affluent, while only 9% of students come from the first and second quantiles, which include the least affluent households.

This makes the 'progressivity' of school fees in the DRC comparable to the 'progressivity' of the tax on alcoholic beverages (and on other luxury goods) in Ethiopia, as reported by Inchauste and Lustig (2017, p. 95). But, evidently, education is not a luxury good, rather a basic necessity, whose importance goes further than just the value attached to them by individual consumers wanting to buy them: they have 'intrinsic value' since they enhance people's basic capabilities, and there are also a lot of positive externalities attached to them (Robeyns, 2006). Both elements can sustain the claim that "progressivity" is different from "equity" in this case. While informal taxes are 'progressive' in the expenditures space, they are not necessarily improving "fairness" or "equity" in this broader sense.

While the analysis of both the overall progressivity of informal taxes and school dropout was carried out using data from surveys 1-2-3, the following subsection complements the latter analysis and focuses on PASEC data. This dataset contains information allowing to measure schools and pupils' educational performance which is a needed element for test of the hypothesis that progressivity could also be explained by payments associated to different levels of educational quality.

6.2. School quality

A similar argument can be made by showing that the observed progressivity in school fees can at least partly be explained by the fact that households don't pay for the same service: our hypothesis is that the richer households don't just contribute more to the over-all cost of organising the public good of education, they actually pay for a much better service than the poorer households. Testing that hypothesis requires a dataset however that would combine measures of education quality, household income and school fees. This dataset doesn't exist for the case of the DRC, yet we propose a close alternative, with the PASEC 2010 dataset.

The sampling frame of PASEC 2010 consisted of a stratified random selection, where each stratum is represented in proportion to its weight in the population of pupils in grades 2 and 5. The stratification criteria were the geographical location of the schools and their public or private status (Rapport National, 2011).

The table 6 below summarizes the key variables for the regression analysis.

Table 6: variables description

Variable label	Description
lninftax (dependant variable)	Informal taxes proxied by school fees charged by each school available in Pasec dataset. We transformed it into logarithm.
Average school quality	This variable is approximated by the results obtained by students in mathematics and French tests organized by the PASEC team members. The scores in each school are averaged, with the school becoming the unit of analysis.
lnHH wealth index	We introduced the asset index in our estimation in its logarithmic form after adding to all observations the maximum value of the untransformed 'household wealth index' variable, so as to avoid negative values whose logarithms do not exist. To bring the variable back to the school level, which is the unit of analysis, we calculate the average of the wealth indices at the school level.
Control variables	Average absences number/teacher, salary zones

Source: authors' conception

In order to study whether progressivity can be explained by differences in school quality, we run two OLS regressions. The first examines the relationship between wealth and informal taxes, while the second assesses the link between household wealth and informal taxes by controlling for the quality of education provided by schools. This approach draws on the recommendations of Inchauste and Lustig (2017, p. 18), who discuss the importance of considering the quality of services provided when analysing the progressivity or regressive nature of a tax. Inchauste and Lustig argue that indicators of progressivity or regressiveness can be misleading if this aspect is neglected, which could distort conclusions about the (in)equalizing effect of the tax under study. School-average PASEC scores combine both a school's value-added and the prior achievement or socioeconomic profile of the pupils it attracts. Because those intake characteristics are likely correlated with household wealth and with fees, there might be endogeneity which we don't intend to solve in this work.

Table 7 compares the two estimation models. Both models regress informal taxes on a number of independent variables presumably influencing school costs, including household wealth.

Table 7: Education quality and parafiscal taxes

VARIABLES	(1) lninfotax	(2) lninfotax
_lnHH wealth index	1.0347*	0.8843*
	(0.5352)	(0.5342)
Average school quality		0.0246***
		(0.0088)
Average absences number/teacher	-0.0663	-0.0660
	(0.0481)	(0.0478)
Lubumbashi	-4.1155***	-3.8066***
	(0.6116)	(0.6173)
Rest of DRC	-4.8867***	-4.7820***
	(0.5494)	(0.5468)
Constant	10.5620***	9.5115***
	(0.9164)	(0.9843)
Observations	486	486
R-squared	0.152	0.166
Standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1	

Source: Own calculations based on PASEC 2010

Analysis of the income proxy, the 'household wealth index' variable in logarithmic form, shows that it is statistically significant in the first regression and the second one. When we don't include the quality proxy variable in the regression, the estimated elasticity is greater than 1, implying that informal taxes are progressive. The comparison with regression 2 allows however to observe to what extent this result is driven by the quality of education: when we include the quality proxy, the household wealth index coefficient turns below 1, implying that informal taxes are regressive.

In Regression 2, this quality education impact is highly significant and positively affects informal taxes. We found that a 1% increase in the PASEC test is associated with an increase of approximately 2.5% percent-point in informal taxes. These results are significant at the 1% level.

Although the two variables are not the focus of our study, their results are interesting. The first variable is teacher absenteeism, which has no a significant effect on informal taxes. The second variable is the salary zones. As the teacher payment system is organized into *salary zones*, with teachers in Kinshasa, Lubumbashi and elsewhere receiving different salaries to account for the difference in living costs (De Herdt, Marivoet & Muhigirwa, 2015). We find that parents pay less in Lubumbashi and the rest of the DRC relatively to Kinshasa.

7. Discussion and conclusion

In this paper we argued that, contrary to earlier arguments in favour of the regressive character of informal taxes, in the case of the education sector in the DRC, these taxes are both structurally and effectively progressive: they weigh heavier in rich households' purses and rich households' contribution to the total tax burden is also relatively bigger. In actual fact, we estimate that 4/5th of the informal revenue financing the education sector in the DRC is paid by the top 20%, whereas this quintile only has a share of about 2/5ths in total expenditures. This means that better-off households pay for most of the informal taxes and that informal taxes paid in the form of school fees are redistributive.

These results contradict earlier estimates of progressivity of informal taxes. To be sure, our results are not easy to compare directly with these earlier estimates as they differ in a number of respects: First, for reasons of data availability, we focused our analysis on informal taxes in the education sector. This narrower focus also allowed us to verify on the (explicit or implicit) assumption in previous analyses that the public goods or services paid for by the informal taxes are really equally shared by rich and poor. This is usually not the case, but in our case, we were also able to control for the most obvious reasons for this, i.e. (1) differential school access and (2) difference in quality of schooling between rich and poor.

We find that the progressivity of school costs can at least partly be explained by earlier school dropout by poorer households as well as by the fact that the higher contribution of the richer households also buys them higher quality education. Indeed, we demonstrate our argument empirically in two steps. First, through descriptive analysis, we highlight that children from less privileged families end up with low levels of education due to difficulties in paying their school fees. Second, we examine the extent to which the quality of education sought by parents may lead them to accept paying additional fees for their children. To do this, we use an OLS regression to establish a link between informal taxes, household wealth index (a proxy for household income), quality of education, and a few control variables. Our results are striking: without considering the quality of education, informal fees appear to be progressive. However, when we incorporate this dimension, they disclose a regressive nature. Both elements arguably imply that informal taxes rather don't correct at all for existing injustices in the education sector, even if school fees can be called progressive.

This also implies that removing school fees remains an important point on the development agenda for the DRC, given that precisely because schools are combining the delivery of a public service with the role of tax collector, inequities are built into the system. Conversely, whether an alternative system of education financing would perform better in terms of equity will depend both on the progressivity of the tax that provides the resources, on the way in which these resources are allocated between different school levels as well as on the extent to which the system can manage between-school inequality in the quality of education.

Although we can establish clear links between informal taxes and household wealth, as well as between informal taxes and the quality of education, we argue that there is likely to be an interplay between these two forces. It is reasonable to assume that they are not independent. For example, children from disadvantaged backgrounds may be over-represented in the lowest-performing schools. Therefore, it is essential to view our findings with caution as some estimates may be overestimated.

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