Express Busways and Economic Development: Case Study of the Miami-Dade South Busway

Arthur C. Nelson (corresponding author)
Professor of Planning and Real Estate Development
School of Landscape Architecture and Planning
College of Architecture, Planning and Landscape Architecture
University of Arizona
1040 N. Olive Road
Tucson, AZ 85719
V: 520.621.4004

Keuntae Kim
Doctoral Student
Metropolitan Research Center
University of Utah

Dejan Eskic
GSBS Architects
Salt Lake City, Utah

Nilia M. Cartaya
Principal Planner
Miami-Dade Transit

Acknowledgements
Support for this article came from the National Institute of Transportation and Communities with numerous co-sponsors including Utah Transit Authority, Portland Metro, TriMet, Lane County Transit, City of Provo, Utah, and Transportation for America (a subsidiary of Smart Growth America). The authors acknowledges technical and editing assistance from Martin Buchert, Shima Hamidi, and Guang Tian. The contents of this article reflect the views of the author, who is solely responsible for the facts and the accuracy of the material and information presented herein.

August 2016

Express Busways and Economic Development: Case Study of the South Miami-Dade Busway

Abstract

Few studies report the association between economic development and such fixed-guideway modes of transit as light rail transit (LRT) and bus rapid transit (BRT) but none do so with respect to express bus service. While conceptually one may expect similar outcomes there is no evidence confirming or rejecting it. This article helps close the gap in literature. Using shift-share analysis applied to the South Miami-Dade express busway, we find that express busway stations are gaining share in metropolitan area jobs over time. To help control for route selection bias—that the express busway route is put where the jobs are likely to locate anyway—we apply shift-share analysis to a spatially-related, counter-factual set of locations. The express busway gains share of jobs with respect to this additional control as well. The article includes implications for transportation and land use planning.

Introduction

There is a considerable, growing literature on the association between numerous forms of fixed-guideway transit systems and economic development. Types of systems include heavy or fifth rail, light rail, streetcar, and bus rapid transit modes. We note a recent, exhaustive review of literature by Higgins and Kanaroglou (2015) pertaining to the contribution of rail transit to property values, which by implication includes economic development. Another recent work reports economic development outcomes to several types of fixed-guideway transit systems by the Institute for Transportation and Development Policy (2013). An earlier work by Belzer et al. (2011) assesses the change in jobs by economic sector for several types of fixed-guideway transit systems through the 2000s. None of those works address the role of express busways and economic development. We help close this gap in the literature.

Unfortunately, some key literature confused types of bus-related services. Notably, TCRP Report (Levinson et al., 2003) offers these examples of bus rapid transit in the U.S. that we contend are better defined as express bus service (Levinson et al., 2003: 36):

- HOV busway
- Freeway HOV lanes have express bus service and stations
- Busway along abandoned railroad line
- Express buses use contra-flow bus lanes on freeway
- Peak-period freeway bus lane busway with stations along unused railroad

The last example is of the South Miami-Dade Busway (see Figure 1). But are these really examples of BRT in current practice? Consider that in recent years, bus rapid transit has come to be characterized as comprising the following elements, adapting from work by Nikitas and Karlsson (2015: 2):

- **Unique buses** that contribute significantly to BRT's image and identity;
- **Stops, stations, terminals and corridors** that clearly define the BRT operating area;
- **Variety of rights-of-way** such as intersection signalization priority, dedicated lanes, and potentially separation from other surface street traffic;
- **Pre-board fare collection** that economizes on boarding time;
- **Information/communication technologies** to improve experience at platform and bus;
- **Substantial day time service** ideally >16 hours per day, peak frequencies <10 minutes;
- **Brand identity** that distinguishes BRT from all other forms of transit.

While many express bus services have the same features, there is an important difference. In our view, express bus services do not principally operate on surface streets. They instead operate substantially (though perhaps not exclusively) in freeway high-occupancy-vehicle lanes, abandoned railroads and other abandoned transportation routes, or other means not associated with regular streets. Put differently, where bus rapid transit operates substantially on surface streets, though ideally within dedicate travel lanes and synchronized intersections, express bus service operates substantially on entirely separate conveyances. There is a second distinction:

where BRT has evolved does not rely substantially on park-and-ride stations, and express bus service does.

Our distinctions may be subtle but they are important because, without clarity, attempts to measure such things as economic development outcomes may be compromised. In this particular context, we are interested in knowing whether express bus service per se may be associated with economic development. We explore this proposition in our paper. We use the South Miami-Dade Busway as our case study.

The South Miami-Dade Busway

The South Miami-Dade Busway, began in 1997, as an eight-mile, two-lane roadway designed for exclusive use by buses and emergency vehicles along a former railroad right-of-way running parallel about 100 feet from US 1 (Baltes, Perk, Perone and Thole, 2003).

The Busway is now a 20-mile, dedicated bus-only facility adjacent to US 1 that operates 24 hours each day, seven days each week over the entire year. Vehicular access to the Busway is currently limited to Miami-Dade Transit Buses and emergency vehicles. The Busway runs in a southwest to northeast orientation and lies within a right-of-way that is typically 100 feet in width. Currently, six local and limited-stop bus routes operate on the Busway. Within its right-of-way, the Busway contains the South Dade Greenway (Greenway). The Greenway is an at-grade, 10-foot wide, pedestrian/bicycle path that generally runs adjacent and parallel to the west side of the Busway.

Since the late 1980s, the State of Florida has required local governments to engage in comprehensive planning to achieve multiple objectives such as coordinating transportation and

land use planning to advance economic development (Arrant, 2012). Since then, Miami-Dade County has prepared and amended land use plans that explicitly target transit stations for mixed-use development and especially economic development (Miami-Dade Government, 2015).

For its part, two major efforts to stimulate economic development along the South Miami-Dade Busway include both its designation as a rapid transit corridor in the County's Comprehensive Development Master Plan (CDMP) as well as the designation of various urban centers along the Busway to encourage mixed-use compact development at key activity nodes.

Accordingly, the county's CDMP designates the existing Busway as a rapid transit corridor. It is the policy of the Board of County Commissioners, through the CDMP, that of establishing transit supportive land uses along the designated rapid transit corridors. The CDMP thus designates the area surrounding major rapid transit stations as urban centers and the corridors between stations as mixed-use corridors. The CDMP provides both policy and interpretative language that guide the planning and development of these urban centers and corridors. It provides for significantly higher densities and intensities and variety of land uses within these designated areas with the dual purpose of generating additional transit ridership and to establish pedestrian-friendly urban centers, which over time will serve as hubs of activities for the surrounding communities.

The seven urban centers designated by the CDMP along the Busway are: Downtown Kendall, Perrine, Cutler Ridge, Goulds, Princeton, Naranja and Leisure City. Since 1998, the county has conducted area plans (charrettes) for each of these urban centers. The purpose of the area plans was to develop a community vision of the CDMP policies. During these planning efforts, the communities aided in the design of transit-supportive, pedestrian-oriented

development that is compatible and responsive to the current bus rapid transit service along the Busway as well as a potential future upgrade of that service to light rail or heavy rail. The collective community vision for these urban centers has resulted in vertical development of varied intensities along both sides of the Busway that is connected by an improved street grid and dotted with new open spaces. This development pattern illustrates the highly urban form described by the policies and interpretative text of the CDMP.

The area planning efforts along the Busway culminated in February of 2012 when the last of the urban centers (Leisure City) was rezoned by the Board of County Commissioners. Thus, all the Busway urban centers are now regulated by the county's urban center districts and the Standard Urban Center District regulations. These "small area plans and ordinances" are aimed in substantial part to facilitate economic development at transit stations (Miami-Dade Government, 2014).

The South Miami-Dade Busway is thus more than a means to connect riders to Metrorail—in our view transportation and land use planning aims to make it an economic development opportunity. In the context of express service, are these efforts effective in advancing economic development? We turn now to a review of the data and methods we use to address this question.

Data and Methods

For our analysis, we rely on the Longitudinal Employment-Household Database (LEHD) for 17 of the 20 two-digit North American Industrial Classification Scheme (NAICS) economic sectors. We exclude agriculture, mining and construction because those workers do not normally occupy building spaces in urban areas. We use LEHD data for 2002 (when the data first became available) through

2011. Though LEHD data are available at the census block level, we aggregate to the block group. We compare change between the central county (CC) – being Miami-Dade County, and the block groups whose centroids are within 0.50-mile Busway stations. For our analysis, we combine the 17 urban-related, space-occupying sectors into eight categories in the manner shown in Table 1. This is similar to the combinations used by others (Levinson et al. 2003).

We use shift-share analysis because it assigns the change or shift in the share or concentration of jobs with respect to the region, other economic sectors and the local area. The "region" can be any level of geography and is often the nation or the state. In our case, where we want to see whether there are intra-metropolitan shifts in the share of jobs by sector, our region is the CC of the metropolitan area. The "local" area is often a city or county or even state, but it can be any geographic unit that is smaller than the region. Our local areas are block groups within 0.50 mile of the nearest Busway station; we call this the Busway Station Area. As shifts in the share of jobs may vary by sector over time because of changes in economic sector mixes, there is also an "industry mix" adjustment that we call the Sector Mix. Using notations by the Carnegie Mellon Center for Economic Development (undated), the shift-share formula is:

$$\mathbf{SS_i = CC_i + Busway}$$

Where:

SSi = Shift-Share

CCi = Central County share

SMi = Sector Mix

Buswayi = Busway Station Area shift

The CC share measures by how much total employment in a Busway station area changed because of change in the metropolitan area economy during the period of analysis. If metropolitan area employment grew by 10 percent during the analysis period, then employment in the Busway station area would have also grown by 10 percent if there is no Busway effect. The Sector Mix (SM) identifies fast-growing or slow-growing economic sectors in a Busway station area based on the CC growth rates for the individual economic sectors. For instance, a Busway station area with an above-average share of the metropolitan area's high-growth sectors would have grown faster than a Busway station area with a high share of low-growth sectors. The Busway station area shift, also called the "competitive effect," is the most relevant component; it identifies a Busway station area's leading and lagging sectors. The competitive effect compares a Busway station area's growth rate in a given economic sector with the growth rate for that same sector in the metropolitan area. A leading sector is one where that sector's Busway station area growth rate is greater than its metropolitan area growth rate. A lagging sector is one where the sector's Busway station area growth rate is less than its CC growth rate.

The equations for each component of the shift-share analysis are:

$$\mathbf{CC} = (_i\mathbf{Busway\ station\ area}^{t-1} \bullet \mathbf{CC}^t / \mathbf{CC}^{t-1})$$

$$\mathbf{SM} = [(_i\mathbf{Busway\ station\ area}^{t-1} \bullet {}_i\mathbf{CC}^t / {}_i\mathbf{CC}^{t-1}) - \mathbf{CC}]$$

$$\mathbf{Busway} = [_i\mathbf{Busway\ station\ area}^{t-1} \bullet (_i\mathbf{Busway\ station\ area}^t / \mathbf{iBusway\ station\ area}^{t-1} - {}_i\mathbf{CC}^t / \mathbf{iCC}^{t-1})]$$

Where:

iBusway station area^{t-1} = number of jobs in the Busway station area sector (i) at the beginning of the analysis period (t-1)

$iBusway\ station\ area^{t}$ = number of jobs in the Busway station area in sector (i) at the end of the analysis period (t)

CC^{t-1} = total number of jobs in the central county at the beginning of the analysis period (t-1)

CC^{t} = total number of jobs in the central county at the end of the analysis period

(t) iCC^{t-1} = number of jobs in the central county in sector (i) at the beginning of the analysis period (t-1)

iCC^{t} = number of jobs in the central county in sector (i) at the end of the analysis period (t)

We apply shift-share analysis to the system of South Miami-Dade Busway stations over the period 2002-2011, or the entire period for which LEHD data were available at the time of our analysis.

However, shift-share analysis by itself does not necessarily ascribe a causal relationship, merely an associative one. In addition, to control for the counter-factual – that is, that development (or lack thereof) would have occurred anyway—we devised an algorithm in ArcGIS to identify 10 alternative locations having comparable attributes to each existing station at the beginning of our study period—2002 (Kim, 2015). We adjust the notation above by substituting "CF," our counter-factual block groups, for "Busway." We caution that though this improves causal inference, we are conservative in asserting only associative ones.

Results

We present our results in Table 2. Over the study period, the Busway station areas gained share of jobs (an average of +59.1 jobs per Busway block group) while the counter-factual locations lost share (an average of -57.5 jobs per block group). We note the following Busway positive shifts relative to the CC that are otherwise negative with the counter-factual locations:

- Manufacturing (+3.3 jobs per block group compared to -6.6 jobs)
- Industrial (+0.3 jobs per block group compared to -16.9 jobs)
- Office (+22.3 jobs per block group compared to -26.5 jobs)
- Education (+13.7 jobs per block group compared to -17.9 jobs)

While both the Busway station areas and counter-factual locations had positive outcomes with respect to the knowledge sectors, the Busway station areas gained about 2.5 times more share than the counterfactual areas (21.9 compared to 8.5 jobs per block group, respectively). Both analytic approaches also gained jobs in the arts-entertainment-recreation sector but Busway station areas gained more than twice the jobs as the counterfactual areas (0.7 jobs compared to 0.3 jobs per block group, respectively). Also, while both analytic techniques showed losses in the retail-lodging-food sector, the Busway station areas lost about one-ninth the jobs than the counterfactual areas. On the other hand, the counterfactual areas gained an average of 5.8 jobs per block group compared to Busway station areas losing an average of 2.7 jobs. Locally knowledgeable people inform us that new health care facilities tend to locate away from the Busway though closer to other forms of fixed guideway transit systems.

Summary and Implications

Using shift-share analysis we find that the South Miami-Dade Busway is associated with substantially improved economic development when compared to the central county as well as counter-factual locations. We surmise that, on the whole, the Busway system contributed to economic development; that is, economic development may not have happened without it.

To an important extent, we surmise the market appears to respond to Busway investments. Where they improve access to employment centers along their routes and where there are opportunities for redevelopment, the Busway appears to facilitate economic development. We also surmise that planning has been effective in generating positive economic development outcomes associated with Busway investments (Nelson, 2014). We note that planning is likely needed to assure market-feasible development opportunities, while incentives are needed to help offset the additional cost of redeveloping otherwise problematic sites lest new development is lured to lower-cost land elsewhere that may impose higher social, environmental and economic costs on metropolitan areas (Nelson, 2013).

Similar analysis of other express busway systems is recommended. As these studies cumulate, insights that can improve planning and implementation of those systems may be revealed.

References

Arrant, Tony. *Planning and Growth Management*, Chapter 11 in Florida Association of Governments. *Florida County Government Guide*. Tallahassee, FL: Florida Association of Governments. (2012). 111-127

Baltes, Michael, Victoria Perk, Jennifer Perone, and Cheryl Thole. "South Miami-Dade Busway System Summary." *National Bus Rapid Transit Institute, University of South Florida* (2003).

Belzer, Dena, Sujata Srivastava, Mason Austin, Tyler Bump, and Jeff Wood.*Transit and regional economic development*. No. FTA CA-26-1007-03. 2011.

Higgins, Christopher D., and Pavlos S. Kanaroglou. "40 Years of Modelling Rail Transit's Land Value Uplift in North America: Diverse Methods, Differentiated Outcomes, Debatable Assumptions, and Future Directions." In *Transportation Research Board 94th Annual Meeting*, no. 15-4103. 2015.

Institute for Transportation & Development Policy. "Best Practices 2013." https://www.itdp.org/library/standards-and-guides/the-bus-rapid-transit-standard/best-practices-2013/

Kim, Keuntae. "Using ArcGIS to Identify Ten Comparable Points for Counter-Factual Analysis." Salt Lake City, UT: *Metropolitan Research Center*, University of Utah. (2015).

Levinson, Herbert, Samuel Zimmerman, Jennifer Clinger, Scott Rutherford, Rodney L. Smith, John Cracknell, and Richard Soberman. "Bus rapid transit, volume 1: Case studies in Bus Rapid Transit." Transportation Research Board, Washington, D.C. (2003).

Miami-Dade Government. " Regulatry and Economic Resources: Comprehensive Development Master Plan (CDMP) Adopted Components." Last Edited: Thu Aug 6, 2015**.** http://www.miamidade.gov/planning/cdmp-adopted.asp.

Nelson, Arthur C., Bruce Appleyard, Shyam Kannan, Reid Ewing, Matt Miller, and Dejan Eskic. "Bus Rapid Transit and Economic Development: Case Study of the Eugene-Springfield BRT System." *Journal of Public Transportation* 16, no. 3 (2013): 3. 41–57.

Nelson, Arthur C. *Foundations of Real Estate Development Financing: A Guide to Public-Private Partnerships*. Island Press, 2014.

Nikitas, Alexandros, and MariAnne Karlsson. "A Worldwide State-of-the-Art Analysis for Bus Rapid Transit: Looking for the Success Formula." *Journal of Public Transportation* 18, no. 1 (2015): 3 1-33.

Figure 1
South Miami-Dade Express Busway

Table 1 Combinations of NAICS Sectors for Analysis

Manufacturing
Manufacturing
Industrial
Utilities
Wholesale Trade
Transportation and Warehousing
Retail-Accommodation-Food Service
Retail Trade
Accommodation and Food Services
Knowledge
Information
Professional, Scientific, and Technical Services
Office
Finance and Insurance
Real Estate and Rental and Leasing
Management of Companies and Enterprises
Administrative and Support and Waste Management and Remediation Services
Other Services (except Public Administration)
Public Administration
Education
Educational Services
Health Care
Health Care and Social Assistance
Art-Entertain-Recreation
Arts, Entertainment, and Recreation

Table 2 Miami-Dade South Busway Shift-Share Results

Sector	Busway 2002	Busway 2011	CC 2002	CC 2011	Busway Change	CC Change	CC Share	SM Share	Busway Shift
Busway Block Groups									
Manufacturing	37.3	32.5	24.5	19.2	-13.0%	-21.9%	35.3	-6.2	3.3
Industrial	59.2	55.7	91.5	85.6	-6.0%	-6.5%	56.1	-0.7	0.3
Retail-Lodging-Food	334.0	394.1	124.4	147.0	18.0%	18.1%	316.3	78.3	-0.5
Knowledge	75.3	89.2	59.5	53.1	18.4%	-10.7%	71.3	-4.1	21.9
Office	192.0	223.0	142.1	148.5	16.1%	4.5%	181.8	18.8	22.3
Education	3.1	16.9	57.1	58.2	447.4%	2.0%	2.9	0.2	13.7
Health Care	47.0	57.5	71.8	92.0	22.4%	28.2%	44.5	15.7	-2.7
Arts-Entertain-Recreation	4.9	5.6	8.1	8.0	13.0%	-1.4%	4.7	0.2	0.7
Total	752.9	874.3	579.0	611.5	16.1%	5.6%	712.9	102.3	59.1
Counter-Factual (CF) Block Groups									
Sector	**CF 2002**	**CF 2007**	**CC 2002**	**CC 2011**	**CF Change**	**CF Change**	**CC Share**	**SM Share**	**CF Shift**
Manufacturing	32.7	19.0	24.5	19.2	-42.0%	-21.9%	30.9	-5.4	-6.6
Industrial	86.5	64.0	91.5	85.6	-26.0%	-6.5%	81.9	-1.1	-16.9
Retail-Lodging-Food	130.3	149.6	124.4	147.0	14.8%	18.1%	123.4	30.6	-4.4
Knowledge	88.9	87.9	59.5	53.1	-1.1%	-10.7%	84.2	-4.8	8.5
Office	204.8	187.5	142.1	148.5	-8.4%	4.5%	193.9	20.1	-26.5
Education	219.9	206.4	57.1	58.2	-6.2%	2.0%	208.3	16.0	-17.9
Health Care	113.3	151.0	71.8	92.0	33.3%	28.2%	107.3	37.9	5.8
Arts-Entertain-Recreation	11.2	11.3	8.1	8.0	1.5%	-1.4%	10.6	0.4	0.3
Total	887.6	876.7	579.0	611.5	-1.2%	5.6%	840.5	93.7	-57.5

Note: CC means Dade County, the central county of the Miami-Dade metropolitan area; SM means economic sector mix; CF means counter-factual, a form of control to help ascribe cause-and-effect between the busway and job change by economic sector.