Estimating the Effect of Social Expenditure on Poverty Reduction and Growth in High- and Middle-Income Countries: A Dynamic Panel Analysis Applying the GMM Approach

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Abstract:

This study's primary objective is to evaluate the impact of social spending on economic development and poverty reduction for a sample of high- and middle-income nations from 2010 to 2018. To achieve this aim, the study applies the GMM approach to two models. First, the study investigate the impact of social spending on reducing poverty in high- and middle-income nations using Model A (the poverty model). Second, the study assesses the impact of social spending on economic growth in high- and middle-income nations using Model B (the growth model). The results of this analysis show that social spending, in both high- and middle-income nations, has beneficial effects on economic growth and negative effects on poverty. Additionally, the study finds that the biggest influences on economic growth, GDP, and poverty are expenditures on health, education, subsidies, and transfers.

Keywords: Social Expenditure, Poverty Reduction, Economic Growth, Dynamic Panel Analysis, GMM Model, High-Income Countries, Middle-Income Countries.

JEL Classification: *C33, E62, I38, O11, I32, H24, H51, H52, H53,*

1. INTRODUCTION

Despite the fact that many studies examine the impact of social spending on reducing poverty in industrialized and developing nations, less focus is given to how social spending could impact economic growth. In reality, some economists who contend that high levels of social spending inhibit economic growth have made the case for the impact of social spending on economic growth. But economists and policy-makers are increasingly in agreement that state intervention through social welfare programs can guarantee long-term economic growth and also lessen poverty (DFID, 2007).

According to the literature of the study, social spending can potentially contribute to enhance or impede growth through a number of pathways and channels that can be summarized as follows: (1) a rise in social expenditure will stimulate aggregate demand by increasing public consumption. (2) Given that many social programmes are targeted at low-income households and people with credit restrictions, an increase in social spending is anticipated to have a considerable impact on private consumption. (3) some social expenditure policies, for instance active labour market policies, may have an effect on output through raising employment. (4) Public and private health sector spending

complement one another, therefore social spending on health may have an impact on investment by enhancing human capital and by delivering medical capital goods. (5) an expansion in social expenditure can be linked with stimulative government policies (for example incentives for retirement pension and incapacity benefits), that may have a short-run and medium-run negative impact on production (by lower labour force participation) (Furceri & Zdzienicka, 2012a). (6) social expenditure such as spending on education, health, and subsidies and transfer are required for balanced development of any economy.

Growth actually has the power to create beneficial cycles of wealth and opportunity. Strong growth and employment prospects, for instance, might increase parents' motivations to engage in their children's education by encouraging them to attend school. Therefore, rapid economic expansion increases human development, which eventually encourages rapid economic growth. Similar growth rates, however, can have quite different effects on eradicating poverty, enhancing the job prospects of the poor, and affecting more general measures of human development depending on a number of factors. It should be highlighted that the degree to which the poor engage in the economic process and receive a portion of its benefits determines the amount to which growth decreases poverty. In order to decrease poverty, growth pattern and speeds must both be considered. (DFID, 2007)

A successful approach for reducing poverty must include key components that support quick and long-term economic growth. The issue for policymakers, according to Cammeraat, 2020, is to combine growth-promoting policies with policies that enable the underprivileged to fully take advantage of the opportunities created and thereby contribute to that growth. Of course, this involves measures to improve the efficiency of the labour market, eliminate gender disparities, and broaden financial inclusion. Asian nations, for instance, are focusing more and more on this "inclusive growth" strategy. The two primary goals of India's most recent development plan are to increase economic growth and make that growth more inclusive. Additionally, the strategy is replicated across South Asia and Africa. (DFID, 2007).

The aim of the current article is to analyse and quantify how social spending affects the rate of poverty and GDP expansion. The rest of the article is structured as follows for this reason. The first part presents the literature and theoretical basis, that is classified into two broad categories. The first category is dedicated to studies discussing conceptualizing social expenditure, economic progress, and poverty alleviation. The second one focuses on and analyzes empirical research of estimating the connection among social expenditure, economic growth, and poverty. The empirical methodology used to determine how social spending affects growth and poverty is

covered in the second section, using a GMM approach with two models for two groups countries (high- & middle-income countries from 2010 to 2018. Finally, the final part then presents the findings and their implications for policy.

2. LITERATURE REVIEW AND THEORETICAL BASIS

A large and diverse body of literature on global poverty has been written. Therefore, the present study classifies this literature into two broad categories. The first category is dedicated to studies discussing conceptualizing social expenditure, economic growth, and poverty. The second one focuses on and analyzes empirical research of estimating the connection amongst social spending, growth, and poverty.

2.1. Conceptualizing Social Expenditure, Growth, and Poverty

A number of conceptual issues, which the study briefly reviews here, are at the core of poverty analysis, poverty measurement, and the channels through which social spending has effects on growth and poverty. In fact, experts have long argued the philosophical foundations of what it means to be poor. According to Press et al. (2010), although poverty can be simply defined as the inability to afford adequate food and other basic essentials, Poverty is a changing combination of conditions rather than a single, clearly defined condition.

According to TAHIRAJ (2009), If a person's resources are "so radically below the other controlled by the typical individual or family that they are, in effect, excluded from conventional life patterns, habits, and activities," then they are said to be in poverty". However, the Participatory Poverty Assessment of the World Bank has adopted a different method of defining poverty, characterizing it as the state of not having an average or socially acceptable amount of money or material goods. According to the (World Bank (E), 2014) When someone lacks the means to meet their basic needs, they are said to be living in poverty. The researchers then look at ten interconnected aspects of poverty, such as erratic employment, remote locations, physical problems, gender issues, problems in social relationships, lack of security, abuse by those in positions of authority, weak community organizations, and restrictions on the abilities of the poor (Howland et al., 2021).

In addition, the main purpose of measuring poverty is to monitor social and economic conditions and to establish standards for success or failure. Therefore, the poverty indexes are descriptive indicators, which complicated social and economic conditions that are used to guide discussions about economic and social goals. Accordingly, there are four standard measurements. The first measurement is the Headcount indicator ("Measuring Poverty," 2017). The headcount is the most basic

and well-known poverty indicator. It refers to the proportion of an inhabitants which income is below the level of poverty. The second measurement is the poverty gap, which assesses how much each person earns in comparison to the poverty line (Iniguez-Montiel & Kurosaki, 2018). The third measurement is the Watts poverty index. It was suggested by Harold W. Watts in 1964 as the initial distribution-sensitive measure of poverty (1964). By dividing the poverty line by income, using logarithms, and adding together all the poor, the indicator is calculated (Walker et al., 2010). The fourth measurement is the Poverty Gap Squared Index. It assesses the intensity of poverty in each area. By squaring the poverty gap for each household/individual, this measure assigns higher weight to those who are much below the poverty line than to those who are more nearby. The FGT family of poverty indices includes this one (Aristondo et al., 2010)

2.2. The Empirical Research of Estimating the link among Social Expenditure, Growth, and Poverty.

2.2.1. Association between Social Expenditure and the Reduction of Poverty

Osabohien et al. (2020) examines the impact of social security programmes on lowering inequality and poverty. The article conducts fixed and random effects models on 38 African nations over the period 2000–2017. The findings suggest that providing social security helps to reduce income inequality and poverty.

According to the analysis, a 1% increase in social protection decreases inequality and poverty by 58% and 26%, respectively.

China's regional multidimensional poverty index (MPI) is calculated between 2007 and 2017 using the Panel Vector Autoregressive (PVAR) model suggested by Dong et al. (2021), and the characteristics of the spatio-temporal dynamics of multidimensional poverty are identified using the exploratory spatio-temporal data analysis (ESTDA) method. Following are the results: In China, the high social gross dependence ratio contributes to poverty, although the country's high per capita GDP, social security spending, public health spending, education spending, and research and development (R&D) spending contribute to its eradication.

From 2007 to 2019, Cyrek assessed how well government social spending reduced poverty and income inequality in EU nations Cyrek (2019). The social efficacy of EU member states is compared using the DEA technique. The main conclusions of the study shed some light on how government expenditure differs between EU countries in terms of its social effectiveness. According to the study, nations with higher levels of social expenditure are also less effective at decreasing inequality; however, there is no correlation between the two when it comes to lowering poverty. The social models of the countries of the North and the countries of the South differ in some ways as well. For example, While the Scandinavian nations and several other wealthy societies prioritize

alleviating poverty in their public spending, the South places a higher priority on reducing inequality in their social programs.

The issue of "What can explain the disparities in poverty-reduction efficacy between EU and OECD countries?" is discussed by Caminada & Goudswaard (2010). The study looks at poverty rates at market and disposable income levels, both before and after transfers, in order to identify the effects of tax and transfer policies on poverty reduction. According to this study, social spending levels and the benefits of social transfers and taxation on reducing poverty are strongly correlated. In both EU15 and non-EU15 countries, poverty is decreased by 0.7 percent for every percentage point of social spending.

Caminada et al. (2012) look into how social transfer programmes in OECD countries influence the poor (1985 – 2005). It makes use of numerous linear regression models to account for these complex interrelationships. In 28 OECD nations, the findings indicate a significant negative connection between social public spending and poverty reduction. For nations outside of the EU15, this connection is stronger. However, the outcomes drastically change when private social expenditures are estimated. On the other hand, the taxation and public/private expenditure policies of the EU15 countries have a considerable impact on reducing poverty.

Osahon (2011) aims to conduct a scientific investigation into the connection between poverty, economic growth, and income

disparity in Nigeria. Co-integration is used to confirm the unit root and the error correction method (ECM). The Real GDP is calculated by regressing on the Private Consumption Expenditure, Per Capita Income, Registered Unemployment, and Government Health and Education Expenditure. The study's conclusions indicate that if the government wants to have long-term gains, it should concentrate more on creating essential social services for better access to education, health, transportation, and financial services. The proper development programmes should be implemented in order to increase the income level of the poor in order to further the goals of income redistribution and poverty reduction.

2.2.2. Relationship between Social Expenditure and Growth

There is an increasing agreement between economists and policymakers that government intervention through social welfare policies may ensure long-term economic development. Over the last two decades, significant empirical research studies have been conducted to assess the influence of fiscal policy on production and the occurrence of crowding-out (negative) vs crowding-in (positively) (Furceri & Zdzienicka, 2012b). While most of the literature have focused on total spending and its impact on economic activity, several empirical studies have attempted to identify the effect of social spending on income inequality and poverty reduction (See, for example, (Arjona et al., 2003; Bassanini et al., 2001, 2005; Bilan et al., 2020; Drazen, 1990; Fic & Ghate, 2005; Linhartova, 2021; Martín-Mayoral &

Nabernegg, 2014; Muinelo-Gallo & Roca-Sagalés, 2011; Nuţâ & Florian-Marcel Nuţâ, 2020; Xu, 2016).

One of the main focuses of any governmental activity is the social protection expenditures of the populace, which is a part of public expenditure. Therefore, the social protection system should be viewed as a vehicle to support the country's economic growth as well as from a purely social perspective. From a social perspective, one of the biggest problems in the world is poverty, which may be overcome thanks to the well-developed social safety system. This social safety net prioritizes preserving societal stability by safeguarding certain demographic groups against various socioeconomic risks (unemployment, illness, poverty, old age, etc.). From an economic perspective, the social safety system affects the variables affecting the nation's economic growth. Additionally, social safety is crucial for sustaining the economy's consistent and steady growth ((Malyovanyi et al., 2018). Numerous studies have found a direct link between social spending and economic development, nevertheless. In social protection systems, there may be a trade-off between equality and efficacy, according to the most prevalent theories. As a result, if benefit systems discourage individuals from working, there will be less labour available in the economy, which would limit output and production (Arjona et al., 2003).

Bellettini & Ceroni (2000) uses both cross-country data for 61 nations and panel data for 20 industrialized countries. The purpose of the study is to examine how social security spending and economic

growth are related. The study found a significant and advantageous relationship between social security spending and growth. The results imply that social security has a sizable and advantageous impact on the development of human capital in terms of the channels.

Castro (2018) examines how spending-driven consolidations affect economic growth, unemployment, and income inequality as well as the practical components of public spending. 15 EU countries are covered by the Dynamic Panel Data from 1990 to 2012. The analysis finds that when fiscal spending reductions are implemented, especially if they are spending-driven, real GDP growth is reduced. Accordingly, reductions in government expenditures, particularly in the areas of public order, entertainment, and education, stifle economic growth. On the other hand, cuts to educational spending, in particular, undermine human capital investment and hinder not just economic growth but also social and human development. (Castro, 2018).

Fic & Ghate (2005) employs one of the Markov-switching models for the period 1950-2001. The findings show a negative effect of welfare state policies on economic growth. Similar findings replicated by McDonald & Miller (2010) that examines both indirect and direct impacts of social programmes on economic conditions through three various channels: employment, investment, and economic growth. For data from all fifty states of the United States from 1976 to 2006, McDonald & Miller (2010) utilizes Panel Data

Analysis (pooled OLS approach, Fixed and Random Effects Models). The study concludes that welfare has an implicit and positive impact on the overall country economy, with this influence through the employment channel. As employment promotes economic growth, the study demonstrates that welfare programs are crowding out investment, and investment has not been demonstrated to be a driver of state economic and social development. According to the findings of the study, welfare has little effect on the economy.

Moreover, the same conclusions have been reflected in a group of studies. For instance, Jin & Rider (2020) estimates the impact of fiscal equalization and spending decentralization on short- and long-term growth, by using dynamic panel data (2SGMM simultaneous equations models) for China and India through 1985 - 2005. The study concludes that decentralization of spending has no impact on short-term growth for two countries. However, the study only reveals that decentralisation of costs has a major impact on long-term growth in India.

Baum and Lin (1993) uses a regression panel model to analyse the impact of spending on welfare and education on growth for 58 nations from 1975 to 1985. This research concludes that education spendings have a positive influence on growth even though welfare expenditures have a negative influence (Baum & Lin, 1993). Also, Midgley (1996) uses panel analysis from 120 developing nations over the period of 1975 to 2000 to examine the indirect and direct channels connecting human capital, social spending, and economic

growth in a set of equations. Moreover, Baldacci et al. (2008) studies the dynamic direct and indirect effects of social spending on human capital and economic growth while taking into account the relationship between interventions in health and education. The empirical estimates are based on a panel data set that spans the years 1975 to 2000 and includes 120 emerging nations. To assess their implications for the MDGs, the study's model looks at the impact of various policy measures on growth and social indicators.

The same methodology is used in paper (Baldacci et al., 2008), which investigates the dynamic indirect and direct impacts of public expenditure on human capital and economic growth, It evaluates estimates for 120 developing countries between 1975 and 2000 using a panel dataset. In order to evaluate the implications for the MDGs, the model examines the unique effects of various intervention policies on economic growth and social indices. Also, Fathy & Safijllin (2019) investigates the empirical relationship between GDP per capita in the EU-28 member countries and education, labour, and innovation as a proxy for human capital. The Panel Data Model for (EU-28) from 1995 to 2017 is used in this study. It leads to the conclusion that there is a significant correlation between real GDP per capita in the EU 28 and expenditure on the development and upgrading of human capital. The study also makes it clear that human capital contributes just as much to boosting real GDP per person and lowering poverty as does physical capital.

In addition, there are some significant studies that utilize time-series analysis. Khan & Bashar (2015), for example, applies co-integration and error correction methods to establish the long-run connection between social expenditures and growth for yearly data from 1980 to 2012 in New Zealand and Australia, and to draw lessons for fast-developing ASEAN nations. According to the study's findings, while social spending increases growth in Australia and New Zealand, fast-developing nations like Singapore and Malaysia need adopt more "generous" social policies to achieve balanced development. Besides, Stoilova & Patonov (2020) uses descriptive analysis and regressions to evaluate the influence of government spending and taxation on Bulgaria's economic growth between 1995 and 2018. Empirical estimates demonstrate that taxes are a more reliable fiscal policy instrument than government expenditures, which government spending cannot encourage domestic output since imports dominate supply. Furthermore, Since investment spending is inefficient and heavily impacted by corruption, public investments have a detrimental impact on growth. Value-added tax tends to be growth-promoting, and a drop in the rates of corporate income tax shows to have a positive effect on economic performance (Stoilova & Patonov, 2020).

2.2.3. Relation among Poverty Reduction and Economic Growth

The relation amongst poverty alleviation and growth has received much interest in recent decades in the economic

literature. Although there is a general agreement between economists that growth reduces the income inequality and contributes to poverty reduction, others realize that not all the advantages of growth are distributed to the poor. The empirical studies attempt to identify the influence of growth on poverty. The following section reviews the empirical studies estimating connection among economic growth and poverty reduction. This relation may be one of the followings: (1) growth reduces the inequality in income and contributes to a decline in poverty (growth pro-poor); (2) not all of the advantages of growth are distributed (trickle down) to the poor; (3) Poverty and growth have a bidirectional causal relationship.

Many leading studies pay attention to the positive effect for the growth on poverty reduction. For example, Garza-Rodriguez (2018) examines the link between poor and growth in Mexico from 1960 to 2016, using a co-integration analysis and the Vector Error Correction Model (VECM). According to this article, a 1% increase in economic growth causes a long-term increase in per capita consumption of 2.4%. (and therefore, poverty reduction). According to the Granger causality test, the study also identifies a bidirectional causal relationship between poverty alleviation and economic expansion in Mexico. Similarly, Chude et al. (2019) used ARDL Model, bound test cointegration, and error correction techniques are used for data for period from 1980 to 2013 to assess the relationship in Nigeria between governmental

spending, economic growth, and poverty reduction. The study reveals that government expenditure has a big and favourable impact on growth and enhances household education and skills by creating human skills. In addition, the study indicates that government spending has a substantial short-run influence on poverty reductions that may be explored by the function of fiscal policy in relieving poverty.

Mohapatra & Giri (2021) examines the important variables driving changes in economic development, poverty, and income inequality throughout the period from 1982 to 2018 in India's short- and long-term patterns of carbon emission. The study employs the ARDL method, co-integration, and the VECM Model. According to the study, the ARDL bounds analysis confirms that the variables have a strong correlation. Furthermore, the coefficient of ARDL model indicates that both poverty and growth raise pollution levels (CO_2) in the short and long term. Causality test, on the other hand, reveals short-term causation extending from economic development and poverty decline to environmental deterioration.

Similarly, the same methodology is used in Khanchaoui et al. (2020). The impact of public spending, especially on human capital development (health and education) and public investment, on inclusive growth in Morocco is examined in this article using the Autoregressive Distributed Lag (ARDL) analysis and the Pesaran Bounds Cointegration Test on annual

data from 1980 to 2018. Estimates demonstrate that long-term economic growth is significantly influenced by public investment spending. Additionally, the conclusions indicate that the highly effective tool for boosting inclusive growth and decreasing poverty is human capital development expenditures.

Likewise, Afzal et al. (2012) evaluates the relationship between education, poverty, physical capital, and growth in Pakistan using data from the years 1971–1972 to 2009–2010 using the ARDL model. The study reveals that physical capital has an impact on economic growth in both the short and long terms that is both favorable and significant. Poverty and economic growth are negatively and strongly connected in the long term. The analysis' findings also show that physical capital has a large and advantageous impact on economic growth over the long and short terms. Education only contributes to growth in a favourable and significant way over the long term. In the long run, poverty and economic growth are substantially and negatively correlated. The Augmented Granger Causation Test reveals bi-directional causality among education and economic development, poverty alleviation and economic growth, and poverty reduction and education.

Moving to panel data and cross-country studies, Guiga & Rejeb (2012) evaluates the connection among poverty alleviation, inequality, and growth, conducting a system of simultaneous equations and econometric panel analysis from 52 growing

countries from 1990 to 2005, to determine the major drivers of poverty reduction. The study concludes that governmental investment in social fields (for instance education and health, and the improvement of rural people's living conditions) may stimulate economic growth and reduce inequality. Similarly, the same results are reflected in Zorgui et al. (2016) that examines the actual impact of economic growth on the poor's living situations, using panel analysis for developing nations. The study demonstrates that growth may have a negative influence on poverty in emerging nations (it means that the increase in the growth rates reduces poverty).

Pham & Riedel (2019) is one of the most influencing poverty studies using dynamic panel data analysis. By using the 2-Stage Least Squares method, it examines the impact of sectoral economic growth on the reduction of poverty in Vietnam from 2010 to 2016. According to the study, increasing the proportion of the manufacturing and agricultural sectors has a major impact on reducing poverty, but increasing the proportion of the service sector causes the poverty rate to increase. Also, the study shows that growth is insignificant for reduction of poverty; the population growth prevents poverty-reduction efforts. Moreover, the urbanization process, the growth in labour force participation, and the rate of literacy significantly and positively contribute to reduction of poverty outcomes.

Nguyen et al. (2020) is a study that incorporates the spatial effects into sub-national economic growth models. From 2006 to 2014, the study evaluates the impact of economic growth and urbanization on reducing poverty in Vietnam. It applies the Panel Data Analysis (both fixed and random effect models). According to the study (1) The value of imports, the rate of urbanisation, and the employment rate have a significant negative impact on the poverty rate; (2) The GDP value and the value of exports have no impact on the poverty rate. In addition, Miranti (2021) employs parametric and non-parametric tests to assess regional poverty convergence in Indonesia (across 514 regions from 2010 to 2018). The study concludes that poverty convergence occurs in all three poverty indices (the headcount index, gap poverty index, and poverty severity index) and regression results of the mean years of schooling have the greatest impact on the poverty reduction catching-up process. Furthermore, the study concludes that declining patterns of poverty disparity are strongly linked to rising patterns of regional dependence. Finally, the study ends up with the result that spatial consequences are significantly low, in terms of speed up rates of poverty reduction convergence.

To sum up, the literature of the study demonstrate a connection between overall public social expenditure, poverty, and growth. This association is inconclusive in the literature. This study applies econometric techniques (Dynamic Panel Analysis - GMM approach) to finally close this gap.

3. EMPIRICAL METHODOLOGY

3.1. Building Structure Model:

The relationship between social spending, poverty, and economic growth has drawn a lot of attention during the past few decades. The most of the works on economic growth However, the vast majority of these studies have relied on time-series methods, Granger causality tests, the Vector Error Correction Model (VECM), Autoregressive Distributed Lag (ARDL), and cointegration models have all been used to examine the relationship between social spending and economic growth (Afzal et al., 2012; Chude et al., 2019; Khanchaoui et al., 2020). The similar approach is used in other studies, for example, (Afzal et al., 2012; Chude et al., 2019; Garza-Rodriguez, 2018; Khanchaoui et al., 2020; Mohapatra & Giri, 2021b) to investigate the relationship between eradicating poverty and expanding the economy. Also, several empirical studies apply the same methodology to identify the link between social spending and reducing poverty (C. Caminada & Goudswaard, 2010; K. Caminada et al., 2012; Cyrek, 2019; Osabohien et al., 2020; Osahon, 2011).

At the same time, there are just a few research works that look at this topic based on panel data analysis. For example, many literature works employ a Static Panel Data Analysis such as (Baldacci et al., 2008; Miranti, 2021; Nguyen et al., 2020; Osabohien et al., 2020; Zorgui et al., 2016). Other research works

apply a Dynamic Panel Data Analysis (2SLS and GMM) as in (Dong et al., 2021; Guiga & Rejeb, 2012; Miranti, 2021; Pham & Riedel, 2019) to evaluate the relationship between social spending, poverty, inequality, and growth.

Examining the relationship between social spending, inequality, poverty, and growth is the purpose of the current study. The study applies a dynamic panel data multiple regression model for 79 countries: 36 high-income countries and 43 middle-income nations over the period of 9 years (2010 - 2018). The significance of panel data is that Panel data provide perspectives on both the cross-sectional and time dimensions, particularly when examining dynamic relationships. Arellano and Bover (1995), Blundell and Bond (1995), and others proposed the GMM model (1998), has become a popular method for estimating panel data models. The System GMM estimator's validity is contingent on two factors: the correctness of the instruments and the absence of second-order autocorrelation in the error term, which should not be associated with the error term. The study employs as few instruments as feasible to minimize these problems. Thus, it limits the number of delays to two and employs the collapsed instrument matrix.

3.2. Measurement of Variables

According to recent literature, relevant works such as (Chude et al., 2019; Cyrek, 2019; Dong et al., 2021; Linhartova, 2021; Mohapatra & Giri, 2021b; Osabohien et al., 2020) Investigate the

connections between social spending, poverty, and growth using the different indicators or variables. The current study uses a homogeneous database provided by the databases of the World Bank - Indicators of global development (WDI)and other official international data. Table 1 lists the variables that were used for this investigation.

Table 1 describe the variables used for this analysis in the two model

N	Variables	Abbreviation	Expected Sign with Poverty	Expected Sign with GDP
1	Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)	POV		
2	GDP per capita (current US$)	GDPPC$	-	
3	Domestic general government health expenditure (% of GDP)	GEXPH	-	+
4	Government expenditure on education, total (% of GDP)	GEXPE	-	+
5	Gini index (World Bank estimate)	GINI	-	+
6	Subsidies and other transfers (% of expense)	PERST	-	+
7	Taxes revenue (% of GDP)	PERTAX	+	+/-
8	Population growth (annual %)	POPGR	+	+/-
9	Population ages 0–14, total	POP0-14	+	-
10	Population ages 15–64, total	POP15-64	-	+
11	Population ages 65 and above (% of total population)	POP65+	+	-

Source: Author's compilation

Poverty (*POV*) denotes a situation where a person or a household lacks the resources necessary to sustain a minimum level of living. It could also be described as a circumstance when there is insufficient revenue from job to cover one's fundamental requirements. In this study, poverty is calculated as a headcount

at US$1.25 2005 Purchasing Power Parity (PPP). Source: World Bank database on poverty (WDI).

GDP per capita (current US(GDPPC$) as the sum of the gross value produced by all domestic producers within the economy, plus any applicable product taxes, less any subsidies not included in the cost of the items. It is estimated without accounting for the deterioration, exhaustion, and depreciation of manufactured assets or of natural resources. The data are displayed in real-time US dollars. The GDP per capita figure comes from the World Bank database. (in US dollars) (WDI).

Domestic general government health expenditure (% of GDP), (GEXPH) the percentage of domestic public health spending as a percentage of GDP. Domestic general government health expenditure as a proportion of GDP was calculated using data from the World Health Organization's Global Health Expenditure database (http://apps.who.int/nha/database).

Government expenditure on education, total (% of GDP), (GEXPE) is computed as General Government Education Expenditure as a Percentage of GDP (current, capital, and transfers). It consists of costs covered by money received from outside the government. Generally speaking, generic governments include local, regional, and national governments.. (http://uis.unesco.org)

Gini index (World Bank estimate), (GINI) gauges how far away from perfectly equal distribution a country's income (or, in

certain situations, consumption expenditures) are distributed among its citizens or families. A Lorenz curve displays the cumulative percentages of total income received vs the cumulative number of recipients, starting with the lowest person or family. The Lorenz curve and a hypothetical line of absolute equality are separated by the Gini index as a percentage of the biggest region under the line. As a result, perfect equality is represented by a Gini index of zero, whereas absolute difference is represented by a Gini value of one hundred. (http://iresearch.worldbank.org/PovcalNet/index.htm)

Subsidies and other transfers (% of expense), (PERST) Defines as subsidies, grants, and other social benefits all unrequited, nonrepayable transfers on current accounts to private and public enterprises, grants to other governments, international organisations, and other governmental units, as well as social security, social assistance benefits, and employer social benefits in cash and in kind. Data files, the Government Finance Statistics Yearbook, and the International Monetary Fund are some of its sources.

Taxes revenue (% of GDP), (PERTAX) refers to forced contributions to the federal government for public purpose. There are some mandatory transfers that do not apply to fines, penalties, and the majority of social security contributions. Refunds and adjustments for improperly collected taxes are

regarded as negative revenues. The main sources of the data are GDP estimates from the IMF, World Bank, and OECD.

Population growth Rate (annual %), Population growth (annual%) indicates the rate at which a nation's population is increasing each year. The WDI is the source for the total population.

Population ages 0–14, total (POP0-14) shows the total number of people aged 0 to 14 in the population. Population is calculated using the de facto definition, which includes all residents regardless of citizenship or legal status. The World Bank's total population and the age/sex distributions from the World Population Prospects report are used to generate the data from staff estimates.

Population ages 15–64, total (POP15-64 shows what proportion of the total population is between the ages of 15 and 64. The de facto definition, which includes all residents regardless of citizenship or legal status, is used to compute population. The statistics from staff estimates are produced using the total population of the World Bank and the age/sex distributions from the World Population Prospects report.

Population ages 65 and above (% of total population), (POP65Ages 65 The plus sign (+) denotes the percentage of the population that is and over. The de facto definition, which includes all residents regardless of citizenship or legal status, is used to compute population. The World Population Prospects

report from the United Nations Population Division's Population Division provides the foundation for the World Bank's assessments of the (POP65+).

As a result, the preceding variables can be used in the GMM model to determine the long-term effects of social spending on economic growth and the decrease of poverty in both high- and middle-income countries. The model's formula is as follows:

Model 1: The impact of social spending on reducing poverty. The dependent variable in this model is the poverty reduction measured as mentioned above. The explanatory variables are spending by the government on health, education, social protection, and the tax rate in %. Next, the model can be briefly described in the following formula:

$$POV_{it} = \alpha + \beta_1 * GDPPC\$_{it} + \beta_2 * GEXPE_{it} + \beta_3 * GEXPH_{it} + \beta_4 * GINI_{it} + \beta_5 * PERST_{it} - \beta_4 * PERTAX_{it}$$

Equation 1

Model 2: The effect of social expenditure on the growth. In this model, the dependent variable is the **GDP** measured as mentioned above. The explanatory variables are government expenditure on health, education, social protection, and the percentage of tax. In the following formula, the structure of model can be defined as

$$GDP\$_{it} = \alpha + \beta_1 * \text{GDP}\$(-1)_{it} + \beta_2 * GEXPE_{it} + \beta_3 * GEXPH_{it} + \beta_4 * GINI_{it} + \beta_5 * PERST_{it} - \beta_4 * PERTAX_{it}$$
Equation 2

In the previous models, t signifies time. Time in this study's context denotes the 9 years (2010–2018). i refers to the cross-sectional or individual (countries). The number of countries is 79 countries: 36 high-income nations and 43 middle-income nations.

3.3. The Estimation and Empirical Results:

The study employs the Dynamic Panel Data (GMM Model) for the above variables in equation No. 1 for estimating the influence of social expenditure on the poverty. Additionally, the study runs GMM model in equation No. 2 to identify the impact of the social spending on growth. Equations No. 3 and No. 4 are generated. Finally, the results suggest that both models are well specified in two groups of countries (Countries with High and Middle Levels of Income). Table 2 shows the Eviews output for two Dynamic Panel Data Models (poverty and growth model) in high- and middle-income nations.

- **Model A: Effect of Social Expenditure on the Poverty Reduction**

The study seeks to define the relationship between social spending and poverty reduction in model A. For the 79 countries, including 36 high-income countries and 43 middle-income countries, the dynamic panel data multiple regression model is

used over a nine-year period (2010 -2018). The study makes use of a few controlled instruments, such as (POV-2) poverty in two-year intervals, population growth (POPGR), population structure (population aged 0 to 14 years, population aged 15 to 64 years, population aged 65 years or older, and GDPP$, which referred to GDP per capita in the previous year). There are now 31 high-income countries and 28 middle-income countries in the cross-section (number of countries). There have been 160 observations for middle-income nations and 213 for high-income countries overall. Additionally, the instrument rank for high-income countries is 31 and for middle-income countries it is 29.

The proliferation of instruments (over-identification) and the serial autocorrelation of mistakes are the two key problems or limitations with the use of GMM in estimation. The study's results indicate that the Prob (J-statistic) is 0.47 for high-income countries and 0.42 for middle-income countries. According to the literature works, if the probability of (J-statistic) achieved is equivalent to or greater than 0.05, the estimate tools utilized are reliable, and over-identification was not observed (Labra Lillo & Torrecillas, 2018). In regard to the condition of no correlation in the errors term, the Arellano-Bond Serial Correlation Test is used to determine whether there is no correlation in the errors term (Autocorrelation). If the probability is higher than 0.05, that is to say, the errors term is not serially correlated (Labra Lillo & Torrecillas, 2018). The study's results also shows that [pr AR (1)

and pr AR (2)] are more than 5%. So, it can be easily confirmed that the errors term is not serially correlated for high-income countries = 0.985.

Table 2 shows the actual outcomes of the GMM model, which estimates the connection between social spending and poverty in high- and middle-income countries.

Dependent Variable	POV							
Method:	Panel Generalized Method of Moments							
Transformation:	First Differences							
Sample (adjusted):	2012 2018 - Periods included: 7							
Instrument specification:	@DYN(POV, -2) POPGR, POP0-14, POP15-64, POP65+, GDPPC$(-1)							
	White period instrument weighting matrix							
	White period standard errors & covariance (d.f. corrected)							
	High-Income Countries				*Middle-Income Countries*			
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Coefficient	Std. Error	t-Statistic	Prob.
POV(-1)	-0.186691	0.003524	-52.97113	0.0000	0.545762	0.014820	36.82720	0.0000
GDPPC$	-1.21E-05	2.27E-06	-5.341725	0.0000	-6.25E-05	8.27E-06	-7.563730	0.0000
GEXPE	-0.176739	0.023579	-7.495660	0.0000	-0.323131	0.018686	-17.29261	0.0000
GEXPH	-0.391766	0.021101	-18.56623	0.0000	-0.270850	0.019102	-14.17888	0.0000
GINI	0.022575	0.004814	4.689490	0.0000	0.117517	0.006344	18.52555	0.0000
PERST	-0.000310	0.000666	-0.465878	0.6418	0.086299	0.002550	33.84037	0.0000
PERTAX	-0.047650	0.004634	-10.28376	0.0000	-0.184247	0.009747	-18.90315	0.0000
Cross-sections included	31 Countries				28 Countries			
Total panel (unbalanced) obs.	213 observations				160 observations			
J-statistic	22.83157				22.76188			
Instrument rank	31				29			
Prob(J-statistic)	0.470642				0.415278			

Source: Author's compilation

To test whether GDPPC$ is exogenous, GDPPC$ and poverty must be tested to know whether or not they don't correlate with the error term. This can be done by first regressing GDPPC$ on all instrumental variables, those above mentioned.

Instrumental variables should be included because they might be partially correlated with poverty and GDPP$. There is a substantial relationship, as evidenced by the empirical findings in table 2. (where the probability of T-statistic equal 0.000 less than 5%). Also, the ***reverse relationship*** appears between GPD Per Capita and poverty reduction in both groups of countries. In the High-Income Countries, While the poverty headcount ratio declines by 6.25E-05 in middle-income nations, the GDP per capita rises by one unit and the poverty headcount ratio falls by 1.21E-05 units.

Similarly, regress government Total education spending as an independent variable for reducing poverty (% of GDP) (the poverty headcount ratio)which is a dependent variable, and all controlled instruments are mentioned above. Consequently, there is a ***reverse relationship*** for both middle-income and high-income nations. In other words, the ratio of people who are poor will fall by 0.176739 It will decrease by 0.323131 if the GEXPE grows by one unit in high-income countries (See Table 2).

Moreover, the domestic government health expenditure (percentage of GDP) (GEXPH) has ***converse relationship*** for nations with high and moderate incomes. For high-income and middle-income countries, respectively, the poverty headcount ratio falls by 0.391766 and 0.270850 if government health spending rises by one unit. (See Table 2).

On the contrary, the effect of the **Gini coefficient** (GINI) is a positive correlation for both groups of countries; a unitary increase in the index will raise poverty in middle-income nations by 0.117517 and in high-income countries by 0.022575, with the percentage in middle-income countries being larger than that in high-income countries (See Table 2).

Incidentally, the third independent variable is the Subsidies and other transfers (% of expense) (PERST). This has a significant effect on poverty for the middle-income countries, where the probability of T-statistic equals 0.000 less than 5%. This means that an increase by one unit will increase the poverty count ratio by 0.086299. Adding this regression for high-income countries, this variable then is not significant as the probability of T-statistic is more than 5 percentage (0.6418) (See Table 2).

Finally, there is a ***reverse relationship*** between the taxes revenue (% of GDP) (PERTAX) as an explanatory variable and poverty reduction as a dependent variable; if the taxes revenue (% of GDP) increases by one unit, in the High-Income Countries, the poverty headcount ratio declines by 0.047650 units, while in middle-income countries, it declines by 0.184247 units. This inverse relationship can be explained by the raising taxes that increase the government's ability to spend on social protection programs and by increasing the government's investment which eventually contributes to employment and poverty alleviation.

- **Model B: Growth Equation Effect of Social Expenditure on the Growth**

    Turning to model B, the study tries to identify the relationship between social expenditure and GDP in current prices in dollars as a proxy to economic growth, applying a dynamic panel data multiple regression model for the 79 countries: 43 middle-income countries and 36 high-income countries over 9 years (2010 -2018). A few controlled instruments are applied, for example, (GDP$-2) GDP in two-year intervals, structure of the population (population 0 to 14, population 15 to 64, population 65+ years). The number of cross-section (countries) is adjusted to 28 middle-income nations and 31 high-income nations. The total number of observations for high-income countries is 215 and 165 observations for middle-income countries. Also, the instrument rank is 31 for high-income countries and 28 for middle-income countries (See Table 3).

    The findings show that the growth model's serial autocorrelation of errors and instrument proliferation (over-identification) were both tested. the Prob (*J-statistic*) is 0.376 for high-income countries and 0.4284 for middle-income countries. So, the used instruments Over-identification is consequently not observed because the estimates are accurate. (Labra Lillo & Torrecillas, 2018). Regarding the condition of no correlation in the errors term, the Arellano-Bond Serial Correlation Test is used to determine whether there is no correlation in the errors term (Autocorrelation) (Labra Lillo & Torrecillas, 2018). The results show that [pr AR (1) and pr AR (2)] is more than

5%. So, it can be confirmed that the errors term is not serially correlated for high-income countries = 0.985. Table 3 presents the findings of the empirical analysis.

Table 3 evaluating the relationship between economic growth and social spending in high- and middle-income nations, according to the empirical findings of the GMM model.

Dependent Variable	GDP$							
Method:	Panel Generalized Method of Moments							
Transformation:	First Differences							
Sample (adjusted):	2012 2018 - Periods included: 7							
Instrument specification:	@DYN(GDP$,-2) POP0-14 POP15-64 POP65+							
	White period instrument weighting matrix							
	White period standard errors & covariance (d.f. corrected)							
	High-Income Countries				**Middle-Income Countries**			
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Coefficient	Std. Error	t-Statistic	Prob.
GDP$(-1)	1.065866	0.000923	1155.076	0.0000	0.173911	0.009014	19.29274	0.0000
GEXPE	-8.68E+10	9.82E+09	-8.838509	0.0000	-1.56E+11	1.09E+10	-14.26590	0.0000
GEXPH	1.38E+11	6.88E+09	20.04086	0.0000	-1.45E+11	3.28E+10	-4.436868	0.0000
GINI	5.23E+10	1.09E+09	47.78681	0.0000	6.19E+10	2.49E+09	24.83770	0.0000
POPGR	-1.54E+11	8.89E+09	-17.32006	0.0000	1.27E+11	2.43E+10	5.229442	0.0000
PERTAX	4.93E+10	5.20E+08	94.88463	0.0000	6.58E+10	2.60E+09	25.29947	0.0000
PERST	-7.20E+10	1.56E+09	-46.07511	0.0000	-6.91E+09	5.66E+08	-12.20802	0.0000
Cross-sections included:	31 Countries				28 Countries			
Total panel (unbalanced) obs.:	215 observations				165 observations			
J-statistic	25.55301				20.47800			
Instrument rank	31				28			
Prob (J-statistic)	0.376228				0.428408			

Source: Author's compilation

According to the findings, public spending on education (GEXPE) is inversely correlated with GDP in both high- and middle-income nations from 2010 to 2018.. Where the probability of the t-statistic is less than 5%, spending on

education is strongly correlated with economic growth. In high-income countries, a rise in public education spending results in a drop in GDP of -8.68E+10 units, while a drop of -1.56E+11 units occurs in middle-income nations. (See Table 3). This relationship contradicts with the results of the literature works and the empirical studies which illustrate that rising education spending in underdeveloped nations has a beneficial impact on per capita GDP (Abdul Rehman et al., 2020). The literature works suggest that, a 1% rise in enrollment rates will enhance GDP by 0.35%. For a population with lower levels of education, A 50% increase in enrolment, or 0.41 log units, from two to three years will lead to a 15.4% increase in GDP (Muhammad Al & KAMEYAMA, 2019). This relation can be illustrated by the idea that when taxes are raised in order to pay more government expenditure, the result will be that aggregate demand (AD), also known as "crowding out," will not increase. Increased government spending may result in crowding out if the economy is nearly at capacity.

Health expenditures (GEXPH) have a varied influence in both sets of countries, with a positive impact in high-income countries and a negative impact in middle-income countries, according to the employment GMM model's findings. In high-income nations, an increase in health spending of 1 unit immediately results in a rise in GDP of 1.38E+11 units, whereas in middle-income countries, it results in a drop of 1.56E+11 units. With regard to

the third exogenous variable, the GINI coefficient, GDP is positively impacted, rising by an estimated 5.23E+10 units in high-income nations and 6.19E+10 units in middle-income countries, respectively. (See Table 3).

Regarding population growth (POPGR), the study also demonstrates that GDP in both groups of nations is significantly impacted by POPGR (positively impact in middle-income countries, negatively effect in high-income countries, in contrast to expectations). In terms of the magnitude of the effects, a 1% rise in population growth causes the GDP$ to decline by 1.54E+11 units in high-income countries while rising by 1.27E+11 units in middle-income nations. As an independent variable, the percentage of taxes (PERTAX) has a positive impact on GDP for both sets of countries in high- and middle-income countries (4.93E+10 and 6.58E+10, respectively), according to the study.

The evaluation of the influence of transfers and subsidies (PERST) on economic growth is the ultimate topic of the study. According to estimates, increases of 1% in transfers and subsidies have a significant negative influence on economic growth in the two groups of countries, with losses in GDP ($) of 7.20E+10 and -6.91E+09 units in high- and middle-income countries, respectively.

4. CONCLUSIONS AND POLICY IMPLICATIONS

Many studies have analyzed the contribution that social expenditure can make to decrease poverty and vulnerability in developing and developed countries, but little interest has been paid to how social expenditure might affect economic growth. This review examines the available evidence on the effects that social spending may be expected to have on growth. It identifies and assesses a number of pathways through which social spending can potentially contribute either to enhance or impede growth and reduce the poverty.

This paper analyze the influence of social expenditure on poverty reduction and growth for a panel of two groups of countries (high- and middle-income countries) from 2010 to 2018. To this purpose, it implies a GMM approach with two models. *In model A* (poverty model), it estimates the effect of social expenditure on reduction of poverty in high- and middle-income countries. Social spending is classified into many areas or proxies: general spending on education, government expenditure on health, and subsidies and transfers, using GDP Per Capita, taxes as a percent of Gross Domestic Product (GDP), and GINI index. Likewise, in this regression, the dependent variable with one lag (POV-1) is then considered as an exogenous variable to reduce the endogeny issues. Furthermore, the paper applies the demographic structure of the population as controlled instruments and poverty with two lags. *In model B*, it

evaluates the effect of social spending on the economic growth in high- and middle-income countries. The social spending components are designed as model A, but the growth of population is also estimated as an exogenous variable.

The social expenditure directly correlates with many solutions to poverty, including reduced income inequality, reduced infant and maternal deaths, and increase in the GPD per capita. On other hand, the social spending is an essential component for economic growth and GDP for both high- and middle-income countries. But in empirical results, there are many issues, for instance, the lack of data to do Efficient Econometric Analysis and many difficulties in collecting and calculating the proxies of social spending.

For components of social expenditure, social transfers have important effects upon the income growth of those in poverty to the extent that social transfers facilitate household investing in human and production, resources and they enable the stability of income flows in the future. In fact, there are two important factors that should be in the subsidies and transfer: 1) the level of subsidies and transfer, which is around 20 percent of average household consumption in most of countries. and 2) The regularity of social transfers and the accuracy of identifying the most vulnerable.

According to the literature, investments in health and education are strongly linked to both economic growth and the

poverty reduction; a 1% increase in enrollment rates results in an increase in GDP of 0.35 percent. For a population with lower levels of education, an increase from two to three years attained by a rise in enrollment of 50% or 0.41 log units will increase GDP by 15.4%. However, the findings of the current study indicated that between 2010 and 2018, public spending on health and education in high- and middle-income nations both correlated adversely with GDP. It can be explained by the fact that more taxes are used to pay government spending, the economy is almost at capacity, and increased government spending could result in crowding out.

These conclusions support the view that social spending in high- and middle-income countries can be more successful in achieving MDGs, particularly poverty reduction. Therefore, many policy interventions are necessary to do it. Firstly, the important policy that can be applied is improving social spending efficiency. In terms of growth and poverty reduction, it may make improvements of a comparable extent. Particularly, improving governance may have significant benefits for both GDP and social metrics. Therefore, improving accountability for public expenditure and decreasing corruption are equally as vital as raising spending. Additionally, macroeconomic measures that improve fiscal balances and lower inflation have a favourable impact on GDP, which in turn lowers the number of people living in poverty.

Other policy interventions are necessary, which is increasing the amount of social spending, especially in the recent period with the high rates of poverty appeared after the rise in food prices as a consequence of the COVID-19 pandemic and the Russian-Ukrainian crisis. Thirdly, there is another necessary policy to reduce poverty and promote economic growth, which is raising the equity of the distribution of the social spending between geographical regions, ages, and gender. Finally, national strategies must be adopted for the alleviation of poverty aimed at meeting the MDGs, especially in middle-income countries, where poverty rates are high. Wide-ranging strategies will be required for interventions, including improving the macroeconomic setting and governance. Growth and poverty will both benefit from improving human capital.

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