

Economic Growth in Trinidad and Tobago

An Empirical Investigation of
the Neo-Classical Growth
Theory

Outline of Presentation

- Objective/ Rationale of Study
- Summary of Economic Conditions
- The Neo-Classical Growth Model
- Methodology of study
- Empirical Testing
- Conclusion



Objective/Rationale of Presentation

- To determine the factors that influence economic growth in Trinidad and Tobago.
- To test the Neo-classical model of economic growth using data from Trinidad and Tobago (1970-2009) in order to determine the impact of K and L on Y.
- First of a series of tests of existing growth models using data from T&T-more tests to be conducted on other existing growth models.



Historical Perspective on Growth Models in Trinidad and Tobago

- Five-Year Economic Development Plans.
- Medium Term Planning Frameworks.
- Social and Economic Policy Frameworks.
- Vision 2020 – Heavy emphasis on human capital, infrastructure expansion and diversification of the economy (top -down approach).
- Peoples Partnership Manifesto (Pillars similar to Vision 2020) – Focus on Capital (K), Labour (L) and diversification (bottom-up approach).

Success of Existing Growth Models in T&T

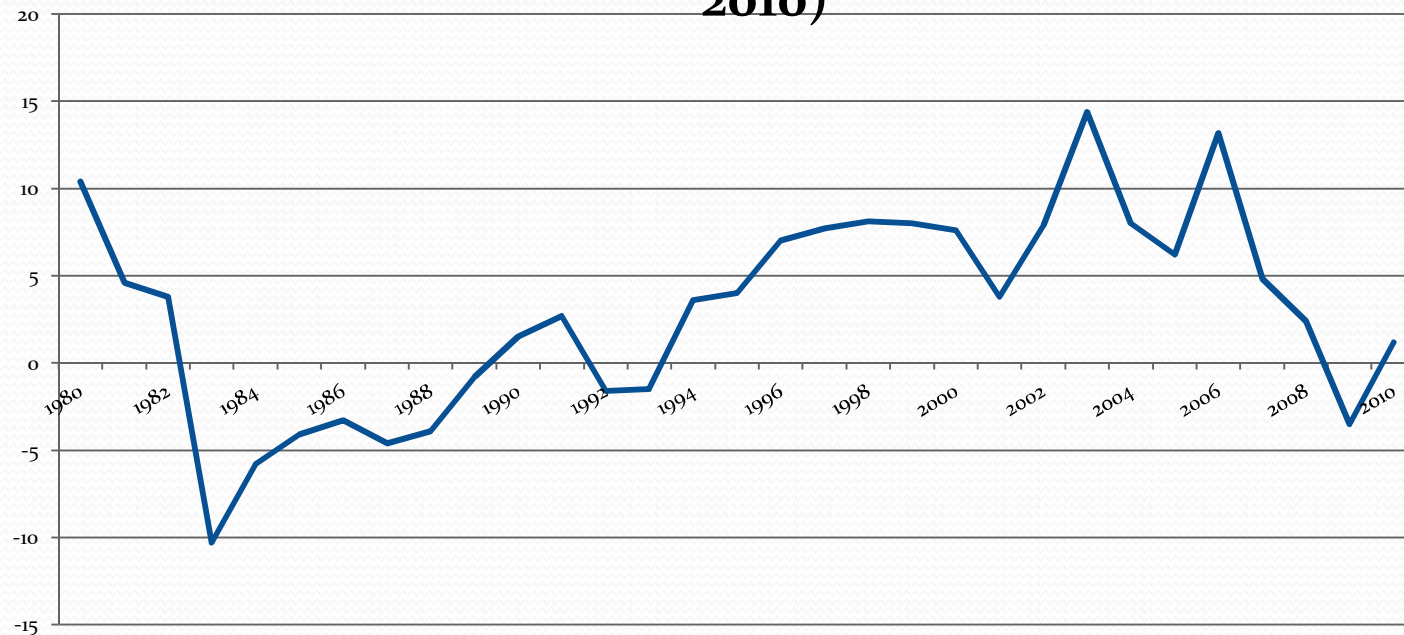
- The growth models used in Trinidad and Tobago have not generated the desired response especially in their ability to:
 - Adequately forecast income and economic growth in the country;
 - Smooth income generation and distribution;
 - Contribute to sustainable economic growth and development;
 - Diversify the economy away from the Hydrocarbon sector; and
 - **Determine the factors that contribute to economic growth.**

Summary of Economic Conditions in Trinidad and Tobago

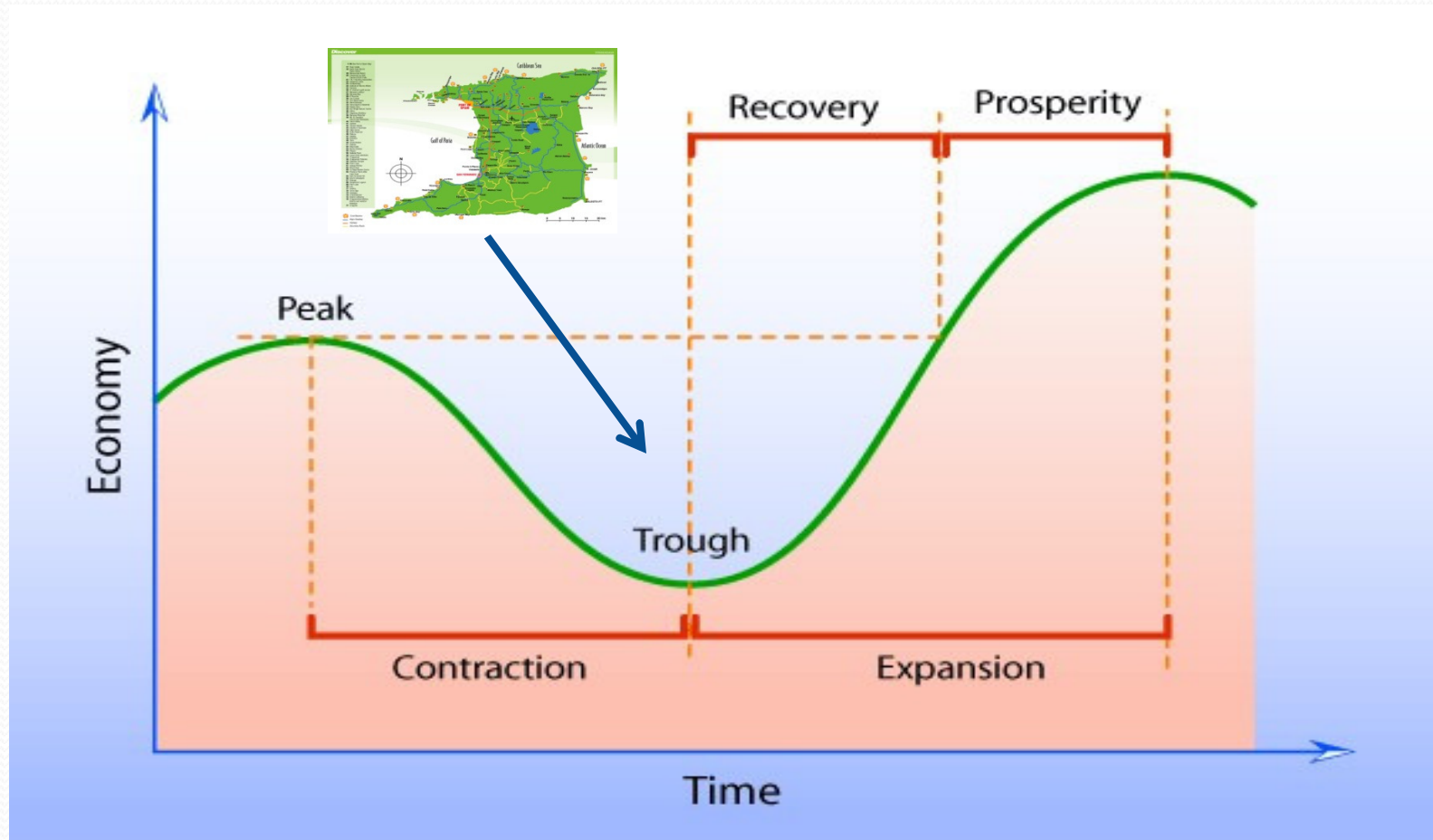
- Declining Inflation.
- Declining Unemployment.
- Declining Interest Rates.
- Declining Economic Growth rates from 2007.
 - A Recession in effect during 4th Qtr 2010 and 1st Qtr 2011 and 4th Qtr 2008- 3rd Qtr 2009
- Sluggish recovery of the world economy except for BRIC countries.
- Existence of a state of emergency and associated curfew.
- The impact of the anti-gang legislation coupled with the combat of the drug trade and anti-money laundering efforts can significantly affect economic activity, wealth creation and income distribution.

Economic Conditions in Trinidad and Tobago

Trinidad and Tobago's Economic Growth Rate (1980-2010)



What's our Position?



The Saga Continues...

- Hence, the search continues for a more predictable framework to model the growth trajectory of the Trinidad and Tobago economy and to be better able to identify those factors that contribute to the growth process.
- This presentation attempts to test one of the major growth models that has been developed to date – The Neo-classical model of economic growth.

The Neo-Classical Model of Economic Growth

- The Neo-classical growth model is arguably the first major model of economic growth.
- Pioneered by Robert Solow (1956) and Trevor Swan (1956) – (Solow-Swan Growth Model-1956).
- Has foundations in earlier work done in the 1930's and 1940's by Roy Harrod and Evsey Domar (Harrod-Domar Model of Economic Growth).



The Neo-Classical Model of Economic Growth Con'd

- The major relationship in the Solow –Swan (hereafter called Solow growth model) growth model is that Output (Y) is determined by Capital (K) , Labour (L) and Technology (A).



The Neo-Classical Model of Economic Growth Con'd

- The major assumption of the Neo-classical growth model is diminishing returns to capital and labour separately in a closed economy.
- Based on the Cobb-Douglas Production Function.
- Technology is assumed to be determined exogenously.

The Neo-Classical Model of Economic Growth Con'd

- It has been generally accepted that the Solow growth model follows a Cobb-Douglas Production Function.
- The Cobb-Douglas Production Function is of the form:
$$Y = A K^{\alpha} L^{1-\alpha}$$
- Where: Y = Output; K = Capital; L = Labour
- α = The contribution of Capital to output.
- $1 - \alpha = \beta$ The contribution of Labour to output.



Use of the Solow Growth Model

- The Solow growth model is mainly used to determine the growth rates of countries in terms of the time period it takes for slow growing countries to “catch up” with the fast growing countries.
- To test the impact of Capital (K), Labour (L) and Technology (A) on the level of Output (Y) for a country` -Trinidad and Tobago.

The Neo-Classical Model of Economic Growth Con'd

- If $\alpha + \beta = 1$ - The production function exhibits constant returns to scale.
- If $\alpha + \beta < 1$ - The production function exhibits decreasing/diminishing returns to scale.
- If $\alpha + \beta > 1$ - The production function exhibits increasing returns to scale.

The Neo-Classical Model of Economic Growth Con'd

- The Cobb-Douglas production function is based on a per worker production function that is derived from the aggregate form of the production function.
- $Y/L = A (K^\alpha L^{1-\alpha}) / L$
- But the objective of this study is not to analyze the micro-fundamentals of the Neo-classical growth model but to determine the relevance or potency of K and L in influencing Y (macro-fundamentals).

The Neo-Classical Model of Economic Growth Con'd

- Following from Tan Bao Hong (2008) the Cobb-Douglas production function is expressed exponentially and to linearize the function it must be converted to a Logarithmic form.
- Hence, the generic Cobb-Douglas production function will be converted to a Log-Linear form for estimating α and β .

The Neo-Classical Model of Economic Growth Con'd

- When the Cobb-Douglas production function is converted to the to the log-linear form it appears as:
- $\ln Y = \ln A + (\beta) \ln L + \alpha \ln K$
- According to Classical economic theory these factors would be paid based on their Marginal Productivities.

The Neo-Classical Model of Economic Growth Con'd

- Hence:
- $MPK = \alpha$; and
- $MPL = \beta$

- Where:
- α is Capital's (K) share of output (Y) or Capital's (K) elasticity of output (Y); and
- β is Labour's (L) share of output or Labour's (L) elasticity of output (Y).



The Neo-Classical Model of Economic Growth Con'd

- Since we only have approximations of the values of α and β , they can be estimated as the coefficients of K and L respectively using the Log-Linear form of the Cobb-Douglas production function.

Methodology

- The estimation of the Log-Linear Cobb-Douglas production function using GLS.
- Use Employment data for Labour (L) (1970-2009).
- Use Gross Capital Formation (GFC) for Capital (K) (1970-2009).
- Estimation of the following model using GLS:
- $\ln Y = \ln A + (\beta) \ln L + \alpha \ln K$

Empirical Modeling

- A test of the Augmented Cobb-Douglas Production function.
- Due to the virtual absence of data on absolute K and labour hours worked L.
- Using GCF (K) and employment data (L) in the Log-linear Cobb-Douglas production function.

Empirical Findings

- The coefficients of K and L generated are:
- $K = 0.78 = \alpha$
- $L = 1.73 = \beta$
- Hence: $\alpha + \beta > 1$

- This indicates that the Cobb-Douglas production function exhibits Increasing Returns to Scale in Trinidad and Tobago (1970-2009) and assuming that technology is exogenously determined.

Conclusion

- The Neo-Classical model of economic growth assumes a Cobb-Douglas production function that exhibits Diminishing Returns to K whereby $\alpha + \beta < 1$.
- Data for T&T (1970-2009) revealed a Cobb-Douglas production function that exhibits Increasing Returns whereby $\alpha + \beta > 1$.
- If K and L are compensated based on their marginal productivities, data shows that the productivity of L is higher in relation to K.
- L seems to be a highly significant factor in influencing Y as opposed to K in T&T and is subject to Increasing Returns.
- An inherent disproof of the Neo-classical theory in T&T (1970-2009).



Thank You