

# **The Export Led Growth Hypothesis in Lesotho: A Case of the Mining Industry.**

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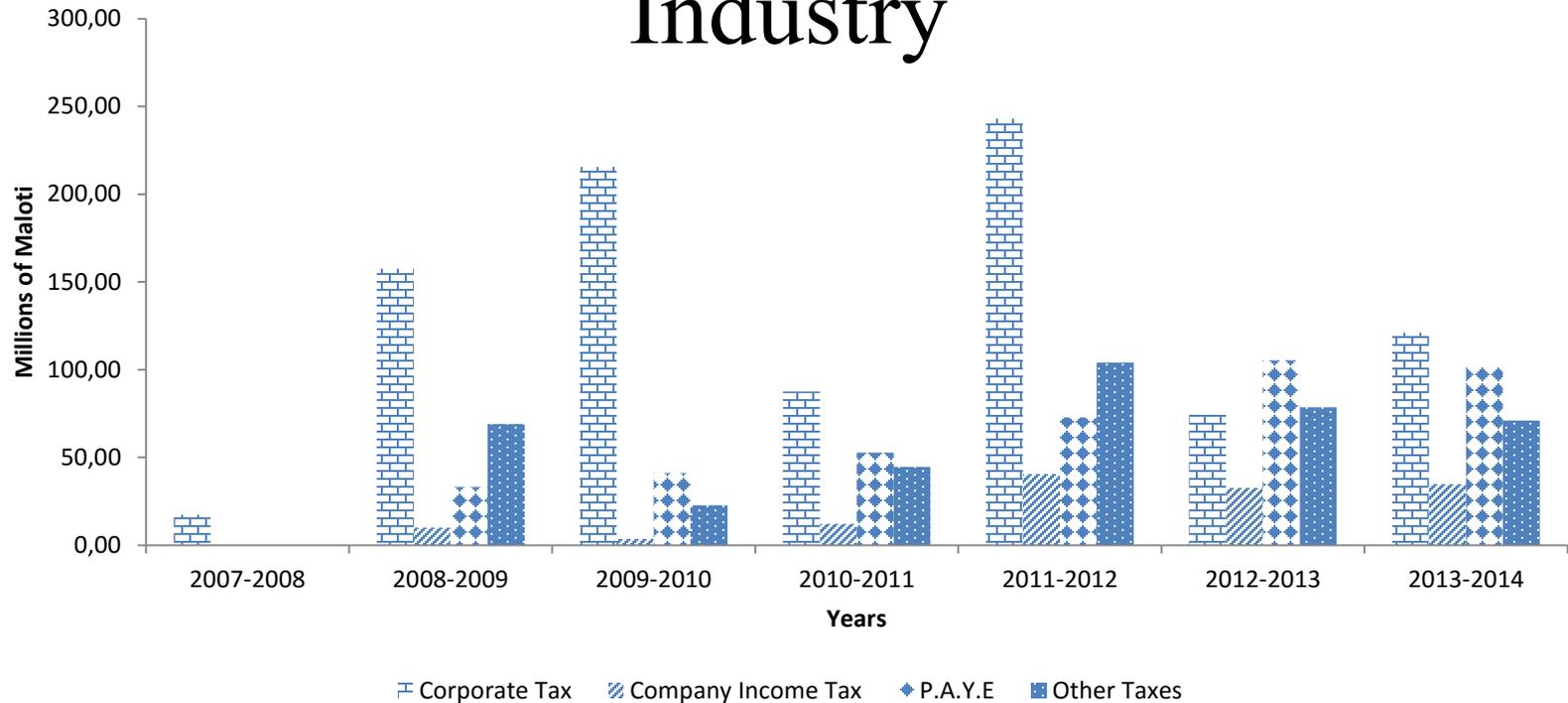
# Outline of Presentation

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# Brief Background of Lesotho's Mining Industry

- Regulatory Framework
  - Explosives Proclamation of 1958, Precious Stones Order of 1970 as amended, the Mine Safety Act of 1981 and the Mines and Minerals Act of 2005.
- Diamonds are at the core of Lesotho's mineral resources interest.
- Lesotho has four diamond mines; Lets'eng Mine, Likhobong Mine, Mothae Mine and Kao Mine all located in the Northern part of Lesotho.
- Annual capacity in 2013 was 100,000 carats, 77, 000\* carats, 60, 000 carats and 220, 000 carats for Lets'eng, Likhobong, Mothae and Kao respectively.
- Value of Lets'eng's production in 2014 was above US\$2,500 per carat, the highest per carat value in the world.
- Government of Lesotho has an ownership stake of between 25 – 30 per cent in each mine.

# Economic Contribution of Mining Industry



- Lets'eng accounts for 70% of Lesotho's corporate tax revenue and 60% of its foreign exchange revenue
- P.A.Y.E averaged M67 million from 2008
- Other taxes markedly high over the 2011 – 2012 period at M104 million
- Diamond exports as a share of GDP increased from zero in 2001 to 15.2% in 2011
- Diamond exports as a share of total exports increased from 0.1% in 2002 to 31.0% in 2011

# Motivation – Why this Paper?

- The relationship between economic growth and exports has generated extensive research and policy interest around the world for centuries (Abou-Stait, 2005; Dar *et al*, 2013; Ajmi *et al*, 2015). Empirical evidence to this effect has also largely been mixed.
- Some studies support a positive relationship between exports and growth with causality running from exports to growth thus proving the “Export-Led Growth” (ELG) hypothesis (Siliverstovs and Herzer, 2007; Dar *et al*, 2013; Daoud and Basha, 2015).
- Other studies support the existence of a positive relationship between exports and growth with causality running from growth to exports and thus proving the “Growth-Led Exports” (GLE) hypothesis (Henriques and Sadorsky, 1996; Shihab *et al*, 2014; Gokmenoglu *et al*, 2015).
- The rest of the studies indicate a bi-directional causality between growth and exports or no relationship at all (Dar *et al*, 2013; Daoud and Basha, 2015; Ajmi *et al*, 2015).
- Most of the studies cited above look at the aggregate effects of exports on growth and as such conceal the underlying effects of specific export categories on economic growth.
- As per the knowledge of the researchers, not any study has been undertaken on the ELG hypothesis in Lesotho and there is a knowledge gap in this area to be filled in the present study.

# Objectives of the Study

- This study adds to scarce literature on exports and economic growth in Lesotho using data from 1970 – 2013.
- We seek to establish four things:
  - What are the effects of Lesotho's main export, namely mining on economic growth?
  - Which hypothesis between ELG and GLE holds true for Lesotho?
  - Which of Lesotho's export sectors impact significantly on economic growth in the long run?
  - What should the country do to enhance exports of mining?

# Relevant Theoretical Literature

**Export-Led Growth (ELG) hypothesis** (Awokuse, 2007; Kim *et al*, 2009; Nguyen, 2011; Dar *et al* , 2013; Ajmi *et al*, 2015; Daoud and Basha, 2015; Gokmenoglu *et al*, 2015; as well as Al-Assaf and Al-Abdulrazag, 2015).

- The *External effect hypothesis* supports the ELG hypothesis by purporting that exports promote greater competition between the domestic and foreign economies by forcing the domestic economy to specialize in the production of specific products. This leads to the discovery of innovative ways to improve quality of domestic products through the use of latest technology and improved skill of the local workforce.

**Growth-Led Exports (GLE) hypothesis** (Vernon, 1966; Henriques and Sadorsky, 1996; Awokuse, 2007; and Kim *et al*, 2009).

- The *Product cycle hypothesis* supports the GLE hypothesis by purporting that as domestic firms invest more in product development and innovation, this leads to an expansion of exports associated with such a product.
- As domestic production increases, so does the efficiency and comparative advantage for the export economy. Export growth is triggered by productivity gains that come as a result of increased domestic levels of skilled labour and technology. Increase in domestic production enables the domestic economy to compete internationally in price and quality.

# Relevant Empirical Literature

## **Export-Led Growth (ELG) hypothesis**

- Siliverstovs and Herzer (2007): Examine the effects of Chile's main exports (mining and manufacturing) from 1960-2001. They found evidence of a unidirectional causal relationship from Manufacturing to growth. Manufactured exports were found to be more important in fostering economic growth than traditional primary exports.
- Dar *et al* (2013): Examine the relationship between exports and growth in India from 1992-2011. They found evidence of a unidirectional causal relationship from exports to growth.

## **Growth-Led Exports (GLE) hypothesis**

- Henriques and Sadorsky (1996): Examine the relationship between real exports, real GDP and terms of trade for Canada from 1870-1975. They found evidence of a long run unidirectional causal relationship from GDP to exports.
- Gokmenoglu *et al* (2015): Examine the existence of a long-run relationship between exports and economic growth for Costa Rica for the period 1980 – 2013. They found evidence of a unidirectional causal relationship from growth to exports.

## **Bi-Directional Causality between Exports and Growth**

- Ajmi *et al* (2015): Examine the causal relationship between real exports and economic growth for South Africa for the period 1911 – 2011. They found evidence of bi-directional causality between exports and real GDP.
- Daoud and Basha (2015) examined the ELG hypothesis for Jordan, Kuwait and Egypt during the period 1976-2013. They found bi-directional causality between exports and GDP for Jordan and unidirectional causality running from exports to GDP for both Kuwait and Egypt.

# Model Specification

## General Model

$$\Delta \ln Y_t = \beta_0 + \beta_1 \ln EXMAN_{t-1} + \beta_2 \ln EXMIN_{t-1} + \beta_3 \ln OEX_{t-1} + \beta_4 \ln TOT_{t-1} + \beta_5 \ln REER_{t-1} + \beta_6 \ln K_{t-1} + \varepsilon_t$$

**Auto Regressive Distributed Lag (ARDL) Model**

$$\Delta \ln Y_t = \beta_0 + \beta_1 \ln Y_{t-1} + \beta_2 EXMAN_{t-1} + \beta_3 \ln EXMIN_{t-1} + \beta_4 \ln OEX_{t-1} + \beta_5 \ln TOT_{t-1} + \beta_6 \ln REER_{t-1} + \beta_7 \ln K_{t-1} + \sum_{i=1}^p \pi_1 \Delta \ln EXMAN_{t-i} + \sum_{i=1}^p \pi_2 \Delta \ln EXMIN_{t-i} + \sum_{i=1}^p \pi_3 \Delta \ln OEX_{t-i} + \sum_{i=1}^p \pi_4 \Delta \ln TOT_{t-i} + \sum_{i=1}^p \pi_5 \Delta \ln REER_{t-i} + \sum_{i=1}^p \pi_6 \Delta \ln K_{t-i} + \theta Z + \varepsilon_t$$

## Long-Run ARDL Model

$$\ln Y_t = \beta_0 + \sum_{i=1}^p \beta_1 \ln EXMAN_{t-i} + \sum_{i=1}^p \beta_2 \ln EXMIN_{t-i} + \sum_{i=1}^p \beta_3 \ln OEX_{t-i} + \sum_{i=1}^p \beta_4 \ln TOT_{t-i} + \sum_{i=1}^p \beta_5 \ln REER_{t-i} + \sum_{i=1}^p \beta_6 \ln K_{t-i} + \theta Z + \mu_i$$

## Short-Run Error Correction Model

$$\Delta \ln Y_t = \beta_0 + \sum_{i=1}^p \pi_1 \Delta \ln EXMAN_{t-i} + \sum_{i=1}^p \pi_2 \Delta \ln EXMIN_{t-i} + \sum_{i=1}^p \pi_3 \Delta \ln OEX_{t-i} + \sum_{i=1}^p \pi_4 \Delta \ln TOT_{t-i} + \sum_{i=1}^p \pi_5 \Delta \ln REER_{t-i} + \sum_{i=1}^p \pi_6 \Delta \ln K_{t-i} + \Omega ECT_{t-i} + \theta Z + \mu_i$$

# Apriori Expectations

Independent Variable	Expected Relationship with Dependent Variable
EXMAN	Positive
EXMIN	Positive
OEX	Positive
TOT	Theoretically ambiguous
REER	Theoretically ambiguous
K (proxy by gross fixed capital formation)	Positive

# Results of Bounds Test for Cointegration

- The results of the bound cointegration test are based on critical values taken from Narayan (2005) due to the study's sample size of 43

Bound Test for Cointegration					
Critical value bounds of the F statistic: restricted intercept and no trend					
90 per cent level		95 per cent level		99 per cent level	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
2.218	3.314	2.618	3.863	3.505	5.121
<b>F-Statistics: 15.15642. Sample size: 43, K is the number of regressors: 6</b>					

- The results show the rejection of the null hypothesis of no cointegration evident from the fact that the calculated F-statistic from the Wald-test exceeds the upper bound critical values at either 1, 5 and 10 per cent significance levels.
- As result, the empirical evidence implies that real GDP, real exports (mining exports, manufacturing exports, other exports), terms of trade, real capital stock and real effective exchange rate are cointegrated for long-run relationship.

# Results of Long-Run ARDL Model

Variable	Coefficient	t-statistic	p-value
LEXMAN	0.122187	1.032591	0.3106
LEXMIN	0.059060	3.750064	0.0008
LOEX	-0.060782	-0.612626	0.5451
LTOT	0.110461	0.576148	0.5691
LREER	-0.087530	-1.096762	0.2821
LK	0.293471	3.754941	0.0008
D2	-0.256431	-2.314642	0.0282
D4	-0.488296	-2.363340	0.0253
C	15.013280	7.954113	0.0000

## Diagnostics Tests

$R^2 = 0.997723$

Adj  $R^2 = 0.996584$

Durbin-Watson = 2.254813

Jarque-Bera = [0.022886] (0.988622)

Wald Test = [15.15642] (0.0000)

Breusch-Godfrey Serial Correlation LM Test = [2.299597] (0.1203)

Heteroskedasticity Test: Breusch-Pagan-Godfrey = [0.709718] (0.7469)

- The  $R^2$  indicates that 99 per cent of the variation in GDP is explained within the model.
- The Durbin Watson (DW) statistic shows that no autocorrelation exists between the variables.
- The Jarque Bera (JB) test for normality fails to reject the null hypothesis that the errors are normally distributed which confirms that the errors are white noise.

# Results of Error Correction Model

Variable	Coefficient	t-statistic	p-value
D(LEXMAN)	0.165759	2.233287	0.0337
D(LEXMIN)	0.026649	5.264139	0.0000
D(LOEX)	-0.087619	-3.367244	0.0022
D(LTOT)	0.335808	4.150222	0.0003
D(LREER)	-0.106633	-2.328529	0.0273
D(LK)	0.100235	4.594598	0.0001
D(D2)	-0.087584	-2.558997	0.0162
D(D4)	-0.166778	-3.169206	0.0037
CointEq(-1)	-0.341550	-3.822296	0.0007

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- The model fits the data well as suggested by a favourable  $R^2$  and adjusted  $R^2$ .
- The DW statistic and JB test both fail to reject the null hypothesis, indicating that the residuals are white noise. The Wald test rejects the null hypothesis that the coefficients are not statistically different from zero while the Breusch-Pagan-Godfrey (BPG) Heteroscedasticity test rejects the null hypothesis that there is heteroscedasticity.

# Results of Granger Causality Test

Null Hypothesis	F-Statistic	P-Value
Y does not Granger Cause EXMAN	4.20549	0.0226
EXMAN does not Granger Cause Y	3.24695	0.0502
Y does not Granger Cause EXMIN	5.23263	0.0032
EXMIN does not Granger Cause Y	4.17135	0.0432
Y does not Granger Cause K	1.11217	0.3396
K does not Granger Cause Y	1.85379	0.1709
Y does not Granger Cause OEX	5.61600	0.0074
OEX does not Granger Cause Y	0.32047	0.7278
Y does not Granger Cause REER	0.66215	0.5217
REER does not Granger Cause Y	0.76327	0.4733
Y does not Granger Cause TOT	5.05461	0.0115
TOT does not Granger Cause Y	0.59653	0.5559

- There exists bidirectional causality running from real GDP growth to exports of manufacturing and exports of mining.
  - This confirms “export-led growth” (ELG) hypothesis and the “growth-led exports” (GLE) hypothesis in Lesotho.
  - The two main export industries in Lesotho; mining and manufacturing, can be used in predicting GDP while on the other hand GDP growth can be used in predicting mining and manufacturing exports.
- There is unidirectional causality running from GDP growth to terms of trade and other exports.
  - This implies that GDP growth can be used to predict other exports and terms of trade.

# Conclusion

- In particular, the paper confirms the fact that exports of mining played a positive and statistically significant role in enhancing the economic growth in Lesotho in the short and long run throughout 1970-2013.
- The main findings of the Granger causality test confirm the two main theories of the relationship between growth and exports, namely the “export-led growth” (ELG) hypothesis and the “growth-led exports” (GLE) hypothesis in Lesotho due to the existence of a bidirectional causality between GDP growth and exports of mining and manufacturing.

# Policy Implications

- The study advocates for the continued promotion of the diamond mining export sector by the GoL through the adoption and intensification of vigorous growth policies and laws necessary to stimulate that particular export industry and ultimately effect rapid economic growth.
- The GoL should encourage technological deepening and the increase of value addition within the mining sector through the prioritization of capital investment in physical infrastructure projects coupled with partnerships between mining companies and locally owned value-adding processing industries with upstream supply-chain-linkages with the mining sector.
  - This will help facilitate positive knowledge and technological spill overs and transcend the country from a low income underdeveloped status to one that specializes in the production of high quality products.
- Furthermore, the GoL should increase the participation of Basotho people in the running and ownership of the country's mining and minerals industry.
  - This will result in fostering accelerated economic and social progress that will create employment and lift the country out of poverty.

Thank you.

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