Welfare regimes and human capital index dynamics in developing countries

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Abstract. Previous research indicates that public spending on health, education, and social protection in developing countries very weakly, if they are at all, correlated with their Human capital outcomes. Thus, it is unlikely that developing countries could close the gap in human capital with OECD countries through additional government social spending. This paper is motivated by attempt to correct and improve this conclusion. The literature on the international and comparative social policy and welfare regimes in developing countries has shown that their social spending priorities vary considerably. This paper investigates how developing countries' social spending priorities, operationalized via their welfare clusters influenced on their human capital outcomes in terms of World Bank Human Capital Index components.

Hypotheses described these influences and their differences between productive and protective welfare clusters were tested with regression analysis of the panel dataset on 20 developing countries for 7 benchmark years (from the 2000 to the 2019), included 26 indicators. The findings confirmed that social spending priorities matters and that these priorities of developing countries with productive welfare better transform into human capital outcomes. Unfortunately, there are also some unintended consequences of productive welfare that restricts their stock of human capital.

Key words: international comparisons, quantitative research, developing countries, welfare regime, human capital, effectiveness of social spending.

Introduction

The literature on the international and comparative social policy and welfare in developing countries from one sight, and the parallel literature on late development, economic growth, and human capital there – from the other sight, operate in mutual isolation to a high degree. At first instance, it is reasonable and predictable since economic growth is often taken as something opposed to redistribution. Furthermore, many developing countries prioritized growth over redistribution or taken the former as necessary condition for the latter. Commonly accepted to consider public social spending as served to redistribution ends, including social security, de-commodification, poverty, and inequality reduction, etc. However, the Human capital theory give the opportunity to take not only private but also public social spending as an investment that could spurred productivity and ultimately stimulate economic growth.

Human capital defined as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being” [OECD, 2001]. In addition to a varied educational characteristic of people - their knowledge and skills, this definition embraces people’s health conditions (even if it is challenging to measure). Thus, theoretically speaking, if developing countries had risen their public social spending, they would caught up developed countries at least in human capital outcomes if not in economic performance. Such a perspective sounds very similar with ‘productivist welfare regime’ [Holliday, 2000] distinguished for some developing countries, where social policy is subordinated to economic growth's ends.

Unfortunately, it is not the case for all developing countries for several reasons. First, their previous economic results determine what they do have to spend on human development and governments somehow (often rationally) decide which item of social expenditure ought to be a top priority. (For instance, one can't spend more on primary education if infant mortality rate is still high; or it is irrational, at least). Previous research in developing welfare regimes indicates that developing countries differed with each other and with OECD with patterns of state, market and household forms of social provision as well as with its welfare outcomes, i.e. the impact on human security, wellbeing and human capital as well. In contrast to OECD countries, in developing countries market (including companies), community, family of household and international actors often play bigger role in social protection in comparison with welfare state. I. Gough and his coauthors [Gough et al. 2004; Gough, Wood 2006] captured it in the concept of "welfare mix" (for sure, the data scarcity on private and out of pockets social spending for developing countries is a big issue; even data on government social spending is always available for some of them). We will return to the issue of different developing welfare regimes and corresponding differences in social spendings priorities in below.

Second, the human capital approach works for developing countries not as well as for OECD. It is empirical fact that for some reasons (assumed to be institutional) public social spending in developing countries worse transforms into human capital [Pritchett, 2013]. In the 2019 World Bank experts – K. Andrews, G. Avitabile and R. Gatti [2019] – concluded that public spending on health, education, and social protection very weakly, if they are at all, correlated with Human capital outcomes. In other words, using World Bank Human Capital Index (HCI) [Kraay 2018] as cross-country ranking metric, authors argued that low-income countries at the bottom of the HCI ranking can hardly close that gap with rich countries through additional public social spending. It is obvious, that high income countries can spend more on human development. Furthermore, co-authors continued a long-lived tradition among World Bank experts to emphasize large cross-countries differences in returns of an additional dollar spent on human capital [see e.g. Pritchet 2001; Al-Samarrai et al. 2018].

In details, to control above mentioned differences Andrews, Avitabile and Gatti [2019) stratified countries by incomes groups and calculated correlations between HCI scores and public social spending by corresponding items within them. And what they observed were generally more statistically significant Pearson correlation coefficients depending on spending item and income group, but except health spending there were no positive and statistically significant correlation between social spending and HCI outcomes in all LDC (i.e., low-income, low-middle, and most upper middle) or non-OECD countries. Authors stressed the data scarcity, shown that above mentioned result might partly be explained by the higher density of the health spending data in LDC and called for following research in that wain.

This paper is motivated by attempt to correct and improve the World Bank experts' conclusion. They highlighted that the LDC's inability to transform resources into human capital outcomes is explained, among other reasons, by their failure to prioritize public social spending by sectors in a cost-effective way. Fortunately, previous studies in the field of welfare regimes in LDC distinguished LDC welfare clusters, that differs exactly in their social spending priorities. Thus, it gave the opportunity to test, how LDC's social spending priorities, operationalized via welfare clusters affiliation, influenced on human capital outcomes in terms of HCI's components.

Welfare regimes in developing countries and hypotheses

Over the last decades there were numerous attempts to distinguish clusters of welfare regimes in LDCs motivated by the fact that they neither can be categorized as part of the welfare regimes developed by Esping-Andersen [1990], nor necessary convergented with them as

appeared, and that the LDC's welfare regimes have experienced changes that affected the composition of clusters. Among leading and most influence recent approaches to the LDC's social regimes clusterization, there are ones of I. Holliday and his coauthors [Holliday 2000, 2005; Kwon, Holliday 2007] or opponents [Aspalter 2006, 2011; Choi 2012], as well as I. Gough and his coauthors [Gough 2001, Gough et al. 2004; Gough, Wood 2006; Abu Sharkh, Gough 2010], N. Rudra [2002, 2004, 2007; Rudra, Haggard 2005], S. Haggard and R. Kaufman [2004, 2008], ect. (Reviewing the literature on LDCs welfare regimes, including latest findings is not the aim of this paper; for more details on it see e.g., [Roumpakis 2020]).

For the purposes of this paper N. Rudra's [2007] LDC clusters is the best fit. No doubts, that the LDC clusters, being distinguished in the 2007, somehow changed since than in their composition and social priorities, as well as that intermediate and mixed sub-clusters can be distinguished. This is precisely what following and influenced by Rudra scholars are looking into [see e.g., Hudson, Kühner 2012; Kühner 2015; Yang, Kühner 2020]. Yet, for the purposes of this paper, let's assume that the Rudra's clusters are relatively stable. Analysis, that followed, as well as its results prove that this assumption is not so misleading.

N. Rudra distinguished her *productive* and *protective* welfare clusters precisely on the base of their governments' social policy priorities which can be observed in percent shares of different social spending item normalized per capita of recipients. (Her cluster approach is designed to exclude influence of cross-countries differences in economic growth and consequently amounts of tax revenues as well as in demography).

Since LDCs with productive welfare regime aimed at finishing labor commodification, encouraging participation in export markets and increasing the export competitiveness of domestic firms, they kept social costs low and invested more in primary and secondary education, basic healthcare, including vaccination against DPT3, as well as in reduction of infant mortality. Protective LDCs in contrast aspired to decommodification before finishing full-fledged commodification as well as to protection of local labor market and enterprises from international market's competition, risks, and uncertainties. Thus, protective LDCs heavily invested in social protection including (old-age pensions, family allowances, unemployment, sickness, and disability insurance), housing subsidies, labor market protections, and in the tertiary education as a privilege for regime loyalists. In a word, public social spending items that were higher in one welfare cluster, appeared to be lower in another, and vice versa.

Thus, one or another government resources allocation indicated their social priorities – either to better save human capital of current workers, or to facilitate human capital accumulation of future generation workers at the expense of the current generation. It should be noted that both strategies have their strengths and limitations. What is more import, it allowed to formulate hypotheses about the relationship between public social spending priorities and human capital outcomes:

H.1: *Productive* LDCs spend more on primary and secondary education per student and have higher corresponding HCI's components outcomes (primary-, low/upper-secondary- TNER and/or HLO scores).
H.2: *Productive* LDCs spend more on reduction of infant mortality and immunization per child and have higher corresponding HCI's components outcomes (probability of survival to 5 years).
H.3: *Protective* LDCs spend more on tertiary education per student and have higher corresponding outcomes (School life expectancy at tertiary education)[*].
H.4: *Protective* LDCs spend more on social protection and extended healthcare per recipient and have higher corresponding HCI's components outcomes (adult survival rate from 15 to 60 years).

[*] School life expectancy at tertiary education is not included in WB's HCI.

H.5: *Protective* LDCs spend more on social protection, family allowances and subsidies and have higher corresponding HCI's components outcomes (fraction of children under 5 not stunted).

Furthermore, since UNESCO Institute for Statistics and WHO Global Health Expenditure Database provided some panel data on private (out of pockets) expenditures on education and healthcare in LDCs, additional hypotheses about the influence of this «welfare mix» [Gough et al. 2004] on human capital outcomes was constructed. (It should be noted that, Abu Sharkh and Gough [2010] culturized LDCs on the basis of combination of particular «welfare mix» spending and it's social outcomes in terms of UNDP HDI components).

HCI components and panel data

Unlike other approaches to human capital measurement, World Bank HCI designed to highlight "how investments that improve health and education outcomes today will affect the productivity of future generations of workers" [Kraay 2018: 2]. It measures human capital, expected to be attained by a child born today by age 18, given the risks to poor health and education in the country where he or she would grow up. It includes 3 components – survival, expected education (its quantity and quality) and expected health – that can be subdivided into subcomponents. Unfortunately, the data on some HCI subcomponents is of low density and available for not so long historical period. It is especially true for LDCs.

In more detail, expected education (in primary-, low and upper-secondary school) is measured by the "total net enrollment rate" (TNER) adjusted by repetition rate (at corresponding level) and then normalized by quality of education measured by harmonized international tests results TIMSS, PISA, and PIRLS, according to the thesis "schooling in not learning" [Pritchett 2013]. Expected health includes 2 subcomponents - adult survival rate from 15 to 60 years normalized by fraction of children under 5 not stunted (for more details and explanation of the normalization see [Kraay 2018, Weil 2007]).

To have enough data on HCI subcomponents and to reduce cross-countries income differences we selected two groups of low-middle and upper-middle income counties that represented the two Rudra's LDCs clusters with higher data density: for *productive* cluster - Colombia, Indonesia, Malaysia, Thailand, Panama, Paraguay, Costa Rica, Chile, Korea[†]; and for *protective* cluster - Iran, Morocco, Tunisia, Turkey, Zimbabwe, Egypt, Bolivia, Dominican Republic, El Salvador, India, Lesotho. Then, we collected panel data for these countries for several benchmark years[‡] (2000, 2003, 2007, 2009, 2012, 2015, 2019) on above mentioned indicators from sources enumerated in the Table 1.

Table 1 shows indicators of social expenditures and HCI's subcomponents included into the panel as well as the sources of data on them.

Table 1. Sources and indicators of social expenditures and HCI's subcomponents

Sources:	**Indicators:**
UNESCO Institute for Statistics (http://data.uis.unesco.org)	• Total net enrolment rate (TNER) by level of education (in %) • Repetition rate by level of education (in %)

[†] Korea joined the OECD in the 1996, yet the country represented one of principal example of the transformation productivist welfare regime into liberal one in the East Asia (Choi 2012, Yang 2013, Yang, Kühner 2020). Colombia and Costa Rica joined the OECD only after the 2019 – in the 2020 and 2021 correspondingly.

[‡] Selected benchmark years explained by availability of data on HLO results and under-5 stunting rate for the countries under the study (see Table 1).

	• School life expectancy by level of education (in years) • Initial government funding per student by level of education (in constant PPP$) • Household funding per student by level of education (in constant PPP$)
Harmonized Learning Outcomes (HLO) Database (Patrinos, Angrist, 2018)	• Harmonized Learning Outcome (HLO) on reading at primary school (for both sexes) • Harmonized Learning Outcome (HLO) on math at secondary school (for both sexes) • Harmonized Learning Outcome (HLO) on science at secondary school (for both sexes)
World Bank World Development Indicators database (https://data.worldbank.org/indicator)	• GDP (in constant PPP$) • Population, total • Urbanization rate (%)
WHO Global Health Expenditure Database (https://apps.who.int/nha/database)	• Government schemes and compulsory contributory health care financing schemes (in constant PPP$ per capita) • Compulsory contributory health insurance schemes (in constant PPP$ per capita) • Voluntary health insurance schemes (in constant PPP$ per capita) • Household out-of-pocket payment (in constant PPP$ per capita)
UNDP, UNICEF WHO WBG, UN IGME, (https://data.unicef.org/resources/resource-topic/malnutrition/) (https://population.un.org/wpp/) (https://childmortality.org)	• Mortality rates for 15–60-year-olds • Under-5 mortality rate (per 1000 birth) • Children under-5 stunting rate (%)
IMF Data – Functional Expenditure (COFOG) (https://data.imf.org/regular.aspx?key=61037799)	• Government social protection spending (as % of GDP)

* If data for an indicator for certain country for benchmark year was not available, then data for nearby year was taken.

** IMF data on social protection spending (as % of GDP) was transformed into per capita (in constant PPP$) format by using WBG GDP and population data.

In sum, it was collected the panel dataset on 20 LDCs for 7 benchmark years (from 2000 to 2019) included 26 indicators of social expenditures and HCI subcomponents (*in the application*). Because of extremely low data available on repetition rate in education, Harmonized Learning Outcomes (HLO), household spending per student by level of education as well on government social protection spending – the total share of missing data (NA) is about 30%. Thus, we forced to utilize those indicators less or drop them and employ step by step regression analysis to investigate assumed to be influence of each spending item on each HCI component.

Research procedures and results

To estimate how public and private (if data available) social spending influence on corresponding HCI's components and realize are there any statistically significant differences in these influences between *productive* and *protective* welfare clusters representing different social spending priorities we computed many regression models and statistical tests for them via R-Studio, following below described steps:

1) Rows with missing values were removed, if needed taken the logarithm of regressors to avoid heteroscedasticity, and calculated the pooled regression model.
2) The Goldfeld-Quandt test for small-N samples was performed to make sure that the standard errors are robust.
3) The 'Cluster' dummy variable appended to the model either as it is, or through creating in addition synthetic variable equal to product of one or more regressors by dummy variable.
4) The best way of adding the dummy variable into the model was chosen via the Wald test.
5) Fixed and random effect regression models were calculated.
6) The best fitted model has been chosen via the Durbin-Wu-Hausman test, the Breusch-Pagan Lagrange Multiplier test, or the Wald test, correspondingly.
7) The hypothesis under study being accepted only in case if coefficient described social spending item's influence in the best resulting regression model (either for one of clusters or for both) was statistically significant.

This research algorithm was repeated for each social spending item as a regressor and for each respective HCI subcomponent as a dependent variable.

Unfortunately, the general model describing the influence of social spending on HCI for LDCs with productive and protective welfare regimes cannot be presented. Data on some social spendings items and some HCI components available for some LDCs but not other. As has been already mentioned, it is especially the case for all kind of private social spending (including out of pockets, companies and communities social spending). As previous research on welfare in developing countries has shown, without that data desired model unable to describe the influence of whole 'welfare mix' endemic to low-income developing countries. Yet, some results are obtained, and some conclusions can be made

The results are as follows:

H.1.1 – Accepted: There is a statistically significant influence of Government spending per student in primary education on TNER in primary education and there are statistically significant differences between productive and protective clusters in this influence:
for productive cluster:

TNER_primary = 95 + 0,0004 * Government spending per student_primary;

for protective cluster:

TNER_primary = 92 + 0,003 * Government spending per student_primary.

H.1.1.1 – Accepted: There is a statistically significant influence of Government spending per student in primary education on Repetition rate in primary education and there are statistically significant differences between productive and protective clusters in this influence:
for productive cluster:

Repetition rate_primary = 4.86 – 0,001 * Government spending per student_primary;

for protective cluster:

Repetition rate_primary = 9.18 – 0,002 * Government spending per student_primary.

H.1.1.2 – Rejected: There is no statistically significant influence of Government spending per student in primary education on results of international tests on reading at primary school.

H.1.2 – Rejected: There is no statistically significant influence of Government spending per student in secondary education on TNER_low secondary.
H.1.2.1 – Accepted: There is statistically significant influence of Government spending per student on repetition rate in low secondary education and there are statistically significant differences between productive and protective clusters in this influence:
for productive cluster:

Repetition rate_low secondary = 4.06 – 0,0004 * Government spending per student_ low secondary;

for protective cluster:

Repetition rate_low secondary = 9.36 – 0,001 * Government spending per student_ low secondary.

H.1.3 – Partly rejected: There is a statistically significant influence of Government spending per student in secondary education on TNER in upper secondary education; however, there are no statistically significant differences between productive and protective clusters in this influence.
H.1.3.1 – Not enough data to test this hypothesis.
H.1.3.2.1 – Rejected: There is no statistically significant influence of Government spending per student in secondary education on results of international tests on math at secondary school.
H.1.3.2.2 – Rejected: There is no statistically significant influence of Government spending per student in secondary education on results of international tests on science at secondary school.
H.2.1 – Accepted: There is a statistically significant influence of Government social spending on infant survival to 5 years and there are statistically significant differences between productive and protective clusters in this influence:
for productive cluster:

log (Survival to 5 years) = -0.04 + 0.004 * log (Government social spending);

for protective cluster:

log (Survival to 5 years) = -0.03 + 0.0005 * log (Government social spending).

H.2.2 – Accepted: There is a statistically significant influence of Government and compulsory contributory health schemes spending and Household out-of-pocket payments on survival to 5 years and there are statistically significant differences between productive and protective clusters in this influence:
for productive cluster:

log (Survival to 5 years) = + 0.006 * Government and compulsory contributory health schemes spending + 0.003 * Voluntary health schemes spending + 0.0003 * Household out-of-pocket payments;

for protective cluster:

log (Survival to 5 years) = + 0.02 * Government and compulsory contributory health schemes spending + 0.003 * Voluntary health schemes spending + 0.003 * Household out-of-pocket payments.

H.3 – Partly rejected: There is a statistically significant influence of Government spending per student in tertiary education on tertiary school life expectancy. (Unexpectedly, this influence appeared to be negative in contrast to positive influence of countries GDP per capita). However, there are no statistically significant differences between productive and protective clusters in both influences.
pooled regression:

log (School life expectancy tertiary) = 1.62 * log (GDP per capita) – 0.31 * Government spending per student_tertiary.

H.4.1 – Rejected: There is no statistically significant influence of Government social spending per capita on the Adult survival rate from 15 to 60 years.

H.4.2 – Accepted: There is a statistically significant influence of Government and compulsonary contributory health schemes spending and Household out-of-pocket payments on the Adult survival rate and there are statistically significant differences between productive and protective clusters in this influence (unfortunately not all coefficients under «Cluster» dummy variables statistically significant):
for productive cluster:

Adult survival rate = 0,823 + 0,00004 * Government and compulsonary contributory health schemes spending + 0,000004 * Household out-of-pocket payments;

for protective cluster:

Adult survival rate = 0,694 + 0,0001 * Government and compulsonary contributory health schemes spending + 0,0002 * Household out-of-pocket payments.

Conclusions and Discussion

LDC's social spending priorities, operationalized via welfare cluster affiliation, matters. They do influence on human capital outcomes in terms of some HCI components, but not others.

Social spending priorities of *productive* LDCs better transform into better education results in terms of TNER (total net enrollment rate) at primary and low-secondary level. This conclusion is in the line with findings of previous studies – public investment in primary education is more cost-effective than that in higher levels of education [Ganimian, Murnane 2014; Al-Samarrai et al. 2018]. *Protective* welfare regimes differed with distinctly higher repetition rate in primary and low secondary education as well as lower international learning outcomes tests. Unfortunately, protective LDCs cannot close the gap in the latter through additional public educational spending (see **H.1.1.2**, **H.1.3.2.1**, **H.1.3.2.2;** probably it explained with scarcity of HLO data). However, they can reduce repetition rate gap with productive welfare regimes at primary and low secondary education levels through additional government spending if they change their social spending priorities.

Generally, social spending priorities of protective welfare regimes did not transform into better outcomes in corresponding HCI components (**H.3**, **H.4**, **H.5**). (Some authors, including Rudra assumed, that social sponging in protective LDCs protect only privileged and/or important for their regimes groups, or served for rent seeking ends). Unexpectedly, additional government spending per student in tertiary education in LDCs led to negative influence on School life expectancy at that level in contrast to positive influence of county income level (in GDP per capita terms) (**H.3**). It means that, for some reason, students receiving government scholarships tend to leave universities earlier in LDCs. It is a puzzling question - why? Furthermore, despite of the fact that the Adult survival rate of protective LDCs (0,694) lower than of the productive (0,823), they still has a potential to reduce this gap via additional Government and compulsory contributory health schemes spending as well as Household out-of-pocket payments (**H.4.2**).

In sum, it seems that there are some threshold levels of HCI components after that additional public social spending can make only very limited contribution – regression coefficients under corresponding social spending items in regression equations are very small, yet statistical significant. (For instance, see **H.1.1**, **H.1.1.1**, **H.1.2**, **H.1.2.1**). To put it simpler, the enumerated hypotheses just show that TNER is already so high and repetition rate is already so negligible in primary and low secondary education level for productive LDCs (neck to neck with OECD levels), that no matter how much they additionally spend on them, the impact would be very limited. However, it is not the case for twice a higher repetition rate in primary and low secondary education level for protective LDCs. Interestingly, if there is a ratchet effect in government social spending: if productive LDCs reduce public spending on primary education

its quantity and quality will reduce as little as regression equation in H.1.1 predicts for reverse circumstances?

Following Andrews, Avitabile, Gatti [2019] we call for further research. As Korea case showed, the unintended consequence of productive welfare regime that restricts social costs on current generation of workers in favour of future generation, is a decline in birth rate. Thus, the total stock of human capital (the number of children born multiplied by the HCI of the country where he or she would grow up) of protective LDCs with above middle HCI and high birth rates could be higher than that of productive LDCs with higher HCI and significantly lower birth rates.

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