

# Econometric Methods for Analyzing Economic Development

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# Table of Contents

**Preface**..... xv

## Section 1

### Employment, Economic Growth, and Inflation

#### Chapter 1

Asymmetric Equilibrium Adjustment between Employment and Economic Growth in Côte d'Ivoire: A Consistent Momentum Threshold Autoregressive Model ..... 1  
*Coffie Francis José N'Guessan, University of Cocody, Ivory Coast*

#### Chapter 2

Inflation and Economic Performance in the CFA Franc Zone: Transmission Channels and Threshold Effects ..... 10  
*Komlan Fiodendji, University of Ottawa, Canada*  
*Bernadette Dia Kamgnia, The African Development Bank, Tunisia*  
*Nasser Ary Tanimoune, University of Ottawa, Canada*

#### Chapter 3

A New Keynesian Phillips Curve for South Africa ..... 30  
*Rulof Burger, University of Stellenbosch, South Africa*  
*Stan du Plessis, University of Stellenbosch, South Africa*

## Section 2

### Development and Equity

#### Chapter 4

Point Density Estimation of Changes in Income Polarization in Tanzania, 1992–2001 ..... 50  
*John K. Mduma, University of Dar es Salaam, Tanzania*

<b>Chapter 12</b>	
Embedding New Technologies and Extending Time Horizons in Input-Output Analysis .....	192
<i>Randall W. Jackson, West Virginia University, USA</i>	
<i>Christa D. Court, MRIGlobal and West Virginia University, USA</i>	
<b>Chapter 13</b>	
Application of Quantitative Methods in Natural Resource Management in Africa: A Review .....	205
<i>Elias T. Ayuk, United Nations University Institute for Natural Resources in Africa, Ghana</i>	
<i>William M. Fonta, United Nations University Institute for Natural Resources in Africa, Ghana</i>	
<i>Euphrasie B. Kouame, United Nations University Institute for Natural Resources in Africa, Ghana</i>	
<b>Chapter 14</b>	
Natural Resources and Welfare: A Study of U.S. States .....	235
<i>Leslie Dunn, Washington and Jefferson College, USA</i>	
<i>Robert Dunn, Washington and Jefferson College, USA</i>	
<b>Chapter 15</b>	
The Role of Governance in Teledensity and Economic Growth: GMM Estimation .....	262
<i>Chali Nondo, Albany State University, USA</i>	
<i>Mulugeta S. Kahsai, West Virginia University, USA</i>	
<i>Peter V. Schaeffer, West Virginia University, USA</i>	
<b>Compilation of References</b> .....	279
<b>About the Contributors</b> .....	311
<b>Index</b> .....	317

# Detailed Table of Contents

<b>Preface</b> .....	XV
----------------------	----

## Section 1

### Employment, Economic Growth, and Inflation

#### Chapter 1

Asymmetric Equilibrium Adjustment between Employment and Economic Growth in Côte d'Ivoire: A Consistent Momentum Threshold Autoregressive Model .....	1
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*Coffie Francis José N'Guessan, University of Cocody, Ivory Coast*

In this chapter, the authors investigate the possibility of asymmetry in the relationship between employment in the modern private sector and economic growth as measured by real Gross Domestic Product (GDP). The analysis is based on a threshold cointegration model. The use of a momentum threshold autoregressive model led to the rejection of the hypothesis of no cointegration, implying that the cointegration relationship between employment and real GDP is asymmetric. The error correction model developed thereafter suggests that in the short-run, when employment is above its long-term trend, the disequilibrium is adjusted via a decreasing of real GDP. However, it seems like adjustment does not occur when employment is below its equilibrium value. This indicates that restrictive macroeconomic policies that affect the labor market can lead to a persistent employment crisis in the modern private sector.

#### Chapter 2

Inflation and Economic Performance in the CFA Franc Zone: Transmission Channels and Threshold Effects .....	10
---	----

*Komlan Fiodendji, University of Ottawa, Canada*

*Bernadette Dia Kamgnia, The African Development Bank, Tunisia*

*Nasser Ary Tanimoune, University of Ottawa, Canada*

This chapter examines the relationship between inflation and economic performance in the CFA franc zone over the period 1991-2009 and studies the mechanism through which inflation affects long-term economic growth. Using a threshold model, the evidence strongly supports the view that the relationship between inflation and economic growth is nonlinear with a unique threshold. The most striking difference between West Africa Economic and Monetary Union (WAEMU) zone and Central African Economic and Monetary Community (CEMAC) zone is that the coefficients of inflation are all significantly negative for all inflation regimes, while for WAEMU zone, the coefficient of inflation is positive for the low and

high inflation regimes. Further investigation suggests that for the WAEMU countries, but not for the CEMAC countries, the level of investment is the channel through which inflation nonlinearly affects economic growth. One of the main contributions of this chapter is to enable the policymakers, specifically central bankers in each zone, to concentrate on those policies that keep the target of inflation, which may be helpful for the achievement of sustainable economic growth. Low inflation is also helpful for minimizing the uncertainties in the financial market, which in turn boost the investment in the country.

### **Chapter 3**

A New Keynesian Phillips Curve for South Africa ..... 30

*Rulof Burger, University of Stellenbosch, South Africa*

*Stan du Plessis, University of Stellenbosch, South Africa*

In South Africa, as elsewhere, economists have not reached an agreed upon model for the Phillips curve, despite its importance for understanding the process of inflation and its relevance for policy makers. It has been a particular challenge to identify the role of aggregate economic activity in the inflationary process in the South African literature, since the breakdown of a reasonably traditional Phillips curve, which had existed until the early seventies. A comparatively new model of the Phillips curve, often called the New Keynesian Phillips Curve (NKPC), has recently received considerable interest and support from monetary economists. The South African literature is exceptional in that these models have not yet been applied locally, despite their close association with forward looking and rules-based monetary policy regimes such as the inflation-targeting regime of the South African Reserve Bank. This chapter takes a first step towards introducing the NKPC in the South African debate, by estimating standard, hybrid, and open economy versions of the model and comparing the results with the international literature as well as South African precedents. The authors find encouraging, though tentative, evidence that research along these lines might help to identify the impact of aggregate economic activity in the domestic process of inflation.

## **Section 2**

### **Development and Equity**

### **Chapter 4**

Point Density Estimation of Changes in Income Polarization in Tanzania, 1992–2001 ..... 50

*John K. Mduma, University of Dar es Salaam, Tanzania*

Data from two Household Budget Surveys in 1991-1992 and 2000-2001 in Tanzania indicate that there is no change in inequality between the two surveys. In spite of this finding, and impressive macroeconomic gains, there is growing discontent throughout the country because of the belief that the change from socialist to market policies has worsened income inequality. In this chapter, the authors argue that the Gini index fails to capture some inconspicuous trends in the income distribution, particularly the problem of polarization across space. Using polarization measures based on point density estimation of alienation and identification, they analyze changes in the distribution of household income in Tanzania in the 1990s. Unlike analyses that rely on the Gini index, the authors find that polarization increased significantly between 1992 and 2001. They also find evidence of increased spatial variability across regions and lack of spatial convergence of household incomes.

## Chapter 5

Sources of Income Inequality in Nigeria: Decomposition Approaches..... 66

*A. S. Oyekale, North-West University, South Africa*

*A. I. Adeoti, University of Ibadan, Nigeria*

*T. O. Oyekale, University of Ibadan, Nigeria*

Income inequality and poverty in Nigeria are closely related. This chapter analyzes the contributions of income sources and socio-economic factors to income inequality, and estimates the contributions of income redistribution and growth to poverty reduction. Household survey data obtained from the National Bureau of Statistics (NBS) are used. Results show that in 2004, income inequality was higher in rural than in urban areas. Wage and non-farm income made the largest contributions to urban income inequality, while agricultural and wage incomes contributed most to rural inequality. Household size, urbanization, and education significantly increased income inequality, while age, paid/salaried jobs, and non-farm enterprises decreased it ( $p < 0.05$ ). Between 1998 and 2004, income redistribution reduced poverty but income growth increased it. The authors therefore recommend that welfare enhancing programs that benefit the poor should be identified and that better economic opportunities should be created for those in rural areas.

## Chapter 6

Measuring and Explaining Economic Inequality: An Extension of the Gini Coefficient..... 87

*C. Chameni Nembua, University of Yaoundé II, Cameroon*

This chapter proposes a new class of inequality indices based on the Gini coefficient (or index). The properties of the indices are studied and are found to be regular, relative, and to satisfy the Pigou-Dalton transfer principle. A subgroup decomposition is performed, and the method is found to be similar to the one used by Dagum when decomposing the Gini index. The theoretical results are illustrated by case studies, using Cameroonian data.

## Chapter 7

Demand for Health Care in Kenya: The Effects of Information about Quality..... 102

*Moses K. Muriithi, University of Nairobi, Kenya*

*Germano Mwabu, University of Nairobi, Kenya*

Although studies on health care demand have previously been conducted in Kenya and elsewhere in Africa, it has hitherto not been shown how health seeking behavior conditional on illness is affected by information on health care quality and by quality variation conditional on that information. This study develops and tests the hypothesis that the information available on service quality at a health facility significantly affects demand for health care, and therefore, parameter estimates that ignore information available to patients about service quality might be biased. The authors highlight the need for public provision of such information. They also draw attention to a potential limitation of demand analysis in the design and implementation of health care financing policies.

**Chapter 5**

Sources of Income Inequality in Nigeria: Decomposition Approaches..... 66

*A. S. Oyekale, North-West University, South Africa*

*A. I. Adeoti, University of Ibadan, Nigeria*

*T. O. Oyekale, University of Ibadan, Nigeria*

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*C. Chameni Nembua, University of Yaoundé II, Cameroon*

**Chapter 7**

Demand for Health Care in Kenya: The Effects of Information about Quality..... 102

*Moses K. Muriithi, University of Nairobi, Kenya*

*Germano Mwabu, University of Nairobi, Kenya*

**Chapter 8**

Explaining International Land Transactions in Africa..... 111

*Yohannes G. Hailu, United Nations Commission for Africa, Rwanda*

*Adesoji Adelaja, Michigan State University, USA*

*Henry Akaeze, Michigan State University, USA*

*Steve Hanson, Michigan State University, USA*

**Section 3**

**Regional Impacts**

**Chapter 9**

Simulating Impacts on Regional Economies: A Modeling Alternative ..... 132

*Guy R. West, University of Sunshine Coast, Australia*

*Randall W. Jackson, West Virginia University, USA*

**Chapter 10**

Regional Structure and Economic Development: Growth Empirics for U.S. Metropolitan Areas .... 153

*David S. Bieri, University of Michigan, USA*

**Section 4**

**Technology, Natural Resources, Energy, and Growth**

**Chapter 11**

Population Dynamics, Economic Growth, and Energy Consumption in Kenya ..... 178

*Nyakundi M. Michieka, West Virginia University, USA*

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*Yohannes G. Hailu, United Nations Commission for Africa, Rwanda*

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Rising global food prices and demand for biofuels have recently heightened global interests in agricultural land resources in Africa, resulting in increased International Land Transactions (ILTs). While opponents of ILTs have dubbed it “land grabbing,” proponents welcome the opening of Africa’s agriculture to foreign direct investment. Limited empirical work exists explaining the motivations of investor and host countries. This chapter attempts to expand the literature by providing an empirical explanation of country land targeting behavior. As the debate on “land grabbing” intensifies, understanding motivations of various actors in the land market becomes relevant.

### **Section 3**

#### **Regional Impacts**

## **Chapter 9**

Simulating Impacts on Regional Economies: A Modeling Alternative ..... 132

*Guy R. West, University of Sunshine Coast, Australia*

*Randall W. Jackson, West Virginia University, USA*

Practitioners and academics apply a range of regional economic models for impacts assessment. These models extend from a simple economic base through to input-output and econometric models and computable general equilibrium models. All such models have strengths and weaknesses. Dimensions of which impact assessment models are often compared include level of industry detail, data availability, and complexity of behaviour modelled. This chapter presents a model for Simulating Impacts on Regional Economies (SIRE) that occupies an intermediate position between Input-Output (IO), arguably the most widely used model for regional impacts assessments, and Computable General Equilibrium (CGE) models. With greater behavioural detail than the typical regional IO model, the SIRE model incorporates many of the features of CGE models without enforcing the strictly linear behavioural relationships of IO. Like most CGE models, the simulation framework presented here borrows a subset of parameters from an existing econometric model for the same region. The SIRE model falls short, however, of the complexity of capturing the full range of behaviours of CGE models.

## **Chapter 10**

Regional Structure and Economic Development: Growth Empirics for U.S. Metropolitan Areas .... 153

*David S. Bieri, University of Michigan, USA*

This chapter investigates several aspects of how local economic development and growth are shaped by regional differences in industrial structure on the one hand and interregional linkages on the other hand. The author begins by proposing an alternative regional classification of regions for U.S. Metropolitan Statistical Areas (MSAs) on the basis of clusters that were formed by principal component analysis from economic variables that are relevant for regional growth. These variables include labor productivity growth, measures of local industry mix, human capital, entrepreneurship, and innovation. He then uses these growth-based regional clusters to control the presence of cluster-specific fixed-effects when explaining the spatial characteristics of urban specialization and concentration in the United States. The empirical validity of these new economic regions are evaluated against alternative established clas-

sifications such as the BEA Regions, Crone's (2005) Economic Regions, the Census Regions, and the Federal Reserve Districts. Looking specifically at the empirics of regional growth both in a traditional  $\beta$ -convergence setting as well as a dynamic panel setting, the author examines the explanatory power of regional differences in economic structure such as industry concentration, employment specialization, and sectoral diversity.

#### Section 4

### Technology, Natural Resources, Energy, and Growth

#### Chapter 11

Population Dynamics, Economic Growth, and Energy Consumption in Kenya ..... 178

*Nyakundi M. Michieka, West Virginia University, USA*

Kenya is a small open economy that depends on energy for growth. Since independence in 1963, it has experienced tremendous urban and rural population growth, placing an increasing strain on energy resources and economic development. Therefore, in this chapter the relationship between urban and rural populations, economic development, and energy use is studied. The empirical analysis uses a vector autoregression framework. The Granger Causality test results suggest unidirectional causality running from urban population to GDP. The vector error decomposition results imply that urban growth will continue to play a major role in energy consumption in Kenya.

#### Chapter 12

Embedding New Technologies and Extending Time Horizons in Input-Output Analysis ..... 192

*Randall W. Jackson, West Virginia University, USA*

*Christa D. Court, MRIGlobal and West Virginia University, USA*

Input-output analysts are often confronted with requests for impacts assessments for economic shocks that stretch uncomfortably the assumptions of standard input-output modeling. This chapter presents an approach to confronting a subset of these challenges straightforwardly in a way that ameliorates some of the more restrictive input-output assumptions, maintains the inter-industry detail of the input-output model, and enhances the representation of certain economic behaviors without the additional complexities of moving to more complex computable general equilibrium or conjoined econometric input-output models. The authors conclude with the observation that direct changes to the input-output framework most often necessitate further modifications requiring additional behavioral assumptions and decisions on the part of the modeler.

#### Chapter 13

Application of Quantitative Methods in Natural Resource Management in Africa: A Review ..... 205

*Elias T. Ayuk, United Nations University Institute for Natural Resources in Africa, Ghana*

*William M. Fonta, United Nations University Institute for Natural Resources in Africa, Ghana*

*Euphrasie B. Kouame, United Nations University Institute for Natural Resources in Africa, Ghana*

Sub-Saharan Africa (SSA)'s natural resource base constitutes the sub-continent's greatest asset. These Natural Resources (NRs), both renewable and non-renewable, are the backbone of the continent as they play very critical functions in the livelihood strategies of the people. There are a wide range of questions and issues concerning the proper management of these NRs. One of the issues relates to the economics of resource preservation, which includes questions associated with the quantifiable benefits of resource preservation, the environmental costs and benefits of Soil and Water Conservation (SWC) strategies, the economic impact of land use changes, and valuation of ecosystem goods and services. The other

issue concerns the ecosystem and economic system interaction. Particular themes of interest are the co-management of natural resources, trans-boundary natural resource management, and the management of resources to reconcile revenue generation, social development, and environmental services of natural resources. This chapter reviews the literature on quantitative approaches that have been undertaken to enhance the understanding of selected Natural Resource Management (NRM) problems on the continent. The review suggests that a wide range of quantitative approaches have been applied in the context of the African resource economics literature, but this review also identifies some specific areas that have received little attention.

#### **Chapter 14**

**Natural Resources and Welfare: A Study of U.S. States** ..... 235

*Leslie Dunn, Washington and Jefferson College, USA*

*Robert Dunn, Washington and Jefferson College, USA*

This chapter examines the link between natural resource intensity and welfare for U.S. states from 1980 through 2009. Previous literature has examined the relationship between resource abundance and economic growth and, ultimately, the existence of a resource curse. The vast majority of these studies have utilized international data sets and focused strictly on economic growth. This chapter utilizes a sub-national data set of U.S. states and focuses on the impact of resources on welfare and development as measured by seven indicators. The findings show a negative relationship between natural resource intensity and welfare. After disaggregating resources into point or diffuse sources, it is found that point resources are likely to be more detrimental to welfare. Two prominent transmission channels of the resource curse, education and rent seeking, are examined and are found to have significant relationships with resource intensity. Finally, Seemingly Unrelated Regression (SUR) estimation is used to explicitly identify the direct and indirect effects of resources on welfare.

#### **Chapter 15**

**The Role of Governance in Teledensity and Economic Growth: GMM Estimation** ..... 262

*Chali Nondo, Albany State University, USA*

*Mulugeta S. Kahsai, West Virginia University, USA*

*Peter V. Schaeffer, West Virginia University, USA*

The objective of this chapter is to highlight the role played by governance in GDP growth and changes in telephone density in Sub-Saharan African (SSA) countries. The contribution of these two factors to aggregate output and telephone density is examined using the dynamic system GMM estimation that accounts for the endogeneity of GDP and telephone density. GMM estimations reveal that government effectiveness is positively associated with GDP growth, while political stability has a negative effect on telecommunications penetration. In addition, the estimations indicate that changes in telephone density have a positive effect on GDP growth. From a policy standpoint, the empirical model results suggest that telecommunications infrastructure-driven growth can be augmented if telecommunications infrastructure investment can generate a multiplier effect through job creation, both directly related and indirectly related to telecommunication infrastructure.

**Compilation of References** ..... 279

**About the Contributors** ..... 311

**Index** ..... 317