Assessing the Impact of Ease of Doing Business and Corruption on Economic Growth for Africa Free Trade Zone (AFTZ) Member States

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Abstract: -*A positive economic growth is one crucial macroeconomic objective of every nation. Many countries have formed regional as well as international trading blocs in an attempt to enhance economic growth and maximise welfare of each member state, the AFTZ member states are not an exception. This paper seeks to investigate the impact of ease of doing business and corruption on economic growth of AFTZ member states. The study employed a panel data analysis for the period 2010-2016, using Stata Statistical Software. The study findings for the bloc, indicated that corruption, trading across borders, getting credit, registration of property, dealing with construction permits, and starting business have a significant impact on the bloc's economic growth; with insolvency resolving and investor protection of concern as well. Paying attention to country effects test, with the quest for efficient results, the study further divided the AFTZ bloc into 3 groups using average GDP as the determining variable. The usual 3 panel models were run for each group, with efficiency noted from the reported adjusted R-squared and overall R-squared. The study recommends each member state to pay particular attention to the identified affecting variables for improved economic growth. The onus to improve economic wellbeing of each state does not lie on the bloc only but on individual efforts as well, since individual differences prevail. All this will enable the broader efficacy and vision of AFTZ to be realised.*

Key Words: *Economic Growth, Ease of Doing Business, Doing Business Indicators, Corruption, AFTZ, Panel Data Analysis.*
JEL Codes: *C01, C12, C33, F15, N17, O55*

I. INTRODUCTION

Africa is one region on the global map with countries still struggling to attract meaningful Foreign Direct Investment (FDI) and hence economic growth rates, which are often low. The year 2015 witnessed one of the historic events on the continent, i.e. the creation of Africa's largest trading bloc, the Africa Free Trade Zone (AFTZ). It consists of the following regional trading blocs in the continent; SADC, COMESA and EAC. Total membership is 26 states with a combined GDP of USD1.2 trillion and 620 million inhabitants.[1]

The most important thing is the diversity of the member states with their unique economic and political systems. Member states in the respective trading blocs, have internal challenges which even makes regional integration not so easy a task. Due to this, most of these countries have painfully lower economic growth rates, with FDI trickling in dribs and drabs which seldom transforms these economies meaningfully. So is this newly created bloc the panacea to Africa's economic growth, economic integration challenges etc.? Will this bloc unlock the roadmap to attaining the continent's agenda 2063? [2]

Interestingly most of these countries share a common feature which is largely the difficult ease of doing business environments. These somehow 'toxic' business environments have resulted in major investments favouring other regions in the world where environments are much conducive. Thus, FDI is elusive for the continent even firms within the borders of the respective countries find it difficult to thrive fully within local environments, causing them to be shut out of the globalisation train given the tremendous speed it is moving at.[3]As a result, this project is a welcome development for the continent as it encourages member states to improve conditions within their borders to facilitate intra Africa trade in the long run.

Doing business indicators is a broad index published by World Bank. It encompasses several parameters which define the ease of doing business in a country. The 10 parameters include, starting a business, registering a property, getting credit, trading across borders among others. The measures have been in use since 2005. According to World Bank there are two aggregate measures for doing business i.e. the ease of doing business ranking and the distance to frontier scores. The later shows the performance of an economy on 41 indicators for 10 doing business categories relative to the benchmark. For instance, if a country has a score of 50, on a category it means it is 50 percentage points away from the frontier as reflected in the performance of other countries in a given period. The ease of doing business ranking aims at assigning a rank for a country from 1-190, on how it will have performed on indicators relative to other countries. The best rank being 1 and the worst a country can be

[1] Extracted from http://www.ipsnews.net/2016/02/africa-launches-largest-trading-block-with-620-million-consumers/
[2] The long term vision of a prosperous Africa, a key goal of African Union member states
[3]Article by Mahuni K 'The Globalisation of African firms', Korea-Africa Centre Publications

ranked relative to others being 190. Problematic areas of Doing Business according to the World Economic Report Forum 2014-2015 include corruption, government bureaucracy and poor infrastructure among other areas.

Africa is a promising continent due to the vast population and untapped natural resources. It has a youthful population which acts as a potential market, natural resources are potential sources of raw materials within and beyond the continent.[4] All this can boost intra Africa trade, hence AFTZ bloc initiative is befitting for a continent still yearning for industrialisation.

For countries in the AFTZ, Botswana, South Africa, Rwanda are some of the countries which have encouraging ease of doing business scores according to World Bank 2016 results. On the other hand, countries such as Zimbabwe, Libya, Somalia, and Eritrea are among poor scorers reflecting difficult business environments. Technology and infrastructure gaps currently exist in the continent in general, this increases cost of doing business. Another problem with Africa is that of corruption. Transparency International Report 2015 shows that for Sub Saharan Africa 40 out of 46 countries are in serious corruption crisis. High risk countries according to the report include, Angola, Burundi and Uganda.[5] A study on corruption by Bonga (2014) using Zimbabwe as a case study has a few important pointers on how corruption is endemic in countries such as Zimbabwe in the continent; the study investigated the various forms of corruption, and showed an index of corruption of 6.8 out 10 (this showed a high affinity for the country Zimbabwe). This is a tip of the iceberg of how corruption is rooted in Zimbabwe. In light of the preceding discussions, in order for efficacy of the AFTZ to be fully realised, besides ease of doing business parameters which need attention, the corruption factor is endemic in Africa as reflected by the brief look of some of AFTZ members.

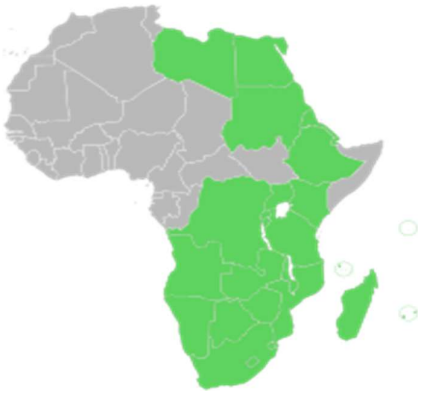
RESEARCH OBJECTIVES

Fundamentally, the study seeks to examine how variations in economic growth is explained by doing business indicators for AFTZ member states, in particular which indicators are essentially important. Furthermore, the research also wants to determine the extent to which corruption determines economic growth variations within the member states besides the doing business indicators. All this helps to see what member states should do for the success of AFTZ, as its success undoubtedly partly hinges on how these twin issues are fully addressed.

II. AFTZ MEMBER STATES: A SYNOPSIS

AFTZ covers the bulk of Southern and Central Africa and partially stretches to North Eastern Africa as shown in figure 1, the regions shaded in green.[6] As alluded to earlier on, the region encompasses a mixed bag of countries with diverse dynamics in terms of economics, politics etc. For instance, in the zone you find some of the most corrupt, poorly managed states relative to some transparent and better managed states. Sadly, all these states have to find common ground for this initiative to work the desired magic through the continent. The conundrum then is, mixing the good and the bad, targeting to achieve the best.

Figure 1: Africa Free Trade Zone Member States



It's worthwhile at this particular juncture to briefly look into some of these member states in particular those which have a lot of issues to do on their respective business environments and those that have fared fairly well in their environments. Also how some of these countries have been rated in as far as corruption is concerned shall be highlighted. In Southern Africa Botswana and South Africa, are countries which have progressed impressively in business environments relative to their other counterparts. For instance, on Doing Business as at 2016, the countries are ranked 71 and 74 respectively. Botswana is doing well given performance of its diamond mining sector. The corruption perception index (CRPI, hereafter) score for Botswana as at 2015 results is 63, which implies strong institutions. South Africa on the other hand, is a powerhouse of the continent which has

[4] Article by John Berman "Seven reasons why Africa's time is now" https://hbr.org/2013/10/seven-reasons-why-africas-time-is-now
[5] Information obtained from https://www.iaca.int/images/news/2016/Corruption_Perceptions_Index_2015_report.pdf
[6] Wikipedia for full details on members. Available on https://en.wikipedia.org/wiki/African_Free_Trade_Zone

strengths in key industries such as mining, manufacturing and processing. Whilst it is a powerhouse of the continent its CRPI score has been at 44. As at May 2016, Moody's, a rating agency assigned South Africa a credit rating of Baa2 although with a negative outlook. According to the report, corruption among other factors were the sources of risks which this country faces.[7] Between March and April 2017 after the infamous cabinet reshuffle in South Africa, in particular the sacking of the finance ministry team among other factors led to downgrading of South Africa to 'junk' status by S & P[8] as well as Fitch[9], a clear testimony of increasing inconsistence and plummeting confidence levels for the economy. Recently, the proposals on the Mining Charter[10] again in South Africa has added to uncertainty to the investor community. All this increases costs of doing business.

As at 2016, Zimbabwe and Tanzania were ranked a disappointing 161 and 132 respectively, with CRPI scores of 21 and 30. Angola, the other potential giant for the continent was ranked at 182 and a low CRPI score of 15, signifying heavy corruption and a toxic doing business environment.

Egypt despite being a potential economic powerhouse for the continent, for the same period it was ranked 122 and had a score of 36, implying substantial corruption. Kenya, is the powerhouse in particular for the East African Community (EAC) regional bloc, despite a ranking of 92, a CRPI score of 25, points to huge corruption. Recently USA suspended aid to Kenya, one of the reasons cited was presence of corruption. Rwanda is a success story for the EAC bloc, which has made significant progress, with an impressive ranking of 54 and a score of 56 for CRPI for the same period. VW, the Germany car maker recently established an automobile plant in Rwanda, a testimony of improving doing business environment in the country and increasing investor confidence.

The preceding brief discourse on conditions of member states of AFTZ, affirms that the countries are so diverse and worlds apart. Harmonising and marrying this diversity together will be the mortar which will bind this regional arrangement into one piece with a shared vision or else the envisaged vision remains but a field of dreams. Besides the discussed factors, other countries for instance Burundi, Somalia, DRC etc. occasionally have incidences of instability. Owing to fragility of states doing business becomes difficult. For instance, countries in the horn of Africa, Somalia, and Eritrea etc. often experience conflict and instability. This obviously makes ease of doing business difficult and investments in other potential sectors complex (Mahuni, 2016). All this adds, to hurdles regards to doing business. The poor corruption scores as reflected by most countries, implies that it is a cancer which is embedded in the structures of these economies. Thus we can safely conclude that the success of AFTZ will also hinge on how problems like corruption are decisively dealt with, besides attending to doing business indicators.

III. LITERATURE REVIEW

Since the inception of doing business indicators, there is now a vast body of literature of studies trying to explain, this concept. In particular, a number of studies on how economic growth or FDI for a country or region is affected by the ease of doing business in a particular country or region. Overtime, World Bank is always refining these indicators, in terms of e.g. methodology of how some of these indicators are ascertained and expanding on how some of them are captured.

Ani (2015) carried out a study on selected Asian countries so as to see how ease of doing business parameters impacted on economic growth within the countries under study. Dealing with construction permits and getting credit had a negative effect. On the other hand, registering a property and trade across borders were found to have a positive effect. Other variables were found not to be significant.

A study by Kasongo (2013) on 40 sub Saharan Africa has important results on link between doing business and FDI inflows. Using seven panel data sets for the countries and FDI as the regress and, doing business indicators were used as regressors. Factors such as starting a business, cost of registering a property were found to be significant in determining FDI inflows in the region. The researcher also found that cost of starting a business, time to register a property, time to export were not significant.

So as to explain how doing business indicators affect economic growth, Haidar (2012) used a sample of 172 countries using panel data spanning 2006-2010. The major finding of the research was that each additional improvement of business regulations resulted in 0.15 increase in economic growth for the period under study.

Mahuni and Bonga (2017) studied how various Doing Business parameters impacted on FDI inflows for Zimbabwe showed that the country has a difficult ease of doing business environment in areas such enforcing contracts which stifles FDI inflows.

Messaoud and Tehem (2014) conducted a study to investigate the link between business regulations for 162 countries from 2007 -2011.The majority of indicators were found to be significant in explaining growth, with the exception of trading across borders and dealing with construction permits.

[7]Moody's Investor's service. Available at http://www.stanlib.com/EconomicFocus/Pages/Moody'sconfirmedSA'ssovereigncreditratingatBaa2.aspx

[8] A top credit rating agency

[9] A top credit rating agency

[10] The charter among other measures aims at reforming the mining sector to allow blacks to have a significant stake

World Bank's International Financial Corporation (2012) is a report which is based on doing business with respect to countries in the Arab league. Its aim was to find out those factors which inhibit or promote Doing Business in the Arab region. The report shows that the Arab world is still grappling with problems like unemployment, low private sector investment etc. Governance was found to be the major hindrance which if manipulated well will help open up economies in the Arab world. Governance influences how institutions are run. In turn variables like enforcing contracts, corruption, getting credit, getting permits etc. will be affected directly or indirectly by governance.

Marek (2012) writing for the World Bank, sought to analyse the relationship between Doing Business, economic growth and regulatory reform. The goal of the paper was to see the importance of instituting reforms as a means of unlocking private sector investment so as to spur economic growth. The researcher acknowledges that whilst the Doing Business indicators cannot be relied upon entirely, they nevertheless help policy makers have a starting point. The research shows Doing Business aspects focusing on costs, have the greatest impact on explaining growth. The researcher singled out factors such as getting credit and enforcement of contracts.

IV. METHODOLOGY

The study, for its analysis used secondary data for 26 countries collected from reliable sources namely; World Bank, Transparency International and UNCTAD statistics. The current study due to data availability, concentrated the analysis on the 2010-2016 period. Economic growth is the dependent variable proxied by annual GDP (Opeyemi, 2011). 11 variables are explaining economic growth; of which 10 are doing business indicators, while corruption index is the eleventh explaining variable. Corruption Perception Index as given by Transparency International assigns scores ranging from 0-100. A score such 100 implies a clean country, whereas a low score e.g. 10 signifies presence of high level of corruption. Doing business indicators, are taken as distance from frontier scores, a score of 100, is the benchmark and ideal for an economy while 1 is the unfavourable country position.

The study chose the panel data analysis technique due to its ability over a short period of time to ensure adequate degrees of freedom for efficient results. Panel data estimation technique, has three models which can be equally used depending on efficient statistical tests namely; Pooled Ordinary Least Squares model, Fixed Effects model and Random Effects model. The choice of an appropriate model depends inter alia on the degree of homogeneity of the intercept and slope coefficients and the extent to which any individual cross-section effects are correlated with the explanatory variables (Song and Witt, 2000), and this is testable.

The economic model for the research was specified as follows to show the functional relationship of the variables under study;

$$GDP = f(SB, DCP, GE, GC, RP, PMI, PT, TAB, EC, RI, CRPI) ----(1)$$

The subsequent econometric model (which has both time dimension and cross-sectional dimension) of the above functional form can be expressed as follows;

$$GDP_{i,t} = \beta_0 + \beta_1 SB_{i,t} + \beta_2 DCP_{i,t} + \beta_3 GE_{i,t} + \beta_4 GC_{i,t} + \beta_5 RP_{i,t} + \beta_6 PMI_{i,t} + \beta_7 PT_{i,t} + \beta_8 TAB_{i,t} + \beta_9 EC_{i,t} + \beta_{10} RI_{i,t} + \beta_{11} CRPI_{i,t} + \varepsilon_{i,t} ---(2)$$

$$and, \qquad \varepsilon_{i,t} = \lambda_t + \eta_{i,t} + v_{i,t} ----------(3)$$

Where; GDP= gross domestic product, β_0=constant term, β_1 -β_{11}=slope coefficients, SB= starting business, DCP=dealing with construction permits, GE= getting electricity, RP=registering property, GC=getting credit, PMI=protecting investors, PT=paying taxes, TAB= trading across borders, EC= enforcing contracts, RI= resolving insolvency, CRPI=corruption perception index, ε=disturbance term, η - unobserved cross-sectional individual effects, v - is the idiosyncratic error, λ - the unobserved time effects, i - denotes country and t -time dimension.

Panel data models take into account a greater degree of the heterogeneity that characterises individuals, regions, firms or study units over time (Hsiao, 2003). Moreover, by combining time-series of cross-section observations, panel data can significantly increase the number of observations. Panel data allows the researcher to distinguish within group correlations from between group correlations (Moyo, 2013). With panel data, study results will remain efficient even if there are omitted variables in the regression equation.

V. DATA ANALYSIS AND ECONOMETRIC MODEL ESTIMATION

The AFTZ has 26 countries, however the analysis has dropped Libya due to serious data problems, the study failed to obtain relevant data for the variables for the period under study. Therefore, the study uses 25 countries in its analysis.

Due to the nature of the study and data collected, a panel data analysis is the best method to use. Panel data analysis relies on three methods, namely Pooled OLS model, Fixed Effects model and Random Effects model. Picking which model to use, usually depends on the study assumptions, and also panel tests can be carried to determine which model best suits the data. The current study will run the three models to confirm the results, and tests will also be done to determine the best model.

5.1 Summary Statistics

Summary statistics for the dependent variable and explanatory variables used in the study are shown below;

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	175	45.68154	87.38279	.53	416.42
crpi	175	33.52571	12.64085	11	65
ri	147	32.32252	16.05922	.0537139	72.50442
ec	175	49.56035	12.82037	25.21676	68.65
tab	174	50.66476	20.27929	1.26	92.68
pt	175	67.92771	13.51239	31.32492	91.91568
pmi	175	47.22385	14.42381	16.66667	80
gc	173	40.7659	22.77071	5	95
rp	175	60.76122	11.39051	27.61442	89.22528
ge	175	59.61627	17.27305	20.43478	84.24401
dcp	168	63.5292	14.3363	26.66667	84.49052
sb	175	68.70247	16.9939	26.12326	94.50762

From the above table, it can be noticed that number of observations are not the same for some variables. This has been caused by data unavailability for some years for some countries. RI is the most affected with 143 observations as compared to the maximum 175 observations. The use of the STATA software is crucial in this scenario as it can hold missing data. Variability is higher in the dependant variable as indicated by a standard deviation of 87.38, and this has been shown by the range where the minimum is 0.53 billion and maximum of 416.42 billion; there is greater difference in national income among AFTZ nations for the period under study. For the explanatory variables, variability is almost the same for each variable, RP has the lowest variability of 11.39, while GC has 22.77.

5.2 Correlation Matrix

Regressions for reliable results requires working with variables that are not serious correlated (correlation that does not exceed 0.8 – rule of thumb). The study undertook a multicollinearity test and results are shown below;

	crpi	ri	ec	tab	pt	pmi	gc	rp	ge	dcp	sb
crpi	1.0000										
ri	0.5505	1.0000									
ec	0.5034	0.2719	1.0000								
tab	0.4894	0.4400	0.0675	1.0000							
pt	0.6373	0.4735	0.2879	0.3782	1.0000						
pmi	0.5059	0.1853	0.4206	0.2847	0.4888	1.0000					
gc	0.4214	0.2326	0.4497	-0.0003	0.1858	0.4896	1.0000				
rp	0.1693	0.0551	0.0929	-0.1593	0.1289	0.1188	0.1524	1.0000			
ge	0.4472	0.4477	0.4578	0.2681	0.0461	0.1013	0.4564	0.2034	1.0000		
dcp	0.4377	0.3965	0.0839	0.3239	0.2942	0.1494	0.2979	0.0454	0.3298	1.0000	
sb	0.3008	0.1019	0.1586	0.2685	0.1928	0.5886	0.2614	0.2767	0.2512	0.1884	1.0000

Form the results above, there is no serious correlation among the explanatory variables. The highest correlation is between CRPI and PT being 0.6373. Therefore, all explanatory variables will be included in the regressions.

5.3 Regression Results

The study undertook all the 3 panel data methods, and the results are presented below;

Dep. Variable: GDP	**POOLED OLS MODEL**			**RANDOM EFFECTS MODEL**			**FIXED EFFECTS MODEL**		
Variables	Coef.	t	p-value	Coef.	z	p-value	Coef.	t	p-value
CRPI	-4.13	-4.14	0.000 ***	0.25	0.58	0.565	0.31	0.70	0.485
RI	-0.49	-0.83	0.411	0.58	1.60	0.109	0.62	1.66	0.100*
EC	1.26	1.45	0.148	0.44	1.11	0.269	0.44	1.08	0.282
TAB	1.37	2.75	0.007***	-0.11	-0.82	0.414	-0.11	-0.82	0.413
PT	0.75	0.70	0.483	-0.04	-0.14	0.892	-0.03	-0.09	0.928
PMI	0.43	0.49	0.625	0.50	2.02	0.043**	0.49	1.91	0.058*
GC	1.31	2.94	0.004***	0.10	0.67	0.503	0.08	0.50	0.617
RP	1.35	1.67	0.097*	-0.02	-0.05	0.959	-0.01	-0.02	0.982
GE	0.39	0.61	0.542	-0.25	-0.96	0.337	-0.28	-1.04	0.302
DCP	1.08	1.76	0.080*	-0.13	-0.55	0.580	-0.15	-0.62	0.537
SB	0.34	0.53	0.596	0.30	1.25	0.210	0.30	1.21	0.231
Constant	-259.5	-3.04	0.003***	-19.76	-0.42	0.675	-20.32	-0.47	0.640
	F (11, 135) = 3.86 (0.0001) Adjusted R-squared = 0.177 Root MSE = 84.434			Wald chi2(11) =15.99 (0.1416) R-squared (overall) = 0.0177 Sigma (u) = 107.34, sigma (e) = 14.38, rho = 0.982			F (11, 115) = 1.39 (0.1861) [ui]: F (20,115) = 226.87 (0.0000) R-squared (overall) = 0.0124		
	Significant; * 10%, ** 5%, *** 1%								

Table above shows the results of the regression results for the three models. The Pooled OLS model shows that 5 variables significantly explain GDP levels for the AFTZ countries, while the Fixed Effects model shows that only 2 variables are significant and the Random Effects model has 1 significant variable, and also a marginally insignificant variable. The Pooled OLS model regression results are contradicting both the Random Effects and the Fixed Effects Model.

The AFTZ as a region, the study has already assumed pooling of data for the region for a collaborative analysis, implying the reliance on the Pooled OLS model. The Pooled OLS model, shows that CRPI, TAB and GC are the most significant variables explain GDP levels (significant at 1% level), and RP and DCP are significant at 10% level. CRPI, the corruption index has a negative significant coefficient (-4.13), implying that the corruption levels in the region negatively affects the income levels. TAB, GC, RP and DCP all have positive significant coefficients, indicating a positive contribution to regional income levels. Variables RI, EC, PT, PMI, GE and SB have been found to insignificantly affect regional income.

5.3.1 Panel Tests

Although the study assumptions require pooling of data, there is greater need to do panel tests to determine the most efficient methodology. Panel tests carried out, include the Chow test (Fixed effects test), the LM test (Breusch and Pagan test) and the Hausman test.

The Chow test reported an F-value of 226.87 with a p-value of 0.0000, indicating that the Fixed Effects model is preferred to the Pooled OLS model. The Breusch and Pagan LM test reported a chi-square statistic of 329.43 with a p-value of 0.0000, indicating that the Random Effects model is preferred to the Pooled OLS model. The two tests are in agreement with each other, causing the study to question its original assumption (though this does not guarantee the assumption to be dropped). Choosing between the Random Effects and the Fixed Effects, the Hausman test is used. The Hausman test reported a Chi-square statistic of 1.16 with a p-value of 0.9999, implying that the Random Effects model is preferred to the Fixed Effects model.

From the panel tests carried out, it is then necessary to consider the regression results of the Random Effects model. The two variables RI and PMI have been found to significantly explain regional income levels, RI with a negative impact while PMI with a positive impact. The results show that investor protection environment if improved will yield higher economic growth. The region should also aim to improve how it resolves insolvency.

5.3.2 Time Effects Test and Country Effects test

To determine the best model for the data analysis, there is greater need to check for time effects and country effects, and sometimes the joint effect of time and country effects.

Time effects test results are presented below;

```
. test _Iyear_2011 _Iyear_2012 _Iyear_2013 _Iyear_2014 _Iyear_2015 _Iyear_2016

 ( 1)  _Iyear_2011 = 0
 ( 2)  _Iyear_2012 = 0
 ( 3)  _Iyear_2013 = 0
 ( 4)  _Iyear_2014 = 0
 ( 5)  _Iyear_2015 = 0
 ( 6)  _Iyear_2016 = 0

       F(  6,   109) =    1.41
            Prob > F =    0.2174
```

The time effects test reported an F-statistic of 1.41 with a p-value of 0.2174, implying that the time effects are insignificant. The impact of time has failed to explain the growth in regional income levels for the period under study.

Country effects test results are presented below;

```
F( 20,   109) =  230.01
     Prob > F =    0.0000
```

The country effects test reported an F-statistic of 230.01 with a p-value of 0.0000, this implies that country effects are present for the countries in the AFTZ region. The country effects test, indicates that, while we may want to pool the countries (as previously assumed), there exist some differences in the region which may prevent the pooling of the countries together for a meaningful analysis. Results from the Pooled OLS may not help to the fullest for policy derivation.

5.4 Grouping AFTZ Member States According to GDP Levels

The study, using the results of the country effects test, have used country average national income for the period under study to further divide the 25 AFTZ countries into 3 groups. The groups are shown in the following table;

AVERAGE GDP (2010-2016)					
GROUP I		**GROUP II**		**GROUP III**	
RSA	359.69	Uganda	24.34	Madagascar	9.94
Egypt	285.34	Zambia	23.59	Rwanda	7.41
Angola	106.61	Botswana	14.86	Malawi	6.34
Sudan	78.29	Zimbabwe	14.23	Swaziland	4.43
Kenya	54.74	Mozambique	13.80	Eritrea	3.34
Ethiopia	49.33	DRC	12.11	Burundi	2.68
Tanzania	41.43	Namibia	12.00	Lesotho	2.49
		Mauritius	11.71	Djibouti	1.48
				Seychelles	1.27
				Comoros	0.59

The 25 countries have been grouped using the average GDP levels for the 2010-2016 period. Group I with higher income has 7 countries, South Africa, Egypt and Angola topping the group. Group II has 8 countries, Uganda, Zambia and Botswana topping the group. Group III has 10 countries, with Madagascar, Rwanda and Malawi on the top, while Comoros, Seychelles and Djibouti on the bottom list. The grouping depends on the range of average national income.

5.4.1 GROUP I REGRESSIONS

South Africa, Egypt, Angola, Sudan, Kenya, Ethiopia, Tanzania. Group I countries have the highest average GDP levels for the period under study, South Africa with an average of US$359.69 billion topping the group while Tanzania recorded US$41.43 billion. Worth to note is that the range remains large for this group despite efforts to classify are concerned.

Summary statistics for Group I are shown below;

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	49	139.3471	122.9018	29.93	416.42
crpi	49	28.06122	9.527172	11	45
ri	42	30.73027	5.555245	18.1016	38.40379
ec	49	51.22884	14.35037	25.21676	66.17498
tab	49	47.98283	16.54575	17.99718	71.56375
pt	49	65.44926	11.01221	48.08729	88.90432
pmi	49	45.83347	17.49563	16.66667	80
gc	49	41.78571	22.59528	5	81.25
rp	49	60.9209	11.46626	27.61442	78.65303
ge	49	66.82023	10.44741	40.97068	84.21494
dcp	49	64.13637	10.85532	45.43057	82.4995
sb	49	69.29364	15.96209	27.94785	87.48431

Variability has changed for this group as compared to first regression. Only GDP the dependant variable has shown that there is greater variation among the countries, and this has been necessitated by greater income values for the Group I countries. For the explaining variables variability has reduced significantly from the statistics of the whole AFTZ member states.

Three panel data methodologies have been estimated for the group and results are shown below;

Dep. Variable: GDP	**POOLED OLS MODEL**			**RANDOM EFFECTS MODEL**			**FIXED EFFECTS MODEL**		
Variables	**Coef.**	**t**	**p-value**	**Coef.**	**z**	**p-value**	**Coef.**	**t**	**p-value**
CRPI	9.71	6.61	0.000***	9.71	6.61	0.000***	2.18	1.63	0.115
RI	1.03	0.46	0.648	1.03	0.46	0.645	3.47	2.86	0.008***
EC	-3.76	-2.46	0.020**	-3.75	-2.46	0.014**	1.90	1.44	0.162
TAB	0.47	0.72	0.477	0.47	0.72	0.471	-0.56	-1.57	0.129
PT	1.95	1.76	0.088*	1.95	1.72	0.078*	3.08	3.88	0.001***
PMI	-0.52	-0.44	0.665	-0.52	-0.44	0.662	1.63	2.59	0.016**
GC	0.19	0.24	0.811	0.19	0.24	0.810	-0.14	-0.36	0.723
RP	4.34	2.32	0.027**	4.34	2.32	0.020**	-3.15	-1.48	0.153
GE	-2.41	-2.10	0.045**	-2.41	-2.10	0.036**	-1.14	-1.85	0.076*
DCP	2.68	2.67	0.012**	2.68	2.67	0.008***	3.06	4.11	0.000***
SB	2.50	1.74	0.091*	2.50	1.74	0.081*	6.55	5.14	0.000***
Constant	-561.2	-2.44	0.021**	-561.2	-2.44	0.015**	-751.6	-4.03	0.000***
	F (11, 30) = 43.63 (0.0000) Adjusted R-squared = 0.9196 Root MSE = 37.436			Wald chi2(11) = 479.88 (0.0000) R-squared (overall) = 0.9412 Sigma (u) = 0, sigma (e) = 17.05, rho = 0			F(11,25)= 6.08 (0.0001) [ui]: F(5,25) = 23.91 (0.0000) R-squared (overall) = 0.6079		
	Significant; * 10%, ** 5%, *** 1%								

From the above regressions, the three models have indicated that most variables significantly explain the levels of national income for the member states. The Pooled OLS and the Random Effects models are in

agreement; the two models have indicated that seven (7) variables significantly explain economic growth for the member states. Significant variables are CRPI, EC, PT, RP, GE DCP and SB; CRPI (an index of corruption levels) being the major determinant significant at 1% level, however with a positive impact.

The Fixed Effects model shows six (6) significant variables; adding RI and PMI as significant variables, which have been rejected by the other two models. The other significant variables include PMI, GE, DCP and SB. RP, EC and TAB are marginally insignificant.

5.4.2 GROUP II REGRESSIONS

Uganda, Zambia, Botswana, Zimbabwe, Mozambique, DRC, Namibia and Mauritius. Group II countries have the medium average income for the period under study, Uganda tops the group with an average of US$24.34 billion annually, and Mauritius is the last with US$11.71 billion.

Summary statistics for Group II are shown below;

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	56	15.83071	5.336429	7.83	28.05
crpi	56	37.16071	14.89451	20	65
ri	49	41.42435	19.76214	.0537139	72.50442
ec	56	51.66732	13.02353	27.32	68.65
tab	56	47.88032	23.2687	1.26	87.74397
pt	56	68.90017	15.02557	31.32492	91.91568
pmi	56	52.02387	12.43244	23.33333	76.66666
gc	56	50.89286	19.37183	18.75	87.5
rp	56	61.24474	9.896014	41.53877	78.82247
ge	56	61.07186	16.82445	33.47826	84.24401
dcp	56	63.38859	16.88026	26.66667	84.49052
sb	56	69.43502	17.09278	26.76988	91.62683

Variability for GDP is significantly lower as compared to the whole AFTZ group, this shows that Group II countries have relatively similar income levels. Variability of the explaining variables, reported a minimum of 9.896 (RP) and a maximum of 19.762 (RI), a range which can be termed marginal.

Group II regression results for the 3 panel data models are presented below;

Dep. Variable: GDP	POOLED OLS MODEL			RANDOM EFFECTS MODEL			FIXED EFFECTS MODEL		
Variables	**Coef.**	**t**	**p-value**	**Coef.**	**z**	**p-value**	**Coef.**	**t**	**p-value**
CRPI	-0.13	-1.17	0.248	-0.13	-1.17	0.240	0.31	2.01	0.053*
RI	0.12	1.33	0.192	0.12	1.33	0.183	0.01	0.09	0.930
EC	0.15	1.72	0.093*	0.15	1.72	0.085*	0.07	0.88	0.388
TAB	-0.07	-1.64	0.109	-0.07	-1.64	0.101	0.02	0.43	0.667
PT	-0.24	-1.17	0.249	-0.24	-1.17	0.242	0.11	0.45	0.654
PMI	-0.14	-0.87	0.389	-0.14	-0.87	0.383	0.16	1.54	0.135
GC	0.08	1.95	0.058*	0.08	1.95	0.051*	0.01	0.29	0.770
RP	-0.04	-0.50	0.622	-0.04	-0.50	0.619	0.31	2.93	0.006***
GE	-0.22	-3.13	0.003***	-0.22	-3.13	0.002***	0.02	0.25	0.803
DCP	-0.06	-0.72	0.473	-0.06	-0.72	0.469	0.03	0.45	0.656
SB	0.35	2.75	0.009***	0.35	2.75	0.006***	0.28	1.76	0.089*
Constant	27.63	2.39	0.022**	27.62	2.39	0.017**	-61.12	-2.55	0.016**
	F (11, 37) = 11.57 (0.0000) Adjusted R-squared = 0.7078 Root MSE = 2.9283			Wald chi2(11) = 127.26 (0.0000) R-squared (overall) = 0.7747 Sigma (u) = 0, sigma (e) = 1.779, rho = 0			F (11,31) = 3.46 (0.0031) [ui]: F (6,31) = 11.54 (0.0000) R-squared (overall) = 0.0511		
	Significant; * 10%, ** 5%, *** 1%								

For Group II countries, both Pooled OLS model and the Random Effects model reported that four variables significantly explain economic growth, and both models are in agreement for signs and magnitude of variables. EC, GC, GE and SB are the significant variables, with GE and SB significant at 1 percent level.

The Fixed Effects model reported three significant variables; CRPI, RP and SB; CRPI and RP have a negative impact on income levels while SB have a positive impact on economic growth levels of the member states.

5.4.3 GROUP III REGRESSIONS

Madagascar, Rwanda, Malawi, Swaziland, Eritrea, Burundi, Lesotho, Djibouti, Seychelles and Comoros. Group III countries are the low income countries as defined by the average GDP levels for the period under study. Madagascar tops the group with an average of US$9.94 billion, while Comoros has the lowest average of US$0.59 billion per annum.

Statistics for Group II countries are presented below;

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	70	3.996286	2.939262	.53	10.67
crpi	70	34.44286	11.41019	18	55
ri	56	25.55261	14.08384	3.38904	42.72675
ec	70	46.70683	11.05356	28.39	65.43989
tab	69	54.82916	19.64524	16.64528	92.68
pt	70	68.88465	13.78592	41.65379	85.67601
pmi	70	44.3571	12.65256	20	66.66666
gc	68	31.69118	22.07282	5	95
rp	70	60.26263	12.53785	39.67756	89.22528
ge	70	53.40903	19.31738	20.43478	80.05976
dcp	63	63.18195	14.46273	36.0999	83.65742
sb	70	67.70261	17.78859	26.12326	94.50762

Just like Group II countries, Group III have reported a lower variability for GDP. The explaining variables also have variability that is almost the same for each variable, the range is very small between the highest and the lowest. Such statistics indicate similarity among the member states.

Group III panel data regressions are presented below;

Dep. Variable: GDP	POOLED OLS MODEL			RANDOM EFFECTS MODEL			FIXED EFFECTS MODEL		
Variables	**Coef.**	**t**	**p-value**	**Coef.**	**z**	**p-value**	**Coef.**	**t**	**p-value**
CRPI	0.04	0.73	0.468	0.04	0.73	0.464	0.01	0.49	0.626
RI	-0.15	-4.51	0.000***	-0.15	-4.51	0.000***	0.04	1.09	0.282
EC	-0.02	-0.28	0.784	-0.02	-0.28	0.783	0.02	0.51	0.614
TAB	0.07	4.03	0.000***	0.07	4.03	0.000***	-0.02	-1.57	0.126
PT	0.10	2.49	0.017**	0.10	2.49	0.013**	0.04	2.18	0.036**
PMI	0.01	0.44	0.662	0.01	0.44	0.660	-0.01	-1.12	0.272
GC	0.09	7.02	0.000***	0.09	7.02	0.000***	0.02	1.72	0.094*
RP	-0.07	-2.04	0.047**	-0.07	-2.04	0.041**	-0.004	-0.21	0.838
GE	-0.10	-3.86	0.000***	-0.10	-3.86	0.000***	0.001	0.04	0.968
DCP	-0.02	-0.80	0.427	-0.02	-0.80	0.423	0.01	0.67	0.508
SB	0.02	0.74	0.462	0.02	0.74	0.458	0.02	1.42	0.165
Constant	2.70	0.92	0.362	2.70	0.92	0.357	-1.70	-0.72	0.474
	F (11, 44) = 19.15 (0.0000) Adjusted R-squared = 0.7840 Root MSE = 1.3928			Wald chi2(11) = 210.63 (0.0000) R-squared (overall) = 0.8272 Sigma (u) = 0, sigma (e) = 0.4737, rho = 0			F(11,37)= 3.01 (0.0059) [ui]: F(7,37) = 49.05 (0.0000) R-squared (overall) = 0.0276		
	Significant; * 10%, ** 5%, *** 1%								

Group III regressions have reported that the Pooled and the Random Effects Model presents similar results. Both models have reported six significant variables; RI, RP and GE with negative impact, and TAB, PT and GC with positive impact. The Fixed Effects model reported two significant variables; PT and GC with positive impact; the variables have been also reported to be significant with same signs by the other two models.

5.5 SUMMARY AND DISCUSSION OF REGRESSION RESULTS

The study employed the Panel data regression technique to analyse the data for the AFTZ member states. The study assumed the Pooled OLS model for the entire group. However, recognising the panel tests (chow, LM and Haussmann) for a better and efficient model, the study also has to run the Random Effects and the Fixed Effects models. Time effects and country effects models have been done, leading to the further division of the group into 3 using the average GDP as the dividing parameter. Four data sets have been run, the whole group of 25 member states, and the 3 divisions of the member states.

The summary of the regressions done are shown in the table below;

Dep. Variable: GDP	25 AFTZ MEMBERS			GROUP I [7 countries]			GROUP II [8 countries]			GROUP III [10 countries]		
Variables	**POLS**	**REM**	**FEM**	**POLS**	**REM**	**FEM**	**POLS**	**REM**	**FEM**	**POLS**	**REM**	**FEM**
CRPI	***			***	***				*			
RI			*			***				***	***	
EC				**	**		*	*				
TAB	***									***	***	
PT				*	*	***				**	**	**
PMI		**	*			**						
GC	***						*	*		***	***	*
RP	*			**	**				***	**	**	
GE				**	**	*	***	***		***	***	
DCP	*			**	***	***						
SB	*			*	*	***	***	***	*			
	Significant; * 10%, ** 5%, *** 1%. **POLS** – Pooled OLS, **REM** – Random Effects Model, **FEM** – Fixed Effects Model.											

The table above gives a summary of the data analysis done by the current study. The AFTZ as a region to improve economic growth have to pay attention to 6 variables affecting the economic growth of the region. These include corruption levels, boarder trading, credit issues, registration of property, construction permits handling and starting business issues. The bloc has to check on the effect of these variables on the economic growth and act to improve accordingly. Corruption levels, boarder trading management and controls, and credit lines are the major significant variables to be dealt with. Not undermining the results of the REM and FEM, the bloc should also address how it resolves issues of insolvency and also improves on investor protection to attract foreign direct investment.

The study results also indicated that, in as much as the bloc might need to address collectively on issues affecting economic growth of the member states, there is greater need to separate the member states into smaller groups and fight further the impacting variables. Thus, the study came up with 3 groups (I, II and III). Each nation within the AFTZ bloc, should also check on what group it falls and check on which variables it should address strongly for the attainment of high levels of growth.

Group I countries, being the high income nations, have resolving insolvency, payment of taxes, dealing with construction permits, starting business, investor protection and getting electricity as significant variables confirming economic growth levels of the member states. The results are drawn from the FEM, which is the best model as per panel tests. Countries in this group should also address issues of corruption, contracts enforcements, and property registration as reported from the POLS and REM regressions, whose results should not be neglected. Worth to note for this group is that, country differences are significant as reported by country effects test (see Appendix B), implying that there are differences that prevail for individual nations, which has to be investigated separately. Time effects are insignificant.

Group II countries, rated as middle income for this study among AFTZ bloc, have registration of property, starting a business and corruption as the significant variables affecting economic growth of member states as reported by the FEM (the best model from panel tests). The group should also have a concern on factors namely; enforcement of contracts, getting credit and getting electricity, which have been reported as significant by the POLS and REM. Time effects have been found significant for this group, indicating that economic growth has been changing with the effect of time, implying a transition. Country differences have also been noted for this group, implying that individual analysis is recommended for efficient analysis.

Group III, composed of lower income countries among the AFTZ bloc, have reported crucial results as well. The Haussmann test, failed to meet the asymptotic assumptions and hence could not report. The Chow test favoured the FEM, while the LM test favoured the REM. Therefore, both models will be reported, and worth to note is that the POLS and the REM have results which are in agreement, from coefficients to p-values. Member states in Group III, should pay attention to variables namely; insolvency resolving, trading across borders, payment of taxes, getting of credit, registration of properties, and electricity provision (reported by the REM and POLS, the FEM also supported the results, though it only mentions PT and GC as the only significant variables). Country differences have been reported, implying further separation required for efficient results. Time effects are insignificant for this group of countries (see Appendix C).

The methodology adopted in this study, has an efficiency tracing component, and hence recommended for policy use. The initial model for the whole bloc, reported an adjusted r-squared and an overall r-squared of 0.177 and 0.0177 for the POLS and REM respectively; and further division of the bloc to three groups have led to the reporting of higher figures of the parameters (0.9196:0.9412, 0.7078:0.7747 and 0.7840:0.8272, for the 3 groups respectively). The FEM reported the same efficiency improvement, though the greatest was for Group I, reporting an overall r-squared of 0.6079. There is greater encouragement for member states to work on improving various doing business indicators, so as for the bloc to improve economic growth.

VI. RECOMMENDATIONS AND CONCLUSIONS

The study has shown how Doing Business indicators should be at the heart and soul of AFTZ trading bloc. Attending to the issues explored in the study is the mortar, which will bind the member states together. The paper has shown how diversity of the member states on their own largely makes it difficult for cross border transactions to be carried with efficiency. The variable TAB attests to this. Thus the member states should strive to open up their borders so as to increase inter Africa trade by reducing barriers among member states .Whilst previous studies on the similar subject have largely dwelt on only the 10 Doing Business indicators given by the World Bank, the study added corruption as it has resulted in the continent haemorrhaged of massive resources through leakages further complicating doing business. Corruption proved to be significant and thus success of this trading bloc will depend too on attending to corruption.

It has also been shown that the diversity of the member states also requires individual efforts by the member states in addressing issues around, credit, registration of property, construction permits handling and starting

business issues within their respective domains. This is corroborated by country effects carried out during the regressions. This will allow convergence around the bloc to be much easier.

The study also recommends that an oversight board be formed by the member states especially consisting of technical people who will work closely with World Bank on guidance and policy direction. Its function will be to design and help member states with a framework of addressing local business environments. This allows also to make sure that member states do conform and align their economies with the bloc's expectations. The major shortcoming of the study though was data unavailability .Thus we recommend for future studies a wider data span to give an appreciation of other factors which may come up. Nevertheless, the study acts as an indispensable policy guide that should be at the disposal of AFTZ member states in their vision for economic growth of the continent.

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APPENDIX

A. AFTZ MEMBER STATES REGRESSIONS (25 COUNTRIES)

POOLED OLS MODEL

Source	SS	df	MS
Model	302571.74	11	27506.5218
Residual	962429.123	135	7129.10461
Total	1265000.86	146	8664.38947

Number of obs = 147
F(11, 135) = 3.86
Prob > F = 0.0001
R-squared = 0.2392
Adj R-squared = 0.1772
Root MSE = 84.434

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	-4.131669	.9985681	-4.14	0.000	-6.10653	-2.156809
ri	-.4943695	.5990056	-0.83	0.411	-1.679018	.6902791
ec	1.260449	.8666519	1.45	0.148	-.4535218	2.97442
tab	1.374611	.4996999	2.75	0.007	.3863581	2.362863
pt	.7507189	1.066891	0.70	0.483	-1.359264	2.860702
pmi	.4336617	.8861184	0.49	0.625	-1.318808	2.186131
gc	1.314981	.446574	2.94	0.004	.4317953	2.198167
rp	1.353302	.8088505	1.67	0.097	-.2463556	2.952959
ge	.3860276	.6318751	0.61	0.542	-.8636268	1.635682
dcp	1.077001	.6107113	1.76	0.080	-.1307977	2.2848
sb	.3444119	.6478087	0.53	0.596	-.9367543	1.625578
_cons	-259.4851	85.269	-3.04	0.003	-428.121	-90.8493

RANDOM EFFECTS MODEL

Random-effects GLS regression
Group variable: code

R-sq: within = 0.1169
between = 0.0159
overall = 0.0177

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Number of obs = 147
Number of groups = 21

Obs per group: min = 7
avg = 7.0
max = 7

Wald chi2(11) = 15.99
Prob > chi2 = 0.1416

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
crpi	.249572	.4336094	0.58	0.565	-.6002868	1.099431
ri	.5778022	.3606208	1.60	0.109	-.1290017	1.284606
ec	.4362578	.3944216	1.11	0.269	-.3367944	1.20931
tab	-.1126039	.1377969	-0.82	0.414	-.3826809	.1574731
pt	-.0431657	.3167725	-0.14	0.892	-.6640283	.5776969
pmi	.5011586	.2480503	2.02	0.043	.0149891	.9873282
gc	.0998141	.1491077	0.67	0.503	-.1924316	.3920598
rp	-.0166015	.3214449	-0.05	0.959	-.646622	.613419
ge	-.2462003	.2563169	-0.96	0.337	-.7485723	.2561716
dcp	-.1280204	.2316009	-0.55	0.580	-.5819497	.3259089
sb	.3022951	.2409979	1.25	0.210	-.1700521	.7746424
_cons	-19.76232	47.14185	-0.42	0.675	-112.1586	72.634
sigma_u	107.36809					
sigma_e	14.382845					
rho	.98237152	(fraction of variance due to u_i)				

FIXED EFFECTS MODEL

Fixed-effects (within) regression
Group variable: code

R-sq: within = 0.1175
between = 0.0106
overall = 0.0124

corr(u_i, Xb) = -0.0871

Number of obs = 147
Number of groups = 21

Obs per group: min = 7
avg = 7.0
max = 7

F(11,115) = 1.39
Prob > F = 0.1861

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	.3140936	.4479396	0.70	0.485	-.5731885	1.201376
ri	.622548	.3759545	1.66	0.100	-.1221455	1.367242
ec	.4447084	.4114067	1.08	0.282	-.3702091	1.259626
tab	-.115953	.1410926	-0.82	0.413	-.3954303	.1635242
pt	-.0292943	.3247683	-0.09	0.928	-.6725978	.6140092
pmi	.4856558	.2537549	1.91	0.058	-.0169838	.9882954
gc	.0768005	.1532933	0.50	0.617	-.2268441	.380445
rp	-.0074794	.3306692	-0.02	0.982	-.6624714	.6475127
ge	-.2753455	.2655563	-1.04	0.302	-.8013613	.2506704
dcp	-.1470634	.2376708	-0.62	0.537	-.6178436	.3237168
sb	.2976304	.2469657	1.21	0.231	-.1915612	.786822
_cons	-20.31669	43.34886	-0.47	0.640	-106.1825	65.54906
sigma_u	93.917868					
sigma_e	14.382845					
rho	.97708471	(fraction of variance due to u_i)				

F test that all u_i=0: F(20, 115) = 226.87 Prob > F = 0.0000

BREUSCH AND PAGAN LM TEST

```
Breusch and Pagan Lagrangian multiplier test for random effects

        gdp[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                 |       Var     sd = sqrt(Var)
        ---------+------------------------------
             gdp |    8664.389        93.0827
               e |    206.8662       14.38284
               u |    11527.91       107.3681

        Test:   Var(u) = 0
                             chi2(1) =   329.43
                          Prob > chi2 =   0.0000
```

HAUSMAN TEST

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
crpi	.3140936	.249572	.0645216	.1123954
ri	.622548	.5778022	.0447458	.1062751
ec	.4447084	.4362578	.0084506	.1169916
tab	-.115953	-.1126039	-.0033491	.030317
pt	-.0292943	-.0431657	.0138714	.0716217
pmi	.4856558	.5011586	-.0155028	.0535035
gc	.0768005	.0998141	-.0230136	.0355772
rp	-.0074794	-.0166015	.0091221	.0775581
ge	-.2753455	-.2462003	-.0291451	.0694389
dcp	-.1470634	-.1280204	-.019043	.0533711
sb	.2976304	.3022951	-.0046648	.0539636

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

 Test:  Ho:  difference in coefficients not systematic

              chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =        1.16
            Prob>chi2 =      0.9999
```

FIXED EFFECTS TEST

```
Fixed-effects (within) regression               Number of obs      =       147
Group variable: code                            Number of groups   =        21

R-sq:  within  = 0.1175                         Obs per group: min =         7
       between = 0.0106                                        avg =       7.0
       overall = 0.0124                                        max =         7

                                                F(11,115)          =      1.39
corr(u_i, Xb)  = -0.0871                        Prob > F           =    0.1861
```

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	.3140936	.4479396	0.70	0.485	-.5731885	1.201376
ri	.622548	.3759545	1.66	0.100	-.1221455	1.367242
ec	.4447084	.4114067	1.08	0.282	-.3702091	1.259626
tab	-.115953	.1410926	-0.82	0.413	-.3954303	.1635242
pt	-.0292943	.3247683	-0.09	0.928	-.6725978	.6140092
pmi	.4856558	.2537549	1.91	0.058	-.0169838	.9882954
gc	.0768005	.1532933	0.50	0.617	-.2268441	.380445
rp	-.0074794	.3306692	-0.02	0.982	-.6624714	.6475127
ge	-.2753455	.2655563	-1.04	0.302	-.8013613	.2506704
dcp	-.1470634	.2376708	-0.62	0.537	-.6178436	.3237168
sb	.2976304	.2469657	1.21	0.231	-.1915612	.786822
_cons	-20.31669	43.34886	-0.47	0.640	-106.1825	65.54906
sigma_u	93.917868					
sigma_e	14.382845					
rho	.97708471	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(20, 115) =   226.87                 Prob > F = 0.0000
```

B. GROUP I REGRESSIONS

POOLED OLS MODEL

Source	SS	df	MS
Model	672527.435	11	61138.8577
Residual	42043.7684	30	1401.45895
Total	714571.203	41	17428.5659

Number of obs = 42
F(11, 30) = 43.63
Prob > F = 0.0000
R-squared = 0.9412
Adj R-squared = 0.9196
Root MSE = 37.436

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	9.707906	1.469475	6.61	0.000	6.706838	12.70897
ri	1.029479	2.231927	0.46	0.648	-3.528724	5.587683
ec	-3.757826	1.527967	-2.46	0.020	-6.87835	-.6373007
tab	.4656667	.6466125	0.72	0.477	-.8548922	1.786226
pt	1.954646	1.107783	1.76	0.088	-.3077491	4.21704
pmi	-.5162823	1.179999	-0.44	0.665	-2.926162	1.893598
gc	.1898015	.7873636	0.24	0.811	-1.41821	1.797813
rp	4.335462	1.866188	2.32	0.027	.5241982	8.146726
ge	-2.409003	1.149036	-2.10	0.045	-4.755646	-.062359
dcp	2.682744	1.004265	2.67	0.012	.6317603	4.733727
sb	2.502309	1.434594	1.74	0.091	-.427522	5.432141
_cons	-561.1678	230.2674	-2.44	0.021	-1031.437	-90.899

RANDOM EFFECTS MODEL

Random-effects GLS regression
Group variable: code

R-sq: within = 0.1083
between = 0.9937
overall = 0.9412

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Number of obs = 42
Number of groups = 6

Obs per group: min = 7
avg = 7.0
max = 7

Wald chi2(11) = 479.88
Prob > chi2 = 0.0000

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
crpi	9.707906	1.469475	6.61	0.000	6.827788	12.58802
ri	1.029479	2.231927	0.46	0.645	-3.345018	5.403976
ec	-3.757826	1.527967	-2.46	0.014	-6.752586	-.7630653
tab	.4656667	.6466125	0.72	0.471	-.8016705	1.733004
pt	1.954646	1.107783	1.76	0.078	-.2165692	4.12586
pmi	-.5162823	1.179999	-0.44	0.662	-2.829038	1.796474
gc	.1898015	.7873636	0.24	0.810	-1.353403	1.733006
rp	4.335462	1.866188	2.32	0.020	.6778013	7.993123
ge	-2.409003	1.149036	-2.10	0.036	-4.661071	-.1569343
dcp	2.682744	1.004265	2.67	0.008	.7144199	4.651068
sb	2.502309	1.434594	1.74	0.081	-.3094427	5.314061
_cons	-561.1678	230.2674	-2.44	0.015	-1012.484	-109.852
sigma_u	0					
sigma_e	17.053393					
rho	0	(fraction of variance due to u_i)				

FIXED EFFECTS MODEL

Fixed-effects (within) regression
Group variable: code

R-sq: within = 0.7279
between = 0.6060
overall = 0.6079

corr(u_i, Xb) = -0.4904

Number of obs = 42
Number of groups = 6

Obs per group: min = 7
avg = 7.0
max = 7

F(11,25) = 6.08
Prob > F = 0.0001

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	2.179825	1.336627	1.63	0.115	-.5730104	4.93266
ri	3.469429	1.212611	2.86	0.008	.9720088	5.966849
ec	1.89597	1.314732	1.44	0.162	-.8117708	4.603711
tab	-.5567043	.3549512	-1.57	0.129	-1.28774	.1743314
pt	3.081285	.7943755	3.88	0.001	1.445238	4.717332
pmi	1.633674	.6305653	2.59	0.016	.3350003	2.932347
gc	-.1386461	.3874551	-0.36	0.723	-.9366247	.6593326
rp	-3.152218	2.136876	-1.48	0.153	-7.553198	1.248761
ge	-1.143325	.6171931	-1.85	0.076	-2.414458	.1278076
dcp	3.057535	.7441548	4.11	0.000	1.52492	4.590151
sb	6.552011	1.275921	5.14	0.000	3.924203	9.179818
_cons	-751.6097	186.298	-4.03	0.000	-1135.298	-367.9217
sigma_u	101.32002					
sigma_e	17.053393					
rho	.97245143	(fraction of variance due to u_i)				

F test that all u_i=0: F(5, 25) = 23.91 Prob > F = 0.0000

BREUSCH AND PAGAN LM TEST

```
Breusch and Pagan Lagrangian multiplier test for random effects

        gdp[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                 |         Var     sd = sqrt(Var)
        ---------+-----------------------------
             gdp |    17428.57        132.0173
               e |    290.8182        17.05339
               u |           0               0

        Test:   Var(u) = 0
                             chi2(1) =     0.11
                          Prob > chi2 =     0.7422
```

HAUSMAN TEST

```
                 ---- Coefficients ----
                 |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                 |    fixed        random       Difference          S.E.
-----------------+------------------------------------------------------------
            crpi |    2.179825     9.707906       -7.528081                .
              ri |    3.469429     1.029479         2.43995                .
              ec |     1.89597    -3.757826        5.653796                .
             tab |   -.5567043     .4656667       -1.022371                .
              pt |    3.081285     1.954646        1.126639                .
             pmi |    1.633674    -.5162823        2.149956                .
              gc |   -.1386461     .1898015       -.3284475                .
              rp |   -3.152218     4.335462       -7.487681         1.040953
              ge |   -1.143325    -2.409003        1.265677                .
             dcp |    3.057535     2.682744        .3747918                .
              sb |    6.552011     2.502309        4.049701                .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                 chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =      401.53
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

TIME EFFECTS TEST

```
. test _Iyear_2011 _Iyear_2012 _Iyear_2013 _Iyear_2014 _Iyear_2015 _Iyear_2016

 ( 1)  _Iyear_2011 = 0
 ( 2)  _Iyear_2012 = 0
 ( 3)  _Iyear_2013 = 0
 ( 4)  _Iyear_2014 = 0
 ( 5)  _Iyear_2015 = 0
 ( 6)  _Iyear_2016 = 0

       F(  6,    19) =    0.56
            Prob > F =    0.7593
```

COUNTRY EFFECTS TEST

```
. test _Icode_30 _Icode_34 _Icode_44 _Icode_50 _Icode_58 _Icode_99

 ( 1)  _Icode_30 = 0
 ( 2)  _Icode_34 = 0
 ( 3)  _Icode_44 = 0
 ( 4)  _Icode_50 = 0
 ( 5)  o._Icode_58 = 0
 ( 6)  _Icode_99 = 0
       Constraint 5 dropped

       F(  5,    19) =   18.73
            Prob > F =    0.0000
```

C. GROUP II REGRESSIONS

POOLED OLS MODEL

Source	SS	df	MS
Model	1091.19341	11	99.199401
Residual	317.263203	37	8.57468116
Total	1408.45661	48	29.3428461

Number of obs = 49
F(11, 37) = 11.57
Prob > F = 0.0000
R-squared = 0.7747
Adj R-squared = 0.7078
Root MSE = 2.9283

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	-.1347452	.1147977	-1.17	0.248	-.3673474	.0978569
ri	.119419	.0897757	1.33	0.192	-.0624838	.3013218
ec	.1451218	.0841849	1.72	0.093	-.0254531	.3156967
tab	-.0686838	.0418588	-1.64	0.109	-.1534978	.0161302
pt	-.2365567	.202183	-1.17	0.249	-.6462185	.173105
pmi	-.1351471	.1549427	-0.87	0.389	-.4490908	.1787966
gc	.0816258	.0417878	1.95	0.058	-.0030443	.1662959
rp	-.0389929	.078475	-0.50	0.622	-.1979984	.1200126
ge	-.2184679	.0698249	-3.13	0.003	-.3599465	-.0769893
dcp	-.0642572	.0886794	-0.72	0.473	-.2439387	.1154243
sb	.3519189	.1281701	2.75	0.009	.0922216	.6116163
_cons	27.62651	11.5358	2.39	0.022	4.252766	51.00026

RANDOM EFFECTS MODEL

Random-effects GLS regression
Group variable: code

R-sq: within = 0.0516
between = 0.9861
overall = 0.7747

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Number of obs = 49
Number of groups = 7

Obs per group: min = 7
avg = 7.0
max = 7

Wald chi2(11) = 127.26
Prob > chi2 = 0.0000

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
crpi	-.1347452	.1147977	-1.17	0.240	-.3597445	.0902541
ri	.119419	.0897757	1.33	0.183	-.0565381	.2953761
ec	.1451218	.0841849	1.72	0.085	-.0198777	.3101212
tab	-.0686838	.0418588	-1.64	0.101	-.1507256	.013358
pt	-.2365567	.202183	-1.17	0.242	-.6328282	.1597147
pmi	-.1351471	.1549427	-0.87	0.383	-.4388292	.168535
gc	.0816258	.0417878	1.95	0.051	-.0002768	.1635283
rp	-.0389929	.078475	-0.50	0.619	-.1928011	.1148153
ge	-.2184679	.0698249	-3.13	0.002	-.3553221	-.0816137
dcp	-.0642572	.0886794	-0.72	0.469	-.2380656	.1095512
sb	.3519189	.1281701	2.75	0.006	.1007101	.6031278
_cons	27.62651	11.5358	2.39	0.017	5.016765	50.23626
sigma_u	0					
sigma_e	1.7788875					
rho	0	(fraction of variance due to u_i)				

FIXED EFFECTS MODEL

Fixed-effects (within) regression
Group variable: code

R-sq: within = 0.5511
between = 0.0848
overall = 0.0511

corr(u_i, Xb) = -0.9319

Number of obs = 49
Number of groups = 7

Obs per group: min = 7
avg = 7.0
max = 7

F(11,31) = 3.46
Prob > F = 0.0031

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	.3097687	.1542701	2.01	0.053	-.0048673	.6244047
ri	.0063334	.0711819	0.09	0.930	-.1388431	.1515098
ec	.0749047	.0854968	0.88	0.388	-.0994671	.2492765
tab	.0180542	.041526	0.43	0.667	-.0666385	.102747
pt	.106773	.2356152	0.45	0.654	-.3737675	.5873134
pmi	.1597436	.1040591	1.54	0.135	-.0524864	.3719736
gc	.0103962	.0352871	0.29	0.770	-.0615724	.0823647
rp	.3084165	.1052916	2.93	0.006	.0936728	.5231602
ge	.0186062	.0739553	0.25	0.803	-.1322266	.1694391
dcp	.0322238	.0716918	0.45	0.656	-.1139926	.1784401
sb	.278615	.1584811	1.76	0.089	-.0446093	.6018393
_cons	-61.12239	23.94864	-2.55	0.016	-109.966	-12.27881
sigma_u	14.975976					
sigma_e	1.7788875					
rho	.98608697	(fraction of variance due to u_i)				

F test that all u_i=0: F(6, 31) = 11.54 Prob > F = 0.0000

BREUSCH AND PAGAN LM TEST

```
Breusch and Pagan Lagrangian multiplier test for random effects

        gdp[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     gdp |    29.34285       5.416904
                       e |    3.164441       1.778887
                       u |           0              0

        Test:   Var(u) = 0
                                 chi2(1) =     0.49
                              Prob > chi2 =     0.4833
```

HAUSMAN TEST

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
crpi	.3097687	-.1347452	.4445139	.1030571
ri	.0063334	.119419	-.1130856	.
ec	.0749047	.1451218	-.0702171	.0149195
tab	.0180542	-.0686838	.086738	.
pt	.106773	-.2365567	.3433297	.1209816
pmi	.1597436	-.1351471	.2948907	.
gc	.0103962	.0816258	-.0712296	.
rp	.3084165	-.0389929	.3474093	.0701997
ge	.0186062	-.2184679	.2370741	.0243696
dcp	.0322238	-.0642572	.096481	.
sb	.278615	.3519189	-.073304	.093213

```
                    b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

 Test:  Ho:  difference in coefficients not systematic

              chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =      102.76
            Prob>chi2 =      0.0000
            (V_b-V_B is not positive definite)
```

TIME EFFECTS TEST

```
. test _Iyear_2011 _Iyear_2012 _Iyear_2013 _Iyear_2014 _Iyear_2015 _Iyear_2016

 ( 1)  _Iyear_2011 = 0
 ( 2)  _Iyear_2012 = 0
 ( 3)  _Iyear_2013 = 0
 ( 4)  _Iyear_2014 = 0
 ( 5)  _Iyear_2015 = 0
 ( 6)  _Iyear_2016 = 0

       F(  6,    25) =    5.03
            Prob > F =    0.0017
```

COUNTRY EFFECTS TEST

```
. test _Icode_18 _Icode_32 _Icode_54 _Icode_78 _Icode_85 _Icode_90 _Icode_94

 ( 1)  _Icode_18 = 0
 ( 2)  o._Icode_32 = 0
 ( 3)  _Icode_54 = 0
 ( 4)  _Icode_78 = 0
 ( 5)  _Icode_85 = 0
 ( 6)  _Icode_90 = 0
 ( 7)  _Icode_94 = 0
       Constraint 2 dropped

       F(  6,    25) =   17.27
            Prob > F =    0.0000
```

D. GROUP III REGRESSIONS

POOLED OLS MODEL

Source	SS	df	MS
Model	408.594021	11	37.144911
Residual	85.354513	44	1.9398753
Total	493.948534	55	8.98088244

Number of obs = 56
F(11, 44) = 19.15
Prob > F = 0.0000
R-squared = 0.8272
Adj R-squared = 0.7840
Root MSE = 1.3928

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	.0353022	.0482573	0.73	0.468	-.0619539	.1325584
ri	-.150922	.033461	-4.51	0.000	-.2183581	-.0834859
ec	-.0157699	.0572843	-0.28	0.784	-.1312188	.0996791
tab	.0681386	.0169159	4.03	0.000	.0340469	.1022303
pt	.0958471	.0384832	2.49	0.017	.0182894	.1734049
pmi	.014804	.0336526	0.44	0.662	-.0530183	.0826262
gc	.0928405	.0132243	7.02	0.000	.0661888	.1194923
rp	-.0707109	.0346427	-2.04	0.047	-.1405286	-.0008933
ge	-.1040347	.0269222	-3.86	0.000	-.1582928	-.0497767
dcp	-.0233906	.0291823	-0.80	0.427	-.0822035	.0354224
sb	.0161943	.0218264	0.74	0.462	-.027794	.0601826
_cons	2.696371	2.928473	0.92	0.362	-3.205579	8.598321

RANDOM EFFECTS MODEL

Random-effects GLS regression
Group variable: code

R-sq: within = 0.0501
between = 0.9710
overall = 0.8272

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Number of obs = 56
Number of groups = 8

Obs per group: min = 7
avg = 7.0
max = 7

Wald chi2(11) = 210.63
Prob > chi2 = 0.0000

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
crpi	.0353022	.0482573	0.73	0.464	-.0592803	.1298848
ri	-.150922	.033461	-4.51	0.000	-.2165043	-.0853397
ec	-.0157699	.0572843	-0.28	0.783	-.1280451	.0965054
tab	.0681386	.0169159	4.03	0.000	.0349841	.1012931
pt	.0958471	.0384832	2.49	0.013	.0204215	.1712728
pmi	.014804	.0336526	0.44	0.660	-.0511538	.0807617
gc	.0928405	.0132243	7.02	0.000	.0669215	.1187596
rp	-.0707109	.0346427	-2.04	0.041	-.1386093	-.0028126
ge	-.1040347	.0269222	-3.86	0.000	-.1568012	-.0512682
dcp	-.0233906	.0291823	-0.80	0.423	-.0805867	.0338056
sb	.0161943	.0218264	0.74	0.458	-.0265847	.0589733
_cons	2.696371	2.928473	0.92	0.357	-3.043331	8.436073
sigma_u	0					
sigma_e	.47370427					
rho	0	(fraction of variance due to u_i)				

FIXED EFFECTS MODEL

Fixed-effects (within) regression
Group variable: code

R-sq: within = 0.4722
between = 0.0529
overall = 0.0276

corr(u_i, Xb) = -0.4569

Number of obs = 56
Number of groups = 8

Obs per group: min = 7
avg = 7.0
max = 7

F(11,37) = 3.01
Prob > F = 0.0059

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crpi	.0105373	.0214354	0.49	0.626	-.0328949	.0539695
ri	.0420942	.0385873	1.09	0.282	-.0360911	.1202796
ec	.0162964	.032078	0.51	0.614	-.0486998	.0812925
tab	-.0141386	.0090269	-1.57	0.126	-.0324289	.0041517
pt	.0414616	.019029	2.18	0.036	.0029051	.0800181
pmi	-.0139381	.0124919	-1.12	0.272	-.0392491	.011373
gc	.017781	.0103442	1.72	0.094	-.0031783	.0387403
rp	-.0048998	.0237822	-0.21	0.838	-.0530871	.0432874
ge	.0008192	.0201357	0.04	0.968	-.0399796	.041618
dcp	.0146573	.0219384	0.67	0.508	-.0297942	.0591088
sb	.0155768	.010984	1.42	0.165	-.006679	.0378325
_cons	-1.702266	2.353912	-0.72	0.474	-6.471746	3.067214
sigma_u	3.4891958					
sigma_e	.47370427					
rho	.98190194	(fraction of variance due to u_i)				

F test that all u_i=0: F(7, 37) = 49.05 Prob > F = 0.0000

BREUSCH AND PAGAN LM TEST

```
Breusch and Pagan Lagrangian multiplier test for random effects

        gdp[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                     gdp |  8.980882       2.996812
                       e |  .2243957       .4737043
                       u |          0              0

        Test:   Var(u) = 0
                                 chi2(1) =     3.23
                              Prob > chi2 =     0.0723
```

HAUSMAN TEST

```
. hausman fixed random

                 ---- Coefficients ----
                |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                |    fixed       random       Difference          S.E.
----------------+----------------------------------------------------------------
           crpi |   .0105373     .0353022      -.0247649                .
             ri |   .0420942     -.150922       .1930162        .0192183
             ec |   .0162964    -.0157699       .0320663                .
            tab |  -.0141386     .0681386      -.0822772                .
             pt |   .0414616     .0958471      -.0543855                .
            pmi |  -.0139381      .014804       -.028742                .
             gc |    .017781     .0928405      -.0750595                .
             rp |  -.0048998    -.0707109       .0658111                .
             ge |   .0008192    -.1040347        .104854                .
            dcp |   .0146573    -.0233906       .0380479                .
             sb |   .0155768     .0161943      -.0006175                .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                           =  -146.85    chi2<0 ==> model fitted on these
                                         data fails to meet the asymptotic
                                         assumptions of the Hausman test;
                                         see suest for a generalized test
```

TIME EFFECTS TEST

```
. test _Iyear_2011 _Iyear_2012 _Iyear_2013 _Iyear_2014 _Iyear_2015 _Iyear_2016

 ( 1)  _Iyear_2011 = 0
 ( 2)  _Iyear_2012 = 0
 ( 3)  _Iyear_2013 = 0
 ( 4)  _Iyear_2014 = 0
 ( 5)  _Iyear_2015 = 0
 ( 6)  _Iyear_2016 = 0

       F(  6,    31) =    1.84
            Prob > F =    0.1236
```

COUNTRY EFFECTS TEST

```
. test _Icode_22 _Icode_23 _Icode_25 _Icode_31 _Icode_47 _Icode_66 _Icode_74 _Icod
> e_88 _Icode_91

 ( 1)  _Icode_22 = 0
 ( 2)  o._Icode_23 = 0
 ( 3)  _Icode_25 = 0
 ( 4)  o._Icode_31 = 0
 ( 5)  _Icode_47 = 0
 ( 6)  _Icode_66 = 0
 ( 7)  _Icode_74 = 0
 ( 8)  _Icode_88 = 0
 ( 9)  _Icode_91 = 0
       Constraint 2 dropped
       Constraint 4 dropped

       F(  7,    31) =   43.75
            Prob > F =    0.0000
```

E. DATA USED IN THE STUDY

Country	Code	Year	SB	DCP	GE	RP	GC	PMI	PT	TAB	EC	RI	CRPI	GDP
Angola	10	2010	52.04	70.15	41.71	27.83	18.75	53.33	59.07	25.89	26.47	.	19	82.47
Angola	10	2011	46.46	76.07	40.97	27.61	18.75	53.33	58.55	27.31	25.22	.	20	104.12
Angola	10	2012	51.28	75.19	42.57	44.36	18.75	53.33	58.54	35.23	25.22	.	22	115.4
Angola	10	2013	53.82	75.35	56.27	46.41	18.75	53.33	58.54	39.34	25.22	.	23	124.91
Angola	10	2014	55.63	75.43	56.53	46.55	18.75	53.33	58.67	40.15	25.22	.	19	126.78
Angola	10	2015	57.15	75.47	56.66	46.62	5.00	51.67	58.37	40.96	25.22	.	15	102.96
Angola	10	2016	76.79	75.53	56.84	46.72	5.00	55.00	60.22	19.27	26.26	.	18	89.63
Burundi	15	2010	68.35	36.10	30.92	57.52	18.75	26.67	45.31	16.65	42.15	7.35	18	2.03
Burundi	15	2011	71.03	36.10	30.92	57.74	18.75	26.67	41.65	18.00	42.15	8.71	19	2.36
Burundi	15	2012	71.97	36.10	30.92	57.82	18.75	56.67	66.41	22.31	42.15	9.06	19	2.47
Burundi	15	2013	91.66	53.89	30.92	63.14	18.75	56.67	66.41	27.47	42.15	8.64	21	2.71
Burundi	15	2014	93.74	60.16	35.27	77.81	18.75	56.67	67.04	33.52	42.15	8.27	20	3.09
Burundi	15	2015	94.25	64.16	35.27	78.38	10.00	51.67	69.45	37.50	42.15	7.98	21	3.1
Burundi	15	2016	94.51	64.22	35.27	78.38	10.00	41.67	69.45	47.38	45.74	7.80	20	3.01
Botswana	18	2010	71.89	58.96	72.05	78.78	62.50	60.00	78.09	43.98	61.29	61.92	58	12.79
Botswana	18	2011	71.88	58.63	71.92	78.82	62.50	60.00	77.47	44.07	62.98	65.48	61	15.68
Botswana	18	2012	78.17	59.46	72.28	78.72	62.50	60.00	77.47	47.56	64.02	66.31	65	14.69
Botswana	18	2013	78.21	60.10	72.51	78.62	62.50	60.00	77.47	51.42	64.02	66.64	64	14.92
Botswana	18	2014	77.95	74.80	72.36	78.65	62.50	60.00	77.47	51.38	64.02	66.64	63	16.26
Botswana	18	2015	76.20	74.87	72.56	78.60	55.00	49.17	77.47	52.02	64.02	67.46	63	14.43
Botswana	18	2016	76.21	74.93	79.11	78.56	55.00	55.00	77.47	85.93	50.95	68.69	60	15.27
Comoros	23	2010	46.91	83.40	74.61	53.71	18.75	33.33	47.37	58.31	33.20	.	21	0.53
Comoros	23	2011	48.73	83.53	75.53	53.71	18.75	33.33	47.37	58.73	33.20	.	24	0.59
Comoros	23	2012	48.31	83.54	75.41	53.71	37.50	33.33	47.37	59.11	33.20	.	28	0.57
Comoros	23	2013	52.61	83.47	75.02	63.67	37.50	33.33	47.37	58.84	33.20	.	28	0.62
Comoros	23	2014	59.96	83.66	76.06	63.78	37.50	33.33	47.37	59.07	33.20	.	26	0.65
Comoros	23	2015	61.03	83.28	76.46	63.83	30.00	45.83	47.37	59.33	33.20	.	26	0.57
Comoros	23	2016	72.89	83.20	76.14	63.79	40.00	40.00	47.37	66.18	32.05	.	24	0.62
Djibouti	25	2010	26.12	61.31	37.63	50.84	6.25	23.33	82.51	77.20	37.31	40.50	32	1.13
Djibouti	25	2011	26.12	61.97	37.63	51.17	6.25	23.33	73.90	77.30	37.31	40.17	30	1.24
Djibouti	25	2012	26.12	57.26	45.60	51.18	6.25	23.33	74.31	77.91	37.31	41.17	36	1.35
Djibouti	25	2013	27.69	58.32	46.94	51.43	6.25	23.33	74.31	78.24	37.31	41.22	36	1.46
Djibouti	25	2014	61.01	58.65	48.13	51.50	12.50	23.33	74.56	78.50	37.31	41.48	34	1.59
Djibouti	25	2015	65.89	63.54	50.18	51.63	5.00	39.17	74.56	78.65	37.31	39.83	34	1.73
Djibouti	25	2016	66.45	64.00	51.86	51.73	5.00	30.00	74.56	51.87	28.39	41.06	30	1.84
Egypt	30	2010	85.85	65.00	75.75	67.16	56.25	36.67	55.30	65.83	44.02	18.10	31	218.9
Egypt	30	2011	87.06	66.05	76.02	67.25	56.25	36.67	57.68	69.45	44.02	18.77	29	236
Egypt	30	2012	87.13	66.46	76.24	67.33	56.25	36.67	57.15	70.07	44.02	29.52	32	279.4
Egypt	30	2013	87.13	68.35	76.49	67.41	56.25	36.67	59.76	70.65	44.02	29.42	32	288.6
Egypt	30	2014	87.22	68.98	76.73	69.09	56.25	36.67	61.03	71.15	44.02	28.79	37	305.5
Egypt	30	2015	87.28	69.33	76.86	69.66	50.00	44.17	58.96	71.56	44.02	28.60	36	332.7
Egypt	30	2016	87.48	69.66	76.99	69.81	50.00	48.33	58.87	42.23	40.90	28.97	34	336.3
Eritrea	31	2010	33.25	.	62.16	39.68	12.50	26.67	43.06	19.73	65.03	.	26	2.12

Eritrea	31	2011	35.95	.	65.84	39.70	12.50	26.67	43.06	25.67	64.34	.	25	2.61
Eritrea	31	2012	38.36	.	64.69	39.73	12.50	26.67	43.06	27.66	63.52	.	25	3.09
Eritrea	31	2013	42.14	.	68.51	39.76	12.50	26.67	43.06	29.49	62.70	.	20	3.44
Eritrea	31	2014	42.80	.	69.15	39.77	12.50	26.67	43.49	30.99	62.70	.	18	3.86
Eritrea	31	2015	44.81	.	70.28	39.78	.	38.33	43.49	32.24	62.70	.	18	4.05
Eritrea	31	2016	46.16	.	71.23	39.79	.	35.00	43.49	.	52.75	.	18	4.2
Ethiopia	44	2010	30.39	66.33	65.97	61.34	25.00	16.67	75.36	18.00	65.43	34.61	27	29.93
Ethiopia	44	2011	32.41	71.48	71.07	61.47	25.00	16.67	75.36	26.97	65.43	33.66	27	31.95
Ethiopia	44	2012	27.95	75.99	69.58	61.51	25.00	16.67	75.36	28.38	65.43	33.85	33	43.31
Ethiopia	44	2013	37.65	77.85	72.76	61.60	25.00	16.67	67.86	33.79	65.43	27.93	33	47.65
Ethiopia	44	2014	46.57	47.34	75.52	61.67	25.00	16.67	69.22	39.14	65.43	29.04	33	55.61
Ethiopia	44	2015	49.22	47.34	76.39	61.69	15.00	41.67	66.83	38.58	65.43	31.03	33	64.46
Ethiopia	44	2016	53.64	47.34	77.46	61.72	15.00	31.67	66.27	42.39	59.06	31.88	34	72.37
Kenya	50	2010	69.11	82.50	69.56	54.31	62.50	50.00	48.09	49.33	55.15	34.04	21	40
Kenya	50	2011	70.31	74.70	69.35	54.25	62.50	50.00	49.32	51.66	55.15	32.10	22	41.95
Kenya	50	2012	70.01	74.79	69.47	54.08	62.50	50.00	49.55	52.02	55.15	33.27	27	50.41
Kenya	50	2013	72.31	71.66	72.85	54.19	62.50	50.00	54.88	52.05	50.98	31.79	27	55.1
Kenya	50	2014	72.61	72.16	71.59	54.25	62.50	50.00	59.62	53.67	50.98	26.57	25	61.45
Kenya	50	2015	72.52	60.58	71.88	52.29	35.00	45.83	71.34	54.49	50.98	29.12	25	63.77
Kenya	50	2016	74.45	58.56	78.10	54.58	70.00	53.33	71.34	66.38	58.27	30.04	26	70.53
Lesotho	66	2010	77.38	43.97	60.21	52.34	37.50	36.67	76.39	45.16	46.84	27.94	35	2.39
Lesotho	66	2011	77.50	43.97	60.24	52.32	37.50	36.67	76.37	53.78	46.84	29.90	35	2.79
Lesotho	66	2012	77.69	43.97	61.10	52.49	37.50	36.67	76.39	53.95	46.84	30.76	45	2.68
Lesotho	66	2013	82.39	45.80	64.02	52.64	37.50	50.00	69.72	57.26	53.94	30.89	49	2.53
Lesotho	66	2014	82.59	49.70	66.78	65.72	37.50	50.00	69.72	58.45	53.94	31.12	49	2.52
Lesotho	66	2015	82.84	54.46	68.20	66.36	25.00	49.17	69.72	57.86	53.94	31.26	44	2.34
Lesotho	66	2016	82.85	54.75	68.28	66.40	50.00	50.00	69.72	91.60	57.18	30.96	39	2.2
M/gascar	74	2010	68.07	44.37	26.24	49.49	12.50	56.67	73.09	62.53	45.91	16.42	26	8.73
M/gascar	74	2011	64.52	44.37	21.57	48.46	12.50	56.67	73.51	65.07	45.91	16.42	30	9.89
M/gascar	74	2012	80.64	44.37	24.30	46.86	12.50	56.67	73.92	66.10	45.91	15.13	32	9.92
M/gascar	74	2013	80.89	44.37	21.31	47.46	12.50	56.67	74.61	66.79	45.91	14.11	28	10.61
M/gascar	74	2014	80.95	42.84	21.50	47.43	12.50	56.67	75.93	68.17	45.91	12.22	28	10.67
M/gascar	74	2015	81.22	38.06	22.97	47.52	5.00	53.33	76.32	68.98	49.21	12.22	28	9.74
M/gascar	74	2016	79.63	38.06	24.36	49.83	15.00	48.33	76.32	60.95	42.85	12.22	26	9.99
Moza	78	2010	75.76	63.93	69.57	57.23	18.75	53.33	66.66	60.22	34.61	27.22	27	10.15
Moza	78	2011	79.80	64.79	71.57	58.86	18.75	53.33	66.66	60.68	34.61	29.26	27	13.13
Moza	78	2012	80.13	66.12	55.65	60.20	18.75	53.33	66.66	61.47	34.61	30.33	31	14.53
Moza	78	2013	80.21	66.97	56.47	61.05	18.75	53.33	66.66	62.23	34.61	29.98	30	16.02
Moza	78	2014	80.30	76.07	55.67	61.86	18.75	53.33	67.09	64.18	34.61	35.81	31	16.96
Moza	78	2015	80.43	76.69	57.19	67.70	30.00	51.67	67.09	64.76	34.61	36.50	31	14.8
Moza	78	2016	80.23	78.99	57.83	68.10	25.00	43.33	67.78	66.31	27.32	36.76	27	11.01
Mauritius	85	2010	91.36	62.86	83.30	64.15	56.25	76.67	91.45	86.37	61.91	59.15	54	10
Mauritius	85	2011	91.40	62.96	83.44	64.18	56.25	76.67	91.29	86.98	63.96	61.94	51	11.52
Mauritius	85	2012	91.43	63.01	83.52	64.84	56.25	76.67	91.45	87.07	63.96	61.94	57	11.67

Mauritius	85	2013	91.46	63.09	84.10	65.98	68.75	76.67	91.10	87.55	63.96	72.04	52	12.13
Mauritius	85	2014	91.43	61.80	84.15	65.99	75.00	76.67	91.92	87.60	64.91	72.32	54	12.8
Mauritius	85	2015	91.61	64.41	84.17	65.95	65.00	65.00	91.92	87.74	66.22	72.50	53	11.68
Mauritius	85	2016	91.63	73.12	84.24	65.97	65.00	65.00	91.92	78.67	68.65	72.50	54	12.16
Malawi	88	2010	64.34	74.69	20.43	65.04	43.75	53.33	83.21	23.22	36.27	18.87	34	6.96
Malawi	88	2011	64.29	74.69	20.43	71.25	43.75	53.33	83.32	25.40	36.27	19.31	30	8
Malawi	88	2012	66.49	74.88	20.43	68.16	43.75	53.33	82.00	30.74	36.27	19.92	37	6.03
Malawi	88	2013	60.03	74.78	20.43	67.35	43.75	53.33	75.59	30.20	36.27	19.92	37	5.52
Malawi	88	2014	61.83	74.94	23.03	70.88	43.75	53.33	72.31	33.91	43.73	16.75	33	6.05
Malawi	88	2015	66.96	75.09	35.78	71.07	25.00	45.00	71.51	37.40	43.73	12.99	31	6.37
Malawi	88	2016	69.71	75.26	48.20	71.27	45.00	43.33	71.82	63.32	46.48	13.39	31	5.44
Namibia	90	2010	67.76	82.25	75.45	56.65	68.75	53.33	66.17	64.37	63.73	33.44	44	11.27
Namibia	90	2011	68.00	83.03	75.70	52.45	68.75	53.33	66.17	64.77	63.73	36.29	44	12.41
Namibia	90	2012	68.16	83.13	75.91	52.90	68.75	53.33	66.17	64.34	63.73	36.97	48	13.02
Namibia	90	2013	67.99	82.79	78.55	46.52	68.75	53.33	73.57	65.01	63.73	37.55	48	12.71
Namibia	90	2014	68.46	83.05	78.92	41.54	68.75	53.33	73.57	66.12	64.82	37.61	49	12.85
Namibia	90	2015	68.67	83.17	78.94	41.61	55.00	53.33	73.57	63.17	64.82	37.93	53	11.49
Namibia	90	2016	68.92	81.87	79.19	41.70	60.00	55.00	73.63	61.47	56.03	37.57	52	10.27
Rwanda	91	2010	89.76	54.31	66.47	78.06	43.75	63.33	78.03	38.04	63.58	3.46	40	5.77
Rwanda	91	2011	89.91	59.72	69.44	78.98	43.75	63.33	78.64	44.45	64.40	3.47	50	6.49
Rwanda	91	2012	90.42	61.42	72.80	67.65	43.75	63.33	83.09	47.87	64.40	3.45	53	7.32
Rwanda	91	2013	85.52	62.87	75.88	69.45	81.25	63.33	83.93	49.42	65.44	3.39	53	7.62
Rwanda	91	2014	85.70	54.47	75.59	89.15	87.50	66.67	80.76	51.84	65.44	20.50	49	8.02
Rwanda	91	2015	80.60	65.27	79.48	89.20	90.00	46.67	80.96	44.67	63.94	21.03	54	8.26
Rwanda	91	2016	82.92	66.11	80.06	89.23	95.00	51.67	81.48	71.19	56.76	20.63	54	8.38
Sudan	34	2010	72.28	47.34	62.96	77.78	25.00	30.00	66.89	30.68	40.43	34.51	16	65.63
Sudan	34	2011	70.89	48.41	64.52	77.86	25.00	30.00	66.89	30.68	40.43	34.82	16	67.33
Sudan	34	2012	71.45	50.56	65.10	77.94	25.00	30.00	66.89	30.68	40.43	35.78	13	68.13
Sudan	34	2013	73.52	55.53	70.95	78.35	25.00	30.00	66.89	33.32	40.43	35.78	11	72.07
Sudan	34	2014	73.48	55.25	67.22	78.34	25.00	30.00	62.34	42.66	40.43	35.78	11	82.15
Sudan	34	2015	73.84	55.81	63.30	78.40	15.00	31.67	62.34	46.98	40.43	34.32	12	97.16
Sudan	34	2016	75.14	59.04	69.65	78.65	15.00	21.67	62.34	19.16	46.91	34.14	14	95.58
Swaziland	22	2010	64.60	75.03	59.80	55.25	62.50	20.00	74.94	52.91	35.93	37.58	32	4.44
Swaziland	22	2011	65.72	75.10	60.03	55.46	62.50	43.33	74.87	59.97	35.93	40.48	31	4.82
Swaziland	22	2012	66.20	75.40	60.73	58.80	62.50	43.33	74.49	58.65	35.93	41.10	37	4.81
Swaziland	22	2013	66.85	75.80	61.68	58.78	62.50	43.33	74.87	62.46	36.37	41.22	39	4.58
Swaziland	22	2014	70.91	75.52	61.01	58.80	62.50	43.33	74.60	64.36	36.37	41.41	43	4.49
Swaziland	22	2015	73.47	75.86	61.81	58.78	55.00	47.50	74.51	65.43	36.37	41.60	42	4.14
Swaziland	22	2016	73.46	75.85	61.80	58.78	50.00	43.33	75.54	92.68	33.94	41.50	43	3.73
Seychelles	47	2010	76.20	73.22	62.76	71.01	25.00	56.67	76.12	77.06	61.62	42.73	48	0.97
Seychelles	47	2011	76.50	73.45	62.39	71.01	25.00	56.67	77.16	79.11	61.20	40.53	48	1.07
Seychelles	47	2012	76.68	73.59	62.63	71.00	25.00	56.67	85.68	79.45	55.88	42.19	52	1.13
Seychelles	47	2013	76.87	73.76	62.93	71.00	25.00	56.67	84.16	79.79	55.88	42.66	54	1.41
Seychelles	47	2014	78.32	73.83	64.18	71.00	25.00	56.67	84.16	81.73	55.88	41.90	55	1.42

Seychelles	47	2015	78.42	71.30	64.32	71.00	10.00	58.33	81.85	81.65	56.92	41.83	55	1.44
Seychelles	47	2016	78.55	71.37	64.50	71.00	40.00	50.00	81.82	71.79	51.25	42.31	55	1.43
Tanzania	99	2010	74.44	45.43	49.34	56.48	43.75	53.33	59.91	54.38	66.17	22.96	27	31.4
Tanzania	99	2011	75.27	48.64	71.37	56.49	43.75	53.33	59.91	55.33	66.17	23.58	30	33.88
Tanzania	99	2012	75.57	49.89	72.11	59.27	43.75	53.33	59.70	61.63	66.17	23.64	35	39.1
Tanzania	99	2013	77.85	47.48	73.26	60.20	43.75	53.33	59.70	59.94	66.17	23.38	33	44.34
Tanzania	99	2014	78.37	49.83	74.30	60.07	43.75	53.33	59.29	60.65	66.17	23.08	31	48.2
Tanzania	99	2015	77.71	52.03	75.28	60.10	25.00	43.33	58.95	62.96	66.17	22.87	30	45.63
Tanzania	99	2016	78.93	56.03	77.05	60.16	65.00	40.00	59.04	20.21	61.66	22.64	32	47.43
Uganda	54	2010	59.26	39.24	40.86	55.96	43.75	46.67	73.76	31.09	54.84	44.23	25	20.18
Uganda	54	2011	59.74	41.63	53.80	56.01	43.75	46.67	73.76	38.33	55.38	42.75	24	20.51
Uganda	54	2012	63.91	45.02	33.48	60.15	43.75	46.67	72.52	39.98	55.38	43.30	29	23.52
Uganda	54	2013	64.14	47.74	33.48	58.42	43.75	46.67	72.53	39.13	55.38	41.87	26	24.88
Uganda	54	2014	64.19	46.82	33.48	62.01	43.75	46.67	71.32	45.67	60.48	38.72	26	27.93
Uganda	54	2015	65.92	53.38	33.48	62.70	30.00	47.50	72.76	48.01	60.48	40.80	25	27.86
Uganda	54	2016	69.26	57.45	40.14	62.73	65.00	50.00	72.76	58.90	60.60	42.10	25	25.53
RSA	58	2010	80.73	71.84	56.88	60.48	81.25	80.00	87.30	57.08	65.10	34.69	45	375.35
RSA	58	2011	80.72	71.91	56.57	60.10	81.25	80.00	87.20	58.22	66.14	37.03	41	416.42
RSA	58	2012	81.42	71.50	55.15	67.31	81.25	80.00	86.96	60.00	66.14	37.93	43	396.33
RSA	58	2013	81.43	71.57	55.46	66.69	81.25	80.00	86.78	70.42	66.14	38.05	42	366.62
RSA	58	2014	81.43	71.57	55.62	66.18	81.25	80.00	88.90	71.18	66.14	38.23	44	350.85
RSA	58	2015	79.71	68.71	55.74	66.02	60.00	67.50	88.81	71.05	66.14	38.40	44	317.41
RSA	58	2016	79.71	68.67	84.21	65.50	60.00	70.00	88.85	58.01	54.10	37.96	45	294.84
DRC	32	2010	30.15	72.13	36.52	42.03	18.75	23.33	32.77	18.10	30.36	.	20	12.01
DRC	32	2011	39.92	83.77	36.52	49.45	18.75	23.33	31.32	22.27	30.36	.	20	14.43
DRC	32	2012	44.70	84.07	36.52	50.48	18.75	23.33	31.32	26.98	30.36	.	21	13.68
DRC	32	2013	46.46	84.19	36.52	50.91	18.75	23.33	31.32	28.61	30.36	.	22	14.09
DRC	32	2014	26.77	84.49	36.52	52.66	37.50	26.67	49.49	30.39	33.51	.	22	14.18
DRC	32	2015	57.67	62.08	43.19	55.39	30.00	42.50	44.88	29.09	33.51	.	22	8.55
DRC	32	2016	85.49	71.02	44.49	55.47	30.00	36.67	43.50	1.26	36.06	.	21	7.83
Zambia	94	2010	82.90	62.39	64.05	64.95	56.25	56.67	73.65	22.30	57.53	32.49	30	20.27
Zambia	94	2011	83.04	62.54	63.84	67.28	56.25	56.67	73.65	20.38	57.53	29.26	32	23.46
Zambia	94	2012	83.17	65.08	63.56	63.34	56.25	56.67	73.65	20.38	57.53	31.58	37	25.5
Zambia	94	2013	81.80	69.90	64.42	63.65	87.50	56.67	73.65	20.38	57.53	32.09	38	28.05
Zambia	94	2014	85.09	71.20	65.05	62.84	87.50	56.67	73.65	21.77	57.53	39.91	38	27.15
Zambia	94	2015	84.95	71.92	65.54	51.75	70.00	54.17	74.52	20.92	57.53	45.77	38	21.15
Zambia	94	2016	84.88	73.27	66.34	45.82	75.00	53.33	79.91	46.99	49.89	48.87	38	19.55
Zimbabwe	12	2010	38.27	31.63	39.16	61.90	62.50	46.67	56.17	15.45	62.41	0.05	24	10.05
Zimbabwe	12	2011	40.24	35.29	42.45	65.65	62.50	46.67	58.28	19.64	41.03	0.22	22	12.07
Zimbabwe	12	2012	45.47	41.00	49.65	66.99	62.50	46.67	60.41	22.67	41.03	10.73	20	14.06
Zimbabwe	12	2013	49.17	26.67	57.09	66.18	62.50	46.67	60.31	25.76	41.03	0.06	21	15.22
Zimbabwe	12	2014	47.92	26.67	56.73	66.14	62.50	46.67	60.46	24.35	43.25	14.07	21	15.83
Zimbabwe	12	2015	49.03	26.67	58.26	66.32	40.00	53.33	60.41	19.40	43.25	14.81	21	16.07
Zimbabwe	12	2016	49.22	26.67	58.54	66.35	50.00	51.67	60.28	55.65	38.73	17.38	22	16.29