ECONOMIC IMPACTS OF A GENERAL AVIATION AIRPORT: MURFREESBORO MUNICIPAL AIRPORT (MBT)

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ABSTRACT

Airports represent important parts of local, regional, and global transportation systems. General aviation (GA) airports (as contrasted with large commercial airports) operate within the scope of needs for their local communities and provide direct effects for employment, business revenues, and tax revenues. This study confirms the impacts of Murfreesboro Municipal Airport (MBT) on its resident county (Rutherford County) and for the state of Tennessee. More broadly, we show the heaviest use of MBT is through Middle Tennessee State University's (MTSU) Aerospace program. In this way, MBT contributes to the aviation labor supply (in the form of pilots and air traffic controllers) for the global community.

INTRODUCTION

General aviation (GA) airports offer many services to local communities that are out of the scope of large commercial airports (hubs). Not least of which is the service of providing the physical location for flight instruction and, in some cases, large-scale university aviation training. For Murfreesboro Municipal Airport (MBT), its partnership with Middle Tennessee State University's (MTSU) Aerospace department affords the university with the use of a close airport, which may be large reason for the success of the department.

In this study we seek to measure the impact of the MBT and the MTSU Aerospace department on local areas (here: the City of Murfreesboro, Rutherford County, and Tennessee), and we use IMPLAN modelling software to calculate the impact counterfactually. The impact categories presented are employment, business revenue, and tax revenues. We can draw the impact of these entities even further through the pipeline for aviation labor, showing that the airport and the university together provide the global aviation stage with aviation transportation professionals.

The paper is structured as follows. The following section outlines research surrounding transportation, regional airports, and general aviation airports. Next, we present the methodology and data used in this study. Then, we report the results for the defined impact areas and categories. We discuss the implications and limitations of this study. Lastly, we conclude.

LITERATURE REVIEW

The review of selected literature suggests that regional airports, like the more-researched large airports, have a significant social, fiscal, and economic impact first through community connection and second through the education of the next generation of aviation professionals.

Transportation and Airport General Effects

A well-designed transportation system aids businesses and individuals in accessing markets for goods and services in a cost-efficient way, and the efficiency of this system can impact the way regions grow and evolve (Weisbrod, 2007). From paved roads to locomotives, to cars, and finally to airplanes—air travel has become the next step in the story of transportation (Weisbrod). To support the recognized economic impact of air service, both U.S. state and federal government agencies award grants to promote airport activity. One well-known program funded by federal grants is the Essential Air Service program, which subsidizes air service to remote or rural areas in order to provide low-growth areas access to wider markets.

Researchers have established through a variety of methodologies the positive impact that airports have on a region's population growth and employment growth (Green, 2007), population growth and GDP (Blonigen and Cristea, 2015), income per capita and personal income (Button and Yuan, 2003), number of business establishments and average wage (Bilotkach, 2015), and gross metropolitan product (Tittle et al., 2012). These studies show the connection between large airports and regional growth.

Not only do airports impact economic growth, they also shape economic growth. Research on airports shows they change the distribution of employment (Cidell, 2015), influence the concentration of employment of different industries (Appold, 2015), and impact the growth rate of employment in a certain radii of miles from the airport itself (Appold and Kasarda, 2013). It is important to mention that in the cited research (Appold, 2015; Appold and Kasarda, 2013; Cidell, 2015), passenger or cargo volume are the most common measures of airport activity. For large airports, these are crucial and applicable measures to determine the impact and influence of airports.

Regional Airport Effects

While smaller airports have not received the research attention of larger airports, Button et al. prove that regional airports in Virginia, along with the larger Virginia commercial airports, have direct effects on the surrounding regions (Button et al., 2009). Button et al. measure the effects of variables on the dependent measure of economic impact: county-level per capita income. For both their random- and fixed-effect models, Button et al. use the independent variables passenger volume to capture airport actives. The study uses population, aged population, federal and local expenditure for each region, and employment to capture local characteristics; and they use distance to hub airlines in Dulles and Reagan to capture the effects of availability of alternative air travel (Button et al, 2009, p. 134). Their choice of variables stems from their assumption that "the success of an airport is linked to the nature of the local economy and the availability of alternative air transportation facilities" (Button et al., 2009, p.132). The authors find in the random-effects model that increasing passenger numbers does have a positive and significant effect on per capita income, meaning that airports of all sizes impact a region's income through increases in passenger count.

General Aviation

Though regional airports impact communities through passenger volume, passenger count alone is not always the best measure of airport activity for smaller, local airports. Non-commercial airports provide non-scheduled passenger services, flight training, cargo shipping, and emergency services—none of which are captured by traditional commercial measures. Most

of these non-commercial airports are categorized as general aviation (GA) airports and operate on levels that provide local services. GA airports make up 77% of U.S. airports and 84% of Tennessee airports (NPIAS, 2018). The National Plan of Integrated Airport Systems (NPIAS) further subcategorized GA airports into national, regional, local, and basic GA airports in 2012 (Federal Aviation Administration, 2012).

Table 1 defines the types of GA airports, as redefined in 2013 by the NPIAS. The definitions in Table 1 include the relationship between the community and the airport, the activity level of the airport, and the based-aircraft parameters for each definition. As shown in Table 1, the defining characteristic of GA airport operations is local impact through partnership with communities. This community impact gives GA airports a unique connection to these areas that allows them to provide services outside the scope of larger airports, such as emergency services (Smith, 2012).

Despite their impact on communities, the impact of GA airports cannot be measured with passenger numbers and cargo weight, as they are not applicable measures for assessing the full range of activities of a GA airport. In order to better measure GA airport activity, the Federal Aviation Administration (FAA) has surveyed GA airports to estimate flying hours. Table 2 shows the top uses of general aviation airports for 2014 and 2016 based on flying hours.

Though not measured by passenger count, the uses of GA airports and the employment and business opportunities they create are important. Personal use—a category that involves recreational flying, family and tourism use, and flying to keep license requirements—makes up the biggest category for GA airports. However, the next highest category is instruction, proving the necessity of GA airports in providing pilot and other aviation-related training.

General Aviation in Tennessee

Within the state of Tennessee specifically, GA airports have impacts through aviation-related output and employment, and a 2015 TDOT aviation report highlights GA airports as the important link between rural communities and larger, more diverse markets. Figure 1 shows all airports across Tennessee by category, based on information from the 2019 NPIAS report. Murfreesboro Municipal Airport (MBT), a regional GA airport, is represented with a five-point star. Any category of airport that is not “hub” or “unclassified” represents GA airports, which have varying degrees of activity and scope.

GA airports in Tennessee are an integral part of local communities and the aviation network. In 2015, TDOT reported that GA airports in Tennessee had over one billion dollars of aviation-related output, over eight thousand aviation-related employees, and over three million dollars in aviation-related earning.

Airport Functions Overview

In the previous sections, we emphasize that commercial airports and GA airports operate in different scopes of activity. Figure 2 shows the primary functions of the airports outlined in this section. GA airports without a commercial provider have local connections to the communities they serve, and their aviation activities are more difficult to measure. Largely, GA airport functions support the community in its business, recreational, and emergency service aviation needs. Due to GA airports’ community connections, they are often used for flight instruction, by both private entities and universities. In this way, strong aviation colleges have impacts on the airports they use. However, GA airports are no less important to the global aviation labor supply pipeline, as GA airports provide most pilot training in the U.S.

Table 1: 2013 Revised General Aviation Categories

National	Supports the national airport system by providing communities with access to national and global markets. These airports have very high levels of activity with many jets and multiengine propeller aircraft. These airports average about 200 total based aircraft, including 30 jets.
Regional	Supports regional economies by connecting communities to regional and national markets. These airports have high levels of activity with some jets and multiengine propeller aircraft. These airports average about 90 total based aircraft including 3 jets.
Local	Supplements local communities by providing access to local and regional markets. These airports have moderate levels of activity with some multiengine propeller aircraft. These airports average about 33-based propeller-driven aircraft and no jets.
Basic	Supports general aviation activities, often serving critical aeronautical functions within the local community such as emergency response and access to remote communities. These airports have moderate levels of activity with an average of 10 propeller-driven aircraft and no jets.

Source: Table recreated from 2013 NPIAS Report, p. 14

Table 2: General Aviation by Actual Hours Flown by Use, 2014 and 2016

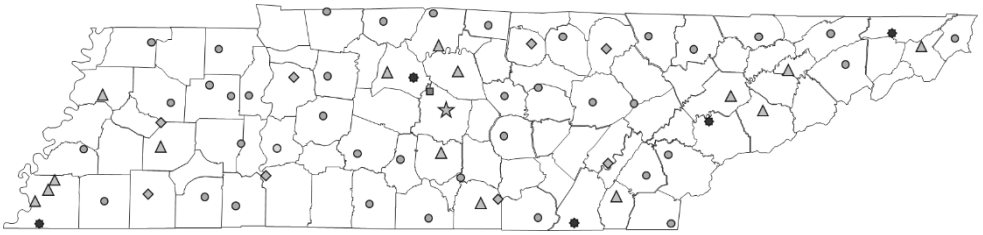
Category	Percent of Total 2014	2016
General Aviation Use		
Personal Use[1]	29.5%	31.7%
Instructional	16.4%	19.7%
Corporate/Executive (with paid flight crew)	12.2%	10.3%
Business (without paid flight crew)	7.5%	7.2%
Aerial Observation	6.4%	5.8%
Other[2]	4.5%	3.8%
Aerial Appliation Agriculture	4.0%	3.5%
Other Work Use	1.1%	1.7%
External Load (Rotorcraft)	0.7%	0.6%
Aerial Application Other	0.7%	0.6%
Sightseeing	0.8%	0.7%
Air Medical	0.5%	0.4%
Subtotal	84.3%	86.0%
On-Demand Federal Aviation Regulation Part 135 Use		
Air Taxi and Air Tours	12.6%	11.0%
Part 135 Air Medical	3.1%	3.0%
Subtotal Part 135 Use	15.7%	14.0%
Total All Uses	100.0%	100.0%

Source: Table recreated from NPIAS Report 2019-2023, info based on GA and Part 135 Activity Surveys

[1] Personal use includes recreational flying, family use and tourism, and flying in order to stay current with license requirements

[2] Other is defined as positioning flights, training, ferrying, sales demos, etc.

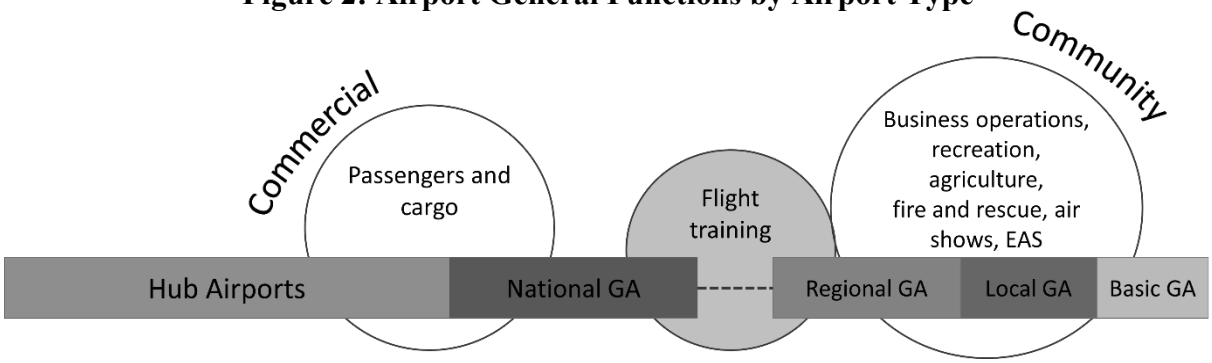
Figure 1: Airport Types Across Tennessee



Types of Tennessee Airports	
Hub	5
National	1
Regional	16
Local	38
Basic	8
Undassified	1
Total	69

Source: Author, based on 2019 NPIAS Report

Figure 2: Airport General Functions by Airport Type



Source: Author, based on 2013 NPIAS Report

MTSU's Aerospace Department

MTSU's Aerospace department received its first Council of Aviation Accreditation in 1992 (Schwab and Haute, 2005), and since that time has grown to be an important part of the university. Schwab and Haute (2005) used MTSU's Aerospace program as a guideline for Indiana State University's own aviation program. More recently, research around the Aerospace department has been on why students stay in aviation programs (Beckman and Barber, 2007), what makes women choose an aerospace major (Zlotsky and Beckmen, 2009), and how students use communication in "high-fidelity" aviation simulations (Lester et al., 2017). This study departs from these types of studies in that we look to the total impact of the Aerospace department on the surrounding communities.

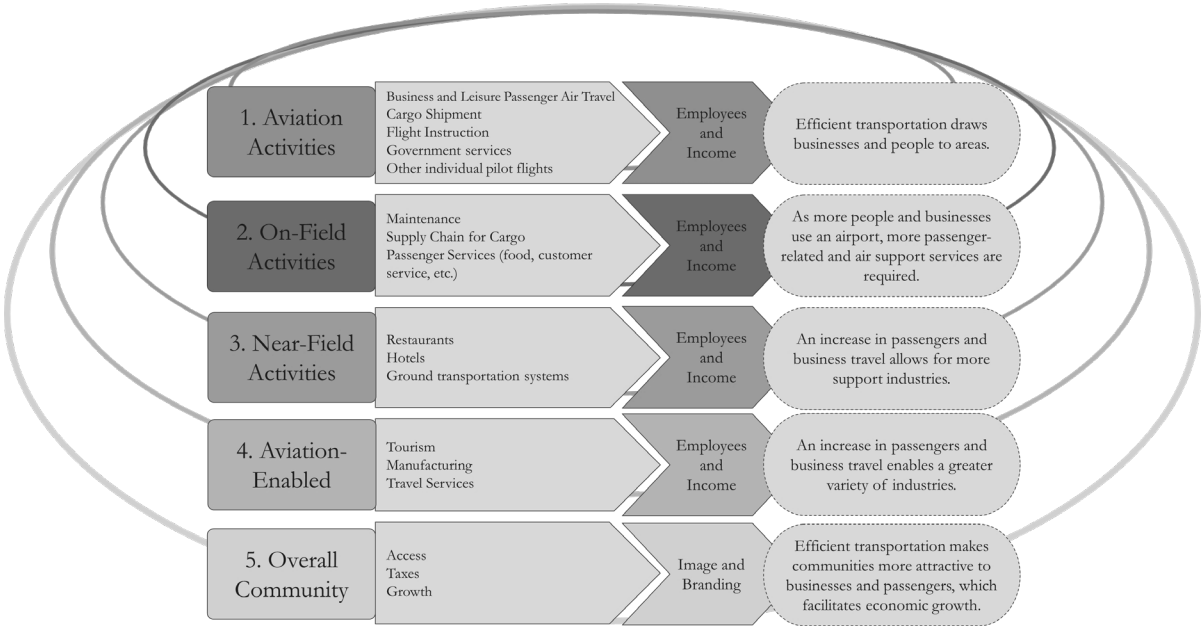
In this section, we explored the relevant literature surrounding the effect that airports have on the surrounding areas, which suggests that airports provide essential services, provide employment, and increase incomes for the surrounding regions. We cited research that finds that small airports (such as GA airports) have economic impacts in the same ways as larger or hub airports. Finally, we outlined the importance of GA airports specifically, examined their NPIAS categories across the U.S. and Tennessee, and cited a TDOT report confirming the importance of GA airports in Tennessee.

METHODOLOGY AND DATA

In this study, economic impact refers to the impact of new economic activity in an existing regional economy, measured by net change. Examples might include out-of-town visitor spending, a new manufacturing plant operating in the region, federal or out-of-region money flowing to an area to support a new program, or an activity that is unique to the region. Economic impact analysis is different from economic contribution analysis or economic significance analysis in that we counterfactually remove an institution, program, or event from an economy to estimate the total economic activities associated with that removal. In this study, we counterfactually remove all MBT-related activities from the economy and then measure the economic contributions the removed activities created.

To measure the impacts of MBT on the local community and beyond, this study uses IMPLAN impact modelling software. IMPLAN is nationally recognized as an appropriate method for calculating impacts of institutions and businesses using sectoral input-output analysis (IMPLAN, 2021). We use IMPLAN software because it is connected to major data sources, with which the program creates sectoral input-output calculations based on region. The conceptual framework of how airports impact their local areas is shown below (Figure 3). As a general aviation airport, MBT does not have many of the commercial or tourist-centric impact items shown in Figure 3. Its main purpose is to provide a space for educating MTSU Aerospace Students, and MTSU's Aerospace department has reached its level of success in no small part to its partnership with MBT.

Figure 3: Airport Community Impact Framework



Source: Author recreation, TDOT (2015)

This study used institutional data directly provided to the researchers by MBT, its associated businesses, and MTSU Aerospace as inputs to determine the total contributions of the airport. We then created regional IMPLAN models for Rutherford County and Tennessee to

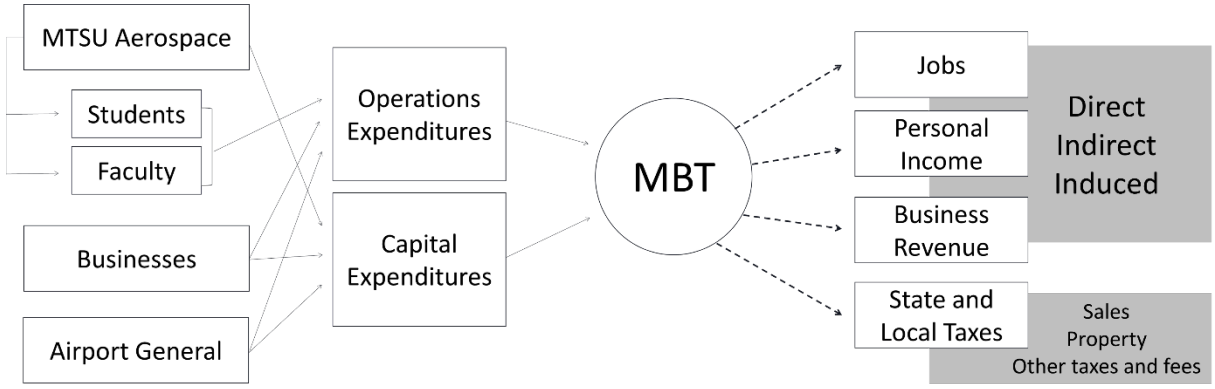
assess the economic impact of MBT operations within those regions. We used the IMPLAN default regional purchasing coefficients to allow for leakages out of the region. In reporting economic impact and economic contribution estimates, we follow the procedure outlined below (see Figure 4 for visual representation of measures):

1. Business revenue (output) effect: direct, indirect (the effect of business-to-business interactions), and induced (the effect of employee spending on wages and salaries) by MBT. These measures (indirect and induced) are also called the ripple effect. The business revenue effect represents all economic activities (i.e., trade, value added, income, taxes, proprietary income, etc.) associated with the activity. Therefore, this figure should not be aggregated with any other measures reported here.
2. Employment effect: direct, indirect, and induced by MBT.
3. Personal income effect: direct, indirect, and induced by MBT.
4. Local and state taxes: total taxes by nonprofit segment.

In this context, it is also important to remember the major assumptions used for this study:

1. The study regions are Rutherford County and the state of Tennessee as a whole.
2. There may be a certain degree of discrepancy in data files in terms of establishments, revenue, expenditure, and employment resulting from (a) the use of multiple databases, (b) several levels of aggregation, and (c) change in data year and impact year.

Figure 4: IMPLAN Inputs



Source: Author

Data

As shown by Figure 4, measures of impact in this study involve inputs from both MBT and the MTSU Aerospace department, namely employment, operations expenditures (including wages and salaries), and capital expenditures. Economic impact studies commonly use employment and wages and salaries as inputs in creating impact models (see Lee and McGrath, 2019). Employment measures were directly supplied by MBT staff, MTSU Aerospace faculty, and MBT businesses themselves as the data for these entities are not publicly available. Table 3 shows the entities that use the MBT for their business or, in the case of MTSU, aviation education purposes. Table 3 breaks down MBT employment by source, where MBT employment represents the airport employees and the employees of the various business entities who work at

MBT. Wage and salary inputs were provided under the heading of operations expenses for both MBT and MTSU Aerospace.

Table 3: Employees at MBT (2019)

	Full time	Part time	
MBT Airport and Airport-Based Businesses	72	7	
MTSU Aerospace	21	72	
		Total Full time	93
		Total Part time	79
		Total FTE	121

Source: Author's calculations based on information provided by MBT and MTSU Aerospace
Note: For the IMPLAN model, MTSU Aerospace full time employment counts only Pro Pilot or Maintenance Management related faculty and only counts staff that have offices at the airport. MTSU Aerospace FTE is calculated as one third of part time. MBT Airport FTE is calculated as half of part time.

This study incorporates the economic impacts of the planned expansion at MBT. MBT plans to construct a South Apron addition, which will include 18,000 square feet of hangar and shop space, 1,000 square feet of office space, and further apron and tie-down space. The terminal project is expected to cost $5.5 million, with state funds of only $350,000. The South Apron project will cost $4.1 million, and the Airport Economic Development Grant will contribute $2 million in funding.

This study also looks specifically at the impact of the MTSU Aerospace students who primarily use the airport for their instruction (or *at airport* students). Table 4 below shows how the total Aerospace student enrollment has grown and that the majority of the growth comes from the increased enrollment of at airport students.

Table 4: MTSU Aerospace Student Total Enrollment by Major/Concentration

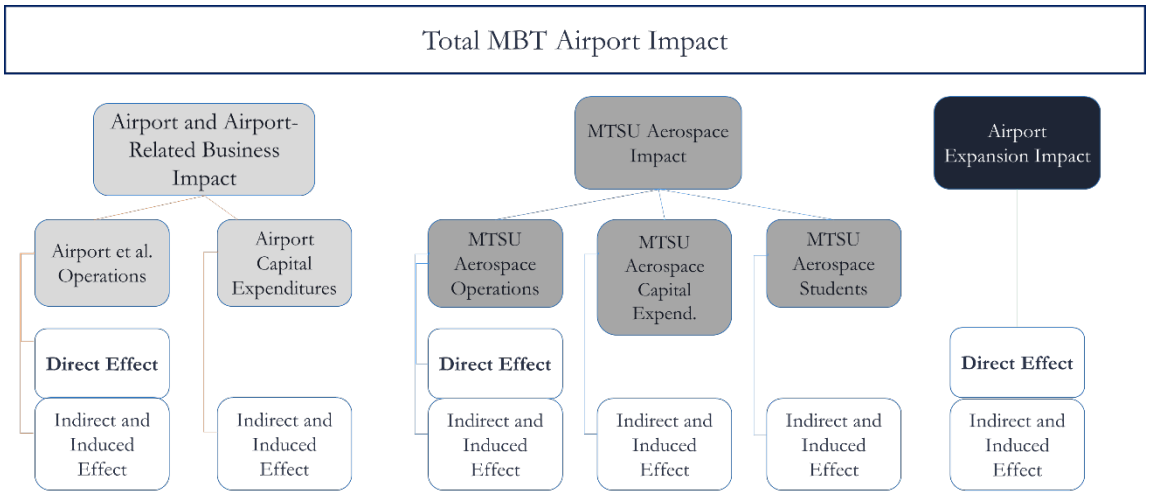
Department/Major/Concentration	Fall 2014	Fall 2015	Fall 2016	Fall 2017	Fall 2018
Maintenance Management	105	98	90	87	89
Professional Pilot	330	347	387	403	499
Students at airport	**435**	**445**	**477**	**490**	**588**
At-airport percentage of total	62.32%	62.50%	62.60%	61.71%	66.59%
Aviation Management	78	75	66	76	83
Flight Dispatch	95	79	82	84	72
Technology	58	47	49	43	29
UAS Operations	0	27	55	70	82
MS Aeronautical Science	32	39	33	31	29
Students on campus	**263**	**267**	**285**	**304**	**295**
On-campus percentage of total	37.68%	37.50%	37.40%	38.29%	33.41%
Total Aerospace Students	**698**	**712**	**762**	**794**	**883**

Source: Author's calculations based on information provided by MTSU Aerospace Department
Note: In impact calculations, the number of part-time student flight instructors (72) was subtracted from the number of at-airport students, as the flight instructors are counted as MBT employees.

RESULTS

MBT impacts the surrounding regions through three channels; each channel exists in its current state due to MBT airport (see Figure 5 below). The first channel is through the operations and employment of the airport itself and the businesses based at MBT. The second is through the MTSU Aerospace program and is calculated using department operations, airport-related capital expenditures, and at-airport major employees and enrolled students. Lastly, we measure MBT impact through the airport's plans for expansion. In this section, we will first discuss the Rutherford County impacts by the three categories; then we will show impacts by impact category (e.g. employment, personal income) for both Rutherford County and Tennessee. Finally, we will outline total impacts based on region.

Figure 5: MBT Impact Channels and Categories



Source: Author

Economic Impacts of MBT on Rutherford County

This section outlines the impact of the three impact channels on Rutherford County only. Table 5 below shows MBT's total general operations (representing operation spending plus capital expenditures for the airport) account for more than 133 jobs, $7.2 million in personal income, $18.2 million in business revenue, and $1.1 million in state and local taxes in Rutherford County.

Table 5: Airport Impact on Rutherford County by Category

Impact Category	Impact Type	Employment	Personal Income	Business Revenue	State and Local Taxes
Operations	**Direct**	**76**	**$4,384,009**	**$10,261,581**	
	Indirect/ Induced	40	$1,781,821	$5,363,584	$992,111
Capital Expenditures	Indirect/ Induced	17	$1,008,463	$2,579,045	$73,467
	Total Impact	133	$7,174,293	$18,204,210	$1,065,578

Source: Author's calculations

As Table 6 shows, the impact of MTSU Aerospace operations accounts for 144 jobs, $4.3 million in personal income, $13.7 million in business revenue, and $0.7 million in state and local taxes in Rutherford County. Table 6 also shows the breakdown of impacts by MTSU Aerospace category (operations, students, and capital expenditures).

Table 6: MTSU Aerospace Impact on Rutherford County by Category

Impact Category	Impact Type	Employment	Personal Income	Business Revenue	State and Local Taxes
Operations	**Direct**	**45**	**$855,469**	**$2,551,124**	
	Indirect/ Induced	12	$509,092	$1,745,859	$182,446
Student	Indirect/ Induced	81	$2,546,055	$8,579,974	$503,330
Capital Expenditures	Indirect/ Induced	6	$336,205	$861,312	$23,738
Total Impact		145	$4,246,821	$13,738,269	$709,514

Source: Author's Calculations

As Table 7 shows, the planned MBT Expansion, which involves $9 million of construction and planning spending, accounts for 105 jobs, $5.7 million in personal income, $13.5 million in business revenue, and over $370,000 in state and local taxes in Rutherford County.

Table 7: Airport Expansion Impact on Rutherford County by Category

Impact Type	Employment	Personal Income	Business Revenue	State and Local Taxes
Direct	**72**	**$4,226,666**	**$9,004,100**	
Indirect and Induced	33	$1,496,887	$4,491,223	$ 370,828
Total	105	$ 5,723,553	$ 13,495,323	$ 370,828

Source: Author's calculations

Economic Impacts of MBT by Impact Category

In the following sections, we pay special attention to the MTSU Aerospace students, and student impacts are reported separately from MTSU Aerospace department impacts. Though enrollment and department spending are very much connected, highlighting student impact separately reinforces the fact that increases in enrollment numbers will increase impacts on the local and state economies. Due to the nature of the impact of the airport expansion, its impacts will be reported separately from the general day-to-day operations impact of the airport, its based businesses, and MTSU Aerospace.

Additionally, the figures in this section report total impacts, meaning that the numbers shown on the graphs are direct, indirect, and induced impacts added together.

Employment

Table 8 presents MBT's impact on employment by channel and region of impact. The table shows that the airport and its based businesses have the most impact on business revenues,

followed by the airport expansion, the MTSU Aerospace students, and the Aerospace department, respectively. The total impact of both the airport and the MTSU Aerospace department on employment is 277 jobs for Rutherford County and 309 jobs for Tennessee.

Table 8: Airport Impact on Employment by Region

	Rutherford	Tennessee
Airport Expansion		
Expansion Direct	72	73
Expansion Indirect and Induced	33	51
Total Airport Expansion Employment Impact	105	124
Airport and Based Businesses		
Operations Direct	76	76
Operations Indirect and Induced	40	56
Capital Expenditures Indirect and Induced	17	20
MTSU Aerospace Department		
Operations Direct	45	45
Operations Indirect and Induced	12	23
Students Indirect and Induced	81	82
Capital Expenditures Indirect and Induced	6	7
Total Airport and MTSU Aerospace Employment Impact	277	309

Source: Author's calculations

Personal Income

Table 9 presents MBT's impact on personal income by channel and region of impact. The airport and its based businesses have the most impact on personal income, followed by airport expansion. MTSU Aerospace has a larger impact on Tennessee in terms of personal income, which the Aerospace students have a larger impact on Rutherford County. The total impact of the airport and MTSU Aerospace on personal income is $11 million in Rutherford County and almost $15 million for Tennessee.

Table 9: Airport Impact on Personal Income by Region

	Rutherford	Tennessee
Airport Expansion		
Expansion	$ 4,226,666	$ 4,174,336
Indirect and Induced	$ 1,496,887	$ 2,582,384
Total Airport Expansion Personal Income Impact	$ 5,723,553	$ 6,756,720
Airport and Based Businesses		
Operations Direct	$ 4,384,009	$ 4,503,369
Operations Indirect and Induced	$ 1,781,821	$ 2,849,385
Capital Expenditures Indirect and Induced	$ 1,008,464	$ 1,181,222
MTSU Aerospace Department		
Operations Direct	$ 855,469	$ 1,992,852
Operations Indirect and Induced	$ 509,092	$ 1,093,989
Students Indirect and Induced	$ 2,546,055	$ 2,905,164
Capital Expenditures Indirect and Induced	$ 336,205	$ 396,340
Total Airport and MTSU Aerospace Personal Income Impact	$ 11,421,115	$ 14,922,321

Source: Author's calculations

Business Revenue

Table 10 presents MBT's impact on business revenue by region of impact. The airport and its based businesses have the most impact on business revenues, followed by the airport expansion, the MTSU Aerospace students, and the Aerospace department, respectively. The total impact of the MBT and the MTSU Aerospace department on business revenue is almost $32 million for Rutherford County and $39 million for Tennessee.

Table 10: Airport Impact on Business Revenue by Region

	Rutherford	Tennessee
Airport Expansion		
Expansion Direct	$9,004,100	$9,090,000
Expansion Indirect and Induced	$4,491,223	$7,530,385
Total Airport Expansion Business Revenue Impact	$13,495,323	$16,620,385
Airport and Based Businesses		
Operations Direct	$10,261,581	$10,336,741
Operations Indirect and Induced	$5,363,584	$8,037,965
Capital Expenditures Indirect and Induced	$2,579,045	$3,016,894
MTSU Aerospace Department		
Operations Direct	$2,551,124	$3,754,966
Operations Indirect and Induced	$1,745,859	$3,402,089
Students Indirect and Induced	$8,579,974	$9,610,246
Capital Expenditures Indirect and Induced	$861,312	$1,048,549
Total Airport and MTSU Aerospace Business Revenue Impact	$31,942,479	$39,207,450

Source: Author's calculations

State and Local Taxes

Table 11 breaks down MBT's fiscal impact by type of tax and shows that sales tax revenues represent the biggest portion of the airport's total fiscal impact on Rutherford County and the City of Murfreesboro. The total fiscal impacts of the airport and MTSU Aerospace are nearly $1.8 million for Rutherford County, almost $0.7 million for the City of Murfreesboro, and almost $2 million for the state of Tennessee.

Table 11: Airport Fiscal Impacts by Category and Region

	Rutherford County	City of Murfreesboro	Tennessee
Airport Expansion			
Sales Tax	$218,809	$91,900	$268,939
Property Tax	$90,821	$32,696	$126,694
Other Taxes	$61,198	$12,240	$73,714
Total Airport Expansion Fiscal Impact	$370,828	$136,835	$469,347
Airport			
Capital Expenditure			
Sales Tax	$42,832	$17,989	$48,036
Property Tax	$17,746	$6,389	$22,618
Other Taxes	$12,889	$2,578	$14,285
Operations			
Sales Tax	$590,568	$248,039	$627,120
Property Tax	$242,719	$87,379	$292,984
Other Taxes	$158,824	$31,765	$160,676
MTSU Aerospace			
Operations			
Sales Tax	$109,519	$45,998	$145,507
Property Tax	$45,070	$16,225	$68,363
Other Taxes	$27,857	$5,571	$38,645
Students			
Sales Tax	$293,166	$123,130	$290,760
Property Tax	$120,363	$43,331	$135,701
Other Taxes	$89,801	$17,960	$90,628
Capital Expenditure			
Sales Tax	$14,030	$5,893	$17,022
Property Tax	$5,816	$2,094	$8,010
Other Taxes	$3,892	$778	$4,632
Impacts	$1,775,092	$655,118	$1,964,987

Source: Author's calculations

Note: Rutherford County and Tennessee level fiscal effects are calculated directly through IMPLAN. City of Murfreesboro fiscal impacts are calculated using ratios (City of Murfreesboro/Rutherford County) based on the sources as follows: For property tax calculations, ACS 2017 Estimates (Housing Characteristics); for sales tax calculations, the combination of number of households, total income, and employment numbers; for other taxes, fees, and fines, Census Bureau municipal government finances.

As the results above show, MBT is a crucial part of MTSU's Aerospace training programs. These training programs lead to degrees for professional pilots or air traffic controllers, adding to the labor supply of the important sector of aviation transportation professionals. Those professionals—and pilots especially—take their talents to the global stage and become themselves crucial parts of the global transportation system. MBT provides the link between general aviation and global commercial aviation by affording the background for educating future generations of aviation professionals.

IMPLICATIONS AND LIMITATIONS

The strong impact of both MBT and MTSU on the surrounding communities implies that the growth of those organizations will lead to increased economic impact on the surrounding areas. As MTSU Aerospace enrollment grows, traffic to the airport will also grow, which may induce more restaurants, gas stations, etc. to build in that area, expanding employment. As we show in the results for the planned MBT expansion, the actual process of building expansions will bring employment and business revenues to Rutherford County.

Though this study focuses primarily on local impacts, those in the field of aviation benefit from having well-taught, experienced graduates entering the workforce. These graduates can only get hands-on experience from MTSU Aerospace's partnership with MBT, and the close proximity of the airport to the university makes the partnership even more valuable.

In exploring the impacts of a general aviation airport, this paper did not include the negative externalities imposed on the local community, such as noise pollution. In the same way as the employment and payroll impacts, the negative externalities fade as we look from the local to the global impacts. Globally, the negative externalities of a general aviation airport are next to none, while the impacts of well-trained aviation professionals remain. A less limited study would include the local negative impacts.

CONCLUSION

GA airports are less researched than major or hub airports due to the nature of their aviation activities, but their impacts on their communities are nonetheless substantial, as shown by Murfreesboro Municipal Airport's (MBT) impact on Rutherford County and Tennessee.

This study demonstrates that MBT provides economic impact through employment, income, business revenue, and state and local taxes. In Rutherford County, MBT is directly and indirectly responsible for 277 jobs and almost $32 million in business revenues through airport-based businesses and the MTSU Aerospace program. MBT and MTSU Aerospace's partnership make the program attractive to perspective students, and the Aerospace students from other regions stimulate business dynamics through spending. Furthermore, the students trained using MBT facilities eventually become part of the aviation workforce.

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