

Dear referee,

The authors gratefully acknowledge the constructive comments on the paper entitled “The Literacy Impact on Tax Revenues” (Discussion Papers No 2013-63), offered by the anonymous referee. We have responded to all comments and generally agree with those. We express our sincere gratitude for your review, which will help to improve the quality of the paper significantly.

Sincerely,
Mihai Mutascu and Dan Danuletiu

Responses

1/(i) Is the contribution of the paper potentially significant?

The authors start by suggesting on pp. 2-3 that: "The literature regarding „tax revenues-literacy” nexus is relatively poor. Whatever, there are several results in this direction. Some authors suggest that there is a significant connection between tax revenues and literacy level (Riezman and Slemrod, 1987; Ghura (1998); Book, 2003; Kenny and Winner, 2006; Kirchler et al., 2008; Mahdavi, 2008; Aidt and Jensen, 2009; Chaudry and Munir, 2010; Marti et al., 2010; Profeta and Scabrosetti, 2010; Aidt and Eterovic, 2011; and Dioda, 2012), while other researchers do not find any correlation in this way (Sartori, 2000)."

First, I am puzzled by the claim that the entire literature is "poor" without substantiating this further. Further, as the authors review some of the paper on the list, it turns out that some of them are more about whether education and literacy affect the composition of tax revenues.

Response:

Yes, we agree that the construction “is relatively poor” is not fitting so good in the literature review context. Our intention was just to underline that the literature topic is not so consistent.

Trying to show this, we noted in the review that Kenny and Winer (2006) entered in their models two variables: a literacy index from Barro and Lee (2000), but in cross-sectional form, as proxy for educational attainment, and enrollment ratio in secondary school from World Bank, respectively. Some authors use literacy in their analyses as a proxy for tax collection costs, using as educational data the enrollment rate (Aidt and Jensen, 2009). In the other papers, the literacy is part of a composite variable (such Human Capital Development index used by Ghura (1998)).

Also, we agree that the studies reviewed suggest either the impact of the literacy/education over different types of taxes, tax mix, tax compliance, or over total tax revenue/GDP (such in Mahdavi, 2008; Chaudri and Munir, 2010; Aidt and Jensen, 2009).

By reviewing all these papers we tried to evidence all such contributions, accentuating how the literacy influences the tax revenues on different ways. Whatever, with all these elements and taking into account your comment, a rewriting of Literature part is required and will be our first target on revision!

2/Second, it is striking that only one study (the one by Sartori) is cited as finding evidence against the existence of a tax revenue-literacy correlation. In fact, there is from this list at best only one researcher who argues against the view that literacy levels and tax revenues are correlated. To my own surprise, Sartori does not produce a single correlation in a table or a graph as far as I can read from a book in Italian. If I am right, this brings us down to zero researchers who produce empirical evidence against the tax revenue-literacy nexus.

Response:

Sartori (2000), in “Homo videns”, explains that in the last years many persons are illiterate or poorly literate, even if the country is developed. He argues that the interest for writing and reading are low as the video informational channels are more easily accessible. Thus, the understanding of public policies (we can include here also the tax policy) depends by “video” environment rather than literacy. Sure, these ideas have not any empirical foundation.

As result, in our further version of paper, we will integrate this reference separately, only as informative note.

3/Yet, while the authors declare the literature poor, they go on to test whether there is a relationship using a panel of countries. The authors do not bother to explain why they expect this relationship. This should have been easy given the extensive literature that they cite.

Response:

We agree that we must revise in order to underline that the literature in the field offers different outputs in respect to direction of “literacy-tax” nexus (as could be seen in Mahdavi, 2008; Aidt and Jensen, 2009; Chaudri and Munir, 2011). Thus, we can expect there are either positive or negative correlations between literacy and tax revenues, registering an ascendant (the variables have the same sign) or a descendent trend of dependent variable (the variables have opposite sign) as literacy increases. In such case, we can suspect there is a unique function “tax revenues=f(literacy)”, with extreme points (i.e. there is a differentiable polynomial function). See also the response to comment 8.

4/Moreover, they never bother to explain the value added of their analysis as compared to the extensive list of papers that they mention in the quote above.

Response:

We will try to extend the value added of the paper, as it was described in the original manuscript: “Extended sample of countries, empirical panel analysis and nonlinearity testing are the most important novelty of this paper.” (pag. 3). The paper has several contributions to the field literature. Firstly, our exploration uses an extended panel, with 123 countries, for the period 1996-2010. The existing literature investigates only subgroup of countries (developing/developed countries, democratic/nondemocratic countries, western European countries, Latin American countries, Latin America and Caribbean countries, developing countries) or single country (Pakistan, Kenya). Moreover, any existing contribution does not use a recent period (e.g. 1985-1996; 1973-2002; only the year 1977, 1975-1980, 1981-1985, 1986-1992; 1860-1938; 1920-2000; 1990-2009).

Secondly, our analysis follows a nonlinear approach, which is a novelty for the related literature. In this way, for the first time, we show that, for each considered country, the literacy can have different effects on tax revenues. We note that the existing studies are based on linear functions only. Thirdly, we use for the first time a new available and more consistent index in order to capture the literacy level, publically offered by United Nation Development Programme in 2010, as component of HDI index. All previous papers follow either the estimations of Barro and Lee (2000) or the values used by Aidt and Jensen (2009). The first authors consider the literacy as proxy for education (the data strictly covers the years 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995 and 1999), while the second authors work with enrollment rate (i.e. primary school enrollment of 5–14 year old as a percentage of all children in that age group) as proxy for tax cost.

5/As frustrating as this might be for the present reader, I do think that the authors are using a relevant measure of literacy which may compare favourably to some of those used otherwise e.g. by Kenny and Winer (2006) and Aidt and Jensen (2009) who use more general education variables, and perhaps the authors could motivate their paper better if they stress their data more.

Response:

The main aim of our paper is to investigate how literacy influences tax revenues. We do not try to see what happens with the education-tax revenue relationship. We also did not use the literacy index as proxy for education. According to de Witte et al. (2012), there are differences between countries regarding the average increase in literacy as a consequence of increasing education level because of the educational systems efficiency in providing literacy, and according to Desjardins (2003), the determinants of literacy proficiency are associated with a variety of contexts including school, home, work, community, so education alone may not be able to sustain adult literacy. On these arguments, we consider that literacy is more important for tax revenue/GDP than education. We consider that literacy generates imperfect and asymmetrical information through taxpayers, which can lead to different level of tax laws understanding. Therefore, this fact can influence the tax revenues through different tax compliance intensity. On the other hand, literacy is, according to the literature (e.g. Riezman and Slemrod, 1987; Kenny and Winer, 2006 etc), a good proxy for tax collection costs, so the public decision-makers will modify the tax mix, but this will imply also changes in the total tax revenues.

Based on our sample and considering the index of education offered by the same United Nation Development Programme, subsequently tests (the results will be entered in revised version) reveal that literacy and educational index are not cointegrated. Moreover, there are not any Granger causalities between them.

In the same time, it is quite complex to compare our used literacy index with the variables used by Kenny and Winer (2006), and Aidt and Jensen (2009). Kenny and Winer (2006) entered in their models two variables: a literacy index from Barro and Lee (2000), but in cross-sectional form, as proxy for educational attainment, and enrollment ratio in secondary school from World Bank, respectively. Aidt and Jensen (2009) used the same enrollment ratio in secondary school from World Bank in order to capture the tax costs.

6/A more significant contribution would be to look at how their literacy measure correlates e.g. with the education variables in Kenny and Winer (2006), and whether the same conclusions that these authors drew can be confirmed with a more direct measure of literacy.

Response:

We explain at comment 5 the main reason for using of literacy index of United Nation Development Programme, as the pure measure of literacy level. In the case of Kenny and Winer (2006), only one variable - educational attainment - has as content the literacy level and is taken from Barro and Lee (2000). Unfortunately, this variable is in a cross-sectional form (i.e. is available only for a couple of years). The second variable is enrollment ratio in secondary school from World Bank and does not illustrate any evidence about literacy level.

Whatever, our nonlinear cubic model covers through the results both types of connections: the positive and negative relationship between literacy and tax revenues. These sentences will also be inserted in revised version of paper.

7/As the paper stands it is not a significant contribution, though there may be potential in stressing the alternative measure used in the present paper and how this relates to existing findings. Yet, this would not be a "big" contribution.

Response:

We already pointed-out the main contributions of our paper at comment 4, including supplementary information of novelty regarding the using of literacy index offered by United Nation Development Programme.

8/(ii) Is the analysis correct?

Essentially, the authors carry out panel regressions to understand the (partial) correlation between tax revenue and literacy. Unsurprisingly, they find that the simple linear relationship is positive. They also show some non-linearity which are potentially interesting, but they never provide an explanation of why the nonlinearities belong in the model.

Response:

We note that the literature in the field offers different outputs in respect to direction of “literacy-tax” nexus. Thus, we can expect there are either positive or negative correlations between literacy and tax revenues, registering an ascendant (the variables have the same sign) or a descendent (the variables have opposite sign) trend of dependent variable as literacy increases. In such case, we can suspect there is an unique function “tax revenues=f(literacy)”, with extreme points (i.e. there is a differentiable polynomial function). Based on reset test results for different polynomial degrees, and taken into account the coefficients’ significance, we found that the cubic function (without square of literacy) is more appropriate for our investigation.

9/Also, why they include cubic terms in some specifications is poorly motivated. Thus, while the econometric model is reasonable for digging out the robust correlations, it remains unclear what we gain from this analysis pointing back to question (i) about the significance of the contribution.

Response:

See the responses for comments 4 and 8.

10/Though, the analysis appears correct, it is poorly motivated and the positive relationship unsurprising.

Response:

10.1/You are absolutely right! We will revise the motivational reasons of the paper. We will highlight the importance of non-economical determinants of tax revenues, especially of literacy, showing that our study covers many countries, for a period of 15 years.

We already noted in the “Conclusion” section of the paper that our study is very important as needed information for tax adjustments in government’s policy area.

10.2/ We underlined at comment 4 that, for each considered country, the main results show the evidence of both positive and negative relationships between literacy and tax revenues, with cubic form. Thus, we evidenced not only a positive connection, but both positive and negative correlations of pairs “literacy - tax revenues”, by using a singular function, at world level.

Additional references:

1. Kristof De Witte, Wim Groot and Henriëtte Maassen van den Brink (2012). *The Efficiency of Education in Generating Literacy: A Stochastic Frontier Approach*, Review of Economics & Finance, vol. 2, pages 25-37.
2. Richard Desjardins (2003). *Determinants of literacy proficiency: a lifelong-lifewide learning perspective*, International Journal of Educational Research, Vol. 39, pages 205–245.