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**Papers in Applied Geography**

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# PAPERS IN APPLIED GEOGRAPHY

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## TABLE OF CONTENT

<b>2013 APPLIED GEOGRAPHY CONFERENCES Board of Directors</b> .....	vi
<b>Preliminary Analysis of the Synoptic-Scale Environment Associated with Tropical Cyclone Tornado Clusters, 1995-2010</b> Todd W. Moore and Richard W. Dixon .....	1
<b>Communicating Kansas Climate and Climate Change: Initial Development of a Web-Based Resource</b> Ram Raghavan and John Harrington, Jr. ....	11
<b>Marketing American Microbrews: Promoting Neolocalism One Map at a Time</b> Matthew T. Pattern and Adam J. Mathews .....	17
<b>Stream Restoration and Hydrochory: Seed Pool Variation in Restored and Degraded Reaches of the Kissimmee River, Florida</b> Scott H. Markwith .....	27
<b>A Geo-Temporal Analysis of the Conservation Reserve Program: Net vs. Gross Change, 1986-2013</b> Chris Laingen .....	37
<b>The Impacts of Natural Revegetation of Abandoned Mine Land on Changing Land Use Patterns in Southeast Kansas</b> Catherine A. Hooey and Timothy J. Bailey .....	47
<b>Considering the Heritage of Place in Consultation with Indigenous Peoples</b> Roxanne T. Ornelas .....	55
<b>Hazard Characterization of Induced Seismicity in Eastern Ohio: A Scenario Analysis Using Hazus-MH</b> James Lein .....	64
<b>Lidar-Based Detection of Shrubland and Forest Land Cover to Improve Identification of Golden-Cheeked Warbler Habitat</b> Jennifer L. R. Jensen, Sandra Irvin, and Adam Duarte .....	74
<b>Forest Changes on Pikes Peak, Colorado as Interpreted through Repeat Photography</b> Steve Jennings .....	83
<b>Historical Channel Change of Vermillion Creek, Kansas, USA between 1937 and 2013</b> Rhett L. Mohler .....	92
<b>Validation of the Everglades Depth Estimation Network (EDEN) Water-Surface Model</b> Zhixiao Xie, Zhangwei Liu, and Yingru Li .....	98

<b>Remote Sensing of Evapotranspiration in Florida Using Dry Pixel Calibration</b>	
Aaron Evans .....	107
<b>Mapping Geographic Literacy in Texas</b>	
Jeff Lash .....	117
<b>The Economic Importance of Hunting in Southwestern Montana</b>	
Ryan D. Bergstrom, Shannon V. Taylor, and Katherine J. Hansen .....	127
<b>A Contingent Valuation of Tampa’s Urban Forest</b>	
Alec Foster and Graham A. Tobin .....	137
<b>Applications of Gravity Modeling to Evaluate Dine-In Restaurant Location and Competitiveness Using a Representative Sample, Jefferson County, Kentucky</b>	
Joel P. Dock and Wei Song .....	146
<b>Influence of Long- and Short-Term Climatic Changes on Chernozem Soils: Central Chernozem Region of Russia</b>	
Yury G. Chendev, Anthony R. Lupo, Aleksandr N. Petin, and Maria G. Lebedeva .....	156
<b>The Sunshine State, GDP, and the DMSP-OLS: Time Series Trend Case Study</b>	
Dolores Jane Forbes .....	165
<b>Chinese FDI in the US: A State Level Analysis of the Geography of FDI and FDI Per Capita</b>	
Jeremy Bennett and Jay D. Gatrell .....	174
<b>The Implementation of GIS in Secondary Education in the State of Maryland</b>	
Heather Holst and Paporn Thebpanya .....	183
<b>Opportunities for Integrating Geospatial Technology across University Environmental Science Courses</b>	
Emariana Taylor, Chris Blackwood and Patrick Lorch .....	192
<b>Investigating Aquatic Invasive Species Propagation within the Adirondack Region of New York: A Lake and Landscape Approach</b>	
Richard R. Shaker and Charles J. Rapp .....	200
<b>Localism and American Broadcasting in the Age of Satellite Television</b>	
Jonathan C. Comer and Thomas A. Wikle .....	210
<b>Deriving Measures and Profiles of Wetland Features from LIDAR LAS Datasets</b>	
Janet Gritzner and Bruce V. Millett .....	220
<b>Spatial Statistical Characterization of Differences between Major Respiratory Diseases across Central Appalachia</b>	
Timothy S. Hare, Chad Wells, Barbara J. Pridemore, Porsha Smith, and Nicole Johnson .....	228
<b>Pre-Service Teacher Preparation in Illinois: A Case Study</b>	
Gillian Acheson .....	237

<b>Prototype Global Coding Political Geographies for Library and Data Management – Wikipedia Example</b>	
Thomas J. Christoffel .....	246
<b>The Price is Right? Food Availability and Affordability in Oklahoma City, OK, USA</b>	
Stacey R. Brown .....	256
<b>The Learning Cluster Model (LCM) as A Means of Extending the Capabilities of An Online Professional Development System in Geography</b>	
Carmen P. Brysch and Richard G. Boehm .....	264
<b>Can You Really Walk There from Here? A Case Study of Walkability at Mockingbird Station in Dallas, Texas</b>	
Owen Wilson-Chavez and Murray D. Rice .....	271
<b>Retail Change and Light Rail: An Exploration of Business Location Changes Accompanying Commuter Rail Development in Denton, Texas</b>	
Trevor Yarbrough and Murray D. Rice .....	281
<b>Estimating Tree Canopy Foliar Volume Using Terrestrial LiDAR</b>	
Clint Harper, Nate Currit, and Jennifer Jensen .....	290
<b>The Edwards Aquifer and Changes in the San Antonio, Texas Water Supply, 1993-2013</b>	
Richard A. Earl, David A. Parr, and Eddi Wilcut .....	299
<b>Maps and Locals: Using Landsat Image Analysis to Document Eastern Red Cedar Expansion in the Northern Flint Hills</b>	
Bryanna Pockrandt, John Harrington, Jr., and Shawn Hutchinson .....	309
<b>The Relationship between Land Cover and Temperature in the Auburn – Opelika, Alabama Urban Area</b>	
Andrew W. Hug, Chandana Mitra, Yingru Li, Luke J. Marzen .....	316
<b>Influence of Surface Land Cover on the Urban Heat Island Intensity within Metropolitan Jefferson County, Kentucky</b>	
Jeremy Sandifer .....	323
<b>Comparative Analysis of Attitudes Towards Water Management Decision-Making in Western North Carolina</b>	
Christopher A. Badurek, Robin Hale, and Kristan Cockerill .....	332
<b>Data Fusion of LiDAR and Optical Imagery for Coastal Vegetation Mapping in South Florida Using an Object-Oriented Approach</b>	
Georgia H. De Stoppelaire .....	339
<b>Analysis of Ground-Level Ozone in Granite City, Illinois</b>	
Mark L. Hildebrandt and Alex McBride .....	348
<b>Precipitation Variability Trends in Texas, 1932 – 2011</b>	
Rebecca K. Parylak and Richard W. Dixon .....	358
<b>Business Clustering in Knowledge-Based Industries in the Austin-Round Rock, Texas, Metropolitan Statistical Area</b>	
Eric Clennon, R. Denise Blanchard, and T. Edwin Chow .....	367

<b>Sultry in Charm City: Shifting Probabilities of Hot Days in Baltimore – 1899 to 2012</b>	
Kent Barnes .....	377
<b>Area Disparities of Obesity, Non-Fresh Food Outlets, and Fitness Centers</b>	
Jay Lee, Mohammad Al Nasralla, Everett Logue, and Heather Beard .....	385
<b>A Demonstration of ArcGIS Network Analyst for Criterion-Based Bicycle Route Selection on Existing Road Networkd</b>	
Kathleen D. Seal .....	396
<b>Demographic Changes and Gentrification in Washington, D.C. between 2000 and 2010</b>	
Cinthia Joseette Arévalo, Bálint Petó, Agustina Suaya and Michael M. Mann .....	406
<b>Taste Paradise: Tropical North Queensland as a Gastronomic Tourism Destination</b>	
Deborah Che, Rose Wright, and Robyn Rae .....	415
<b>Coping with Meniere’s Disease: Identification of Places with Fewest Weather Changes</b>	
Kent M. McGregor .....	423
<b>The Impacts of School District Spending: Exploring the Connection between School District Expenditures and Graduation Rates in Virginia</b>	
Amber Boykin, Michael Gaskins, Sarah Jackson, Christine McDonnell, Michael L. Mann .....	432
<b>Area Health Disparities Based on Death Certificates: A Case Study of Census Tracts in Summit County, Ohio</b>	
Gordon A. Cromley, Mohammad Al Nasrallah, Jay Lee, and Heather Beard .....	441
<b>GIS Analysis of Power Plant Carbon Dioxide Emission Inventory Databases in the Continental US</b>	
Maya G. Hutchins and Christopher A. Badurek .....	451
<b>Urban Expansion and Environmental Parameters – A Case Study of Huntsville, Alabama</b>	
Mahjabin Rahman, Chandana Mitra, Luke J. Marzen, and Yingru Li .....	458
<b>Chinatown, Ethnoburb, or Invisiburb? Settlement Patterns of Chinese Migrants to Texas</b>	
Melissa E. Holmes and Sarah A. Blue .....	467
<b>Analysis of Impacts of Removing the Fort Loudoun Dam on Upstream Residential Property Values in Tennessee</b>	
Jeffrey C. French and Christopher A. Badurek .....	478
<b>Examining the Impact of Spatial Measures on Residential Property Prices in the Toronto Region</b>	
Maurice Yeates, Tony Hernandez, and Paul Du .....	485
<b>A GIScience Approach to Urgent Care Facility Site Selection in Nebraska</b>	
Paul Burger, Brett Chloupek, and H. Jason Combs .....	495
<b>Measuring Temporal Displacement of Non-Violent Crime</b>	
Vijayaprabha Rajendran and Falguni Mukherjee .....	505
<b>Author Index .....</b>	<b>514</b>

**LIST OF REVIEWERS** ..... 516

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# RETAIL CHANGE AND LIGHT RAIL: AN EXPLORATION OF BUSINESS LOCATION CHANGES ACCOMPANYING COMMUTER RAIL DEVELOPMENT IN DENTON, TEXAS

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## 1. INTRODUCTION

The American urban landscape is rapidly changing in response to technological and economic evolution. High automobile usage for commuting in particular has had many contentious effects, including highway congestion, elevated environmental pollution, and urban sprawl. Planners in many cities are looking to commuter rail to mitigate these impacts and, in effect, create more dense and sustainable urban environments. However, research on the impacts of commuter rail development on urban form is still needed.

One aspect of the varied impacts of commuter rail development which is in need of further research relates to business location and development. Construction of new rail lines and stations in an existing urban environment is an important development with sizable impacts. Previous investigation has examined such impacts in regards to commuting (Hsu and Guo, 2006), public and environmental health (Topalovic *et al.*, 2012), land values (Armstrong, 1994; McMillen and McDonald, 2004; Leonard, 2007), and changes in transportation usage (Cottrell 2006). However, little research has been done with regard to the meaning of light rail development for the location of business, especially the retail and service-oriented businesses that might be expected to be drawn to high-traffic areas such as rail stations. The effects of rail development on existing businesses, and the ability of such development to draw new business to an area, deserve further attention.

This paper analyzes the relationship between commuter rail and retail development, with a specific focus on the following central question: what is the impact of the introduction of new commuter rail stations on nearby retail environments? Research that addresses this focal issue can provide private- and public-sector decision-makers with important information of use in assessing future rail development impacts.

This study examines the business impacts associated with the A-Train commuter rail development in Denton County, Texas. The A-Train line is a 21-mile light rail corridor connecting the suburban city of Denton with the light rail system of Dallas. This study specifically focuses on impacts related to the A-Train terminal opening in the center of Denton, addressing the changing location and composition of the business community situated around the terminal and the nearby courthouse square, which is the historical central business district for the City of Denton. While this is an exploratory study, and more work is planned to examine the location dynamics of more stations and business types along Denton County's A-Train line, the findings presented here can be of value in providing some initial guidance for economic development officials, corporate decision-makers, and business geography researchers alike.

## 2. BACKGROUND

Since the mid-1940s, the urban morphology of cities in America has changed dramatically. A combination of lower transportation costs, massive infrastructure investments, and rising incomes encouraged suburbanization (Neechyba and Walsh, 2004). While before World War 2 central business districts (CBDs) in American cities had the highest population

densities in each metropolitan region, over the last 60 years the densities of most American urban areas have become much lower at the center (Baum-Snow, 2007).

One major problem associated with this change is the congestion that resulted from longer and more pervasive commuting behaviors (Medda *et al.*, 2003). While congestion may appear to be the issue of greatest concern from a planning standpoint, geographers recognize that increased traffic congestion leads to a complex matrix of impacts, including elevated levels of pollution, stress on commuters, and an overall negative impact on metropolitan standards of living (Cervero and Duncan, 2002).

Since traffic levels have increased in the U.S. throughout most of the last half-century, many urban planners are attempting to encourage a slowing of the growth of urban sprawl. A primary public policy initiative focuses on transit-oriented development through commuter rail construction (Cervero and Duncan, 2002). Research has shown that a negative correlation exists between residential density and automobile use in urban areas (Kitamura *et al.*, 1997). As a result, development that exists near commuter rail stations appears to be more clustered, as more residents want to take advantage of the nearby transportation option. Specifically, many medium sized cities have begun implementing agendas for rail development, making it easier for their citizens to commute to neighboring places (Sakano and Benjamin, 2011). Some cities with bus transit systems are also integrating rail stations and bus stations in one location to promote transit-oriented development and to relieve congestion (Chew, 1999).

Another complementary initiative is the implementation of New Urban design. New Urban designs plan neighborhoods that include mixed-use residential, retail, and office functions in a relatively compact area, resulting in more intensive land use that works to counter the overall contemporary trend toward urban sprawl (Boarnet and Sarmiento, 1998). New Urbanism partners well with commuter rail in promoting a more dense community. In contrast to areas of the city that feature more sprawl, one would expect to find more retail clustering in locations with denser land use (Cervero, 2003).

Implementation of commuter rail is of particular interest to retailers because it enhances the accessibility of areas in close proximity to stations and creates prime conditions for retail clustering. Rail stations often function as nodes of transportation since they are places where people transition from one transportation method to another (Debrezion *et al.*, 2007). Since many people encounter these areas in a day as they travel and since generally these locations include multiple modes of transportation, they are highly accessible. The effects of accessibility are what make the area surrounding stations potentially valuable. A neighborhood's value is reflected in its use, thus land with higher value will typically feature multifamily housing, upscale one family housing, or retail. These features promote increased density within the neighborhood and clustering of various types of activity (Debrezion *et al.* 2007).

Retail firms are attracted to increased accessibility, such as is provided by commuter rail development, since heightened access presents businesses with an opportunity to serve a larger market. The retail industry responds to perceived consumer demand by building stores in locations that are accessible to desired markets. Rail is one transport mode of several to consider in the connection of retail to accessibility. Commercial properties that are integrated with rail stations positively affect area market performance, experience lower vacancy rates, and are leased much faster than the surrounding commercial property (Cervero, 2003). This relationship between real estate and rail is, however, contingent upon market density, as local, small-scale retailers require higher customer densities to survive (Turner, 2007). Strategic location relative to automotive, train, walking, and other forms of transportation are essential in building the connection between markets and businesses.

Central Place Theory plays a part as well in explaining the organization of economic activity in space, especially with regard to market access. For a retail location to be successful and capture a given market, it must access the minimum market area, be in location where consumer demands able to be met, and benefit from economies of scale. Research in geography has established a strong relationship between the overall predictions of Central Place Theory and actual retail spatial structure (Bartlett, 2002).

Lastly, retail located near commuter rail can benefit from economies of scale and agglomeration. In particular, businesses offering differentiated products or unique experiences (such as restaurants or bars) benefit from agglomeration since they are less concerned with price competition among rivals. When businesses are clustered, they may benefit by having heightened access to market information. They also gain attraction and consideration from potential customers by being located near competition. In this way, the retail attraction to commuter rail stations is created by both accessibility to transportation options as well as accessibility to nearby retail alternatives: an agglomeration effect (Picone *et al.*, 2009).

In the local context of Denton, the present study's case study venue, the Denton Economic Development Partnership's *Downtown Master Plan* outlines the vision the city has planned for future development of the downtown area as the city continues to grow. Their plan is to promote mixed-use development and increase transit usage, in hopes that the downtown area will attain the structure of a dense core relative to the surrounding areas and exhibit a larger degree of retail clustering (Denton Economic Development, 2013). Thus, the introduction of New Urban planning ideals and pedestrian traffic magnets such as commuter rail station development appears to be a good fit for the area. But specific evidence relating to the actual impacts of commuter rail development on business is still lacking, and is needed.

Thus, the overall literature suggests that the inclusion of commuter rail into a community such as Denton should result in the emergence of new clusters of retail and services businesses in locations near new transit stations. Due to the presence of differentiation among business types by market needs and characteristics, retail and service businesses should be expected to have different responses to changes in transportation infrastructure and accessibility, further suggesting that clustering should not be expected to occur uniformly among all retail types. In order to examine this hypothesis, the remainder of this study observes retail and services business changes in the downtown Denton area in the years before and after the opening of the A-Train commuter line and its associated downtown Denton transit terminal.

### 3. STUDY DESIGN

The business dataset used in this analysis comes from the Denton telephone book listings published by *Verizon Communications*, the dominant local telephone service provider. The study extracted business listings for 2004 (seven years prior to the A-Train line opening) and 2012 (one year after the A-Train opening). In both years, data were collected exclusively for businesses located in Denton's downtown business community (see Figure 1). Use of data for 2004 and 2012 provides a targeted perspective on business change, focused on the years around the opening of the A-Train line and the downtown Denton light rail terminal. Telephone book listings were used because they provide a readily-available historical record of businesses in Denton and area. While telephone books provide a good historical record of local businesses, this data source is not without potential issues. Most businesses have telephone listings, but not all necessarily do. This may be a particular issue with service-oriented businesses that do much or all of their business in person, and not over the telephone. Also, addresses listed in connection with telephone numbers may or may not be the actual service location of the business; for example, the address of a management office might be listed instead of an actual store location. However, the study takes the businesses with such issues to be a distinct minority. Given the study need for historical business information, use of telephone book data provides a reliable research foundation.

Telephone book data for 2004 and 2012, including business name and address, were manually entered into an Excel spreadsheet for seven business categories: restaurants, bars, specialty food retailers, furniture retail, automotive sales and services, clothing retail, and novelty stores.<sup>1</sup> These major categories were chosen in order to represent a cross-section of

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<sup>1</sup> The *specialty food* category includes businesses from the telephone Yellow Pages ice cream, frozen yogurt, coffee, and donut listings. The *bar* category includes bar, tavern, wine, and beer

businesses present in downtown Denton, but the aim of this initial study is not to be comprehensive. We expect that some of these categories (restaurants, bars) have grown as a result of rail development, while other services, such as automobile and furniture, have declined. After both datasets were complete, the addresses were geocoded using the *Navteq* street database that is part of the *Mapitude 2012* GIS.



FIGURE 1  
DOWNTOWN DENTON STUDY AREA

#### 4. RESULTS

A first task is to summarize overall trends in downtown Denton’s business change through the 2004-2012 period. Table 1 summarizes the overall business change results for selected, key retail and service sectors over the 2004-2012 study period. The net difference is displayed in the far-right column in the table. As anticipated, some business categories showed growth during the eight-year study period while others showed a marked decline. The table indicates that the restaurant and bar categories showed the most growth, with an increase of three businesses in each. The automobile category, on the other hand, saw the largest net decrease with a loss of seven businesses in the area.

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listings. Lastly, the *novelty* category includes yellow page business listings from the antiques, books, art, florist, and thrift shop categories.

TABLE 1  
SELECTED MAJOR RETAIL AND SERVICE BUSINESSES  
BY SECTOR, 2004 AND 2012

<b>Business Category</b>	<b>Number of Businesses, 2004</b>	<b>Number of Businesses, 2012</b>	<b>Net Change in Business Numbers, 2004-2012</b>
Restaurants	17	20	+3
Bars	4	7	+3
Specialty Food	5	6	+1
Novelty	10	11	+1
Furniture	4	2	-2
Clothing	3	0	-3
Automotive	17	11	-7

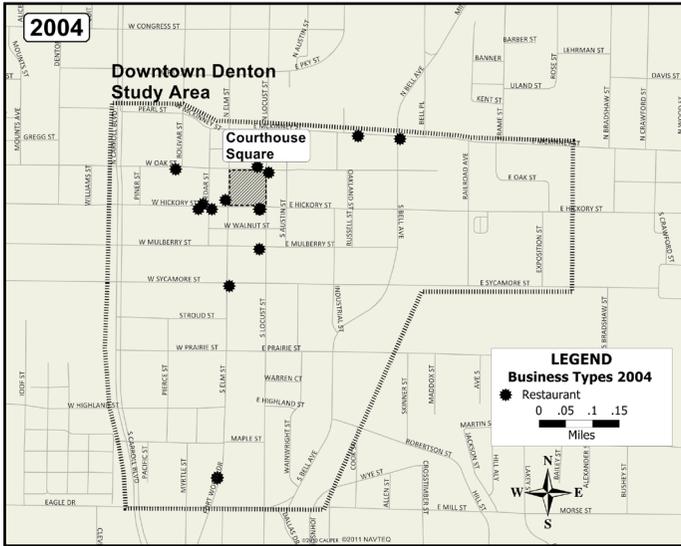
A second task is to map the distribution of business locations for 2004 and 2012. Figure 2 focuses on businesses in the *restaurant* sector, one of the two sectors at the top of business expansion from Table 1. Figure 2 is subdivided into two parts: Figure 2a depicts the location of restaurants in 2004, while Figure 2b shows restaurant locations in 2012. The overall 2004 pattern focuses on locations around the courthouse square, with little activity to the east of the square. The 2012 pattern exhibits some substantial change relative to 2004, as a restaurant corridor has become evident to the east of the square.

A third figure combines the maps of Figure 2 to provide a single summary of the spatial change in Denton's downtown restaurants. Figure 3 focuses on the block-by-block change in number of restaurants across the downtown study area. The figure demonstrates a clear pattern of change:

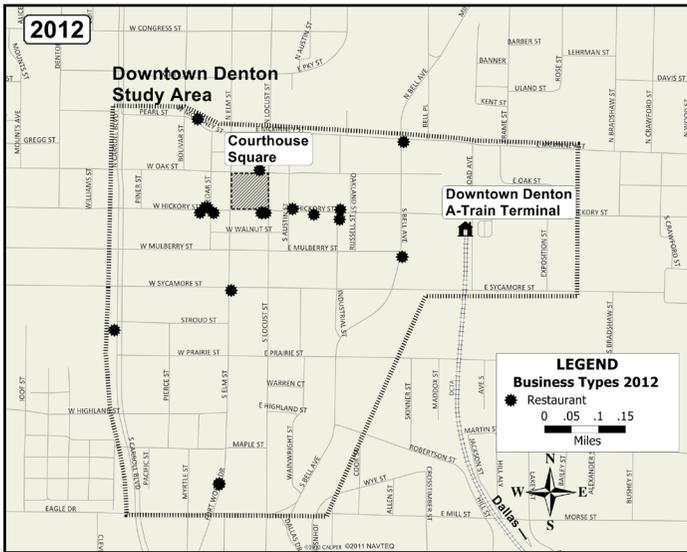
1. *A loss of restaurants* in several blocks in close proximity to the square
2. *A gain in restaurants* in several blocks immediately adjacent to East Hickory Street, the major city street that links the courthouse square area with the A-Train terminal.

Most other blocks in the downtown core experienced no change in number of restaurants.

A final figure provides some additional context for the restaurant results of Figure 3 by summarizing the spatial change in another service sector, Denton's *automotive sales and service* businesses (see Figure 4). Businesses in this sector include car dealerships (almost all in the area being small and featuring used vehicles), repair facilities, and vehicle parts and accessories retailers. Figure 4 illustrates the block-by-block patterns in automotive business gains and losses across the downtown core. This automobile business change map shows this business category left the immediate vicinity of the square between 2004 and 2012. Indeed, only two blocks in the entire downtown area experienced a gain in automotive businesses. Of those blocks that gained automotive businesses, each were located toward the edge of downtown, indicating a spatial reordering of businesses in the downtown area. It appears that the coming of increased restaurant activity was accompanied by the departure of automotive business in much of the East Hickory Street corridor that provides the most direct connection between the A-Train terminal and Denton's courthouse square district.



a. Restaurant Locations in 2004, Before the A-Train Line Construction



b. Restaurant Locations in 2012, After the A-Train Opening

**FIGURE 2**  
RESTAURANT LOCATIONS IN DOWNTOWN DENTON FOR 2004 AND 2012

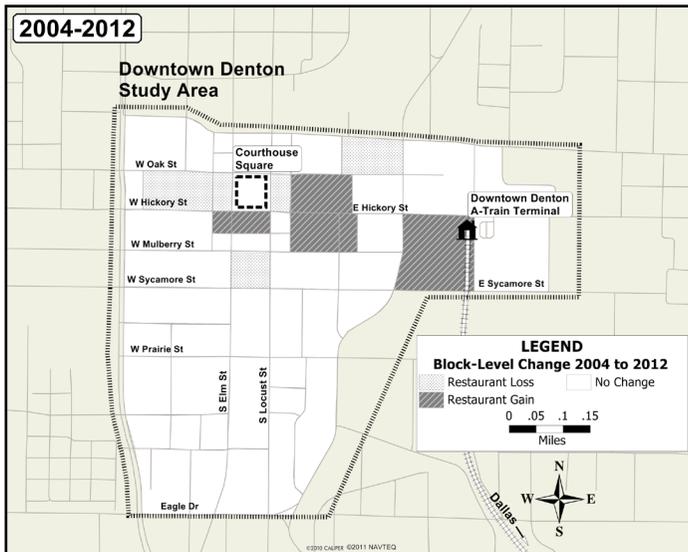


FIGURE 3  
RESTAURANT CHANGE IN DOWNTOWN DENTON, 2004-2012

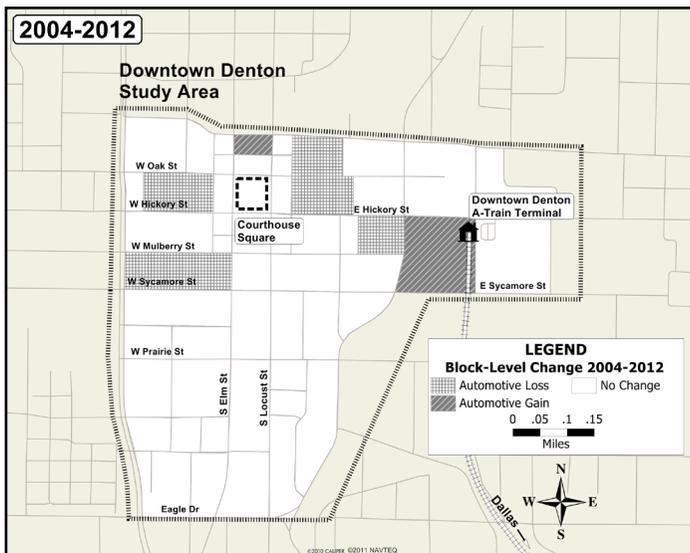


FIGURE 4  
AUTOMOTIVE RETAIL AND SERVICES CHANGE  
IN DOWNTOWN DENTON, 2004-2012

## 5. DISCUSSION, CONCLUSION, AND FUTURE RESEARCH

The study results indicate that the retail landscape of downtown Denton has undergone some important changes in composition between 2004 and 2012. Business growth

and shift has occurred unevenly, however, throughout the area and among the business sectors present in the downtown. Some business categories, such as restaurants and bars, have expanded in the downtown study area. Other business types, including the automobile, clothing, and furniture categories, have reduced their presence in the area. However, beyond these shifts by sector, it is also apparent that an accompanying spatial reordering has begun in the downtown. The study results indicate that the opening of the downtown Denton A-Train terminal has had a meaningful impact on business location in the area.

While the relationship between downtown retail and the introduction of the A-Train cannot be completely specified based on the evidence presented here, it appears there is some relationship between rail development and business change, especially with respect to businesses providing differentiated offerings. The restaurant and bar categories, which have seen the most growth, offer a wide range of fare and dining experiences. The products offered by these businesses are highly varied and might be summarized as entertainment or experiential retail. With the exception of novelty items, all other categories showing growth in the area could be classified as this type of retail. This supports the hypothesis from the literature that differentiated product offerings could be expected to benefit most from the opening of a nearby commuter rail station.

It must also be acknowledged that the attraction of nearby restaurant and entertainment retail can be related to the operation of agglomeration effects, another important theme in the literature (Picone *et al.*, 2009). It becomes difficult, therefore, to say whether new restaurant establishments have been driven by the *increased accessibility* provided by the commuter rail station, or whether other factors such as growing *agglomeration economies* are a more explanation. It is likely, however, that commuter rail is having an important impact (the emergence of a restaurant corridor along Hickory Street between the courthouse square and the rail terminal being a strong indication). We conclude that restaurants and bars have been attracted to the *increased pedestrian and vehicular traffic* generated by the rail terminal opening, and to a *growing local cluster of retail and services* in a circular and cumulative feedback process (cf. Myrdal, 1957; Pred, 1977).

The automobile, furniture, and clothing categories, on the other hand, have not fared as well in downtown Denton since the rail terminal opening. This relates to at least a couple of factors. First, the economic downturn of 2008-2012 has resulted in *broad business decline* across the country. Some component of any business decline observed in Denton could be related to broader economic conditions. Secondly, the new rail station, as argued previously, can be conceived as having a *differential impact* on a variety of business types. The opening of the A-Train station has altered the local real estate environment. Business types that do not benefit from increased, rail-related traffic thus experience an incentive through increased land costs to relocate, in turn opening up these properties for other businesses to relocate and convert rail-accessible locations into increased sales and profits. We would argue that both the restaurant and automotive shifts observed in this paper could be explained from this perspective.

There is a need for further research to follow up on selected questions and issues raised here. Future research is needed to focus on land values across the downtown Denton study area. This can provide more evidence to examine the differential impact ideas advanced above. Also, pursuit of similar business location and property value analysis in proximity to other A-Train stations, along the Denton-Dallas corridor, can provide more insight into the relationship between rail and retail. This is especially important, as each station exists within a different regional context, with some being located in high-density zones while others have been developed on greenfield sites. Provision of more evidence relating business change to rail development promises to provide public- and private-sector policy-makers with important insights that can drive better investment decisions.

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## AUTHOR INDEX

- A**  
 Acheson, G. .... 237  
 Al Nasralla, M. .... 385, 441
- B**  
 Badurek, C. A. .... 332, 451, 478  
 Bailey, T. .... 47  
 Barnes, K. .... 377  
 Beaird, H. .... 385, 441  
 Bennett, J. .... 174  
 Bergstrom, R. D. .... 127  
 Blackwood, C. .... 192  
 Blanchard, R. D. .... 367  
 Blue, S. A. .... 467  
 Boehm, R. G. .... 264  
 Boykin, A. .... 432  
 Brown, S. R. .... 256  
 Brysch, C. P. .... 264  
 Burger, P. .... 495
- C**  
 Che, D. .... 415  
 Chendev, Y. G. .... 156  
 Chloupek, B. .... 495  
 Christoffel, T. J. .... 246  
 Chow, T. E. .... 367  
 Ciarleglio, M. .... 146  
 Clennon, E. .... 367  
 Cockerill, K. .... 332  
 Combs, H. J. .... 495  
 Comer, J. .... 210  
 Cromley, G. A. .... 441  
 Currit, N. .... 290
- D**  
 De Stoppelaire, G. H. .... 339  
 Dixon, R. W. .... 1, 358  
 Dock, J. P. .... 146  
 Duarte, A. .... 74
- E**  
 Earl, R. A. .... 299  
 Evans, A. .... 107
- F**  
 Forbes, D. J. .... 165  
 Foster, A. .... 137
- French, J. C. .... 478
- G**  
 Gaskins, M. .... 432  
 Gattrell, J. D. .... 174  
 Gritzner, J. .... 220
- H**  
 Hale, R. .... 332  
 Hansen, K. J. .... 127  
 Hare, T. S. .... 228  
 Harper, C. .... 290  
 Harrington, J. Jr. .... 11, 309  
 Hildebrandt, M. L. .... 348  
 Holmes, M. E. .... 467  
 Holst, H. .... 183  
 Hooley, C. A. .... 47  
 Hug, A. W. .... 316  
 Hutchins, M. G. .... 451  
 Hutchinson, S. .... 309
- I**  
 Irvin, S. .... 74
- J**  
 Jackson, S. .... 432  
 Jennings, S. .... 83  
 Jensen, J. L. R. .... 74, 290  
 Johnson, N. .... 228  
 Arévalo, C. J. .... 406
- L**  
 Laingen, C. .... 37  
 Lash, J. .... 117  
 Lebedeva, M. G. .... 156  
 Lee, J. .... 385, 441  
 Lein, J. .... 64  
 Li, Y. .... 98, 458  
 Liu, Z. .... 98  
 Logue, E. .... 385, 441  
 Lorch, P. .... 192  
 Lupo, A. R. .... 156
- M**  
 Mann, M. M. .... 406, 432  
 Markwith, S. H. .... 27  
 Mathews, A. J. .... 17

Marzen, L. J. ....	316, 458	<b>X</b>	
McBride, A. ....	348		Xie, Z. .... 98
McDonnell, C. ....	432	<b>Y</b>	
McGregor, K. M. ....	423		Yarbrough, T. .... 281
Millett, B. V. ....	220		
Mitra, C. ....	316, 458		
Mohler, R. L. ....	92		
Moore, T. ....	1		
Mukherjee, F. ....	505		
<b>O</b>			
Ornelas, R. T. ....	55		
<b>P</b>			
Parr, D. A. ....	299		
Parylak, R. K. ....	358		
Pattern, M. T. ....	17		
Petin, A. N. ....	156		
Pető, B. ....	406		
Pockrandt, B. ....	309		
Pridemore, B. J. ....	228		
<b>R</b>			
Rae, R. ....	427		
Raghavan, R. K. ....	11		
Rahman, M. ....	470		
Rajendran, V. ....	517		
Rapp, C. J. ....	200		
Rice, M. D. ....	283, 293		
<b>S</b>			
Sandifer, J. ....	335		
Seal, K. D. ....	408		
Shaker, R. R. ....	200		
Smith, P. ....	228		
Song, W. ....	146		
Suaya, A. ....	418		
<b>T</b>			
Taylor, E. ....	192		
Taylor, S. V. ....	127		
Thebpanya, P. ....	183		
Tobin, G. A. ....	137		
<b>W</b>			
Wang, O. ....	146		
Wells, C. ....	228		
Wikle, T. A. ....	222		
Wilcut, E. ....	311		
Wilson-Chavez, O. ....	283		
Wright, R. ....	427		

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