

4 CONCLUSIONS FROM THE STUDY OF SOURCES OF GROWTH

4.1 Lessons learned from the Comprehensive Examination

This multi-year study effort on non-metro Appalachian growth prospects combined several research techniques to examine various hypotheses on the growth processes that may be most compatible with local conditions and assets (both physical and human-made). The working hypothesis of this inquiry is that when local economic development efforts are better informed by the use of the new tools and insights about what they have to work with – including the attributes of neighboring communities/economies – such efforts will yield better suited opportunities for growth than when planned in isolation.

That being said, it is not always transparent to even local economic developers what the explanation is for one rural county's success story. Even if that evidence can be articulated retrospectively, it is likely that the perspectives would differ in terms of the identifying the most critical factor(s) to the economic turnaround and in the sequence of socio-economic/policy events – whether local, regional, national or global.

4.2 Lessons from the Case Studies

In the few instances where case study results did not entirely agree with the expected model generated patterns of growth, we gained a new understanding of how neighboring economies' spatial influence exert adverse backwash effects on the case study economies (such as the influence of the Cincinnati metro area on the development path of Scioto County, OH). In essence we learned about the limitations of the spatial economic base modeling diagnostics and reinforced the validity of findings from other research, such as by Feser (2005). This discovery process added another dimension to our understanding of the processes influencing the current and desired economic performance in non-metro Appalachia. In short, while timing and

patience are key features of every strategy plan, and its associated outcomes, these results underscore the need for a periodic reassessment of how the local economy and labor market are changing in relation to neighboring economies. Market access opportunities are rarely evenly distributed which makes it all the more imperative to (a) improve what you can, and then with the remaining access limitations (b) plan regionally so that the growth opportunities that have emerged for one county (e.g. Pike County, KY) may exert more of a beneficial spillover to distressed, neighboring counties.

Engaging the educational system – from K-12 to leveraging certificate programs and community colleges – has to be one of the first steps to re-conditioning the existing workforce and preparing the county’s future working age residents for meeting regional employment demand – especially if job growth is slow to ignite in the home county. This also requires that the workforce has access to the transport infrastructure to connect to the employment center. This evolution of events was most clearly demonstrated in the case of Alabama’s success in building its current auto assembly cluster.

Both the educational resources and transportation infrastructure of a county can evolve to take on more dynamic roles to shaping local and regional growth outcomes. As the case of the Morgantown-Fairmont high-tech development demonstrated, the R&D investment and population that are drawn to locations with higher-education institutions and government research facilities are rewarded with broader networks (e.g. social capital), commercialization of research, business start-ups, and opportunities for higher wage job formation. These are the benefits conferred on learning-based economies.

In addition to Alabama’s responsive educational system, auto assembly manufacturing took hold throughout the state as a result of plentiful development sites (many as greenfields and flat terrain) and the fact that Alabama’s ample highway network allowed in-state auto manufacturing firms to participate in several national supply chains as well.

4.3 Key Findings from Empirical Studies

These studies shed new light on what causes some non-metro Appalachian counties to make economic strides forward, while others remain distressed. Key objectives of these studies were an examination of the role of economic linkages among counties, and the effects of demographic factors, industry mix, mountain topography, market access and highway improvements, among other factors, in affecting relative economic performance. Of particular note is the exploration of new techniques to examine spatial and economic linkages in a region to help diagnose complementary development prospects for the economic base of neighboring counties. Another contribution is the empirical study of the economic development impact of the ADHS, which provides evidence on the significant impact of new corridors in the system, as

well as the continued importance of manufacturing in accounting for the growth differences of Appalachian counties as compared to their socioeconomic non-Appalachian twins. The set of empirical studies provide important insights into how spatial measures interact with demographic, industry, geographical and transportation variables to influence economic performance and growth rates. Taken together these findings provide better calibrated economic analytical techniques that can help to identify relevant development paths given the assets, linkages and constraints of the counties within their regional neighborhood.

Economic Base Studies:

The spatial linkage economic base model provides new tools to diagnose the economic development prospects of counties relative to their neighbors and the larger surrounding region. The principal distinction between the classical export-base model and the modified spatial model is that in the spatial model, the export-base is segmented into two components where the “local” oriented export-base is linked directly to “global” export activities in the neighboring counties. In addition, this approach introduces the concept of *regional neighborhood* which can be understood as the sphere of immediate economic influence of a county’s economy exerted via common infrastructure, economic linkages, shared labor pools, etc. Because most of these effects diminish with geographical distance, it is reasonable to assume initially that most of these cross-county border interactions affect neighboring counties.

The spatial export base method provides insights into the development potentials of the distressed and transitional counties’ export-base, but the methodology is perhaps best used on a regional and sub-regional basis rather than on a county basis. While this analysis can be used to create profiles for each county, highlighting the multipliers, the top industries for each county, etc., users should not construe these county profiles as policy prescriptions since by definition the profiles reflect the influences of neighboring counties. Instead this approach should be used for a cross-county comparison to understand the relative characteristics of these counties such as the degree of industry diversification or concentration, or the regional linkages. This application may be useful in identifying potential “growth hubs” that possess strong spatial and economic linkages with their neighbors and the potential to generate regional growth, but caution is recommended given important data and modeling limitations as evidenced by the case study of Scioto County, OH in Volume 2. Moreover, this model has analytical limitations in applications to remote, rural counties. In this context it is recommended that this method be applied to groups of counties for case studies that examine the spatial forces at work on each county in a specific neighborhood.

Transportation Access Studies: Several facets of these studies examine the impact of different types of transportation accessibility in affecting the economic performance and prospects of counties.

The Impact of the ADHS: The key empirical finding of twin county study on the impact of ADHS is that by 2000, the performance of ARC counties with open ADHS segments had higher income growth relative to their non-Appalachian twins, with the ADHS counties posting 200% more income growth over the 1969-2000 period. This finding can be compared to the growth rate gap between all ARC counties and their twins. By 2000 income in all ARC counties had grown 131% more since 1969 than in the non-Appalachian counties; earnings growth was 96% higher; population growth was 9% higher; and per capita income growth was 36% higher. Thus, this study showed that using survey-based data overcame shortcomings in earlier analyses to demonstrate a robust statistical link between ADHS investments and differential income and earnings growth between ARC counties and their twins, particularly for new construction. These findings also suggest that there is a considerable lag between highway investments and their full effect on economic growth.

The twin county study also provides insight into the uneven performance in the ARC region during this period: performance in the northern part of the ARC region not only lagged its non-Appalachian twins but also the rest of Appalachia, and smaller metropolitan areas fell far behind their non-Appalachian counterparts. By contrast, the study of long-term trends also showed that the states performing best relative to their non-Appalachian “twins” (i.e., Georgia, Kentucky, and South Carolina, and Tennessee) appeared to do so in part on the strength of their performances in manufacturing. This reinforces the finding that manufacturing clusters are still an important source of economic growth.

Airport Accessibility: This study found that there are the types of industries that can be expected to situate near airports because they rely on business air travel for meetings with either clients or other office locations of their business. Businesses that appear to particularly value reductions in travel time to airports include wholesale trade, paper manufacturing, insurance, and professional services. While these findings on airport access make sense, there is need for further analysis of the business attraction relationship to airport access – separating improvements in access time, distance, type of highway access and/or airport service levels. Furthermore, there is a need to further explore the ways in which market scale and airport access may be better measured by industry employment shares, concentration ratios or total size of the industries.

Demographic and Spatial Influences on County Economic Performance: These econometric studies provide new insights into how spatial influences interact with demographic, industry, geographical and transportation attributes of a county to influence its economic performance and rate of growth. First, the studies demonstrated the importance of explicitly modeling spatial dependencies among counties in order to avoid overstating the influence of other non-geographical factors that account for growth differences within the Region. In addition, using adjacency to measure spatial dependency may not be the best way to account for spatial spillover effects among counties, particularly knowledge-based spillovers such as the diffusion of information, innovations, and technical collaboration which are not as simply contained by adjacency.

Second, the analyses confirm the importance of other measures of connectivity and interdependence, particularly major highway and rail infrastructure connecting the localities to population centers or resource users. Work force accessibility as measured by commuting times vary in their impact on economic performance according to county types, with commuter accessibility mattering most for micropolitan counties, registering as somewhat important for Metro counties, and as not significant for non-core, non-metro counties. With respect to geographical factors, the most salient finding is that metro areas' economic performance are least influenced by geography (the result of infrastructure and population-economic density having diluted the constraints of topography). In contrast non-metro areas, particularly non-core counties with neighboring counties that have relatively more rugged terrain, may benefit economically from accessibility improvements as shown in the case study in Volume 2 of Pike County, KY as a trade center, and Cherokee County (Murphy, NC) as a trade center in the Corridor K region.

Third, rather than trying to identify a single, complex model for explaining economic performance and growth differences across all county types, a potentially more useful inquiry was to identify the most relevant type of model for a county depending upon the characteristics of that county and its neighbors. Indeed, while the results from the general models developed in this report underscored the relevance of spatial modeling, the findings also indicate the need to disaggregate counties into metro, micropolitan and non-core, non-metro types.

Once the cross sectional analysis was disaggregated by county type, the separate analyses demonstrated that metro, micropolitan and non-core counties exhibit considerable variation in economic performance and growth, with varying responses to demographic, industrial, geographic and transportation accessibility factors. Yet, analyses based on county types pose new challenges in modeling spatial relationships, as the researchers indicated, and leave open to question certain findings since spillover effects are not being explicitly modeled, particularly for demographic variables such as educational attainment (which are probably considerable for micropolitan counties). The finding of the positive employment growth effect of industry concentration within the micropolitan county makes intuitive sense in that it may reflect the influence of cluster-type development, while the negative employment effects of industry

concentration in non-core, non-metro counties undoubtedly reflects the effect of a narrow economic base due to the high dependence on one industry. The lack of influence of industry concentration in metro counties follows from the higher diversification of the economies of such counties. Nevertheless, the findings on industry mix (based on factor analysis) raise more questions than they answer, and clearly require more exploration, as do the specifications of these models which lack explanatory power, particularly for explaining employment growth in micropolitan and non-core, non-metro counties.

Fourth, a few conundrums were uncovered by these analyses, particularly the lack of explanatory power of natural amenities to account for economic performance differences based on the natural assets of the counties. The lack of explanatory power for natural amenities suggest the need for other types of spatial modeling, perhaps based on transportation networks and improvements between metro and non-metro counties. Since the presence of natural amenities is largely invariant over time, it makes sense to model relevant changes in infrastructure that may affect the accessibility or value of these assets to the non-resident population. The influence of knowledge-based spillovers may require an understanding of networks that link, for example, higher education institutions with research and industry centers.

Fifth, entrepreneurial measures performed reasonably well in the economic health models indicating that increases in *income per non-farm proprietor* were positively correlated with lower distress levels, while an increase in dependence on *proprietors' income relative to wage and salary income* were correlated with increased distress. These results seem to reflect the differences stemming from greater entrepreneurial opportunities in counties where proprietors income is growing, while increases in proprietors income relative to wage and salary incomes suggests *entrepreneurship of necessity* due to a lack of wage and salary employment growth.

Finally, a separate analysis of the relationship of the size of the population base on the business mix of a county shows that population thresholds matter, particularly for transportation, financial services, publishing, professional and technical services, and real estate. These findings are useful in framing and targeting local strategies for both business recruitment and entrepreneurial strategies that non-metro counties might pursue.

4.4 Implementing Findings for Strategy Planning

Many of these modeling findings provide an analytical foundation for applying better calibrated economic techniques to identify relevant development paths given the assets, linkages and constraints of the counties within their regional neighborhood. Counties in micropolitan areas, and perhaps those adjacent to micropolitan areas or

linked via major transportation corridors and supplier chains, should be viewed as the prime candidates for applying many of these techniques and insights. Many of the growth factors that were identified in the various facets of this study are amenable to further refinements by augmenting the diagnostic capabilities of the EDR-LEAP model which is available to all local development district entities as an on-line research tool. Many of the growth path specific attributes are already now implemented in the EDR_LEAP tool and the current market access logic of EDR-LEAP implicitly begins to address spatial linkage potential, though this could be done with greater detail as the data resources become available. Having evolved from the first *ARC-Highway Opportunities* model, the EDR –LEAP model is an accessible economic development analysis framework that accounts for the role of overcoming market isolation and points towards different opportunities for an area’s working age residents and businesses. The result of including better understood metrics that depict the spatial influences exerted on a county, or its growth path propensity would seem promising to improve how opportunities are both understood and identified. There may be opportunities to complement such applications with additional case study work that applies spatial econometric analysis and regional input-output analysis to better explicate the nature of these spatial relationships among non-metro counties and the implications on how economic activity is organized.

4.5 Future Study Directions on Non-metro Growth Processes

The following areas have emerged for future study as a result of where this current research effort has concluded. The impact analysis of the ADHS suggests the need for more detailed examination of the time lags between the completion of corridors and the economic impacts, including applying spatial analysis to assess any backwash or relocation effects. The augmented export base model could be revisited to improve the level of resolution regarding the nature of cross-sector interactions under-pinning the spatial linkages currently detected. Further spatial modeling techniques should be developed to explore the spillover effects for different county types, as well as developing new spatial modeling approaches for amenity and knowledge-based spillovers. Finally, nowhere in the current study undertaking was the role of fiscal capacity in growth outcomes explored. To do so will require overcoming the current data constraints and harnessing a good cross-section of fiscal data.