Beyond representative households: The macro–micro impact analysis of VAT designs applied to Niger

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ABSTRACT

Implementing a value added tax (VAT) system to simultaneously increase public revenues, increase economic efficiency and reduce inequalities is a significant challenge for developing countries. The question of the distributional impact of VAT design has received much attention in the literature. While VAT is a general equilibrium policy, its impact has been primarily considered in partial equilibrium contexts. However, the VAT is not only paid by final consumers in developing countries. VAT becomes a reporting burden for producers with exemptions and a financial burden if refunds of VAT credits are not timely. In this paper, we use a two-step modelling procedure —a computable general equilibrium (CGE), followed by a micro-simulation—to analyse the distributional and economic impact of various VAT designs for Niger. Our simulations show that while a flat rate is best for economic efficiency, a higher statutory VAT rate (at around five percentage points) with exemptions for staple foods, has the greatest potential for poverty reduction. When the two objectives are combined, a multiple rate is the best option if VAT credits are refunded. By using a disaggregated macro–micro framework, we illustrate the importance of capturing the specificities of VAT design to measure its distributional and economic impact.

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1. Introduction

The combination of different taxes defines a government's capacity to use its fiscal tools to collect public revenue while providing an economic (efficiency) and social (equity) optimum. VAT is theoretically an economically efficient fiscal mechanism for generating public revenue, but performs poorly in terms of equity.[1]

Direct taxation and public expenditure are in theory appropriate mechanisms for introducing progressivity into a fiscal system. However, these traditionally redistributive instruments are often weak tools when applied in a developing economy context. According to Auriol and Warlters (2005), direct taxation represents less than 7% of gross domestic product (GDP) in sub-Saharan African countries compared to 22% in developed countries.[2] Also, even if public expenditure could

effectively target vulnerable social groups, many analysts have shown that this is difficult to verify empirically (Filmer and Pritchett, 1999; Filmer et al., 2000; Gauthier and Wane, 2007). Since internal indirect taxation has become crucial in tax collection,[3] concerns for equity and tax progressivity have steered thinking towards VAT. VAT has become, on its own, a fiscal tool which can be used to achieve economic efficiency and social policy objectives.

Examples in Africa include those countries within the Western African Economic and Monetary Union (WAEMU), especially Niger. VAT was introduced in Niger in 1986 with a multiple rate structure. In 2000, to complete the tax-tariff transition and increase public funds, the VAT system evolved to a single-rate of 19%, with a zero rate on exports. 19% is the highest statutory VAT rate in the WAEMU. VAT accounted for 30% of total tax revenue, 60% of internal tax revenue, and 5% of GDP (Appendix A). However, Niger had a tax to GDP ratio of 13.4% (2011), which is one of the lowest tax collection rates amongst the WAEMU countries and well below the WAEMU target of 17% of GDP. Niger's VAT efficiency ratio (0.24 in 2010) is also lower than the average ratio for sub-Saharan countries (0.27 in 2010). This is mainly due to the high number of VAT exemptions (Barlow and Snyder,

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[1] VAT reduces purchasing power since it is applied to consumer goods, and since poor household have a limited capacity to save they will be affected on a larger share of their total income. Hence, they will have a larger share of tax burden than to non-poor households.
[2] The share of population receiving wage income is low and the capacity of government to tax other sources of revenues is also weak where direct taxation brings in less than 5–10% of fiscal revenues (Bird and Zolt, 2014).

[3] More than 50% of tax revenue in Senegal and Burkina Faso, Mansour (2014).

1994; Zafar, 2005), self-consumption and the size of the informal economy.[4]

Like other developing countries, Niger needs funds to finance its targeted public interventions. In 2005, in an attempt to improve yields from internal indirect tax, the government of Niger expanded the tax base to exempt goods and especially basic food products. In a period of price inflation, these tax measures prompted violent social opposition with VAT being seen as increasing poverty.[5] Faced with this situation, since 2009 WAEMU countries have assessed the possibility of returning to a multiple rate VAT system with a reduced rate of between 5%–10% on strategic goods.[6] Niger's experience highlights that the debate on the social impact of VAT collection improvement is relevant to developing countries. What is the best pro-poor VAT design to increase public revenue: a tax base expansion with a single-rate, exemptions with a higher tax rate, or a tax base expansion with a multiple rate system?

The question of whether VAT should be uniform or differentiated has received much attention in the literature, especially through the numerous developments in optimal tax theory (Ramsey, 1927; Diamond and Mirlees, 1971; Atkinson and Stiglitz, 1972; Sandmo, 1976; Sadka, 1977; Keen, 2007). Nonetheless, most studies were performed in partial equilibrium contexts, and VAT is typically addressed only as a final consumption tax which sets aside the VAT implementation in developing countries: VAT is also a tax burden for producers due to exemptions and non-refunding of VAT credits.

Considering that the design of a VAT scheme influences public revenue, consumption and production, the CGE method seems the most appropriate method for capturing the direct and indirect effects of different VAT designs. To perform an in-depth social impact analysis, a micro-simulation model that takes into account the heterogeneity of household revenue and spending structures completes the CGE model (Chen and Ravallion, 2004). Though the model is applied only to Niger in this paper, given the sensitivity of this issue, it is equally applicable to all West African countries.

This paper is organized into four sections. Section 2 outlines the debate on VAT design. Section 3 presents key elements of the modelling of VAT mechanisms in the CGE micro-simulation model. Section 4 describes the different scenarios and results, and the final section presents some concluding remarks.

2. Social impact of VAT designs: a necessary reminder of the VAT mechanism

Several empirical analyses have assessed the social impact of different VAT designs. Ahmad and Stern (1984, 1991) concluded that a multiple rate or a single-rate VAT scheme with exemptions is more progressive than a single-rate system. Sahn et al. (1999) found that in five sub-Saharan countries, a reduced tax base was more progressive than both the single-rate and multiple rate VAT systems. Munoz and Cho (2004) found that the VAT system in Ethiopia is less progressive than the sales tax it replaced, because the exempt goods are mostly consumed by non-poor households. Hossain (1995, 2003) found that a single VAT system in Bangladesh was regressive, whereas Jenkins et al. (2006) showed that the existence of an informal sector makes the single VAT rate system more progressive. Mathieu-Bolh (2010) showed that a reduced consumer goods rate increases welfare more than a single-rate.

There is, however, no consensus on how best to design a VAT schema that is pro-poor.

Moreover, most of these studies were performed in partial equilibrium micro-simulation contexts, and consider VAT only as a final consumption tax which ignores the issues surrounding VAT implementation in a developing country context.

Maurice Lauré invented VAT as a final consumption tax (Lauré, 1957), and not a sales tax. Liable producers transfer to the government the difference between the VAT collected on sales and the VAT paid on their inputs. With this tax abatement principle, intermediate inputs as well as investments do not belong to the tax base. The value of the collected tax throughout the economic cycle is equal to the value of a consumption tax levied on the sales price of the final good. Theoretically, VAT is therefore a tax on final consumption paid by the consumers and only collected by the producers (Ebrill et al., 2001). Nonetheless, the VAT implementation in developing countries differs from its original conception due to numerous exemptions and problems of refunding VAT credits held by liable producers.

When VAT exemptions are given, officially for poverty reduction or social considerations, the VAT abatement principle does not work. The final good is untaxed, but the VAT paid by the liable producer is not recoverable (i.e., VAT exemptions have more complex implications than applying a zero VAT rate; see Tait, 1988; Mackenzie, 1992; Ebrill et al., 2001; Chambas, 2005). The tax burden shifts from consumers to producers which decreases consumer prices and increases production cost.

Similarly, if VAT credits are not refunded by tax administrations, producers bear a VAT burden. Producers hold VAT credits when the VAT collected is less than the VAT paid on their inputs (Harrison and Krelove, 2005). In Africa (except South Africa), non-refunded VAT credits represent 6% of the gross VAT against 40% on average in developed countries (Bodin and Koukpaizan, 2009; Bodin, 2012; Bird, 2014). Therefore, considering and modelling VAT only as a final consumption tax becomes inaccurate, and omitting the producer standpoint in social impact analyses of VAT is inappropriate.

To go beyond the restrictive view of VAT, this study proposes to model VAT as a final consumption tax, but also as an input tax supported by some producers in a CGE model analysis. This study proposes a complete social evaluation of different VAT designs in developing countries: a tax base expansion with a single-rate, exemptions with a higher tax rate, or a tax base expansion with a multiple rate system taking into account administrative capacity for refunding VAT credits.

3. A CGE model linked to a micro-simulation model to analyse a pro-poor VAT design

General equilibrium modelling is more relevant than the partial equilibrium models to analyse VAT reforms. Partial equilibrium modelling describes isolated links between economic variables by considering other variables as exogenous. The rest of the economy is assumed to be fixed according to the formula: "ceteris paribus". The general equilibrium modelling takes into account the interactions between sectors, between goods and between factors which can induce substitution effects and effects on relative prices (Devarajan and Hossain, 1998; Creedy, 2001). The economic implications become more complex in a general equilibrium analysis than under partial equilibrium. The need for a CGE is reinforced by the fact that VAT is a complex tax, affecting not only consumers but all economic agents in developing countries (producers, consumers and government).

CGE models have often been used to assess the macroeconomic impact of tax reforms (Shoven and Whalley, 1984; Burgess and Stern, 1993). Different general equilibrium models have been built to analyse the effects of introducing or strengthening VAT in various countries (Serra-Puche, 1984; Ballard et al., 1987; Toh and Lin, 2005), especially in the case of a tax/tariff transition (Clarete and Whalley, 1987; Cockburn, 2006). However, VAT is modelled as a tax on final

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[4] Between 2003 and 2005, exemptions represented, on average, more than 43% of internal VAT revenue. The effective VAT base is 43.1% of total consumption in rural areas and 48.6% of total household consumption in Niamey (Chambas, 2005).

[5] Niger belongs to the category of least developed countries with a Human Development Index ranking of 174 out of 177 countries, with 62% of the population living below the poverty line, and 34% living in extreme poverty (INS, 2006).

[6] Edible oils, sugar, manufactured milk, pasta, animal feed, poultry, cornmeal, millet, sorghum, rice, wheat, fonio, agricultural equipment, computer equipment, and solar energy production equipment. Directive n°02/98/CM/UEMOA, Directive n°06/2002/CM/UEMOA and Directive n°02/2009/CM/UEMOA du 27 Mars 2009.