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POVERTY AND REAL EXCHANGE RATE: EVIDENCE FROM PANEL DATA

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ABSTRACT

The paper explores the relationship between economic policies and poverty by using the dependant economy model framework. Accordingly, it focuses on two variables: the real exchange rate and the absorption, and explores the links between these two variables and poverty. This method has particularly the advantage of addressing model uncertainty. Using the System general method of moments (SY-GMM) estimator (Blundell and Bond, 1998), the paper shows that real exchange rate depreciation favours the poor, provided that income is fairly distributed and institutions are sound.

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INTRODUCTION

Frequent exogenous shocks, including volatility of terms of trade and resource flows, and capricious weather conditions, have taken a heavy toll on the internal and external balances of many developing countries. As a result, some of these countries have adopted economic policies largely inspired by structural adjustment programs. The theoretical foundations of these policies are rooted in the dependant economy model or "Australian model", in which clearing internal and external imbalances requires an increase of the relative price of tradable to non tradable goods, defined as the depreciation of real exchange rate, and a reduction in domestic absorption. Policies aimed at reducing fiscal deficits and privatising state owned enterprises are therefore supposed to contain domestic absorption while measures gearing toward promoting trade, such as slashing tariffs on exports, are expected to lead to the depreciation of real exchange rate. The analysis of the impact of these economic policies on real incomes, or poverty, has received a special attention in the literature.

The approach of this paper is to investigate the influence of the intermediate indictors of economic policies, namely real exchange rate and absorption, on poverty. This fundamentally differs from the way the effects of economic policies on poverty are assessed in the literature. Dollar and Kraay (2002), Ghura et al. (2004), for instance, explore the relationship between policy outcome indicators, such as inflation, trade openness, and fiscal deficits, and the incomes of the poor. The idea of reverting to intermediate policy indicators rather than final policy outcomes has two advantages. First, it makes the model specification less cumbersome as the analysis relies on fewer factors. Second, the method helps to effectively address model uncertainty concerns and the parsimonious choice of explanatory variables because the approach is based on a theoretical model. The relationship between the intermediate policy variables and poverty come into play through indirect and direct channels. In line with the

vast empirical literature on poverty reduction, economic growth is considered as the major indirect channel through which economic policies, real exchange and absorption in this paper, influence poverty. Direct channels are highlighted as well.

The rest of the paper proceeds as follows. Section II presents the dependant economy model. Section III provides the conceptual background by reviewing the indirect and direct channels through which real exchange rate and absorption affect the incomes of the poor. This analysis will be complemented by a close look at the role of a third set of factors that determine the direct relationship between real exchange rate and poverty. Section IV presents the theoretical framework and the econometric methodology. Section V discusses the choice of variables and data and presents the econometric results. Section VI concludes.

2. SIMPLE DEPENDANT ECONOMY MODEL

The failure of traditional economic models, Keynesian and Monetarian models, to capture the realty of the developing world gave a prominent role to the dependant economy model. This model has provided the theoretical background for policies designed to reduce internal and external imbalances in most of developing countries.

The economy dependant model was initially developed in the area of international trade theory (Salter, 1959: Swan, 1960) and subsequently found numerous applications in development economics because of its ability to capture dynamics in small opened economies, especially developing economies. The model is built on the assumption that the country is price-taker, meaning that the country market power is not significant to influence world prices. Other salient feature of the model is the distinction made between tradable and nontradable goods. In fact, the price of tradable goods is determined by the world market, the prevailing nominal exchange rate and trade policy, especially tariffs and

export subsidies, while nontradable price depends on the domestic effective demand and domestic supply.

The model could be summarised by the following equations:

$$P_T = e^* P^*_T * (1 + w) \quad (1)$$

$$P = P(P_T, P_N) \quad (2)$$

$$E = \frac{P_T}{P_N} \quad (3)$$

$$ED_N = N_D(E, G) - N_s(E) \quad (4)$$

$$ED_T = T_D(E, G) - T_s(E) \quad (5)$$

$$\frac{\partial ED_N}{\partial E} < O; \frac{\partial ED_N}{\partial G} < O; \frac{\partial ED_T}{\partial E} > O; \frac{\partial ED_T}{\partial G} > O \quad (6)$$

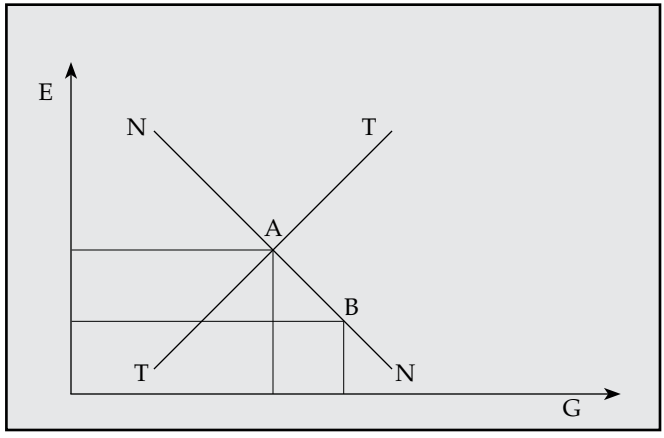
Equation (1) indicates the determinants of tradable prices, P_T, which are the nominal exchange rate , *e*, the international price of tradable goods, P_T^* and the trade policy materialised in the equation by a tariff, *w*. Equation (2) captures the general level of prices, which is assumed to be a linearly homogenous function of the prices of tradables, P_T, and nontradables, P_N . Equation (3) defines the real exchange rate, *E*, as the relative price of nontradables to the tradables[1]. Equations (4) and (5) underline excess demand[2] of nontradable and tradable goods, respectively. These equations also carry two public policy variables; the public spending G[3] and the real exchange rate, *E*. Equation (4) suggests that any appreciation of the real exchange rate results in the decline of the excess demand of nontradables as they become relatively expensive. On the other hand, an increase in public spend-

1 For convenient reason, the real exchange rate is defined in such a way that it matches the concept that will be used for empirical investigation.
2 The difference between the demand and supply
3 We ignore the public spending on nontradable goods for simplicity purposes

ing leads to higher excess of the demand for nontradables. Equation (5) shows that an appreciation of real exchange, by both boosting the demand and restraining the supply of tradables, increases the excess demand of this particular good. The same equation suggests that an increase in government expenditures or an augmentation in absorption widens the excess demand for tradable goods.

Equations (4) and (5) could be used to set the conditions for internal and external equilibriums, which require excess demands for nontradables and tradables to be equal to zero. In the dimension (*E*,*G*) internal equilibrium is represented by a curve with negative slope, (*NN*). This reflects the idea that a real exchange appreciation is key in restoring equilibrium in the nontradable market when public spending increases. In other words, an increase in absorption, which is identical to an increase in public spending, triggers an excess in the demand of nontradables. The relative price of nontradables has to go up for this imbalance to be cleared, meaning that the real exchange rate has to appreciate. The external equilibrium is captured by an increasing curve (*TT*), suggesting that, if public spending increases, so does the absorption, relative price of tradable must rise in order to eliminate the external imbalance. The simultaneous internal and external equilibriums are achieved in point A.

Figure 1: Dynamics in a dependant economy model



The point B represents a situation where there is an external imbalance, say a trade deficit. B can also be described as a situation where the real exchange rate is below its equilibrium level, or overvalued. This is reminiscent of the conditions that prevailed in many African countries after the second oil shock.

One way of clearing this external disequilibrium, moving from B to A, consists in both reducing the absorption and depreciating the relative price of tradables to nontradables. Economic policies are therefore designed to achieve these two goals and usually qualified as sound economic policies. These policies include prudent fiscal, monetary policies and exchange rate policies geared towards avoiding overvaluation and excessive absorption. Clearly, economic policies in the dependant economy model framework tend to primarily impact the real exchange rate and absorption. Consequently, analysing the effects of sound economic policies on poverty amounts to assessing the impact of real exchange rate and absorption on poverty. The paper identifies direct and indirect channels through which real exchange rate and absorption influence poverty

3.1 REAL EXCHANGE RATE, ABSORPTION AND POVERTY

3.1 Indirect effects

Economic growth remains one the key indirect channel through which absorption and real exchange rate affect poverty. In fact, sound macroeconomic policies, reflected in the dependant economy model by appropriate real exchange rate and absorption, are generally considered to be conducive to strong economic growth (Fischer, 1993), and strong economic growth , in turn, is believed to lead poverty reduction.

3.1.1 Real exchange rate, absorption and growth

Many growth studies support the contention that misalignments of real exchange rate adversely affect economic performance (Cottani and al., 1990: Ghura and Grennes, 1993). There are two explanations behind this pattern. First, as a relative price of tradable to non tradable goods, real exchange rate determines to a large extent the degree of competitiveness of the export sector, which is a key growth engine in many small developing countries. Second, an inappropriate real exchange rate gives rise to speculation against the domestic currency. This creates a destabilizing effect on domestic financial markets, leading therefore to lower investment and growth.

The relationship between the reduction of absorption and economic growth is rather ambiguous and can be illustrated by the experience of many developing countries that undertook fiscal adjustment policies. Those countries adopted stringent fiscal measures, including deep cuts in public investment spending and severe cuts in transfers, in order to achieve sustainable fiscal balances. The purpose of such policies is to send a signal to the private sector about governments' commitment and ability to efficiently run their economies and contributes to higher private investment and economic growth. However, some of the measures may seriously undermine economic growth prospects. This is particularly true if the cuts relate to public-sector spending in infrastructural facilities and in the area of human capital, and law and order, which tend to strongly crowd in private investment and therefore highly beneficial to economic growth (Aschauer, 1989: Erenburg, 1993: Serven and Solimano, 1993: Oshikoya, 1994: Serven, 1996).

3.1.2 Growth and poverty

Although there is no fully developed theoretical framework on the relationship between economic growth and poverty, numerous empirical studies provide conclusive evidence about the positive

association between income growth and income measures of poverty. By using panel data, Dollar and Kraay (2002) found that a one percent of increase of per capita income results in one percent rise of the average incomes of the poorest fifth of society. Timer (1997), Ghura et al. (2004), Foster and Szekely (2002) applied different approaches to the same data, and found that the incomes of the poorest 20 per cent increase less than proportional with those of the non-poor. The positive impact of economic growth on poverty is also confirmed by various individual country studies (Lipton and Ravallion, 1995).

3.2 DIRECT EFFECTS

3.2.1 The direct impact of the reduction of absorption

The reduction of the absorption is often achieved by cutting public spending, namely through freezing the nominal bill wage or/and downsizing the public sector or/and reducing substantially subsidies and other currents transfers. These measures increase directly poverty, particularly in a context where there are few work opportunities for the poor in the private sector.

However, the relationship between absorption, especially public expenditures, and poverty could be also positive for three reasons. First, cuts in public spending may reduce the government tendency to revert to monetary financing as means to finance fiscal deficits, contributing to lowering inflation. The poor may therefore benefit from low inflationary pressures as clearly demonstrated by Easterly and Fischer (2001). Second, a growing body of evidence has shown that the structure of public expenditures in social sectors in many developing countries, especially in Africa, tend to favour the richest at the expense of the poorest (Castro-Leal et al., 1999). For instance, the share of public subsidy to the poorest 20 percent of the population in the health sector varies from 4 percent in Guinea to 17 percent in Tanzania while the share received by the richest 20 percent ranges

from 48 percent in Guinea to 17 percent in South Africa. In the education sector, the poorest 20 percent capture only 5 and 14 percent of public spending in education respectively in Guinea and Tanzania whereas the 20 percent richest receive 44 percent and 21 percent of public spending in Guinea and Ghana. In such circumstances, reduction in public spending may impact little the poor. Third, this is even true if cuts in public expenditures are accompanied by changes affecting the intra and inter allocation of public spending, with more public resources channelled towards social sectors and/or compartments of these sectors extensively used by the poor. For instance, a shift in social spending toward the delivery of basic public services, including basic education and health care that are mostly consumed by the poor, can lead to poverty reduction. Clearly, the direction of the relationship between poverty and absorption is ambiguous.

3.2.2 The direct impact of real exchange rate on poverty

Stolper-Samuelson theorem provides a strong foundation for a potential positive impact of real exchange rate depreciation on poverty. In fact, if one assumes that the tradable sector is labour-intensive, as suggested in many studies (Dorosh and Sahn, 2000: Agenor, 2004), and a perfect mobility of labour across sectors, namely between tradable and non tradable sectors, any increase of the relative price of tradable goods would lead to higher returns for labour: the most abundant factor at the disposal of the poor.

However, real exchange rate depreciation can potentially give rise to offsetting effects that could mitigate partially, or even completely, the benefits the poor get from stronger tradable relative price. These effects are mainly three. First, higher tradable price, if achieved by nominal depreciation, raises the domestic costs of imported goods and therefore the cost of living of the poor. This negative income effect might seriously dampen the relative price effect if imported goods represent a substantial share in the consumption basket of the poor. Except for the urban poor, this impact tends to be margin-

al for rural poor, which constitutes the majority of the poor in most developing countries. Second, when production and resources switch in favour of the tradable sector as a result of a real exchange appreciation, the demand for labour and wages in the nontradable sector declines, depressing therefore revenues in that sector. Since most urban poor tends to be nontradable good producers, the consequence will be increasing urban poverty. But, this effect is likely to be mitigated by the reduction in rural poverty if most of the poor live in rural areas. Third, the other offsetting effect comes from the potential contraction impact of a nominal depreciation. A real depreciation gained through a nominal depreciation can lead to higher cost of capital and intermediate inputs such as oil as these goods are generally imported in developing countries (Lora and Oliveria, 1998). Real exchange rate depreciation generates therefore a negative supply-side shock that can take a toll on output and employment, both in the tradable and nontradable sector. As a result poverty may rise. Again, this effect could be very limited in situations where production techniques are highly labour intensive and allow a high degree of substitution between production factors, namely capital and labour. Such production techniques are likely to reflect those of commodities and some manufacturing goods4 , the mainstay of many developing countries' exports.

3.3 UNSKILLED AND SKILLED LABOUR

The structure of the labour market could be much more complex than what was previously assumed, with the coexistence of skilled and unskilled labour. One can assume that the poor constitute the bulk of unskilled workers because they are likely than the other segments of the society to lack education and marketable skills. In this framework, the outcomes of real exchange depreciation remain again favourable to the poor provided that the two types

4 Textiles and apparels are cases in point

of labour are mobile and the tradable sector is low-skill-intensive. These results fit well with the experience of some East Asian that experienced significant real exchange depreciation and poverty reduction in the 1960s and 1970s. Wood (1994, 1997), for instance, shows that the demand for unskilled labour and wages for this type of labour soared in the Republic of Korea, Taiwan, and Singapore after these countries liberalize their trade and increase the relative price of their tradable goods. Elsewhere, in Latin America particularly, empirical evidence is mixed, with real exchange depreciation leading to an apparent change in the structure of labour demand in favour of skilled workers and higher overall unemployment and poverty in most countries (Berry, 1998: Hanson and Harrison, 1999). The apparent combination of real exchange rate depreciation and rising poverty stirs controversy about the Latin America's comparative advantage. Given the region's impressive endowment of natural resources and its relatively higher human capital endowment compared to other developing regions, Spilimbergo et al. (1999) and Wood (1997) suggest that Latin America's comparative advantage might not be in low-skill-intensive production.

In any event, even by assuming that labour, especially unskilled labour, is the most abundant factor and a perfect mobility of this production factor among sectors, one can suspect the relationship between real exchange rate and the incomes of the poor to be influenced by a third set of factors, which include the quality of institutions and the distribution of productive assets.

3.3 THIRD SET OF FACTORS

3.3.1 Inequality

The debate on inequality, growth and poverty has recently regained momentum. A vast literature tends to point toward a potential deleterious impact of inequality on growth. Similar conclusions are also found regarding the relationship between inequality and

poverty, with inequality leading to the appearance of poverty traps. The issue of access to production factors is widely referred as the key explanation for such relationships.

The access to productive assets is key in determining the responses to incentives, particularly the increased relative price of tradable to nontradable. In fact, expanding activities in the tradable sector, as a result a favourable real exchange rate, requires additional capital, which has to be mobilised though credit. But the access to credit, in a context of financial market imperfections, critically depends on collateral, which lenders demand in exchange of any loan they grant. For this reason, only borrowers with reasonable assets are able to respond to price incentives and engage in productive activities. Consequently, only few reap the income opportunities created by adequate real exchange rate when inequality runs high.

Inequality could also determine the direction and the scope of the effects of real exchange rate on poverty through its impact on human capital accumulation. Inequality adversely affects the process of acquiring skills in two ways. First, credit market imperfections and the demand for collateral can constraint not only the access of the poor to capital but also to education, especially if the latter has to be financed by loans. Acquisition of skills becomes therefore easy only for a very few when inequality is high. Second, inequality may influence the process of human capital accumulation even if there is no credit constraint. This is the case if the quality of the educational system is a local good (Durlauf, 1994: Fernandez and Rogerson, 1998). In this situation, agents sort in groups that are separated according to human capital or wealth status. The segregation can even be fortified by the establishment of political measures, including zoning restrictions or voluntary contribution to school financing (Deininger and Olinto, 2000). Consequently, disparities in skills widens over time, with the poor likely to be the most affected. Since the level of skills may be one of the determinants of how effectively agents take advantage of opportunities, the poor are unlikely to

gain the benefits resulting from a favourable real exchange rate. It can therefore be assumed that a fair distribution of wealth plays a positive catalytic role in the relationship between real exchange rate and poverty while a more unequal one will dampen the supposedly positive effects of real exchange appreciation on the incomes of the poor.

3.3.2 The quality of institutions

It is broadly agreed that intuitions play a critical role in the process of economic development. In particular, institutions that promote economic freedom, ensure a good provision of public goods, and enforce contracts are regarded as determinant in creating an enabling environment for economic activities, thus leading to economic expansion (Rodrik, 1999: Parente and Prescott, 1999: Acemoglu et al., 2001: Acemoglu and Robinson, 2004). Such institutions also determine the effectiveness of the poor's response to any economic incentives, especially to changes in real exchange rate.

The impact of institutions on the relationship between real exchange rate and poverty will be illustrated by three pieces of evidence. First, the lack of access to capital is regarded as one of the constraints facing the poor in their endeavours to boost their incomes. It has been already mentioned in the paper that access to credit, when capital markets are imperfects, depends upon collateral provided by borrowers. The ownership of that collateral can be severely constrained if property rights are not well defined and protected. The implication is that the poor can hardly get loans in the absence of a clear definition and protection of property rights. As a result the poor are unlikely to expand their activities in the tradable sector when there is a favourable real exchange rate.

Second, even if property rights are protected, the lack of adequate provision of public goods can dampen the response of the poor to any improvement of the relative price of tradable to non tradable goods. For instance, the quality and density of the road

system, namely rural roads, determines to what extent the poor are connected to markets and therefore their ability to exploit growth-promoting opportunities. Consequently, the lower the provision of the public goods is, the weaker is the positive impact of a favourable real exchange rate on poverty.

Third, the enforcement of contracts is also likely to influence the extent to which the poor react to economic incentives created by the change in real exchange rate. The reason for this is that enforcing contract reduces the risk of default between agents and creates a more auspicious environment for investment. In this context, the poor are therefore more likely to gain from new opportunities created by real exchange depreciation.

4. THEORETICAL FRAMEWORK AND THE ECONOMETRIC METHODOLOGY

4.1 Theoretical Framework

The relationship between the economic policies and poverty is guided by the following equation:

$$P_{i,t} = {}_0 + {}_1 Y_{i,t} + {}_2 E_{i,t} + {}_3 I_{i,t} * E_{i,t} + {}_4 G_{i,t} * E_{i,t} + {}_5 X'_{i,t} + {}_i + {}_{i,t} \quad (7)$$

where the *i* subscripts refers to country and *t* indexes years. Variable $P_{i,t}$ is supposed to capture poverty. Since there are few observations for alternative indicators of poverty, I revert to the logarithm of per capita income of the poor to measure poverty. $Y_{i,t}$ denotes the logarithm of per-capita income. $I_{i,t}$ represents the quality of institutions, $E_{i,t}$ is the real exchange rate and $G_{i,t}$ corresponds to a Gini coefficient. $X'_{i,t}$ is a vector of control variables. The error component is decomposed into a time invariant element ${}_{i,t}$ and a time variant component $\nu_{i,t}$. δ_0 is a constant. δ_1 captures the impact of economic growth on poverty but also reflects the indirect effects of other right-hand-side variables on the incomes of the poor. δ_3 measures the interactive effect of real exchange rate

and the quality of institutions while δ_4 captures the interaction between real exchange rate and income inequality. These interactions are key elements in determining the direction and the scope of the effects of economic policies on poverty. δ_3 is expected to be positive, which implies that any combined depreciation of real exchange rate and sounder institutions results in the increase of the incomes of the poor. Conversely, any appreciation of real exchange rate that takes place in a context of weaker institutions is associated with disappointing outcomes for the poor. In line with the theoretical framework, I expect δ_4 to be negative. This means that real exchange depreciation would be beneficial for the poor if there is a fairly equal income distribution. On the other hand, increasing the relative price of tradable to nontradable would not serve the cause of poverty alleviation if income distribution is acutely skewed. Finally, the coefficient vector δ_5 also capture potential direct effects that other control variables may have on poverty. These right-hand-side variables include other policy as well as structural variables.

4.2 Econometric Methodology

$$P_{i,t} = \ _0 + \ _1 Y_{i,t} + \ _2 E_{i,t} + \ _3 I_{i,t} * E_{i,t} + \ _4 G_{i,t} * E_{i,t} + \ _5 X'_{i,t} + \ _i + \ _{i,t} \qquad (7')$$

The first temptation is to use Ordinary Least Squares (OLS) as an estimation approach. This method, in the particular case of this study, has a number of shortcomings. First, some of the right-hand-side variables, especially per capita income, $Y_{i,t}$, are likely to be endogenous. In fact, various studies on income distribution and growth point to a reverse causation from per capita income of the poorest to the average income (Barro, 1999: Perroti, 1996). Then, one should not exclude the possibility of omitted explanatory variables that are correlated with other right-hand-side variables of the equation. Moreover, not accounting for unobserved country-specific effects is likely to lead to biased results. Finally, over or under-reporting can be an important problem associated to the poverty measure and

other control variables. It is well known that measurement error of the dependant variable does not generate biased coefficients[5] when the error is not correlated with other right-hand-side variables. This seems unlikely to be the case for the poverty measure. For instance, in many developing countries, rural households may be difficult to reach by survey teams, leading to the underestimation of poverty. The same is true in situation where education attainment of the population is low or in a context in which income inequality is high. Measurement error in poverty can clearly be influenced by the education attainment of the population, which constitutes some of the regressors of the equation to be estimated. Using OLS in a context of likely combination of omitted explanatory variables, measurement error, and endogeneity of some explanatory variables leads to inconsistent estimates.

Following the procedure developed by Anderson and Hsiao (1982), one possible solution is to revert to the Method of Instrumental Variables (IV), which is a first-differenced 6version of equation 7':

$$(P_{i,t}) = {}_1\ (Y_{i,t}) + {}_2 E_{i,t} + {}_3\ (I_{i,t} * E_{i,t}) + {}_4\ (G_{i,t} * E_{i,t}) + {}_5\ (X'_{i,t}) + (\ {}_{i,t}) \quad (8)$$

This procedure eliminates not only country-specific effect but also all other time-invariant variables. It also helps control for endogeneity and even address the inconsistency problem associated with measurement errors (Greene, 1998) if the chosen instrumental variables are not correlated with measurement errors. In line with standard arguments on the instrumental variables, the lagged differenced-endogenous variables (or lagged endogenous variables) are used as instruments. But Arellano and Bond (1991) argue that if such procedure is adequate therefore further lagged variables are good instruments as well. On that basis, they develop a Generalised Method of Moments Estimator (GMM), well-known

5 Even though coefficients are not biased their standard errors are.
6 First-differencing may exacerbate measurement error

by "first-differenced GMM estimator", that combines the suggested instruments in an efficient way. However, Blundell and Bond (1998) demonstrate that first-differenced GMM have poor finite sample properties, especially when lagged levels of the variables are not strongly correlated with subsequent first-differences. Bond et al. (2001) indicate that this is likely the case when the series are close to a random walk or when variance of the country-specific effects rises relative to the variance of error term .

In order to address the problem associated with persistent panel data, Blundell and Bond(1998) develop a system GMM estimator that is based on a simultaneous system of two equations, which are equations (7′) and (8). Lagged variables serve as instruments for the differenced equation (8) while their lagged first-differences are the instruments for the equation in level (7′):

The validity of the GMM system as a consistent estimator can be ascertained by showing that the error term is not serially correlated and the instruments used are the adequate ones. The first condition is gauged by Arrelano Bond (1991) test for autocorrelation, which determines whether the first-differenced error term has a second-order. The second condition is verified by a test of over-identifying restrictions, which could be either the Sargan test or Hansen Test.

5. DATA ISSUES AND ECONOMETRIC RESULTS

5.1 Brief description of the variables and their sources

The dataset used in this paper refers to an unbalanced panel of 86 developed and developing countries, including 13 Sub-Saharan African countries, observed from 1962 to 1999. It relies to a great extent on Dollar and Kraay's dataset, which was also used in other studies including in Ghura et al. (2004). This database is complemented by several sources. The World Bank's 2004 World Development Indicators provides data on total government expenditure, GE. The International Monetary Fund's 2004 International Financial Statistics supplies figures on Real Effective Exchange Rate (REER)

while Polity V Database is the source for the indicators of political institutions. Ideally, ICRGE7 index might have been the appropriate indicator to capture what is understood as good institutions in this paper (an environment where the rule of law is enforced, effective government and civil society entities exist, and policies and legal framework have not been controlled by vested interest). Unfortunately, I could not get series for this indicator and finally have to content myself with indicators of political institutions, supplied by Polity V Database and Freedom House. These indicators include Democracy index, Democracy, Civil Rights Index, ICL, and Political Rights Index, IPR. Higher values of these indexes indicate better institutions. There are theoretical underpinnings behind using political institutions indexes as indicators of good institutions. It has been widely shown in the literature that democratic institutions are likely to be associated with strong legal structure and security of property, which are some of the features emphasized in the definition of institutions (Clague et al., 1997: Gradstein, M. 2005).

5.2 Main Empirical Results

5.2.1 The results of the estimation of the basic model

The first step is to estimate a basic equation, in which the key variable of interest, the real exchange rate, is introduced in addition to per capita GDP and school enrollment as explanatory variables. I also consider two measures for school enrollment, namely primary and secondary enrollments, to make sure that the results are robust. The same approach will be followed in the rest of the empirical investigation.

7 International Country Risk Guide index is based on underlying numerical evaluations with respect to the expropriation risk, corruption, the rule of law and government repudiation of contracts.

Table 1: The incomes of the poor and real exchange rate
Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (1)	SY-GMM (2)
Log Per Capita Income	0.9071***	(0.0341)
	0.9550***	(0.0361)
Log REER	-0.0065	(0.0148)
	-0.0133	(0.0165)
Log PRIMEDAV	0.0690***	
Log SECEDAV	(0.0172)	0.0279***
		(0.0074)
Number of Observations	203	203
Number of Countries	57	57
Chi-Square(Hansen over-id test)	0.603	0.61
AR(2) (Test for Serial Autocorrelation)	0.920	0.854
P(H0: = 1)	0.223	0.0086
Variables that are instrumented	Log Per Capita Income and Log PRIMEDAV	Log Per Capita Income, Log SECEDAV

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical levelREER, PRIMADAV and SECEDAV stand for Real Effective Exchange Rate, Primary Enrolment and Secondary Enrolment, respectively.
Time dummies are included and they turn not to be significant.
Nakamura and Nakamura (1981) test does not reject the null hypothesis that real exchange rate is exogenous.

Table 1 reports the results on the basic equation. Per capita income, growth in short, and education appear with the theoretically expected signs and are statistically significant. The magnitude of the coefficient on per capita income is 0.907 and 0.955 in specifications (1) and (2), respectively, which is very close to what was found by other studies (Dollar and Kraay, 2002; Ghura et al., 2004). The coefficient on primary enrollment is 0.069 while that on secondary enrollment is 0.028,

suggesting that the positive impact of primary education on the incomes of the poor may be stronger than that of secondary education. Overall, these results seem to lend a strong support to the contention that economic growth and human capital development are conducive to poverty alleviation. However, real exchange rate turns surprisingly with a negative sign, albeit statistically insignificant in all the specifications. The insignificance of real exchange rate can be attributed to two reasons. First, the channels through which real exchange rate influences poverty might have not been properly captured. More specifically, as indicated in the theoretical framework, the level of inequality and the quality of institutions may determine the extent to which real exchange rate influences poverty. Second, regressions based on the basic equation might have left out other important variables. If those variables happen to be correlated with other right-hand-side variables, the estimates may turn biased. It is therefore important to expand the specification to account for other key factors.

5.2.2 The results of the estimation of the core model

The next move is to estimate the core specification of my model, which include as main right-hand-side variables average income, a human capital indicator, real exchange rate and the interactions between real exchange rate and the quality of institutions and between real exchange rate and inequality. To check the robustness of the econometric results, I use three measures of political institutions[8]: democratic institutions index, DEMO, civil liberties index, ICL, and political rights index, IPR, in columns (4), (5) and (6), respectively.

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Table 2: The incomes of the poor, real exchange rate, institutions and inequality

Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (4)	SY-GMM (5)	SY-GMM (6)
Log Per Capita Income	0.9052*** (0.0194)	0.9016*** (0.0167)	0.9097*** (0.0172)
Log REER	0.0469*** (0.0110)	0.0520*** (0.0096)	0.0443*** (0.0079)
Log REER*DEMO	-0.00004 (0.0001)		
Log REER*ICL		0.0001 (0.0004)	
Log REER*IPR			0.00041 (0.0003)
Log REER*GINI	-0.1119*** (0.0100)	-0.1231*** (0.0107)	-0.1163*** (0.0082)
Log PRIMADAV	0.0260*** (0.0094)	0.0264*** (0.0077)	0.0273*** (0.0061)
Number of Observations	203	172	172
Number of Countries	57	56	56
Chi-Square (Hansen over-id test)	0.995	0.956	0.931
AR(2) (Test for Serial Autocorrelation)	0.751	0.315	0.345
P(H0: =1)	0.00	0.00	0.00
Variables that are instrumented	Log Per Capita Income and Log PRIMEDAV, DEMO, and GINI	Log Per Capita Income and Log PRIMEDAV, ICL,and GINI	Log Per Capita Income and Log PRIMEDAV, IPR and GINI

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
DEMO, ICL, IPR, REER and PRIMEDAV stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Primary Enrolment, respectively.
Time dummies are included and they turn not to be significant.

Table 2 presents the results, in which primary education is used as a proxy for human capital accumulation. Except the interaction between real exchange rate and institutions, all the other right-hand-side variables have explanatory power on the incomes of the poor and enter the regressions with the theoretically expected signs. Indeed, average income is positively and significantly correlated to the incomes of the poor. The coefficient on real exchange rate becomes statistically significant and displays a positive sign, which indicates that a real depreciation in exchange rate is potentially beneficial to the poor. More importantly, the interaction between real exchange rate and the Gini coefficient turns to be significantly negative, meaning that inequality has the potential to reduce the positive contribution of real exchange rate depreciation to poverty alleviation. However, the interaction between real exchange rate and all the indicators measuring institutions turn not to exert a statistically significant influence on poverty. This finding does not necessary imply that the quality of institutions does not matter. It could suggest that measures based on political institutions might not be entirely appropriate in gauging the quality of institutions. In line with previous findings, I find primary enrolment to have a positive and significant effect on the incomes of the poor.

Table 3: The incomes of the poor, real exchange rate, institutions and inequality
Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (7)	SY-GMM (8)	SY-GMM (9)
Log Per Capita Income	0.9106*** (0.0176)	0.8994*** (0.0199)	0.9116*** (0.0154)
Log REER	0.0504*** (0.0097)	0.0583*** (0.0098)	0.0501*** (0.0079)
Log REER*DEMO	0.00001 (0.0001)		

Log REER*ICL		0.00005 (0.0004)	
Log REER*IPR			0.0002 (0.0003)
Log REER*GINI	-0.1144*** (0.0104)	-0.1212*** (0.0097)	-0.1165*** (0.0063)
Log SECEDAV	0.0127*** (0.0038)	0.0141*** (0.0054)	0.0155*** (0.0057)
Number of Observations	203	172	172
Number of Countries	57	56	56
Chi-Square (Hansen over-id test)	0.933	0.939	0.989
AR(2) (Test for Serial Autocorrelation)	0.655	0.401	0.551
P(H0:)	0.00	0.00	0.00
Variables that are instrumented	Log Per Capita Income and Log SECEDAV, DEMO, and GINI	Log Per Capita Income and Log SECEDAV, ICL,and GINI	Log Per Capita Income and Log SECEDAV, IPR and GINI

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
DEMO, ICL, IPR, REER and SECEDAV stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Secondary Enrolment, respectively.
Time dummies are included and they turn not to be significant.

The previous results are based on primary enrollment. One concern is whether the results hold up when using alternative measures of human capital. I respond to this question by repeating the previous exercise but using secondary rather than primary enrolment as the measure of human capital accumulation. Results are reported in table 3. Those results bear a lot of similarities to those in table 2, with the notable exception that the coefficient on secondary enrollment is significantly lower than that on primary education. In any event, these results are preliminary because there are some structural and policy variables that have not yet been accounted for.

5.2.3 Additional controls

The second concern that has consistently been raised in the paper is the issue of omitted variables. I therefore consider in tables 4 and 5 potential controls that might have been left out in my core specification. These controls include trade openness, agricultural productivity, public spending variables, three variables that are frequently used as right-side-variables in the regressions on poverty. Accounting for the labour productivity in agricultural sector, AGRPRODAV, is a way to capture the impact of a sectoral distribution of growth on poverty. The poor are likely to live in rural areas and derive their livehood from the agriculture sector. As a result, they are inclined to benefit much more than the rest of the population from a strong performance of that sector. The economic literature is replete with examples of countries where a vibrant productivity in agricultural sector is associated with better outcomes for the poor (Ravallion and Datt: 1996). The idea of considering an indicator of openness in the empirical investigation is justified by the desire to take into account the burning issue of trade liberalization and poverty. I use as indictor of openness the residuals of trade volumes purged of the geographical determinants, OPENADJAV9. Both openness and productivity in agriculture appear not to have a statistically significant effect on poverty. The purpose of adding an indicator for public spending is to include in the empirical analysis the second main policy variable of the dependant economy model: the absorption. In this regard, the government expenditures to GDP ratio appears to be an ideal candidate.

Results from table 4 and 5 clearly reinforce the previous findings. All additional controls turn to be statistically insignificant, expect in column 10 of table 4 where the coefficient on openness turns to be positive and significant. The lack of a statistically significant effect of openness, agricultural productivity and public spending on the incomes of the poor does not imply that these factors are irrelevant for poverty alleviation. It rather suggests that those factors affect

9 The indicator of openness is a residu and requires to be rescaled in order to have the correct variance. I use residual bootstrap but the results suggest that bias is negligible.

the poorest 20 per cent of the society the same way they impact the rest of the population. In other terms, it indicates that the main channel through openness, agricultural productivity and public spending influence the poor is through their impact on the average income or the growth of per capita income

The coefficient on average income, which is the elasticity of the income of the poorest 20 percent of the population with respect to average income, is statistically significant and appears with the expected sign. Its magnitude varies from 0.9016 to 0.9246 and the test on growth-poverty elasticity indicates that its value is statistically different to 1. The positive and significant coefficient on per capita income confirms various studies findings (Foster and Szekely, 2001: Dollar and Kraay, 2002: Ghura et al., 2003) that fostering economic growth is an important avenue for poverty reduction. Putting this finding in the African context, one could affirm that the lackluster economic growth in the continent has been the driving force behind the relatively poor performance of the region in terms of poverty reduction in recent years.

Real exchange rate continues to display a statistically significant impact on poverty. The same is also true for the interaction between real exchange rate and inequality and the human capital development indicator. Both tables 4 and 5 show that the interaction between income distribution, captured through Gini coefficient, and real exchange rate appears with a negative coefficient, with significance obtained at the 1 percent level. Once again, this indicates that a skewed income distribution can undermine the positive impact of an appropriate real exchange rate on the incomes of the poor. The most important change that occurs when including additional controls is that the coefficient on the interaction between real exchange rate and some of institution variables, especially Civil and political Rights indicators, turns significant and appears with a positive sign. Even though entering the regression with the expected sign, the interaction between real exchange rate and democracy

index, DEMO, remains statistically insignificant. Overall, the results on institution variables tend to support the claim that the quality of institutions amplifies the positive impact of an appropriate real exchange rate on poverty alleviation. Turning to human capital indicators, I again find both secondary and primary enrollments to be positively related to the income of the poorest fifth of the population in all specifications.

Table 4: The incomes of the poor, real exchange rate, institutions and inequality and other covariates
Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (10)	SY-GMM (11)	SY-GMM (12)
Log Per Capita Income	0.9155*** (0.0308)	0.9201*** (0.0214)	0.9246*** (0.0234)
Log REER	0.0478*** (0.0114)	0.0440*** (0.0074)	0.0457*** (0.0070)
Log REER*DEMO	0.00002 (0.0001)		
Log REER*ICL		0.00086*** (0.0003)	
Log REER*IPR			0.0056*** (0.0002)
Log REER*GINI	-0.1141*** (0.0092)	-0.1148*** (0.0079)	-0.1121*** (0.0091)
Log PRIMADAV	0.0158** (0.0062)	0.01164 (0.0074)	0.0151*** (0.0056)
OPENADJAV	0.0371** (0.0168)	0.0209 (0.0214)	0.0200 (0.0170)
AGRPRODAV	-0.0250 (0.0128)	-0.0189 (0.0126)	-0.0305 (0.0120)
Log GE	0.0008 (0.0075)	-0.0013 (0.0091)	-0.0054 (0.0079)

Number of Observations	157	148	148
Number of Countries	53	53	53
Chi-Square (Hansen over-id test)	1.00	1.00	1.00
AR(2) (Test for Serial Autocorrelation)	0.395	0.339	0.711
P(H0:)	0.008	0.0005	0.002
Variables that are instrumented	Log Per Capita Income and Log SECEDAV, DEMO, and GINI	Log Per Capita Income and Log PRIMEDAV, ICL, GINI and GE	Log Per Capita Income and Log PRIMEDAV, IPR, GINI and GE

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
** denotes significance of the estimates at 5 percent critical level
DEMO, ICL, IPR, REER and PRIMEDAV, OPENADJAV, AGRPRODAV, GE stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Primary Enrolment, the measure of Openness, the Agricultural Relative Productivity and the ratio Government Expenditures to GDP respectively.
Time dummies are included and they turn not to be significant.

Table 5: The incomes of the poor, real exchange rate, institutions and inequality and other covariates

Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (13)	SY-GMM (14)	SY-GMM (15)
Log Per Capita Income	0.9246*** (0.0215)	0.9240*** (0.0211)	0.9380*** (0.0293)
Log REER	0.0446*** (0.0095)	0.0432*** (0.0078)	0.0407*** (0.0060)
Log REER*DEMO	0.00004 (0.0001)		
Log REER*ICL		0.0006** (0.0003)	
Log REER*IPR			0.0004*** (0.001)
Log REER*GINI	-0.1141*** (0.0156)	-0.1124*** (0.0098)	-0.1106*** (0.0072)

Log SECEDAV	0.0099* (0.0056)	0.0118** (0.0048)	0.0144*** (0.0039)
OPENADJAV	0.0348 (0.0309)	0.0188 (0.0241)	-0.0056 (0.0200)
AGRPRODAV	-0.0178 (0.0122)	-0.0086 (0.0127)	-0.0222 (0.0142)
Log GE	0.0030 (0.0057)	-0.0013 (0.0073)	-0.0039 (0.0148)
Number of Observations	157	148	148
Number of Countries	53	53	53
Chi-Square (Hansen over-id test)	1.00	1.00	1.00
AR(2) (Test for Serial Autocorrelation)	0.342	0.703	0.792
P(H0: =1)	0.001	0.001	0.039
Variables that are instrumented	Log Per Capita Income and Log SECEDAV, DEMO, GINI and GE	Log Per Capita Income and Log SECEDAV, ICL, GINI and GE	Log Per Capita Income and Log SECEDAV, IPR, GINI and GE

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
** denotes significance of the estimates at 5 percent critical level
* denotes significance of the estimates at 10 percent critical level
DEMO, ICL, IPR, REER and SECEDAV, OPENADJAV, AGRPRODAV, GE stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Secondary Enrolment, the measure of Openness, the Agricultural Relative Productivity and the ratio Government Expenditures to GDP respectively.
Time dummies are included and they turn not to be significant.

5.2.4 Asymmetry effects

One of the concerns about the results in tables 4 and 5 is whether the real exchange-poverty correlation is either driven by episodes of real exchange rate depreciation and decline in poverty or episodes of real exchange appreciation and increasing poverty. I address this concern by extending the analysis so as to account for potential asymmetry effects of real exchange rate on poverty. Following Agenor (2002), I introduce two dummy variables. The first is labeled PASY and is equal to 1 times REER when there is

depreciation in real exchange rate and 0 otherwise. The second is called NASY, which gets the value 1 times REER when there is real appreciation in exchange rate and 0 otherwise.

Table 6: The incomes of the poor and real exchange rate asymmetry effects

Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (16)	SY-GMM (17)	SY-GMM (18)
Log Per Capita Income	1.0092*** (0.0216)	1.0062*** (0.0203)	1.0014*** (0.0288)
Log REER*DEMO	-0.00003 (0.0001)		
Log REER*ICL		0.00065** (0.003)	
Log REER*IPR			0.00047 (0.0003)
Log REER*GINI	-0.1085*** (0.0095)	-0.1100*** (0.0101)	-0.1050*** (0.0144)
Log PRIMEDAV	0.0046 (0.0073)	0.0067 (0.0108)	0.0062 (0.0140)
OPENADJAV	0.0270 (0.0257)	0.0044 (0.0186)	0.0123 (0.0144)
AGRPRODAV	-0.0097 (0.0191)	-0.0044 (0.0186)	-0.0216 (0.0186)
Log GE	-0.0054 (0.0108)	-0.0071 (0.0174)	-0.0046 (0.0117)
NASY	0.00038*** (0.00008)	0.00035*** (0.00009)	0.00036*** (0.00006)
PASY	0.00036*** (0.00009)	0.00035*** (0.0001)	0.00038*** (0.00006)

Number of Observations	122	116	116
Number of Countries	44	44	44
Chi-Square (Hansen over-id test)	1.00	0.99	1.00
AR(2) (Test for Serial Autocorrelation)	0.537	0.281	0.281
P(H0: =1)	0.672	0.761	0.960
P[H_0: Coef(NASY)=Coef(PASY)]	0.777	0.941	0.340
Variables that are instrumented	Log Per Capita Income and Log PRIMEDAV, DEMO, GINI and GE	Log Per Capita Income and Log PRIMEDAV, ICL, GINI and GE	Log Per Capita Income and Log PRIMEDAV, IPR, GINI and GE

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
** denotes significance of the estimates at 1 percent critical level
DEMO, ICL, IPR, REER and PRIMEDAV, OPENADJAV, AGRPRODAV, GE stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Primary Enrolment, the measure of Openness, the Agricultural Relative Productivity and the ratio Government Expenditures to GDP respectively. NASY is equal to 1 times REER when there is an appreciation in REER, 0 otherwise. PASY is equal to 1 times REER when there is depreciation in REER, 0 otherwise.
Time dummies are included and they turn not to be significant.

Table 7: The incomes of the poor and real exchange rate asymmetry effects

Dependant variable is the Log average income of the poorest 20 per cent of the population

	SY-GMM (19)	SY-GMM (20)	SY-GMM (21)
Log Per Capita Income	1.0121*** (0.0118)	1.0038*** (0.0147)	1.0085*** (0.0247)
Log REER*DEMO	-0.00004 (0.00013)		
Log REER*ICL		0.0004 (0.0003)	
Log REER*IPR			0.0005 (0.0002)
Log REER*GINI	-0.1057*** (0.0125)	-0.1088*** (0.0085)	-0.1059*** (0.0111)

Log SECEDAV	0.0045 (0.0117)	0.0081* (0.0041)	0.0081 (0.0075)
OPENADJAV	0.0165 (0.0394)	0.0025 (0.0215)	-0.0063 (0.0196)
AGRPRODAV	-0.0136 (0.0585)	-0.0035 (0.0210)	-0.0137 (0.0158)
Log GE	-0.0061 (0.0167)	-0.0042 (0.0088)	-0.0084 (0.1273)
NASY	0.00036*** (0.0001)	0.00035*** (0.00008)	0.00036*** (0.00007)
PASY	0.00035*** (0.0001)	0.00035*** (0.0001)	0.00036*** (0.00007)
Number of Observations	122	116	116
Number of Countries	44	44	44
Chi-Square (Hansen over-id test)	0.99	0.99	1.00
AR(2) (Test for Serial Autocorrelation)	0.55	0.40	0.88
P(H0: =1)	0.31	0.79	0.73
P[H_0: Coef(NASY)=Coef(PASY)]	0.828	0.975	0.814
Variables that are instrumented	Log Per Capita Income and Log SECEDAV, DEMO, GINI and GE	Log Per Capita Income and Log SECEDAV, ICL, GINI and GE	Log Per Capita Income and Log SECEDAV, IPR, GINI and GE

Note: Robust standard errors are in parenthesis
*** denotes significance of the estimates at 1 percent critical level
DEMO, ICL, IPR, REER and SECEDAV, OPENADJAV, AGRPRODAV, GE stand for Democracy, Civil Rights, Political Rights, Real Effective Exchange Rate and Secondary Enrolment, the measure of Openness, the Agricultural Relative Productivity and the ratio Government Expenditures to GDP respectively. NASY is equal to 1 times REER when there is an appreciation in REER, 0 otherwise. PASY is equal to 1 times REER when there is depreciation in REER, 0 otherwise.
Time dummies are included and they turn not to be significant.

Table 6 reports the results in which primary enrollment is used as the measure of human capital development whereas Table 7 contains the results of estimates that revert to secondary enrollment as the measure of education. The results in both tables tilt towards the same conclusions. The more important one is that

the coefficients on PASY and NASY are significant and statistically indistinguishable, which implies that there is no asymmetry effect of real exchange rate on the incomes of the poor. As far as the other explanatory variables are concerned, results largely confirm previous findings. Especially, per capita income, or economic growth, continues to be strongly correlated with poverty as suggested by a significant higher poverty-growth elasticity, which in both tables is not statistically different to 1. The coefficient on the interaction between inequality and real exchange rate also remains statistically significant while those on openness, agricultural productivity and government expenditures are insignificant at conventional significance levels.

6. CONCLUSION

Facing both external and internal imbalances, several developing countries have implemented some economic reforms over the past the two decades. The dependant economy model shows that these policies have two pillars: the reduction of absorption, obtained to a large degree through fiscal adjustment, and the depreciation of real exchange rate. The approach used in this paper consists in assessing the impact of economic policies on poverty through these two instruments, with more emphasis on real exchange rate.

The main point made in the theoretical framework is that the depreciation of real exchange rate is conducive to poverty reduction provided that there are good institutions and a fairly equal distribution of assets. The empirical investigation strongly supports the view that high inequality, proxied by income distribution, impedes the potential positive effect of real exchange rate depreciation on poverty. It also largely backs the contention that the potential positive impact of real exchange rate depreciation on the poor is much stronger when institutions are sound.

Some additional controls are added in the analysis to account for

other factors that might have been missed in the analysis. Education appears to be critical for poverty reduction. On the other hand, trade openness, agricultural productivity and public spending are found not to be statistically associated with the incomes of the poor. The lack of significant coefficients associated with these variables does not mean a complete absence of relationships between these indicators and poverty but rather indicate that trade openness, agricultural productivity and public spending come into play indirectly because of their potential impact on economic growth.

Overall, the main policy implication of my findings is that real exchange depreciation could be a powerful tool for poverty reduction if complemented by other policies. Those policies include facilitating the access of the poor to production factors and improving the quality of institutions.

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ANNEX 1: Sources and Comments

VARIABLE	SOURCE	COMMENTS (IF ANY)
Average Incomes in lowest quintile	Dollar & Kraay	
Per Capita Income	Dollar & Kraay	
REER	International Financial Statistics (2004)	Ratio of prices in the country to prices in the rest of the world adjusted for variations in nominal effective exchange rate. The weighting scheme for world price and nominal effective exchange rate is based on the trade shares of the country's main trade partners. The IFS series were inverted so that an increase in REER means depreciation and a decrease suggests an appreciation.
PRIMAV	Dollar & Kraay	
SECEDAV	Dollar & Kraay	
DEMO	Polity V Database	Polity2 was transformed into DEMO by adding 10. DEMO becomes strictly positive.
ICL	Freedom House	CL was transformed into an increasing function (ICL) by subtracting 7
IPR	Freedom House	PR was transformed into an increasing function (IPR) by subtracting 7
OPENDJAV	Ghura, Dhaneshwar ; Leite, Carlos A., and Charalambos Tsangarides (2002)'s Database	
AGRODAV	Labour productivity in agricultural sector relative to economy wide labor productivity	
GE	World Development Indicators	