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Developing Asia and the informal sector

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Abstract

The informal sector is generally viewed as having a negative impact on economic development and thus a negative impact on human development. It is argued in this paper that the impact of the informal sector on human development is dependent on the agricultural environment that exists in the particular country. Specifically, if agricultural productivity is rapidly growing the informal sector is less likely to have a negative impact and more likely to have a positive impact on human development. This hypothesis was tested utilizing data from twelve Asian countries.

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1. Introduction

The focus of this paper will on the role of the informal sector. It will be argued that the role of the informal sector may vary dramatically dependent upon the environment which exists in the agricultural sector. It is argued that the low productivity (output per worker in agriculture) which exists in agriculture in many poor countries is not due to low value added per work hour of agricultural labor, but is instead the result of the lack of employment opportunities within agriculture itself. Thus it is labor time that is surplus, not workers (McCollough 2017). An employment gap exists between agriculture and nonagriculture and this is what accounts for the measured low labor productivity per worker in the former relative to the latter sector. Informal sector economic activities offer an opportunity for agricultural families to perhaps increase family total employment and total family income. If the increased income earned materializes, it would allow families to provide for improved health via increased food calorie consumption, pay for their children's education, as well as increase the ability to purchase tools which can directly enhance productivity, and allow for increased time devoted to improving skills. This impact is likely to be substantial. In developing countries as a whole the informal sector accounts, on average, for one third of GDP and 70 percent of employment. In South Asia this sector accounts for approximately 60% of employment and 30% of GDP. In East Asia the numbers are approximately 50% for employment and less than 30% of GDP (Elgin, et al. 2021). Thus, the informal sectors impact on well-being is significant.

Two possible scenarios or hypotheses follow from this analysis. In regions in which agricultural productivity growth occurs, incomes will increase leading to increased purchases of goods and services produced via informal activities, as well as increased purchases of goods and services produced in the formal sector. The former provide increased employment opportunities for families in the informal sector and for rural families. Thus the increased income from informal sector employment can be used to improve their children's education, enhance caloric intake, and improve the overall skill base of the family. The dynamic interaction between enhanced agricultural production and enhanced income from informal employment provide the basis for rapid human development.

However, a different scenario emerges if agricultural activity is stagnant. In this case farm incomes rise slowly (or not at all) and the demand for informally produced goods and services will grow slowly (if at all). Given that population growth is likely to add to the employment problems found in agriculture discussed earlier, there would be an increased flow of labor into informal activities. Because this sector is not growing very rapidly, the law of diminishing returns will set in resulting in an informal sector where productivity is very low. Thus family income will not grow very much and this will sharply restrict the extent to which families can increase caloric intake, spend more on their children's education, etc. Thus the basis for future human development is likely to be limited. In this case the expansion in the informal sector is a sign of economic stagnation and is likely to be associated with a decline in human well-being.

Thus, the main hypothesis can be simply stated. The impact of the informal sector on human development is dependent on the agricultural environment that exists in a particular country. Specifically, if agricultural productivity is rapidly growing the informal sector is less likely to have a negative impact and/ or more likely to have a positive impact on human development.

2. Empirical Analysis

The dependent variable that will be used in the empirical analysis is the human development index (HDI). The HDI is a summary measure of human development that incorporates three dimensions: a long and healthy life, the extent of human knowledge, and the standard of living. It is a geometric mean of indices used to measure these three dimensions. The health aspect is measured by life expectancy at birth, education is measured by mean years of schooling for adults aged 25 or above, and the standard of living measured as gross national income per person.

The independent variables utilized in the analysis can be divided into two categories: that pertaining to productivity in agriculture and industry and that pertaining to measures of the relative size of the informal sector. The productivity variables are as follows: total factor productivity in agriculture (*TFPA*), labor productivity in agriculture (*AGLABPROD*), and value added per worker in industry (*VAIEMPL*). Data for *TFPA* is from the U. S. Department of Agriculture, International Economic Research Service and is based on the work of Fuglie (2012 and 2015). It is an index representing agricultural output (of over 200 products) divided by an aggregation of the quantity of labor, land, capital, and intermediate inputs. The labor input is measured by the number of workers employed in agriculture. Data on labor hours devoted to agriculture is not available. *AGLABPROD* is also calculated utilizing data from the U. S. Department of Agriculture, International Economic Research Service. *AGLABPROD* is total output divided by the number of workers in agriculture since data on labor hours employed in agriculture is not available. *VAIEMPL* is calculated utilizing data from GGDC/UNU-WIDER Economic Transformation Database and is based on the work of Kruse et al. (2021). This is included as a control variable.

One of the most important sets of variables utilized are the measures of the relative size of the informal sector (the second category of data mentioned above). Data concerning this variable comes in three forms and is available from the World Bank and is based on the work of Elgin, et al. (2021). The first two are model based estimates: dynamic general equilibrium model-based estimates of the share of informal output in total output (*INFD*) and multiple indicators multiple causes model estimates of the share of informal output in total output (*INFM*). The third measures the share of self-employment in total employment (*SE*). This has been thought to represent a good proxy for the informal sector employment.

The dynamic general equilibrium approach considers how optimizing households will allocate labor between formal and informal activities over time. This approach allows for comprehensive country and year coverage and has a clear theoretical basis. The drawbacks are as follows: it relies upon strong assumptions about the functional form of activities that take place in the informal and formal sector, it requires base year estimates of the informal economy, and this model only captures some of the stylized facts of the informal sector. The multiple indicators multiple cases model has also been used to measure the relative size of the informal sector. It explicitly takes account of the multiple possible causes and incorporates multiple outcome indicators of the informal sector. It too requires data providing base year estimates of the relative size of the informal sector and is sensitive to alternative model specifications. Both approaches provide data on the share of informal sector production in GDP and the countries incorporated into the analysis of this paper are: Bangladesh, Cambodia, China, India, Indonesia, South Korea, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, and Thailand. The data is available for 1990 to 2018 for INFG data and 1993 to 2018 for *INFM* data.

The most used survey method for measuring the relative size of the informal sector is self-employment as a share of total employment (SE). This is the only survey-based method that provides the data necessary to conduct the empirical analysis that will be carried out in this paper. However, the number of countries for which this is available is reduced to: India, Indonesia, South Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and China. The time period is from 1990 to 2018.

As one can see, the empirical analysis is focused on Asia. The Asian countries in the samples utilized here have all been characterized by large informal sectors. Some have experienced significant success in terms of achieving rapid growth, while some have struggled to attain significant improvements in their standard of living. Some have succeeded in terms of promoting manufacturing, but many have found it difficult to increase the relative size of the manufacturing sector. These countries are for the most part relatively labor abundant and thus have faced the significant problem of generating enough jobs for countries facing the problem of providing growth while also providing employment. The choice of countries in Asia was dictated by the availability of data. Here we also include South Korea. While South Korea reached the status of developed country, it was characterized as a developing country for much of the sample period.

The first set of equations to be estimated can be written as

$$ln(HDI)_{it} = a_0+a_1 ln(TFPA)_{it} + a_2 ln(TFPA)_{it}^2 + a_3 ln(SELFEMP)_{it} + a_4[ln(SELFEMP)*ln(TFPA)]_{it} + a_5 ln(VAIEMPL)_{it} + e_{1it} \quad (1)$$

$$ln(HDI)_{it} = b_0+b_1 ln(TFPA)_{it} + b_2 ln(TFPA)_{it}^2 + b_3 ln(INFD)_{it} + b_4[ln(INFD)*ln(TFPA)]_{it} + b_5 ln(VAIEMPL)_{it} + e_{2it} \quad (2)$$

$$ln(HDI)_{it} = c_0+c_1 ln(TFPA)_{it} + c_2 ln(TFPA)_{it}^2 + c_3 ln(INFM)_{it} + c_4[ln(INFM)*ln(TFPA)]_{it} + c_5 ln(VAIEMPL)_{it} + e_{3it} \quad (3)$$

Logs are taken of all the variables. It is hypothesized that agricultural productivity (*TFPA*) is positively associated with human development since it enhances the availability of food and other critical agricultural goods and provides additional sources of income for households in agriculture where a significant proportion of the poor reside. However, the relationship is assumed to be nonlinear in nature, with the association between agricultural productivity and human development weakening as agricultural productivity becomes much higher. Thus, it is hypothesized that $a_1>0$, $a_2<0$, $b_1>0$, $b_2<0$, $c_1>0$, $c_2<0$.The literature on the informal economy tends to indicate that the informal sector, however it is measured, is associated with a lack of growth and human development (La Porta and Schleifer 2014). Thus one would expect that the signs for all the measures of the importance of the informal sector would be negative ($a_3<0$, $b_3<0$, $c_3<0$). However, the main hypothesis of this paper is that the impact which the informal sector has on human development is tempered by how productive the agricultural sector becomes. Thus one would expect that the interaction terms involving agricultural productivity and the various measures of the importance of the informal sector are likely to have positive signs. Thus one would expect $a_4>0$, $b_4>0$, $c_4>0$. This result implies that the association of the informal sector, however measured, with the level of human development becomes more positive and/or less negative as the productivity of agriculture increases. Finally, one would expect that increases in industrial productivity would be associated with improvements in human development since increases in the former are likely to provide opportunities for labor to earn

higher income via industrial employment. However, there is a literature (Rodrik 2016) that argues that industrial productivity growth may not generate significant increases in employment due to the increasing capital intensity of industrial production as well as the inability of industrial producers in developing countries to survive competition from the outside as a result of trade liberalization. Thus, industrial sector productivity increases may not be associated with human development. The signs for industrial labor productivity in the above estimations may not be positive or significant.

A second set of three equations will also be estimated in which total factor productivity in agriculture (*TFPA*) is replaced by labor productivity in agriculture (*AGLAPROD*). This is done as a robustness check involving a different measure of agricultural productivity.

As mentioned earlier, the HDI variable is composed of several components. Two of these involve the level of health, as measured by life expectancy (*LIFEEXP*), and the level of education, as measured by average years of schooling (*AVGSCHLYRS*). Thus, it is of interest to determine the extent to which these two are associated with agricultural productivity and the informal sector. Thus, two additional sets of analysis will be carried out with *AVGSCHLYRS* and *LIFEEXP* utilized as dependent variables. There will be three equations estimated for each (incorporating the three different measures of informality. The same set of independent variables will be used as in the previous analysis. However, one additional control variable is utilized, GDP per capita (*GDPP*). This control variable could not be used in the previous two sets of estimations (using *HDI* as the dependent variable) since *HDI* directly incorporates income per person.

Before proceeding with the empirical analysis, it should be pointed out that the analysis does not formally allow for the determination of causality. A positive sign on the interaction term in the estimations utilizing *HDI* as the dependent variable only implies that there is a positive association between agricultural productivity and employment in the informal sector and human development. Increases in human development might cause agricultural productivity and thus enhance the contribution of the informal sector to human development. So, the results that follow are limited in terms of inferring causality.

The autoregressive distributed lag ARDL estimation method is utilized to estimate the equations. An ARDL model is an ordinary least square (OLS) based model which is applicable for both non-stationary time series as well as for time series with mixed order of integration. ARDL models extend autoregressive models with lags of explanatory variables. ARDL models focus on the exogenous variables and selecting the correct lag structure from both the endogenous variable and the exogenous variables. Thus this model addresses endogeneity and heterogeneous cointegration. The results are presented in Tables 1 and 2. Table 1 presents the three estimations using *TFPA* as the measure of agricultural productivity while Table 2 presents the three estimations utilizing *AGLAPROD* as the measure of agricultural productivity. Table 3 presents estimations using life expectancy as the dependent variable while Table 4 utilizes average years of schooling as the dependent variable (both using *TFPA* as the measure of agricultural productivity). As stated above, the number of countries utilized varies with the measure of informality used. For *INFD* and *INFM* all twelve countries are included in the estimations. When *SE* is utilized as the measure of informality, only nine countries are included. The number of years depends on the number of lags utilized in the estimation. Informal sectors in other regions, especially in Sub-Saharan Africa, are also important and this represents areas for future research.

Table 1: ARDL results with *ln(HDI)* as the dependent variable and *ln(TFPA)* as the measure of agricultural productivity

Long run equation	(1)	(2)	(3)
ln(TFPA)	-1.05	-0.11	-0.68
	(0.802)	(0.556)	(1.261)
$ln(TFPA)^2$	0.07	-0.02	-0.09
	(0.082)	(0.052)	(0.128)
ln(SELFEMP)	-0.57***		
	(0.137)		
*ln(SELFEMP)*ln(TFPA)*	0.09***		
	(0.03)		
ln(INFD)		-0.46***	
		(0.157)	
*ln(INFD)*ln(TFPA)*		0.10***	
		(0.031)	
ln(INFM)			-2.92***
			(0.785)
*ln(INFM)*ln(TFPA)*			0.44**
			(0.152)
ln(VAIEMPL)	0.13***	0.0002***	0.25***
	(0.025)	(0.00003)	(0.048)
Cointegrating term	-0.32***	-0.29**	-0.13**
	(0.098)	(0.110)	(0.062)
Obs#	225	322	288

Note: Results are presented with standard errors in parenthesis; *, **, *** represent statistical significance at 90%, 95%, and 99% respectively; all estimations include a constant term; lags are determined by utilizing the AIC criterion.

Table 2: ARDL results with *ln(HDI)* as the dependent variable and *ln(AGLAPROD)* as the measure of agricultural productivity

Long run equation	(1)	(2)	(3)
ln(AGLAPROD)	1.17**	0.49***	0.83***
	(0.443)	(0.122)	(0.187)
$ln(AGLAPROD)^2$	-0.09***	-0.05***	-0.07***
	(0.023)	(0.006)	(0.005)
ln(SELFEMP)	-1.01***		
	(0.319)		
*ln(SELFEMP)*ln(AGLAPROD)*	0.11**		
	(0.037)		
ln(INFD)		-0.67***	
		(0.101)	
*ln(INFD)*ln(AGLAPROD)*		0.1***	
		(0.011)	
ln(INFM)			-0.69**
			(0.284)
*ln(INFM)*ln(AGLAPROD)*			0.09**
			(0.036)
ln(VAIEMPL)	0.06***	0.01	0.04***
	(0.016)	(0.01)	(0.011)
Cointegrating term	-0.14**	-0.47**	-0.33**
	(0.072)	(0.165)	(0.163)
Obs#	234	311	288

Note: Results are presented with standard errors in parenthesis; *, **, *** represent statistical significance at 90%, 95%, and 99% respectively; all estimations include a constant term; lags are determined by utilizing the AIC criterion.

Table 3: ARDL results with *ln(LIFEEXP)* as the dependent variable and *ln(TFPA)* as the measure of agricultural productivity

Long run equation	*ln(LIFEEXP)*	*ln(LIFEEXP)*	*ln(LIFEEXP)*
ln(TFPA)	0.83***	-0.42	3.43***
	(0.193)	(0.468)	(0.642)
$ln(TFPA)^2$	-0.10***	-0.01	-0.43***
	(0.022)	(0.046)	(0.066)
ln(SELFEMP)	-0.10**		
	(0.051)		
*ln(SELFEMP)*ln(TFPA)*	0.02**		
	(0.011)		
ln(INFD)		-0.66***	
		(0.197)	
*ln(INFD)*ln(TFPA)*		0.15***	
		(0.038)	
ln(INFM)			0.05
			(0.15)
*ln(INFM)*ln(TFPA)*			0.08**
			(0.032)
ln(VAIEMPL)	0.01**	0.03***	0.03***
	(0.003)	(0.004)	(0.005)
ln(GDPP)	0.03***	0.04**	0.09***
	(0.005)	(0.013)	(0.005)
Cointegrating term	-0.03**	-0.004*	-0.005***
	(0.016)	(0.002)	(0.001)
Obs#	228	309	288

Note: Results are presented with standard errors in parenthesis; *, **, *** represent statistical significance at 90%, 95%, and 99% respectively; all estimations include a constant term; lags are determined by utilizing the AIC criterion.

Table 4: ARDL results with *ln(AVGSCHLYRS)* as the dependent variable and *ln(TFPA)* as the measure of agricultural productivity

Long run equation	*ln(AVGSCHLYRS)*	*ln(AVGSCHLYRS)*	*ln(AVGSCHLYRS)*
ln(TFPA)	-1.09	10.02***	5.85***
	(1.716)	(2.968)	(0.682)
$ln(TFPA)^2$	0.21	-1.09***	-0.57***
	(0.219	(0.307)	(0.095)
ln(SELFEMP)	0.001		
	(0.267)		
*ln(SELFEMP)*ln(TFPA)*	-0.01		
	(0.062)		
ln(INFD)		2.28***	
		(0.59)	
*ln(INFD)*ln(TFPA)*		-0.11	
		(0.129)	
ln(INFM)			1.18*
			(0.642)
*ln(INFM)*ln(TFPA)*			-0.19
			(0.148)
ln(VAIEMPL)	0.14**	-0.11***	0.16***
	(0.053)	(0.015)	(0.041)
ln(GDPP)	-0.12**	0.75***	-0.27***
	(0.06)	(0.035)	(0.053)
Cointegrating term	-0.19**	-0.23**	-0.27**
	(0.081)	(0.101)	(0.102)
Obs#	225	298	288

Note: Results are presented with standard errors in parenthesis; *, **, *** represent statistical significance at 90%, 95%, and 99% respectively; all estimations include a constant term; lags are determined by utilizing the AIC criterion.

The results indicate that agricultural labor productivity (*AGLAPROD*) has a nonlinear relationship with human development. As agricultural labor productivity increases, human development increases at a diminishing rate. However, when total factor productivity in agriculture is used this relationship does not hold. All three measures of the informal sector have a negative impact on human development, however agricultural productivity is measured. However, the interaction terms for various measures of the informal sector and agricultural productivity indicate that the more productive the agricultural sector is the negative impact of services (measured in three different ways) declines and if the increase in agricultural productivity is large enough the impact of the informal sector would become positive. This becomes clear if one looks at the marginal effect of the three measures of informality on the human development index. Taking the derivative of the *ln*(*HDI*) with respect to each measure of the informal sector (equations 1-3), the following expressions emerge:

$$d\ln(HDI)/d(lnINFD) = -.46 + .01(lnTFPA) \quad (4)$$

d*ln*(*HDI*)/d(*lnSELFEMP*)= -.57 +.09(*ln*TFPA) (5)

d*ln*(*HDI*)/d*(lnINFM*)= -2.92 +*.79(lnTFPA)* (6).

Thus, increases in *lnTFPA*, ceteris paribus, always have a positive impact on *ln*(*HDI*) through the informal sector. Industrial productivity is positive in sign for all the estimations and statistically significant for five of the six estimations.

In terms of the impact on life expectancy (*LIFEEXP*), Table 3, when total factor productivity in agriculture is used (*TFPA*), the results indicate that for two of the measures of the informal sector a non-linear relationship is found for *TFPA*, implying that as it goes up there is a positive relationship with *LIFEEXP*, but as *TFPA* continues to rise this positive association declines. With respect to the impact of the informal sector, the results indicate that for two of the measures of informality there is a negative association with life expectancy. The interaction term between *TFPA* and the measure of informality, measured in three ways, indicates that there is a positive association with life expectancy, implying that increases in agricultural productivity tend to enhance the positive impact (or reduce the negative impact) of the informal sector on life expectancy. Thus, the more productive the agricultural sector, the stronger the positive association (or the weaker the negative association) between the informal sectors size (measured as the share of employment) and life expectancy. In terms of the control variables, value added in industry per laborer (*VAIEMPI*) is positively associated with life expectancy. GDP per capita is also positively associated with life expectancy.

With respect to average school years (*AVGSCHLYRS*), Table 4, the results are more mixed. The *TFPA* variable has a nonlinear relationship with *AVGSCHLYRS* for two of the measures of informality, but not for the third. For two of the direct measures of informality there is a positive association with *AVGSCHLYRS* while for the third there is no significant relationship one way or the other. Thus, in general, informality seems to be associated with a positive relationship with schooling. In terms of the interaction variable, there is no significant relationship with schooling. Thus, increases in agricultural productivity do not influence the impact of informality on average school years. For the control variables there are mixed results for both industrial labor productivity and GDP per capita.

3. Summary and Conclusion

In this paper it was hypothesized that the informal sector can play a positive (or less negative) role in increasing human development. The strength of this impact was hypothesized to be positively related to the productivity of the agricultural sector. Indeed, the results of the estimations support this hypothesis. Thus improving agricultural productivity enhances human development by making the informal sector more effective in improving human well-being. In addition, industrial productivity growth would also seem to be an important factor the process of human development. Looking at life expectancy increases in agricultural productivity tend to increase the positive or reduce the negative association between the informal sector and school years. GDP per capita and industrial productivity are also positively associated with life expectancy. In terms of average schooling in years, the size of the informal sector is positively

associated with this variable. Changes in agricultural productivity do not seem to influence the effectiveness of the informal sector in terms of its relationship with average years of school. Thus, these results support the idea that the informal sector is important in terms of overall human development as well life expectancy and years of schooling.

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