PWR^3: *A New Economic Development Tool evaluating Production, Wholesale, Residential, Recreational and Retail*

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1. Introduction

PWR^3 is an analytical tool designed to help economic development community planning. The tool can be employed to aid local communities in crafting growth strategies that reflect the realities of the regional environments in which they operate. PWR^3 is an acronym representing the five economic activities: *Production, Wholesale, Retail, Residential and Recreation*.

- *Production* reflects the presence of wealth-generating, private-sector employment opportunities for goods and services which can be exported out of the region.
- *Wholesale* reflects the myriad warehousing, wholesale, transportation, distribution and logistics-related activities involving goods moving through or stored in the region.
- *Retail* reflects employment based upon the purchase of locally based goods and services.
- *Residenti*al measures the attractiveness of the region to new households
- *Recreation* includes public and private, natural and human-made recreational amenities which would provide incentives to the relocation of households.

PWR^3 lets policy makers better understand the roles that community assets and limitation play in forging a place within the regional economy. It would also enable communities to determine which of the PWR^3 elements they possess strength and how to leverage those strengths to increase regional wealth.

2. Data and Methodology

This study links various aforementioned economic disciplines viz. Production, Wholesale, Residential, Recreational and Retail and the data for those are gathered from various sources. We have used available public data sets and categorized them into 5 different economic disciplines. There are several variables that influence various calculation performed to arrive at the PWR[3] aggregate score for 92 counties in Indiana and the data variables were acquired from any of the following sources: IMPLAN, American Community Survey, Bureau of Economic Analysis and United States Census Bureau.

Production:

The interactive complementarity and coupling effects between localized growth factors and the strategic needs of trans-local actors propels regional development. It is these interactive effects that contribute to regional development (Coe et al. 2004) In Russia, as across Central and Eastern Europe, privatization and the establishment of new private firms have been viewed as key factors in labor market adjustment during the transition period (Gimpelson and Lippoldt 1999). Private sector firms appear to have relatively flexible employment patterns, utilizing more fixed-term or part-time employment than other types of firms and experiencing greater labor turnover.

Under Production category, two variables are used: Exportable Supply and Exportable Demand. Refer to Appendix A for the sectors that constitute production pull factor. The data for these variables were obtained from 2010 IMPLAN. Other variables include 2010 and 2011 population.

- The Production Supply pull factor is obtained by finding the ratio of Exportable Supply to 2010 Population of each county to the ratio of Exportable Supply to 2010 Population of the United States
- The Production Demand pull factor is obtained by finding the ratio of Exportable Demand to 2010 Population of each county to the ratio of Exportable Demand to 2010 Population of the United States

Wholesale:

Public transportation services are very imperative in the development of a community. The historic and most common view of the role of transportation in the development process is a prerequisite for economic growth. They provide mobility, can shape land use and development patterns, generate jobs and enable economic growth (Weisbrod and Reno 2009).

Freight transportation system enables customers to enjoy the availability of goods which are not produced in their locale. Truck transportation is an engine of local economic growth as well as a lifeline to the national economy. A significant importance of trucking has been the ability to door-to-door service. It usually includes pickup of the cargo at shipper's place of business to the consignee's place of business.

The variables that are used under Wholesale category are: 2011 Wholesale Personal Income, 2011 Wholesale Personal Income per Capita, Total establishments: Wholesale Trade, Total establishments: Wholesale Trade per Capita, 2011 Truck Transportation Personal Income and its per Capita.

- 2011 Wholesale Personal Income and Total Establishment: Wholesale Trade are obtained directly from BEA
- 2011 Wholesale Personal Income per Capita is calculated by dividing 2011 Wholesale Personal Income by 2011 Population and multiplying it by 1000
- Total Establishment: Wholesale Trade per Capita is obtained by dividing Total Establishment: Wholesale Trade by 2011 Population
- 2011 Truck Transportation Personal Income per Capita is calculated by dividing 2011 Truck Transportation Personal Income by 2011 Population

Retail:

Recent theories of economic growth view local externalities, as opposed to scale economies, as the primary engine in generating growth in cities. While scale economies operate at the plant level, externalities operate at the firm level, primarily through entrepreneurial activity (Armington 2004). It was found that higher rates of entrepreneurial activity were strongly associated with faster growth of local economies.

   Opening new business will have a positive effect on the economy. Retail, especially, is helpful in aiding local economies and providing jobs in that area. Opening a new store doesn't just employ new people directly but it also creates job elsewhere viz. manufacturing unit, warehouses etc. The revenue from opening just one store will trickle on to many levels, supporting a vast number of people all over.

   Under Retail category, the variables used are: Retail Supply Pull factor (Non-exportable Supply per Capita), Retail Demand Pull Factor (Non-exportable Demand per Capita), Total Establishments: Retail Trade and its per capita. Refer to Appendix B for the list of sectors chosen to constitute retail pull factors.

- Retail Supply Pull factor (Non-exportable Supply per Capita) is calculated by finding the ratio of Retail Non-exportable Supply to 2010 population of each county to the ratio of Retail Non-exportable Supply to 2010 population of the United States
- Retail Demand Pull factor (Non-exportable Demand per Capita) is calculated by finding the ratio of Retail Non-exportable Demand to 2010 population of each county to the ratio of Retail Non-exportable Demand to 2010 population of the United States
- Total Establishments: Retail Trade per capita is obtained by dividing Total Establishments: Retail Trade by 2011 Population

Residential:

Martin and Zurcher (2008) argue that the decision to relocate to another country can be grouped loosely into two categories, economic and non-economic. However, for the purpose of analysis, the factors which actually propel a migrant to make that final move might best be divided into three categories: Demand-pull, Supply-push, networks/other.

Lowell and Findlay (2001) purport not only has the demand for skilled labor in developed countries increased, but pull factors such as "better wages and employment conditions, better

information, recruitment and cheaper transportation," encourage skilled migrants to seek jobs and opportunities
in developed countries.

Residential category variables are: Housing Density (units per square mile), Median House Value, 2001-2011 Population Growth and Metro Dummy.

- Population growth is calculated between years 2001 and 2011
- Metro Dummy is a variable that takes binary value. 1 for metro and 0 otherwise

Recreational:

Over a period of time, many countries have transitioned to industrialized nations and thereby increasing the demand for recreation and entertainment activities. Wolf (1999) notes that the US entertainment industry as the largest target of household spending with 5.4% ahead of health care with 5.2%.

BLS says that on an average, an American family spends about $2,698(4.01%) of their income on Entertainment. According to the 2010 Consumer Expenditure Survey from the Bureau of Labor Statistics, consumers who earned less than $50,000 spent less than $2,000 on entertainment. Americans who earned $100,000 or more spent an average of $5,500 on different types of entertainment, and those with annual incomes of more than $150,000 averaged $7,032.

As America becomes more urban the resources that rural area offers like open space natural amenities and small town values become more valuable (Deller et al. 2001). For the rural parts of America that are growing most rapidly the cause does not appear to come from traditional resource extractive industries and manufacturing. Rather, analyses by Nord and Cromartie and Beale and Johnson, among others, suggest that natural amenities and other non-market attributes that contribute to overall quality of life may be the driving factors.

The variables that are used in Recreation category are Total Establishments: Arts, Entertainment and Recreation and its per Capita, Index of Changeable Amenities, Index of Relatively Static Amenities, 2010 Percentage of Total Population under 30 years and 2010 Percentage of 25yr & Older Population that have a Bachelor Degree or Higher (Outdoor Recreation Participation report. 2012).

- Total Establishments: Arts, Entertainment and Recreation per Capita is obtained by dividing Total Establishments: Arts, Entertainment and Recreation by 2011 Population.

3. Rankings

PWR[3] Aggregate Score:

PWR[3] Aggregate score is calculated for each of the five economic disciplines. They are calculated by finding the geometric mean of the variables considered in each category. The geometric mean is calculated as:

$$\left(\prod_{i=1}^{n} x_i \right)^{1/n} = \sqrt[n]{x_1 x_2 \ldots x_n}$$

The use of the geometric mean in this setting is that it treats as each element equally in the ranking, so it isolates the assumptions of weighting variables to this single calculation.

PWR³ Ranking:

PWR³ Ranking is given to each county in Indiana based on the PWR³ Aggregate Score among all the five economic activities. The rank ranges from 1 through 5 (1 being the highest and 5 being the lowest).

4. Summary

The PWR³ rankings provide an analytical tool which should assist in economic development community planning. It may be used to support local communities in crafting growth strategies that reflect the realities of the regional environments in which they operate. PWR³ is an acronym representing the five economic activities: *Production, Wholesale, Retail, Residential and Recreation.*

5. References:

A Study of Retail Trade in Cities across Kansas. An Annual Report of Trade Pull factors and Trade Area Captures. Kansas Department of Revenue. Dec., http://www.ksrevenue.org/pdf/citypullfactorfy12.pdf

Zoltan, A., C. Armington. 2010. *Employment Growth and Entrepreneurial Activity in Cities.* Regional studies 38(8): 911-927.

Coe, N.M., M. Hess, H. Yeung, P. Dicken and J. Henderson. 2004. *Globalizing' regional development: a global production networks perspective.* Transactions of the Institute of British Geographers 29(4): 468 – 484.

Deller, S., T.Tsai, D.W. Marcouiller and D.B.K. English. *The Role of Amenities and Quality of Life in Rural Economic Growth.* American Agricultural Economic Association 83: 352-365.

Economic Development - Texas in Focus: South Texas. Texas Comptroller of Public Accounts. http://www.window.state.tx.us/specialrpt/tif/southtexas/development.html

Gimpelson, V. and D. Lippoldt. 1999. *Private sector employment in Russia: Scale, composition and performance.* Economics of Transition 7(2): 505-533.

Harris, T.R. 1985 *Commercial Sector Development in Rural Communities: Trade Area Analysis*. Western Rural Development Center, Oregon State University. https://wrdc.usu.edu/files/publications /publication/pub__6479779.pdf

Lowell, B. L. and A. Findlay (2001). *Migration of Highly Skilled Persons from Developing Countries: Impact and Policy Responses*. International Labor Office, Geneva, Dec., 3-4

Martin, P., and G. Zurcher. 2008. *Managing Migration: The Global Challenge*. Population Bureau, Mar., 4-5

Outdoor Recreation Economy. 2012. Outdoor Industry Association. http://outdoorindustry.org/pdf /OIA_OutdoorRecEconomyReport2012.pdf

Outdoor Recreation Participation Report. 2013. Outdoor Foundation: 10-11. http://www.outdoorfoundation.org/pdf/ResearchParticipation2013.pdf

Parkins, N. Push and Pull Factors of Migration. *Push and Pull Factors of Migration* 8: 6. http://arpejournal.com/ARPEvolume8number2/Parkins.pdf

Sasaki, K. and T. Tomioka., 2002. *Economic evaluation of urban amenities including the effects on migration*. European Regional Science Association. http://www-sre.wu-wien.ac.at/ersa/ersaconfs/ersa02/cd-rom/papers/131.pdf

Weisbrod, G. and Reno, A. 2009. *Economic Impact of Public Transportation Investment*. http://www.apta.com/resources/reportsandpublications/Documents/economic_impact_of_public_ transportation_investment.pdf

Wolf, M. J. (1999). *The Entertainment Economy: How Mega-Media Forces Are Transforming Our Lives.* New York: Times Books.

Yu, Li., and G. M. Artz. 2009. *Migration and rural entrepreneurship*. Iowa State University. July.

Appendix A: List of Industries constituting "Production" category

NAICS	Industry/Commodity
211	Oil & gas extraction
212	Mining
213	Mining services
221	Utilities
230	Construction
311	Food products
312	Beverage & Tobacco
313	Textile Mills
314	Textile Products
316	Leather & Allied
321	Wood Products
322	Paper Manufacturing
323	Printing & Related
324	Petroleum & coal prod
325	Chemical Manufacturing
326	Plastics & rubber prod
327	Nonmetal mineral prod
331	Primary metal mfg
332	Fabricated metal prod
333	Machinery Mfg
334	Computer & oth electron
335	Electrical eqpt & appliances
336	Transportation eqpmt
337	Furniture & related prod
339	Miscellaneous mfg
481	Air transportation
482	Rail Transportation
512	Motion picture & sound recording
515	Broadcasting
517	Telecommunications
518	Internet & data process svcs
519	Other information services
521	Monetary authorities
522	Credit intermediation & related
523	Securities & other financial
524	Insurance carriers & related
525	Funds- trusts & other finan
541	Professional- scientific & tech svcs
611	Educational svcs

Appendix B: List of Industries constituting "Retail" category

NAICS	Industry/Commodity		NAICS	Industry/Commodity
111	Crop Farming		712	Performing arts & spectator sports
112	Livestock		712	Museums & similar
113	Forestry & Logging		713	Amusement- gambling & recreation
114	Fishing- Hunting & Trapping		721	Accomodations
115	Ag & Forestry Svcs		722	Food svcs & drinking places
42	Wholesale Trade		811	Repair & maintenance
441	Motor veh & parts dealers		812	Personal & laundry svcs
442	Furniture & home furnishings		813	Religious- grantmaking- & similar orgs
443	Electronics & appliances stores			
444	Bldg materials & garden dealers			
445	food & beverage stores			
446	Health & personal care stores			
447	Gasoline stations			
448	Clothing & accessories stores			
451	Sports- hobby- book & music stores			
452	General merch stores			
453	Misc retailers			
454	Non-store retailers			
483	Water transportation			
484	Truck transportation			
485	Transit & ground passengers			
486	Pipeline transportation			
487	Sightseeing transportation			
492	Couriers & messengers			
493	Warehousing & storage			
511	Publishing industries			
516	Internet publishing and broadcasting			
531	Real estate			
532	Rental & leasing svcs			
533	Lessor of nonfinance intang assets			
551	Management of companies			
561	Admin support svcs			
562	Waste mgmt & remediation svcs			
621	Ambulatory health care			
622	Hospitals			
623	Nursing & residential care			
624	Social assistance			
712	Performing arts & spectator sports			