

**“THE CHANGING LANDSCAPE OF HUMAN CAPITAL: THE
EDUCATIONAL NEEDS INDEX”**

by

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INTRODUCTION

For several decades, scholars have stressed the need for academics to become more involved in policy relevant research (Keller, 1985; Conrad, 1989; Nettles, 1995; Terenzini, 1995; Davies 2006). As Keller (1985) notes, much of the research in higher education is preoccupied with methods, neglects educational policy, and is written for other researchers rather than those who must act, i.e. policymakers. One of the critical challenges facing the field is the need for scholars to heed this call and simultaneously reframe the policy debate toward a state rather than institutional focus (Davies 2006). In reframing the conversation around public needs and educational opportunities, Davies calls for the development of profiles that begin the process of evaluating a state-level public agenda for higher education. From this lens, policy questions move to the creation of a public agenda that examines the policy needs of states, local communities, and business and industry.

The impetus for framing a public agenda is especially relevant as scholars work to address the link between the educational needs of local communities and their economic opportunities. Although the field of human capital theory (Schultz, 1961; Becker, 1964; Denison, 1967; Mincer 1974) has provided a theoretical foundation for research in this area, few studies have provided a direct link between educational attainment and economic/social welfare at the county level. Such information is critical to policymakers as they attempt to develop strategies to improve the general social welfare of citizens across the nation. Furthermore, not only does human capital needs vary widely at the national and international level (Wellman 2007), there is even greater variance at the county level that requires for further exploration and analysis.

Scholars (Weiss, 1972; Meltsner, 1976; Gordon, 1992; Jones and Kelly 2007) have increasingly called for a stronger nexus between academic research and public policy development, formulation, and implementation. Although there is general acceptance in the field of the need for higher education to play a vital role in the policy-development process, there are limited examples of this movement at the upper-strata of the decision making process. This research attempts to fill this void through the creation of an indicator-based model that measures the potential societal value of investments in higher education. As Blank (1993) and Conway and Johnson (2005) posit, education-based indicator models have the potential to provide a dependable picture of the status of investments in education and can be used to establish a valid basis for assessing ways to structurally and functionally improve education.

As states transition into an economic era in which their fortunes will be determined more by the human capital potential of their citizens than by physical capital and natural resources, policymakers will increasingly rely on their state systems of higher education to promote and sustain economic enhancement and viability. Given the strong correlation between educational attainment and the transmission of social and economic status, education is increasingly cited as a prime determinant of economic well-being and flexibility (Progressive Policy Institute, 2007). Research into this relationship is especially relevant given the increased focus on the role that

higher education plays in not only supporting, but driving, economic and cultural development. As Williams and Swail (2005) note, the underlying premise is as states invest in their “people infrastructure” positive economic outcomes for individuals and society will emerge. Although there are a variety of ways to invest in human capital, the most fundamental, significant, and beneficial means to effectuate these ends is through educational opportunities. The need for investing in human capital is more critical today than ever before because of an enlarging gap between the knowledge, skills, and abilities available in the human capital pool and the workforce requirements needed in a competitive global, knowledge-based economy (National Association of Manufacturers 2005; Williams and Swail 2005). Human capital is enhanced, in general, as more highly educated and skilled individuals enter into the workforce. As a result, the growing awareness of the demands for an educated citizenry in a highly competitive, knowledge-based economy will put further pressure on state systems of secondary and post-secondary education. These pressures range from expanding access opportunities to an increasingly diverse population to engaging in research that yields the systemic diversification of local economies.

Researchers (Conway, 2001; Callan, 2002; Jones and Kelly 2004) posit that states must strategically re-examine their stock of educational and human capital if they are to remain competitive in the Knowledge Economy. If policymakers want to better understand the supply of human capital at the local, state and regional levels, they need to strategically assess who is entering the workforce, closely examine the existing and projected economic conditions impacting the locality, and determine who is leaving the workforce (Jones and Kelly 2004). The equitable education and training of the U.S. workforce is of the utmost importance as human capital has become the essential ingredient for economic success through this century (Judy and Lommel 2002).

The need for states to critically examine their human capital infrastructure is further pronounced by impending changes in the nation’s workforce. Approximately 43 million baby-boomers with at least some college education will be over the age of 55 and retired or approaching retirement by 2020. At this time, according to the Bureau of Labor Statistics, the nation will face a prospective deficit of about 12 million workers with at least some college education. Over the past twenty years, many states and regions have successfully relied upon a strategy of importing skilled workers to fill voids in the marketplace (Franklin 2003). While this policy has been somewhat successful, it is increasingly risky in a marketplace that is dependent upon highly trained and increasingly mobile knowledge workers. Nationally, regions that have relied upon such strategies must realize that their educational deficits leave them increasingly vulnerable to economic change (Conway 2001). In order to remain competitive, states must remain diligent in efforts to raise the educational attainment of their current residents.

THE KNOWLEDGE ECONOMY AND HIGHER EDUCATION

For the majority of the past century, regions across the nation have experienced significant and pronounced shifts and alterations in jobs and industries. From the coal mines of Appalachia and the Great West to the textile plants of North Carolina, the regions that were the heart of American prosperity in the twentieth century face challenges as the nation transitions into a global economy. For such areas however, their historical success in the industrial economy

encouraged an over-reliance on heavy manufacturing, as well as on industrial recruitment strategies centered upon manufacturing related industries. Consequently, these regions are vulnerable to technological change and global competition.

Evidence of this tension between traditional and knowledge based economies is especially evident in the South, where the reliance upon abundant natural resources and a low-cost workforce were historic strengths, but now serve as vulnerabilities in the global marketplace. The recession of the early 2000's magnified the impact of the emergence of the knowledge economy, as low-skill, labor-intensive jobs were replaced by technology or outsourced to other parts of the world at an increasing rate, resulting in a two-tier labor market (Conway and Johnson 2005). The knowledge economy's premium on education and technical skills widened the wage gap between skilled and unskilled workers. As noted in *The Mercedes and the Magnolia: Preparing the Southern Workforce for the Next Economy*:

“The region has almost 400,000 fewer manufacturing jobs now than we did a decade ago. The remainder of the nation also lost manufacturing jobs during the period, but at less than half the South's rate of loss. Moreover, Southern jobs lost in manufacturing were not replaced one-for-one with jobs in the high-paying, technology-intensive sectors. The new jobs grown in the South tended to be in the lower-paying retail and service sectors. While the demands of the knowledge economy for educated, skilled, flexible workers have grown exponentially, the South has made only incremental progress in improving its workforce” (Clinton and Conway, 2002; pg. 6).

In the Knowledge Economy, education, technology, and learning are the keys to sustainable economic growth. More specifically, higher education provides the foundation for the Knowledge Economy. Higher education provides not only skills for employees, but a medium for advanced research and development activities on campuses across the region. In the old economy, fixed assets, financing, and labor were principal sources of competitive advantage for firms. But now, as markets fragment, technology accelerates, and competition comes from unexpected places, learning, creativity, and adaptation are becoming the principal sources of competitive advantage in many industries (Progressive Policy Institute, 2002).

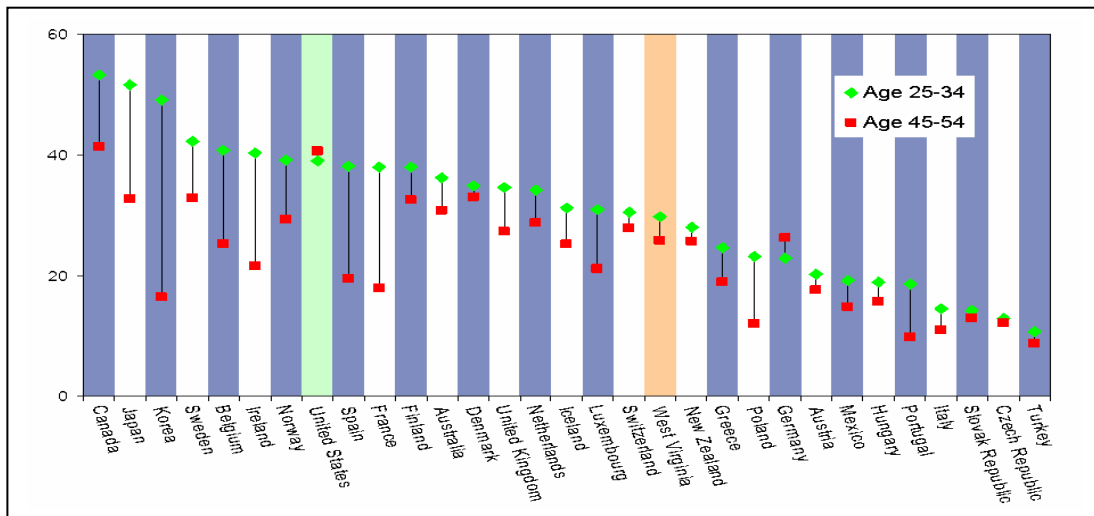
Knowledge-based economies, marked by rapidly changing technological advances, depend on the ability of individuals and organizations to produce new ideas. Specifically, the primary characteristics defining a knowledge-based economy (Judy and Lommel, 2002: p.17) are:

- Increasing “knowledge content” of goods and services, coupled with the shorter life span for such items;
- High levels of research/development at the governmental, university and industry levels;
- Unrelenting demands on organizations to innovate to remain competitive;
- Increased need for more efficient and effective responsiveness (and adaptability) to changing markets and customer needs;
- Greater reliance on information acquired through telecommunications media such as the Internet and other resources;

- High incidences of innovative and transformative entrepreneurial activities;
- Ongoing challenges to established technologies and development of new markets.

Consequently, creating intellectual property and being able to incorporate that intellectual property into new products, services, and processes is paramount for states to remain competitive in the current global economy (Judy and Lommel, 2002). Enabling constant innovation and the expansion of adult educational attainment levels have become the goals of states committed to prospering and should also become the goal of public policy in the Knowledge Economy.

At its core, this discussion theoretically creates a symbiotic relationship between higher education and economic development. As Jones and Kelly (2007) note, few issues unite policymakers in quite the same way as economic development. The underlying assumption that strong economies are characterized by an abundance of well-paying jobs and that in the knowledge economy, well-paying jobs are held by individuals who have knowledge and skills obtained through education beyond high school is no longer debatable in this post-Freidman (2005) era. However, the nation’s long-range relative position in this environment is undermined generational inequalities in educational attainment. As referenced in the chart to the



above, Americans approaching retirement age are better educated than their counterparts in other countries, but is one of a few countries internationally in which the educational attainment level of those aged 25 to 34 trails prior generations.

While there is variance across states (as indicated above for West Virginia), the data serves as an indicator of the inability of states to address educational issues systematically in a P-16 manner. According to a recent study by the Greene and Winters (2005), of every 100 ninth graders, 73 graduate from high school, 39 transition to college successfully, and 18 graduate within six years. Total “throughput” data range from a high in South Dakota of 28 college graduates to a low in Mississippi of 11 graduates. If the nation is to remain competitive in the knowledge economy and continually improve the quality of life for all citizens, policymakers must critically examine these data and work to develop policies that address gaps in the educational pipeline.

The consequences of this human capital deficiency are further evidenced in the poor performance of many states on benchmark reports such as the Progressive Policy Institute’s *New*

Economy Index and the National Center for Higher Education's *Measuring Up 2006*. These reports highlight the inability of states to create, nurture, and sustain both an educated citizenry and an affordable system of higher education. These benchmark reports also provide a vivid conceptualization of the link between a state's educational and economic fortunes. Both studies note that unless significant and creative investments are made to increase the number of young and working adults who move into an affordable system of higher education, poorly performing states will continue to lose ground in the global competition for business and industry.

Further compounding the policy environment for poor performing states in both of the aforementioned reports is the uneven distribution of educational capital. In areas such as Atlanta, Denver, San Francisco, Austin, and Boston, states have developed an intellectual and business nexus that is rivaled by few internationally. However, much of the nation looks nothing like these metropolitan areas. In over one-third of the counties nationally, less than 15 percent of the population aged 25 or older holds a bachelor's degree. Given that many of these counties are rural, they are presented with a variety of policy hurdles not faced by their urban counterparts. Furthermore, given that many rural counties lack a diversified economy and are dependent upon single industries, they are especially vulnerable to the forces of global competition in the Knowledge Economy. As a result, many rural counties are plagued by chronic unemployment, shifting population patterns, and economic vulnerability.

One of the most important factors impacting both urban and rural communities is the meteoric increase of new residents emerging population groups. As the baby-boom generation exits the workforce, the nation will become increasingly reliant on immigration to fuel economic expansion. According to the U.S. Census, the Hispanic population is now the largest minority subgroup in America, and in the South alone the Hispanic population increased by more than 400 percent from 1980 to 2000. As Conway and Johnson (2005) note, developing a highly skilled workforce is contingent on the nation's ability to engage and educate an increasingly diverse populace. This need is especially paramount for the Hispanic population, in which only 36 percent of students graduate from high school in four years.

This combination of political, economic, and demographic challenges only magnifies the importance of prudent policy analysis for elected officials and decision-makers as they attempt to address many of the problems facing the region. The nation is in a global race to develop a knowledge-based economy that facilitates competition in the information marketplace (Freidman 2005). Given the critical role that higher education plays in human capital development, policymakers must remain responsive to the multiplicity of factors that impact the state's human capital potential. Governmental policies play a significant role in influencing the growth rate of economies across nations, states, and localities. Those communities that make prudent investments in education will have a healthier and wealthier citizenry than those that do not. Additionally, communities who invest in education will attract industry which relies upon a skilled labor force, further perpetuating development. Clearly, "performance in the knowledge economy can rise no higher than the sum of the knowledge of its people and the level of educational achievement that we settle for establishes an absolute upper limit on our economic prosperity" (Clinton and Conway 2002; p. 5).

HUMAN CAPITAL THEORY

At the core of the Knowledge Economy is the realization that individuals and society derive economic benefits from human capital investments in their citizens. This investment feature differentiates human capital expenditures from consumptive expenditures, which provides few benefits beyond immediate gratification (Vaizey 1962). Human capital theory is based on the notion that education increases the human capital stock of individuals, improves their productivity, leads to increases in economic productivity, and contributes to the general betterment of society (Denison 1983; Walberg and Zhang 1998). As Becker (1964) demonstrated, education is a powerful individual and social lever that government can manipulate to improve overall societal conditions. As nations and states evolve, the advancement of educational attainment has become an indispensable variable in policy efforts to make improvements in society as a whole. The availability of a quality education provides individuals with the cognitive skills and knowledge that can be transformed into improved social and economic conditions. Additionally, as the percentage of individuals with an advanced education increases, societies are provided with a greater degree of economic flexibility. This condition eventually becomes a self-fulfilling prophecy. Ultimately, the cycle of rising literacy rates increases educational opportunities, with a better prepared workforce demanding additional skills and training, which translates into the perpetual growth of the Knowledge Economy.

Applying human capital theory to micro-level variables, increased rates of educational attainment are closely correlated with increased earnings capacity. As evidenced by data obtained from the U.S. Census Bureau, individual earnings capacity increases exponentially as educational attainment levels increase. Individuals with a bachelor's degree on average earn twice the salary of individuals who did not complete high school. This disparity is even more pronounced for those holding doctoral and professional degrees. As a result of the relationship between earnings potential and education, scholars (Curtin and Nelson 1999) have found that increases in educational attainment levels result in increased income attainment capabilities for all social strata.

Several auxiliary benefits also accrue from raising educational attainment levels. Society as a whole benefits from a more educated populace in ways other than simple fiscal returns. Crime rates have been shown to decrease as the rate of education increases (Institute for Higher Education Policy 1998). Education is also the driving force in preparing citizens for participation in political, economic, and social aspects of their communities (Putnam 2000). Bachelor's degree holders are 40 percent more likely than high school graduates to be a member of a community organization, 28 percent more likely to vote in national or state elections, and 90 percent more likely to contribute money to a candidate or political cause associated with education attainment.

Human capital theorists have demonstrated that there is a direct inverse relationship between education and poverty. In their study of societal health and welfare conditions, Curtin and Nelson (1999) found that primary schooling is shown to reduce the incidence of poverty by 10 percent as compared to households whose heads have little or no formal education. Furthermore, one extra year of schooling decreases the probability of poverty by 1.6 percent. Educational attainment has also been shown to have a positive impact on the health and social well being of

communities. For example, neonatal mortality rates decrease as educational attainment increases. States that invest in education will also realize decreased participation rates in social welfare programs (IHEP 1998). Participation in programs such as welfare, unemployment benefits, food stamps, medical assistance, and housing assistance decreases as the level of education attended increases. In 1996, 25 to 34-year olds who completed 9-11 years of high school were three times more likely than high school graduates to receive income from public assistance programs (National Center for Educational Statistics 1997). States that are able to increase educational attainment levels will ultimately promote the health and welfare of their citizenry, thereby reducing societal mortality rates (Gibson 1996; Harrison 1997).

Human capital investments have also been shown to have measurable micro-level effects. Goldsmith et al (1997) demonstrated that human capital positively impacts psychological capital and impacts individual productivity levels. Psychological capital includes factors such as perceptions of self, attitudes toward work, ethical orientations, and outlook on life. Psychological capital is also positively correlated with increased worker productivity and economic production capacity. Thus, not only does education produce skills, it produces well-being among the citizenry.

In sum, human capital theory clearly demonstrates that individuals and society derive direct benefits from educational investments. From increased earnings capacity to worker productivity and flexibility, education is the one variable that drives micro and macro level prosperity. States would be wise to develop initiatives that evaluate the human capital potential of their citizenry, thereby allowing them to target resources to maximize this critical resource.

LIMITATIONS OF HUMAN CAPITAL THEORY

Although the research detailed above has been successful at describing the economic impact of education, it still suffers from several shortcomings with respect to the generalizability of the results. With the exception of studies by Smith (1987) and Levine (1985), there has been very little attention paid to the relationship between education and social indicators at the county level. As Beaumont and Isserman (1987) note, this deficiency is due primarily to the lack of valid indicators available at the county level. Another problem related to their development is that such models are often expensive to construct, difficult to use, and rely upon overly complex statistical assumptions (Beaumont and Isserman 1987; Walberg and Zhang 1998). In order for a policy nexus to be achieved, researchers must carefully monitor data quality, availability, and strive to ensure that their models are not overly complex (Mercenier and Yeldan 1999).

Another criticism of studies and models based upon human capital theory is that the methodology is interesting as a description of the past, but should not be used to predict the future (Baptiste 2001). Because of this limitation, many human capital studies are purely descriptive and provide few bottom line answers or solutions to societal problems. Further compounding the issues addressed above are concerns generated by the very nature of the questions asked in this research. Questions regarding the economic impact of education are often overly generalistic, and as Murnane (1987) notes, it is difficult to achieve a research/policy nexus in such circumstances. Additionally, scholars (Livingstone 1997; Erosa, Koreshkova, and Restuccia 2007) hold that the broad application of human capital theory is problematic because

returns vary significantly across urban and rural areas and does not account for variances in the quality of education received as an explanatory variable in returns on investment. The authors have worked diligently to overcome many of the concerns noted in the literature. Through the use of an innovative data set, we are able to overcome the complexity concerns of Mercenier and Yeldan (1999) while at the same time keeping the indicators simple so that they can be used by policy makers.

THE EDUCATIONAL NEEDS INDEX

The United States is blessed with a rich mix of urban and rural areas that enhance the quality of life for all citizens. However, the nation's geographic and demographic diversity provides challenges to those planning for the delivery of private or public goods and services. As noted in *The State of the South 2002 – Shadows of the Sunbelt Revisited*, regions across the country evidence “complex diversity, with fast-growth and slow-growth communities, with high-tech metro areas and backwater rural counties, and with coastal towns having emerged as vacation havens and older cities searching for a place in the new economy” (MDC Inc., 2002; p. 4). While rural communities offer a variety of amenities to the social capital mix of states, they lack the resources and presence of a human capital base to attract Knowledge Economy industries. This deficiency is significant because the presence of a critical mass of highly educated and versatile workers is the engine that drives expansion in Knowledge Economy industries.

The recent emergence of a multifaceted and multidimensional global economy presents challenges for policymakers as they work to direct state resources toward future policy needs. Given the nation's diversity, policymakers must avoid “one size fits all” solutions to statewide policy challenges. However, the ability of such individuals to make well informed policy decisions is limited by the lack of clear and consistent economic and education data at the local level. As the relationships between education, training, demographic shifts, and the economy has become a focus of public policy debate, there is a pronounced need for states to build and maintain a complete demographic profile of their workforce.

Such a profile should take into account educational, economic, and population growth factors to provide a clear picture of workforce opportunities and challenges. While elected officials often have a qualitative feel for the issues, they lack the quantitative data needed to educate and inform the decision-making process. The creation of a generalizable and evaluative tool that informs the policymaking process would provide a powerful tool in the policy toolbox. This study answers the call of the Southern Growth Policies Board and presents a set of consistent data elements that allow policymakers to examine how their states, and the counties that comprise them, compare regionally and nationally.

The purpose of this research is to develop an econometric model that demonstrates the link between education and social welfare at state, regional, and national levels. Building upon earlier research (Davis, Noland, & Kelly, 2003) conducted on behalf of member states of the Southern Governors Association, the current iteration is national in scope, and offers refinements to earlier versions of the Educational Needs Index (ENI). As noted, the national ENI introduces an econometric model that assesses conditions and trends for all 3,140 counties or their equivalents and allows peer comparisons across a variety of indicators. The research presents a set of consistent data elements nested within factors categories that allow policymakers to

examine how their states and the counties that comprise them compare regionally and nationally with regard to educational, economic, and demographic pressures. Furthermore, this research addresses information shortcomings through the creation of an indicator-based model that measures the potential outcome of investments in postsecondary education.

The Educational Needs Index also places an emphasis on the transition between K-12 policy concerns and postsecondary opportunities while at the same time placing those issues in a broader public policy context of educational attainment as a concern for economic development and government response to population growth and shifting demographics. The data assists policymakers at state, regional, and local levels as they work to reach informed decisions on issues of secondary education achievements, adult education concerns, and general postsecondary education access and attainment. Particular emphasis is placed on the role that training, certificate programs, two-year degrees, and adult literacy initiatives play in forming foundations for more promising futures and stronger economies built upon a more versatile workforce. By identifying and offering intervention strategies for the most pressing issues facing critical regions, this research promotes a more informed and long-term debate about postsecondary access and workforce training. Through in-depth field research in targeted regions of the country, the project focuses on the most disadvantaged rural and urban areas of the nation and promotes regional partnerships between education, business, and government.

Several core principles have guided the development of the Educational Needs Index. These foundational constructs are as follows:

- The realization that state budgets are increasingly challenged by poor revenue growth; therefore, scarce resources and increasing demands for accountability require informed decisions in the allocation of those resources.
- The awareness that education and the economy are increasingly intertwined as human capital becomes a centerpiece of the Knowledge Economy. Private sector success hinges as much upon “what you know” as much as it does upon “what you do.”
- Educational planning indicators need to be linked with economic and demographic variables to provide a legitimate representation of the region’s citizens. Education, whether elementary, secondary, or higher, does not function in a vacuum; therefore, decisions should not be made as if population patterns, labor dynamics, or income disparities do not exist.
- The demographic characteristics of the nation are not uniform from region to region. Postsecondary education planning efforts should not assume that all regions will react in a similar manner to policy initiatives.

Through the creation of the Educational Needs Index, policymakers are presented with a clear and consistent reference tool that allows them to identify areas in need of educational investments, thereby providing for a more informed decision-making process regarding the distribution of scarce resources to support educational and economic policy initiatives.

METHODOLOGY

The methodology utilized in this research is built upon the work of Todaro (1977) and his analysis of developmental policy and population growth. Todaro measured the impact of various

economic and social variables on the poverty rate of poor and developing countries. His index of development included factors such as per capita income, GNP, household income, birth rates, and education. These variables were assimilated into a “poverty index” which was used to compare various nations across the globe and tied their index ratings to policy and planning at the national level. Other examples are found in the literature of establishing indices through standardized data to achieve inter- and intra-country comparisons along conditions of wealth, industrial activity, social problems, etc. (Faul and Hudson, 1997; Park, 1997; Dixon and Menon, 1997).

This research follows Todaro’s basic foundation, but contains a higher level of data specificity and a much more detailed theoretical model. The model includes county-level variables that directly impact participation rates in postsecondary education, educational attainment levels, employment patterns, and socioeconomic status. The indicators have been carefully chosen to allow for a manageable data pool, inclusiveness of relevant economic and social indicators, and control of redundancy (Walberg and Zhang, 1998).

The Educational Needs Index includes county-level data that directly impact participation rates in postsecondary education, educational attainment levels, employment patterns, and socioeconomic status. The model combines these various educational, demographic, and economic characteristics and allows for comparison across all of the respective counties in a given state, region and the nation as a whole. The model employs fifteen unique indicators that are folded into four categories: educational, economic, and market demand. A population adjustment factor was also added to provide more power to the largest counties in states.

Employing Gaussian based statistics to standardize county-level variables, the index classifies those counties whose demographic and economic characteristics display the greatest need and/or demand for increased efforts to deliver education and remove participation barriers. The indicators have been carefully chosen to allow for the inclusiveness of relevant economic and social indicators, to provide a manageable data pool, and to control for variable redundancy (Walberg and Zhang, 1998). Building upon the foundation of previous research conducted by Davis and Noland (2003), this study evaluates the educational needs and demands of the 3,140 diverse counties of the nation, allowing for economic, educational, demographic, and social variables to be included simultaneously in the analysis.

The model employs fifteen unique indicators that are folded into four factor categories:

1. **Education Factors** – Indicators assess the educational capacity of a county’s adult population. Indicators measure the percent of the population with a high school degree, associate’s degree, bachelor’s degree and a measure of the educational attainment gap between younger and older members of the workforce.
2. **Economic Factors** - Indicators in this category assess the degree of economic challenges and opportunities facing counties. Indicators measure the percent of population in poverty, unemployment rates, existing earnings capacity of residents, and dependence upon manufacturing jobs.
3. **Market Demand Factors** – Indicators assess the present population growth issues facing the county and potential need for increased emphasis on human capital development to

address changing demographics of the county. Indicators measure recent and projected population growth, population aged 19 and younger as a percent of the total population, population aged 20-44, and the relative size of a county's at-risk minority population.

4. **Population Factors** – Indicators serve as corrective variables to control for the population size of each respective county.

In all cases, the research relies on the most recently published statistics available and encompasses data derived from both federal and state sources. A detailed list of data sources is provided in Appendix A.

Using the data selected, the authors form a generalized Educational Needs Index as follows:

$$I = f_1w_1 + f_2w_2 + f_3w_3 + f_4w_4 + f_5w_5$$

where,

I = a weighted index of the educational needs of a county relative to the other 3140 counties nationally as measured in z-score statistics;

$f_i^{i=1,2,\dots,n}$ = the average z-scores of the individual indicators within each of five factors impacting measures of educational need;

$w_i^{i=1,2,\dots,n}$ = the weight assigned to each factor. The sum of all w_i 's must equal one.

Each of the five factors ($f_i^{i=1,2,\dots,n}$) representing data elements that gauge the educational needs of a county are constructed as follows:

$$f_i = (z_1 + z_2 + \dots + z_n) / n$$

where,

$f_i^{i=1,2,\dots,n}$ = an average of the z-scores of those indicators within each factor category;

$z_i^{i=1,2,\dots,n}$ = the county's z-score for each indicator of educational need.

In short, averaging the z-scores of the factors' core indicators generates each factor (or category) score. These normalized values for each factor are then used in the overall "educational needs index" formula (summarized below) to determine a county's overall educational needs when relevant educational, economic, and demographic data are considered together. Data weights are assigned to each category according to the relative importance of each factor in gauging need, as well as demand, for post-secondary education and training.

OVERALL EDUCATIONAL NEEDS INDEX =

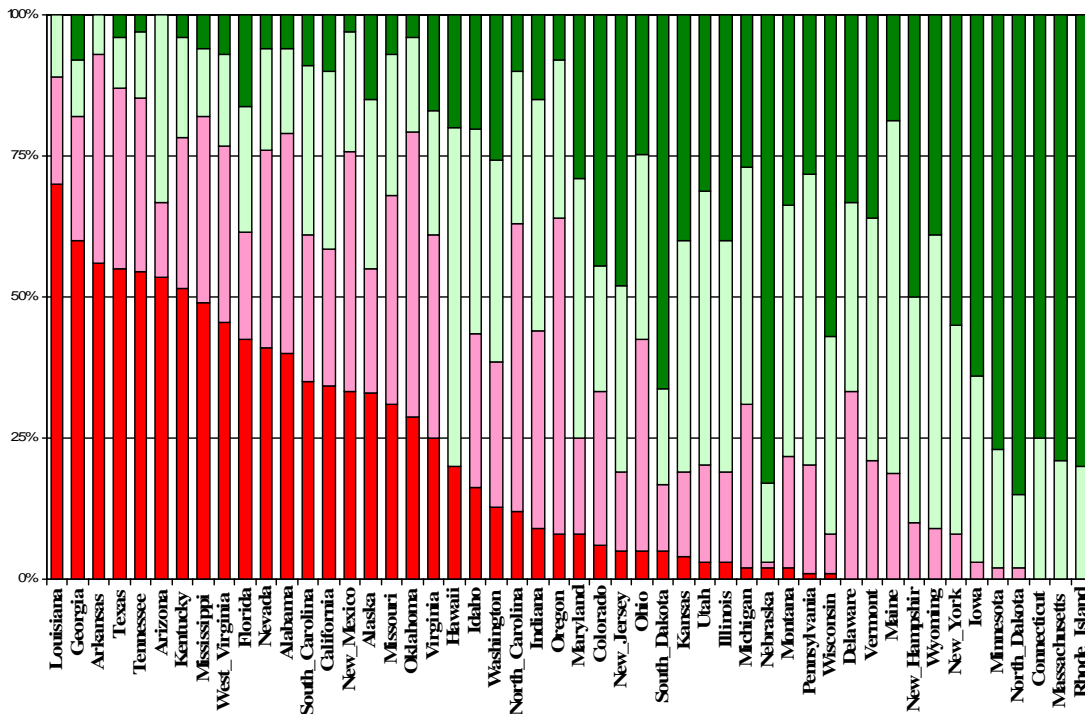
(EDUC)(0.3) + (ECON)(0.3) + (MARKET DEMAND)(0.3) + (POP. ADJ.)(0.1)

Collapsing fifteen indicators of educational need and demand into four factor categories (education, economic, market demand, and population) allows each county to be profiled and an overall index score to be calculated. Rankings in each of the categories are possible as well as the rankings of the counties' overall index scores. This process provides the rankings of all counties relative to one another and further informs the debate of where scarce educational resources could be best applied.

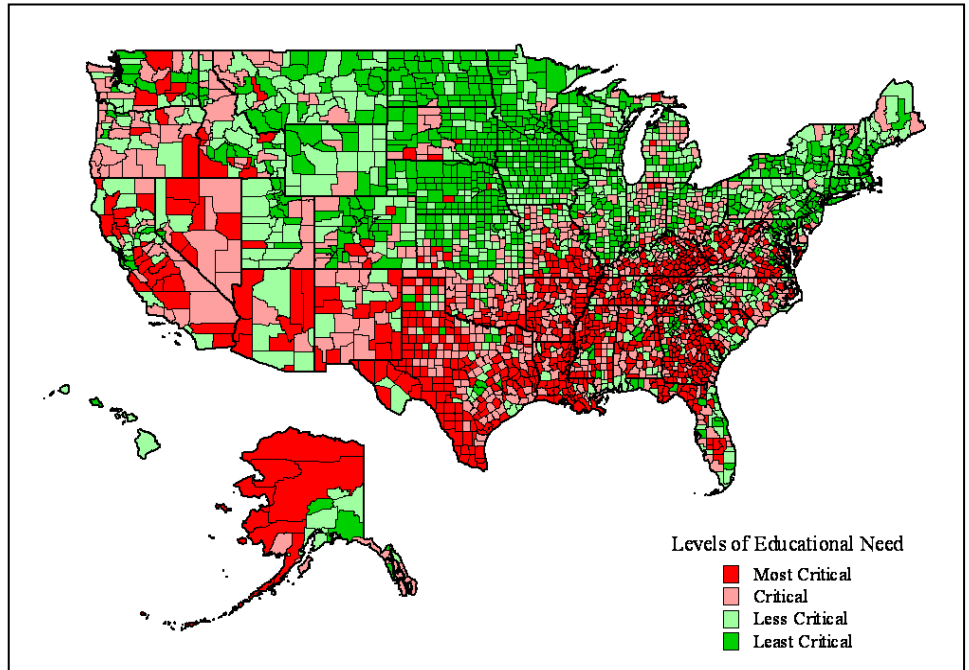
EDUCATION FACTORS

In the knowledge economy, post-high school education and training opportunities are more important than at any time in our nation's history. Recent employment projections reveal that significant job will occur primarily in fields requiring high-level skills and education. Consequently, increasing pressure is placed on policymakers, educators and other state leaders to provide affordable educational opportunities to all citizens to not only enhance the social and economic well being of individuals, but also to benefit and strengthen communities, states and the nation.

The ENI employs an Education Factor which consists of several indicators that in combination assess a county's educational challenges and provide some sense of the magnitude of these challenges at the state and regional level. These indicators measure the percent of the adult population with a high school, associate's, and bachelor's degree. Additionally, this factor includes an indicator of the educational gap (associate degree or above) between younger and older members of the workforce. This information is essential to state-level leaders as they make critical decisions about *how* and *where* to invest public funds to provide educational opportunities to residents in all counties.



An analysis of the model’s Educational Factor reveals regional pockets in which levels of educational need are more critical than others. As detailed in the above chart and map below, the states with the largest percentage of their counties ranked in the “most critical” quartile, for example, are located mostly in the southern-half of the country. While the Southeast historically has faced educational challenges in comparison to the rest of the country in both its rural and urban centers, the Southwest and South Central regions have more recently



experienced challenges associated with educating an influx of immigrants and an increasingly young population relative to other parts of the country. The majority of states with relatively few counties in this “most critical” quartile are located in the Midwest or Northeast.

Of the five states with the largest percentage of counties in the “most critical” quartile based on the Education Factor data analysis, three states (*Louisiana, Georgia and Tennessee*) are situated in the southeastern region of the country with the other two states (*Arkansas and Texas*) located in the neighboring south central region. In contrast, the states in the Northeast and Midwest have the largest percentage of their counties ranked in the “least critical” quartile as compared to other states from other regions of the country. Historically, education has been a greater individual and societal priority in these two regions as evidenced by the favorable statistical comparison when contrasted against other areas of the U.S.

States with the largest percentage of counties in the “most critical” quartile			States with the largest percentage of counties in the “least critical” quartile:		
State	Percent	Counties	State	Percent	Counties
Louisiana	70	45 (of 64)	North Dakota	85	45 (of 53)
Georgia	60	96 (of 159)	Nebraska	83	77 (of 93)
Arkansas	56	42 (of 75)	Rhode Island	80	4 (of 5)
Texas	55	140 (of 254)	Massachusetts	79	11 (of 14)
Tennessee	55	52 (of 95)	Minnesota	77	67 (of 87)

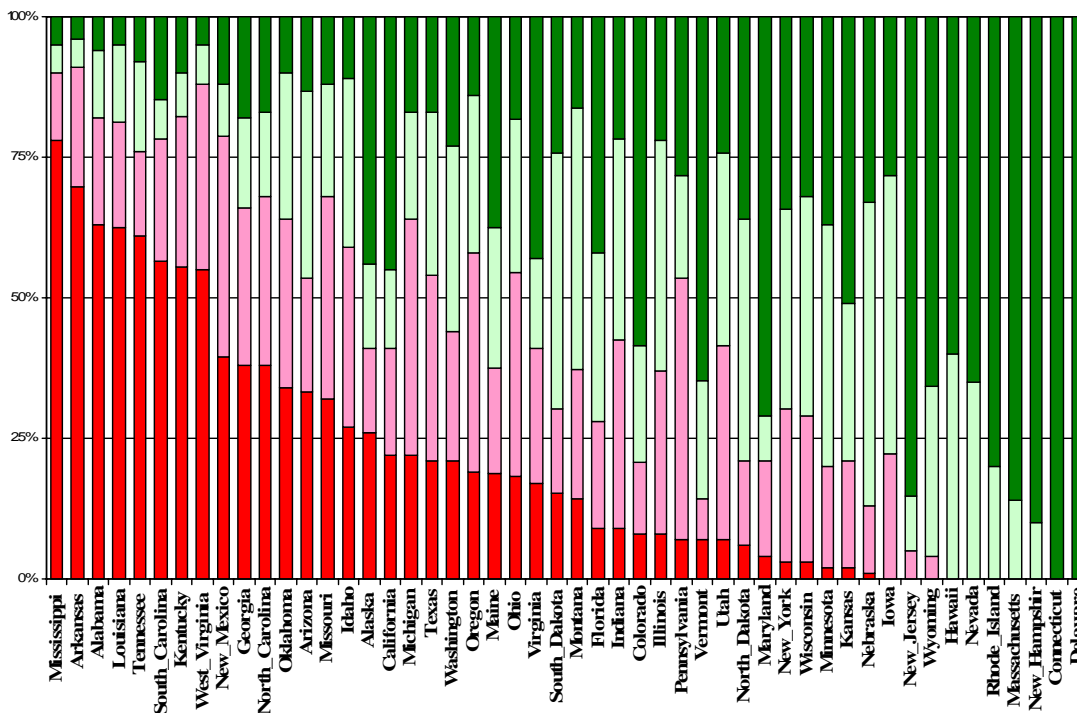
Of the five states with the largest percentage of counties in the “least critical” quartile, three states are situated in the Midwest (*North Dakota, Nebraska and Minnesota*) and two others in the Northeast (*Rhode Island and Massachusetts*). Clearly, the challenge for these states (and other

states throughout these respective regions) is how to create educational policy initiatives that sustain excellence in their best-performing counties while concurrently expanding access to post-secondary education opportunities to residents across their other respective counties.

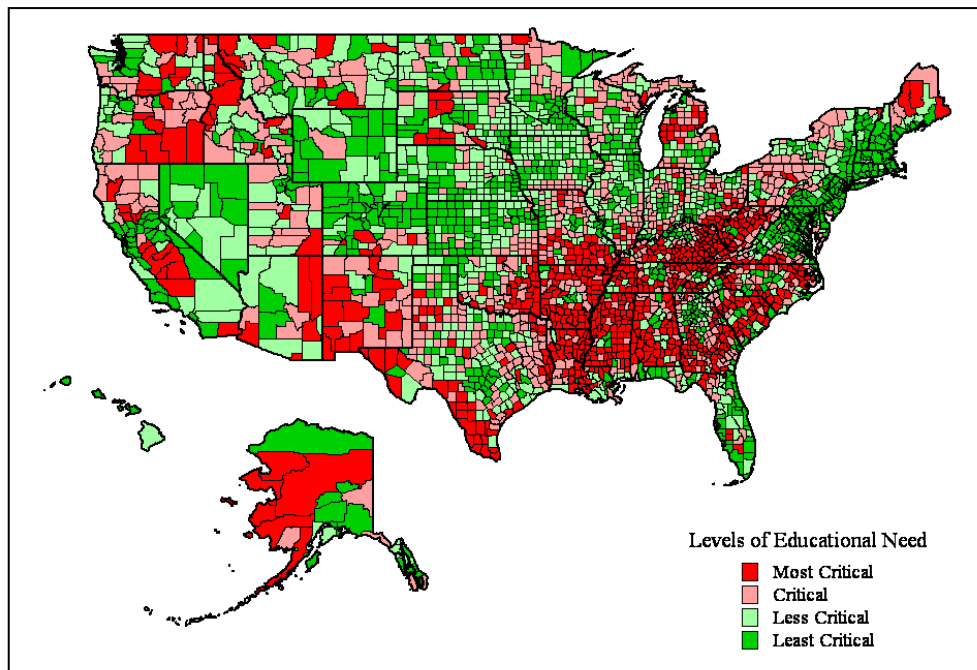
ECONOMIC FACTOR

The twenty-first century marks the beginning of a new economy that relies heavily on science and technological advances, economic innovation, higher productivity, and increased competition in a global marketplace. These changes – or at least the future prospect of change – are of particular concern in great expanses of the nation that have over the past 50 years relied on agricultural or manufacturing-based economies. Yet, in order for individuals to have higher living standards and for communities, states and the nation to have a flexible workforce and expanded economic opportunities, policymakers and other economic development leaders must work to overcome emerging and persisting economic challenges. This must be done with a strategic eye toward the role that education, training, and skills will play in shaping the best possible future for an area.

The model’s Economic Factor consists of several indicators that when combined assess the degree of economic challenges facing states’ counties. These indicators measure the percent of population in poverty, unemployment rates, the existing earnings capacity of residents, and unusually high dependence upon manufacturing jobs. Overall, this factor analysis reveals the economic well being of a state and region as it measures directly each county’s economic health and provides an estimate of a state’s competitiveness with other regional peers around the country. This information is essential to local and state-level leaders as they make critical economic development decisions and other public policy choices.



An analysis of the Economic Factor category reveals regional pockets of the country in which levels of need are more critical than others. As detailed in the chart above and the map below, the states with the largest percentage of their counties ranked in the “most critical” quartile are mostly found in the southern regions of the country including southeastern and south central states where economic development efforts have made gains in recent decades but still lag behind other areas of the nation. The northeastern states have the largest percentage of their counties ranked in the “least critical” quartile in comparison to other states from other regions throughout the country. As the new jobs of the global, knowledge-based economy continue to challenge all regions’ reliance on a traditional manufacturing and agricultural economies over the next decade, the level of critical needs relative to national trends is changing.



Of the five states with the largest percentage of counties in the “most critical” quartile based on the Economic Factor data analysis, three states (*Mississippi, Alabama* and *Tennessee*) are situated in the southeastern region of the country and two states (*Arkansas* and *Louisiana*) are part of the south central region. Though not as highly represented in the “most critical” quartile, the northwestern, southwestern and midwestern states are scattered with examples of counties exhibiting the same sort of economic challenges as are found in other regions.

States with the largest percentage of counties in the “most critical” quartile			States with the largest percentage of counties in the “least critical” quartile:		
State	Percent	Counties	State	Percent	Counties
Mississippi	78	64 (of 82)	Delaware	100	3 (of 3)
Arkansas	69	52 (of 75)	Connecticut	100	8 (of 8)
Alabama	63	42 (of 67)	New Hampshire	90	9 (of 10)
Louisiana	63	40 (of 64)	Massachusetts	86	12 (of 14)
Tennessee	61	58 (of 95)	New Jersey	86	18 (of 21)

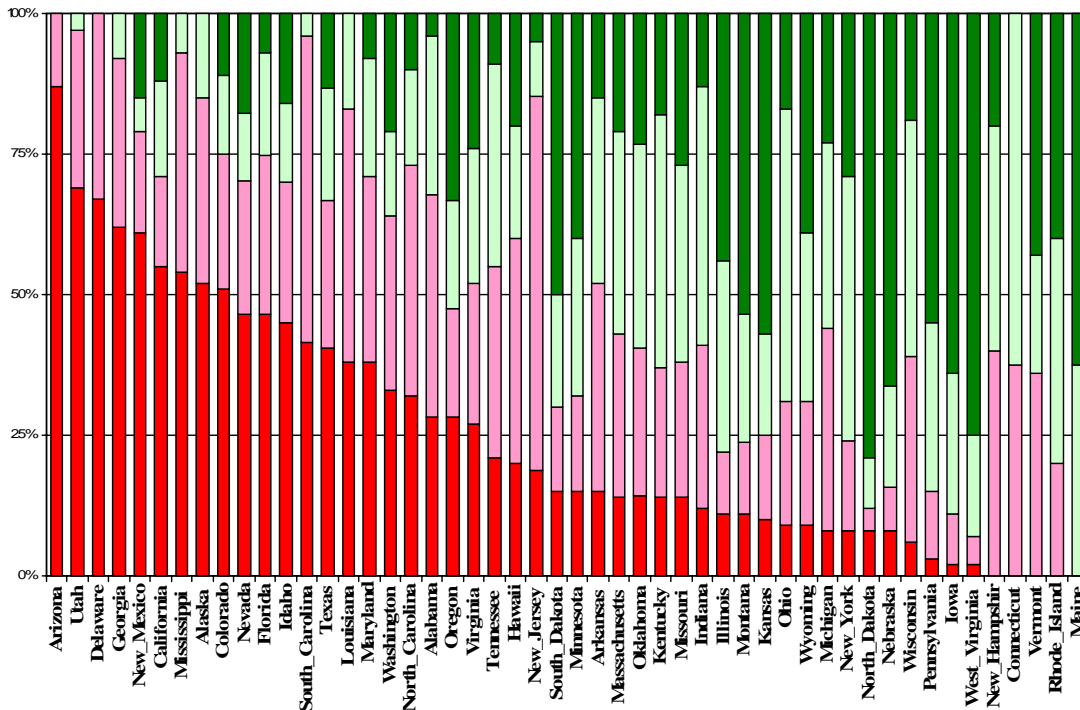
The five states with the largest percentage of counties in the “least critical” quartile are states (*Delaware, Connecticut, New Hampshire, Massachusetts and New Jersey*) situated in the northeastern region of the country. Delaware and Connecticut are states leading the nation on this comparative measure of labor patterns, earning statistics, and relative economic challenges. Yet, policymakers in these and other “less critical” states must remain cognizant of the interrelations between future economic demands and educational opportunities as they struggle to balance any regional disparities that emerge in pockets of their states. Overall, the creation and sustaining of knowledge-based jobs for the new economy and the preparation of citizens for a lifetime of employment opportunities must be a public policy priority.

MARKET DEMAND FACTOR

Local- and state-level policymakers and other leaders must have an enhanced understanding of market demands and shifting demographics in order to make informed policy choices about economic development and access to affordable educational opportunities for their residents in the global, knowledge-based economy. Policymakers need to be aware of the range of populations within their borders and whether those populations are diversifying or growing, remaining stagnant or declining, or displaying some complex combination of trends. The results of these trends impact the overall economic, social and cultural well-being of individuals and communities and shape the public policy choices for the area.

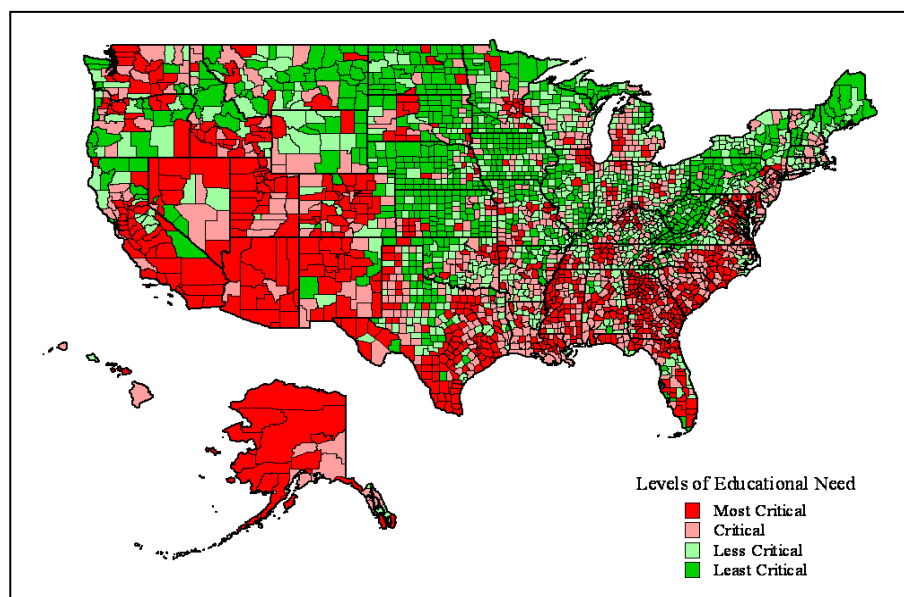
The model’s Market Demand factor consists of several indicators that when combined assess the present population growth issues facing counties and the potential need for increased emphasis on human capital development to address changing demographics. These indicators measure recent and projected population growth, population aged 19 and younger as a percent of the total population, population aged 20-44, and the relative size of a county’s at-risk minority population. Together these conditions, if combining to form a youthful and increasingly diverse community, exacerbate any educational and economic challenges that face community, business, and state leaders.

It is important to note that a higher critical level in this factor analysis may suggest a booming (almost certainly not declining) population growth in pockets of a state, which may pose both economic benefits and challenges as tax bases shift but also increase demand for and costs of education and other social services. Overall, this factor analysis reveals the demographic shifts occurring within a county, state, and region and places that growth in the context of other areas of the country.



An analysis of the model’s Market Demand Factor reveals regional pockets of the country in which levels of need are more critical than others. As detailed in the chart above and the map

below, the states with the largest percentage of their counties ranked in the “most critical” quartile are mostly found in the southern-half of the country – primarily in the southwestern regions with states distributed across the southeastern and south central regions. The northeastern and midwestern states have the largest percentage of their counties ranked



in the “least critical” quartile in comparison to other states from other regions throughout the country. The northwestern states are varied in the percent of their counties exhibiting critical need in this area.

Of the five states with the largest percentage of counties in the “most critical” quartile based on the Market Demand Factor data analysis, three states (*Arizona, Utah* and *New Mexico*) are situated in the southwestern region of the country. *Arizona* and *Utah*, for example, are states

experiencing a large growth in youth and at-risk minority populations, for example, first and second generation Latino populations. State policymakers will need to balance the demands associated with this growth pattern with that of an elderly, retiring community in both states. The other two states (*Delaware* and *Georgia*) are part of the northeastern and southeastern region respectively. Five states have *no* counties in this “most critical” quartile; these states are located primarily in the northeastern regions suggesting relatively no significant change in demographic patterns relative to the changes being experienced by peer states.

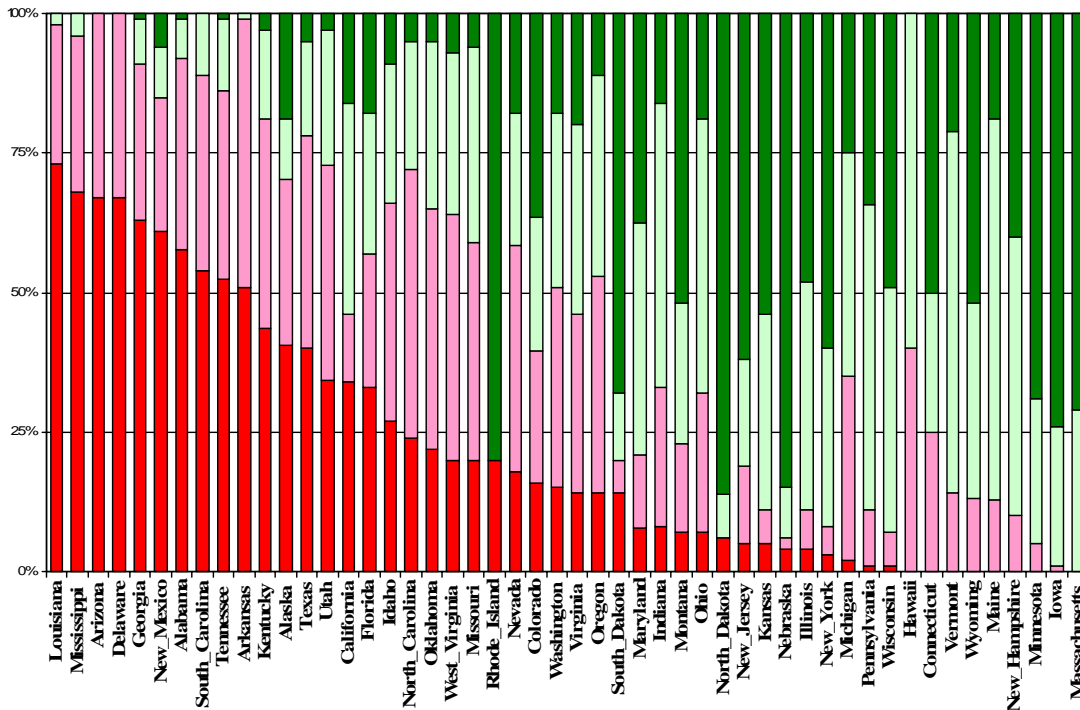
States with the largest percentage of counties in the “most critical” quartile			States with the largest percentage of counties in the “least critical” quartile:		
State	Percent	Counties	State	Percent	Counties
Arizona	87	13 (of 15)	North Dakota	79	42 (of 53)
Utah	69	20 (of 29)	West Virginia	75	41 (of 55)
Delaware	67	2 (of 3)	Nebraska	67	62 (of 93)
Georgia	62	99 (of 159)	Iowa	64	63 (of 99)
New Mexico	61	20 (of 33)	Maine	63	10 (of 16)

The five states with the largest percentage of counties in the “least critical” quartile are states scattered in the midwestern region (North Dakota, Nebraska and Iowa), the northeastern (Maine) and southeastern (West Virginia) regions of the country. Many of these states have aging populations, only pockets of slight growth in urban areas, and little in- and out-migration. Any slight shift in demographics occurring in the Midwest region is primarily that of diverse populations. Overall, this information about population growth and decline as well as shifting demographics is essential to local and state-level leaders as they make critical public policy choices about *how* and *where* to invest public dollars.

OVERALL ANALYSIS

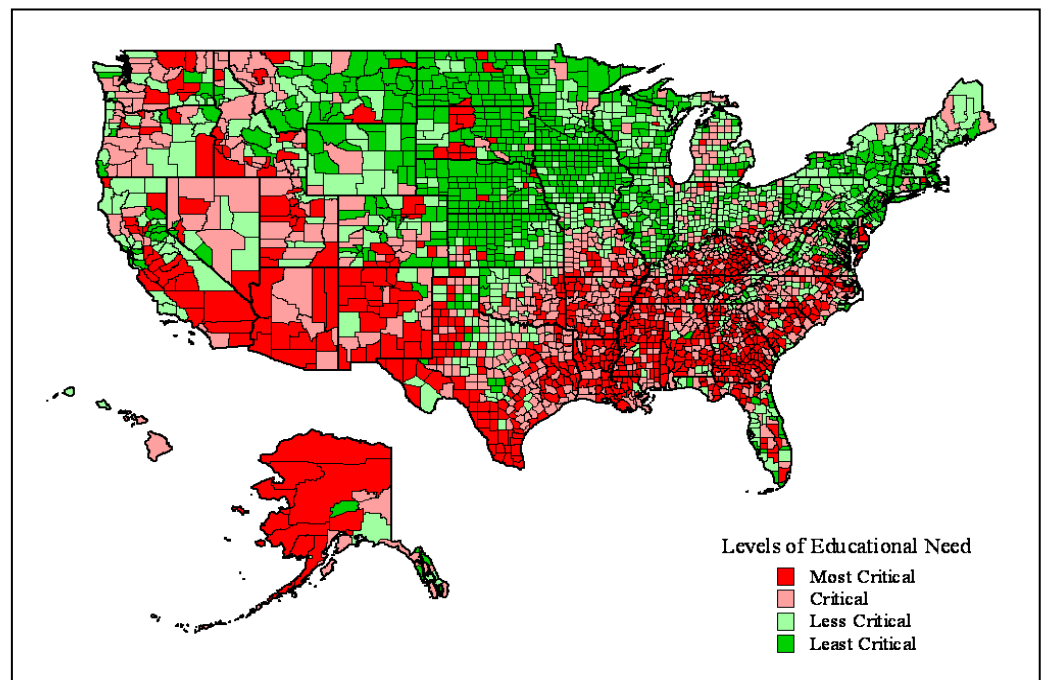
One of the insights gleaned from the ENI is that each region, state, and county exemplifies a unique set of social, economic, political, and cultural contexts. Within these parameters, policymakers are expected to make equitable policy decisions despite the varied challenges existing across regions, often with relatively limited information available. The Educational Needs Index (ENI) provides policymakers with county-level data related to postsecondary education participation rates, educational attainment levels, employment patterns, socioeconomic status, and demographic shifts that hopefully enables better-informed and socially just public policy decisions.

As presented earlier in this report, the educational, economic, demographic, and social variables analyzed through the ENI are categorized into three primary factors: 1) Education Factor, 2) Economic Factor, and 3) Market Demand Factor. Counties (and regions) labeled as “critical” are facing relatively poor conditions of under-education and economic challenges compounded by shifting demographics toward youth or at-risk minority populations.



A comprehensive analysis of the model’s combined factor categories reveal regional pockets of the country in which the level of overall need is more critical than others. As detailed in the

chart above and the map below, the states with the largest percentage of their respective counties ranked in the “most critical” quartile are mainly found in the southeastern, southwestern and south central regions of the country. States in the Northeast and Midwest have the largest percentage of their counties ranked in the “least



critical” quartile in comparison to other states from other regions throughout the country. The northwestern states are varied in the percent of their counties’ critical educational need.

Of the five states with the largest percentage of counties in the “most critical” quartile on the overall ENI analysis, the three southern states (*Louisiana, Mississippi and Georgia*) are most

heavily impacted by educational attainment statistics and their associated factor category. The additional two states (*Delaware* and *Arizona*), situated in other regions of the country, are more profoundly impacted by rapid population growth through the market demand factor analysis. *Massachusetts* is the only state in the nation that has *no* counties in the “most critical” quartile in the overall ENI analysis.

States with the largest percentage of counties in the “most critical” quartile			States with the largest percentage of counties in the “least critical” quartile:		
State	Percent	Counties	State	Percent	Counties
Louisiana	73	47 (of 64)	North Dakota	87	46 (of 53)
Mississippi	68	56 (of 82)	Nebraska	85	79 (of 93)
Arizona	67	10 (of 15)	Rhode Island	80	4 (of 5)
Delaware	67	2 (of 3)	Massachusetts	74	73 (of 99)
Georgia	63	100 (of 159)	Minnesota	71	10 (of 14)

The five states with the largest percentage of counties in the “least critical” quartile are states situated in the Midwest (*North Dakota, Nebraska* and *Iowa*) or Northeast (*Rhode Island* and *Massachusetts*). The majority of these states’ ENI score is impacted more so by the Market Demand Factor than any other factor analysis because of a growing youth population in urban centers and their surrounding counties.

CONCLUSIONS AND APPLICATIONS TO LOCAL AND STATE ACTIVITIES

Serving as a critical data resource and made available through www.educationalneedsindex.com, the Educational Needs Index provides scholars with state-specific reports, county-level data sets, and searchable query tools that can be used to create peer comparisons. The data and associated analyses seek to identify counties (urban, suburban, and rural) where educational attainment and economic challenges are exacerbated by robust population growth and shifting demographics. Because of this utility, the ENI serves as a valuable public policy tool for researchers, public officials, and education leaders. The ENI provides practical benefits to state and regional officials as they work to develop a public agenda for higher education. The ENI positions data to inform these discussions and encourages debate and questions regarding the current and emerging workforce in given areas. Included among these efforts are the following:

- Regional education and state government organizations have used the ENI in their outreach and policy/planning discussions.
- Postsecondary leaders in multiple states have included the ENI analysis in developing strategies for better dealing with educational access challenges and understanding barriers to participation.
- The project has aided several organizations in the development of grant proposals and building a case for need and importance of selected areas.
- Institutional researchers have found the ENI to be helpful in strengthening the depth and scope of their environmental scanning activities.

- State-level and multi-campus systems have used the ENI as a supporting resource for strategic planning purposes.
- Educational systems seeking the establishment of P-16 regional networks have employed the ENI in raising awareness of the growing importance of partnerships.
- Various education, economic development, and advocacy groups have found the comparison data at local, regional, and state levels to be particularly useful in public presentations seeking to inform the public debate surrounding the relationship between education and the economy.

As a platform for discourse and study, the broader project has also served as a vehicle for public forums and individual discussion with the goal of better understanding best practices and strategies for meeting challenges of human capital development. Throughout 2006 and 2007, the authors have been in dialogue with education leaders, economic officials, and other public figures from the following urban areas and their respective counties: El Paso, Memphis, Chicago, Providence, and Miami. In addition, the following rural regions of the country were included in the study: Central Washington State, Northwest New Mexico, Southeast Arkansas/West Mississippi, Southeast Kentucky/Northeast Tennessee, and South Central Virginia. Focus groups, public forums, and individual meetings were employed to explore how the county's demographic trends impact planning and public policy in these selected areas.

Of particular priority to the researchers was generating discussions and seeking solutions around the following general questions:

- What do present educational and economic conditions mean to the residents of the area? How are these conditions affecting everyday lives and planning for the future?
- How are economic pressures affecting education and training needs? What challenges exist for the emerging workforce versus the current workforce?
- What are the barriers that are preventing public officials from meeting these educational challenges?
- What accomplishments or best practices in this region might inform similar efforts in other urban and/or rural areas?

Through numerous visits, meetings, and conversations, the research team gained valuable insight regarding the challenges and opportunities faced by these regions and other national peers. It must be noted that in virtually all locations visited, the team found a positive spirit among local and state leaders. Common to the locations was a sense of pride in place and a strong determination to meet the challenges facing the region. Whether in major urban areas or remote rural locations, concerned citizens and local leaders exhibited a pride in their rich histories and a commitment to establishing foundations for the future.

In the course of conducting these public forums around the nation surrounding educational and economic issues, the researchers have observed several commonalities in those communities, regions, and states that have found success in targeting initiatives that promote human capital development. Although all of the details of the field research will be outlined in a forthcoming

report to Lumina Foundation for Education, the following points are shared as a compliment to the data project as presented in this paper and represent critical ingredients to consider in planning for successful local initiatives.

1. **Start with sound information and involvement of key decision-makers.** Objective data that provides honest comparisons to peer and regional averages is a critical ingredient to facing what the real challenges are at the local level. Having the right people at the table ensures that good ideas will be matched with a commitment and capability to actually move forward with the policy agenda.
2. **Consideration for state-level policy and barriers to local action.** Many successful projects start as local pilot initiatives that have to gain state-level approval to alleviate or remove policy barriers. Solid communication between local leaders and state-level officials that can partner in these innovative activities is critical.
3. **Flexibility to respond to the region's needs.** One-size-fits-all solutions are rare and state-level policies and programs cannot assume that every city and county is going to have the same experience with new programs.
4. **Commitment to accountability.** Along with the first question of “what needs to be done,” all stakeholders should also be committed to answering the second question of “who is responsible.” Many good ideas have failed to come to fruition because everyone in the room thought that someone else was going to follow through.
5. **The more entrenched the problem – the less eager people are to address it.** Know the difference between big and small challenges and accept that some solutions may take considerable effort to create and implement. Ample evidence has been found in the overall project conversations that communities have been able to overcome major challenges. Just because participants find that progress is slow, a real commitment by community officials to the long-term value of the initiatives can overcome a tremendous amount of resistance and obstacles.
6. **Leadership and “ownership of the challenge” are common to every success story seen nationally.** Research and the discussion of successful initiatives in education and economic development can be traced to select actors that were committed to seeing their visions become reality. Much as strong accountability ensures that everyone knows who is responsible, having a visible, influential, and committed champion for the project makes a tremendous difference. One should not discount the importance of quality leadership on the pace of progress.

Overall, the results of this broader research effort has further supported the notion that states must work diligently to bring together political, educational, and civic constituencies to develop and frame consensus around many of the issues detailed above. These issues of regional and statewide importance should eventually frame the policy focus and public agenda for higher education. Researchers (Rowley and Freshwater, 1999; MDC Inc. 2002; Progressive Policy Institute, 2002; Bailey and Preston, 2003; Davis and Noland, 2003) have demonstrated that higher education must play a larger role in state and regional policy initiatives if the nation is to move forward in the coming decades. For far too long, higher education has existed in a vacuum, concerned more with institutional goals than serving the broader needs of their regions. This situation must be reversed if states are to remain competitive in the Knowledge Economy.

This research answers the call of the Southern Growth Policies Board to provide a nexus between the scholarly and policy worlds, providing a practical, concise, and generalizable results that can be used to better inform planning for delivery of all levels of education to the citizens of the region and will provide great insights for a variety of audiences, including institutional presidents, governors, legislators, educators, planners, and policymakers. Finally, by employing a broad set of economic and demographic indicators, the Educational Needs Index answers the call to bring the best of what is known about human capital from a variety of disciplines and focuses policy debate on their combined relevance to crucial educational and economic decisions. At its heart, the Educational Needs Index is intended to increase public awareness of the current and emerging workforce development and educational attainment challenges and create a conversation about the challenges states and their counties face in the present and future. Because these challenges cut across state lines, the research offers a unique opportunity to identify regions of the country that are facing comparable pressures.

REFERENCES

- Bailey, J.M. and Preston, K. (2003). Swept Away: Chronic Hardship and Fresh Promise on the Rural Great Plains. Walthill, Neb.: Center for Rural Affairs.
- Baptiste, I. (2001). "Educating lone wolves: Pedagogical implications of human capital theory." Adult Education Quarterly. 51,(3) pp. 184-201.
- Becker, G. (1964). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. New York: Columbia University Press.
- Beaumont, P and A. Isserman. (1987). "Tests of forecast accuracy and bias for county population projections: Comment." The Journal of the American Statistical Association. 82 (400): 1004-1009.
- Blank, R.K. (1993). "Developing a system of education indicators: selecting, implementing, and reporting indicators." Educational Evaluation and Policy Analysis, 15,(1), pp. 65-80.
- Bonser, C.F., McGregor, Jr., E.B., & Oster, Jr., C.V. (1996). Policy Choices and Public Action. New Jersey: Prentice-Hall.
- Boyd, D.J. (2002). State Spending for Higher Education in the Coming Decade. Prepared for the National Center for Higher Education Management Systems. Denver, CO.
- Boyd, D.J. (2003). "The bursting state fiscal bubble and state Medicaid budgets." Health Affairs. 22, (1), pp. 46-61.
- Callan, P.M. (2002). Losing Ground: A National Status Report on the Affordability of American Higher Education. The National Center for Public Policy and Higher Education. San Jose, CA.
- Callan, P.M. (2002). Coping with Recession: Public Policy, Economic Downturns and Higher Education. The National Center for Public Policy and Higher Education. San Jose, CA.
- Clinton, J. and Conway, C. (2002). The Mercedes and the Magnolia: Preparing the Southern Workforce for the Next Economy 2002 Report on the Future of the South. The Southern Growth Policies Board. www.southern.org.
- Conklin, K.D. (2002). "After the tipping point: A new first principle for state postsecondary education finance." Change (2) pp 25-29.
- Conrad, C. (1989). "Meditations on the ideology of inquiry in higher education: Exposition, critique, and conjecture." The Review of Higher Education. 12,(3), pp. 199-200.

- Conway, C. (2001). Leave No Stone Unturned: A Human Capital Approach to Workforce Development. Southern Growth Policies Board. www.southern.org.
- Conway, C. and Johnson, S. (2005). The Southern Workforce Index. Southern Growth Policies Board. www.southern.org
- Curtin, T.R.C and E.A.S. Nelson. (1999). "Economic and health efficiency of education based funding." Social Science and Medicine. (48): 1599-1611.
- Davis, H. and Noland, B. (2003). "Understanding human capital through multiple disciplines: The development of an educational needs index" Journal of Social Indicators Research. (Vol. 61(1): pp. 147-174).
- Denison, E. (1983). "The interruption of productivity growth in the United States." The Journal of Economics, 93, (1), 56-77.
- Dixon, P. B. and Menon, J. 1997. "Measures of intra-industry trade as indicators of factor market disruption." The Economic Record. 73 (222): 233-247.
- Erosa, A., Koreshkova, T. and Restuccia, D. (2007). "How important is human capital? A quantitative theory assessment of world income inequality." www.andres.erosa@utoronto.ca.
- Faul, A. C. and Hudson, W. W. 1997. "The index of drug involvement: A partial validation." Social Work. 42 (6): 565-573.
- Franklin, R. (2003). Migration of the Young, Single, and College Educated: 1995 to 2000. Washington, DC: US Census Bureau.
- Friedman, T.L. (2005). The World is Flat: A Brief History of the 21st Century. New York: Farrar, Straus, and Giroux.
- Gibson, J. (1996). Baseline Poverty Estimates for Urban Areas of Papua New Guinea. Institute of National Affairs: Port Moseby.
- Goldsmith, A., J. Veum, and W. Darity. (1997). "The impact of psychological and human capital on wages." Economic Inquiry, 35, 4, 815-829.
- Gordon, G. (1992). Public Administration in America. 4th edition. New York, NY: St. Martins Press.
- Greene, J.P. and Winters, M.A. (2005). Public High School Graduation and College-Readiness Rates: 1991–2002. New York, NY: Manhattan Institute for Policy Research.
- Gumport, P.J., Iannozzi, M., Shaman, S. and Zemsky, R. (1997). Trends in Higher Education from Massification to Post-massification. National Center for Postsecondary Improvement. Stanford, CA.

- Harrison, K.A. (1997). "The importance of the educated healthy women in Africa." The Lancet, 349, (9052), 644-647.
- Hovey, H.A. (1999). State Spending for Higher Education in the Next Decade: The Battle to Sustain Current Support. San Jose: The National Center for Public Policy and Higher Education.
- Institute for Higher Education Policy [IHEP]. (1998). The New Millennium Project on Higher Education Costs, Pricing, and Productivity: Reaping the Benefits. Washington DC: IHEP Publications.
- Jones, D., and Kelly, P. (2004). The Emerging Policy Triangle: Economic Development, Workforce Development and Education. Boulder, CO: Western Interstate Commission on Higher Education and The National Center for Higher Education Management Systems.
- Jones, D and Kelly, P. (2007). The Emerging Policy Triangle: Economic Development, Workforce Development, and Education. (second edition). Boulder, CO: Western Interstate Commission for Higher Education.
- Jorgenson, D. and B. Fraumeni. (1992). "Investment in education and US economic growth." Scandinavian Journal of Economics, 94 (suppl.), 51-70.
- Judy, R.W., and Lommel, J.M. (2002). Twenty-first century workforce: Central Illinois. Peoria, IL: Central Illinois Workforce Development Board and Workforce Associates, Inc.
- Justiz, M. (1994). "Demographic trends and the challenges to American higher education." in Minorities in Higher Education (pp. 1-21). Washington, D.C.: ACE Publications.
- Keller, G. (1985). "Trees without fruit: The problem with research about higher education." Change, 17, 1, pp. 7-10.
- Levine, N. (1985). "The construction of a population analysis program using a microcomputer spreadsheet." Journal of American Planning Association, 51, pp. 496-511.
- D.W. Livingstone. (1997) "The limitations of human capital theory: Expanding knowledge, informal learning and underemployment." Policy Options. (July/August)
- Meltsner, A. (1976). Policy Analysts in the Bureaucracy. Berkley, CA: University of California Press.
- Mercenier, J. and Yeldan, E. (1999). "A plea for greater attention on the data in policy analysis." Journal of Policy Modeling, 21, 7, pp. 851-873.

Mincer, J. (1974). *Schooling, experience, and earnings*. New York: Columbia University Press.

MDC Inc. (2002). [The State of the South 2002 – Shadows of the Sunbelt Revisited](http://www.mdcinc.org).
www.mdcinc.org

Murnane, Richard J. (1987). “Improving education indicators and economic indicators: The same problems?” *Educational Evaluation and Policy Analysis*, 9, (2), 101-116.

National Association of Manufacturers. (2003). [Keeping America competitive: How a talent shortage threatens U.S. manufacturing](#). Washington, DC: National Association of Manufacturers

National Center for Education Statistics. (1997). [Education and the Economy: An Indicators Report](#). U.S Department of Education. Washington, D.C.

National Center for Education Statistics. (2002). [The Condition of Education](#). U.S Department of Education. Washington, D.C.

Nettles, M. (1995). “The emerging national policy agenda on higher education assessment: A wake-up call.” *Review of Higher Education*, 18, 3, pp. 293-313.

Nespoli, L.A. (1991). “Investing in human capital: State strategies for economic development.” In [New Directions for Community Colleges: Economic and Workforce Development](#). San Francisco: Jossey-Bass Publishers.

Park, D. 1997. “An alternative examination of intercountry income inequality and convergence.” *Comparative Economic Studies*. 34 (3): 53-65.

Progressive Policy Institute. 2002. [The 2002 State New Economy Index: Benchmarking Economic Transformation in the States](http://www.ppionline.org). www.ppionline.org

Progressive Policy Institute. 2007. [The 2007 State New Economy Index: Benchmarking Economic Transformation in the States](http://www.ppionline.org). www.ppionline.org

Putnam, R.D. (2000). [Bowling Alone: The Collapse and Revival of American Community](#). New York: Simon and Schuster.

Schultz, T. (1961). “Investment in human capital.” *American Economic Review*, 51, (1), 1-17.

Schultz, T. (1963). [The Economic Value of Education](#). New York: Columbia Press.

Smith, S. (1987). “Stability over time in the distribution of populations forecast errors.” Unpublished paper presented at the annual meeting of the Population Association of America. Chicago.

Southern Governors' Association Advisory Committee on Research, Development, and Technology. (2001). Seeds for the New Economy: Research, Development, and Technology. www.southerngovernors.org

Terenzini, P.: 1996. "Rediscovering the roots: Public policy and higher education research." The Review of Higher Education, 20, 1, pp. 5-13.

Todaro, M. 1977. "Developmental policy and population growth: A framework for planners." Population and Development Review. 3 (12): 23-43.

Rowley, T.D. and Freshwater, D. (1999). Ready or Not? The Rural South and Its Workforce. Southern Rural Development Center. www.rural.org

Sweetland, S.R. (1996). "Human Capital Theory: Foundations of a field of inquiry." Review of Education Research, 66, (3), 341-359.

Vaizey, J. (1962). The Economics of Education. London: Faber and Faber.

Walberg, H. J. and Zhang, G. (1998). "Analyzing the OECD indicators model." Comparative Education, 34, (3).

Weiss, C. (1972). Evaluation Research: Methods of Assessing Program Effectiveness. Princeton, NY: Prentice Hall.

Wellman, J.V. (2007). Apples and Oranges in the Flat World: A Layperson's Guide to International Comparisons of Postsecondary Education. Washington, D.C.: American Council on Education.

Williams, A., and Swail, W.S. (2005). Is more better? The impact of postsecondary education on the economic and social well-being of American society. Washington, D.C.: Educational Policy Institute, Inc.

APPENDIX A

ENI Factor Categories and Associated Indicators
Education Factor (30% of ENI)
Percent of 18-64 Year Olds with a High School Diploma (2000) [U.S. Census, 2000]
Percent of 25-64 Year Olds with an Associates Degree (2000) [U.S. Census, 2000]
Percent of 25-64 Year Olds with a Bachelor's Degree or Higher (2000) [U.S. Census, 2000]
Difference in College Attainment Between Young (25-35) and Older (45-64) [U.S. Census, 2000]
Economic Factor (30% of ENI)
Unemployment Rate (2003) [Bureau of Labor Statistics, County Data, 2004]
Percent of Population Under 65 in Poverty (2000) [U.S. Census, 2000]
Median Family Income (2000) [U.S. Census, 2000]
Per Capita Income (2000) [U.S. Census, 2000]
Percent Manufacturing Employment (2000) [Bureau of Labor Statistics, County Data, 2000]
Market Demand Factor (30% of ENI)
Rate of Population Growth 64 and Under (1990 to 2000) [U.S. Census, 1990 & 2000]
Projected Percent Change in 64 and Under Population 2000 to 2020 [Woods & Poole Economic Dataset, 2004]
Percent of Population Ages 0 to 19 (2000) [U.S. Census, 2000]
Percent of Population Ages 20 to 44 (2000) [U.S. Census, 2000]
Percent At-Risk Minority -- Afric. Amer., Hisp./Lat., Nat. Amer. (2000) [U.S. Census, 2000]
Population Adjustment Factor (10% of ENI)
Percent of State Population Ages 0 to 44 (2000) [U.S. Census, 2000]