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Do institutions alleviate poverty? New Empirical Evidence

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Abstract

This paper analyses whether institutional quality affects poverty, and unlike previous papers, we use a larger dataset and panel estimations. Whereas cross-section regressions disclose a relationship between the quality of institutions and poverty alleviation, this linkage vanishes in panel regression analysis.

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1. Introduction

An enormous body of work has accumulated over the last few decades in an attempt to pinpoint the impact of institutions over the process of economic development. Within this body of literature there are a number of studies that have examined whether a well-working institutional framework affects the standard of living for the poor.

From a theoretical point of view, a number of papers maintain that institutions could play an important role in poverty reduction, see amongst others Grindle (2004), Hasan *et al*. (2007), Rothstein and Uslaner (2005). On the empirical front, the works that examine the links between institutions and poverty rely on pure cross-sectional approaches (Chong and Calderón, 2000; Hasan *et al*. 2007; Tebaldi and Mohan, 2010).

One problem with cross-country regressions is that they fail to control for unobserved country-level effects. In the presence of correlation between these effects and the explanatory variables, which is quite likely in large sample of countries, the coefficient estimates are biased. Moreover, pure cross-sectional analyses do not exploit any piece of information available in the time-series dimension of the data. The only study on the institutional quality-poverty relationship which uses a longitudinal approach is Perera and Lee (2013). However, their investigation is limited to only nine countries from Asia. The small sample size is an important caveat which prevents their result from being generalised. In this study, we employ both cross-sectional and longitudinal approaches on a large set of developing countries. This large-N analysis allows us to generalize our findings. Further, the panel data analysis allows us to go beyond the cross-country variance and to assess whether changes in institutional quality over time within a country have any effect on poverty.

The rest of the paper is organised as follows. Section 2 presents the literature underlying the subject of study. Section 3 displays the empirical model and the methodology. Section 4 describes the sample. Section 5 summarises the empirical findings of the analysis. Finally, section 6 provides some concluding remarks.

2. Literature Review

In recent years a growing strand of literature has debated whether and how the development of a country's institutional set-up could have any relevant effect on the standard of living for the poor. From a theoretical point of view, on one hand, institutions could play an important role in poverty reduction. For example, Grindle (2004) highlights that good governance is a precondition for poverty reduction. According to Hasan *et al*. (2007), weak institutions in the form of ill-defined property rights, mounting corruption and heavy regulatory burden are likely to foster rent-seeking activities by the rich at the expense of the rest of society, especially the poor. Rothstein and Uslaner (2005) explain that universal welfare programs are unlikely to gain the necessary political support if the taxpayers believe that resources will be drained by corruption.

On the other hand, Chong and Calderon (2000) point out a potential adverse effect of institutional quality on poverty. Specifically, the authors suggest that institutional reforms might entail high transaction costs for those who operate in the informal sector, especially the poor, thereby increasing poverty. Eventually, however, institutional reforms will decrease poverty because of the gain in efficiency in public service delivery. Thus, institutional improvement might first increase poverty before alleviating it.

Another important reason why institutions might have an impact on poverty involves a two-step argument: institutions affect either growth or the income level, which in turn affects the poverty rate. On the empirical side, several studies have provided evidence in favour of a positive impact of institutions on economic growth and income level (see, amongst others, Keefer and Knack, 1995; Barro 1997; Hall and Jones, 1999; Acemoglu *et al*.

2001; Rodrick *et al*. 2002). If a trickle-down effect is at work, it follows that institutions will mitigate poverty indirectly through an increase in the economic growth rate/income level. A renowned study from Dollar and Kraay (2002) suggests that economic growth is pro-poor indeed.[1]

We now proceed to summarise previous empirical works focusing on the linkage between institutional quality and poverty rates. Unless specified otherwise, the studies quantify poverty as the proportion of the population that lives below the poverty line (absolute poverty).

Chong and Calderon (2000) analyse the effects of five proxies of institutions on poverty – taken from the International Country Risk Guide - for a sample of about 45 developing countries between 1960 and 1990. Using ordinary least squares they found that the pro-poor impact of institutions is statistically significant in three out of the five institutional measures, namely repudiation of contracts, expropriation risk and bureaucratic quality. They also use an overall index of institutional quality. This measure provides further evidence in favour of a pro-poor impact of institutions. Similar results emerge in an additional specification where institutions are instrumented with public expenditure on defence and legal tradition.

In a similar line of investigation, Hasan *et al*. (2007) study the relationship between institutions and poverty for a sample of up to 80 countries between 1990 and 1999. They use, as institutional index, a principle-component aggregate of three measures of institutional quality, namely rule of law, government efficiency and corruption. Besides institutions and some other controls, their regressors include a set of variables gauging the "easiness" of doing business. Remarkably, the coefficients associated with the institutional variables turn out not to be statistically significant.[2] However, some of the doing business variables are statistical significant with a negative sign, meaning that they have a pro-poor impact.

Tebaldi and Mohan (2010) examine the linkage between institutions and poverty and use a set of variables - including human capital at the beginning of the 20th century, colonial legacy, latitude, costal land and ethnolinguistic fractionalization - to instrument for institutional quality. To proxy for institutions they use six measures taken from Kauffman et al (2007). The coefficients associated with some of the institutional variables – control of corruption, regulatory quality, rule of law, government effectiveness and voice and accountability - are negative and statistical significant, thus providing evidence in favour of a pro-poor impact of institutions. Nevertheless, political stability and expropriation risk lack statistical significance. The negative relationship between institutions and poverty is corroborated by an overall index of institutional quality. We should highlight that once the average income level is accounted for, the authors find that regulatory quality, rule of law and voice accountability becomes statistically insignificant. According to this, the authors suggest that these institutions act on poverty via the income level. On the other hand, the statistical significance of control of corruption and government effectiveness persists. On this basis, the authors argue that these two dimensions of institutions affect poverty via both income level and income distribution.

The next seminal paper on this is Perera and Lee (2013), who reassess the institution-poverty nexus using a system GMM estimator for a panel of nine developing Asian countries. The

[1] One criticism that can be moved to this study is that the authors use the income of the poorest 20 % of population, which is a measure of *relative* poverty. As such this index reflects the issue of inequality rather than poverty. A reduction in this measure do not necessarily implies a reduction of *absolute* poverty, defined as the number of people with an income lesser that $2 a day.

[2] It should be noted that the sign of the coefficient associated with institutions is always negative and it is statistically significant at 10% in one specification.

study covers the period from 1985 to 2009. They use five different measures of institutions along with an aggregate index. When the former index is used, the results support the pro-poor impact of institutions. Moving to the individual measures, the authors find that government stability and law and order have negative signs whereas corruption, democratic accountability and bureaucratic quality have positive signs, all statistically significant. This means that an improvement of institutions might alleviate or exacerbate poverty depending on the specific dimension of institutions under analysis. The authors also show that corruption, democratic accountability and bureaucratic quality increase income inequality. As suggested by the authors, this inequality widening effect can explain why the improvement in some institutions might exacerbate poverty.

3. Empirical Model and Estimation Method

To start our empirical analysis we compute cross sectional estimates based on data averaged over the entire time period

$$Pov_i = \alpha + \beta Pov_i^0 + \gamma I_i + \Gamma X_i + \varepsilon_i \quad [1]$$

where subscript i represents country. Pov_i is a index of poverty incidence and I_i proxies for the country's institutional quality. We include a set of two control variables, X_{it}, namely public spending and population growth. The initial level of poverty, Pov_i^0 has also been included in the set of regressors as poverty rates are likely to show some kind of inertia.

α, β, γ and Γ are the parameters to be identified. The specific impact of institutional quality on poverty is revealed by the coefficient γ. A negative sign of γ corroborates the beneficial impact of institutions in terms of lower levels of poverty, as found in previous empirical studies. On the contrary, a positive sign means that an improvement in the institutional set-up is harmful to the poor. Still in another scenario γ is not statistically distinguishable from zero. This result would imply that the impact of institution on poverty is irrelevant.

Once regression [1] is estimated we move to a panel approach which allows us to exploit any piece of information available in the time-series dimension of the data. The model is as follows:

$$Pov_i = \alpha + \beta Pov_{it-1} + \gamma I_{it} + \Gamma X_i + \lambda_t + \eta_i + \varepsilon_i \quad [2]$$

where *t* stands for time period, λ_t is a time fixed effect, η_i is the country-specific effect and ε_{it} is the disturbance. Each variable in [2] is a five-year average. The panel approach coupled with a specific technique which is explained in the next section allows us to deal with the problems associated with estimation of regression function [1].

3.1 Estimator

Pure cross sectional regression [1] as well as OLS estimation of panel regression [2] yields inconsistent estimates because of the presence of unobserved and time-invariant country-specific factors, η_i.To overcome the omitted variables problem, one approach is to apply the within estimators. Specifically, such technique applies OLS estimation on demeaned data. Although the within estimator is effective in removing the unobserved fixed effects, these estimators yield a downward biased estimate of the coefficient of the lagged dependent

variable (Nickell, 1981). Further, the coefficients of other explanatory variables might also be biased if these are correlated with the lagged dependent variable (Baum, 2006). Arellano and Bover (1995) provide a solution for this problem by proposing the system GMM estimator later fully developed by Blundell and Bond (1998). Such estimator runs simultaneously both an equation in levels and an equation in first differences. Unlike within estimator, the system GMM estimator is robust to the bias introduced by the lagged dependent variable. Further, it also controls for potential endogeneity in the independent variables by using their lagged values as instruments in the estimation.

The consistency of the system GMM estimation depends on the absence of the autocorrelation in the residuals. We test this by applying the Arellano and Bond (1991) AR(2) test. Given the dynamic of the model, it is very likely that the residuals exhibit first order correlation. However, the first-differenced residuals are expected not to display second-order serial correlation. An additional assumption that has to be satisfied for the GMM estimator to be consistent is that the instruments are appropriately uncorrelated with the disturbance process. This is tested by using the *J* test for over-identifying restrictions developed by Hansen (1982).

4. Sample

Our investigation focuses on an unbalanced panel of 69 countries over the period 1984-2013. The data are averaged over five-year periods. This allows us to abstract from short run disturbances and to maximize the number of country-observations. The panel includes observations with a maximum of six non-overlapping periods. Countries which do not have observations for at least two consecutive periods are excluded from the panel. The complete list of countries is displayed in Appendix. The dataset does not record poverty rate for developed counties, thus our analysis is limited to the sample of developing countries.

In keeping with standard development literature, we use the *headcount* index based on the international poverty lines of $ 2 and $ 1.25 a day as our main dependent variable. This index simply counts the number of people with per capita consumption (or income) below the poverty lines. One problem with such measure is that it does not reflect the depth of poverty. A reduction in income of those living below the poverty line will not result in a reduction of the headcount. Such kind of information is reflected in our second measure of poverty, namely the *poverty gap* index. The higher the index, the farther is the average poor from the poverty line.

Our main variable of interest is the quality of institutions. The measure of institutional quality is from the International Country Risk Guide (ICRG) – a dataset collected by the Political Risk Services (PRS). Specifically, as a measure of the overall institutional quality we use the arithmetic average of three PRS indicators: (i) corruption within the political system, (ii) law and order, and (iii) bureaucratic quality. The overall index ranges from 0 to 1, where higher values denote better institutional quality. Data on poverty and control variables are collected from the World Bank *World Development Indicators*. Data on institutions have been retrieved from Teorell *et al*. (2011).

5. Empirical Findings

5.1 Preliminary Overview of the Data

Table I displays some descriptive statistics. As it can be seen, the sample of countries is characterized by a considerable variation in poverty rates. The lowest headcount index at $2 a day belongs to Hungary, with 0.1%. Madagascar has the highest $2 headcount index, 90.8%. Institutional quality also varies considerably across countries. Iraq shows the lowest institutional quality (0.223). The one with the highest ICRG index is Hungary.

Table I: Summary statistics for the main variables (1970-2005).

Variables	Mean	Std.Dev.	Min	Max
Headcount ($2 at day)	0.371	0.286	0.003	0.915
Headcount ($1.25 at day)	26.484	18.032	1.6	82.8
Poverty gap ($2 at day)	31.624	20.286	0.25	96.15
Poverty gap ($1.25 at day)	29.859	21.181	0.13	103.96
Institution	0.404	0.191	0.056	0.833
Public Spending	2.527	0.298	1.567	3.139
Population growth	6.368	2.377	1.197	10.63

Notes: The table illustrates summary statistics of the main variables used for empirical analysis.

Table II illustrates the correlation indices between the variables used in the empirical analysis. As it can been seen, the headcount index and poverty gap are strongly correlated with each other. Countries with better institutions tend to have lower poverty rates. This provides some preliminary evidence that the impact of institutions is beneficial to poor, although the correlation indices are not high. Countries with a fast growing population seem to have higher poverty rates. It is plain that when it comes to causal effects we cannot rely on these indices. We have to use instead the regression function [1] and [2].

Table II: Correlation Matrix

	Headcount ($2 at day)	Headcount ($1.25 at day)	Poverty gap ($2 at day)	Poverty gap ($1.25 at day)	Institutions	Public Spending
Headcount	0.9753					
($1.25 at day)	(0.000)					
Poverty gap	0.974	0.9988				
($2 at day)	(0.000)	(0.000)				
Poverty gap	0.9052	0.9713	0.9768			
($1.25 at day)	(0.000)	(0.000)	(0.000)			
Institutions	-0.2875	-0.2724	-0.2793	-0.2679		
	(0.017)	(0.024)	(0.020)	(0.026)		
Public Spending	-0.1826	-0.1429	-0.1434	-0.1014	0.3911	
	(0.133)	(0.241)	(0.240)	(0.407)	(0.001)	
Pop. growth	0.6679	0.6521	0.6591	0.6291	-0.1973	-0.1148
	(0.000)	(0.000)	(0.000)	(0.000)	(0.104)	(0.348)

Notes: The table shows simple correlations between the main variables used for empirical analysis. P-values are in parentheses.

5.2 Estimation Results

The estimates from the cross-sectional regression described by model [1] are displayed in Table III. Columns 1 to 4 of table 1 show the results from our estimation using the full sample of countries. With regards to the control variables, the initial level of poverty is statistically significant with a positive sign in all specifications. This result means that changes in explanatory variables will affect poverty incidence in the current as well as in future time periods. The estimates also show that growth of population is positively associated with the incidence of poverty. On the other hand, the coefficients associated with public expenditure fail to achieve any conventional level of statistically significance.[3]

Shifting our focus to the main variables of interest, we observe that the coefficient associated with institutions is statistically significant at the 10% level when poverty is measured by the headcount index. The institutions variable is no significant when the poverty gap index is used as the dependent variable. However, a closer look shows that this specific result is driven by some influential points. The DFITS statistics of Welsh and Kuh (1977) identifies Madagascar, Nigeria, Malawi, Mali, Iraq, China, Ivory Coast, Azerbaijan, Vietnam and Guinea as outliers, the specific set of countries depending on the dependent variable used. Once they are dropped from the sample, the coefficient associated with institutions turns out to be statistically significant with a negative sign in all specifications (columns 5-8). These estimates are in line with Chong and Calderon (2000), Tebaldi and Mohan (2010) and Perera and Lee (2013) who also find a significant relationship between poverty incidence and an overall index for the quality of institutions.

Table III: Poverty and institutional quality: cross section results

	Full Sample				**Excluding Outliers**			
	Headcount ($2)	Headcount ($1.25)	Poverty gap ($2)	Poverty gap ($1.25)	Headcount ($2)	Headcount ($1.25)	Poverty gap ($2)	Poverty gap ($1.25)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Institutions	-0.196*	-0.183*	-0.119	-0.080	-0.256**	-0.192**	-0.128*	-0.125***
	(0.116)	(0.107)	(0.079)	(0.065)	(0.107)	(0.088)	(0.067)	(0.047)
Pov^0	0.752***	0.699***	0.672***	0.562***	0.800***	0.704***	0.682***	0.586***
	(0.041)	(0.048)	(0.050)	(0.071)	(0.036)	(0.048)	(0.048)	(0.060)
Public spending	0.227	0.3	0.145	0.084	0.368	0.445**	0.217	0.198*
	(0.279)	(0.264)	(0.189)	(0.159)	(0.251)	(0.214)	(0.145)	(0.101)
Pop. Growth	0.046***	0.029***	0.022***	0.015***	0.028***	0.021**	0.019***	0.011**
	(0.012)	(0.009)	(0.006)	(0.005)	(0.010)	(0.009)	(0.006)	(0.004)
Constant	0.023	0.015	0.02	0.018	0.045	0.009	0.017	0.025
	(0.059)	(0.048)	(0.035)	(0.026)	(0.052)	(0.043)	(0.032)	(0.021)
Countries	69	69	69	69	63	64	64	63
Adjusted R squared	0.908	0.887	0.88	0.808	0.944	0.920	0.914	0.864
Durbin-Wu-Hausman	0.757	0.361	0.331	0.229	0.882	0.662	0.594	0.529

Notes: Robust standard errors are reported in parentheses. The *p*-values for the Durbin-Wu-Hausman statistic indicate that the null hypothesis that the OLS estimator is consistent cannot be rejected. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

[3] We run the Variance Inflation Factor to detect any near-collinearity. We can be comfortable with the chosen set of variables as the maximum VIF is 1.60.

The magnitude of the relationship is substantial: taken at face value, the coefficient in column 5 implies that a one-standard deviation increase in institutional quality (by 0.099 in the overall time period 1984-2013) is estimated to lower the poverty rate by 0.025 (2.5%).

Before moving to the panel evidence it is worth spending a few words about a possible reverse causation from institutions to poverty alleviation. In particular, poverty alleviation might give raise to conditions that foster the development of the institutional set-up. Then, the estimates displayed in table 1 might be biased. To address this concern we run IV methods using initial values for the institutions variable as instruments for the average period values.[4] The p-values associated with the Durbin-Wu-Hausman test of endogeneity are reported at the bottom of table 1. According to the null hypotheses the OLS estimator is consistent implying that the suspected variable is in fact exogenous. As it can be seen, the p-values range from 0.88 to 0.22, which means that we should prefer the OLS estimates over the IV.

We now turn our attention to the panel regression analysis [2]. As it can be seen from Table IV, the OLS panel estimates generally mirror the cross section results. As far as the institutions variable is concerned, pooled OLS corroborate the statistical significance of the impact of institutions on poverty. However, the system GMM given in columns 5-8 tells us a different story. As it can be seen, the coefficients associated with institutions have still a negative sign, yet they are no longer statistically significant. The AR(2) test rules out second-order serial correlation of the residual terms. Further, the Hansen test does not reject the null hypothesis of no correlation between the instruments and the residuals. Therefore, we are confident that the GMM estimator is yielding consistent estimates.

The lack of statistical significance of institutions in GMM estimates is clearly in stark contrast with the panel OLS estimation. The reason underlying this discrepancy is probably due to the presence of the lagged dependent variable and the unobservable country heterogeneity which bias the panel OLS estimates.

Similarly to the panel OLS estimates, the results yielded by model [1] are also biased. However, we cannot say whether the cross-sectional estimates are misleading on the basis of the system GMM estimator. To understand this we need to recall that panel estimates based on five year intervals capture the short run effect of institutions on poverty, whereas the cross-section seizes a long run effect. Thus, the GMM estimates discard any effect from institutions on poverty in the short run. However, this finding does not imply that the pro-poor effect of institutions is statistically insignificant also in the long run. The cross-section estimates are biased, yet this does not authorize us to deny any long-run relationship between institutions and poverty. The results from system GMM might well be compatible with a long-run impact of institutions in terms of poverty alleviation.

Then it is interesting to understand the possible reason underlying this discrepancy between long run and short run effect. As explained in the literature review, Chong and Calderon (2000) suggest that institutional reforms are likely to raise the transaction costs in the informal sector, thereby harming those ones that work there, especially the poor. Then, it is possible that such adverse effect neutralizes the pro-poor effect of institutional reforms in the short-run. However, as maintained by Chong and Calderon (2000), institutional advancements will eventually turn out to be pro-poor in the long-run. This is precisely in line with our cross section estimates. Further research is needed to ascertain the long-run relationship between poverty and the institutional set-up.

[4] The regression of poverty rates on the initial values of institutions yield statistically insignificant coefficients. On the other hand, we observe that the initial values of are a strong predictor of the average values of institutions. This result suggests that the initial values are good IV instrument.

Table IV: Poverty and institutional quality: panel results

	OLS				System GMM			
	Headcount ($2)	Headcount ($1.25)	Poverty gap ($2)	Poverty gap ($1.25)	Headcount ($2)	Headcount ($1.25)	Poverty gap ($2)	Poverty gap ($1.25)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$Institutions_t$	-0.127**	-0.122**	-0.084**	-0.062*	-0.142	-0.156	-0.053	-0.038
	(0.056)	(0.054)	(0.041)	(0.037)	(0.094)	(0.143)	(0.106)	(0.115)
$Poverty_{t-1}$	0.872***	0.815***	0.798***	0.700***	0.822***	0.720***	0.696***	0.528***
	(0.018)	(0.028)	(0.036)	(0.073)	(0.065)	(0.057)	(0.065)	(0.100)
Public $spending_t$	0.091	0.033	0.003	-0.028	0.466	0.296	0.166	0.114
	(0.116)	(0.103)	(0.077)	(0.068)	(0.296)	(0.362)	(0.256)	(0.205)
Pop. $Growth_t$	0.020***	0.011***	0.009***	0.006**	0.041***	0.036**	0.026**	0.015
	(0.005)	(0.004)	(0.003)	(0.003)	(0.014)	(0.016)	(0.012)	(0.009)
Constant	0.052	0.069**	0.055**	0.047**	-0.048	-0.009	-0.021	-0.007
	(0.035)	(0.032)	(0.024)	(0.019)	(0.070)	(0.099)	(0.073)	(0.071)
Countries	69	69	69	69	69	69	69	69
Observations	220	220	220	220	220	220	220	220
R squared	0.946	0.919	0.905	0.805				
Instruments					29	29	29	29
AR(2) test					0.192	0.29	0.185	0.193
Hansen J test					0.506	0.387	0.444	0.335

Notes: Robust standard errors are reported in parentheses. Time period dummies are included for each 5-year period. The *p*-values for the Hansen J test indicate that the null hypothesis of orthogonality condition cannot be rejected, and for the AR(2) test they indicate that there is no second-order serial correlation in the error term. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

6. Conclusions

Previous empirical studies have generally provided evidence in favour of a pro-poor impact of institutions. The purpose of this study is to reassess the causal link from institutional quality to poverty for a sample of developing countries using a panel data analysis based on five years-intervals.

The main results from the empirical investigation can be summarized as follows. In line with the literature, the cross-section analysis corroborates a statistically significant relationship between institutions and poverty alleviation. However, such relationship turns out no statistically significant in the panel approach. This finding shows that institutional improvements do not alleviate poverty in the short run. As for the long run, two outcomes are possible. In one scenario, the statistical significance of the pro-poor effect of institutions which emerges in the cross-section analysis is an artefact of omitted variable bias. Should this be the case, then one would argue that institutions do not have beneficial effect in terms of poverty mitigation. In the alternative scenario, the cross-country regression captures a genuine impact of institutions on poverty. If so, then one would argue that institutions improve poverty in the long run. We leave this issue open to future research.

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Appendix: List of Countries

Albania	Ghana	Nicaragua
Argentina	Guatemala	Niger
Armenia	Guinea	Nigeria
Azerbaijan	Guyana	Pakistan
Bangladesh	Honduras	Panama
Belarus	Hungary	Paraguay
Bolivia	India	Peru
Botswana	Indonesia	Philippines
Brazil	Iran	Romania
Bulgaria	Iraq	Senegal
Burkina Faso	Jamaica	Serbia
Cameroon	Jordan	South Africa
China	Kazakhstan	Sri Lanka
Colombia	Kenya	Tanzania
Congo	Madagascar	Thailand
Costa Rica	Malawi	Togo
Cote d'Ivoire	Malaysia	Tunisia
Dominican Republic	Mali	Turkey
Ecuador	Mexico	Uganda
Egypt	Moldova	Ukraine
El Salvador	Morocco	Venezuela
Ethiopia	Mozambique	Vietnam
Gambia	Namibia	Zambia

Notes: The table illustrates the sample of countries used in the empirical investigation.