AN ECONOMETRIC ANALYSIS OF THE IMPACT OF ECONOMIC FREEDOM ON ECONOMIC GROWTH IN THE SADC

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1. Introduction

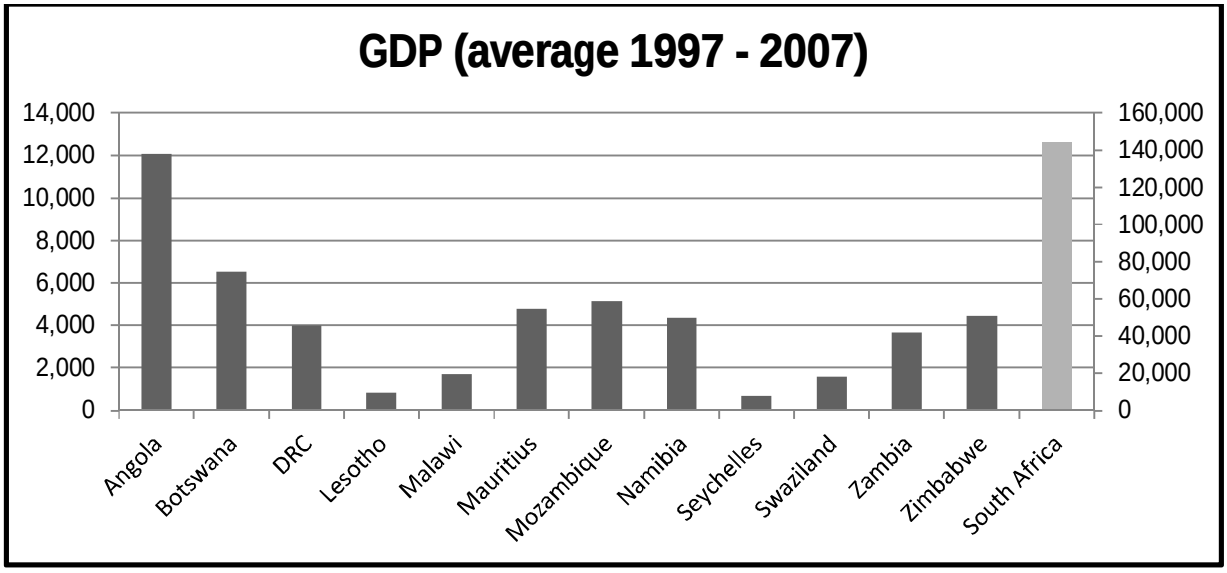
The main objective of the SADC is to achieve development and economic growth, to alleviate poverty and enhance the standard and quality of life for the peoples of Southern Africa. The SADC is attempting to achieve economic integration through macroeconomic convergence. A number of macroeconomic variables have been set to act as primary indicators. These include inflation, fiscal balance, public debt and the current account balance (SADC 2011).

The conventional approach to increasing economic growth -- increasing inputs, such as labour and capital, is not always possible. The wider, fundamental sources of economic growth need to be considered too. Foreign aid is a temporary lifeline and does not spur economic growth. Conversely, financial assistance negatively affects economic growth and can hamper development prospects.

According to Parkin, (2010: 446), between 1997 and 2007 the OECD countries average growth rate was 2,6 per cent whereas the average growth rate for the developing countries was 5,3 per cent. The South African economy grew by 3,5 per cent during this period, just above the world average of 3,2 per cent. It is necessary to consider why the economic growth rates have differed so dramatically across different countries.

Figure 1 below illustrates the severe economic growth disparities in the SADC region. It is evident that the growth for this region is highly uneven. Figure 1 shows that average GDP, between 1997 and 2007, is very poor with South Africa overshadowing the rest of the SADC. It is thus important to understand why such vast differences are present and establish whether economic freedom can help balance this.

Figure 1: The SACD average GDP for period 1997 – 2007 (millions of rands)



Previous studies have shown that economic freedom and economic growth are exponentially related -- and that by initially becoming freer, countries can increase their growth rates at higher rates

Economic freedom and economically freer countries have been associated with higher growth rates, higher per capita incomes, greater volumes of trade, prosperity and overall wellbeing. By improving their economic freedom, deregulating the economy and allowing economic freedom to prosper, countries can experience sustained GDP growth.

By introducing the concept that economic freedom can lead to higher growth rates, and being able to quantify economic freedom, it makes it possible to investigate how the SADC can achieve its set goals by becoming freer. This study establishes whether a positive relationship exists between economic freedom, openness and economic growth in the SADC. Secondly, the study shows the direction of causality between economic freedom and economic growth.

2. Methodology

This research attempts to show, that a country can experience sustained economic growth without increasing fundamental inputs such as labour and capital. The objective of this study is, firstly, to test the effects of openness and economic freedom on economic growth, and secondly, to test the direction of causality between economic freedom and economic growth.

A panel data model is proposed for this particular research, as there is insufficient data for individual SADC countries. Thus, data consisting of both cross-sectional units, as well as a time-series component are "pooled" together to obtain a larger sample size with more degrees of freedom. The panel data approach is most appealing, as it will provide valuable information on the behaviour of the individual SADC countries.

The data used in this analysis were drawn from the African Development Indicators 2008/2009 (World Bank CD-Rom). Because of the limitations of data availability for most of the SADC countries, only six of the 15 countries will be used to conduct the empirical tests; Botswana, the DRC, Madagascar, Namibia, South Africa and Tanzania.

The economic freedom index is adopted from The Fraser Institute which categorises economic freedom into five broad classes namely; Size of Government, Legal Structure and Property Rights, Access to Sound Money, Freedom to Trade Internationally and Regulation of Credit, Labour and Business. The Fraser institute only started measuring the freedom index annually from the year 2000; therefore, the data are limited to seven time periods, 2000 - 2006.

3. Literature Review

Countries grow by acquiring more inputs, by increasing physical capital, improving education and skill levels of workers and by adopting improved technology. However, expanding the availability of these inputs does not always -- by itself -- lead to economic growth. This research will show that by becoming economically freer, improving institutions and political policies, a country can experience sustained economic growth.

Recent research by The Fraser Institute and The Heritage Foundation has focused on the wider determinants of economic growth in order to try and understand why some countries have performed better than others with respect to growth. It appears that institutions, democracy and quality of governance all play a significant role in economic growth.

According to Snowdon and Vane (2005: 636), the major income differential that is observed around the world can be attributed to the differences in the quality of a countries institutions, economic policies as well as the quality of political leadership. This could explain the relative stagnation of most of sub-Saharan African countries since 1960. Democracy and the quality of governance both play a significant role in economic growth. Economic freedom promotes prosperity, and policies that promote economic freedom will also promote democracy. The failure in many countries to develop good governance has had serious, often drastic, economic and political consequences.

Studies by Gwartney and Lawson (2009), Miller and Holmes (2010) and Shaefer (2006), examined the relationship between economic freedom and economic growth. These studies conclude that countries with more economic freedom have higher growth rates. Similar results were also determined from studies conducted by de Haan and Sturm (2000) on the relationship between economic freedom and economic growth as well as the freedom-growth causality study conducted by Dawson (2003).

In a previous study, de Haan and Sturm estimated the effects of, amongst other variables, population growth, openness and economic freedom on GDP growth. The conclusion states that population growth and openness are significant and positively related to economic growth. Economic freedom fosters economic growth and suggests that more economic freedom will bring countries more quickly to their steady state level of economic growth (de Haan and Sturm, 2000).

The causality between economic freedom and economic growth is confirmed by a study done by Dawson. According to Dawson (2003), the level of economic freedom Granger causes growth. The study further shows freedom to be correlated with growth, suggesting that freedom actually

causes growth.

This research will attempt to show, by using a panel data model on the SADC data, that economic freedom and economic growth are positively correlated and that economic freedom causes economic growth.

The effects of openness on economic growth in the SADC needs to be examined to establish the relationship between trade policy and growth. Studies by Rodriguez and Rodrik (2000), found that open trade policies, in the sense of lower tariff and non-tariff barriers to trade are significantly associated with economic growth.

According to Snowdon and Vane (2005: 593), an increase in the capacity of a country to produce goods and services can either be absorbed by an increase in population -- this is known as extensive growth -- or it can lead to an increase in per capita income. This is known as intensive growth. The effects of population growth on economic growth regarding the SADC countries needs to be examined in order to establish whether increased population growth is positively or negatively contributing to economic growth and whether the relationship is significant.

A priori expectations are as follows: The effects of openness and freedom are expected to be positively related to economic growth. Population growth could produce mixed results, depending what form of growth, intensive or extensive, the SADC is experiencing. Nonetheless, a negative relationship is expected.

A panel data model is proposed for this particular research, as there is insufficient data for individual SADC countries. Thus, data consisting of both cross-sectional units, as well as a time-series component are “pooled” together to obtain a larger sample size with more degrees of freedom. Panel data are most appealing, as they will provide valuable information on the behaviour of the individual SADC countries.

4. Model Specification

The econometric model used is similar to that of Moinul Islam and Salimullah (2006) who adopted a growth model based on a neoclassical aggregate production function, to estimate the effects of population growth, economic freedom and openness on economic growth in the Least Developed Countries (LDC countries).

The use of panel data in economic relationships is appealing, since panel data provides valuable information on the behaviour of the individual units (countries) and at the individual level. The benefits of using panel data include controlling heterogeneity amongst the SADC countries; better identify effects that are not detectable in pure cross-section or time-series data and the bias due to aggregation over countries may be eliminated (Baltagi, 2008: 6).

The structural panel data component then is:

$$\log(GDP_{it}) = \beta_0 + \beta_1 \log(POP_{it}) + \beta_2 \log(OPEN_{it}) + \beta_3 (FREE_{it}) + \varepsilon_{it}$$

where

GDP: Log of real GDP per capita (in PPP Current International Dollars)

POP: Rate of population growth (a log function is used to account for the variables exponential nature)

OPEN: Proxied by trade in goods and services (sum of imports and exports of goods and services as a percentage of GDP), in a logarithmic function

FREE Summary rating for economic freedom index as reported by Gwartney and Lawson (2009)

ε: error term $\varepsilon_t \sim N(0; \sigma^2)$

t: Denotes the observation period (2000 - 2006)

i : Denotes the observation for the ith country ($i = 1, 2, \ldots, 6$)

However, economic systems are rarely in equilibrium. Thus, a dynamic error correction model is

introduced in order to correct the current short-run state deviations from its long-run relationship and obtain a short-run elasticity.

The dynamic component looks as follows:

$$d(\log(GDP_{it})) = \beta_0 + \beta_1 d(\log(OPEN_{it})) + \beta_2 d(FREE_{it}) + RESID_{i[t-(t-1)]} + \beta_3 d(\log(GDP_{it-1}))$$

Where

RESID: Coefficient of adjustment (residuals generated from the structural, long-run model)

GDP_{t-1}: Lagged dependent variable, in logarithmic function (included due to GDPs autoregressive nature)

4.1 Preliminary Data Analysis

Before the model can be estimated, the variables included in the model need to be tested for stationarity. According to Hill, Griffiths and Lim (2008: 326), a time series is stationary if its mean and variance are constant over time, and the covariance between two values from the series depends on the length of time separating the two values, and not on the actual times at which the variables are observed.

Performing individual unit root tests for each cross-section has limited power in a panel data study, therefore, a more powerful panel-unit root test is suggested. The Levin, Lin and Chu test (LLC) is the formal test used for this purpose. According to Baltagi (2008: 276), the LLC test is derived by performing separate augmented Dickey-Fuller (ADF) regressions for each of the cross-sections and tests the null hypothesis that each individual time series contains a unit root against the alternative, and that each time series is stationary.

Using the LLC test, it is possible to test the following hypothesis to determine whether the pooled variables are stationary:

$H_0: \theta_{iL} = 0$ (when $\rho_i = 0$ and $\rho_i < 0$)

$H_a: \theta_{iL} < 0$ (stationary)

The table below provides the panel-unit root test results for the variables included in the model. Using the LLC t-statistic, H_0 of non-stationarity is rejected for all variables at the 99% confidence level.

Table 1: Panel-unit root test results for the proposed variables

Variable	Test Statistic	Level of Integration
log(GDP)	-5.99*	I(1)
log(POP)	-28.56*	I(1)
log(OPEN)	-5.13*	I(0)
FREE	-5.18*	I(0)
$RESID_{t-1}$	-2.48	I(1)

** Significant at 99% confidence level*

5 Empirical Estimation and Results

The main purpose of this study is to test the effects of openness and economic freedom on economic growth in a typical SADC country, by making use of a panel data model. There are two models used to estimate economic relationships by using panel data. These are the fixed effects model and the random effects model. Each can be characterised according to the assumptions made on the parameters and the errors, and the type of data for which they are suited (Hill *et al.,* 2008: 385).

In this particular research the random effects model appears to be the appropriate model to use, due to data the random availability of country data. However, a formal test, known as the Hausman Test, is used to determine if the random effects model is statistically significant. The Hausman Test confirms the statistical significance of the random effects model and the output is provided in the appendix. The table below summarises the coefficients and main test statistics of the long-run component of the model.

Table 2: Coefficient and test statistic for the structural component

Variable	Coefficients	t-Statistic
$\log(POP_{t-2})$	-0.32	-3.88*
log(OPEN)	0.5	4.75*
$FREE_{t-1}$	0.27	3.1*
Test Statistic	**Value**	
R^2	0.52	
F-stat	9.2*	
Durbin-Watson	2.82	

** Significant at 99% confidence interval*

The long-run, structural components indicate that the model is statistically significant and accounts for approximately 52% of the variation in the dependent variable. Serial correlation is not present. All the independent variables are significant and conform to *a priori* expectations.

The population growth variable is most significant at the second lag, this is due to the indirect relationship of population growth and growth in GDP. The coefficient, interpreted as the elasticity, indicates that a 10 per cent increase in the population will decrease GDP by 3.2 per cent. This indicates that extensive growth is occurring in the SADC region, where an increase in population contributes negatively to output.

Openness refers to restraints that mete out the negative aspects that accompany trade such as; administrative inefficiencies that increase time delays and passage of goods through customs, corruption and bribery by officials and controls limiting the movement of capital. The openness of the economy is believed to have a coincident relationship with GDP growth, indicating that the degree of net exports affects GDP in the current period. The structural equation estimates the elasticity of the openness coefficient to be positively related to GDP growth, and that GDP growth will increase by 5 per cent if openness increases by 10 per cent.

The parameter of major interest is economic freedom. The long-run estimate suggests that the economic freedom index displays a positive and significant coefficient and is most meaningful when lagged one period. This indicates that any changes in economic freedom will only filter

through one period later, due to the implementation lag. The elasticity coefficient suggests that a 10 *unit* increase in economic freedom causes a 2.7 per cent increase in GDP growth. This is in line with previously stated expectations that economic freedom is positively related to economic growth. The table below summarises the coefficients and main test statistics of the short-run component of the model.

Table 3: Coefficient and test statistic for the dynamic component

Variable	**Coefficients**	**t-Statistic**
d(log(OPEN))	0.15	5.72*
d(FREE)	0.04	2.42**
$d(\log(GDP_{t-1}))$	-0.37	-3.82*
$RESID_{t-1}$	-0.44	-6.14*
Test Statistic	**Value**	
R^2	0.91	
F-stat	12.18*	
Durbin-Watson	1.72	

** Significant at 99% confidence interval*
*** Significant at 95% confidence interval*

The dynamic component provides information on short-run dynamics of the independent variables as well as the short-run elasticities. The magnitude and direction of the independent variables are generally ignored but the elasticities are still useful for interpretation purposes. Only significant variables are left in the model.

The model is statistically significant, is accurate for estimation and prediction purposes and doesn't suffer from autocorrelation. All variables included in the model are significant at least at 5 per cent significance level. The coefficient of adjustment indicates that 44 per cent of the models errors are cleared every period for adjustment from short-run to long-run equilibrium.

Population growth proved to be insignificant in the short-run, which is in line with the reasoning that in the short-run, population growth will not contribute to output. Thus, the variable was dropped. Included in the dynamic component is an autoregressive term, the dependent variable

lagged by one period. This is done due to the fact that the current value of GDP depends on its value in the past period.

Having estimated both the long-run and short-run dynamics, it is possible to derive and interpret the elasticities -- both long-run and short-run -- for openness and economic freedom. Table 3 below summarises the said elasticities.

Table 4: Long-run and short-run elasticities

	Long-run Elasticity	**Short-run Elasticity**
OPEN	0.5	0.15
FREE	0.27	0.04

From the above table it is evident that for both economic openness and economic freedom, the long-run elasticity exceeds short-run elasticity. This indicates that the impact of GDP growth from changes in openness and/or freedom is more predominant in the long-run, not the short-run. The magnitude of openness outweighs that of economic freedom both in the long-run and short-run. This indicates that although both variables contribute positively to output, openness has a bigger impact.

5.1 Granger Causality Test

It has been established that there is a positive economic relationship between economic freedom and economic growth. However, a formal test, known as the Granger-causality Test, is required in order to provide evidence on the direction of causality in this economic relationship.

The hypothesis test is as follows:

H_0: FREE does not Granger Cause GDP growth

H_a: FREE does Granger Cause GDP growth

The test reveals that the null hypothesis is rejected and leads to the conclusion that economic freedom Granger causes economic growth in the SADC countries. The test results are provided

in the appendix.

6 Conclusion and Findings

The SADC objectives are to achieve development and economic growth, alleviate poverty and eventually achieve economic integration in the face of highly uneven growth disparities. This research attempts to address the growth inequalities evident in the SADC region by circumventing the conventional approach of increasing growth -- by increasing labour and capital inputs -- and instead focusing on the effects of institutions and economic policies on growth.

Due to the lack of data for the individual SADC countries, a panel data model is adopted in the analysis. Data are pooled together in order to allow for a larger sample size and sufficient degrees of freedom. The fixed effect model is both acceptable and statistically accurate in this research.

After conducting preliminary analysis on the data a two-step error correction model is estimated. The model does not exhibit serial correlation, is accurate for estimation purposes and fits the data sufficiently. All independent variables display the expected positive *a priori* signs and are significant at either the 1% or 5% significance level.

This research has shown that there is a positive impact of economic freedom on economic growth and that economic freedom precedes economic growth. The empirical results suggest that the SADC can achieve substantial increases in growth rates by merely adopting policies that support and foster economic freedom. Thus, by becoming freer in aspects such as investment and financial freedom, fiscal and monetary freedom, governmental freedom and freedom from corruption as well as property rights, GDP growth rates will increase.

Regulation falls within the category of freedom and it is argued that reducing regulation such as; credit market regulation, labour regulation and business regulation, and allowing the market to self adjust will in the long-run, lead to increased growth. Therefore, a major implication for the

SADC Members is to move beyond the removal of trade barriers and attempt to address inefficiencies hampering international trade as well alleviating factors that impede economic freedom. Other findings from the research include:

Figure 2: Economic freedom is not equally distributed

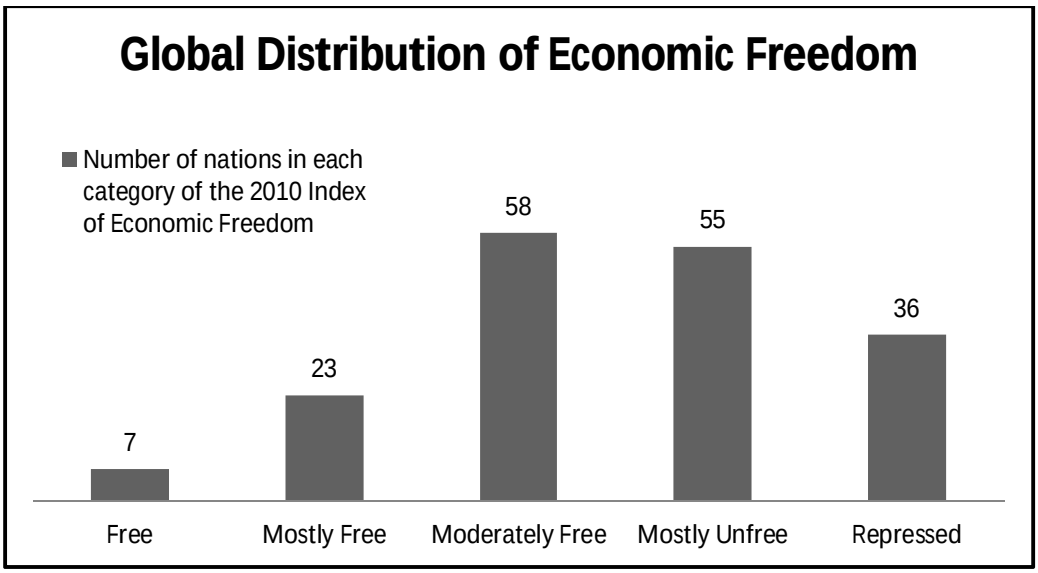


Figure 3: There is less poverty in freer economies

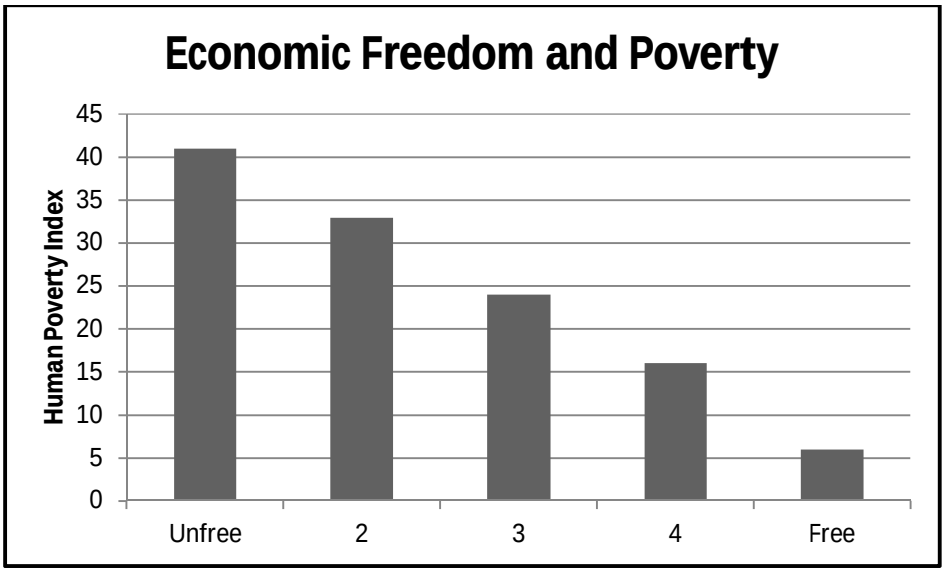


Figure 4: A higher level of economic freedom is associated with a higher level of per capita GDP

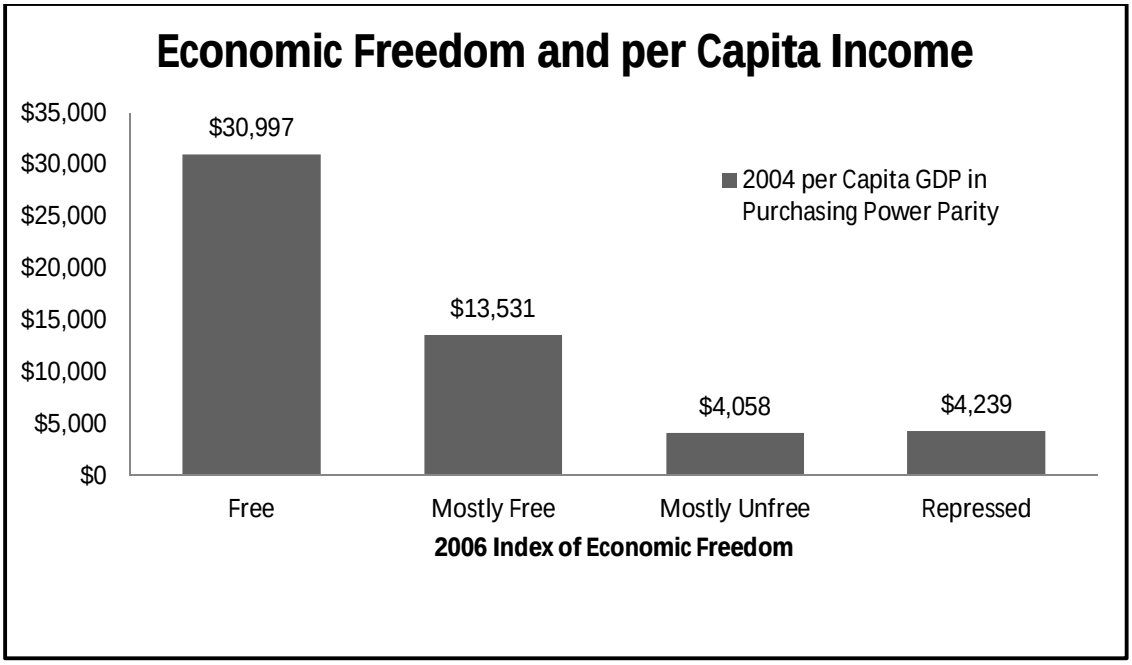


Figure 5: More open economies have higher levels of trade as a percentage of their GDP

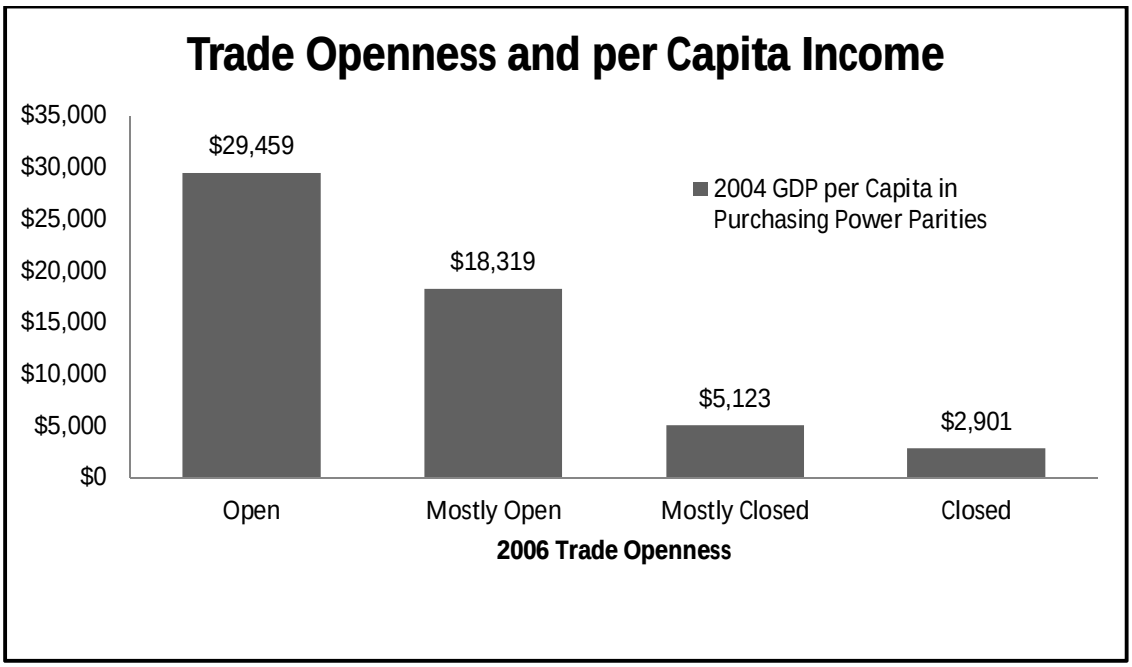


Figure 6: Freer countries have higher growth rates

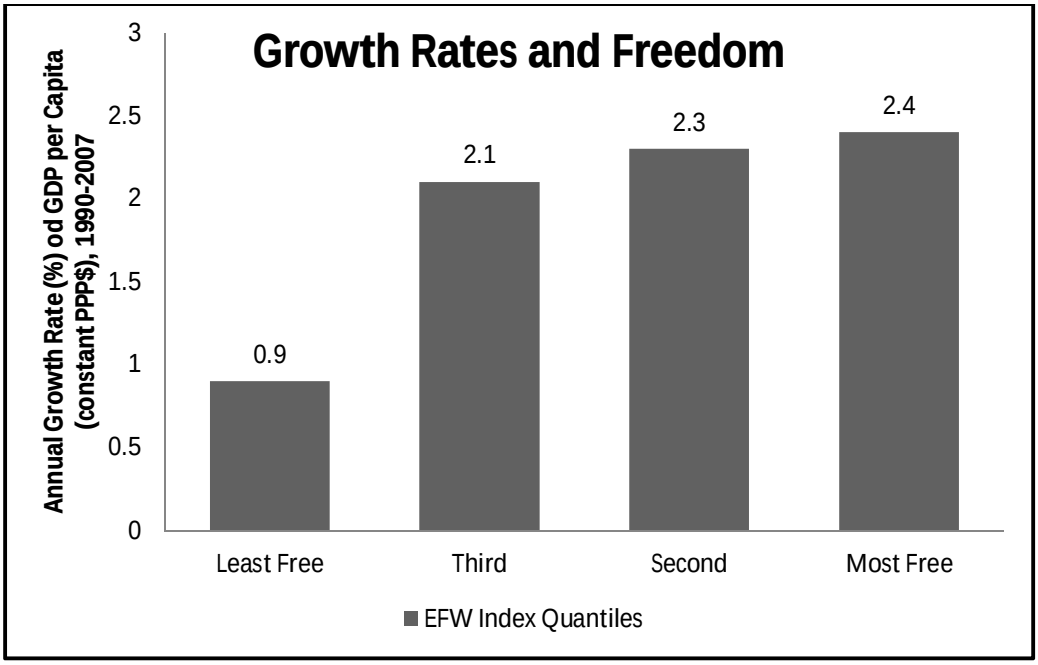


Figure 7: A strong relationship exists between economic freedom and the standard of living

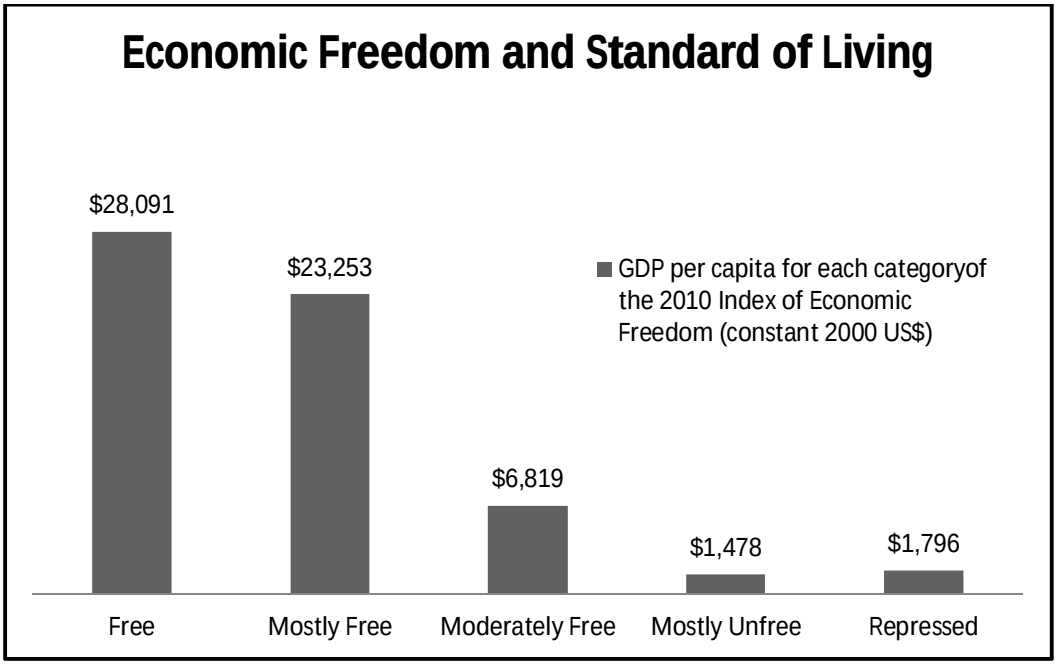
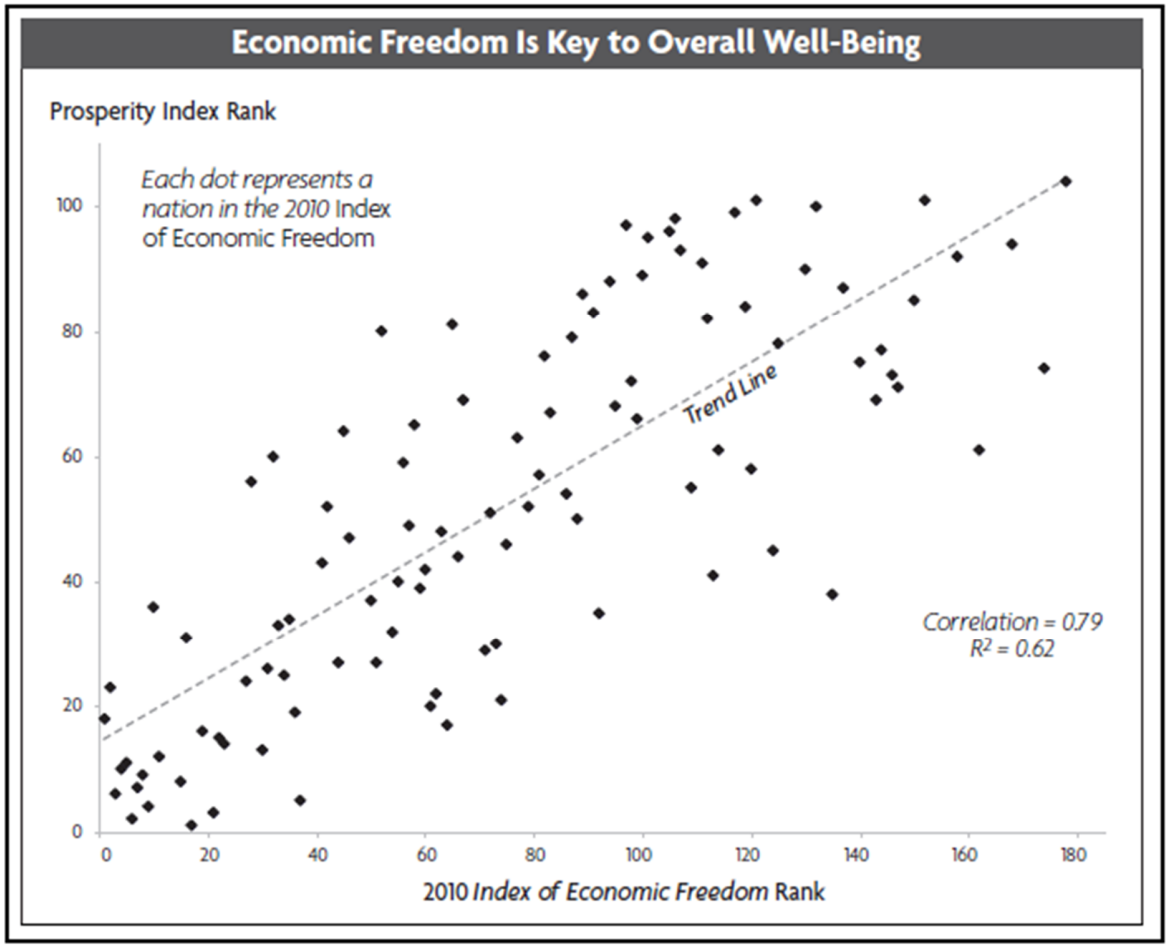


Figure 8: Economic freedom is key to overall wellbeing



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Appendix

Table A1: Hausman Test (Correlated Random Effects) results

Correlated Random Effects - Hausman Test
Equation: EQ01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	49.528436	3	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LPOP(-2)	0.921159	-0.318475	0.314013	0.0270
LOPEN	0.170092	0.504088	0.013421	0.0039
FREE(-1)	-0.013031	0.271220	0.002064	0.0000

Cross-section random effects test equation:
Dependent Variable: LGDP
Method: Panel Least Squares
Date: 08/10/11 Time: 09:17
Sample (adjusted): 2002 2006
Periods included: 5
Cross-sections included: 6
Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.062863	8.199341	-0.861394	0.3988
LPOP(-2)	0.921159	0.566361	1.626451	0.1188
LOPEN	0.170092	0.157095	1.082736	0.2912
FREE(-1)	-0.013031	0.098523	-0.132267	0.8960

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.997304	Mean dependent var	7.627333
Adjusted R-squared	0.996278	S.D. dependent var	1.387955
S.E. of regression	0.084682	Akaike info criterion	-1.856509
Sum squared resid	0.150591	Schwarz criterion	-1.436150
Log likelihood	36.84764	Hannan-Quinn criter.	-1.722033
F-statistic	971.1977	Durbin-Watson stat	0.610977
Prob(F-statistic)	0.000000		

Table A2: Long-run structural model estimation results

Dependent Variable: LGDP
Method: Panel EGLS (Cross-section random effects)
Date: 08/04/11 Time: 10:24
Sample (adjusted): 2002 2006
Periods included: 5
Cross-sections included: 6
Total panel (balanced) observations: 30
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.804774	1.591357	5.532872	0.0000
LPOP(-2)	-0.318475	0.082172	-3.875689	0.0006
LOPEN	0.504088	0.106105	4.750859	0.0001
FREE(-1)	0.271220	0.087426	3.102290	0.0046

Effects Specification	S.D.	Rho
Cross-section random	0.305847	0.9288
Idiosyncratic random	0.084682	0.0712

Weighted Statistics

R-squared	0.515022	Mean dependent var	0.937279
Adjusted R-squared	0.459063	S.D. dependent var	0.192302
S.E. of regression	0.141435	Sum squared resid	0.520101
F-statistic	9.203559	Durbin-Watson stat	2.824978
Prob(F-statistic)	0.000255		

Unweighted Statistics

R-squared	0.662854	Mean dependent var	7.627333
Sum squared resid	18.83505	Durbin-Watson stat	0.016429

Table A3: Short-run dynamic model estimation results

Dependent Variable: D(LGDP)
Method: Panel Least Squares
Date: 08/04/11 Time: 12:40
Sample (adjusted): 2002 2006
Periods included: 5
Cross-sections included: 6
Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.057956	0.006059	9.565811	0.0000
D(LOPEN)	0.148636	0.026000	5.716712	0.0000
D(FREE)	0.041524	0.017134	2.423498	0.0276
RESID01(-1)	-0.439889	0.071645	-6.139869	0.0000
D(LGDP(-1))	-0.379238	0.099339	-3.817623	0.0015

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.910873	Mean dependent var	0.052000
Adjusted R-squared	0.838457	S.D. dependent var	0.040802
S.E. of regression	0.016399	Akaike info criterion	-5.078417
Sum squared resid	0.004303	Schwarz criterion	-4.424525
Log likelihood	90.17626	Hannan-Quinn criter.	-4.869231
F-statistic	12.57838	Durbin-Watson stat	1.718824
Prob(F-statistic)	0.000005		

Table A4: Granger Causality results

Pairwise Granger Causality Tests
Sample: 1 108
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FREE does not Granger Cause GDP	90	3.91049	0.0237
GDP does not Granger Cause FREE		2.05738	0.1341