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Social Spending, Human Capital, and Growth in Developing Countries: Implications for Achieving the MDGs

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Social Spending, Human Capital, and Growth in Developing Countries: Implications for Achieving the MDGs

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Abstract

Using panel data from 120 developing countries from 1975 to 2000, this paper explores the direct and indirect channels linking social spending, human capital, and growth in a system of equations. The paper finds that both education and health spending have a positive and significant direct impact on the accumulation of education and health capital, and thus can lead to higher economic growth. The paper also finds that other policy interventions, such as improving governance, reducing excessive budget deficits, and taming inflation, can also be helpful in moving countries toward the Millennium Development Goals (MDGs). As such, higher spending alone is not sufficient to achieve the MDGs.

JEL Classification Numbers: I1, I2, O2, O4

Keywords: Economic Growth, Human Capital, Social Spending, MDGs

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Contents Page

of the 1990 level)—cannot be met under this scenario.[36] In addition, there are also small but positive effects from health spending on school enrollment and growth. On average, the net enrollment rate in developing countries would rise by about 2 percentage points (i.e., from 90 to 92), and the growth rate would rise by a total of 0.5 percentage points over 15 years.

Improve governance to a level above the sample average

Enhancing governance is a powerful instrument to improve social indicators and growth. A change in the governance index from lower- to higher-than-average is associated with an immediate reduction of 0.5 percentage point in the child mortality rate, an increase of 6 percentage points in the composite enrollment rate, and a rise of 1.6 percentage points in per capita GDP growth. Through the reinforcing impact of higher income on human capital, this measure can lead to even better social indicators. For example, it can increase net primary enrollment by 10 percentage points in 10 years without additional resources. The positive impact from elevating a country from a below- to a higher-than-average level, therefore, is comparable to an increase in education spending of 1 percent of GDP.

Reduce inflation

The growth effects of lower inflation (and hence its effects on poverty) are substantial. Cutting the rate of inflation by 10 percentage points (e.g., from 40 percent to 30 percent) is associated with a 0.5 percentage point increase in annual growth. Moreover, countries that reduce their rate of inflation to below 20 percent would also experience an additional fillip to growth of 0.1 percentage point per year. The magnitude of this effect is consistent with the literature.

Reduce fiscal deficit

As discussed in previous sections, budget deficits have an adverse effect on growth. Improving the fiscal balance by 1 percentage point of GDP is associated with an increase in per capita GDP growth by 0.5 percentage point.[37] However, while the initial impact on growth is comparable to that achieved with increased social spending, it does not bring additional lagged positive effects, as in the case of social spending. Furthermore, as shown in Table 2, the effects from increasing the fiscal balance in a low-deficit environment is no longer significant. This result is consistent with Gupta and others (2004), which finds no relationship between further deficit reduction and growth in low-income countries that have already achieved a modicum of macroeconomic stability.

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[36] Based on the sample average of the dataset used in this paper.

[37] We assume the cut is achieved through grants, increased revenue collection or reduction of unproductive spending, with social spending on education and health unchanged.

VI. Conclusion and Policy Implications

The paper finds that a number of policy interventions could be effective in moving countries toward the MDGs. Both education and health spending have a positive and significant direct impact on the accumulation of education and health capital, and a positive and significant indirect impact on growth. An increase in education spending of 1 percentage point of GDP is associated with 3 more years of schooling on average and a total increase in growth of 1.4 percentage points in 15 years. Similarly, an increase in health spending of 1 percentage point of GDP is associated with an increase of 0.6 percentage points in the under-5 child survival rate and a rise of 0.5 percentage point in annual per capita GDP growth.

There is a significant time lag between increases in education spending and the realization of their full effects on social indicators and growth. Two-thirds of the direct impact of education spending is felt within five years, but the full impact materializes with a significant time lag of 10 to 15 years. Such a lag needs to be kept in mind when designing policy interventions. The impact of health spending, however, is immediate. The positive effects of both education and health spending are strongly influenced by the quality of governance. In countries suffering from poor governance, the positive effects of increased spending on education is reduced, and those of higher health spending can be completely negated.

There are substantial differences in the effects of social spending on social indicators and growth among different country groups. The positive effects are the highest in low-income countries and sub-Saharan Africa. This supports the view that social spending can be more effective in such countries in achieving MDGs, as the marginal returns to social spending tend to decline for countries with high levels of social outlays.

Other policy interventions may also achieve improvement of a similar size in social indicators and growth. In particular, strengthening governance can have a strong payoff for social indicators as well as for growth. Therefore, reducing corruption and increasing accountability for public spending are no less important than increasing spending. In addition, macroeconomic policies, such as reducing inflation and improving fiscal balances, also have a positive effect on growth and, in turn, on the poverty headcount.

The results have a number of implications for poverty reduction strategies aimed at meeting the MDGs. Given the importance of different policy interventions, efforts to meet the MDGs will need to be wide-ranging and include strengthening the macroeconomic environment and governance. Relative to the significant cost of raising spending, the moderate effects of social spending on indicators also confirm the important role of reforms aimed at improving the efficiency and targeting of these outlays. Furthermore, while improving human capital will have a salutary effect on growth, it will be far from a panacea for unlocking the more robust expansion in economic activity needed to achieve the MDGs.

As such, additional research is needed to address the key policy interventions needed to achieve rapid economic growth.

Derivation of the Growth Equation with Human Capital [38]

In a neoclassical growth model enhanced by human capital:

$$Y(t) = K(t)^{\alpha} H(t)^{\beta} \left(A(t)L(t)\right)^{1-\alpha-\beta}$$

where *Y* is output, *K* and *H* are physical and human capital respectively, *A* is technology, *L* is population, and α and β are the partial elasticities of output with respect to physical and human capital. The right-hand side variables are assumed to take the following time paths:

$$\begin{aligned} \dot{k}(t) &= s_k(t)A(t)^{1-\alpha-\beta}k(t)^{\alpha}h(t)^{\beta} - (n(t)+d)k(t) \\ \dot{h}(t) &= s_h(t)A(t)^{1-\alpha-\beta}k(t)^{\alpha}h(t)^{\beta} - (n(t)+d)h(t) \\ \dot{A}(t) &= g(t)A(t) \\ \dot{L}(t) &= n(t)L(t) \end{aligned} \qquad [2]$$

where *y = Y/L* and *k = K/L* are output and physical capital in per capita terms, *h = H/L* represents average human capital, s_k and s_h are the investment rate in physical and human capital, *n* is population growth, *g* is the rate of technological change and *d* is the time-invariant depreciation rate.

Under the assumption of decreasing returns to scale ($\alpha+\beta < 1$), this system of equations can be solved to obtain steady-state values of k^* and h^* defined by:

$$\begin{aligned} \ln k^*(t) &= \ln A(t) + \frac{1-\beta}{1-\alpha-\beta}\ln s_k(t) + \frac{\beta}{1-\alpha-\beta}\ln s_h(t) - \frac{1}{1-\alpha-\beta}\ln(g(t)+n(t)+d) \\ \ln h^*(t) &= \ln A(t) + \frac{\alpha}{1-\alpha-\beta}\ln s_k(t) + \frac{1-\alpha}{1-\alpha-\beta}\ln s_h(t) - \frac{1}{1-\alpha-\beta}\ln(g(t)+n(t)+d) \end{aligned} \qquad [3]$$

Substituting these two equations into the production function and taking logs yields the expression for the steady-state output in per capita terms. The human capital component can be expressed either as a function of s_h and the other variables or as a function of h^* and the other variables (see Mankiw and others, 1992). In this paper, the human capital component is expressed in terms of human capital stock, proxied by the gross enrollment rate. Therefore, the steady-state path of output can be written as:

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[38] The section is adapted mainly from the derivation used in Bassanini and Scarpetta (2001), but we further introduce education capital and health capital as two components of the human capital variable so that their interactions and effects on growth can be better identified.

$$\ln y^*(t) = \ln A(t) + \frac{\alpha}{1-\alpha}\ln s_k(t) + \frac{\beta}{1-\alpha}\ln h^*(t) - \frac{\alpha}{1-\alpha}\ln(g(t)+n(t)+d) \quad [4]$$

h^* is unobservable, but a relationship between h^* and the actual level of human capital can be established by solving the system of differential equations in [2] and substituting out the respective investment rates by means of the equations in [3]:[39]

$$\begin{aligned} \frac{d\ln\frac{k}{A}}{dt} &= (n+g+d)e^{-(1-\alpha)\ln\frac{k}{k^*}}e^{\beta\ln\frac{h}{h^*}} \\ \frac{d\ln\frac{h}{A}}{dt} &= (n+g+d)e^{\alpha\ln\frac{k}{k^*}}e^{-(1-\beta)\ln\frac{h}{h^*}} \end{aligned} \quad [5]$$

The linearized solution for *ln h* is the following:

$$\ln(h(t)/A(t)) = \psi(\ln(h^*(t)/A(t)) + (1-\psi)\ln(h(t-1)/A(t-1)) \quad [6]$$

where ψ is a function of (α, β) and the term $(n+g+d)$. Rearranging equation [6] yields an expression for $\ln h^*$:

$$\ln h^*(t) = \ln h(t) + \frac{1-\psi}{\psi}\Delta\ln(h(t)/A(t)) \quad [7]$$

By replacing the term $\ln h^*$ with its expression [7] into equation [4], we obtain an expression for the steady state output as a function of the investment rate and the actual human capital stock. Assuming countries are in their steady-states or their deviations from the steady states were independent and identically distributed, the transitional growth dynamics can be expressed as follows (Mankiw and others, 1992):

$$\frac{d\ln(y(t)/A(t))}{dt} = \lambda(\ln(y^*(t)/A(t)) - \ln(y(t)/A(t))) \quad [8]$$

where $\lambda = (1-\alpha-\beta)(g(t)+n(t)+d)$.

Substituting the expression for y^* and h^* into the solution of this differential equation yields the following:[40]

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[39] To simplify the notation, the suffix *t* has been dropped.

[40] The equation has been simplified by assuming a constant rate of technological change. Its version with non-constant technological change can be easily derived as well.

$$\Delta \ln y(t) = -\phi(\lambda)\ln(y(t-1)) + \phi(\lambda)\frac{\alpha}{1-\alpha}\ln s_k(t) + \phi(\lambda)\frac{\beta}{1-\alpha}\ln h(t) + \frac{1-\psi}{\psi}\frac{\beta}{1-\alpha}\Delta \ln h(t) - \phi(\lambda)\frac{\alpha}{1-\alpha}\ln(g+n(t)+d) + \left(1-\frac{\phi(\lambda)}{\psi}\right)g + \phi(\lambda)\ln A(0) + \phi(\lambda)gt \quad [9]$$

Since *g* is not observable and therefore cannot be distinguished from the constant term empirically, the estimated baseline growth equation can be expressed as follows:

$$\Delta \ln y(t) = a_0 - \phi \ln y(t-1) + a_1 \ln s_k(t) + a_2 \ln h(t) - a_3 n(t) + a_4 t + b\Delta \ln h(t) + \varepsilon(t) \quad [10]$$

In this paper, we separate human capital further into two components: education capital—*ed*, and health capital—*he*, and assume human capital *h(t)* takes the following form:

$h(t) = ed(t)^{\gamma} * he(t)^{\eta}$ *or* $\ln h(t) = \gamma \ln ed(t) + \eta \ln he(t)$.

We also assume that the time paths for education capital, e, and health capital, h, are as follows:

$$ed_t = ed_{t-1} + \Delta ed_t$$

$$he_t = he_{t-1} + \Delta he_t$$

Hence, [10] becomes [11]

$$\Delta \ln y(t) = a_0 - \phi \ln y(t-1) + a_1 \ln s_k(t) + a_2 \ln he(t) + a_3 \ln ed(t) - a_4 n(t) + a_{54} t + b_1 \Delta \ln he(t) + b_2 \Delta \ln ed(t) + \varepsilon(t) \quad [11]$$

Or, in a simplified representation after adding a matrix of control variables, Ω,

$$g = f(s_k, he, \Delta he, ed, \Delta ed, \Omega) \quad [12]$$

List of Countries Included in the Sample and Data Sources

The countries included in the study are Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Barbados, Belarus, Belize, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Democratic Republic of Congo, Republic of Congo, Costa Rica, Côte d'Ivoire, Croatia, Czech Republic, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Estonia, Ethiopia, Fiji, The Gambia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, Lao People's Democratic Republic, Latvia, Lebanon, Lesotho, Libya, Lithuania, FYR Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Slovak Republic, Solomon Islands, South Africa, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

All data series are five-year averages of annual data. Data on real per capita GDP, inflation, investment, terms of trade, trade openness, total government expenditure, and fiscal balance are based on the *World Economic Outlook* (WEO) database. In particular, real GDP growth rates are calculated by the change of GDP in constant prices; the rate of inflation is calculated by the rate of increase in CPI index; investment, government expenditure, and fiscal balances are calculated as a ratio to GDP at current prices; and trade openness is calculated by the value of total exports and imports of goods and services as a share of GDP. Data on child mortality, the school repetition rate, ratio of female students in school, population growth, the shares of the under-15 population and urban population, and fertility rates are taken from the World Bank's *World Development Indicators* (WDI) database; data on the enrollment rate is taken from the 2003 Barro-Lee dataset; and the composite enrollment rate is the sum of primary and secondary enrollment rates. Child mortality and enrollment rates are not available for all years, but five-year averages allow the construction of a consistent panel dataset nonetheless. Data on education spending as a share of GDP is taken from the WDI database, but health spending as a share of GDP is taken from an IMF database that has better country coverage. Data in the IMF database is compiled from IMF staff reports and the IMF's *Government Financial Statistics*. Data on governance are calculated as the sum of the simple annual averages of two indices on corruption and democratic accountability, which are two components of the ICRG rating produced by the Political Risk Service Group.

Appendix Table 8. Short-Run Total Effects Decomposition: Selected Endogenous Variables

	Real Per capita GDP growth	Investment ratio	Gross enrollment rate	Under-5 child survival rate
Total effects				
Real per capita GDP growth	0.000	0.702	0.091	0.165
Investment ratio	0.000	0.000	0.000	0.035
Gross enrollment rate	0.000	0.000	0.000	0.188
Under-5 Child survival rate	0.000	0.000	0.000	0.000
Direct effects				
Real per capita GDP growth	0.000	0.702	0.091	0.124
Investment ratio	0.000	0.000	0.000	0.035
Gross enrollment rate	0.000	0.000	0.000	0.188
Under-5 Child survival rate	0.000	0.000	0.000	0.000
Indirect effects				
Real per capita GDP growth	0.000	0.000	0.000	0.042
Investment ratio	0.000	0.000	0.000	0.000
Gross enrollment rate	0.000	0.000	0.000	0.000
Under-5 Child survival rate	0.000	0.000	0.000	0.000

Appendix Table 9. Short-Run Total Effects Decomposition: Selected Exogenous Variables

	Population growth	Catch-up variable	Trade Openness	Changes in Terms of Trade	Fiscal balance	Low-deficit fiscal balance	High inflation dummy	Inflation rate	Low governance dummy	Current income	Gender equality	Current education spending	Lagged Education spending	Health spending
Total effects														
Real per capita GDP growth	-1.93	-15.90	0.15	-0.04	0.50	0.00	-0.07	-0.05	-1.65	2.30	0.67	0.54	0.25	0.39
Investment ratio	0.00	0.00	0.07	-0.06	0.00	0.00	-2.20	0.00	-1.69	0.33	0.12	0.00	0.00	0.08
Composite enrollment rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.90	10.00	2.03	6.00	2.72	0.44
Under-5 child survival rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.34	9.43	3.29	0.00	0.00	2.36
Direct effects														
Real per capita GDP growth	-1.93	-15.90	0.10	0.00	0.50	0.00	-0.06	-0.05	0.00	0.00	0.00	0.00	0.00	0.00
Investment ratio	0.00	0.00	0.07	-0.06	0.00	0.00	-2.20	0.00	-1.61	0.00	0.00	0.00	0.00	0.00
Composite enrollment rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.46	8.23	1.42	6.00	2.72	0.00
Under-5 child survival rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.34	9.43	3.29	0.00	0.00	2.36
Indirect effects														
Real per capita GDP growth	0.00	0.00	0.05	-0.04	0.00	0.00	-0.02	0.00	-1.65	2.30	0.67	0.54	0.25	0.39
Investment ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.33	0.12	0.00	0.00	0.08
Composite enrollment rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.44	1.77	0.62	0.00	0.00	0.44
Under-5 child survival rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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