Debt mechanisms and education financing:
a comparative study in seven countries

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Acknowledgments

Executive Summary

This study is part of research project of Global Campaign for Education on debt alleviation mechanisms and education financing in 7 target countries. Specifically, the report aims at revealing the link between the external public debt stock and government spending on education in the following seven countries: El Salvador, Zambia, Gambia, Nepal, Mongolia, Lebanon, and Georgia. The paper summarizes case studies conducted by the coalition partners in 2021 and evaluates the question of debt and public financing of education through an econometric model. Moreover, it also includes in-depth theoretical analysis on how the variables could be linked from the macroeconomic perspective.

The report concludes that high external debt to GDP ratio is associated with higher limitations to increasing public education expenditure. The report shows that the public's external indebtedness is not a problem since it allows developing countries to acquire resources that could be used for development programs. However, as external public debt increases, so does its service, which constrains the public expenditure on education. The econometric analysis conducted within the study shows that a 1% increase in the external debt-to-export ratio is associated with a 0.33 percent decrease in public spending on education. Thus, the report concludes that different specifications of debt stock variables (both as a share of GDP and export) are negatively associated with public spending on education. In that sense, it is difficult to expect that developing countries will increase their budget for education if there are not enough international efforts to reduce the debt service pressure on these countries. The Gambia and Zambia are two examples of how debt-relief programs could contribute to providing more resources for public expenditure on education.

However, an important element that should be taken into consideration on debt relief programs is that countries have different context, and, therefore, country specific measures should be designed. For example, it is likely that a country with a higher GDP, such as Georgia and Mongolia, will be able to deal with current crises without participating in debt relief program. Moreover, for these countries' debt is not a problem itself if it used for promoting structural change and increase of productive capabilities.

Debt relief programs are important tools for reducing the pressure that debt services make on public expenditure on education; however, it is not the only significant variable that matters in this

context. The report emphasizes that the governments of the seven countries under this study should consider measures to reduce the countries' trade deficit. A given economy can't run structural trade deficits without a constant indebtedness to the external sector. One additional indicator that has shown a positive connection with the public expenditure on education is the tax revenue to GDP. This means that discussions on addressing public debt problems should also involve questions related to improving tax collection and solving informality problems.

Recommendations for Global Campaign for Education and National Coalition Partners

- Initiate public discussion on incorporation of the Incheon Declaration principles regarding public spending on education ratios into constitutions (or through other strong legislative pledges).
- Create Debt Management Task Force which will help respective governments to design long-term debt management strategy.
- Promote discussion on debt swap mechanisms for Zambia's and Lebanon's external debt.
- Creating long-term plans for de-dollarization of the economy and strategy for minimization of reliance on borrowing in foreign currency.
- Promote public discussion against 'commodification' and privatization of education system.
- Establish tax advisory research institute which will help respective governments to re-evaluate existing possibilities for increasing tax revenues through improving tax administration and making taxation system more just.
- Foster dialogue on structural change (industrial policy) and elimination of trade deficit.

Introduction

According to the IMF report, during the past decade, developing countries and emerging countries faced the "largest, fastest, and most broad-based increase in debt" in the past 50 years. This wave of debt has turned economies into a spiral of indebtedness following the COVID-19 pandemic and subsequent economic crises (Kose, Ohnsorge, Nagle, & Naotaka , 2020). Increased indebtedness raises concerns about whether developing countries can simultaneously deal with higher external debt service burden and maintain public spending on vital services, such as education and healthcare. This study is part of research project of Global Campaign for Education on debt alleviation mechanisms and education financing in 7 target countries. Specifically, the report aims at revealing the link between the external public debt stock and government spending on education in the following seven countries: El Salvador, Zambia, Gambia, Nepal, Mongolia, Lebanon, and Georgia. The paper summarizes case studies conducted by the coalition partners in 2021 and evaluates the question of debt and public financing of education through an econometric model. Moreover, it also includes an in-depth theoretical analysis of how the variables could be linked from the macroeconomic perspective.

The report consists of three major sections. In the first section, we critically analyze the key findings of the reports produced by the coalition partners in 7 target countries regarding the education quality challenges and the education sector's public financing. Furthermore, this section also looks at reports published by UNICEF, UNESCO, the World Bank, and other international organizations, which refer to education problems in those countries. The reports show that the countries differ in their level of economic development, and structural issues related to education are not homogenous. However, some general tendencies, such as privatization and commodification of education, affect almost all countries considered in this analysis. Besides that, the case studies (produced by the coalition members) also found that the COVID-19 pandemic affected the revenues of some countries given in the study, which may undermine governments' commitment to increase public spending on education up to 6 percent of GDP.[1]

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[1] The international benchmarks (e.g. see: the Incheon Declaration) recommend 15-20 % of the overall public expenditure on education and/or 4-6% of Gross Domestic Product.

Section 2 provides a general description of the public expenditure on education for the seven countries, the evolution between 1998 and 2020 of the main macroeconomic variables such as Gross Domestic Product (GDP), public debt to GDP, external debt to exports, trade balance, and discusses them for each country. This section also provides possible relations between these macroeconomic variables and the expenditure on education mainly derived from the theoretical framework presented by FitzGerald (2009). The authors of this report chose this framework because it explains the fiscal and external constraints faced by developing countries' public expenditure. At the end of this section, a summary table is provided that explains the expected relationship (from a theoretical perspective) between the independent variables and the public expenditure on education that is explored in the econometric model.

Section 3 provides macro-econometric analysis, where we use linear panel models to test the relationship between government spending on education and external public debt stock. We provide two different specifications for the public debt stock variable, one as a share of GDP and the second with the export of goods and services. This transformation of variables is in line with the debt ratio indicators used by the International Monetary Fund for assessing the debt sustainability of nations (IMF , 2003). In addition, we control the model with other variables for checking the robustness of the models. The econometric analysis rejects the null hypothesis that claims that government spending on education and external public debt stock is unrelated variables. The preferred model shows that the two variables mentioned above are negatively associated, including when controlled with other variables such as tax revenue as a share of GDP, foreign exchange rate, GDP growth rate, and trade balance. However, the results should not be overgeneralized and should not be understood as a general economic hypothesis for other developing countries not included in this study.[2]

The concluding part discusses major findings and implications for policymakers and international organizations regarding education financing and external debt issues. COVID-19 and the subsequent economic shock had significant effects on the economy of the countries within this study. The countries analyzed in this report are different in their economic development and debt

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[2] For improving statistical results, the sample size should be increased, and nonlinear panel models should be used, which would capture existing nonlinearities across time within and between countries.

level. Considering the heterogeneity and existing differences in the economic structures, the treatment of the debt question should be country-specific. The concluding part of this report provides a policy framework for short-term and long-term perspectives.

Section 1: Overview of Education Challenges

This section provides a general overview of education attainments and government financing in the seven countries: El Salvador, Zambia, Gambia, Nepal, Mongolia, Lebanon, and Georgia. These countries differ in the level of economic development, geographical, economic, urban, and political peculiarities. The various political and historical processes make these education systems and their challenges unique. The degree of economic development affects how much resources these countries dedicate to education in nominal terms and as a share of GDP. However, other factors such as population density also affect the cost of education. The Incheon Declaration, which 184 Member States adopted, says that by 2030 the target of government spending on education as a share of total expenditure should be at least 15-20%, while the public spending to GDP ratio should be at least 4-6% (UNESCO, 2015).

Zambia

In Zambia level of government spending on education as a share of GDP is at the lowest level since 2006. Government spending on education is 11 percent. The estimated growth rate for Zambia 2021-2025 is 1 percent growth annually, which is relatively low considering the level of economic development (Milapo, 2021). Zambian economy shrunk by 3 percent during the COVID-19 pandemic in 2020. Two major problems which hamper Zambia from mobilizing enough resources to finance its developmental goals are as follows: a) the tax collection system is inefficient, and the government is unable to mobilize enough resources for local needs b) second is a high level of corruption and informality, which is associated with the first problem. According to the ILO and OECD joint report, 88.7 percent of the employed Zambian population work informally (ILO&OECD, 2019). The completion rate of primary school in Zambia is high. However, according to the UNICEF report, the percentage of students who progress to secondary school is low (around 67.5 percent). Joint report of UNICEF and UNESCO says that "500,000

children aged 6-15 are not in school (UNICEF&UNESCO, 2014)." This problem might be related to specific barriers, which make the continuation of education more costly, such as school fees and long distances from school. Besides that, quality of education stays to be a central problem for Zambia's education system. The UNICEF report notes that the ratio of students who pass the Grade 9 and Grade 12 examinations are meager (UNICEF, 2021).

The case study analysis by Milapo (Milapo, 2021) supports the evidence produced by the international organizations on Zambia's situation in the education system. According to Milapo, the Zambia education system suffers from a lack of adequate bursaries for vulnerable children to attend school and limited school places, which is one of the root causes for the low attendance of classes. The high poverty rate also affects school enrolment. Girls are dropping out because of early pregnancy and marriages, girl unfriendly environments at schools in Zambia also affect school enrollment. According to the evaluation of the Ministry of Education of Zambia in 2013, low academic attainment, poor learning environment, lack of learning and teaching materials, and high pupil to teacher's ratio are challenges of the Zambian education system. The report by Milapo maintains that the Zambian education system is still plagued with the challenges mentioned above (Milapo, 2021). Moreover, according to the report, public schools suffer from inadequate teaching staff, especially in rural areas, caused by poor job conditions and low salaries for teachers in public schools. According to the World Bank's latest data, pupil to teacher ratio is 42.06.

Mongolia

The net enrollment in primary education in Mongolia is almost universal, and unlike Zambia, Gambia, and Lebanon, gender disparity is not present. The state finances all levels of education in Mongolia. Plus, government provides total funding for 300 sub-provincial school dormitories in rural areas. However, according to UNICEF, absenteeism among children with disabilities and minority groups is much higher, especially in remote and rural areas (UNICEF, 2021). The report says that the geographic fixed effects of Mongolia cause peculiar problems for school children. Specifically, access to schooling is limited for children from rural areas and herder family children. Literacy and enrollment rates are high in Mongolia; however, it was declining among children with disabilities, children of herders, and minorities. Mongolia's population growth is positive, and the proportion of the population aged up to 15 to the total population increased up to 31.5

percent in 2019. If there is contraction in public education finance, it potentially may put at risk the achieved successes by Mongolia's education system (Banzragch, 2021).

The case study done by Banzragch cites several papers on per-pupil cost in Mongolia. It claims that it is relatively high, considering low population density and the high proportion of nomadic herders in population, which is around 28% of the total population. The relative sparsity of rural areas and severe climatic conditions (such as long and cold winter periods) levies extra costs on Mongolia's education system. COVID-19 crisis has reduced government revenues, but central government spending on education did not decrease. Mongolia's public expenditure on education will be 6.6 of GDP, which is greater than the benchmark set in Education 2030 framework. However, considering the increase in the international market prices of the export commodities such as copper and gold and high projected (6 percent) economic growth in 2021, it is less likely that government revenues will be at risk of contraction (Banzragch, 2021).

Lebanon

For Lebanon, crises in Syria created new challenges in terms of education financing. According to UNICEF, over one million refugees from Syria live in Lebanon, of which around 63% are school age and need access to education.[3] Twenty-five percent of Lebanese and 75% of refugee households live below the poverty line, which significantly affects access to quality education. The conflict in Syria added pressure on the Lebanon government, which already hosts 450,000 registered Palestinian refugees (UNRWA, 2021). Lebanon is the highest per capita refugee host country, accounting for nearly 33 percent of its population. Around 59 percent of Syrian refugees aged 3-18 are out of formal schooling. UNICEF reports that "10 per cent of children are engaged in some form of paid work – 22 per cent among Syrian refugees, 7 per cent among Palestinians and 4 per cent among Lebanese" (UNICEF, 2021).

According to the World Bank report, the level of education contributes to higher earning in labor markets. In Lebanon, a person who completed primary education earns on average 19 percent higher than an individual with no formal education (controlled with gender and age variables).

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[3] According UNCHR estimated number of refugees in 2021 was 844,056: https://reporting.unhcr.org/document/1262

Furthermore, university-level education makes on average 171 percent higher wages than an individual with no education (The World Bank, 2017) .

Commodification (increased privatization and turning education from a public good into a commodity) of the education sphere is one of the biggest challenges in Lebanon's education system. Total government expenditure on education as a share of GDP accounts only 2.45 percent, and it equals only 6.4 percent of total government expenditure. The private sector is a key provider of education, and it is only marginally subsidized by the public sector. Around 60 percent of students attend private schools. Only 14 percent of students who are enrolled in private schools getting subsidized free education (Lahire, El-Ghali, & Sedmik, 2021). This leads to high out-of-pocket expenditures from the household and leads to unequal social and economic outcomes. The lower the socio-economic status of the household, it is less likely that its members will pursue higher education. Wealthy students usually attend a few best-performing schools. In terms of financing education, government spending on education has increased in nominal terms however, it has decreased as a share of total spending (Arab Network Popular Education - Lebanese Coalition, 2021).

El Salvador

El Salvador's net enrolment rate in primary education has decreased from 94.1 percent in 2011 to 79.1 percent in 2019. There is a decreasing trend in the net enrolment rate of secondary education, from 63.5 percent to 59.1 percent. The literacy rate increased significantly for both male and female populations last two decades and reached almost 90 percent. However, the OECD report point out El Salvador's education system faces three major problems. The first one is related to a low level of education quality, which results in high drop-out rates. Specifically, students usually complete only six grade of nine (OECD, 2021).

Like other countries in this analysis, El Salvador also suffers from inequities in education. This inequity excessively affects the urban and rural population living with low income, girls and young people whose parents do not have formal education. Finally, the high dropout rate puts young people who abandon schools at risk of becoming members of gangs or getting involved in criminal activities (Centeno, 2017). Social mobility in El Salvador is limited, and the existing education system does not provide adequate means for advancing socio-economic status. In the World Economic Forum's Index of Social Mobility, El Salvador's score is 47.4, and it is at 68th place

among 82 countries (WEF , 2020). Moreover, in this index, sub-score for education is 33, which quite low in comparison to other developing countries which are surveyed by the World Economic Forum.

Georgia

Georgia has devoted insufficient public resources to all levels of education, as well as to science, and research and development since gaining independence in 1991. This country collects and spends a smaller portion of revenue as a share of GDP than most of the EU countries. Therefore, the size of spending on education as a share of the total spending of Georgia is higher than the EU average, however, this discrepancy stems from Georgia's conservative approach   toward the role of government in economic development, which is reflected in the government spending to GDP ratio. Georgia spends on average 1 per cent less share of GDP on education than the EU countries. However, Georgia spends more on public order and safety, and defense as a share of GDP than EU countries on average. In 2019 then Prime minister of Georgia Georgi Gakharia announced a new pledge of the government to raise public spending to up to 6% of GDP by 2022. This plan envisioned the adoption of special regulatory mechanisms, which would force all subsequent governments to follow this pledge in the years to come. However, as early as December 2020, the Georgian government announced that there is a risk that it may take longer to fulfill this pledge due to the economic shock resulting from the COVID-19 pandemic (Khundadze, 2021).

According to the World Bank (2020) the GDP per capita of Georgia could be 1.64 times higher, if it fully realizes its education and health potential in the long-run perspective. The report states that many Georgian students have problems with development of fundamental cognitive and socioemotional skills needed for successful careers. Furthermore, the report mentions that this situation is further aggravated by "the low prestige and salaries given to teachers, as well as by the limited professional development opportunities available to them and the aging of the teacher workforce" (World Bank, 2020, p. 20). As stated by the National Statistics Office of Georgia, the education sector in Georgia is the lowest-paid field in the country. More recent data from the Ministry of Education and Sciences shows that wages of public-school teachers have increased substantially over the last decade (Godar, Khundadze, & Truger, 2018). However, adjusted wage growth was much more modest. The low level of teacher's salaries affects quality of education. In 2018 PISA edition, Georgia ranks 73rd out of 78 countries in scientific literacy, 70th out of 77 in

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reading literacy, and 66th out of 78 in mathematical literacy. It should also be noted that Georgia's scores in PISA have deteriorated since 2015, moreover, Georgia has shown worse scores across all PISA components (OECD, 2018a).

Preschool education is also affected by the lack of financial resources. According to UNICEF (2017), along with low salaries, other problems, such as overcrowded classrooms, long working hours, lack of initial and continuous training, are the major obstacles existing in early childhood education and care in Georgia. Lack of infrastructure, especially on the regional levels causes the absence of a sufficient number of places in kindergartens. UNICEF report states that around 5% of the total number of children are unable to attend kindergartens due to the lack of places (UNICEF, 2018a).

The lack of public spending on education causes other problems for the stability and economic prosperity of Georgia. There is a rising level of the commodification of all levels of the education system in Georgia. Commodification and privatization of the system could lead to differences in socio-economic outcomes of Georgian youth in the long run. Moreover, privatization of the education system may further exacerbate economic inequality between the capital city and the regions. The number of pupils in private schools has increased by 400 per cent and the private-to-public school pupil's ratio has increased from 1.7 per cent to up to 10 per cent since 2000. Apart from this, there is also a rising trend of profitability in the education system. For instance, the profit margin has increased by 13 percentage points throughout the last decade and reached 19.7 per cent in 2019. The tendencies of commodification and privatization are identical in pre-school and higher education (Bochorishvili & Peranidze, 2020).

Gambia

The Gambia is one of the least developed country and inequality adjusted index is as low as 0.34. For the country with estimated GDP US$746 (2020), the challenges related to education system is much more acuate. Gambia suffers from high pupil to teacher's ratio, mismatch in supply and demand for teachers. According to the Gambia Case Study, student/teacher ratio above 1:50 (Jobe, 2021). One of the reasons for lack of qualified teachers is the fact that teachers refuse to accept positions in the Central River and Upper River Regions of the country. Moreover, there is the tendency that teachers from public schools are moving to private ones, because salaries and

allowances are small. Lack critical infrastructure, is also causing problems in terms of maintaining qualified staff at Gambian schools (Jobe, 2021).

The report says that in 2019, government of Gambia was forced to decrease education spending as a share of national budget from 20 to 16 percent to meet its external debt obligations. Government spending on education as a share of GDP also decreased. Specifically, this ratio has decreased from 3.36 percent of GDP (2017) to 2.58% of GDP (2019). This level of spending is by no means adequate to tackle existing challenges in the Gambian education system. For instance, Global Education Monitoring Report (2015) recommends Gambia to spend around 6.3 percent of GDP on public education to meet the existing problems related with teachers' salaries and infrastructural projects. Low public spending on education affects households, and as a result households are forced to pay out-of-pocket. According to the Gambia Case Study estimated household spending on education is around 2.8 percent of GDP (Jobe, 2021).

UNICEF notes that Gambia's education sector is rising annually, and there is growing funding requirements which should be addressed by the government to ensure availability of classrooms, learning materials and teachers. Quality of education is one of the key problems for the Gambian education system. Pre-school education system is not adequately developed in terms of programs and capacity. Most children in primary education are not able to achieve national competency criteria set by National Assessment Test. Performance related dropout is also presented in Gambian schools. The Gambian schools also suffer from lack of inclusivity, specifically, access to education for children with disabilities is constrained, because of existing social norms and structural constraints. Even though walking distance to schools has been reduced, it is remaining long 3 kilometers for primary and 5 kilometers for secondary school kids (UNICEF, 2021).

Nepal

Throughout last 30 years Nepal went through several waves of education reforms. Specifically, Basic and Primary Education Reform (1992-2003), the Education for All Program (2004-2009), and the School Sector Reform Program (2016-2021). The right to free and compulsory education is reflected in the constitution of Nepal since 2015. Specifically, the constitution of Nepal guarantees free and compulsory education up to basic level and free education up to secondary level (9-12). The right to education is also supported by Free and Compulsory Education Act and a Children's Act adopted in 2018 (Bhatta, 2021). Nepal has made significant progress in terms of

improving certain basic education indicators. For instance, net enrollment rates in basic and secondary education have increased. Since 2004 adjusted net enrollment rate in primary schools in Nepal increased by 16 percentage points. There were some positive developments in increasing literacy rates among 15-24 years old, and completion years also improved. Since 2001 literacy rate has increased 22 percentage points and reached 92 percent among 15-24 (UNESCO Institute for Statistics, 2022).

Despite the institutional changes and achieved progress, Nepali education quality is far from perfect. Only 68 percent of primary school graduate achieve proficiency in mathematics, and 80 percent in mathematics respectively (UNICEF, 2019). Average pupil-to-teacher ratio is higher in comparison to its neighboring South Asian countries however, this varies from region to region (UNICEF, 2019). For instance, in mid-Western regions it as high as 52:1 (UNICEF, 2019). According to UNICEF for every 100 children which enroll, 29 of them drop out before 8th grade. By the estimates the same report 700,000 children remain out of schools in Nepal. The dropout rates are especially problematic in ethnic minority groups. Nepal is linguistically diverse countries, with 123 different languages spoken in the country with population of around 30 million population. UNICEF estimates that over 2 million children are unable learn effectively due to the low level of proficiency in Nepali language. The same report mentions that in some schools only 13 percent of 3rd graders are fluent in Nepali language (UNICEF, 2019).

Increasing level of 'commodification' of the education sector is also prevalent in Nepal, which exacerbates and cements existing socio-economic inequality. The economic divide is represented and self-reinforced by the education inequality: "Only 73% of poorest children complete primary education, versus 95% of the wealthiest; 59% of the poorest children complete lower secondary, versus 90% of wealthiest; and 9% of the poorest complete upper secondary compared to 60% of the richest (ActionAid, 2022)." Existing tendencies towards privatization also leads to increasing out-of-pocket spending on education. Household spending in education is currently 3.2% of GDP (ActionAid, 2022).

Organizations working in the education sectors conclude that increased privatization in Nepal's education system leads to "segregated education landscape" and fuels economic inequality (ActionAid, 2022). The study done by Nepal Economic Forum found that "cartelization" of Nepali education system is underway. Defunding and discreditation of public schools and

simultaneously increasing popularity of private schools, brought "public schools on the verge of collapse (Nepal Economic Forum , 2020 , p. 9)." The report further suggests that owners of elite private schools use their political clout to maintain existing status quo and moreover, broaden cartelization of education system (when handful of elite schools set high prices, and also influence political agenda on education for their own enrichment). The inequality is also present at early education development level. The Early Childhood Development Index shows that 86 percent of children from the wealthiest quantile achieve corresponding ECDI benchmark (which assess 36–59 months kids in four directions: literacy and numeracy, physical, socio-emotional, and cognitive development), while only 60 percent of kids from the poorest quintile achieve this milestone (The World Bank & UNICEF, 2020). ECED funding as a share of GDP was about 0,08% in 2020, which is "grossly inadequate and poses significant challenges to improving the quality of ECED services", according to the joint report by the World Bank and UNICEF (The World Bank & UNICEF, 2020).

One of important aspect related to Nepali education system is existing decentralization tendency of its governance structures. Nepal made institutional changes in terms of governance of education system. Specifically, through the constitutional changes made in 2015, education service provision is delegated to local governments. Municipalities are responsible for implementing basic management activities, such as: management of schools and salary payments. The provincial governments are responsible for coordination municipalities and organization of technical support. Besides that, the role of provincial government involves training of teachers. Central government retained functions related to technical guidance and education policy development (UNICEF&UNESCO, 2021). The radical and quick move towards decentralization of education system brought about controversial results. Scholars working in the field point out that the way how the process was done could create problems related to 'elite capture' and poor management of schools (Uprety & Bhatta, 2018). Empirical evidence indicates that the "low academic qualification, lack of managerial skill or capacity of the members [school management bodies] had been regarded as some of the mounting challenges (Kharel, 2017)." Joint study done by UNICEF and UNESCO concluded that decentralization became a challenge in terms of providing public goods during the COVID-19 pandemics, especially to remote areas: "While local governments were certainly active in dealing with the COVID-19 crisis, they were also overwhelmed, understaffed and could not effectively utilize the available funds (some funds were used for other

purposes than education) (UNICEF&UNESCO, 2021)." The report further suggests that capacity of the local governments should be increased, so that the self-governance bodies are able to meet increased responsibility, which they acquired after above mentioned legislative changes.

Nepal has young and growing population, which means that it needs long-term public financing plans for its educations system. Government public spending to GDP ratio on education slightly exceeds the lower bound of the UN benchmark recommendation for developing countries. However, public spending as a share of budget has decreased since 2012 by 4 percentage points, and was 11,7 percent in 2021 (Nepal Ministry of Finance, 2021). The report prepared by Bhatta (2021) for National Campaign for Education Nepal, emphasizes the critical problems in terms of public financing of education in Nepal. In particular, the report indicates that lack of financing created shortage of teachers in schools. Specifically, the net shortage of teacher at various level is 66,000, which requires mobilization of extra USD 0.29 billion (Bhatta, 2021). Moreover, the report by High Level National Education Commission dates by 2018, indicates that there is need for extra 0.94 billion USD funding annually for schools to meet overall operational costs (cited in Bhatta, 2021). This means that, according to the assumptions made in this report, public spending for schooling should at least double to avoid shortages of teachers at schools. Claussen (2020) indicates that there is approximately 2.2 times per student funding gap over the current funding (cited in Bhatta, 2021).

Section 2: Macroeconomic and public debt context and theoretical framework

This section offers a general contextualization of the macroeconomic and public debt situation in each country studied. Furthermore, the following section provides a theoretical framework describing the main macroeconomic constraints these countries face in expanding their public expenditure. Table 1 introduces each country's main macroeconomic variables and public spending on education. The table allows observing some of the similarities and differences among these countries. As mentioned in 1 of this report, according to UNESCO (2015), to achieve the Sustainable Development Goal 4 2030, countries should spend on education 4-6% of GDP. Table 1 shows that Mongolia, Nepal, and Zambia reached this goal in 2019. El Salvador, Georgia, Gambia, and Lebanon still have to accomplish this threshold.

Table 1 GDP per capita, public debt to GDP ratio and Public Expenditure on Education 2019

Country	GDP per capita 2019 (PPP 2017)	Country classification according to income	Public debt 2019 (% GDP) *	Public expenditure on Education 2019 (% GDP)
El Salvador	8,795.45	Middle Income	69.4	3.4
Gambia	2,156.02	Low Income	80.0	2.9
Georgia	14,975.81	Middle Income	41.3	3.8
Lebanon	10,960.83	Middle Income	174.5	2.6**
Mongolia	12,048.93	Middle Income	60.0	4.9
Nepal	3,972.63	Middle Income	30.1	4.4
Zambia	3,383.31	Middle Income	91.9	4.5

Source: own elaboration with IMF and UNESCO data

Notes: *Due to data limitations, for El Salvador and Georgia is presented the General Government debt while for the rest of the countries is presented the Central Government Debt (these variables are not used in the econometric model of the next section) **For Lebanon, the data on education expenditure to GDP is for 2018.

Concerning the income generated in each country, almost all the countries are classified as Middle-Income Countries according to the World Bank (except for The Gambia, which is classified as a Low-Income country)[4]. However, the GDP per capita differences are relevant since countries with

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[4] According to Fitzgerald (2009, p. 63), it is harder for Low-Income countries to acquire external private capital due to "contract enforcement, information asymmetry, and economic externalities". Although Fitzgerald does not give further information about this point, some possible Low-Income countries' characteristics that he might be referring could be the lack of debt payment guarantees (contract enforcement) and the lack of government transparency (information asymmetry).

lower income might participate in debt relief programs. Some countries such as El Salvador, Gambia, Nepal, and Zambia are below the 10,000 international dollars (PPP), while Georgia, Lebanon, and Mongolia have GDP per capita above this threshold. This impacts the amount of private and public resources that could be invested in education. In the public sector, for example, with a given tax rate, a higher GDP per capita will increase the government revenue, which becomes potential resources to spend more on education[5].

The countries also show heterogeneity in the public debt to GDP indicator. Lebanon is the country with the highest level. According to IMF global debt databases (2021) this country has shown a public debt higher than 100% of GDP since 1996. Saleh (2021, p. 9) points out that this high public debt to GDP implies a high amount of resources from the public expenditure dedicated to debt services: "the interest on the public debt from the year 1993 to 2019 amounted to about 41% of the total public spending" (Saleh, 2021). As table 1 shows, Lebanon also had the lowest public expenditure on education as a percentage of GDP for 2018 which gives us some insights on how a higher public debt could generate a higher amount of public resources comprised for debt services which represents an opportunity cost on social expenditures as education. In the last IMF (2022) virtual mission on Lebanon highlight the necessity for "[f]iscal reforms that ensure debt sustainability but also space to invest in social spending and reconstruction efforts". Lebanon defaulted on its international debt in March 2020, specifically, on $30bn of foreign currency bonds. The World Bank estimated that Lebanon's GDP shrunk by 58.1 percent since 2019 (LEM, 2022). Lebanon also suffered from imported inflation via exchange rate channel, which slashed real income of the population. Public revenues almost halved, which means that government spending on vital services, such as education has decreases significantly as well.

The second country with the largest public debt to GDP is Zambia. This country moved in 2011 from a Low-Income country to a Middle-Income country. Before that, in 2005, Zambia was part of the Indebted Poor Countries Initiative (HIPC) which is a program from the IMF and the World Bank for debt relief "with the aim of ensuring that no poor country faces a debt burden it cannot manage" (IMF, 2021a). Zambia is Africa's first country, which defaulted during the COVID-19 pandemic. In 2020 Zambia stopped paying US dollar Eurobonds and skipped interest payments

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[5] There are different ways to increase the tax-to-GDP ratio. To avoid negative impact on the lower income households, it is possible to consider new progressive taxation, evaluate current tax incentives, and fight against tax evasion.

under the former president's President Edgar Lungu government. Zambia's total debt amounted to $27 billion in June 2021 according to the Ministry of Finance. Contraction of economy aftermath of COVID-19 has increased debt burden on Zambia, since the economy has shrunk, and debt-to-GDP ratio has increased. According to the Ministry of Finance of Zambia 62 percent of total debt is issued in US dollars, the rest is in local currency. After the coming to power Zambia's New President Hakainde Hichilema said in the interview the following: "… the IMF will be very pleased to know that we'll not be hiding behind them to say to Zambians, these are IMF conditionalities. These are our minimum requirements as a government in order to deliver on the economy (Hill & Mitimingi, 2021)."

According to the latest report of the IMF, it reached "staff-level agreement with the authorities of Zambia on a three-year program supported by an arrangement under the Extended Credit Facility (ECF) in the amount of about SDR 980 million or $1.4 billion (IMF, 2021b)." The IMF Mission Chief to Zambia stated that, the agreement with IMF staff "is based on the authorities' plans to undertake bold and ambitious economic reforms" (Cotterill, 2021). Specifically, the government should undertake radical austerity policy, which among other things include cutting fiscal deficit (in 2020 the fiscal deficit reached 12% of GDP). Government plan is also related to attracting foreign investors in copper mining. The new government pledged the cuts will not touch government spending on healthcare and education.

According to Milapo (2021, p. 1) "a review of education financing five years post HIPC shows that the country scored numerous successes in almost all sectors including education". This might explain why Zambia shows the third highest public expenditure on education to GDP and as a share of total public expenditure (around 15% and 20% between 2006 and 2015), regardless of the high public debt to GDP. Moreover, as figure 4 shows, the public expenditure on education increased considerably after 2010, when it moves from shares below 3% of the GDP to percentages higher than 4%. However, Milapo (2021) also argues that after the main positive impact of the HIPC program, Zambia has been reducing the expenditure on education as a percentage of the government budget in the recent years, especially in 2021 when it was allocated only 11.5% of the total budget.
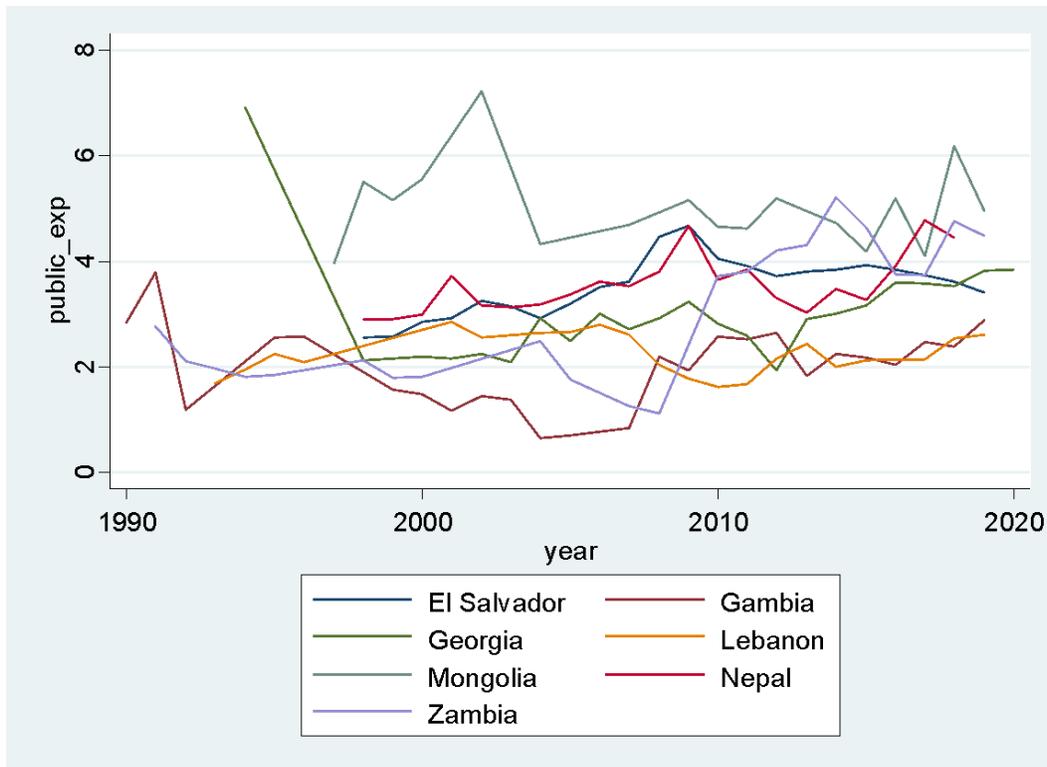
Figure 4 Public expenditure on education as a percentage of GDP, Source: author's own calculation with UNESCO data

During COVID-19 Zambia has also benefited from the G20 Debt Service Suspension Initiative (DSSI) which "means that bilateral official creditors are, during a limited period, suspending debt service payments from the poorest countries (73 low- and lower middle-income countries) that request the suspension", the main goal is to increase the available resources to mitigate the impacts of COVID-19. Zambia is also applying to the G20 Common Framework for Debt Treatments beyond the DSSI which also envisions the deferral of debt service or the possibility of a debt restructuring according to the situation of each country.

Gambia is the third country with the largest public debt to GDP. According to the IMF (2021c), Gambia was improving its macroeconomic development before COVID-19. However, Ousman (2021) argues that the high level of debt to GDP[6] was pushing up the resources dedicated to debt services and, at the same time, it was reducing the amount of finances allocated to education even before the 2020.

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[6] Although table 1 shows the public debt of the central government, Ousman (2021) points out that the total public debt to GDP was even higher and it was around 120% by 2016.

As Zambia, Gambia also has benefited from debt relief coming from HIPC. Gambia can participate because it is still part of the Low-Income countries. This program also has allowed the Gambia for higher public expenditure on education because:

> [T]he international community made it a condition that countries benefitting from the initiative (after reaching completion point) must use the proceeds to finance their social sectors, especially education and health. The Gambia reached completion point in December 2007 and consequently received extensive debt relief, including under the Multilateral Debt Relief Initiative" (Jobe, 2021, p. 13).

During COVID-19, Gambia has also benefited from the DSSI programs which in 2020 "have reduced debt service to its official bilateral creditors and the IMF by US$4 million and SDR 4.2 million, respectively, and allowed a re-direction of debt service payments to social and infrastructure needs" (IMF, 2021d). This country has also benefited from the Extended Credit Facility (ECF) from the IMF. The focus of this program in Gambia is to provide resources to acquire vaccines in the short-run and to improve institution in the medium-term[7].

In El Salvador, the public debt has increased in recent years especially due to the cost of regime shift and other reforms from the pension system (Alvarado & Cabrera, 2013), and in the recent years before COVID-19, the public expenditure on education as a percentage of GDP was constant and even falling as it is shown in figure 4 from the previous section. During COVID-19, El Salvador's debt to GDP ratio, moved from 69.4% to almost 90% by the end of 2020 (Rivas , 2021). This could imply some budgets constraints on education in the following years. Moreover, El Salvador has not been able to close a deal with the IMF which not only reduces the direct access to resources, but also increases the cost of issuing bonds[8].

Regarding debt relief programs, El Salvador has also benefited from debt conversion for social expenditure. According to Rivas (2021) in 2005 the Spain and El Salvador governments signed the "Debt for Education Conversion Programme" that was mainly used for infrastructure

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[7] "From a medium-term perspective, it will be paramount to unlock the full potential of digitalization, implement the financial inclusion strategy, improve the business environment, develop climate-related policies, and pursue
the ambitious legislative reforms (including on human rights and gender equality)" (IMF, 2021d)

[8] One of the main points highlighted by the IMF (2021d) that could be undermining the possibility of an agreement is the implementation of Bitcoin as a Legal Tender. According to the IMF (2021e, p. 2) t there are large risks associated with the use of Bitcoin on financial stability, financial integrity, and consumer protection, as well as the associated fiscal contingent liabilities. They urged the authorities to narrow the scope of the Bitcoin law by removing Bitcoin's legal tender status"

investment and teachers' training. However, Rivas points out that these kinds of conversions are not significant in relation to the total debt.

Mongolia has a similar debt to GDP as El Salvador for 2019, with 60%. However, the GDP per capita from the former is much higher than from the latter. Mongolia is also the country with the highest public expenditure on education as a percentage of GDP with 4.9% in 2019 and, as figure 4 shows, this expenditure has been stable during all the period analyzed (1998-2019). According to Banzragch (2021), this trend has continued during the COVID-19 pandemic. The public expenditure on education during 2020 increased its share in total government expenditure.

Finally, the countries with the lowest public debt to GDP are Georgia (41.3%) and Nepal[9] (30.1%). Figure 4 from section 2 shows that the expenditure on education for both countries has presented a smooth increase between 1998 and 2019. In the case of Georgia, it has allowed increasing this expenditure from around 2% of GDP to almost 4%. According to Khundadze (2021, p. 9): "in 2019, the then Prime minister of Georgia announced a new pledge of the government to raise public spending to up to 6% of GDP by 2022"; however, due to the COVID-19 shock, this goal could be postponed. In summary, from a first description of the similarities and differences among the countries, it seems that a higher level of debt to GDP could be associated with lower public education financing.   The following subsection explains the importance of the external debt and how it generates a balance of payments constraints. We also discuss the evolution of the external debt parameters in the seven countries under the study.

External public debt and balance of payment constraints

Getting external public debt is not a problem by itself. FitzGerald (2009) points out that external indebtedness could be useful in developing countries if it finances public investment which could lead to a higher economic growth. In this sense, as Domar (1957) argues, the ratio of public debt

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[9] Nepal has also requested to participate in the DSSI programs.

to GDP could stabilize at a lower level if GDP is growing in a higher proportion than public debt (Domar, 1957) [10] [11].

Moreover, according to FitzGerald, for domestic firms in developing countries, it is difficult to get external credit; therefore, public external indebtedness is useful if it contributes to lending money for productive and export-aimed firms. External resources acquired through public debt could also be used for social programs such as the one that we are interested in education. From a macroeconomic (national account) perspective, as Tran-Nguyen and Tola point out, external debt gives an additional source to finance investment because in an open economy this variable is not only financed by savings but also by the inflow of external finance (Tran-Nguyen & Tola, 2009).

However, in contrast with internal credits, external debt requires a source of international currency or countries strategic assets as a form of surety to guarantee resources to pay the debt service. In other words, while Central Banks have room for intervention through monetary policies to ensure internal debt payments, external debt service requires a source for the international currency that is commonly obtained through exports.

In that sense, public external debt stock and service are usually measured as a percentage of exports since it expresses the constraints that the balance of payments imposes for getting of external debt. According to the International Monetary Fund (IMF) (2003, p.174), the external debt to exports is an indicator of solvency and this indicator is "closely related to the repayment capacity of a country", while debt service to exports is a hybrid indicator that shows solvency and liquidity (IMF, 2003).

In this line, Missaglia (2021) points out that, for a dollarized economy -which also could be understood as an economy with a balance of payment constraints-, a negative shock on exports (such as the one experienced during COVID-19) could generate the necessity of a greater external indebtedness to be able to fulfill external obligations like international debt service (Missaglia,

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[10] Domar (1957) shows that the ratio public debt to GDP tends to stabilize at the ratio between the public deficit and the rate of economic growth.

[11] This vision challenges the idea that high levels of debt to GDP causes low level of economic growth (see Reinhart and Rogoff, 2010), and the causality is inversed, i.e., low rates of economic growth generate high debt to GDP ratios. In El Salvador, for example, Alvarado and Cabrera (2013) show with quarterly data from 1991 to 2013 that changes on the economic growth explain changes on the public debt to GDP ratio. Alvarez, et al. (2017) find similar results by using annual data between 1961 and 2014.

2021). However, an increasing external public debt also implies a higher external public debt service, which utilizes resources that could be used for social expenditure.

For all the above, the external public debt stock as a percentage of exports is an important variable to understand the behavior of public expenditure and to foresee some of the possible impacts of COVID-19. Figure 5 shows this indicator evolution for our seven countries. At first, it is interesting to point out that Mongolia and Gambia, both HIPC countries, showed at the beginning of the series the largest external public debt to exports (with Lebanon), but both countries had a severe reduction on this indicator around 2005. This could be explained by the debt relief applied to the HIPC countries.

However, it seems that after 2010 Zambia has started to increase this indicator once again which could generate a solvency problem in the future, especially under the current economic growth projections for Zambia which, according to Milapo (2021), is expected to grow an average of 1% annually between 2021 and 2025. Improvements in public expenditure in education could come from external indebtedness generating pressure on the external debt to exports indicator.

The other country with the highest external debt stock to the export indicator is Lebanon. As table 1 shows, this country has the highest external debt service to export indicator in the present which utilizes public resources and that could contribute to keeping the public expenditure at the lowest level for the seven countries analyzed. As it will be explored later, and in contrast with Zambia, Lebanon has a structural trade deficit that generates even more pressure under its balance of payments and utilizes more resources.[12]

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[12] Lebanon has a high share of remittances to GDP which might allow for high trade deficits.
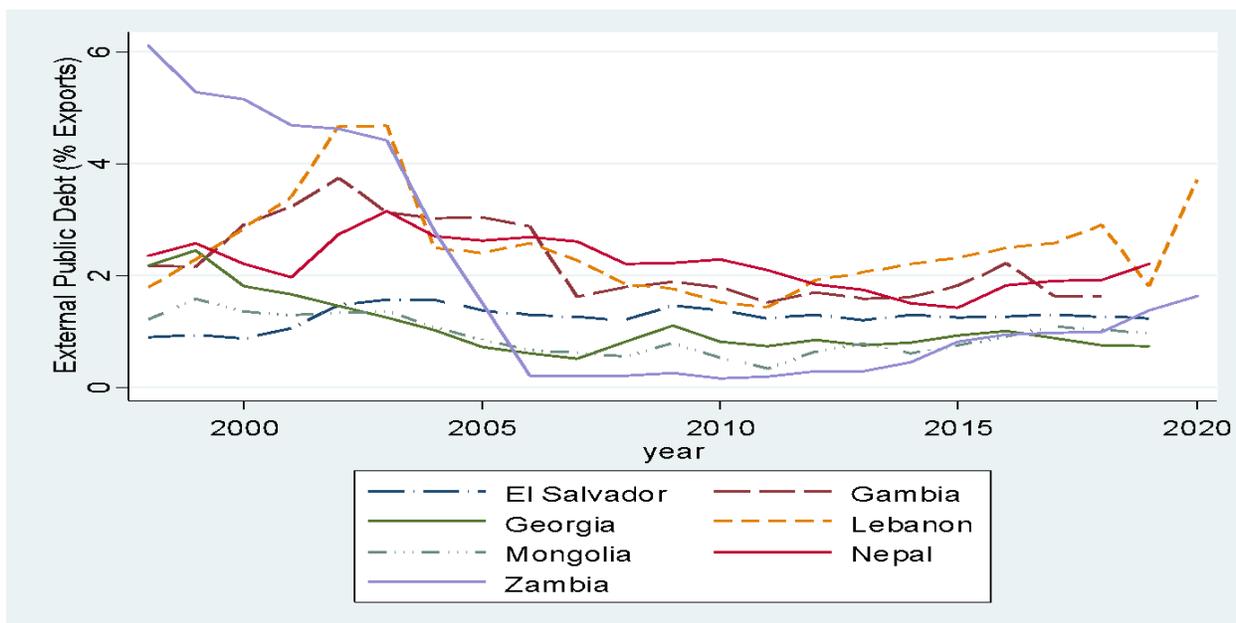
Figure 5 External public debt stock to exports, source: the World Bank data, authors' own calculations
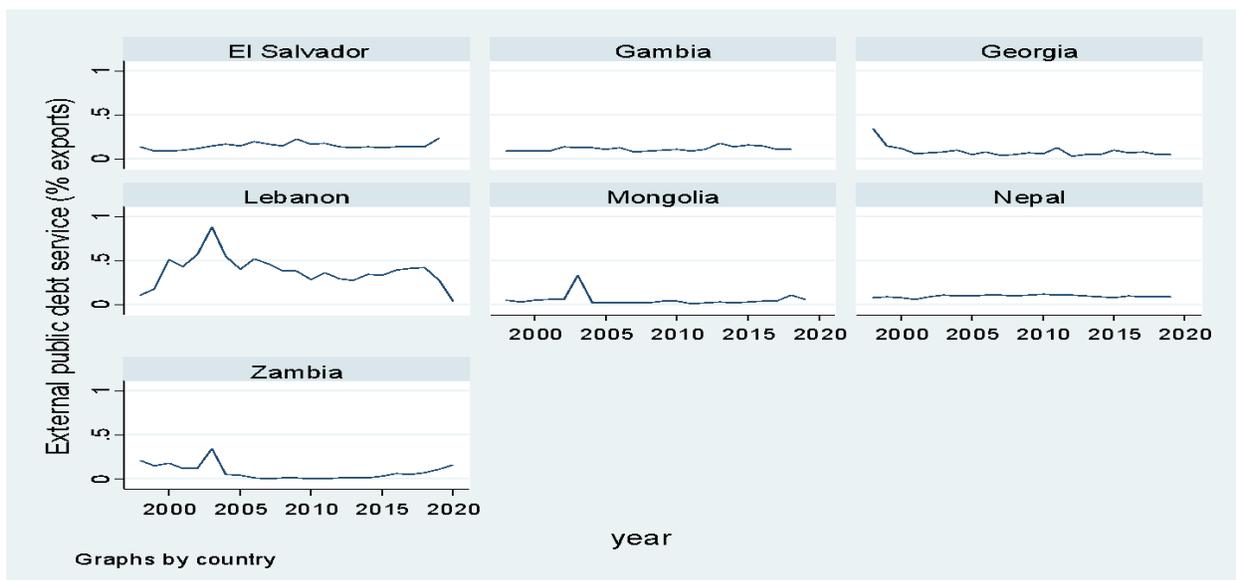
Figure 6 External Public Debt Service to Export Ratio, authors' own calculation with WDI data

In respect to the rest of the countries, except for Nepal that presents a similar behavior as Gambia, the indicator of public external debt stock to exports is similar, around 100% and 200% with Mongolia and Georgia with the lowest levels. In the case of Georgia, Khundadze (2021, p. 6) argues that the drastic changes in the tendency of the external public debt to export after 2008 are

explained by the financial crisis, the Georgian-Russian war, and the regional crisis in Ukraine in 2014-2016.

The following two subsections focused on the external and fiscal constraint of the public expenditure and indebtedness. These constraints are approached mainly from the ideas presented by FitzGerald (2009) and Tran-Nguyen and Tola (2009), since both documents are focused on developing economies that are, as it will be shown, facing similar limitations as those from the countries studied in this research. Moreover, these models are derived from national accounts identities which reduces the number of assumptions that are necessary to deduced them and, therefore, make them more realistic.

The external constraints

As it was explained above, when the external debt service increases, the pressure on the balance of payments raises, so the trade balance plays an important role to allow for a higher or lower level of indebtedness. As FitzGerald explains:

> External debt has to be paid on foreign exchange, so that trade plays a critical role. The relationship between external borrowing and trade is key to a successful external debt strategy, as external indebtedness cannot be sustainable in the long run if the development strategy does not lead to an increase in foreign exchange earning above import requirements sufficient to repay the debt   (FitzGerald 2009, p. 64).

In other words, the acquisition of foreign debt is limited by the trade balance. Equation (1) describes this external constraint, F represents capital inflows (outflows in case of a positive trade balance), X is exports and M is imports[13]. A higher trade deficit $(M - X)$ generates a higher need for capital inflows and makes a higher pressure on the balance of payment since it increases the necessity of external resources from sources such as external indebtedness.

$$F = M - X \qquad\qquad (1)$$

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[13] Tran-Nguyen and Tola (2009) include the payment of interest on equation 1 as outflow of resources. To focus the attention on the balance of trade, the impact of the interest rate is contemplated in the fiscal constrain in the next subsection.

In this connection, Tran-Nguyen and Trola (2009, p. 53) go further and show that the debt to export ratio changes on time have a positive relationship with the difference between the interest rate and rate of growth of export and the change on the trade deficit. For these reasons, the balance of trade is an important indicator to understand the constraint on the acquisition of external debt. These authors also test this idea empirically and show for seven developing countries[14] that the change in the public debt has a positive relationship with the trade balance (i.e., negative relationship with a trade deficit).

As figure 7 shows, almost all the countries selected for this research have had structural trade deficits, except Mongolia and Zambia, while the former shows a more turbulent behavior, Zambia has had a structural trade surplus after 2005. This, with the HIPC program, could explain why the indicators in Figures 5 and 6 when down after 2005.

On the other hand, the rest of the countries with structural trade deficits face higher pressures on the balance of payment because international currency is not only necessary to repayments of external public debt but also to import goods and services[15]. Although, as Missalgia (2021) points out and as explained above, a higher external indebtedness allows to solve conjectural pressures on the balance of payments, it is not a solution in the long run because every time it implies a higher amount of resources dedicated to debt service (see equation 4 and 5 in the next subsection).

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[14] Argentina, Bangladesh, Bolivia, Kenya, the Republic of Kore, Malaysia, and Uganda.
[15] For some countries studied here, remittances play an important role to alleviate the pressure on the balance of payment done by the trade deficit (except for Zambia and Mongolia that do not have structural trade imbalance nor the high level of remittances).
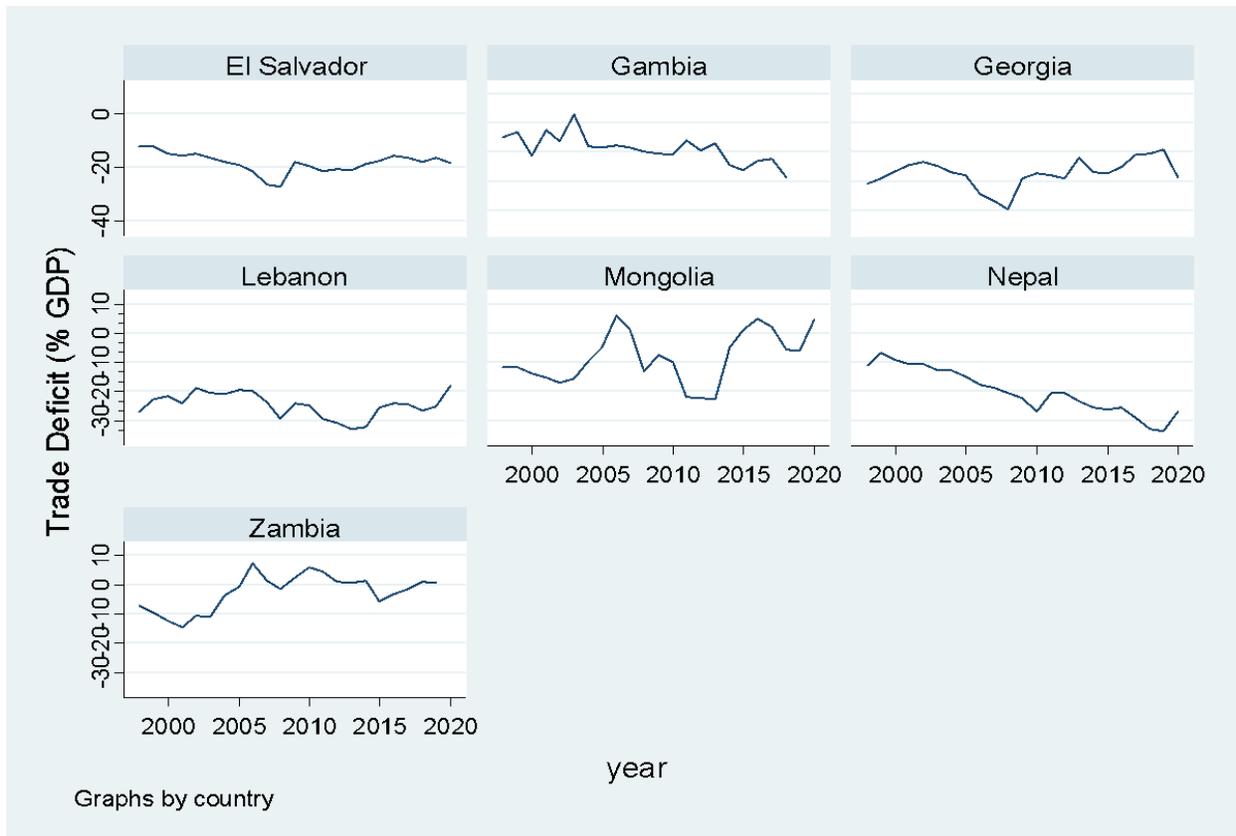
Figure 7 Trade Deficit as a percent of GDP, The World Bank Data, authors' own calculation

The fiscal constraints

So far it has only been considered the relation between external sector variables (external debt and trade balance) and the public expenditure. However, the fiscal policy on each country is also relevant in our analysis especially the tax revenue. The tax revenue could have a positive impact on the public expenditure on education since it allocates a higher share of resources to the public sector, regardless of the external solvency indicators. In the case of El Salvador, for example, Rivas (2021) shows empirically that there is a positive relationship between public expenditure on education and tax revenue. Following Fitzgerald (2009) and from national accounts perspective, the fiscal constraint could be expressed as:

$$T + \Delta D \equiv G + iD \qquad (2)$$

Where T is tax revenue, ΔD is new public debt acquired, G public expenditure and iD is the interest payment on public debt. See that expression (2) is an identity and, with everything else constant,

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a higher tax revenue reduces the fiscal constraint for public expenditure. In other words, with a given level of new public debt acquired and interest payment on public debt, a higher tax revenue allows for a higher public expenditure (including education).

Some transformations of equation (2) are useful to explore the relation of these variables and public expenditure. At first, it is convenient to define the tax revenue as a percentage of GDP for two main reasons: (1) to compare among the countries, (2) because the tax revenue to GDP is more stable than the tax revenue level. Secondly, and following FitzGerald, if it is assumed that all the debt acquired and the interest payments on debt are in foreign currency[16], then we can express the equation according to the exchange rate:

$$G \leq tY + e\Delta D - ieD \qquad (3)$$

Where t is tax revenue to GDP and e is the exchange rate. See that expression (3) is an inequality which means that the additional resources could be used or not for public expenditure. Following FitzGerald, we also assume that there is a given level of debt to GDP that the government wants to maintain named d. Then equation (3) could be expressed as[17]:

$$G \leq tY + ed\Delta Y - iedY \qquad (4)$$

Dividing by Y:

$$g \leq t + e(y - i)d \qquad (5)$$

Where g is public expenditure to GDP and y is the rate of growth of the economy[18]. Expression (5) says the tax revenue to GDP and the rate of growth has a positive relation with g, while the interest rate has a negative impact on g. Regarding the exchange rate and the debt to GDP parameter, their impact depends on the difference between the economic growth and the interest rate, if the interest rate is greater than the economic growth, then the exchange rate has a negative impact on the public expenditure as a percentage of GDP.

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[16] See that if debt is acquired in local currency then the exchange is equal to one; hence, the relationship between public expenditure and the rest of the variables hold.

[17] See that D=dY and it is possible to demonstrate that ΔD=dΔY from equation D+ΔDY+ΔY=d.

[18] Similar results are found by Tran-Nguyen and Tola (2009), but they focus the attention on the changes of the public debt to GDP ratio.
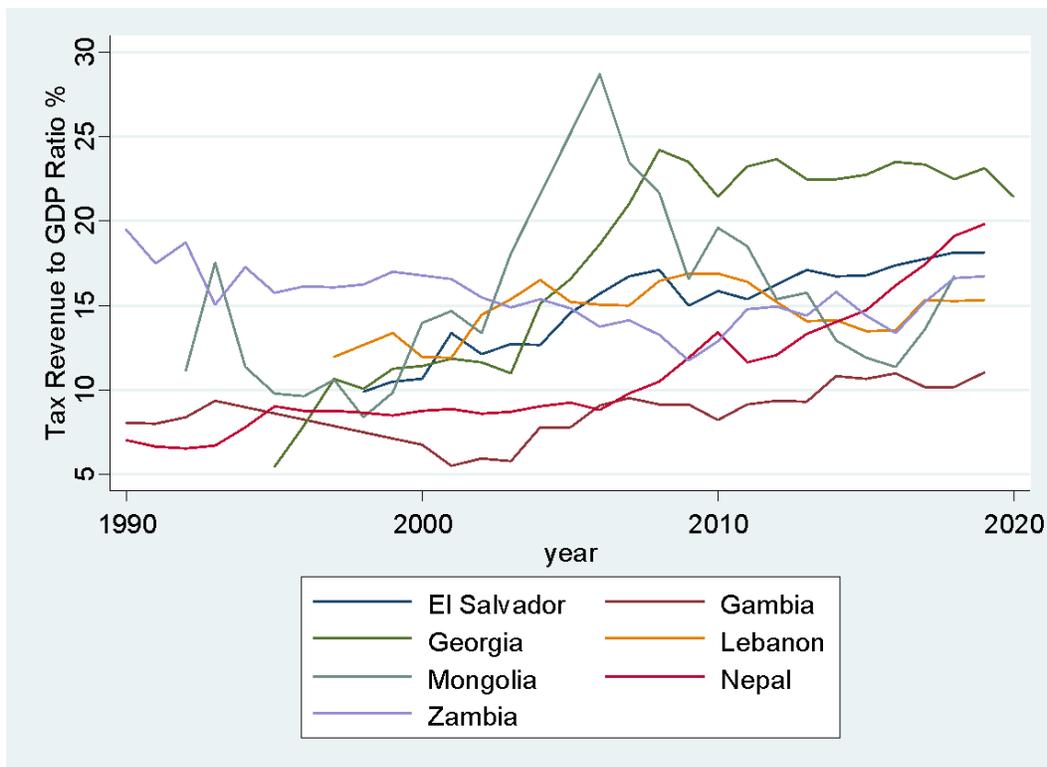
Figure 8 Tax Revenue as a share of GDP, source: WDI data, authors' own calculations

Going back to our initial interest on tax revenue, this variable has a direct impact on g because, as it was stated above, when it increases it allows for a greater allocation of resources on government hands that could contribute to increasing public expenditure without or with a lower indebtedness. An example could illustrate this relation. Figure 8 shows the evolution of the tax revenue to GDP for each country. In the case of Georgia and Mongolia, they have a similar GDP per capita according to our initial description; however, in recent years Georgia has shown a higher tax revenue to GDP which might allow its government for a lower necessity of indebtedness or higher public expenditure.

Regarding the rest of the countries, it seems that in 2019 they are converging to a similar level around 15% and 20% of the GDP. However, while some countries as El Salvador and Nepal showed a gradual increase, some others -as Georgia and Mongolia- show drastic changes.

To sum up, different variables must be considered to understand the resources dedicated to public expenditure on education. In this research, we are mainly interested in how this variable is impacted by the external public debt and the service that it pays, especially due to the constraints that it implies on solvency and liquidity with the external sector commitments. However, other important variables should be considered due to the differences among the countries studied. The GDP of an economy is important because it gives a general idea of how much resources an economy generates in the aggregate. The balance of trade tells us the dependence of a country on the external sector, and it gives an idea of the pressure that it could generate on the balance of payments. For some countries, a positive trade balance could imply higher flexibility to pay the external public debt services, such as the case of Mongolia and Zambia. But for other countries, a negative trade balance implies a higher pressure on the balance of payment because international currency is required to acquire goods and services from foreign countries. The tax revenue as a percentage of GDP allocates more resources to the government, so it is expected to have a positive impact on the public expenditure on education. Table two offers a summary of the independent variables considered here and the expected impact on public expenditure on education according to what has been described in this section. Finally, it is important to clarify that some of these variables could be connected among them; therefore, an ideal model not necessarily will consider all these variables. These relations will be evaluated in our econometric models.

Table 2 Independent variables and their potential impact on the public expenditure on education

Variable	Impact on public expenditure on education	Description of the impact
External public debt stock to exports	Negative	It is a solvency indicator. If it increases, the solvency of a country is reduced, the interest rate for acquiring external debt could increase, and more government resources are dedicated for the payment of it
External public debt service to exports	Negative	It is a hybrid between solvency and liquidity indicator. If it increases, it could raise the share of public expenditure dedicated to debt service, which reduces the budget for public expenditure on education
Real GDP (aggregate or per capita)	Positive	A higher real GDP gives more resources to a given economy; with more resources, a higher share may be dedicated to public expenditure on education
Balance of trade to GDP	Positive	A positive balance of trade gives more flexibility to the balance of payments and reduces the pressure from external debt. On the other hand, a negative balance of trade increases the impact on the outflows from repayment of external public debt

Tax Revenue to GDP	Positive	A higher level of this indicator allocates more resources of a given country to the government. This allows for a potential increase in public expenditure on education
Exchange rate	No clear	According to equation (5), it depends on the difference between the rate of growth and the interest rate

Source: own elaboration

Section 3: Econometric Analysis

The data used (covering 1990-2020 period) in the model related to debt ratios comes from the World Bank debt statistics databases. The data on GDP and exports of goods and services are from the World Bank national accounts databases. The data for the dependent variable public, i.e., government expenditure on education, is obtained from the UNESCO Institute for Statistics databases. The variable is adjusted through the GDP deflator to consider the inflation. The data on tax revenue information was missing from the World Bank dataset, and it was obtained from the IMF World Revenue Longitudinal Dataset. Data for some countries for specific period is missing, however, as noted below, the model we use for this report takes into account this limitation.

The key assumption from the theoretical perspective discussed in the previous section is that the government spending on education is negatively affected by the increase of public external debt and public external debt service. The assumptions are evaluated through panel data models. There are multiple reasons which stimulated us to use panel data for this model. First, the available data for the sample is limited and has gaps, therefore, it is difficult for instance to counter-test the models with linear or non-linear time series models. Second, as Baltagi put it: "Panel data give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency" (Baltagi, 2021). Third, panel data can be also useful for controlling unobserved heterogeneity among the cross-sectional units, in this case among the countries within the study (Das, 2019).

The report tests three different models: Pooled OLS, Fixed Effects, and Random Effects. If the country-specific effects do not exist, Ordinary Least squares would provide efficient and consistent results. Panel data models analyze individual-specific (country-specific) effects, time effects, or both together. A fixed-effect model looks if group-level intercepts vary, while a random effect examines differences in error variance components across groups. In the random-effects model,

group-specific effects are random and are not correlated with the dependent variable. Postestimation is also conducted for checking theoretical assumptions of the given econometric models. It includes verification of goodness of fit, serial correlation, heteroscedasticity, Hausman Test, and cross-sectional dependence.[19]   Before running regressions, we transform data and take natural logarithms of the variables to make a more straightforward interpretation and comparison of the size of coefficients.

In this paper we build the linear panel models, which tries to analyze the relationship between government spending on education and external public debt:

$$ln\, ln\, Education\ Spending_{i\,t} = \alpha + \beta_1\, ln\, ln\, \frac{Ext.Debt}{GDP} + ln\beta_i\, X_{i\,t} + \varepsilon_{it}$$

In this behavioral equation[20], dependent variable is government spending on education deflated by the GDP deflator. The independent variable which is our object of analysis is external public debt stock GDP ratio. $X_{i\,t}$ denotes vector of control variables. The following control variables are used for checking the signs of the coefficients: tax revenue to GDP ratio, GDP per capita growth rate, exchange rates and trade balance. For checking potential control variables, we conducted correlation analysis. The following matrix shows that external debt stock is negatively correlated with government spending on education. The government tax revenue as a share of real GDP, real GDP per capita growth, and the exchange rate is positively correlated with government spending on education. However, the correlations are only statistically significant at the 10% level, so we include them all in the various specifications of the models.

Initially, we estimate the simple OLS without control variables. The Model shows a negative relationship between the government spending on education and external public debt stock as a share of GDP. Next, we estimate Least Squared Dummy Variable Regression[21], which includes

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[19] We test cross-sectional dependence with the Pesaran test (2004). The cross-sectional dependence can be problematic, especially for macro panels (and in this case T>N), because it may lead to bias related to contemporaneous correlation (Hoyos & Sarafidis, 2006).   The test shows that there exists cross-sectional dependence. To obtain the estimate, which is robust cross-sectional and temporal dependence, we used Driscoll and Kraay (1998) standard error estimate. This estimate is also heteroscedastic consistent (Hoechle, 2007). The estimation gives a statistically significant and negative coefficient for the debt to export ratio.

[20] How dependent variable changes, when independent variable changes.

[21] In LSDV regression there is n-1 intercepts for each country (i.e., there is 7 countries, but 6 intercepts). It shows unobserved heterogeneity across these countries, which is basically deleted by Fixed Effect estimation. Each intercept is the deviation from baseline intercept, which is El Salvador in this case.

separate intercepts for each country in the sample. We separately check for country-fixed effects. As expected, the coefficient is the same as LSDV regression. The Hausman Test result indicated that we should use the Fixed Effect model. Summary regression table below provides all the estimations together.

When controlled separately by the natural logarithm of real GDP per capita and tax revenue as a share of GDP, the coefficients have expected signs and are statistically significant. After controlling with other covariates, the slope of the external public debt to GDP ratio does change. Since the variable are on logs and the model includes within country effects, the coefficients can be interpreted as elasticities: ceteris paribus, 1% increase in external public debt level, is associated with 0,33 percent decrease in public spending on education. This is pure effect of external public debt as a share of GDP on the deflated government education spending since unobserved heterogeneity is controlled within the model.

Following the discussion in the section 2 we check separately, how debt-to-export ratio affects government spending on education. Fixed Effect model shows that, 1% increase of external debt-to-export ratio is associated with 0.33 percent decrease in public spending on education. Thus, we conclude that, different specifications of debt stock variable (both as a share of GDP and export) are negatively associated with public spending on education which is in line with the theoretical discussions presented in the section 2.

Conclusion

The econometric model developed in section 3 indicates that higher external debt to GDP ratio for given countries is associated with lower public expenditure on education. The Fixed Effect model shows that a 1% increase in the external debt-to-export ratio is associated with a 0.33 percent decrease in public spending on education. Thus, we conclude that different specifications of debt stock variable (both as a share of GDP and export) are negatively associated with public spending on education. As section 2 shows, from a macroeconomic perspective, the external public indebtedness is not a problem per se since it allows developing countries to acquire resources that could be used for development programs. However, as external public debt increases, so does its service, which constrains the public expenditure on education. Considering this finding, the 7 seven countries discussed in this study, need stronger legislative pledges, to maintain and/or increase public spending on education ratio in accordance with international benchmarks given in

Incheon Declaration. Georgia had an attempt to make such pledge in 2019, however, it did not materialize. Strong legislative pledge, such as inclusion of above-mentioned spending ratios into constitution could help governments to guarantee education as a fundamental right even during macroeconomic instabilities.

Considering the positive international experience of using debt relief program for funding education, effort of international actors would be important for designing such plans in the current context. Otherwise, it is difficult to expect that developing countries will increase their budget for education if there are not enough international efforts to reduce the debt service pressure on these countries. The Gambia and Zambia are two examples of how debt-relief programs could contribute to providing more resources for public expenditure on education. In the current context, it would be especially important, to design packages of unconditional debt reliefs and debt swaps for Zambia and Lebanon. Debt swap mechanisms for the developmental goals are already tested, and linking to education financing, might help the respective governments to mobilize needed public resources for guaranteeing right to get decent education services. One of the drawbacks of the debt swap mechanism is its complexity, especially given diverse interests of creditors. Involvement of local grassroot organizations, such as labor organizations, education associations, and also international stakeholders, would be an important in terms providing sufficient political support and corresponding expertise.

Debt relief, debt swap, cancelation and other programs are important tools for reducing the pressure that debt services make on public expenditure on education. However, these instruments would not solve long-term and structural economic problems. Considering the implications of the macroeconomic model discussed in section 2, the debt relief program should aim to reduce the trade deficit and control the trade surplus from the developed economies (since a trade deficit is the mirror image of a trade surplus). From national accounts properties, a given economy can't run structural trade deficits without a constant indebtedness to the external sector. One additional indicator that has shown a positive connection with the public expenditure on education is the tax revenue to GDP. Specifically, the econometric model developed in section three indicates that the tax to GDP ratio is positively associated with public spending on education. Therefore, long-term public finances problems should be addressed via improving tax collection and solving informality problems.

Zambia is Africa's first country, which defaulted during COVID-19 pandemics. The restructuring of the economy and structural changes required by the IMF agreement includes reforming subsidies, specifically, shifting "spending from subsidies and inefficient public investment towards health, education, and the delivery of social benefits (FitchRatings, 2021)." Zambia is heavily dependent on extractive industries (mainly on copper). Around 10 percent of its export earnings come from extractive sector, according to the Zambia Extractive Industries Transparency Initiative (EITI, 2022). Increasing copper prices my create some economic cushion for the Zambian economy, and it may also slow down pace of austerity policy, however, extractive resources are source of economic fluctuations and Zambia may fall in the same trap again. The long-term plan of economic structural change is required, which would encompass investment is social rights, such as education and healthcare, along with structural change of the economy and industrialization. The IMF has provided $1.4 billion aid deal to Zambia, and the agreement on debt restructuring is expected to be concluded in mid of 2022. The process of negotiation is expected to be complicated taking into consideration interests of diverse creditors, however, Zambian government should consider best practices of debt swaps in the field of education.

Lebanon defaulted on its international debt in 2020, and its economy has faced harshest crash in 21st century. Public debt (including external debt) has been heavy burden for its economy for several decades. In 2019 state almost half of its revenue on servicing local and external public debt. Public spending on education in real terms was also affected since government revenues almost halved in 2021. Lebanon faces a challenge in education that is different from the rest of the countries: the high number of school-age refugees. Moreover, Lebanon has the highest public debt to GDP, and it has one of the largest structural trade deficits to GDP. As section three pointed out, both variables hurt the public expenditure in education. Lebanon seems to be an example of this since it is also the country with the lower expenditure on education to GDP. This country faces an important challenge since it has to control the debt to GDP without reducing the already modest expenditure on education.

COVID-19 had a severe effect on Mongolia's schools. As noted by the UNICEF (2021) report, closures of schools and limited capacity of childcare had substantial adverse effects on children under 18, which is almost a third of the total population. COVID-19 reduced access to education and seriously affected social well-being in Mongolia. For instance, according to recent studies in

the wake of COVID-19, child abuse has increased (due to the increasing unemployment of parents), and food insecurity affected Mongolian kids in terms of inadequate access to necessary nutrients for social development (Sharma, 2021). Even though Mongolia meets the education spending criteria discussed in the section 1, it needs more public resources taking into consideration geographic peculiarity and high ratio of kids in total population. Taking into consideration improving export opportunities, Mongolia will have more resources finance public education. Improving tax administration will be another window for opportunity to mobilize more resources for modernization of public education and making it more equitable for all in Mongolia.

Georgia made some progress in terms of financing public education. The latest example of the changes in public financing of education is increasing public school teacher's salary. However, Georgian education system is still in need of greater budgetary resources. Lack of public support increases chances of privatization of public education and rise of inequality. The International Monetary Fund suggested both Mongolia (in Mongolia's case, increasing progressivity of income tax) and Georgia to use progressive income tax system for mobilization of public resource for achieving macroeconomic stability. Introduction of progressive taxation can not only improve macroeconomic stability, but also help Georgia to achieve its social goals in education and healthcare.

The Gambia is the only country studied that is classified as a Low-Income economy. Even before the pandemic, Gambia was suffering a reduction in the government expenditure on education due to the high level of debt to GDP. The Gambia has been benefited from debt-relief programs which have contributed to financing social expenditure in education and health. Gambia is also participating in the Extended Credit Facility during COVID-19, but the resources, at least in the short term, are focused on acquiring vaccines. As shown in the second section, this country has the lowest tax revenue to GDP which, according to the analysis presented here, impacts positively on the expenditure on education. Therefore, improving the recollection of taxes represents a potential opportunity to acquire more resources for social expenditure.

El Salvador has structural problems that have been combined with the impact of COVID-19. As pointed out in the first section, there are three challenges that El Salvador must face: increase the education quality, reduce the drop-out rates and reduce the inequities in the education system. At the same time, El Salvador is facing fiscal policy constraints. The public debt to GDP increased

from 69.4% to almost 90% between 2019 and 2020. Moreover, El Salvador has not been able to close a deal with the IMF which reduces its access to credit. In that sense, it could be expected that the public expenditure on education will be constrained and there could be pressure to reduce its participation in the GDP that could worsen the problems in the education system described above.

Finally, Nepal has the lowest level of debt to GDP and the third-highest public expenditure on education among the countries which are analyzed within this study. Nepal's economy is highly dependent on remittances. As in the case of some other economies studied here, this explains why the high level of trade deficit presented in section 2 does not put substantial pressure on the balance of payment that could constrain the acquisition of external debt. This country also shows a positive trend in the tax revenue to GDP ratio, enabling the public sector to collect a higher proportion of the country's total resources for public needs. However, as discussed in section 1 of this study, Nepal went extreme in terms decentralization of public education. In the name of decentralization, there is a trend of increasing privatization and defunding of public education in real terms considering the population growth.
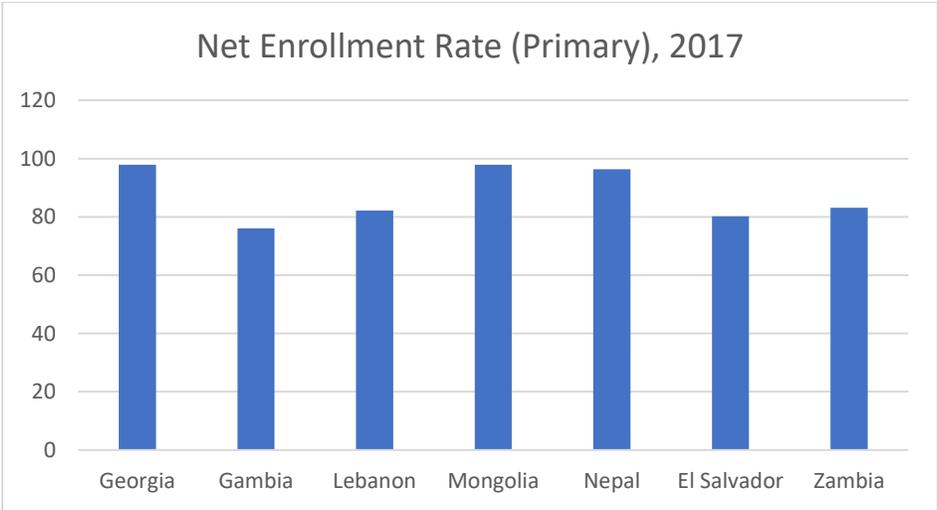
Annex Tables

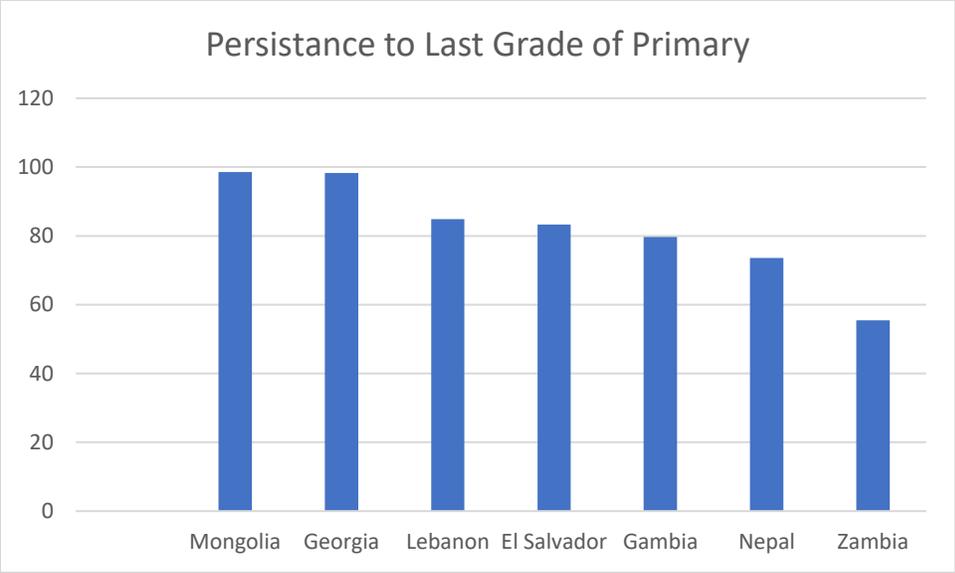Figure 1 Source: **UNESCO Institute for Statistics (uis.unesco.org). Data as of February 2020.**

Figure 2 source: UNESCO Institute for Statistics (uis.unesco.org). Data as of September 2021.
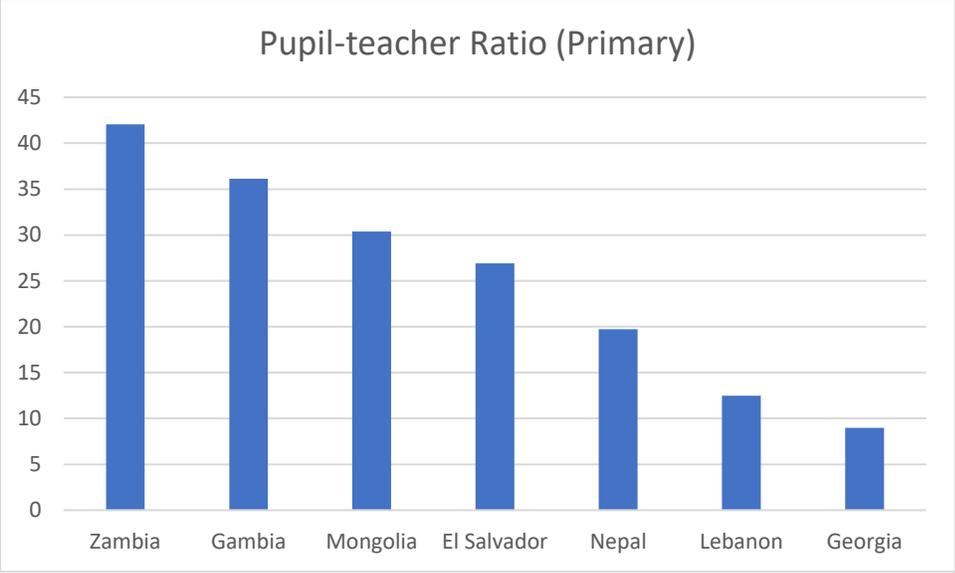
Figure 3 source: UNESCO Institute for Statistics (uis.unesco.org). Data as of February 2020.

Figure 9 External Debt and Public Spending on Education to GDP Ratio, Authors' own calculation based on the World Bank and UNESCO Data

Table 3: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)
(1) Ln(public education spending)	1.000				
(2) Ln(Ext.Debt to GDP)	-0.192	1.000			
(3) Trade Balance	-0.297	0.225	1.000		
(4) Growth Exchange Rate	-0.174	0.339	0.357	1.000	
(5) Growth GDP per Capita	0.103	-0.238	-0.305	-0.484	1.000

Table 4: Comparison of OLS, LSDV, Fixed Effect and Random Effect Estimators

Variable	OLS	LSDV	FE	RE
Ln(debt-to-GDP)	-34944176	-.33635463***	-.33635463***	-.31212825***
Ln(Tax-to-GDP)	1.044e+08***	1.1530132***	1.1530132***	.61995111***
Tradebalance	-3.84e+06	0.007	0.007	-0.006
Growth Exchange Rate				
	-6.394e+08*	-0.325	-0.325	-0.703
Growth GDP per capita				
	-6.514e+08**	-1.0061991**	-1.0061991**	-1.1080957**
Gambia		2.647365**		
Georgia		-.91482775***		
Lebanon		.59533807***		

Mongolia		-.4561492**		
Nepal		0.103		
Zambia		-.3856013*		
_cons	-38682283	13.206054***	13.462133***	16.670737***

legend: * p<0.05; ** p<0.01; *** p<0.001

```
-----------------------------------------------------------------------------
 N |        140                       140        140        140
 R2 |        .42678641                .90598389  .40470696
 R2_a |      .40539784                .89790438  .35354896
-----------------------------------------------------------------------------
```

Table 5: Fixed Effect Model with Controls

Dependent Variable: Government Spending on Education (inflation adjusted)

Ln(Ext. Debt to GDP)	-0.246***	-0.348***	-0.293***	-0.347***	-0.336***
	(-3.67)	(-5.29)	(-4.13)	(-4.46)	(-4.46)
Ln(Tax/GDP)		0.969***	1.109***	1.133***	1.153***
		(5.72)	(5.99)	(6.12)	(6.42)
Trade Balance			0.00767	0.00800	0.00680
			(1.05)	(1.10)	(0.96)
Growth Exchange Rate				0.656	-0.325
				(1.51)	(-0.62)
GDP per capita Growth					-1.006**
					(-3.08)
Constant	19.24***	16.67***	16.48***	16.35***	16.39***
	(249.29)	(38.40)	(37.34)	(36.39)	(37.64)

Observations	155	144	141	140	140

----

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 6: Fixed Effects Heteroskedasticity-robust Standard Errors Model

ledu_spend	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log(debt_gdp)	-.336	.096	-3.50	.013	-.571	-.101	**
Log (tax_gdp)	1.153	.23	5.02	.002	.591	1.716	***
Tradebalance	.007	.009	0.76	.476	-.015	.029	
GDP pc growth	-.325	1.442	-0.23	.829	-3.854	3.203	
Exchange rate growth	-1.006	.858	-1.17	.286	-3.107	1.094	
Constant	13.462	1.431	9.41	0	9.961	16.964	***

Mean dependent var		19.549	SD dependent var			1.287	
R-squared		0.405	Number of obs			140	
F-test		229.632	Prob > F			0.000	
Akaike crit. (AIC)		145.932	Bayesian crit. (BIC)			160.640	

*** p<.01, ** p<.05, * p<.1

Table 7: Standard Error Estimates Robust to heteroscedastic, autocorrelated and cross-sectionally dependent disturbances

Regression with Driscoll-Kraay standard errors   Number of obs   =   144
Method: Fixed-effects regression   Number of groups =   7
Group variable (i): country1   F(2,   6)   =   16.52
maximum lag: 3   Prob > F   =   0.0036
         within R-squared =   0.3568

		Drisc/Kraay				
ledu_spend	Coef.	Std.Err.	t	P>t	[95%Conf.	Interval]
ldebt_gdp	-0.348	0.136	-2.550	0.044	-0.681	-0.014
ltax_gdp	0.969	0.209	4.640	0.004	0.458	1.481
_cons	14.521	1.495	9.710	0.000	10.863	18.179

Table 8: Fixed Effect model (external debt to export ratio is included as an independent variable)

ledu_spend	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Log(ext. debt to export)	-.332	.071	-4.71	0	-.471	-.192	***
Log(Tax/GDP)	1.021	.167	6.13	0	.691	1.35	***
Constant	14.594	1.201	12.15	0	12.219	16.97	***

Mean dependent var		19.530	SD dependent var			1.301	
R-squared		0.366	Number of obs			141	
F-test		38.070	Prob > F			0.000	
Akaike crit. (AIC)		150.824	Bayesian crit. (BIC)			159.670	

*** p<.01, ** p<.05, * p<.1

Post-Estimation tests

Hausman (1978) specification test

	Coef.
Chi-square test value	57.051
P-value	0

Pesaran's test of cross sectional independence =   1.138, Pr = 0.2553
Average absolute value of the off-diagonal elements =   0.276

Testing for heteroskedasticity

Pesaran's test of cross sectional independence =   1.138, Pr = 0.2553

Average absolute value of the off-diagonal elements =   0.276

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