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Minh Dao
Eastern Illinois University, mqdao@eiu.edu

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Poverty in Agrarian Developing Economies

Minh Quang Dao

Economics Eastern Illinois University 600 E. Lincoln Avenue Charleston, IL 61920 USA
*Corresponding Author: mqdao@eiu.edu

Abstract   This paper examines the determinants of poverty in agrarian developing economies. Based on data from the World Bank and a sample of thirty agrarian developing economies we find that the fraction of the population below the national poverty line is linearly dependent on urbanization as measured by the fraction of the total population living in urban areas, the maternal mortality ratio, the level of development as measured by purchasing power parity per capita gross national income, and the fraction of births attended by skilled health staff. We observe that the coefficient estimate of one explanatory variable, namely, the fraction of births attended by skilled health staff does not have its expected sign, possibly to the collinearity between this variable and the maternal mortality ratio as well as with the level of purchasing power parity per capita GNI. Statistical results of such empirical examination will assist governments in agrarian developing countries focus on appropriate policies in order to reduce poverty.

Keywords   National Poverty Line, Urbanization, Per Capita GNI, Agrarian Developing Economies

1. Introduction

This study empirically examines the determinants of poverty in agrarian developing economies. According to the *2013 World Development Report: Jobs*, in agrarian economies the main ways to reduce poverty and hence improve living standards are increases in productivity in farming and the creation of a dynamic economic milieu in urban areas. As an example, much of Mozambique's poverty can be found in agriculture. While over four-fifths of its labor force is employed in agriculture, this sectors accounts for only 30 percent of its gross domestic product. Compared to the value added per hour worked in services and in manufacturing, that in agriculture represents only one-seventh and one-twelfth, respectively. Over the last decade, yields have not changed. The use of modern technology is virtually absent and there is minimal access to agricultural extension services, while almost all agricultural workers work on small plots.

Much evidence points to growth in agriculture as an engine for poverty reduction since poor people are concentrated in this sector and they also tend to be participants in the growth of this sector than in that of other sectors. Lipton (2005) finds that since the turn of the 18th century an increase in agricultural productivity has virtually led every example of poverty reduction. While the Green Revolution has increased cereal yield and the incidence of poverty has declined in many parts of Asia, cereal yield has remained low and the incidence of poverty high in many agrarian economies of Sub-Saharan Africa. This is also true for some Southeast Asian countries, such as Cambodia, the Lao People's Democratic Republic, and Myanmar.

Poverty reduction also requires successful urbanization as the latter may be responsible for more rapid productivity increase and income growth as well as social cohesion. However, urbanization in itself may not be conducive to poverty reduction if cities are not dynamic as this may result in rural-urban migration that is motivated by despair and not by hope. In Mozambique, for instance, few young rural-urban migrants are able to find regular wage employment.

This paper attempts to empirically estimate the impact of the major determinants of poverty in agrarian developing economies. Based on data from the World Bank and a sample of thirty[i] agrarian developing economies we find that the fraction of the population below the national poverty line is linearly dependent on urbanization as measured by the fraction of the total population living in urban areas, the maternal mortality ratio, the level of development as measured by purchasing power parity per capita gross national income, and the fraction of births attended by skilled health staff.

This paper is organized as follows. In the next section, a selected review of the economic literature on the determinants of poverty in developing countries is given. This is followed by the formulation of a statistical model to be estimated. Theoretical underpinnings for the inclusion of explanatory variables are presented in this section. Statistical results are reported in the subsequent section. A final section gives concluding remarks as well as policy recommendations.

2. Selected Review of the Literature

Comparative research on landlessness and rural poverty started in the late 1970s (Esman, 1978; Eckholm, 1979). Then, the argument was that the development of commercial farming had altered the role of the moneylender in rural areas from usurer to land speculator and, in several cases, landowner. This change has led to a deterioration of the economic status of Asian peasant cultivators over time, hence resulting in a higher incidence of poverty.

On the other hand, according to the "new agrarian economics" of the late 1970s and 1980s, usurious lending was efficient in the presence of market failures such as imperfect information, high transaction costs, or the moral hazard problem (Bardhan, 1984; Osuka and Hayami, 1988). Writing extensively on the topic of rural poverty in developing countries beginning in the mid-1980s, Khan (1986, 2000, 2001) identifies the major causes of poverty as the political environment, systemic discrimination based on gender, race, ethnicity, religion, or caste, ill-defined property rights to agricultural land and other natural resources, high concentration of land ownership giving unfair disadvantage to tenants, political corruption and/or bureaucratic red tape, large family sizes resulting in high dependency ratios, and national economic and social policy biases. There have also been many more recent studies on rural poverty in different regions (for Latin America, see, for example, López and Valdés (2000) and for the Caribbean, Valdés and Wiens (1996)) or in a particular country (see Datt and Ravallion (1998), Jayaraman and Lanjouw (1999), Misra (2000), Fan *et al.* (2000), Pant and Patra (2001), and Ghosh (2002) for India, Malik and Nazli (1999) and Arif *et al.* (2000) for Pakistan, Huang (1999) and Fan *et al.* (2002) for China, Hentschel and Waters (2002) for Ecuador, Cavendish (2000) for Zimbabwe, and Lanjouw (2001) for El Salvador).

More recently, Dao (2004) uses data from a sample of 32 developing countries and shows that income redistribution in favor of the poorest 10 percent of the population, improving the productivity of agricultural workers, raising the economic and social status of women, especially of rural women, government policies aimed at reducing systemic discrimination against ethnic minorities, encouraging tourism where possible, and programs designed to assist the irrigation of croplands are called for in the quest for alleviating poverty in rural areas. In another study based on data from the World Bank and using a sample of forty-three developing economies, Dao (2007) finds that the fraction of the population below the poverty line is linearly dependent upon the total enrollment rate of young people ages 18-24, that of young females ages 12-14, ages 15-17, that of young males ages 12-14, the unemployment rate of young females ages 15-24, the labor force participation rate of young females 15-24, the rural unemployment rate of young people ages 15-24, the probability that a 15-year old female will die before the age of 60, and that of a 15-year old male. Dao (2008) uses data from the World Bank and a sample of 40 developing economies and finds that the poverty rate linearly depends on the gender parity ratio in primary and secondary

schools, the prevalence of child malnutrition, per capita purchasing power parity gross national income, the maternal mortality rate, and the percentage of births attended by skilled health staff.

The current research complements previous studies by incorporating the effect of urbanization on the extent of poverty in an agrarian developing country. We hypothesize that poverty is the consequence of the following factors: the level of urbanization, investment in human capital as proxied by the gross enrollment ratio in secondary schools, the maternal mortality rate, the extent of malnutrition among boys and girls under the age of five, the percentage of total births that are attended by skilled health staff, the female labor force participation rate, and the purchasing power parity per capita gross national income.

3. The Statistical Model

To estimate the impact of various determinants of poverty in agrarian developing countries we specify the following statistical model:

$$Ntlpoor = \beta_0 + \beta_1 AgValAdd + \beta_2 Urban + \beta_3 GrossSec + \beta_4 FemLPR + \beta_5 MatMortal + \beta_6 PGNI + \beta_7 SkillBirths + \beta_8 MaleMal + \beta_9 FemMal \qquad (1)$$

where *Ntlpoor* = Fraction of the population below the national poverty line, various years.

AgValAdd = Agricultural value added per agricultural worker, measured in 2000 dollars, in 2011.

Urban = Fraction of the total population living in urban areas, in percent, in 2011.

GrossSec = Gross enrollment rate in secondary education, in percent, in 2011.

FemLPR = Female labor force participation rate, in 2011.

MatMortal = Maternal mortality rate, per 100,000 births, in 2006-2011.

PGNI = Purchasing power parity per capita gross national income, in dollars, in 2010.

SkillBirths = Percentage of total births attended by skilled health staff, 2006-2011

MaleMal = Fraction of male children under 5 who suffer from malnutrition, 2006-2011.

FemMal = Fraction of female children under 5 who suffer from malnutrition, 2006-2011.

As pointed out by López and Valdés (2000), the poor in general are poor because they own meager quantity or quality productive assets. We thus hypothesize that agricultural value added per agricultural worker used as a proxy variable for the productivity of the latter would bear a negative impact on the extent of overall poverty in developing nations.

We expect the sign of the coefficient estimate for the urbanization variable to be indeterminate as we argue earlier that poverty reduction requires successful urbanization but that urbanization alone may not be sufficient to alleviate poverty. As such, this becomes an empirical question. On the

other hand, the coefficient estimates for both the gross enrollment rate in secondary education and the female labor force participation rate variables are expected to have a negative sign. We hypothesize that poverty is reduced in countries where a large proportion of people are enrolled in school. In addition, the higher the female labor force participation rate, the more likely women will find productive employment and their country is more likely to be less poor.

While the average level of income in a developing economy may not be an accurate measure of the standard of living of the average person in such an economy if the distribution of income is very unequal, it is for the same reason that average income may not be a good predictor of the extent of poverty. But, by and large, as economies grow, the incidence of poverty may be lessened due to the trickledown effect, which is often mentioned in the economic literature. We thus expect a negative coefficient estimate on the GDP average annual growth rate variable.

The percentage of deliveries attended by personnel trained to give the necessary supervision, care, and advice to women during pregnancy, labor, and the post-partum period, to conduct deliveries on their own, and to care for newborns is a good indicator of a health system's ability to provide adequate care for pregnant women. Good pre- and post-natal care ameliorates mother's health and reduces both maternal and infant mortality. A study by Dao (2007) finds that lowering infant mortality does result in a reduction in fertility rate in developing countries, which in turn has positive consequences for women's health. This helps lift families out of the poverty trap. We thus expect the coefficient estimate for this variable to have a negative sign.

Finally, another component of health status (hence of human capital) is the prevalence of child malnutrition as measured by the percentage of children under the age of five whose weight for age is less than minus two standard deviations from the median for the international reference population ages 0-60 months. According to the World Health Organization, the most common indicator of malnutrition is the proportion of children who are underweight. In fact, it has been argued that even mild underweight may raise the risk of death and inhibit cognitive development in children. Also, the problem is perpetuated from generation to generation as undernourished mothers tend to have low-birth-weight babies. To capture the tendency of the reinforcement of the vicious cycle of poverty in developing countries we include the child malnutrition variable for both boys and girls and expect the coefficient estimates for these variables to have a positive sign.

Data for all variables are from the *2012* and the *2013 World Bank Indicators*.

4. Empirical Results

Table 1 gives least-squares estimates of regression coefficients in equation *(1)* for a sample of thirty agrarian developing economies. We observe that only two explanatory variables are statistically significant at the 5 percent or lower level and six coefficient estimates do have their anticipated sign. The goodness of fit of the model is quite good as indicated by the high value of 0.465 of the adjusted coefficient of determination.

Table 1.   Dependent Variable: National Poverty Rate

	Coefficient Estimates	t-Statistics
Intercept	38.725	1.407
AgValAdd	0.0002	0.186
Urban	0.273	1.052
GrossSec	-0.053	-0.280
FemLPR	-0.098	-0.669
MatMortal	0.024	2.117*
PGNI	-0.005	-2.769*
SkillBirths	0.166	0.995
MaleMal	-0.861	-0.427
FemMal	0.619	0.332

Adjusted R2 = 0.465
*Significant at the 5 percent level.

All else equal, a one-woman increase in the number of those who die from pregnancy-related causes during pregnancy and childbirth per 100,000 live births is expected to lead to a 0.02 percentage point increase in the fraction of the population living below the national poverty line. On the other hand, as per capita gross national income increases by one hundred dollars, we would expect the fraction of the population living below the national poverty line to decrease by 0.5 percentage point, ceteris paribus.

A backward elimination stepwise method was applied to arrive at a revised model, the regression results of which are reported in Table 2. We note that the goodness of fit of the model to the data is much better as indicated by the higher value of 0.556 of the adjusted coefficient of determination.

Table 2.   Dependent Variable: National Poverty Rate (Revised Model)

	Coefficient Estimates	t-Statistics
Intercept	17.324	1.672
Urban	0.336	1.559*
MatMortal	0.026	3.027***
PGNI	-0.005	-3.506***
SkillBirths	0.197	1.831**

Adjusted R^2 = 0.556
*Significant at the 10 percent level.
**Significant at the 5 percent level.
***Significant at the 1 percent level.

We observe that in addition to the maternal mortality rate and per capita gross national income variables urbanization and the percentage of total births attended by skilled health staff are now statistically significant. Ceteris paribus, the impact of the maternal mortality rate and that of per capita gross national income remains much the same. We note that, in this sample of thirty agrarian developing economies,

urbanization has resulted in a higher national poverty rate. All else equal, a one-percentage point increase in the fraction of the population living in urban areas leads to an expected increase of 0.3 percentage point in the fraction of the population living below the national poverty line. This empirical result suggests that rural-urban migration in this set of thirty agrarian developing countries may have been motivated by despair rather than by hope.

While the percentage of total births attended by skilled heath staff is statistically significant in explaining cross-country variations in the national poverty rate, the coefficient estimate for this variable does not have its expected negative sign. We suspect that this may be due to the extent of the multicollinearity problem among explanatory variables. We report this extent in table 3 in the form of a sample correlation coefficient matrix. From this table, we observe that the percentage of births attended by skilled health staff is strongly linearly related to the maternal mortality rate and per capita gross income. As expected, an increase in the proportion of births attended by skilled health staff results in a lower maternal mortality rate while economic development as measured by a higher per capita income undoubtedly leads to a higher demand for births attended by skilled health staff.

Table 3. Sample Correlation Coefficient Matrix

	Urban	MatMortal	PGNI	SkillBirths
Urban	1			
MatMortal	-0.117	1		
	-0.625			
PGNI	0.270	-0.555	1	
	1.482	**-3.527**		
SkillBirths	0.095	-0.419	0.556	1
	0.505	**-2.439**	**3.544**	

Note: Bold t-statistics imply statistical significance at the 10 percent or lower level.

5. Conclusion

In this paper we use an econometric model to examine the effect of various determinants of national poverty using data from a sample of thirty agrarian developing countries. From the statistical results we are able to draw the following conclusions:

1. Within the set of thirty agrarian developing economies used in this study, investments in human capital have a significant impact on poverty reduction. Governments in these countries need to continue to devote an adequate share of their budget to public health in order to alleviate overall poverty.

2. Governments in agrarian developing countries need to make the urbanization process a dynamic one in order to reduce overall poverty. Successful urbanization requires that rural-urban migration be motivated by hope rather than by despair.

3. Regression results also show the importance of economic development in alleviating poverty in agrarian developing countries. Governments in these countries need to create an environment in which the private sector can thrive and provide jobs so as to raise the standard of living of their citizens.

4. The empirical evidence in this study seems to show that increases in productivity in farming have not been associated with a reduction in poverty, at least in the set of these thirty agrarian developing countries. Hence, the main avenues to alleviate overall poverty may lie in creating a dynamic economic environment in cities while promoting labor reallocation from rural to urban areas.

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[i] The sample consists of the following countries: Bangladesh, Bhutan, Bosnia and Herzegovina, Cambodia, Democratic Republic of Congo, Egypt Arab Republic, Ethiopia, Guinea, India, Kenya, Kyrgyz Republic, Lao PDR, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Pakistan, Philippines, Rwanda, Senegal, Sri Lanka, Sudan, Swaziland, Tajikistan, Tanzania, Thailand, Togo, Uganda, and Vietnam.