EXPORT-LED GROWTH HYPOTHESIS IN ZIMBABWE: DOES EXPORT COMPOSITION MATTER?

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Abstract
This study examines the validity of the export-led growth hypothesis in the Zimbabwean economy. We use annual time series data for the period 1977 to 2006 in an export augmented aggregate production function framework. Applying the bounds testing (ARDL) approach to cointegration, we investigate whether a long-run relationship exists between exports and non-export GDP. Two models are estimated; the first model is the total exports model while the second model disaggregates exports into primary goods export and manufactured goods exports. Empirical results support the export-led growth hypothesis in Zimbabwe and reveal that a long-run relationship exists between exports and non-export GDP and that the direction of relationship runs from exports to non-export GDP in both the short-run and the long-run. The results also show evidence of productivity-enhancing effects of primary exports while manufactured exports are productivity-limiting in the short-run.
Key words: export-led growth, disaggregated exports, productivity-enhancing effects, Zimbabwe

1: INTRODUCTION

The Export-Led Growth (ELG) strategy contrasted with the Import Substitution Industrialization (ISI) strategy has often been cited as the main reason for observed differences in development patterns and performance among both developed and developing countries. Phenomenal growth rates achieved by the south-east Asian countries between 1970s and 1990s following successful implementation of the ELG strategy provide evidence in support of the superiority of ELG strategy (World Bank; 1991, 1993). Hong Kong, Singapore, Taiwan and South Korea achieved on average economic growth rates of between 7.0 percent and 9.5 percent between 1970 and 1996 (Singh, 1999). Low export growth rates experienced in most Less Developed Countries (LDCs) are therefore, postulated to be the cause of low economic growth rates that they experience (Chenery *et al*., 1986; World Bank, 1987). The question which arises is whether ELG strategy is suitable for Africa and if African countries can emulate the development experience of the East Asian countries.

In 1990, Zimbabwe liberalised its trade and is believed to have adopted the ELG strategy[3]. Trade liberalisation in Zimbabwe, resulted in an increase in export growth from 2.5% during the 1980s to 6.9% between 1991 and 1995 and 15.5% for the period 1996-2000 although they decreased again to -1.1% between 2001 and 2004 (IMF, 2004). The contribution of exports to economic growth also improved as indicated by an increase in the export-GDP ratio from an average of 23% between 1982 and 1990 to an average of 32% between 1991 and 1997 and over 40 % for 1998 and 1999 before declining again in 2000 (CSO, 2005). We would expect the remarkable improvement in export performance that Zimbabwe experienced during the 1990s to translate into an acceleration of growth and productivity through greater capacity utilization, increased labour productivity, improved allocation of scarce resources, increased external earnings and increased foreign investment. Paradoxically however, Zimbabwe's growth rate was lower in the 1990s, averaging 1.5 percent, than during regulated UDI (1971-

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[3] The country followed ISI strategy since the 1970s when sanctions were imposed to the then colonial government under Ian Smith through to 1990 when government focus shifted towards trade liberalisation under the new government's drive to expand exports.

1979) in which it averaged 4.2 percent, and 3.1 percent in the 1980s. In addition, Zimbabwe had been experiencing deteriorating economic performance and a general fall in exports since 2000. This prompted the ongoing debate among various sectors, including government, on the suitability of following the export strategy for development purposes. For a small country like Zimbabwe, timely empirical evidence on the contribution of exports to economic growth is crucial for the formulation of policies consistent with the use of the countries limited resources.

Empirical studies that sought to establish the relationship between exports and economic growth in Zimbabwe are considered outdated both in terms of the time periods covered and the methodologies applied[4]. These studies used mainly bivariate and trivariate models which, when used to test the ELG hypothesis may result in misspecification bias (Husein, 2009). Moreover, up to now no attempt has been made to examine the separate effects of primary and manufacturing exports on Zimbabwe's economic growth. This study uses a country case study approach focussing on Zimbabwe to investigate whether a long run relationship exists between exports and economic growth and to determine the relative contribution of primary goods and manufactured goods exports to the economic growth process.

1.1 Evolution of development and trade policies in Zimbabwe

Around the early 1940s Zimbabwe had managed to build a relatively sophisticated industrial base achieved largely under import substitution industrialisation (ISI) strategy (Riddell, 1988). According to Riddell, around 10 per cent of GDP and 8 per cent of exports were derived from the manufacturing sector.

As a measure to counter international trade sanctions that were imposed between 1965 and 1979, the country developed a highly protected system including the creation of an extensive set of controls to ration foreign exchange, and the adoption of restrictive trade policies. The escalating war of independence further disrupted economic activity and trade. This resulted in a limited development of exports especially in the manufacturing sector. The ratio of manufactured exports to gross output dropped from about 27 per cent in 1965 to 15 per cent in 1980 (Ndlela and Robinson, 1992).

In the 1980s the new government maintained many of the restrictive trade policies and controls of the previous regime and even introduced new ones. The post independence boom (1980-1982) was unsustainable on foreign exchange grounds, and the government resorted to administering foreign exchange allocation to control the current account deficit. This policy initially led to macroeconomic stability although growth was also restricted (Pakkiri and Moyo, 1987; Davies, 1991). Later on the country landed into serious macro-economic problems. Foreign currency availability was the major macroeconomic constraint which also retarded growth in production since producers could not obtain foreign exchange to secure inputs. The government responded initially by introducing incentives for exporters in an effort to curtail the foreign currency problem namely the Export Promotion Programme (EPP), the Export Revolving Fund (ERF) and the export retention scheme and export bonus scheme.

During the late 1980s, domestic consumption was falling (consumption /GDP ratio was unity in 1986 and fell to 0.96 and 0.95 in 1987 and 1988 respectively) as per capita income declined, hence export expansion began to appeal as the only option out of the impending

[4] Three studies covered a period up to 1990, and one up to 1994 and these studies were mainly cross sectional studies which employed either bivariate or trivariate causality methods.

problem (GOZ, 1994).This culminated in the initiation of the debate on structurally adjusting the economy during late 1988, as stated in the policy reform document (ESAP, 1991). This idea received overwhelming support from the World Bank and international monetary fund, hence the implementation of the Economic Structural Adjustment Programme (ESAP) in November 1990. The target was to gradually dismantle the ISI policies inherited from the previous regime and implement market driven policies.

The adoption of trade liberalisation policy under ESAP in 1990 was tantamount to the government's re-focusing of policy from ISI to ELG. The argument was that, openness to trade and free market policies are fundamental in promoting exports (World Bank, 1987). Trade liberalisation and market deregulation were, thus, used as the principal drivers towards the implementation of ELG. The main focus of trade liberalisation was to achieve an expansion of exports through diversion of resources from the domestic to the export sector. Such orientation would in turn lead to faster growth of GDP (Balassa, 1982).

Exports were further stimulated throughout the 1990s by the continued devaluation of the Zimbabwean dollar which was devalued seven times by more than 400 percent between 1991 and 2000. The establishment of the export processing zones (EPZs) in 1995 aimed at promoting foreign direct investments (FDI) which would then translate into an increase in manufactured exports. The EPZ programme also included several export incentives to promote export oriented production and development.

However, year 2000 saw a reversal of some of the economic reforms implemented in the previous decade, for example, price controls on many food and agricultural products were reintroduced. Also in an effort to protect local manufacturing, to restore foreign exchange market stability and to generate revenue, government increased tariffs on finished goods with local substitutes or those considered luxuries in October 1998. In 2003 a number of ad hoc measures were instituted in response to an increasingly overvalued exchange rate that the country was facing. This includes the introduction of a managed foreign exchange tender system and the creation of a special regime for tobacco and gold exporters early in 2004.

After the implementation of the land reform programme in 2000 resources, including labour, shifted from the industrial sector back to the agricultural sector. Industrial output fell by at least 47% between 2000 and 2007. However, agricultural production also decreased by 51% between 2000 and 2007 (IMF, 2007). GDP fell by at least 40% during the same period. This prompted a number of efforts by various sectors to try and revive the economy including the reserve bank of Zimbabwe and Zimtrade.

2: LITERATURE REVIEW

2.1 Theoretical literature review

The decision on whether to follow ISI or ELG strategy for economic development primarily emanates from the Keynesian theory of demand. The former places more emphasis on domestic demand, while the latter places more emphasis on outside or external demand. Thus, by focussing on different forms of demand, the two strategies implicitly acknowledge the vitality of 'effective demand' on economic development as enunciated by the Keynesian theory of demand in Keynes' General Theory (1930). Thirlwall (1979), in his BOP constrained growth model argues that, countries grow at different rates because demand grows at different rates. Thus much of the debate in development literature generally tries to explain which demand is more superior and in particular why external demand is said to be more superior for LDCs than domestic demand for long-run economic development.

In the mid 1970s, there emerged a dramatic shift in stance on development policy. Policy stance shifted in favour of the ELG model which focuses on production for the export market rather than domestic market. The shift in development stance was propelled by the shift in intellectual outlook of economists in favour of market directed economic activity sanctified by the ‘Washington Consensus’. This ideology is based on the argument that interventionist measures through ISI are distortionary and contribute to productive inefficiency and rent-seeking (Williamson, 1990). The World Bank (1987) argued that openness to trade and free market policies are fundamental in promoting exports. They therefore advocated for the implementation of ELG in developing countries, which makes exports an engine for growth.

Feder (1983) and Bhagwati (1985) argued that the impact of exports on economic growth possibly operates through total factor productivity. Cornwall (1977) advanced the argument that exports stimulate investment directly via the accelerator and indirectly via greater entrepreneurial confidence now that the current account has improved and governments can follow accommodating policies. Ben-David and Loewy (1998) furthered the argument stating that exports may give access to advanced technologies, learning by doing gains and better management practices which in turn will stimulate technological diffusion into the economy hence improved productivity and growth. Technological transfers are biased in favour of skilled labour and hence they stimulate investment in human capital (Berman *et al*., 1998). Exports by facilitating the diffusion of soft and hard technologies including management, marketing and production expertise are also said to promote the productivity of capital and labour (Grossman and Helpman 1991).

The Ricardian argument postulate that, it is not only exports which matter for growth, but the composition of exports is also crucial. According to the Prebisch-Singer hypothesis (1950), the terms of trade of primary products, deteriorate over time relative to terms of trade of manufactured goods. The Prebisch-Singer hypothesis is backed by the perception that manufactured exports offer better prospects for export expansion without the possibility of destabilising effects on prices. Commodity dependant economies whose foreign-exchange earnings are heavily dependant on a narrow range of primary commodities are said to be more vulnerable to external shocks and also benefit less from exporting activities than those with a diversified export structure (Bonaglia and Fukasaku, 2002).

2.2 Empirical literature review

Empirical literature on the role of export performance in the process of economic growth can be considered to be vast, results are however contradictory for both DCs and LDCs and for studies carried using different methodologies. This made the study of the role of exports on economic growth a recurrent research theme in trade and development literature (Todaro and Smith, 2003).

Early empirical studies on ELG sought to establish the relative superiority of different types of strategies on economic development, mainly the inward oriented strategy as opposed to the outward orientated strategy. Balassa (1980) summarised these studies and concluded that “the evidence is quite conclusive, countries applying outward-orientated development strategies performed better in terms of exports, economic growth and employment than countries with continued inward orientation” (pp.18).

The next generation of studies focussed attention to detecting the association between export performance and economic growth. Many of these studies supported the ELG hypothesis while also indicating that DCs and LDCs that have been capable of diversifying their exports by moving higher the production chain into more manufactured exports have been more successful in terms of growth compared to the vast of LDCs that based on primary products for exports mainly agricultural products and minerals (Syron and Walsh, 1968, Kravis 1970).

During the 1980s and early 1990s there emerged strong opinion behind the view that more outward oriented economies tended to fare better in terms of economic growth through increased exports (Dollar, 1992; Edwards, 1992). Surprisingly, more than half of the empirical investigations published in the 1990s found no long-run relationship between exports and economic growth; rather, the studies suggest that it arises only from a positive short-term relationship between export expansion and growth of gross domestic product (GDP) (Medina-Smith, 2001).

Ghatak *et al.*, (1997) emphasised the importance of examining disaggregated exports in testing the ELG hypothesis. They argued that even if there is evidence in favour of ELG hypothesis relating to certain export categories, this may not be reflected at the aggregate level, and spurious conclusions may be drawn when disaggregated exports are not examined.

More recent studies put more emphasis on using more advanced econometric techniques in investigating the export-economic growth relationship in an effort to correct mistakes that might have been made in earlier studies. Such studies include Choong *et al*., (2005) and Husein, (2009) among others.

Among a few studies which tested the ELG hypothesis in Zimbabwe are Dodaro (1993), Riezman *et al.*, (1996), Pomponio (1996) and Mafusire (2001). The first three were cross sectional studies in which Zimbabwe along with many other countries were included in a two or three variable causality model framework. The studies found no evidence of any causal relationship between real export growth and real output growth for Zimbabwe thereby invalidating the ELG strategy. On the contrary Mafusire's sudy validated the ELG strategy in Zimbabwe.

3: METHODOLOGY AND RESULTS

3.1 Theoretical model

We base our empirical model on the Feder (1983) model. Starting with a general neoclassical Aggregate Production Function:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \qquad (1)$$

where, Y_t = aggregate production of the economy at time *t*, A_t = level of Total Factor Productivity (TFP), K_t = capital stock at time *t*, L_t = stock of labour at time *t*. According to Feder (1983) and Bhagwati (1985) the impact of exports on economic growth possibly operates through total factor productivity (A_t), the channels are explained in the literature review. In order to investigate if and how exports affect economic growth through changes in TFP, we assume that TFP can be expressed as a function of exports X_t, and other exogenous factors C_t, thus:

$$A_t = f(CM_t, X_t, C_t) = CM_t^{\delta} X_t^{\gamma} C_t \qquad (2)$$

where CM_t = capital goods imports, which are also considered potential to boost productivity through technological sophistication embodied in them 'especially in LDCs' (Herzer *et al*., 2004). Moreover, omission of this variable can result in spurious conclusions regarding the ELG hypothesis (Riezman *et al*., 1996). Combining equation (2) and equation (1) we obtain:

$$Y_t = C_t K_t^{\alpha} L_t^{\beta} CM_t^{\delta} X_t^{\gamma} \qquad (3)$$

where *α*, *β*, *δ*, and *γ* are the elasticities of production with respect to K_t, L_t, CM_t and X_t respectively. Taking natural logs (*L*) of both sides of equation (3) gives an explicit estimable linear function:

$$LY_t = c + \alpha LK_t + \beta LL_t + \delta LCM_t + \gamma LX_t + e_t$$

(4)

In which all coefficients are constant elasticities, accordingly, *γ* =productivity effects of exports on economic growth, *δ* =productivity effects of capital goods imports on economic growth, *α*=elasticity of capital, *β*=elasticity of labour, *c* = constant parameter, and e_t = white noise error term.

However, a problem arises because exports themselves are embodied in output (via the income national accounting identity). Simultaneity bias is therefore almost inevitable, even if there are no productivity effects. According to Herzer *et al*., (2004) as a remedy to this problem, there is need to separate the 'economic influence' of exports on output from the influence incorporated into the 'growth accounting relationship'. Following Ghatak *et al*., (1997), the problem is resolved by using the aggregate output, net of exports, $NY_t(NY_t = Y_t - X_t)$ instead of total output Y_t. Thus:

$$LNY_t = c + \alpha LK_t + \beta LL_t + \delta LCM_t + \gamma LX_t + e_t \qquad (5)$$

Since we also want to determine the significance of commodity composition of exports between primary goods exports and manufactured goods exports on economic growth. We disaggregate total exports X_t into primary goods exports PX_t and manufactured goods exports MX_t, and estimate equation (5) along with equation (6) below:

$$LNY_t = c + \alpha LK_t + \beta LL_t + \delta LCM_t + \lambda LPX_t + \rho LMX_t + e_t \qquad (6)$$

All coefficients and variables are as defined above with λ measuring productivity effects of primary goods exports on economic growth and ρ measuring productivity effects of manufactured goods exports on economic growth. Since equation (5) and equation (6) are derived in the same manner, for illustration purposes we are going to use equation (5) and assume that the same will also apply for equation (6) in the derivations which follows. Hereafter, we shall refer to the aggregated exports equation (5) as model (1) and the disaggregated exports equation (6) as model (2).

3.2 Econometric methodology

To empirically investigate the long-run relationship and dynamic interactions between exports and economic growth, we estimate models (1) and (2) using the ARDL bounds testing cointegration procedure developed by Pesaran, Shin and Smith (2001). It is necessary to first perform unit root tests on the variables in order to ensure that none of the variables is integrated of order two I(2) or beyond. According to Ouattara (2004), in the presence of I(2) variables the computed F-statistics of the bounds test are rendered invalid because they are based on the assumption that the variables are I(0) or I(1) or mutually cointegrated.

3.21 Unit root tests

The Dicky-Fuller Generalised Least Squares (DF-GLS) unit root tests are reported in table 1. A plot of variables against time indicated no trend for non-export GDP, labour and capital, but a trend exists for all the other variables. Therefore, in the unit root test of the variables in levels, cases where only an intercept is included were considered for these variables (indicated Θ) while both an intercept and a trend are included for all the other variables.

Results of the unit root tests in levels indicate that the computed t-statistics are greater than the critical values thus implying that we do not reject the null hypotheses that the variables have a unit root. However, once the first differences of the variables are considered the null hypothesis of unit root can be rejected at least at the 5% level of significance. Thus the variables are I(1). DF-GLS results are based on the Akaike Information Criteria (AIC).

Table 1: Unit Root tests of series in levels and first differences based on De-Trending

Unit root tests in levels				Unit root tests in first differences			
Variable	DF-GLS		Remark:	Variable	DF-GLS		Remark:
	Test statistic	lag	Order of integration		Test statistic	lag	Order of integration
LYΘ	-0.6101	3	I(1)	DLY	-5.6454	2	I(0)
LX	-3.0419	0	I(1)	DLX	-5.8164	0	I(0)
LMX	-2.6162	1	I(1)	DLMX	-7.8172	0	I(0)
LPX	-2.3548	1	I(1)	DLPX	-4.3104	0	I(0)
LCM	-1.5051	0	I(1)	DLCM	-4.9541	0	I(0)
LLΘ	-1.5432	1	I(1)	DLL	-2.5330	0	I(0)
LKΘ	-1.4638	0	I(1)	DLL	-3.6981	0	I(0)

Notes: The software package E-Views 4.1 was used to perform these tests. The null hypothesis is that the variable has a unit root. The DF-GLS test statistics at 5% and1% levels with trend and intercept are -3.19 and
-3.77 respectively, and -1.95 and -2.65 with intercept only.

Unit root test results discussed above shows that none of the variables is integrated of order two or higher. This provides us with a good rational to use the ARDL cointegration method.

3.22 The ARDL cointegration approach

Following Pesaran *et al.*, (2001) as summarized in Choong *et al.*, (2005), we apply the bounds test procedure by modeling equations (5) and (6) as general vector autoregressive (VAR) models of order p in z_t:

$$z_t = c_0 + \alpha t + \sum_{i=1}^{p} \eta_i z_{t-i} + \varepsilon_t \text{ , } t=1, 2, 3\ldots T \qquad (7)$$

with c_0 representing a (*k+1*)-vector of intercepts and α denoting a (k+1)-vector of trend coefficients. z_t is the vector of variables y_t and x_t respectively. y_t is the dependant variable defined as LNY_t, and x_t is the vector matrix which represent a set of explanatory variables (as already defined) with a multivariate independently and identically distributed (*iid*) zero mean error vector $\varepsilon_t = (\varepsilon_{1t}, \varepsilon'_{2t})'$ and a homoskedastic process. We further developed the following vector equilibrium correction model (VECM) corresponding to equation (7) above:

$$\Delta z_t = c_0 + \alpha t + \lambda z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \sum_{i=0}^{p-1} \Phi_i x_{t-i} + \varepsilon_t \text{, } t\text{=1, 2, 3…T} \qquad (8)$$

where Δ represent the first difference operator. We derive our preferred ARDL model following the assumptions made by Pesaran *et al.* (2001) in case III, that is unrestricted intercepts and no trends. The VECM procedures described in case III are important in the testing of at most one cointegrating vector between the dependant variable y_t and a set of regressors x_t [5]. This requires imposing the restrictions λ_{xy} = 0, which allows us to derive a unique long-run relationship between x_t and y_t . Further assuming that, $c_0 \neq 0$ and α = 0, the unrestricted error correction model (UECM) of interest can now be specified as below:

$$\Delta LNY_t = c_0 + \lambda_1 LNY_{t-1} + \lambda_2 LK_{t-1} + \lambda_3 LL_{t-1} + \lambda_4 LCM_{t-1} + \lambda_5 LX_{t-1} + \sum_{i=1}^{p} a_i \Delta LNY_{t-i} \qquad (9)$$

$$+ \sum_{i=0}^{p} b_i \Delta LK_{t-i} + \sum_{i=0}^{p} c_i \Delta LL_{t-i} + \sum_{i=0}^{p} d_i \Delta LCM_{t-i} + \sum_{i=0}^{p} f_i \Delta LX_{i-i} + \varepsilon_t$$

Where c_0 is the intercept, ε_t are white noise errors, Δ is the first difference operator and *p* is the optimal lag length. All variables are in natural logarithms. In equation (9), the parameters λ_i , *i*=1,2,3,4,5, function as long-run multipliers, while the a_i, b_i, c_i, d_i, f_i parameters function as the short-run dynamic coefficients of the underlying ARDL model.

3.23a Bounds testing procedure

The first step in the ARDL bounds testing approach is to estimate equation (9) by ordinary least squares (OLS) for both models (1) and (2) in order to discern any long-run relationship among the concerned variables. We conduct a Wald test (F-Statistic) by imposing restrictions on the estimated long-run coefficients. The null and alternative hypotheses are:

$H_0 : \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = 0$ (no long-run relationship),

$H_A : \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq 0$ (a long-run relationship exists)

The computed F-statistic value is compared with the critical values tabulated in table CI(iii) of Pesaran *et al*., (2001).

3.23b Bounds test for cointegration

As suggested in Pesaran and Shin (1999) and Narayan (2004), since the observations are annual, we choose 2 as the maximum number of lags in the ARDL. The short span of time series data at our disposal also provides another rational for our choosing 2 as the maximum number of lags. The calculated F-statistics for the cointegration test are reported in Table 2. The critical values are reported together in the same table. The calculated F-statistic for model (1) is 10.815. When we consider disaggregated exports (model 2), the calculated F-statistic is 12.543. Both the calculated F-statistics are greater than the upper bound critical values at the 1% level. Thus the null hypothesis of no cointegration is rejected in both cases, implying long-run cointegration relationships amongst the variables when the regressions are normalised on non-export GDP (LNY_t).

[5] For a mathematical analysis of the assumptions made in case III, see Pesaran *et al.*(2001) and Choong *et al.*(2005).

Table 2: Bounds Test for Cointegration Analysis Based on Equation 9.

F-statistic		10% Critical values		5% Critical values		1% Critical values	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Model 1	10.8154	2.45	3.52	2.86	4.01	3.74	5.06
Model 2	12.5434	2.26	3.35	2.62	3.79	3.41	4.68

3.3 Long-run model results

Once we establish the existence of a long-run cointegration relationship, the following long-run model is estimated:

$$LNY_t = \alpha + \sum_{i=1}^{p}\phi_i LNY_{t-i} + \sum_{i=0}^{q_1}\theta_i LX_{t-i} + \sum_{i=0}^{q_2}\delta_i LK_{t-i} + \sum_{i=0}^{q_3}\xi_i LL_{t-i} + \sum_{i=0}^{q_4}\pi_i LCM_{t-i} + \mu_t \quad (10)$$

This involves selecting orders of the ARDL($p, q_{1,} q_2, q_3, q_4$) model for all the variables. The orders of lags in the ARDL model are selected either by Akaike information criterion (AIC) or by Schwarz Bayesian criterion (SBC) before the selected model is estimated by ordinary least squares (OLS). This involves estimating $(p+1)^k$ number of regressions in order to obtain the optimal lag length for each variable, where *p* is the maximum number of lags to be used and *k* is the number of variables in the model. According to Pesaran and Shin (1998), SBC is generally used in preference to the other criteria because it tends to define more parsimonious specifications. In this research the small data sample is another reason to prefer SBC.

An econometric time series software that automatically and conveniently selects an optimal ARDL lag structure for each of the several model selection criteria after the researcher has set the maximum lag length is MICROFIT (Pesaran and Pesaran, 1997). An additional advantage of MICROFIT is that it can be applied without having to know the order(s) of integration of the variables even when the variables are a mixture of I(0) and I(1) series. This circumvents the inaccuracies of standard unit root tests in cases where there is a structural break thereby increasing the stability of the model. Based on the SBC, the optimal ARDL model(s) selected by MICROFIT are ARDL(2,2,2,1,2) for model (1) and ARDL(1,2,0,2,1,2) for model (2), where the numbers in parenthesis represents the lags for each of the variables in the two models[6].

Both models pass the diagnostic tests against serial correlation, functional form misspecification, non-normal errors and heteroscedasticity. Therefore, we can safely continue with our regression. Two versions of the diagnostic tests (the LM Version and the F Version) were considered for the two models and the results are shown in Appendix A. The long-run coefficients of the variables under investigation are shown in Table 3.

[6] To estimate the ARDL model for 5 independent variables in model 1 and 6 independent variables in model 2 and a specific lag length of 2, MICROFIT needs to run $(2+1)^5$ =243 and $(2+1)^6$ =729 regressions for model (1) and model (2) respectively before choosing the optimal model.

Table 3: Estimated Long Run Coefficients using the ARDL Approach.

Dependant Variable: LNY

Model 1	ARDL(2,2,2,1,2) Selected based on SBC		Model 2	ARDL(1,2,0,2,1,2) Selected based on SBC	
Variable	Coefficient	T-Ratio [Prob]	Variable	Coefficient	T-Ratio [Prob]
C	11.8046	3.9013[0.002]***	C	52.7296	2.5479[0.024]**
LX	0.72554	5.8150[0.000]***	LPX	2.2126	2.5684[0.023]**
LK	0.78030	4.1925[0.001]***	LMX	-0.4250	-1.7366[0.106]
LL	-1.6139	-2.8573[0.013]***	LK	1.5278	2.4526[0.029]**
LCM	-0.47899	-3.4256[0.005]***	LL	-9.1339	-2.2840[0.040]**
			LCM	-0.7829	-2.1333[0.053]*
Adjusted R-squared		0.73155	Adjusted R-squared		0.81732
DW-statistic		2.3172	DW-statistic		2.4079
F-stat.	F(9, 17)	9.3167[0.000]	F-stat.	F(9, 17)	14.3691[0.000]

* (**) (***) *Significant at 10 %,* 5% and 1% respectively.

3.31 Discussion of long-run results

After we estimate our models (Table 3), we can see that the high values of adjusted R-squared indicate that the overall goodness of fit of the models is satisfactory. The adjusted R-squared shows that around 73 percent and 82 percent of the variation in non-export GDP is explained by the regressors in model (1) and model (2) respectively. This reveals that better estimates can be obtained if disaggregate exports (model 2) are considered. The F-statistics measuring the joint significance of all regressors in the models is statistically significant at the 1 percent level for both models. Similarly, the Durbin Watson statistics are close to 2.

Table 3 reveals that long-run results for model (1) and model (2) follow the same general pattern. It is evident in model (1) that total exports have a crucial role in promoting economic growth in Zimbabwe. The coefficient of LX is 0.73 which is positive and statistically significant at the 1 percent level. It suggests that in the long-run, an increase in total exports of 1 percent is associated with a 0.73 percent increase in non-export GDP.

When we disaggregate exports into primary goods exports and manufactured goods exports (model 2), we can see that primary goods exports are, particularly of greater importance relative to manufactured goods exports in promoting economic growth in Zimbabwe. The coefficient LPX is positive and statistically significant at the 5 percent level. This means that increasing primary goods exports by 1 percent will exert productivity effects which result in a 2.21 percent increase in non-export GDP. On the other hand, manufactured goods exports are marginally insignificant.

These results provide us with clear-cut evidence validating the Export-Led Growth (ELG) hypothesis for the case of Zimbabwe. Primary goods exports have proved to have strong productivity effects crucial in facilitating the economic growth process. This is however contrary to the findings of Ghatak *et al*., (1997) for the case of Malaysia who found that manufactured exports contributed significantly to the existing exports and GDP compared with traditional (non-fuel primary) exports. This implies that, compared with Malaysia which has a comparative advantage in manufactured goods exports, Zimbabwe has a comparative advantage in primary goods exports compared to the rest of the world.

Furthermore, these results may be an explanation of the paradox that occurred in the 1990s whereby Zimbabwe experienced lower growth rates with relatively higher exports than the previous decades. The exports that were mainly promoted and which significantly increased during this period were manufactured goods exports that have proved to be ineffective in promoting economic growth.

Table 3 also shows that capital investment 'proxied by gross fixed capital formation' has the expected positive sign and is highly significant in both models. This is confirmation to theory which states that higher capital stock should produce higher output at any given point in time due to greater production capacity and increased ability to utilise resources (Berman *et al.*, 1998; Balassa, 1985).

On the other hand, labour force variable is negatively signed and statistically significant in both models. LL is -1.61 in model (1) and -9.13 in model (2). This means that increasing labour force by 1 percent result in a 1.61 percent decrease in non-export GDP in model (1) and a 9.13 percent decrease in non-export GDP in model (2). This is a reflection of an increasing problem of labour inefficiency in Zimbabwe.

Possible explanations to this growing labour inefficiency problem could be that: first, poor remuneration leading to disgruntled workers deliberately reducing their work effort in protest to the poor remuneration and bad working conditions that they receive. Second, the problem of 'brain drain' has seen Zimbabwe loosing highly qualified and experienced personnel to other countries as they seek better paying jobs and more favourable working conditions. Third, the de-industrialisation process in Zimbabwe has seen some people doing jobs for which they are not qualified and other qualified personnel being underutilised because there are not enough jobs for everyone to do.

In addition, the fall in employment that the country experienced since around 1998 is less than proportionate to the fall in both industrial and agricultural output experienced during the same period. As discussed in the introduction, labour shifted backward from industry to agriculture which remarkably reduced the productivity of labour in confirmation to the Lewis, (1954) dualistic theory which states that labour productivity in the agricultural sector in LDCs is zero. Furthermore, the backward shift of labour also means that remuneration in both the industrial and the agricultural sector fell significantly as industrial remuneration is generally perceived to be higher compared to agricultural remuneration since profits are higher in industry. This further reduced the willingness to work by workers in the country.

Similarly, capital goods imports have a negative sign and are statistically significant at 1 percent and 10 percent levels for models (1) and (2) respectively. A 1 percent increase in capital goods imports will result in a 0.48 percent and 0.78 percent fall in non-export GDP in Zimbabwe for model (1) and (2) respectively.

The negative sign on the capital goods imports variable could mean that the capital goods that are being imported are not being utilized to capacity. This could be the explanation why relative manufacturing output was declining in the 1990s while expenditure on capital goods was increasing. Expenditure on capital goods imports was increasing at an average rate of 10 percent (in real terms) in the 1990s (CSO, 2005). However, relative manufacturing output declined from 22.8 percent of GDP in 1990 to 20.7 percent in 1994 and 17.1 percent in 1998 (Bhalla *et al*., 1999).

Some of the reasons why the above phenomenon might have occurred include the following. First, the country is lacking suitable personnel to handle sophisticated capital goods as most experienced and well trained personnel are leaving the country to find better paying jobs elsewhere. Second, the high labour turnover rate that the country is experiencing in production means that people who operate the sophisticated machinery frequently change resulting in companies failing to benefit from gains in specialization and also companies may fail to recover due to high training costs. This is further exacerbated by other production bottlenecks caused by shortages of raw materials and energy and power problems.

3.4 Stability tests

The plots of the stability test results (CUSUM and CUSUMSQ) of the ARDL models are given in Appendix 2. The null hypothesis is that the coefficient vector is the same in every period and the alternative is that it is not the same (Bahmani-Oskooee, 2001). CUSUM and CUSUMSQ are plotted against critical bounds of 5% significance level and the plots of these statistics are within the bound of the 5% significance level which shows that the null hypothesis (that all coefficients in the error correction model are stable) cannot be rejected. Therefore, both the CUSUM and CUSUMSQ tests confirm the stability of the long-run coefficients of the non-export GDP function in models (1) and (2).

3.5 Short-run model results

After estimating the long-term coefficients, we proceed to obtain the error correction representation of equation (10).The ARDL specification of the short-run dynamics can be derived by selecting an error correction model (ECM) of the following form:

$$\Delta LNY_t = \alpha_2 + \sum_{i=1}^{p} \omega_i \Delta LNY_{t-i} + \sum_{i=0}^{p} \tau_i \Delta LX_{t-i} + \sum_{i=0}^{p} \Omega_i \Delta LK_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta LL_{t-i} \quad (11)$$

$$+ \sum_{i=0}^{p} \zeta_i \Delta LCM_{t-i} + \psi ECM_{t-1} + \vartheta_t$$

where ECM_{t-1} is the error correction term, defined as:

$$ECM_t = LNY_t - \alpha - \sum_{i=1}^{p} \phi_i LNY_{t-i} - \sum_{i=0}^{q_1} \theta_i LX_{t-i} - \sum_{i=0}^{q_2} \delta_i LK_{t-i} - \sum_{i=0}^{q_3} \xi_i LL_{t-i} - \sum_{i=0}^{q_4} \pi_i LCM_{t-i} = \mu_t$$

All coefficients of the short-run model are coefficients relating to the short-run dynamics of the model's convergence to equilibrium. The error correction term indicates the speed of adjustment to restore equilibrium in the dynamic model. The ECM coefficient ψ shows how quickly variables converge to equilibrium and it should have a statistically significant coefficient with a negative sign. According to Banerjee *et al.* (1998), the highly significant error correction term further confirms the existence of a stable long-run relationship.

Table 5. 8: Error Correction Representation for the Selected ARDL Model(s).
Dependant Variable: ΔLNY

Model 1	ARDL(2,2,2,1,2) Selected based on SBC		Model 2	ARDL(1,2,0,2,1,2) Selected based on SBC	
Variable	Coefficient	T-Ratio [Prob]	Variable	Coefficient	T-Ratio [Prob]
C	12.0747	3.7782[0.002]***	C	20.0631	6.3604[0.000]***
ΔLY(-1)	1.0659	4.2118[0.001]***	ΔLPX	0.32324	3.3262[0.004]***
ΔLX	0.35861	2.6590[0.017]**	ΔLPX(-1)	-0.43787	-4.5703[0.000]***
ΔLX(-1)	-0.45919	-3.5716[0.002]***	ΔLMX	-0.16171	-2.7211[0.015]**
ΔLK	0.25383	1.3541 [0.193]	ΔLK	0.11751	0.84199[0.411]
ΔLK(-1)	-0.45107	-3.5437[0.002]***	ΔLK(-1)	-0.34067	-3.3532[0.004]***
ΔLL	1.6312	2.0519[0.056]*	ΔLL	1.15610	1.7071[0.106]
ΔLCM	-0.30603	-2.3969[0.028]**	ΔLCM	0.02238	0 .3086[0.761]
ΔLCM(-1)	0.30708	3.4091[0.003]***	ΔLCM(-1)	0.29059	4.1660[0.001]***
ECM(-1)	-1.0229	-6.0319[0.000]***	ECM(-1)	-0.38049	-2.9342[0.009]***
Adjusted R-squared		0.73155	Adjusted R-squared		0.81732
DW-statistic		2.3172	DW-statistic		2.4079
F-stat. F(9, 17)		9.3167[0.000]	F-stat. F(9, 17)		14.3691[0.000]

*(**)(***) , *Significant at 10 %*, 5% and 1% respectively.

3.51 Discussion of short-run results

Since we confirmed the existence of a cointegrating relationship among the variables, this suggests that there must be Granger causality in at least one direction, but it does not indicate the direction of temporal causality between the variables. According to Granger (1988), a significant error correction term (ECM) indicates long-run granger causality running from the explanatory to the dependant variables. Table 5.8 shows that the ECM is highly significant in both models and carries the expected negative sign. The coefficients of ECM(-1) are (-1.02) and (-0.38) for models (1) and (2) respectively and imply that the deviation from the long-term growth rate in non-export GDP is corrected by 1.02 percent in model (1) and 0.38 percent in model (2) by the coming year. Put differently, the highly significant error correction term suggests that more than 1.02 and 0.38 percent of disequilibrium in the previous year are corrected in the current year for model (1) and (2) respectively.

The coefficient of LMX (long-run coefficient) is not statistically significant. However the coefficient of ΔLMX (short-run coefficient) is significant at the 5 percent level. This implies that although there is no statistically significant long-run productivity effect of manufactured goods exports on non-export GDP in Zimbabwe, a change in the manufactured goods exports is associated with a negative productivity effect on non-export GDP in the short-run. This reflects the short-run inefficiencies of moving resources (including labour) from the production of primary goods exports (for which the country has a comparative advantage) to the sector which produces manufactured goods for exportation.

On the other hand, the short-run coefficients of total exports in model (1) and primary goods exports in model (2) are positive and statistically significant at the 5 percent and 1 percent levels respectively. This implies that both total exports and primary goods exports have positive short-run effects on total factor productivity. Since the productivity effect of total exports on non-export GDP is positive in the short-run, it also implies that the positive short-run effect on productivity of primary goods exports dominates the negative short-run effect on productivity of manufactured goods exports. This gives further evidence of Zimbabwe having a comparative advantage in primary goods exports.

We can also see in Table 5.8 that capital has no short-run effects on non-export GDP for both models since it is statistically insignificant. Similarly, labour has no short-run effects on non-export GDP for model (2) although there is weak evidence that an increase in labour result in an increase in non-export GDP in the short-run for model (1). On the other hand, capital goods imports are negative and statistically significant at the 5 percent level in the short-run for model (1). This implies that an increase in capital goods imports causes a decline in total factor productivity in the short-run as resources shift in production. Capital goods imports are however statistically insignificant in the short-run for model (2).

3.6 Data analysis

The empirical analysis is based on annual data on variables covering the period 1977 to 2006. They were collected from the central statistical office (CSO) national accounts and quarterly economic reviews and the reserve bank of Zimbabwe (RBZ) quarterlies. The period included covers several important events such as the ISI period before 1990, the ELG period from 1990 to 2000 and from year 2000 to 2006. An in-depth explanation to these periods is given in Chapter 2.

Non export output NY, is measured by Zimbabwean GDP net of exports, NK is the capital stock in real terms, for which we use gross fixed capital formation as a proxy, CM represent real imports of capital goods, real exports X are further disaggregated into primary goods exports PX and manufactured goods exports MX. Non-export GDP, capital stock, capital goods imports, real exports, primary goods exports and manufactured goods exports are evaluated in Zimbabwean dollars at constant 1990 prices. The labour variable L is represented by the total number of people employed each year. All of the series are transformed into log form. Log transformation can reduce the problem of heteroskedasticity because it compresses the scale in which the variables are measured (Gujarati 1995).

3.61 Limitations of the data

The sample period is limited to 1977-2006 because of the non availability of official national accounts data prior to this period for capital goods imports and disaggregated exports. Secondly, we tried to use the perpetual inventory method to estimate the capital stock series. However, because of the inherent difficulties in measuring the stock of physical capital, we use data related to investment, specifically gross fixed capital formation (GFCF) to proxy capital. It is worth to mention that this proxy has been used in numerous other studies including Al-Yousif (1999), Lussier (1993) and Medina-Smith (2001) among others.

4: CONCLUSIONS AND POLICY RECOMMENDATIONS

4.1 Summary of findings

Few empirical studies have been conducted in the past to investigate the validity of the export-led growth hypothesis in the case of Zimbabwe. Earlier studies found no evidence in support of the ELG hypothesis in Zimbabwe for the periods before the economy liberalized trade (before 1990). On the other hand, Mafusire (2001) found strong evidence in support of the ELG hypothesis using a different data sample which included four years after the trade liberalisation process. This shows that the empirical results differ by sample period. In an attempt to arrive at a conclusive finding, this study adopted a different perspective—that is, to test the relationship between exports and output growth in Zimbabwe using the newly proposed bounds testing approach.

This study found strong evidence in support of the ELG hypothesis in Zimbabwe in both the short-run and the long run and that primary goods exports have a significant contribution to the export and economic growth relationship. This proves that the trade liberalization policies that were implemented at 1990 to open up the economy played a significant role in improving export performance and increasing the role of exports in long-run economic growth process of Zimbabwe. A major finding of this study is that there exists a stable positive long-run relationship between economic growth and exports, particularly primary goods exports in Zimbabwe. It is worth noting that this study differs from others in that it uses a multivariate approach which considers other important macroeconomic determinants of growth rather than considering only two or three variables under granger causality.

4.2 Policy recommendations

It is evident from the empirical results that Zimbabwe relies heavily on foreign trade and that external demand is a critical component of her long term economic performance. Hence, economic performance of the domestic economy is sensitive to the changes in international markets. Therefore the government should implement sound macroeconomic policies to stabilise the economy and expand production for export purposes. More specifically, demand for primary goods has proved to be more vital in promoting economic growth both in the short run and long run. Hence policies that increase production of primary goods must be implemented in order to achieve higher economic growth.

On the other hand, although manufactured goods exports have proved to be an inefficient way of promoting economic growth in the current study, there is high evidence of its potential to realise the country increased economic performance. For example, profitability of manufactured exports depend highly on the productivity of the manufacturing sector, but in the current study the manufacturing sector has proved to be inefficient in utilising higher productivity potential that comes with increased exports as shown by the negative coefficients of the manufactured goods exports variable. This is further corroborated by the negative signs of the capital goods imports variable and the labour variable. Therefore, the government should implement complementary policies that ensure full utilisation of the production benefits that comes with increased exports like increased capital goods inflows and higher technical abilities required of the labour-force. Such policies includes firstly, ensuring adequate supply of well-equipped labour in order to fully and efficiently utilise the sophisticated technology that would come with liberalisation. This involves providing technical education to citizens by building vocational training institutions so as to increase ability to operate sophisticated imported technology. Second, retaining qualified and experienced personal (reducing brain drain) in local industries by incentivising companies to improve working conditions and increase earnings so that the general productivity of the labour-force remains high.

An appropriate policy mixture and proper sequencing of policies that promote primary goods exports and manufactured exports is also required to achieve both short run and long run objectives that ensure sustained economic growth in the country. In addition, proper policies should be implemented to ensure adequate market coverage that ensures maximum demand for the local exports. For instance, Zimbabwe lost most of its traditional export markets especially the European markets which saw the country redirecting its focus back to Africa and to Asian countries under the countries 'look east' policy. During this period of transition from one market to another, exports decreased due to efficiency losses during the process of re-channelling resources in production and also as a result of differences in demand in the different markets. For example, the loss of a beef market in Europe resulted in a reduction in beef exports as beef is not demanded in Asia as much as it is demanded in Europe.

4.3 Recommendations for further studies

Future researches can consider focussing on manufactured goods exports with particular emphasis on examining the productive efficiency of the manufacturing sector as a way to further increase the benefits from exports.

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APPENDICES

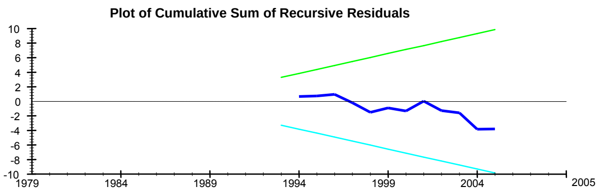
Appendix A: Diagnostic Tests

Test Statistics	LM Version		F Version	
	Model 1	Model 2	Model 1	Model 2
A: Serial Correlation	CHSQ(1)= 2.0642[.151]	CHSQ(1)= 1.9129[.167]	F(1, 12)= 0.99336[.339]	F(1, 12)= 0.91499[.358]
B: Functional Form	CHSQ(1)= 1.5417[.214]	CHSQ(1)= 0.78811[.375]	F(1, 12)= 0.72672[.411]	F(1, 12)= 0.36080[.559]
C: Normality	CHSQ(2)= 0.41150[.814]	CHSQ(2)= 1.6347[.442]	Not applicable	Not applicable
D: Heteroscedasticity	CHSQ(1)= 0.67761[.410]	CHSQ(1)= 0.30994[.578]	F(1, 25)= 0.64357[.430]	F(1, 25)= 0.29032[.595]

Notes: A: Lagrange multiplier test of residual serial correlation
B: Ramsey's RESET test using the square of the fitted values
C: Based on a test of skewness and kurtosis of residuals
D: Based on the regression of squared residuals on squared fitted values

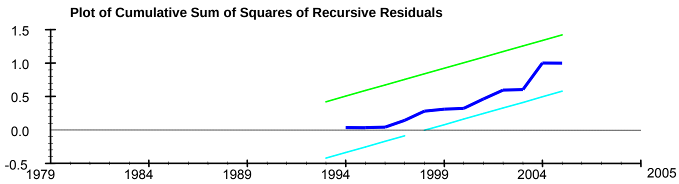
Appendix C: Plots of stability tests results

Model 1 (CUSUM)



The straight lines represent critical bounds at 5% significance level

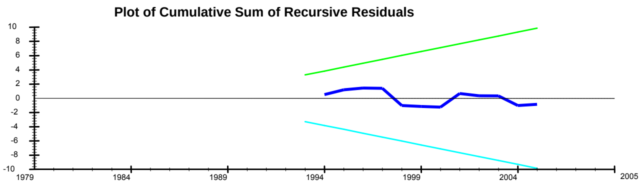
(CUSUMSQ)



The straight lines represent critical bounds at 5% significance level

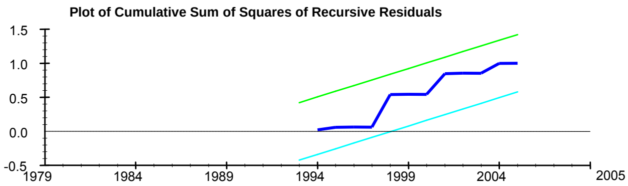
Model 2

(CUSUM)



The straight lines represent critical bounds at 5% significance level

(CUSUMSQ)



The straight lines represent critical bounds at 5% significance level