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MAXIMIZING WELFARE: THE IMPACT OF HUMAN CAPITAL AND GLOBALIZATION IN DEVELOPED AND DEVELOPING COUNTRIES

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Abstract
Despite substantial progress in reducing global poverty, a significant portion of individuals in developing nations still grapple with impoverished conditions. The adoption of global economic integration as a development strategy has gained popularity, yet its specific implications for the well-being of the most disadvantaged remain unclear. This research delves into the relationship between education and health, pivotal facets of human capital (HC), and the impact of globalization on both the poverty gap and child mortality rates across 46 developing and developed nations from 2000 to 2020. Employing a System Generalized Method of Moments (SGMM) model to address potential unobserved heterogeneity and endogeneity, our results indicate that globalization contributes to the reduction of poverty gaps and a decline in child mortality rates. Also, the buildup of HC in developing economies increases these positive outcomes.
Keywords: *System Generalized Method of Moments, human capital, education and health, child mortality rate*

INTRODUCTION

The number of people living in extreme poverty is still startlingly high, despite tremendous advancements in recent decades in worldwide efforts to reduce poverty. Over 700 million people live on $2.15 or less per day, with over 300 million subsisting on less than $2.50 per day in 2015, according to the World Bank (2017). The World Bank (2017) has underlined that there is dire need for global anti-poverty initiatives due to this ongoing poverty. More than half of the world's extremely poor people live in Sub-Saharan Africa, making the situation there especially dire (World Bank 2017). Numerous facets of political stability, social cohesiveness, productivity, and human development are affected by wide-ranging poverty (Ali & Rehman, 2015; Ogunniyi et al. 2016; Upton et al. 2016). Over the past three decades, many industrialized and developing nations have undertaken reform agendas, which have placed a strong emphasis on efforts to advance integration and openness, frequently through globalization (GB). Improving welfare results and promoting economic growth have been the main objectives. But although some countries have profited from GB, others—especially emerging nations—have not gained the intended rewards. There has been much discussion of the benefits of GB from both theoretical and empirical angles.

According to the Heckscher–Ohlin model's Stolper–Samuelson trade theorem, GB may reduce inequality in developing nations and open doors for workers with lower levels of education (Kremer and Maskin 2003; Le Goff and Singh 2014). These advantages can be brought about by GB through the exchange of knowledge, information, technology, and trade openness, which would increase productivity and improve the efficiency of resource allocation (Ali, 2015; Margolis and Calderon, 2021; Marc & Ali, 2016; Le Goff and Singh 2014; Perkins and Neumayer 2005). Research has shown that GB has a favorable effect on per capita income and the decrease of poverty in developing nations (Tayebi and Ohadi 2009; Bechtel 2014; Bergh and Nilsson 2014; Ha and Cain 2017; Ali et al., 2016; Marc et al., 2021; Karim & Said, 2024).

Nevertheless, there is still empirical data that shows conflict regarding the welfare benefits of GB; some research indicate negative effects, particularly in light of recent social and economic problems in some areas (Kanbur 2000; Gaston and Rajaguru 2009; Bergh and Nilsson 2014). Trade liberalization, which is frequently related to GB, has

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been related to small gains for emerging economies and exacerbated inequality (Kremer and Maskin 2003; Calderón and Chong 2001; Banai, 2021; Audi et al., 2021). The difference in results emphasizes how complicated and unclear the relationship between GB and wellbeing is, particularly in developing nations.

In developing countries, human capital (HC)—which includes health and education—is an important variable in determining economic growth, productivity, and welfare (Huay and Bani 2018; Ogundari and Awokuse 2018; Nwezeaku, 2018; Marc et al., 2021; Baydur, 2024). More equal incomes distribution is associated with educational access, and poverty reduction is linked to advancements in education and health (Neal and Johnson 1996; O'Neill 1990; Huay and Bani 2018; Kassem et al., 2019; Roussel et al., 2021). According to Bloom et al. (2004), Ogundari and Abdulai (2014), and Ogundari and Awokuse (2018), productivity and income per capita rise with improved health and education levels. HC, GB, and welfare outcomes have a dynamic relationship; new research has shown how interdependent they are (Ha and Cain 2017; Le Goff and Singh 2014; Sajid & Ali, 2018).

Despite previous studies, little is known about how HC shapes the connection between GB and welfare in emerging nations. We carried up a cross-country analysis encompassing both developed and developing countries between 2000 and 2020 in order to close this gap. Our research investigates the ways in which HC indicators (health and education) and GB, as gauged by the KOF index, interact to affect welfare outcomes, particularly the child mortality rate and poverty gap.

THE INTERCONNECTION OF GB, HC, AND WELFARE

The concept of GB, though lacking a universally agreed-upon definition, generally refers to the increasing interconnectedness of societies (Bourguignon 2002). Its impact on welfare is a topic of debate among scholars and economists. According to conventional trade theory, like the Heckscher-Ohlin model, GB is expected to reduce poverty in developing nations by promoting specialization, competition, and sound macroeconomic policies, thereby fostering economic growth (Agénor 2002; Dollar 2001; Senturk & Ali, 2021; Mehmood et al., 202). Studies such as Dollar and Kraay (2004) have found positive connections between trade volume, economic growth, and improved income distribution, particularly benefiting the poor. Additionally, GB has been associated with enhanced returns on education in poor countries and the transfer of health technologies, contributing to improved health outcomes for the impoverished (Distinct 2004; Deaton 2004; Roussel & Audi, 2024).

However, GB also presents challenges to welfare, especially in developing countries. Social GB, for instance, can facilitate the spread of infectious diseases, exacerbating health disparities and hindering labor productivity (Wamala and Kawachi 2007). Unhealthy cultural practices and lifestyle patterns, influenced by social integration, may also have adverse effects on productivity and health (Yach et al. 2007; Mendez and Popkin 2004; Riaz et al., 2024). Additionally, the accessibility of cheaper capital through GB can lead to short-term unemployment as labor is substituted with capital, particularly in developing nations (Agénor 2002; Bhagwat and Srinivasan 2002).

At the macro level, HC, encompassing knowledge, skills, and attributes, plays a crucial role in determining societal well-being. Studies have shown positive correlations between investments in education and health and various welfare indicators, such as per capita income and poverty reduction (Burro and Lee 1994; Hanushek and Woessmann 2008; Audi, 2024). However, disparities in HC investment across regions, particularly in Sub-Saharan Africa, have contributed to persistent poverty and lower economic growth rates (Burro 2013; Le Go and Singh 2014; Marc et al., 2022).

Considering the interplay between GB, HC, and welfare, it becomes evident that the effects of GB on welfare outcomes can be mediated by the level of HC within a society. Studies have suggested that the benefits of GB, such as income and employment gains, are contingent on the availability and quality of HC (New farmer and Sztajerowska 2012; Gu and Dong 2011). For instance, economic GB may lead to welfare improvements in developing countries, but the extent of these gains depends on the level of educational HC (Burro 1998). Similarly, the welfare effects of trade openness are strengthened when accompanied by investments in HC (Wang and Fan 2009).

METHODOLOGY

Dependent Variables: National Poverty Gap and Child Mortality Rate

Measuring welfare poses challenges due to its complexity (Ravallion, 2001). While early studies on the GB-welfare relationship focused on income inequality, it's recognized that this provides a relative rather than absolute picture of wellbeing (Ha and Cain, 2017). As an alternative, the poverty headcount, representing the percentage

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of the population living below the poverty line, offers a more direct measure. The poverty line, set at $2.15 per person per day by the World Bank in 2020, is adjusted using purchasing power parity (PPP) to account for currency differences (World Bank, 2020). For our cross-country analysis, we adopt national poverty gap statistics from WDI, which assess both the depth and extent of poverty by calculating the total income shortfall from the poverty line per capita (Ha and Cain, 2017).

Child mortality rate, defined as the number of children per 1000 live births who die before reaching the age of five, serves as an indirect indicator of welfare and poverty (Gerring et al., 2012). This metric reflects the quality of life in impoverished societies by capturing the number of children who survive to adulthood (McGuire, 2006). This data, more readily available compared to poverty gap figures, allows for a comprehensive assessment across various countries and years.

Main Independent Variables: GB and HC

GB is gauged using the KOF GB index developed by Dreher et al. (2008). The index takes values ranging from 0 to 100, higher scores signify greater GB, enabling cross-national and longitudinal comparisons (Bergh and Nilsson, 2014).

HC, crucial for labor productivity, comprises knowledge (education) and health (Ogundari and Awokuse, 2018). Education is represented by primary and secondary school enrollment rates, offering diverse indicators for cross-comparison (Ogundari and Awokuse, 2018). Health capital is proxied by government expenditure on health, aligning with previous studies (Ogundari and Awokuse, 2018; Azizi, 2018).

Control Variables

To address omitted variable bias, we incorporate several control variables from the WDI dataset. GDP per capita reflects a nation's economic resources, with higher values expected to correlate with reduced poverty (Ha and Cain, 2017). Rural population share and arable land area account for agricultural significance and resource endowments, impacting poverty and child mortality rates (Ogunniyi et al., 2017). Economic growth rate captures cyclical fluctuations in output and is associated with reduced poverty (Ames et al., 2001). Annual population growth reflects demographic pressures on economic resources and is expected to positively correlate with poverty and child mortality rates (Dithmer and Abdulai, 2017). Access to electricity represents infrastructural development, enhancing productivity and livelihoods (Alaverdyan et al., 2015). Finally, the Consumer Price Index (CPI) inflation rate controls for macroeconomic stability, with high inflation rates associated with increased poverty and child mortality (Ha and Cain, 2017).

DATA AND ESTIMATIONS

The panel dataset utilized in this study comprises of information from 44 countries spanning the period from 2000 to 2020. Among these countries, 22 are classified as developing nations, while the remaining 22 are categorized as developed countries. The data were sourced from the World Bank's World Development Indicators (WDI) dataset and the KOF GB index dataset. To derive the estimates, we employ the system generalized methods of moments (SGMM) estimator, which enables robust analysis by accounting for potential endogeneity issues, unobserved country-specific effects, and collinearity among regressors.

To investigate the influence of HC and GB, we establish a model succeeding backgrounds proposed by various scholars like Ha and Cain (2017), Bergh and Nilsson (2014), and Welander et al. (2015).

The baseline model is represented as follows:

$$p_{it} = \theta + \beta_1 OGI_{it-1} + \beta_2 HC_{it-1} + \delta_i + \mu_t + \varepsilon_{it} \quad (1)$$

here the subscripts i and t represents the country and the time periods, respectively, P_{it} denotes welfare measures represented by the national poverty gap (a direct poverty measure) and the child mortality rate (indirect poverty measure). OGI_{it-1} is the one year lagged overall GB index, HC_{it-1} denotes one year lagged HC measures, δ_i represents country specific effects such as country characteristics that do not change over time, μt is the time specific effect that controls for shocks that do not vary among countries such as global demand shocks, and ε_{it} is the error term. θ, β_1 and β_2 are the estimated parameters.

To effectively identify the effect of GB and HC on welfare, we include a set of control variables, CV_{it}, into Equation above. CV_{it} represents control variables capable of explaining P_{it}, which are included to avoid omitted variable bias problems.

$$p_{it} = \theta + \beta_1 OGI_{it-1} + \beta_2 HC_{it-1} + \beta_3 CV_{it} + \delta_i + \mu_t + \varepsilon_{it} \quad (2)$$

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In this equation, the subscripts i and t denote the country and time period, respectively. The variable p_{it} represents welfare indicators, specifically the national poverty gap (a direct measure of poverty) and the child mortality rate (an indirect measure). The term OGI_{it-1} refers to the overall GB index with a one-year lag, while HC_{it-1} represents the HC measures, also lagged by one year. The parameter δi captures country-specific characteristics that remain constant over time, while $\mu_t$accounts for time-specific effects, such as global economic shocks that affect all countries. The error term is denoted by εit, and θ, β1, and $\beta 2$ are the estimated coefficients.

To accurately assess the impact of GB and HC on welfare, additional control variables (CV_{it}) are incorporated into the equation. These control variables help explain p_{it} and mitigate the risk of omitted variable bias.

Here β_3 represents the coefficient of the estimated parameters of the control variables.

The relationship between welfare and GB is influenced by measures of HC, such as education and health. To account for this, we enhance Equation (2) by incorporating interaction terms.

$$p_{it} = \theta + \beta_1 OGI_{it-1} + \beta_2 HC_{it-1} + \beta_3 CV_{it} + \beta_4 GI_{it-1} \times HC_{it-1} + \delta_i + \mu_t + \varepsilon_{it} \quad (3)$$

This method allows us to deal with potential challenges in estimating the relationship between welfare and GB, especially concerning education and health measures of HC. Estimating these equations can be tricky due to factors that might confuse the results and issues with how variables are related. To tackle these challenges, we use a method called the system generalized method of moments (SGMM) estimator, developed by Blundell and Bond (1998). This method helps us control for things we can't directly observe, like specific characteristics of each country, and also deals with problems like endogeneity and collinearity among variables, ensuring that our estimates are reliable.

To make sure that our SGMM estimator is giving us accurate results, we conduct a Sargan test of over-identifying restrictions. If the test doesn't reject the idea that our instrumental variables (which help us estimate the relationship between welfare and GB) are not related to the leftover differences, it means our estimation is consistent. Additionally, we also perform a serial correlation test to ensure that errors in our calculations don't show any patterns over time.

Table 1: Descriptive Statistics

	Developing Countries			Developed Countries		
Variable	N	St. Deviation	mean	N	St. Deviation	mean
Poverty Gap	504	3.36058	2.43385	462	0.192665	0.18088
Child mortality	504	32.1352	36.5196	462	2.12467	4.3636
OGI	504	9.94642	56.17978	462	8.15428	80.7849
Primary level enrollment	504	26.5243	80.57169	462	4.78485	102.4813
Secondary level enrollment	504	29.5942	41.67644	462	18.05749	109.1193
Health expenditure	504	1.96918	2.56749	462	2.43006	5.88154
Rural population	504	20.02048	46.78753	462	774.5583	51.5179
Population growth	504	1.244925	1.32510	462	2.52738	1.59737
Arable land	504	16.47528	17.4796	462	15.12441	14.2120
GDP growth rate	504	4.92285	4.83532	462	3.8349	2.60600
GDP per capita	504	4.94174	3.46000	462	3.47783	0.99666
Inflation rate	504	6.8112	6.24687	462	2.67313	1.9379
Access to electricity	504	22.4119	85.97486	462	0	100

The descriptive statistics reveal significant disparities between developing and developed. Developing countries exhibit a substantially higher poverty gap, with a mean of 2.43% compared to 0.18% in developed countries, reflecting greater income inequality and poverty in these nations. Additionally, the under-5 child mortality rate is markedly higher in developing countries (mean = 36.52 per 1,000 live births) than in developed countries (mean = 4.36), underscoring the challenges in healthcare access and living conditions in developing regions. In contrast, developed countries demonstrate a higher level of GB (mean = 80.78) compared to developing countries (mean = 56.18), indicating their greater integration into the global economy, society, and political systems.

Education enrollment rates further highlight the divide between the two groups. Developed countries achieve near-universal primary-level enrollment (mean = 102.48%), with secondary-level enrollment also significantly higher

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(mean = 109.12%) compared to developing countries (means = 80.57% and 41.68%, respectively). This suggests that developed countries have more robust and inclusive education systems. Similarly, health expenditure as a percentage of GDP is considerably higher in developed countries (mean = 5.88%) than in developing countries (mean = 2.57%), reflecting better healthcare infrastructure and prioritization of public health in developed nations. Economic indicators also reveal notable differences. Developing countries experience higher GDP growth rates (mean = 4.84%) compared to developed countries (mean = 2.61%), indicating faster economic expansion. However, developed countries enjoy significantly higher GDP per capita (mean = 0.99666 in log terms) compared to developing countries (mean = 3.46 in log terms), highlighting the vast income disparity between the two groups. Inflation rates are also higher in developing countries (mean = 6.25%) than in developed countries (mean = 1.94%), pointing to greater economic instability in developing regions.

Access to basic infrastructure, such as electricity, further distinguishes the two groups. Developed countries achieve universal access to electricity (mean = 100%), while developing countries lag behind (mean = 85.97%), with considerable variability across nations. This disparity underscores the need for improved infrastructure development in developing countries. Finally, the proportion of rural population is higher in developing countries (mean = 46.79%) compared to developed countries (mean = 51.52%), though the extremely high standard deviation in developed countries (774.56) suggests potential data anomalies or extreme variability in this indicator.

EMPIRICAL RESULTS

We conducted a correlation analysis between the explanatory factors taken into account in the regression models prior to estimating equation 3. A snapshot of the strength of the bivariate link between variables is given by the correlation analysis (Self and Grabowski 2004). Multicollinearity shouldn't be an issue for our estimations, according to the results, which showed that the majority of the variables are not highly associated

DEVELOPING COUNTRIES ANALYSIS

National Poverty Gap in Developing Countries

We use the poverty gap as a proxy variable for welfare. Initially, we regress it with independent variables, including GB and HC. Within the HC category, we consider health expenditure, primary and secondary school enrollment.

Table 2: Without Control variables

Variables	Coefficient	St. Error	Probability
Globalization	0.019722	1.007978	0.013
Health	-0.17935	0.86388	0.038
Pri.Edu	-0.00997	0.00634	0.116
Sec.Edu	0.006208	0.00584	0.288

Table 3: With Control Variables

Variables	Coefficient	St. Error	Probability
Globalization	0.00395	0.01323	0.765
Health	0.10982	0.091153	0.228
Pri.Edu	-0.005901	0.006204	0.342
Sec.Edu	0.005093	0.005739	0.375
Electricity	0.007736	0.005925	0.192
Inflation	0.004561	0.008707	0.600
GDP. Growth	0.062038	0.60719	0.919
Per capita	0.07194	0.61884	0.907
land	-0.00485	0.01194	0.685
population	-0.03369	0.6185	0.957
R.population	0.028731	0.01336	0.032

Our findings reveal a positive relationship between GB and a negative correlation with HC. Notably, there is a robust association between health expenditure and the poverty gap, indicating that If Health expenditure increase by 1 unit, poverty gap will reduce by 0.179355. If GB increase by 1 unit, poverty gap will increase by 0.19723. shows that in developing countries, GB adversely affect the welfare while health expenditures have a positive impact on welfare. Upon introducing control variables in the regression analysis, we observe a reduction in the

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impact on the dependent variable. A positive relationship emerges between the poverty gap and inflation, GDP growth, rural population, GB, and secondary school enrollments (Valerie Cerra,2021), while other variables exhibit a negative impact. In developing countries, inflation and GDP growth appear to increase due to rising inequality between the upper and lower classes, as indicated by our variables. When introducing the control variable, when health expenditure increases by 1 unit, poverty gap will reduce by 0.10982 showing that welfare will increase, however when GB increase by 1 unit, poverty gap will increase by 0.00395. Whereas primary school enrollment increases by 1 unit, poverty gap reduces by 0.00591 depicting a negative relation between HC and poverty gap. Furthermore, when electricity will increase by 1 unit, poverty gap reduces by 0.00772. When GDP per capita increase by 1 unit then poverty gap reduces by 0.7194 units. When land availability increases by 1 unit then poverty gap will face a reduction by 0.00485 units. When population increase by 1 unit, poverty gap reduces by 0.0336 units. All these control variables explain that when they rise poverty gap reduces causing an increase in the welfare in developing countries.

Child Mortality in Developing Countries

Table 4: Without Control variables

Variables	Coefficient	St. Error	Probability
Globalization	0.01256	0.00768	0.102
Health	0.16441	0.7184	0.022
Pri.Edu	0.00336	0.006211	0.588
Sec.Edu	-0.00141	0.00354	0.691

Table 5: With Control Variables

Variables	Coefficient	Std.Error	Probability
Globalization	0.03620	0.011868	0.760
Health	0.124835	0.07589	0.100
Pri.Edu	0.00124	0.00623	0.842
Sec.Edu	-0.00118	0.0036	0.746
Electricity	0.01334	0.0057	0.019
Inflation	0.00622	0.0058	0.286
GDP.growth	0.51059	0.45137	0.258
Per capita	-0.1764	0.46028	0.261
land	-0.01764	0.01926	0.360
population	-0.49086	0.45702	0.283
R.population	-0.004039	0.01114	0.717

We utilized the child mortality rate as a proxy variable for assessing the welfare of developing countries. Initially, we regressed it against the main independent variables, revealing a positive relationship between child mortality rate and these variables. Notably, health expenditure emerged as the most influential among all the independent variables. The analysis suggested that an increase in health expenditure positively correlates with improved health facilities in developing countries, resulting in a higher survival rate for children under the age of five. When GB increase in developing countries child mortality rate increases by 0.01256 units shown that there is positive relationship between variables and when health expenditure rises by 1 unit child mortality increases by 0.16441, when primary school enrollment increases by 1 unit child mortality rate increases by 0.00336 which depicting that when HC rises in developing countries that child mortality under five year rises, so welfare enhance in developing countries.

Upon introducing control variables into the regression, the impact of the independent variables diminished compared to previous values. Among the control variables, land per capita income and rural population exhibited a negative impact on the child mortality. The results are in line with (Klaauw and Wang (2011)). It means when land availability increases by 1-unit child mortality rate reduces by 0.1764, when per capita income increases by 1-unit child mortality rate reduces by 0.5177 units. When rural population rises by 1-unit child mortality rate reduces by 0.0041 units. Whereas increase in population by 1 unit, mortality reduces by 0.4906 which has significant impact on the welfare, these variables shown that when they rise the availability of resources reduces due to which death rate increases under 5 year, causes welfare to diminish. These findings imply that population

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growth contributes to an increase in the death rate of children under five years, particularly evident in regions like Sub-Saharan Africa. Furthermore, the results indicated that an increase in rural population leads to a decrease in health facilities, potentially exacerbated by pollution. The rise in pollution, in turn, is associated with an increased death rate, highlighting a negative relationship between the control variables and child mortality rate. All other variables exhibit a positive impact on child mortality rate. Notably, among all these variables, the GDP growth rate had the most significant effect on the child mortality rate showing when GDP growth rate rises, child Mortality rate will increase by 0.5105 units. This suggests that an increase in GDP positively influences living standards and enhances health facilities, ultimately contributing to a reduction in death rate under 5 years.

DEVELOPED COUNTRIES ANALYSIS

National Poverty Gap in Developed Countries

Table 6: Without Control variables

Variables	Coefficient	Std.Error	Probability
Globalization	0.00789	0.00209	0.001
Health	-0.00030	0.00676	0.964
Pri.Edu	-0.00198	0.00148	0.1822
Sec.Edu	-0.0022	0.00070	0.002

In a similar way to developing countries, we conducted a regression analysis for developed countries, using the poverty gap as the dependent variable and the same set of independent variables. Without introducing control variables, we observed a negative relationship between health expenditure, primary and secondary school enrollment, and the poverty gap (LGR Velazequez,2022) indicating that when health expenditure rises in the developed countries poverty gap reduces by 0.0031 units and primary school enrollment rises by one unit poverty gap reduces by 0.00198 units. Moreover, when secondary school enrollment increases by 1 unit poverty gap reduces to 0.00221 units. These relationships shows that when human flourishes in developed countries poverty gap reduces which in turns to increases in welfare conversely, GB showed a positive association with the poverty gap indicating that when GB increase by 1 unit poverty gap increases by 0.00789 units Notably, in developed countries, secondary school enrollment and GB had a more significant impact on the poverty gap compared to other variables. This suggests that as developed countries become more globalized, internal inequalities among different social classes tend to persist. Additionally, an increase in secondary school enrollment is linked to a reduction in the poverty gap for developed countries.

Table 7: With Control Variables

Variables	Coefficient	Std.Error	Probability
Globalization	0.00631	0.00307	0.040
Health	0.0049	0.0075	0.551
Pri.Edu	-0.00201	0.0019	0.310
Sec.Edu	-0.00207	0.00072	0.004
Electricity	0.00190	0.00288	0.509
Inflation	0.0108	0.0040	0.007
GDP.growth	0.0307	0.03376	0.414
Per capita	-0.02767	0.38832	0.476
land	-0.0080	0.00227	0.00
population	-0.04104	0.3777	0.277
R.population	0.0900	7.05	0.896

In the subsequent regression, with the inclusion of control variables, the analysis revealed a negative relationship between rural population, population growth, land per capita income, and secondary school enrollment with the poverty gap (R. Akthar,) all these are indicates that rural population rises by 1 unit poverty gap reduces by 9.25 when population growth rises by 1 unit poverty gap reduces by 0.04 units, as land availability rises by 1 unit poverty gap reduces by 0.02767 units moreover when per capita income increases by 1 unit poverty gap reduces by 0.02767 which in turns to increase in the welfare . Conversely, other variables demonstrated a positive relationship with the poverty gap for developed countries. These findings indicate that as the population increases in developed countries, there is a rise in HC, resulting in a decrease in the poverty gap. Notably, the coefficient of

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rural population had the highest impact on the poverty gap, emphasizing its significance in influencing the level of poverty in developed countries.

Child Mortality in Developed Countries

Table 8: Without Control variables

Variables	Coefficient	St. Error	Probability
Globalization	0.00139	0.00148	0.346
Health	0.0039	0.0053	0.464
Pri.Edu	-0.00162	0.00139	0.245
Sec.Edu	0.001046	0.00048	0.032

Table 9: With Control Variables

Variables	Coefficient	St. Error	Probability
Globalization	0.002739	0.003073	0.929
Health	0.00132	0.00617	0.831
Pri.Edu	-0.00117	0.001536	0.444
Sec.Edu	0.00110	0.000528	0.036
Electricity	0.00039	0.00339	0.907
Inflation	0.00306	0.00222	0.168
GDP.growth	0.00819	0.02188	0.708
Per capita	-0.0076	0.0226	0.736
land	-0.00003	0.00149	0.982
population	-0.0089	0.00226	0.693
R.population	0.50001	4.49	0.266

When examining child mortality rates as a proxy for the welfare of developed countries and conducting a regression analysis with independent variables, we observed a positive relationship between GB , health and secondary school enrollments shown that when GB increases by 1 unit child mortality rates also increases by 0.00139 , when Health increases by 1 unit child mortality rate increase by 0.0039.When the Secondary school enrollments increases by 1 unit Child mortality rate increase by 0.004 units which rises the well-being of developed countries. This suggests that as developed countries become more globalized, there is a transfer of knowledge related to health and environmental protection, leading to a reduction in the death rate among children under the age of five.

Upon introducing control variables into the regression, we identified a negative relationship between rural population, population growth rate, land per capita income, primary school enrollment, and health , all these variables explains that when Rural population increases by 1 unit child mortality rate reduces by 0.50001 units and when the population growth increases by 1unit , Child mortality rate reduces by 0.00892 units. When land availability increases by 1unit child mortality rate increases by 0.0089. These relationships explain that when these variables rise, the burden of the resources increases which in turns to deduction in the wellbeing. Conversely, other variables exhibited a positive relation. Notably, among all these variables, rural population had a more pronounced impact on child mortality rates compared to others. This implies that as the population in rural areas increases, the lack of adequate health facilities contributes to an increase in the death rate among children under five years old. Furthermore, the results indicated that GB, driven by the transfer of technology and knowledge, is associated with an increase in child mortality rates among developed countries. This observation aligns with findings from developed countries such as the United States and Australia.

COMPARISON BETWEEN DEVELOPING AND DEVELOPED COUNTRIES' RESULTS

In the context of developing countries, when GB increases by 1 unit, the poverty gap increases by 0.0039 units. Conversely, in developed countries, it increases by 0.063 units, indicating that GB has a greater impact on developed nations. Regarding health expenditures, a rise of 1 unit in developing countries leads to a poverty gap increase of 0.1098 units, whereas in developed countries, it rises by 0.0049 units. This demonstrates that health expenditures have a more pronounced effect on the poverty gap in developing countries. In terms of primary education, an increase of 1 unit reduces the poverty gap by 0.0059 units in developing countries and by 0.0021

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units in developed countries. This suggests that primary school enrollment has a greater impact on the welfare of developing countries.

Table 10: Difference in the Poverty Gap

Developing Countries				Developed Countries			
Variables	Coefficient	Std.Error	Probability	Variables	Coefficient	Std.Error	Prob.
Globalization	0.00395	0.01323	0.765	Globalization	0.00631	0.00307	0.040
Health	0.10982	0.091153	0.228	Health	0.0049	0.0075	0.551
Pri.Edu	-0.005901	0.006204	0.342	Pri.Edu	-0.00201	0.0019	0.310
Sec.Edu	0.005093	0.005739	0.375	Sec.Edu	-0.00207	0.00072	0.004
Electricity	0.007736	0.005925	0.192	Electricity	0.00190	0.00288	0.509
Inflation	0.004561	0.008707	0.600	Inflation	0.0108	0.0040	0.007
GDP.growth	0.062038	0.60719	0.919	GDP.growth	0.0307	0.03376	0.414
Per capita	0.07194	0.61884	0.907	Per capita	-0.02767	0.38832	0.476
land	-0.00485	0.01194	0.685	land	-0.0080	0.00227	0.00
population	-0.03369	0.6185	0.957	population	-0.04104	0.3777	0.277
R.population	0.028731	0.01336	0.032	R.population	0.0900	7.05	0.896

When secondary school enrollment increases by 1 unit in developing countries, the poverty gap increases by 0.0051 units. Conversely, in developed countries, the poverty gap reduces by 0.0021 units. This indicates that secondary school enrollment has a significant impact on the welfare of developed countries. These variables demonstrate that HC enhancement has a predominant effect on the welfare of developed countries, while in developing countries, HC enhancement has a greater effect on welfare. Regarding control variables, an increase in electricity by 1 unit leads to a poverty gap increase of 0.0077 units in developing countries and 0.0019 units in developed countries, indicating that the availability of electricity has a greater impact on developing countries.

In terms of inflation, a 1-unit increase causes poverty to rise by 0.0045 units in developing countries and by 0.0108 units in developed countries, showing that inflation has a greater impact in developed countries. Concerning GDP growth, a rise of 1 unit increases poverty by 0.06203 units in developing countries and by 0.0307 units in developed countries, indicating that GDP growth has a greater impact in developing countries. Regarding rural population, a 1-unit increase causes poverty to increase by 0.02873 units in developing countries and by 0.0900 units in developed countries, indicating that rural population has a greater impact in developed countries.

Table 11: Difference in the Child Mortality rate

Developing Countries				Developed Countries			
Variables	Coefficient	Std.Error	Prob.	Variables	Coefficient	Std.Error	Prob.
Globalization	0.03620	0.011868	0.760	Globalization	0.002739	0.003073	0.929
Health	0.124835	0.07589	0.100	Health	0.00132	0.00617	0.831
Pri.Edu	0.00124	0.00623	0.842	Pri.Edu	-0.00117	0.001536	0.444
Sec.Edu	-0.00118	0.0036	0.746	Sec.Edu	0.00110	0.000528	0.036
Electricity	0.01334	0.0057	0.019	Electricity	0.00039	0.00339	0.907
Inflation	0.00622	0.0058	0.286	Inflation	0.00306	0.00222	0.168
GDP growth	0.51059	0.45137	0.258	GDP growth	0.00819	0.02188	0.708
Per capita	-0.1764	0.46028	0.261	Per capita	-0.0076	0.0226	0.736
land	-0.01764	0.01926	0.360	Land	-0.00003	0.00149	0.982
population	-0.49086	0.45702	0.283	population	-0.0089	0.00226	0.693
R.population	-0.00403	0.01114	0.717	R population	0.50001	4.49	0.266

To analyze the variations in Child Mortality Rates, we examine the following regressions. As GB increases by one unit, the child mortality rate in developing countries rises by 0.0362 units, while in developed countries, it increases by 0.00273 units. This indicates that GB has a more pronounced impact on developing nations. Concerning health expenditure, a one-unit increase leads to a rise of 0.1248 units in child mortality for developing countries, contrasting with a modest increase of 0.00132 units in developed countries, highlighting the significant impact of health expenditure in the developing world.

Moreover, an increase of one unit in primary education leads to a rise of 0.00124 units in child mortality in developing countries, whereas in developed nations, it decreases by 0.00117 units. This underscores the pivotal role of primary school enrollment in enhancing the welfare of developing countries. Conversely, a one-unit increase in secondary school enrollment reduces child mortality by 0.00118 units in developing countries, yet in developed nations, it increases by 0.0010 unit, suggesting that secondary school enrollment is more efficacious for the welfare of developed countries, likely reflecting higher investment in research and development (R&D).

Regarding control variables, a one-unit increase in access to electricity results in a rise of 0.01334 units in child mortality for developing countries, compared to a negligible increase of 0.00039 units in developed countries, underscoring the greater impact of electricity access on the well-being of developing nations. Similarly, a one-unit increase in inflation leads to a rise of 0.0062 units in child mortality for developing countries and 0.0031 units for developed countries, indicating its significance for developing nations' welfare. Furthermore, a one-unit increase in GDP growth results in a substantial rise of 0.5105 units in child mortality for developing countries, whereas in developed countries, it increases by only 0.00819 units, emphasizing the critical role of GDP growth in the welfare of developing nations. Conversely, a rise in per capita growth leads to a reduction of 0.1764 units in child mortality for developing countries and 0.76 units for developed countries, illustrating its positive impact on both. Additionally, when population increases by one unit, child mortality decreases by 0.4908 units in developing countries and 0.0089 units in developed countries, indicating the differing effects due to resource availability. In developing countries, an increase in rural population by one unit reduces child mortality by 0.0041 units, highlighting the strain on urban areas and scarcity of resources, which adversely affect welfare. Conversely, in developed countries, a rise in rural population leads to a significant increase in mortality, suggesting a different dynamic, likely related to shifts in human resources.

POLICY IMPLICATIONS

The GMM regression results reveal distinct patterns in the determinants of child mortality rates between developing and developed countries. In developing countries, access to electricity and health expenditure are significant factors influencing child mortality, with electricity access showing a positive but statistically significant relationship ($p = 0.019$). This suggests that improving infrastructure, particularly electricity access, could play a crucial role in reducing child mortality in these regions. However, other variables, such as globalization, education, and economic indicators, do not show statistically significant effects, indicating that their impact on child mortality may be indirect or context-dependent. In developed countries, secondary education enrollment emerges as a significant factor ($p = 0.036$), highlighting the importance of education in improving child health outcomes. However, most other variables, including health expenditure and globalization, do not show significant effects, likely due to the already high standards of living and healthcare systems in these nations.

In this study, we utilize cross-country panel data to examine the influence of HC on the relationship between GB and welfare across both developing and developed nations. This article makes a significant contribution to the ongoing discourse surrounding the effects of GB on the well-being of impoverished populations by investigating the intermediary role played by HC. Our findings suggest that developing countries would benefit from directing their attention towards enhancing their HC and fostering growth in their GDP. Conversely, developed countries should prioritize considerations such as their rural population dynamics alongside the broader impacts of GB. As developed nations increasingly integrate into the global economy, their overall welfare tends to improve, reinforcing the importance of GB in their development strategies.

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