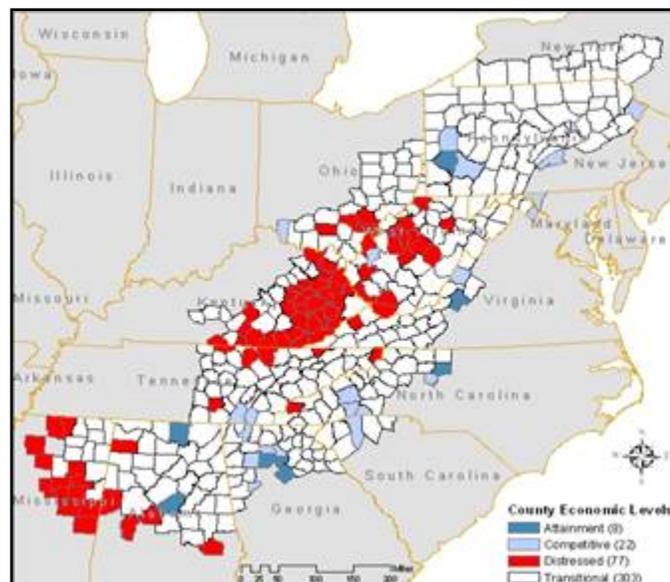


Sources of Regional Growth in Non-Metro Appalachia

Vol. 3 Statistical Studies of Spatial Economic Relationships



Prepared for the Appalachian Regional Commission

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SOURCES OF GROWTH PROJECT

The *Sources of Growth* project is part of a series of research efforts funded by the Appalachian Regional Commission to improve our understanding of factors affecting economic growth in rural and distressed areas. As stated in the Volume 1 Introduction, “the starting premise of this project is that there can multiple paths that an area can pursue in successfully enhancing job and income creation. They may build on natural resources, cultural resources, human resources, local amenities, institutional facilities or location advantages. The resulting direction of economic growth may involve manufacturing or supply chain development, resource extraction or tourism development, educational development or trade center development.” This research is intended to provide a basis of information that can ultimately be useful for enhancing the effectiveness of policies and tools aimed at improving the region’s economic development.

This is Volume 3 in a series of reports prepared as part of this project:

- ***Executive Summary*** –synthesis of findings from all work products related to the study’s four main research components.
- ***Volume 1, Project Background and Prior Research on Economic Growth Paths*** – study objectives, characteristics of non-metro Appalachian counties, classification of economic development growth paths, and a synopsis of white paper findings on theory relating to economic development growth paths.
- ***Volume 2, Case Studies of Local Economic Development Growth Processes*** – findings related to growth paths as observed for selected case studies covering manufacturing industry specialization clusters, supply chain-based development, tourism-based development, advanced technology development, and diversification from resource-based economies.
- ***Volume 3, Statistical Studies of Spatial Economic Relationships*** – findings from a series of econometric modeling and GIS-based analyses, focusing on roles of spatial adjacency, market access and transportation in determining economic growth and development of trade centers.
- ***Volume 4, Tools for Economic Development & Study Conclusions***– description of new and updated tools available to ARC and its Local Development Districts to assess economic development opportunities and potential directions for economic growth.
- ***Appendices*** – (A) Spatial Analysis of Economic Health, (B) Economic Analysis of Hub-Spoke Relationships, (C) White Papers on Economic Growth Theories, (D) Literature Review of Empirical Studies on Spatial Influences in Economic Development.

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The Sources of Growth project involved a team of researchers including:

- Economic Development Research Group, Inc. (EDRG) – Lisa Petraglia (Project Director), Glen Weisbrod and Teresa Lynch, with research support from Tyler Comings, Brett Piercy and Susan Moses;
- Regional Technology Strategies, Inc. (RTS) –Stuart Rosenfeld, Phil Psilos and Dan Broun;
- Massachusetts Institute of Technology, Department of Urban Studies & Planning (MIT-DUSP) – Prof. Karen R. Polenske, Prof. Joseph Ferreira, Jr., Ayman Ismail, and Li Xin, with research support from Tan Zhijun, and Isabelle Yi Xu.

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1

INTRODUCTION

1.1 Background

Role in the Sources of Growth Project. Volume #3 presents results of four empirical research studies conducted as part of the Sources of Growth project. These studies build directly on the discussion of theory and prior research which are covered in Volume 1, and corroborate some of the case study findings of Volume 2.

The prior documents identified a consistent set of location and access factors that affect the economic viability and opportunity of various growth paths. They are summarized in Exhibit 1-1. Accordingly, all four of the empirical research studies presented here examine an aspect of the relationship between a county's spatial location or access characteristics and its pattern of economic growth and development. All four also utilize some form of econometric modeling and/or geographic information system to examine these relationships.

Exhibit 1-1. Location and Access Factors Affecting Economic Growth Paths

Basis for County's Economy Growth	Examples of Location and Access Factors
Trade Center	<ul style="list-style-type: none"> • Adjacency of rural markets (spokes) to micropolitan trade centers (hubs); • Scale of markets relative to regional population
Agglomeration (e.g. cluster economy)	<ul style="list-style-type: none"> • Labor force size • Delivery market reach
Supply-Chain (e.g. dispersal economy)	<ul style="list-style-type: none"> • Distance to highway, rail terminal, air or marine port • Same day delivery distance
Natural Amenity or Cultural Assets	<ul style="list-style-type: none"> • Access to visitor markets • Distance to highway
Knowledge (Learning) Assets	<ul style="list-style-type: none"> • Labor force or population size • Proximity to major education or technology institutions

The motivation for this research comes from three directions: (1) recognition that while the various paths of economic growth serve different markets, they all depend in some way on access; (2) the fact that many of ARC's programs aim to reduce isolation and improve access, and (3) the availability of relatively new analytic methods for

examining spatial relationships among counties. This research thus aims to build upon prior ARC-funded research and to advance our understanding of how ARC investments promote economic development by reducing isolation and increasing local capacity for growth.

1.2 Study Summaries and their Foundations

Extending Prior Research. It is important to note how these research efforts build upon prior studies.

- The first study focuses on enhancing our understanding of relationships between counties that serve as rural trade centers (economic hubs) and adjacent counties that are served by them (economic spokes). This work by Ayman Ismail of MIT utilizes new economic base techniques first explored by Smirnov and Smirnova (See ““An Assessment of the Economic Base of Distressed and Near-Distressed Counties in Appalachia,” 2000) and revisits the evaluation of county-level “spatial regional multipliers” based on more recent employment data.

The Pike County case study of Volume 2 can be better understood from the perspective of how well its economy ties into those of the four other counties in the Big Sandy Area (BSA) – all distressed counties. Pike County’s transitional status has been achieved through attempts to gradually diversify its mining economy, and through a unique public works project that removed barriers to development, and opened access options. The BSA counties of Mingo and Boone exhibit the weakest *spatial regional multipliers* of the five counties, and all five counties have economic compositions that tend to hinder each in benefiting from growth stimulated in a neighboring economy (low *total spatial linkage multiplier* values).

The Morgantown-Fairmont case study on the other hand now can be further understood as each county (Monongalia and Marion) having strong internal economic linkages (high *spatial regional multipliers*), and room for their economies to become more reinforcing if mutually desired (low values for their *total spatial multiplier* as of 2002 and four of the top 5 employing sectors are in common). Monongalia County’s metro status explains in large part why this county has a *local spatial linkage multiplier* that is more than double that of Marion County.

We can also understand that the Corridor K case study county of Cherokee, NC though transitional, exhibits as strong an internal employment multiplier and local spatial linkage multiplier as the corridor’s terminating metro counties which have competitive economic status. This result for Cherokee County can be attributed to the trade center role exerted by the City of Murphy on

surrounding counties in NC, GA and TN.

- The second study focuses on enhancing our understanding of relationships between highways, ARC investments and subsequent economic growth over a long period of time. This work by Teresa Lynch of EDR Group utilizes time series regression techniques. It updates and extends a direction of research using “twin counties” that was initially developed by Andrew Isserman (see “The Economic Effects of the Appalachian Regional Commission”, by Isserman and Rephann, 1995.) An improved specification for ADHS highway capacity and access was tested and found to significantly contribute to the differential income and earnings growth experienced from 1969 to 2000 for ARC counties relative to their twins’ performance.

The Scioto County case study in Volume 2 revealed that Scioto has been bypassed by recent highway investments while the ring of neighboring counties have benefited through improved highway access to the metro areas of Cincinnati, Columbus. These extra regional economies exert an adverse urban backwash effect on Scioto County that challenges any geographic predilection for it to serve as a thriving trade center.

Likewise the partial explanation of positive differential growth outcomes for Appalachian counties from highway access improvements is a welcome expectation for the counties in SE Tennessee and SW North Carolina aligned along Corridor K. Whether improved economic outcomes result from better market reach of the region’s eco-tourism and cultural heritage assets and/or eventual economic integration into the metro Appalachian counties that terminate the corridor (Hamilton Co., TN and Buncombe Co., NC) it will not occur without better access through the region.

- The third study focuses on enhancing our understanding of the relationship of business mix to (a) the size of the local population base and to (b) accessing quality air services. The analysis of market scale shows how trade centers differ in industry composition depending on market size. The analysis of airport access shows how highway drive times to airports also affect industry mix. This work by Teresa Lynch, Glen Weisbrod and Tyler Comings of EDR Group uses non-linear regression techniques and geographic information systems. It builds upon the prior ARC report, “Handbook for Assessing Economic Opportunities from Appalachian Development Highways” by Weisbrod et al., 2001.)
- The fourth study focuses on use of new advances in geographic and spatial analysis techniques to illustrate how proximity to mountains and roads affects economic development patterns and trends among counties. This work by Prof. Joseph Ferreira, Jr., Ayman Ismail, and Li Xin shows the use of GeoDa software for spatial analysis. It represents a pilot effort to demonstrate the value of spatial analysis to better understand factors affecting the economic

development of Appalachian counties.

The case studies from Volume 2 that in part have some aspect of economic performance tied to physical terrain (as constraint or not) include Pike County KY and its neighbors in the Big Sandy Area, Scioto County OH embraced by two rivers, Corridor K's Cherokee County NC as trade center to a group of counties surrounded by a mountain ring, and for the case of Alabama an abundance of relatively flat land with broad highway coverage.