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**Thomas H.W. Ziesemer**

**Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)**
email: info@merit.unu.edu | website: http://www.merit.unu.edu

**Maastricht Graduate School of Governance (MGSoG)**
email: info-governance@maastrichtuniversity.nl | website: http://mgsog.merit.unu.edu

Keizer Karelplein 19, 6211 TC Maastricht, The Netherlands
Tel: (31) (43) 388 4400, Fax: (31) (43) 388 4499

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**Maastricht Economic and social Research Institute on Innovation and Technology, UNU-MERIT**

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# Worker remittances and government behaviour in the receiving countries

Thomas H.W. Ziesemer, Department of Economics, Maastricht University, and UNU-MERIT, P.O. Box 616, NL 6200 MD Maastricht.
T.Ziesemer@maastrichtuniversity.nl. Fax: ++31-43-3884150. [1]

*Abstract.* We estimate the impact of worker remittances on savings, taxes, and public expenditures on education, all as a share of GDP, for about 30 years in two samples of countries with per capita income above and below $1200 using dynamic panel data methods. Remittances increase the savings ratio in both samples. Savings have an (inverted) u-shaped impact on the tax ratio in poor (rich) countries. Higher tax revenues lead to higher public expenditure on education in both samples. In the richer sample, governments raise less tax revenues but spend more on education in direct response to remittances. Governments of the poorer sample raise more tax revenues in response to remittances at low levels of remittances, but less at high levels of remittances. In simultaneous equation simulations of a permanent shock to remittances, the governments of richer countries reduce taxation and public expenditure on education as a share of GDP. This may slow down growth of human capital, one of the major growth factors. In poor countries they raise more tax revenues and spend more money on education, which is likely to support growth. Strong non-linearities, which differ by country group, make the effects of shocks dependent on the initial levels of the variables and the heterogeneity of the estimation results.
JEL class.: F22, 24; O15, J61. Keywords: migration, remittances, growth, accumulation

## 1. Introduction

The literature on the effects on worker remittances has mainly focused on behaviour of private households, but has said little about the reaction of governments in the receiving countries. For example in the survey of Lucas (2005) the word ‘tax’ does appear but always without any reference to empirical work. Whereas some countries like Morocco tax worker remittances heavily and therefore worker remittances should increase tax revenues, it is also possible that growth is increased and therefore the ratio of tax revenues as a share of GDP may go up or down and other countries provide tax incentives to attract remittances (Ratha 2004). In addition, other determinants of taxation like savings may increase as well and therefore remittances may have an indirect effect

[1] The author is grateful to Bertrand Candelon, Femke Kramer, Pierre Mohnen and seminar participants at UNU-MERIT and the University of Giessen for useful discussions. This paper is a revised version of Ziesemer (2008). We have added Durbin-Wu-Hausman tests for endogeneity and made explicit assumptions on pre-determinedness vs. exogeneity. Numerical calculations are replaced by simulations and more recent literature is discussed. Results changed only marginally, providing a case in spirit of the suggestion by Nakamura and Nakamura (1998) that endogeneity may be statistically significant but economically very small.

on taxation via them. [2] Recently, Ziesemer (2008) and Ebeke (2010) have studied the impact of remittances on tax revenue.

Similarly, we did not find any information about the reaction of public expenditure on education to the appearance of worker remittances although theoretical work uses 'the assumption … that the diaspora bear the costs of education' (Wei and Balasubramanyam 2006. p.1608). This naturally raises the question whether the government then reduces or increases its own efforts. As a matter of subjective selection we think that this is a highly relevant government variable, as it contributes to human capital formation, which is important for many aspects of economic development. Recently, Ziesemer (2008) and Ebeke (2012) have treated the impact of remittances on public expenditure on education.

We will therefore focus on the effects of worker remittances on tax revenues and public expenditure on education, all expressed as a share of GDP. We will try to explain empirically the determination of these variables for two sets of countries, one with per capita income above and the other below $1200 in 2003 in order to figure out how poor and less poor developing country governments react to remittances and other determinants. The poorer sample consists of 52, and the richer sample of 56 countries. For both samples, we have data on worker remittances and development aid and both contain former communist countries.

Of course, with these questions we are no longer in the realm of pure economics but rather also in politics. We will try to find preliminary answers via an estimate of an empirical model for two panels of countries explained in section 2. In section 3, we describe the data and the econometric method used. In section 4, we present the results. In section 5, we show baseline simulations and scenarios for permanent shocks to remittances as a share of GDP. Section 6 summarizes and points to issues for further research.

## 2. An empirical model

We specify the following tax function explained below using the index 'i ' for countries and 't' for time.

[2] Desai et al. (2009, footnote 28) apply a tax rate of 11.5 per cent to a part of Indias 3.11 per cent remittances as a share of GNI resulting in a contribution of about 0.21 per cent of GNI. However, no economic interactions with other variables are taken into account when getting this number.

$$taxy_{it} = a_{0,i} + a_1 taxy_{it-1} + a_2 savgdp_{it} + a_3 (wr/gdp)_{it} + u_{it} \quad (1)$$

For the explanation of tax revenues as a share of GDP, *taxy*, the first argument besides a country-specific constant is its lagged value, *taxy(-1)*, implicitly capturing the history of tax policy. Taxability is well known to be limited by poverty in poor countries. Poverty itself can be expressed in many ways. Mostly per capita income or expenditure variables are used, followed by a discussion of distribution issues. The idea used here, related to traditional surplus debates, is that the savings ratio, *savgdp*, reflects how much of their income people can miss in view of existence minimum requirements. In rich or less poor countries savings ratios may also reflect how much people can care for themselves rather than relying on state support. The idea for poor countries then would suggest that we get a positive sign for the coefficient of savings, but possibly a negative one for sufficiently less poor countries. We consider worker remittances, *wr*, as a share of GDP as a sort of marginal income received. The question then is whether governments want to tax this at higher rates in the spirit of progressive taxation or at lower rates, as under special tax incentives intending to attract remittances. A negative sign could also imply that the effect on the GDP (the denominator), not discussed explicitly in this paper, is larger than that on taxes (the numerator). We will also explore the use of quadratic terms for all regressors.[3] The last term in the regression is the residual. In principle, we might have used per capita income rather than the savings variable. However, it has a growth trend and even when employing quadratic and cubic terms with or without a time trend the tax variable would go out of bounds in all simulation exercises we have carried out. We have also tried out literacy as a regressor because it might be a motive for raising taxes, and it is relevant for some development issues, but it has turned out to be insignificant. We did try out the use of natural logarithms besides quadratic and cubic terms for all variables.

Remittances may not only have a direct effect on tax ratios, but also an indirect effect via savings ratios. Remittances add to disposal income and if the total increase is not taken away by taxes, both consumption and savings will both increase if they are not

[3] The effect of remittances on tax revenues can also serve as a channel for shocks from the sending countries as in Ziesemer (2010a) and Abdih et al. (2012).

inferior.[4] An interesting question then is whether the *share* of consumption or savings are increasing or decreasing.[5] For savings ratios we specify the following regression.

$$SAVGDP_{it} = b_{0,i} + b_1 SAVGDP_{it-1} + b_2(WR/GDP)_{it} + b_3(ODA/GDP)_{it} + \quad (2)$$

$$+ b_4 D(LOG(GDPPC_{it})) + b_5 LOG(1+RI_{it-1}) + b_6 (PEEGDP)_{it} + b_7 (nm/l)_{it} + e_{it}$$

Again, there is a country-specific constant and a lagged dependent variable. Worker remittances are international transfers received by private households. They enhance disposable income. Remittances as a share of GDP can be used to enhance or reduce savings ratios depending on whether they go more or less than proportionately into consumption or savings (Griffin 1970). Official development aid is an international transfer as well and enhances disposable income of the country, mostly of the government though. This also may provide an incentive to increase or decrease savings ratios and therefore we add it also as a regressor, *oda/GDP*. The growth rate of the GDP per capita, *GDPPC*, and the interest rate, *RI*, may have an impact as in basic macroeconomic textbooks to the extent that people are looking into the future. Public expenditure on education, *PEEGDP*, may reduce the private incentives to save and reduces government savings directly. Net immigration, *nm*, taken as a share of the labour force, *l*, to correct for country size may enhance savings ratios if the immigrants bring high savings with them to the country of arrival. Conversely, emigrants may dis-save because they probably prepare their emigration by saving money to carry the cost of migration. The last term in the regression is the residual.

[4] Osili (2007) provides portfolio theory and evidence for the effect of remittances on household savings.
[5] The question may not only be whether remittances have an impact on macroeconomic consumption vs. investment as demand components, but rather consumption vs. savings, both in terms of ratios, as components of allocation of disposable income. Nationally imperfect capital markets and savings are important for education financing and other household investments even if national capital inflows are important in size. The developmental perspective is of course different from an interest in macroeconomic fluctuations generated by stochastic processes, where the reaction of investment to remittances shocks is indeed interesting. Karpestam (2012) calculates the impact of remittances on demand components in a detailed way.

On the expenditure side, public expenditure on education as a contribution to financing the development of capability or human capital building is one of the much-discussed items in development studies. We specify the following regression.

$$PEEGDP_{it} = c_0 + c_1 PEEGDP_{it-1} + c_2\, TAXY_{it} + c_3 SAVGDP_{it} + c_4 (WR/GDP)_{it}$$

$$+ c_5 (ODA/GDP)_{it} + \varepsilon_{it} \qquad (3)$$

Besides the constant and the lagged dependent variable, the more tax money is available, the more can go to education. The more people save, the more they signal that the government should do the same concerning education. Worker remittances may discourage public expenditure on education, because the government may think that people can take care of themselves more than before. On the other hand, education may become accessible in poor countries if private and public money support it, but not if only one of them does so. This would provide an incentive to invest more in education publicly. Development aid should encourage, for example via co-financing between donors and governments, public expenditure on education. However, it is also possible that more aid on that purpose leads to less public money. Again, the last term is the residual.

There are three channels then along which remittances affect public expenditure on education. First, they have a direct impact. Second, there is an impact via savings and third, there is an impact via the tax ratio, which in turn depends itself on an effect via savings.[6]

## 3. Data and econometric method

We take all data from the World Development Indicators, World Bank (2007)[7], where definitions are given. Information that is more detailed is available from the sources

[6] As a matter of cross checking, we did not find an impact of remittances on aid.

[7] Updates are possible but one may indeed end up with less data for public expenditure on education because of data revisions that have wiped out many observations for many low-income countries (see Ziesemer 2012a). This would also change the *N/T* ratio. Results are in general dependent on the *N/T* ratio of panels (Smith and Fuentes 2010) and having different *N/T* ratios might make comparison across samples impossible in particular for equation (3) with roughly six observations per country and each 29 countries. In

mentioned below. Worker remittances are official receipts in constant (2000) US$ and do not contain compensation of residents going across the border to work in neighbouring countries. The data stem from Balance of Payments Statistics.[8] Flows going via financial investments and withdrawals from related accounts are not included (see IMF 2005, p.99). Unofficial receipts may be high - Freund and Spatafora (2005) estimate that informal remittances are between 35 and 75 per cent of the official ones - and important but we have no way to deal with the issue directly (see Adams and Page 2005).[9] Taxes are only those of the central government. This is a limitation, but the most well known federal states like the USA and Germany are not in our sample. Savings are gross of depreciation but include net current transfers and net income from abroad. Data on official development aid include loans containing at least a grant element of 25 per cent. When taking remittances and aid as a share of GDP, we use algebraic expression where the 3 per cent is 0.03. For the other data, taken from the WDI as they are expressed there, shares of GDP are multiplied by 100, and then 3 per cent is just 3. Data of the GDP per capita, *gdppc*, are in constant (2000) US$ and stem from national accounts. Interest rates, *ri*, are real rates as obtained by use of the GDP deflator and taken from the IMF IFS Yearbook. Data on public expenditure on education, *peegdp*, are from the UNESCO and we assemble them from several versions of the World Development Indicators.[10] Data on migration are five-year estimates of the United Nations Population Division. Labour force data are from the ILO.

We use data for 108 countries for which data are available for remittances and aid. We divide these countries into two groups, those with a GDP per capita that is above and below $1200 in 2003 because Kernel density estimates for the years 1960, 1970, 1980,

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this respect the *N/T* ratios are comparable for equations 1a and b and also 3a and b but hardly so for 2 a and b. Adding observations for the richer sample might turn this around implying that updating is devalued by loss in comparability.

[8] In the WDI, there are surprisingly many zero values, which are quite implausible because they are preceded and followed by positive values of non-negligible size. We have turned them into 'non available'.

[9] We would like to point out though that GDP data also underestimate economic activity because of the neglect of the informal sector. Schneider and Enste (2000, Table 2) report values of 25-76 per cent of GDP for developing countries. This is the same order of magnitude as for remittances. For developed countries, these values are lower. Informal remittances are falling as a share of the official ones. It is not clear though that the share of the informal sector is falling in developing countries over time. The imperfection of remittances data is broadly discussed in all related papers. That of GDP data is not discussed anymore although it may still be as severe.

[10] The versions since 2005 cover only data since 1998.

1990 and 2000 show peaks at around $1000. The number of countries around this peak is fairly constant over time. Analysis of growth rates shows that the countries in the poor group have an average growth rate below 1 per cent in the period 1960-2005. Those in the less poor group have growth rates above 2 per cent. Another important difference between the two groups is that for the richer sample it holds that remittances are a larger share of GDP than aid is, 4 per cent and 2 per cent respectively. However, for the poorer sample this often-stated result is by far not true. Aid is more than 9 per cent and remittances are above 3 per cent in the poor sample. Panel homogeneity then is hardly a convincing assumption concerning both the level and the growth rates of the GDP and therefore we split the sample. In the richer sample, we will then have 56 countries and 52 in the poorer (see Appendix A for the lists of countries). We postpone further splits to future research. Data are not available for all other variables though and therefore our regressions will often cover less than the 52 or 56 countries.

For all equations, we follow a basic econometric lesson for macroeconomic variables, to include the lagged dependent variable. It tends to be highly significant in most circumstances and therefore is always included in order to avoid an omitted variable bias (see Greene 2003, Chaps. 19 and 20). By implication, we consider dynamic panels.

Moreover, results in dynamic panels depend on the ratio *N/T*, where *N* is the number of cross-sections and *T* is number of periods (Smith and Fuentes 2010). As we are dealing with a dynamic issue, we like to have a long time dimension *T* and therefore we use yearly data rather than five-year averages.

A basic econometric lesson here is that in dynamic panels the coefficient of a lagged dependent variable, when using a fixed effects estimator, has a downward bias of an order of magnitude of *1/T*. This is an expected value of the bias for the case of having no further regressors; with more regressors, it is lower (Asteriou and Hall 2011, chap.19). Its standard deviation allows for having a much higher or lower bias. The best response to this currently is the use of a system GMM estimator by Arellano and Bover (1995), which combines the within estimator of the level equations with their version in first differences, imposing equality constraints on the respective coefficients of the regressors. Alternatively, one method of system GMM is called ‘orthogonal deviations’; it replaces the first difference equation mentioned above by orthogonal deviations, which consist of

a Helmert transformation, i.e. it subtracts from each residual the sum of the future residuals.[11] As many regressors are under suspicion of endogeneity, we use instruments also for some of the regressors other than the lagged dependent variable in this approach. The orthogonal deviation approach does not estimate the intercept of the above equations. Therefore, we will leave the coefficient in its general form when reporting results or alternatively we could present the estimation results in terms of first differences, which would cost more space though. The GMM approach minimizes a quadratic form called the J-statistic. If the number of instruments used is identical to the number of regressors, the J-statistic is zero. When more instruments are used, the J-statistic increases. It should not increase too much for instrument to be valid according to the chi-square test, but also not too little because then instruments do nothing or too little. An extremely high (low) Hansen-Sargan p-value (henceforth HS p-value) indicates that it is not increasing too much (little). Roodman (2007) argues that the p-values should not be too far outside the range of 5 per cent and 25 per cent. It remains unclear though what is 'too far'. Therefore, we report the J-statistic, the HS p-value and the standard error of regression whenever we use the Arellano-Bover method. All regressions are based on unbalanced panels.

The practical procedure we follow then is as follows. We first search for a good specification in terms of a fixed effects estimate also including time fixed effects, which reduce contemporaneous correlation (see Roodman 2006). In terms of doubts about significance in connection with collinearity we also carry out a variance inflation factor test (VIF) (see Kennedy 2003 and Ziesemer 2010b). When contemporaneous regressors are significant we use the Durbin-Wu-Hausman test in the version of Davidson and McKinnon (2004) to test for endogeneity.[12] This information together with assumptions on pre-determinedness versus exogeneity is used for the choice of instrumental variables in the Arellano-Bover (1995) orthogonal deviation version of our system GMM estimate; see Appendix B which also reports the results for the difference-in-Sargan test for the use of additional instruments.

[11] A third appraoch could be the use of system GMM with differenced equations as explained above, and use this approach for equations (1)-(3) in a simultaneous equation setting. The GMM also takes care of the contemporaneous correlation in a similar way as normally the SUR (Seemingly Unrelated Regression) method does, without imposing the assumption of normally distributed residuals though. Such an approach has been used by Fosu et al. (2012), Meijers (2012) and Ziesemer (2011). This is an intuitively plausible approach but it has not been investigated by econometricians.

[12] See also Masud and Yontcheva (2005).

## 4. Results

We present here the regression results first for the countries with GDP per capita above $1200 indicated by an ‘a‘ in the equation number and then the result for the countries below $1200 indicated by a ‘b’ in the equation number. We present results first from an econometric perspective linking back to the discussion of the previous section and then discuss them from an economic perspective.

TABLE 1 OVER HERE

*Econometric results: Aspects of system GMM estimation*

Table 1 shows the coefficients of the lagged dependent variable for fixed effects estimation in column 1, for system GMM estimation in column 2, and for OLS in column 3. In all cases, the value from system GMM is between the under-estimating one from fixed effects and below the over-estimating one from OLS. The number of periods is much larger in all cases than the number of observations divided by the number of countries, as indicated by columns 4 and 5. Mostly the expected bias *1/T* is about 1/10. The expected bias in the column *1/T* is between 10 and 50 per cent. The system GMM estimate of the lagged dependent variable should therefore be 10-50 per cent higher than that of fixed effects if there were no other regressors. Roughly, it is achieved in all six equations that the correction is equal to its expected value or lower, as it should be because there are more regressors than only the lagged dependent variable. Finally, second order serial correlation should be absent. Finally, second order serial correlation should be absent. We present the p-values for the regression the first difference of residuals on their own second lag in the last column, indicating absence of second-order serial correlation (see Roodman 2006).[13]

*Economic results: Estimation and Interpretation*

[13] Roodman (2006) reports that the Arellano-Bond test for second-order serial correlation break down when the coefficient is below 20 per cent, which is the case in all our checks. The Hansen-Sargan chi-square test then is the relevant one for instrumenting and specification.

For the sake of brevity, we abbreviate the savings ratio as '*s* ', the remittance ratio as '*w*', the peegdp as '*p*', *d(log(gdppc))* as '*g*', real interest rates as '*r*', and the development aid ratio as '*d*'. In parentheses, we present p-values, the significance levels, rounded upwards.[14] Appendix B shows the instruments. To save space we do not write time fixed effects.

$$taxy_{it} = a_{0,i} + 0.946taxy_{it-1} - 0.16s_{it} + 0.004s_{it}^2 - 20.16(w_{it-1})^2 + u_{it} \quad (1a)$$

(0.00) (0.09) (0.052) (0.06)

Per.: 33 (1973-2005); Countr.: 41; Obs.: 406; S.E.[15]:1.49; J-stat.: 133.2; p(J)[16] = 0.023

$$Log(taxy_{it}) =$$

$$b_{0,i} + 0.939\log(taxy)_{it-1} + 0.0025s_{it-1} - 0.00006s^2_{it-1} - 1.03w_{it} + 3.42(w_{it-1})^2 - 0.17\log w_{it} + u_{it}$$

(0.000) (0.033) (0.044) (0.01) (0.004) (0.08) (1b)

Per.:30 (1976-2005); Countries: 33; Obs.: 311; S.E.: 0.12; J-stat.: 68.1; p(J) = 0.17

FIGURE 1 ABOUT HERE

For the poorer sample, there is a negative impact of remittances from 1.9 per cent to 13 per cent and a positive outside this interval (see Figure 1). However, there are many observations below 1.9 per cent but not many above 13 per cent. Indeed the panel average in the simulations below is at about 1.7 per cent for the poorer countries. For the richer panels remittances have a negative direct impact on the tax ratio. The savings ratio has a u-shaped impact with a minimum at 19.7 per cent in the richer sample and an inverted u-shape with a maximum at 20.6 per cent in the poorer sample. Therefore, we look at the impact of remittances on savings next dropping the residuals from the equation though.

$$s_{it} = c_{0,i} + 0.55s_{it-1} + 71.7\log(1+w_{it}) - 105\log^2(1+w_{it}) + 9.0g_{it-1} + 27.7\log(1+d_{it}) - 0.57p_{it-1} \quad (2a)$$

(0.00) (0.0003) (0.064) (0.013) (0.04) (0.005)

[14] The corresponding standard errors are SUR-PCSE (Panel Corrected Standard Errors of the seemingly unrelated regression type), which essentially correct for remaining serial correlation.
[15] Standard error of regression
[16] P-value of Hansen (-Sargan) statistic

Periods: 26 (1976-2005); Countries: 46; Obs.: 457; S.E.:3.29; J-stat: 172.8; p(J) = 0.045.

$$s_{it} = f_{0,i} + 0.668 s_{it-1} + 51.8 w_{it-1} - 216.7 w_{it-1}^{2} - 0.0072 p_{it}^{2} - 25.4 d_{it} + 52.8 d_{it-1}^{2} + 18.7 (NM/L)_{it} \quad (2b)$$

(0.00) (0.0034) (0.03) (0.0003) (0.038) (0.0073) (0.0025)

Per.: 6 (1980-2005); countr.:32; Obs.:65; S.E.:3.3; J-stat.:26.83; p(J): 0.14

In both samples, worker remittances enhance the savings ratio, because the inverted u-shape effect has a negative slope only when remittances are more than 40.6 per cent of the GDP for the richer sample an 12 per cent for the poorer sample; both values are higher than average plus two standard deviations.

There are some other interesting effects in these regressions. The effect of development aid on savings has been debated controversially since decennia (see Doucouliagos and Paldam (2006) for a survey). One possibility for this is coming out of our regressions. In richer countries, aid enhances savings, but in poorer countries, aid reduces savings until it is 24 per cent of the GDP, when ignoring the lag. This is plausible in the sense that in poorer countries more money goes to emergency and poverty fighting - that is present needs rather than future needs -, and this money may be matched by that of the government and thereby contribute to a reduction in savings. For richer countries, especially when aid is tied to trade, such as buying machines from the donor country, imperfect fungibility of money allows driving aid into savings and investment rather than consumption. In short, the controversies of the past may be due to panel heterogeneity, stemming from different behaviour of poor and less poor countries. Moreover, in both samples, higher public expenditure on education reduces the savings ratio, which probably is the case, because these countries have imperfect credit markets concerning investment in human capital, forcing people to save before investing in education. Then, more public expenditure on education reduces the pressure to save before schooling. Finally, it seems remarkable that net immigration enhances savings in the poor sample. Probably this is the case because migrants bring some savings with them at amounts higher then the average value in the country, or it is because they do contribute to savings but not yet to the GDP. From the narrow perspective of this paper, these variables mainly

serve the purpose of avoiding an omitted variable bias. Interest rates have turned out not to be significant in the savings equations.

Next, we look at public expenditure on education in order to see how they depend on tax ratios, savings ratios, remittances and aid.

$$P_{it} =$$

$$h_{0,I} + 0.8P_{it-1} - 0.03P_{it-1}^2 + 0.77\log(TAXY_{it}) + 17.9w_{it} - 76.2w_{it}^2 - 19.78d_{it} + 91d^2_{it} + 0.21p_{it-5} \quad (3a)$$

(0.0013) (0.17) (0.003) (0.001) (0.0001) (0.006) (0.0015) (0.0002)

Per.: 20 (1981-2005); countries: 29; Obs.: 169; S.E. = 0.45; J-stat.:8; p(J) = 0.53.

$$P = k_{0,i} + 0.86P_{it-1} - 0.028P_{it-1}^2 + 0.049TAXY_{it} + 1.98d_{it-5} + 0.14LOGw_{it-1} - 21.66w^2_{it} - 5.4d^2_{it} \quad (3b)$$

(0.00) (0.014) (0.0013) (0.003) (0.0013) (0.015) (0.1003)

Per.:24 (1982-2005); countr.: 29; obs.:182. S.E.: 0.33; J-stat.: 63.4; p(J).: 0.036.

For both groups of countries we find also a quadratic term of the lagged dependent variable. Higher tax revenues are used for higher public expenditure on education. Remittances, often used for private financing for education, induce governments first to increase and then to decrease public expenditure on education with a maximum of 11.7 per cent in richer countries' and 5.4 per cent in poorer countries. Development aid has a u-shaped effect in the richer sample with a minimum at 10.8 per cent and an inverted u-shaped effect in the poorer sample effect with a maximum near 18.3 per cent. Richer countries tend to reduce public expenditure on education when getting more aid and poorer countries tend increase it before the extremum. Savings have no direct impact on public expenditure on education.

The logic coming up from the above regressions for both samples is that remittances have a positive impact on savings; remittances and savings have an impact on taxation, with opposite effects of savings on taxation in the two samples; and remittances and taxation have an impact on public expenditure on education. This is slightly complicated further as for the savings ratio of both samples public expenditure on education appear also in the equations and in the poorer sample also net immigration as a share of the labour force. Savings do not appear in the equation for public expenditures on education, whereas aid does, with a u-shaped curvature for the rich sample and an inverted u-shaped

curvature for the poor sample, when ignoring lags. Average effects will therefore depend on the values determining in which part of the curvature the groups are on average. There will also be a strong sensitivity concerning the size of the shock, which may lead into areas with changed slopes.

## 5. Effects of increasing remittances: Baseline simulation and shocks compared

We simulate the above equations with respect to the endogenous variables in order to analyze the effect of changes in remittances on savings ratios, tax ratios and public expenditure on education as a share of GDP. The other variables might also be affected by remittances and the differentiated variables, but we treat them as autoregressive processes, cutting off feedback effects and isolating the effects under consideration.[17] For the richer sample, the autoregressive assumption refers to remittances per unit of GDP, the growth rate of the GDP per capita, and the development aid per unit of GDP. For the poorer countries, they regard remittances/GDP, aid/GDP and net immigration per unit of the labour force. In all cases, initial values are constructed by regressing the dependent variable on a constant and a linear or quadratic time trend for some periods with some overlap with the period of estimation.

FIGURE 2 ABOUT HERE

*Baseline simulations and shocks in the richer sample*

Figure 2a shows the autoregressive processes. The GDP per capita has increasing growth rates until 1970 and then they fall to a bit more than three per cent. Worker remittances go to about 4.7 per cent of GDP and aid to about 3.6 per cent. For the richer sample, remittances are larger than aid.

Figure 2b shows the simulation of the dependent variables of equations (1-3a). Savings go up to 27 per cent of GDP, taxation at about 23 per cent and public expenditure on education remains below 5 per cent.

The consequences of a 10 per cent shock to remittances/GDP ratio are shown in Figure 2c. The increase in the savings ratio runs up to almost 4 per cent. Government variables

[17] The total system effect of remittances taking into account many feedback effects for the poorer sample is considered in Ziesemer (2012b) in a slightly different but larger version of the system. The innovations of this paper are the results for the richer sample and the comparison of the two samples.

fall though: the tax ratio by 15 per cent below baseline and public expenditure on education up to 7.5 per cent. The government withdraws in the richer sample when remittances increase and at the same order of magnitude so.[18] Smaller shocks lead to qualitatively similar results. If we increase the shock to 60 per cent, the system collapses as public expenditure on education go extremely negative and savings and tax ratios extremely positive. This might indicate that estimated coefficient values have to change when the shock is large as suggested by the Lucas critique. On the other hand, permanent shocks of 60 per cent are very unlikely to occur and therefore coefficient changes may remain low too.

FIGURE 3 ABOUT HERE

*Baseline simulations and shocks in the poorer sample*

Figure 3a shows the autoregressive processes. Aid is going to 9.5 per cent of GDP and therefore is much larger than remittances. Remittances remain below 1.8 per cent and in the most left part of Figure 1 where the slope is positive until a value of 1.9 per cent. Net immigration falls to a negative 2 per cent.

Figure 3b shows that savings remain below 15 per cent of GDP, but taxes go beyond 25, and public expenditure on education go to 6.5 per cent.

Figure 3c shows that a 10 per cent shock of remittances increases the savings ratio and unlike the previous sample, the public expenditure on education and the tax ratio.[19] Again, smaller shocks lead to qualitatively similar results. If the shock goes to 39.6 per cent or higher the tax ratio reacts slightly negatively because the shock leads far into the area of a negative relation of remittances and taxes in equation 1b and Figure 1, the range of 1.9 to 13 per cent discussed above. The Lucas critique has been written in the times of log-linear macroeconomic models with constant-elasticity assumptions. It is very plausible that the Lucas critique indeed holds here because of the high non-linearity of Figure 1, which does not support a constant elasticity assumption, even for constant parameter estimates.

[18] Ebeke (2012) finds a negative impact of remittances on public expenditure on education for a sample of 86 countries not if the countries are less poor, but rather if governance is bad.
[19] A positive effect is also found in Ebeke (2010) for a sample of 111 countries and in Ziesemer (2012b) for a poor country sample.

## 6. Summary and conclusion

Summing up, savings increase through remittances in both samples. In the richer sample, remittances reduce taxes and higher savings reinforce this. In the poorer sample, a highly non-linear effect of remittances on taxation is present, which lead to higher savings and taxes for small and medium size shocks, but to negative effects on tax ratios for very high shocks. Public expenditures on education are negatively affected in the richer sample, although higher remittances have a positive effect but lower tax ratios have a negative effect. In the poorer sample too, public expenditure on education increase directly through remittances, but there is no fall in tax ratios for shocks below 39.6 per cent of the remittance ratio and therefore the total effect is also positive for public education money.

In sum, for the richer sample, taxation and public expenditure on education are diminished - the government withdraws. In the poorer sample, education clearly benefits from remittances as far as savings, tax ratios and public expenditure for education are concerned because the government acts complementarily. These effects can be viewed as a return to earlier emigration and a (partial) compensation for the implied brain drain.

## References


Abdih, Y., A. Barajas, R. Chami, and C. Ebeke (2012) Remittances Channel and Fiscal Impact in the Middle East, North Africa, and Central Asia. IMF WP 12/104, April.

Adams, R.H. Jr. and J. Page (2005). Do international Migration and Remittances Reduce Poverty in Developing countries? *World Development*, vol.33, No.10, 1645-1669.

Arellano,M. and O. Bover (1995), Another look at the instrumental variable estimation of error-components models, *Journal of Econometrics* 68 29-51.

Asteriou, D., Hall, S.G. (2011). Applied Econometrics, fourth ed. Palgrave Macmillan, New York.

Baltagi, B.H. (2008). *Econometric Analysis of Panel Data*. 4nd edition, John Wiley, Chichester.

Davidson, R. and MacKinnon, J. (2004) Econometric Theory and Methods, Oxford University Press, Oxford.

Desai, M.A., D. Kapur, J. McHale, and K. Rogers (2009). The fiscal impact of high-skilled emigration: Flows of Indians to the U.S., *Journal of Development Economics* 88, 32-44.

Doucouliagos, H. and M.Paldam (2006). Aid Effectiveness on Accumulation: A Meta Study, *Kyklos*, Vol. 59 (2), 227-254.

Ebeke, C.H. (2010) Remittances, Value Added Tax and Tax Revenue in Developing Countries. CERDI Document de travail de la série *Etudes et Documents* E 2010.30.

Ebeke, C.H. (2012) Do Remittances Lead to a Public Moral hazard in Developing Countries? An Empirical Investigation. *Journal of Development Studies* 48 (8), 1009-1025.

Fosu, A.K., Getachew, Y.Y., Ziesemer, T.H.W. (2012), Optimal Public Investment, Growth, and Consumption: Evidence from African Countries, Department of Economics and Finance, Durham University, Working Paper No 2012_03.

Freund, C. and N. Spatafora (2005). Remittances: Transaction Costs, Determinants, and Informal flows. *World Bank Policy Research Working Paper* 3704, September.

Greene, W.H. (2003). Econometric Analysis. 5th Edition. Pearson, New Jersey.

Griffin, K., 1970, `Foreign Capital, Domestic Savings and Economic Development', *Oxford Bulletin of Economics and Statistics*, 99 112.

IMF (2005). *World Economic Outlook*. Washington , Chap.2, 69-107.

Karpestam, R.P.D. (2012) Dynamic multiplier effects of remittances in developing countries. Journal of Economic Studies 39(5), 512-536.

Kennedy, P. (2003), A Guide to Econometrics, 5th edition, MIT Press and Wiley Blackwell.

Lucas, R.E.B. (2005). International Migration to the High-income Countries: Some consequences for Economic Development in the Sending Countries. In Blanpain, R. (ed.): *Confronting Globalization*. Kluwer, The Hague, 157-190.

Masud, N. and B. Yontcheva (2005) Does Foreign Aid Reduce Poverty? Empirical Evidence from Nongovernmental and bilateral Aid, IMF Working paper WP/05/100, May.

Meijers, H. 2012, Does the internet generate economic growth, international trade, or both?, UNU-MERIT Working Paper 2012-050.

Nakamura, A., Nakamura, M. (1998), Model specification and endogeneity, *Journal of*

*Econometrics* Vol. 83, pp. 213–237.

Osili, U.O. (2007). Remittances and savings from international migration: Theory and evidence using a matched sample. *Journal of Development Economics* 83, 446-465.

Ratha, D. (2004). Understanding the Importance of Remittances. Migration Information Source, Migration Policy Institute, Washington. Download from 28-3-2008.

Roodman, D. (2007). A Short Note on the Theme of Too Many Instruments. CGDEV WP 125, August.

Schneider, F. and D. Enste (2000). Shadow Economies: Size, Causes, and Consequences. *Journal of Economic Literature*, March, Vol. 38 Issue 1, 77-114.

Smith, R.P. and A.-M. Fuentes (2010) Panel Time-Series, cemmap course, April. Download 24 Aug 2011.

Wei, Y. and V.N. Balasubramanyam (2006). Diaspora and Development. *The World Economy*, 1599-1609.

Ziesemer, T. H. W. (2008). Worker remittances and government behaviour in the receiving countries, UNU-MERIT WP 2008-029.

Ziesemer, T.H.W. (2010a). The impact of the credit crisis on poor developing countries: Growth, worker remittances, accumulation and migration, *Economic Modelling* 27, 2010, 1230-1245.

Ziesemer, T.H.W. (2010b). Worker remittances in growth regressions: The problem of collinearity. *Applied Econometrics and International Development* Vol. 10-2, September 2010, 5-12.

Ziesemer, T.H.W. (2011), What Changes Gini Coefficients of Education? On the dynamic interaction between education, its distribution and growth, UNU-MERIT Working Paper 2011-053.

Ziesemer, T.H.W. (2012a). The impact of development aid on education and health: Survey and new evidence from dynamic models, UNU-MERIT WP 2012-057.

Ziesemer, T.H.W. (2012b). Worker remittances, migration, accumulation and growth in poor developing countries: Survey and analysis of direct and indirect effects. *Economic Modelling* 29, 2012, 103-118.

**Appendix A: List of Countries**

*Countries with GDP per capita above $1200 (2000):*

Albania, Algeria, Argentina, Aruba, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cape Verde, China, Colombia, Costa Rica, Croatia, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Guatemala, Hungary, Jamaica, Jordan, Kazakhstan, Latvia, Lebanon, Libya, Lithuania, Macao, Malta, Mexico, Morocco, Namibia, New Caledonia, Oman, Panama, Paraguay, Peru, Romania, Russian Federation, Samoa, Seychelles, Slovak Rep., Slovenia, Suriname, Swaziland, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela.

*Countries with GDP per capita below $1200 (2000):*

Armenia, Azerbaijan, Bangladesh, Benin, Bolivia, Burkina Faso, Cambodia, Cameroon, Comoros, Congo Rep., Cote d'Ivoire, Djibouti, Ethiopia, Ghana, Guinea, Guyana, Haiti, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Lesotho, Madagascar, Malawi, Mali, Mauritania, Moldova, Mongolia, Mozambique, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Philippines, Rwanda, Senegal, Sierra Leone, Sri Lanka, Sudan, Syria, Tajikistan, Tanzania, Uganda, Ukraine, Vanuatu, Yemen, Zimbabwe.

**Appendix B:**

**Instrumental variables, DWH Endogeneity test, and difference in Sargan tests**

This appendix provides the list of instruments used in the regressions, starting with the number of the respective regressions. The first number after a variable gives the first lag used and the second the last lag. These are used as dynamic instruments then (see Baltagi 2008, Chap.8). If only one lag is mentioned, we have a simple standard instrument.

(1a) TAXY,-2,-3;[20] SAVGDP,-1,-1; $SAVGDP^2$,-1,-1; $(WR(-1)/GDP(-1))^2$, time dummies; c. Instrument rank: 158.

(1b) LOG(TAXY),-2,-3; SAVGDP(-1); $SAVGDP(-1)^2$; WR/GDP; $(WR(-1)/GDP(-1))^2$ LOG(WR/GDP); time dummies; c. Instrument rank 94.

(2a) SAVGDP,-2,-4; LOG(1+WR/GDP),-1,-1; $LOG^2$ (1+WR/GDP), -1,-1; D(LOG(GDPPC(-1)));

[20] The difference in Sargan test for the last lag has p-value of p=0.30.

LOG(1+ODA/GDP),-1,-1; PEEGDP(-1); time dummies; c. Instrument rank: 179.

(2b) SAVGDP,-3,-6;[21] WR(-1)/GDP(-1); $(WR(-1)/GDP(-1))^2$; $(PEEGDP)^2$; ODA(-1)/GDP(-1); $ODA(-1)/GDP(-1))^2$; NM/L; time dummies; c. Instrument rank: 33.

(3a) PEEGDP,-2,-3; $PEEGDP^2$,-2,-4; LOG(TAXY); WR/GDP; $(WR/GDP)^2$; ODA(-1)/GDP(-1); $(ODA(-1)/GDP(-1))^2$; ODA(-2)/GDP(-2); $(ODA(-2)/GDP(-2))^2$; PEEGDP(-5); time dum.; c. Instr.rank: 113.

(3b) PEEGDP,-2,-2; $PEEGDP^2$,-2,-2; TAXY; ODA(-5)/GDP(-5); LOG(WR(-1)/GDP(-1)); $(WR/GDP)^2$; $(ODA(-1)/GDP(-1))^2$ ; time dum.; c. Instrument rank: 76.

*DWH endogeneity test of regressors, with one lag as instrument*

In the fixed-effects regression corresponding to eq. (1a), the savings variables are endogenous because adding the residuals from the first stage regressions as an additional regressor in the DWH test yields p-values of *0.0669* for savgdp and *0.02* for $savgdp^2$.

In the fixed effects regression corresponding to eq. (1b), the worker remittance variable *wr/gdp* is not endogenous because adding the residuals from the first stage regression as an additional regressor yields a p-value of *0.73* and *p=0.82* for its log version. We assume that the worker remittance variable is not pre-determined, but exogenous.

In the fixed-effects regression corresponding to eq. (2a), the aid and worker remittance variables *are* not endogenous because adding the residuals from the first stage regression as an additional regressor yields p-values of *0.81, 0.37 and 0.645* in the order of appearance above. We assume that worker remittances and aid both are predetermined rather than exogenous, as they may compensate earlier shocks to savings in the richer sample.

In the fixed-effects regression corresponding to eq. (2b), the variables public expenditure on education/GDP, ODA/GDP and net immigration as a share of the labour force aid are not endogenous because adding the residuals from the first stage regression as an additional regressor yields p-values of *0.97, 0.62 and 0.30* in the order of appearance above. As ODA/GDP may indeed depend on earlier residuals, because in poor countries aid is given because of a lack in the surplus product, it may be pre-determined and we use a lagged instrument. For education expenditure and migration

[21] The difference in Sargan test for the last lag has p = 0.72, indicating a low effect on the J-statistic but the lagged dependent goes into the expected direction.

there is hardly any reason why they should depend on earlier residuals of savings and we assume that they are exogenous.

In the fixed effects regression corresponding to eq. (3a), all the contemporaneous regressors are not endogenous because adding the residuals from the first stage regression as an additional regressor yields p-values of *0.67* for *taxy, 0.46* for *wr/gdp, 0.66* for $(wr/gdp)^2$ *, 0.33* for *oda/gdp* and for its square *0.16.* As ODA/GDP may indeed depend on earlier residuals, because in developing countries aid is given because of lacking education money,[22] it may be pre-determined and we use a lagged instrument. For taxes and remittances we assume that they are exogenous.

In the fixed effects regression corresponding to eq. (3b), all the contemporaneous regressors are not endogenous because adding the residuals from the first stage regression as an additional regressor yields p-values of *0.71* for *taxy, 0.54* for $(wr/gdp)^2$, *0.38* for *oda/gdp* squared. As ODA/GDP may indeed depend on earlier residuals, because in poor countries aid is given because of lacking education money, it may be pre-determined and we use a lagged instrument. For taxes and remittances there is hardly any reason why they should depend on earlier residuals of *peegdp* and we assume that they are exogenous.

Unfortunately, there seems to be no test for the question whether a regressor is exogenous or predetermined. Making the assumptions differently from what we did above leads in all cases to lower values of the coefficient of the lagged dependent variables, although they should probably be even higher to correct the bias of *1/T*, and often we get in addition other worse results. We do not hesitate to admit that the assumption have been made in a way to get the results as consistent as possible with econometric theory, here the upward correction of the fixed effects bias in the coefficient of the lagged dependent variable.

[22] This may be reflected in earmarked aid for education purposes; see Ziesemer (2012a), Table 1.

| **Table 1** | **Aspects of system GMM** | | | | | | |
|---|---|---|---|---|---|---|---|
| *Equation* | *Coeffcients of lagged dependent variables* | | | | | | |
| | *fixed effects* | *GMM sys* | *OLS* | *Obs./N* | *1/T (ave)* | *col.C/col.B* | *p(2.ord.ar)* |
| 1a | 0.853 | 0.946 | 0.985 | 406/41 | 1/10 | 1.109 | 0.95 |
| 1b | 0.870 | 0.939 | 0.960 | 311/33 | 1/10 | 1.079 | 0.42 |
| 2a | 0.533 | 0.549 | 0.850 | 457/46 | 1/10 | 1.030 | 0.45 |
| 2b | 0.642 | 0.668 | 0.778 | 65/32 | 1/2 | 1.041 | insuff.obs. |
| 3a | 0.747 | 0.799 | 0.908 | 5.828 | 0.172 | 1.069 | 0.56 |
| 3b | 0.772 | 0.863 | 1.094 | 6.276 | 0.159 | 1.117 | 0.5 |

All regressions with time fixed effects. System GMM uses orthogonal deviations and 2SLS instrument weighting matrix. Panel corrected standard errors (PCSE) of the PERIOD SUR type, for eq. (2b) cross-section SUR.

**Figure 1: The non-linear relation between remittance and tax ratios in data range of the poor sample (mean 0.029, median 0.014 per cent, std.dev. 0.041)**

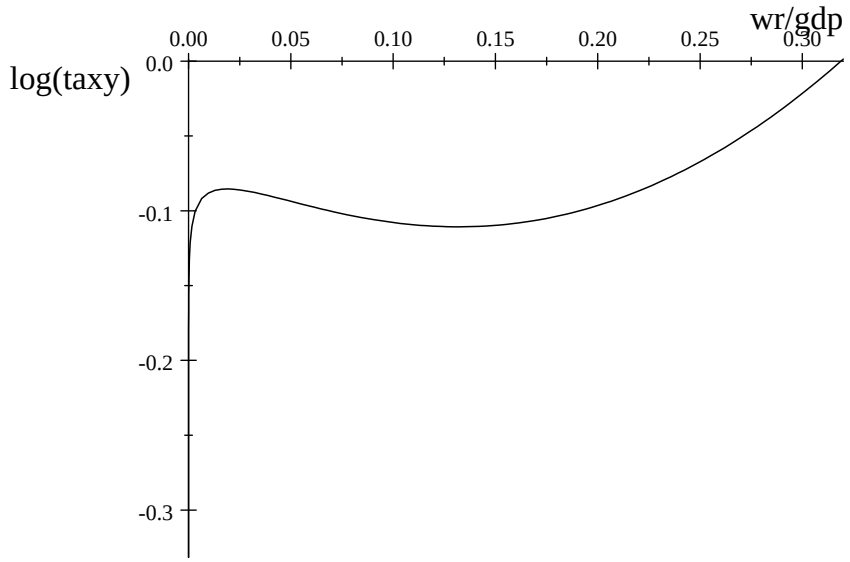
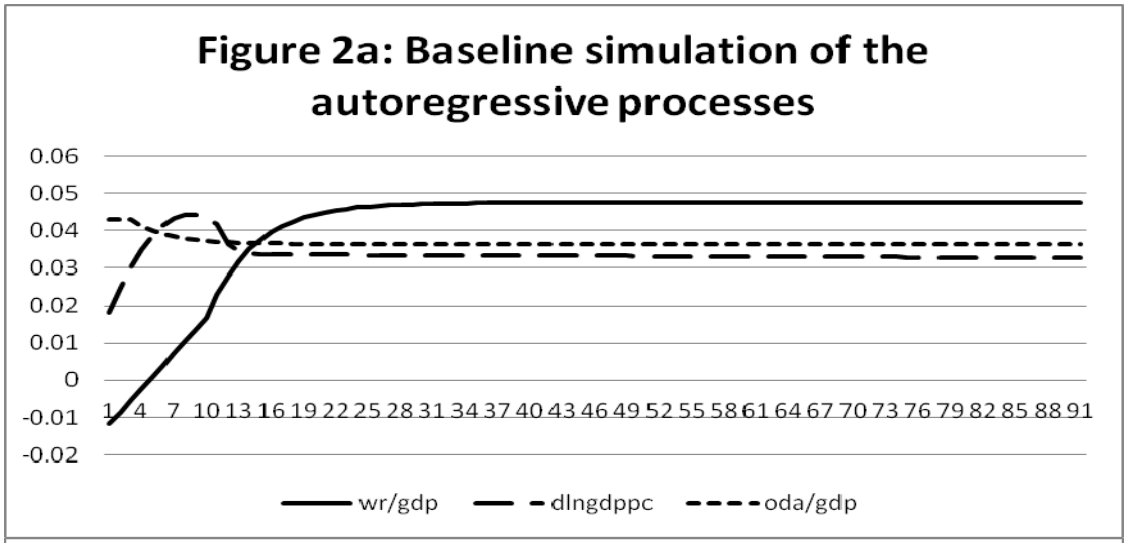
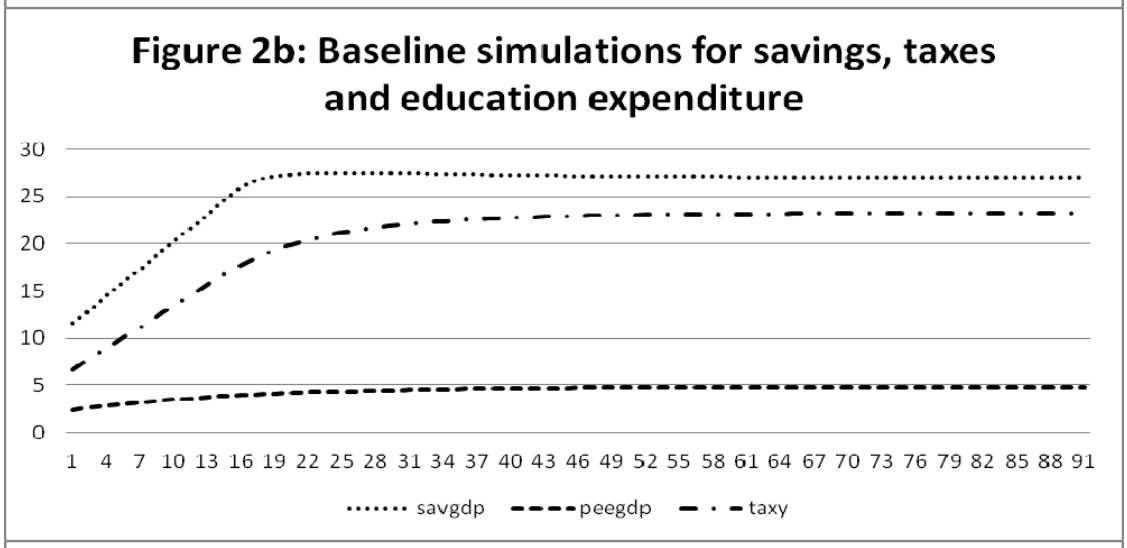


**Figure 2: Baseline simulation and 10 per cent shock for the richer sample**



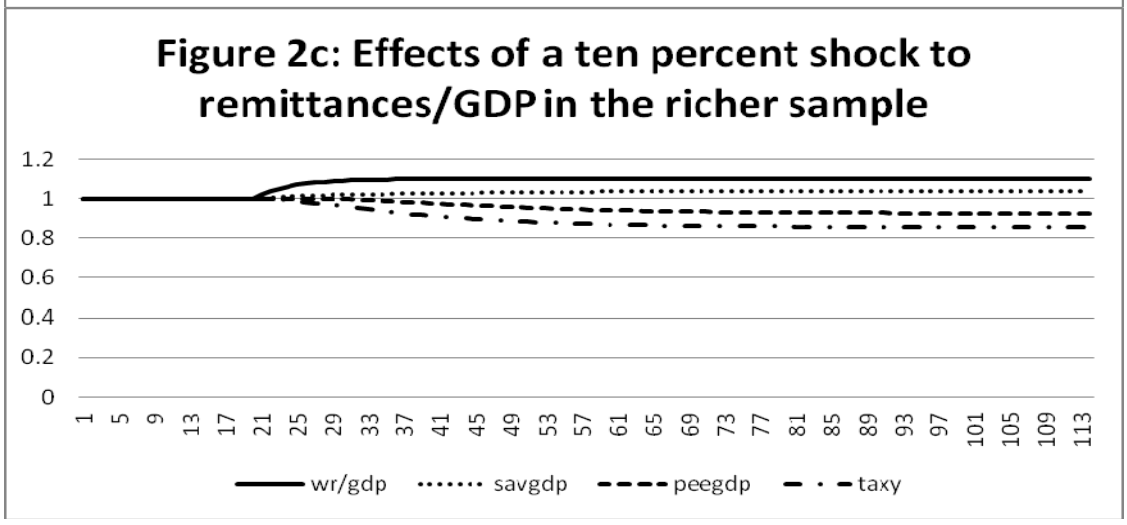
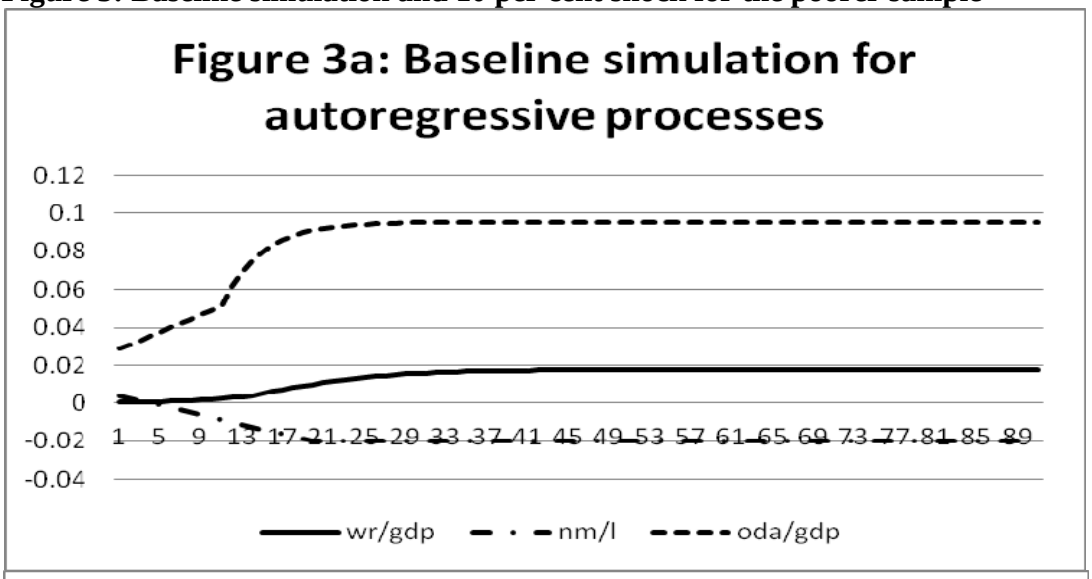
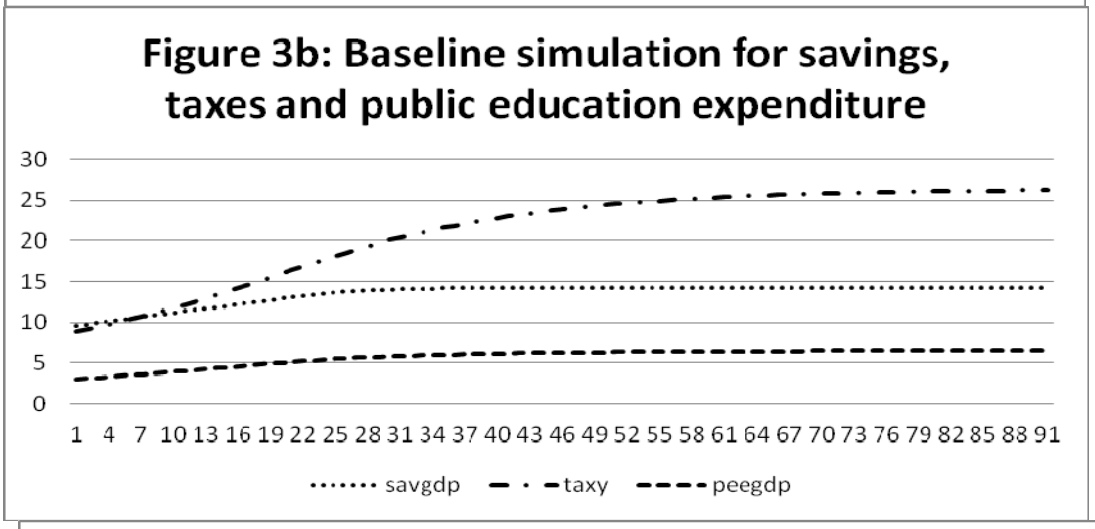
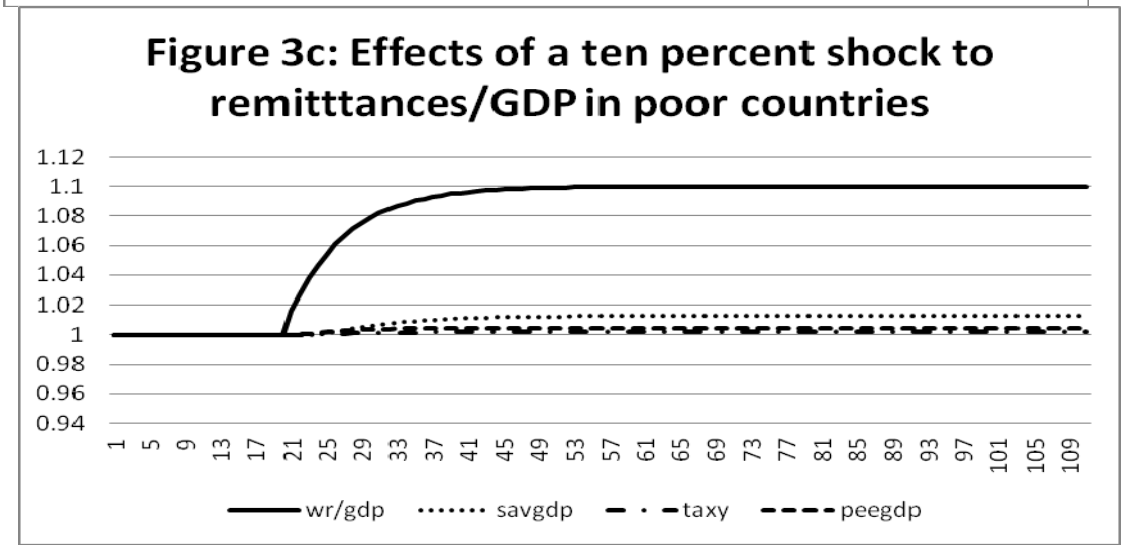



**Figure 3: Baseline simulation and 10 per cent shock for the poorer sample**



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