

Economic Impact of the Commercial Construction Industry on the Economy of the State of Alabama

Prepared by: M. Keivan Deravi, Ph.D.

Professor of Economics

Auburn University at Montgomery

September 2012

This report attempts to estimate the economic impact of a major industrial sector on the economy State of Alabama. The variables of interest to be analyzed are employment, earnings, and final demand (output).

At the very best, this economic report is an estimate, which is based on the sound theoretical foundation of the region's economy and the most updated socioeconomic, demographic, retail, and general business climate information available.

This study estimates possible changes to the regional economy predicated on an existing economic operation and does not consider the presence of any externalities, either positive or negative, in its computation.

The premise of this analysis is that there will be no major event to change the short or long term economic foundation of the region in the future. In other words, we assume everything else will remain constant, as we run this exercise.

Every attempt has been made to use the most recent information. The author, however, does not assume responsibility for any changes or revisions that may be made to the source data.

M. Keivan Deravi, Ph.D.
Professor of Economics
Auburn University at Montgomery
September, 2012
Email address: mderavi@aum.edu
Tel: 334-324-5994

Contents

Executive Summary	4
The Purpose	4
The Data	4
Economic Impact.....	5
Direct Impact	5
Total Economic Impact	5
Tax (Fiscal) Impact.....	5
Introduction.....	6
Commercial Construction Industry in Alabama- In Glance.....	6
Methodology Economic Impact.....	8
Notes about the Model	9
Economic Impact	10
Table 1: Commercial (non-residential) Construction Activities in Alabama- 2010.....	7
Table 2: Commercial Construction Industry Subsectors in Alabama.....	8
Table 3: Output Economic Impact – Payroll Expenditure Contribution	10
Table 4: Output Economic Impact – Non-Payroll Expenditure Contribution.....	11
Table 5: Total Economic Impact – Output (Payroll and Non-Payroll Expenditure Contribution)	11
Table 6: Employment Impact.....	11
Table 7: Total Economic Impact – Output, employment and Earning.....	12
Table 8: Total Economic Impact: Alternative Approach	12
Table 9: Industry Share.....	13
Table 10: Alabama Selected Tax Collection Estimates – Attributable to Commercial Construction	15
Figure 1: Industry Share – Output	14
Figure 2: Industry Share - Employment	15

Executive Summary

The Purpose

- The purpose of this report is to estimate the economic impact of the nonresidential (commercial) construction activities on the economy of the State of Alabama.
- Our findings are presented in terms of total dollar value of output, total payroll (earnings), and total employment attributable to the commercial construction industry.
- The U.S. Bureau of Economic Analysis (BEA) estimates that in 2010, the contribution of Alabama construction industry to the State's Gross Domestic Product (GDP) amounted to \$7.6 billion.
- In terms of GDP-share, construction activities represented 4.5% of Alabama's GDP.
- The industry's employment was estimated at 86,970 jobs in 2010. This accounted for 4% of the payroll employment in Alabama.
- These statistics highlight the economic significance of the construction industry, in both absolute and relative terms.
- We believe that these figures under-represent the real contribution and importance of this industry on the State economy.
- This is because; the employment and payroll data for the construction industry includes those individuals who are employed, by way of employment or contract, by the construction firms. They do not, however, account for those who are employed in construction-support industries, such as, architectural, engineering, and related services, paper, pulp, lumber and wood industries or manufacturing of flooring materials.
- This report attempts to highlight and estimate the more complete (or the true) economic significance (impact) of Alabama's commercial construction industry.

The Data

- We concentrated on the 2010 construction data since 2010 was the latest year for which detail information are available.
- The total output produced by the construction industry in 2010 in Alabama was reported to be \$7.6 billion.
- We estimate that residential and non-residential share of the output to be of \$2.5 billion and \$5.1 billion, respectively.
- The 2010 payroll and employment data, for the construction industry, were reported to total to \$5.6 billion and 116,644 jobs.^{1,2}

¹ Source: The U.S. Census, County Business Pattern

² For the employment and payroll data, we added the respective data for the architectural, engineering, and related services (NAICS 5413), and special design services (NAICS 5414) to that of the construction industries' (NAICS 23).

Economic Impact

Direct Impact

- Direct economic impact of the commercial construction industry in Alabama in 2010 is as follows:
 - ✓ Direct Output: \$5.101 billion
 - ✓ Direct Payroll: \$3.116 billion
 - ✓ Direct Employment: 61,858 FTE jobs

Total Economic Impact

- It is our estimate that economic impact of the commercial construction in 2010 can be summarized as follows:
 - ✓ Total output impact: \$9.349 billion
 - ✓ Total earnings impact: \$6.984 billion
 - ✓ Total employment impact: 150,000 FTE jobs
- According to our model, the largest beneficiaries of the economic impact of the commercial construction are as follows:
 - ✓ Construction
 - ✓ Manufacturing sector
 - ✓ Service sector
 - ✓ Wholesale trade
 - ✓ Finance sector
 - ✓ Transportation sector

Tax (Fiscal) Impact

- The commercial construction industry is estimated to have generated a total of \$400 million of taxes for the State coffers in 2010.
- Based on our estimate, the commercial construction was responsible for:
 - ✓ \$216 million in income taxes
 - ✓ \$158 in sales and use taxes
 - ✓ \$27 million in utility taxes
- These taxes are net of deduction and collection fees and are net contribution to the State's Education Trust Fund.

Introduction

The construction industry is divided into two sectors. They are residential and nonresidential (or commercial) construction. The purpose of this report is to estimate the economic impact of the activities of the nonresidential (commercial) construction sector on the economy of the State of Alabama. Our findings are presented in terms of total dollar value of output, total payroll (earnings), and total employment attributable to the commercial construction industry.

The construction industry is a vital and significant component of the State's economy. The U.S. Bureau of Economic Analysis (BEA) estimates that in 2010, the contribution of Alabama construction industry to the State's Gross Domestic Product (GDP) amounted to \$7.6 billion. In terms of GDP-share, construction activities represented 4.5% of Alabama's GDP. Likewise, the industry's employment was estimated at 86,970 jobs in 2010. This accounted for 4% of the payroll employment in Alabama.

These statistics highlight the economic significance of the construction industry, in both absolute and relative terms. However, we believe that these figures under-represent the real contribution and importance of this industry on the State economy. For example, the employment and payroll data for the construction industry includes those individuals who are employed, by way of employment or contract, by the construction firms. They do not, however, account for those who are employed in construction-support industries, such as, architectural, engineering, and related services, paper, pulp, lumber and wood industries or manufacturing of flooring materials. Some of these industry subsectors are captured in the service sector, and the others are included in the manufacturing sector.

This report attempts to highlight and estimate the more complete (or the true) economic significance (impact) of Alabama's commercial construction industry. To that end, we employ an economic impact methodology and a model that is specific to the State and one which has been used in estimating the economic impacts of all mega industrial projects recently located in the State of Alabama. Examples of such projects are, Mercedes, Honda, Hyundai, ThyssenKrupp Steel, and the Airbus project. The model allows us to map out detailed interactions among all the industries in Alabama's economy via the dynamics of the multiplier analysis. As such, the model output should yield a more realistic view of the size and significance of the commercial construction activities in Alabama. As is customary in this type of research, the model uses the multipliers estimated by RIMS II, which is developed by the U.S. Department of Commerce Bureau of Economic Analysis.

Commercial Construction Industry in Alabama- In Glance

The first step in every economic impact study involves collecting the project's direct primary data. In this case, we were able to access, collect, and construct the primary data for Alabama's construction industry and its two components from a variety of sources. Our sources included information from the U.S. Bureau of Economic Analysis, the McGraw-Hill Construction national historical data, and the U.S. Census (County Business Pattern). We used the 2010 data for our study since 2010 was the latest year for which the U.S. Census information was available. This data is presented in Table 1.

As is highlighted in Table 1, the total output produced by the Construction industry in 2010 was reported to be \$7.6 billion.³ This information is collected from the U.S. Bureau of Economic Analysis (BEA). The BEA, however, does not disaggregate the construction estimate further into the residential and nonresidential sub-components. In order to disaggregate the BEA (industry level) data, we used the information provided to us from the McGraw-Hill Construction national historical dataset. More specifically, we used the McGraw-Hill database for 2010 and computed the ratio of non-residential to total construction. This ratio was then applied to the BEA figures in order to estimate the non-residential share of the construction output. Our estimates are output of \$2.5 billion and \$5.1 billion for residential the nonresidential sub-categories, respectively.

The 2010 payroll and employment data, for the construction industry, were reported to total to \$5.6 billion and 116,644 jobs.⁴ This information was constructed from the U.S. Census Bureau. For the employment and payroll data, we added the respective data for the architectural, engineering, and related services (NAICS 5413), and special design services (NAICS 5414) to that of the construction industry's (NAICS 23). Further, since the payroll and employment data was available at a more detailed level (four-digit NAICS level), we were able to further disaggregate the data to the residential and nonresidential sub-component levels.

According to Table 1, the nonresidential subcomponent of the construction industry accounts for \$3.1 in payroll and 61,858 jobs in Alabama. Based on our estimate, nonresidential construction represents 56 and 53 percent of the construction industry's total payroll and employment.

Table 1: Commercial (non-residential) Construction Activities in Alabama- 2010

	Production (Nominal GDP)	Payroll	Employment
Construction Industry in Alabama	\$ 7,617,000,000	\$5,592,481,000	116,644
Minus Residential Construction Subsector	\$ 2,515,896,963	\$2,476,354,300	54,786
Commercial Construction GDP in Alabama	\$ 5,101,103,037	\$3,116,126,700	61,858

In Table 2, we list all the construction subsectors (disaggregated sectors) that were included in the calculation of the nonresidential construction component. As is highlighted, we incorporated the employment and payroll for the construction of new multifamily projects, nonresidential building, utility system, land subdivision, highway and bridge construction, and a fraction of the data for the specialty trade contractors' subsector in our calculation of nonresidential construction statistics.

³ Source: The U.S. Bureau of Economics

⁴ Source: The U.S. Census, County Business Pattern

Table 2: Commercial Construction Industry Subsectors in Alabama

Industry Identifier	NAICS
New Multifamily Construction	236116
Nonresidential Building Construction	2362
Utility System Construction	2371
Land Subdivision	2372
Highway, Street, and Bridge Construction	2373
Specialty Trade Contractors	238
Architectural, Engineering , and related Services	5413
Specialized Design Services	5414

Methodology Economic Impact

The methodology employed to estimate the impact of commercial construction on the State economy is derived from regional economic models. The basic premise is that spending by commercial construction in Alabama stimulates a number of (additional) sectors in the local economy. This is true since the transaction activities by commercial construction companies increase the demand for goods and services for a number of industries in the region. This in turn, makes the affected sectors increase their demand from their suppliers throughout the region to respond to the additional demand for their output generated by the nonresidential construction sector.

Classifying the impacts into three broad categories facilitates an understanding of how an initial change in the demand for goods and services in the economy, due to an economic activity, is multiplied into additional impacts.

The three categories of impact are:

Direct: The direct impacts of nonresidential construction spending are the additional demand and expenditures in the local economy that are directly (one-to-one) attributable to the regular and day-to-day spending of the commercial construction companies in the State.

Indirect: Indirect impacts occur when purchases of materials and services by the commercial construction sector, of the economy (the direct impact), result in further increases in business transactions. An indirect impact, for example, results when a business needs additional resources to service the increased demand directly attributable to the commercial construction projects. The suppliers of these items find their sales increasing and, in turn, need more input to meet the new demand. This process continues, yielding a multiplier effect on the output of the local economy. Whenever the extra demands are met by industries outside the local economy, there are **leakages** from the flow of products and income from the local economy. **The greater number of leakages, the lower the indirect impacts, and the lower the multiplier.** On the other hand, the more diversified the local economy, the higher the value of multipliers.

Induced: Additional indirect effects are induced by the change in income in the economy. For example, when a business hires additional employees to meet the demand caused by commercial construction firms, the employee's spending further enhances economic activity in the region.

Determining multipliers, for the project under consideration, is a fundamental step toward conducting an economic impact analysis. The term multiplier refers to the ratio of all direct, indirect, and induced effects to the direct effects. Once the total direct impact of operation are estimated, they are linked to other relevant criteria to estimate other important variable such as the demand on housing, labor force, and any addition to sales tax, property tax, and income tax revenues realized by the state officials.

For the purpose of estimating the economic impact of this project, economic, demographic, and housing market information was gathered from:

The U.S. Department of Labor

The U.S. Census Bureau

The U.S. Bureau of Economic Analysis

Alabama Department of Revenue

Economic Development Partnership of Alabama

Notes about the Model

The following observations should be noted about the model that has been used for conducting the analysis in this study:

- The Input-Output model used for this study deals with readily available quantifiable impacts such as dollars of spending or employment.
- The model does not consider social costs or benefits of economic activities.
- The model used is a static process that does not take into effect changes over time in a dynamic economy. This suggests that the relationships between economic sectors are fixed, as of the date of the model's underlying database, and does not account for adjustments that may take place over time.
- The model assumes that the relationship between changes in demand for products and services and the resulting changes in income and employment are linear. That is, it does not take into account the changes in productivity over time.
- The model assumes that a response to any incremental change in demand for goods and services is at the average rather than the marginal rate.
- Finally, the model does not take into consideration the additional capital expenditures required to support indirect and induced effects on the local economy.

Economic Impact

As suggested in the earlier sections, the first step in conducting any economic impact analysis is to identify the direct impacts of the operation or organization in question. In this context, direct impacts are defined as the output, payroll, and job additions that are solely attributable to the operation of the commercial construction companies in the State. This information was presented in Table 1.

Next, we opted to follow two distinct approaches. The first approach entailed a static and detailed step-by-step process of applying construction-specific multipliers to the direct impacts. The estimated results from this approach are presented in Tables 3 through 7. The second approach involved utilizing our economic development model. Here, we feed the direct impact variables into our model. The model then used its multipliers algorithm to produce the indirect and induced economic impact estimates. This process involved using a detailed industry-by-industry matrix of multipliers to map out the complete industry level interaction amongst all sectors of the Alabama economy. This set of results is presented in Tables 8 through 10.

Table 3: Output Economic Impact – Payroll Expenditure Contribution

Commercial Construction Gross Payroll	\$ 3,116,126,700
Weighted Average Payroll Multiplier	1.897
Output Impact Contribution from Payroll	\$ 5,910,980,737

In the first approach, we started with dividing the commercial construction spending into payroll and non-payroll spending. Payroll spending is defined as the direct payment for services to employees and contractors, and non-payroll spending is direct payment to suppliers of input and materials. These two categories of spending once incurred, in turn, lead to additional purchases and production of goods and services throughout the economy.

In Table 3, we show the output impact of the commercial construction's direct payroll spending in Alabama. In 2010, the industry was identified to inject a total of \$3.1 billion of direct wages and salaries in the State's economy. This income (earned income) was spent on purchase of goods and services (output) throughout Alabama economy. The total output impact is estimated as follows:

- ✓ The output multiplier for payroll spending is defined at 1.897.
- ✓ Applying this multiplier to the direct payroll yields an output impact contribution from payroll of \$5.9 billion for the Alabama economy.

Next, we concentrated on the industry's output contribution from non-payroll expenditures. In addition to the payroll spending, Alabama's commercial construction companies also purchased materials and services in support their ongoing operation. This included, naming just a few, purchases of heavy machinery, construction materials, and office supplies. This non-payroll spending, in turn, boosted sales and revenues for the local suppliers of such product and services. It also supported additional employment. The output impact of this category of spending is highlighted in Table 4.

Table 4: Output Economic Impact – Non-Payroll Expenditure Contribution

Commercial Construction- Value Put in Place	\$ 5,101,103,037
Industry Payroll	\$ 3,116,126,700
Industry Non-Payroll Expenditure	\$ 1,984,976,337
Leakage at 20%	\$ 396,995,267
Total In State Non-Payroll Expenditures	\$ 1,587,981,069
Multiplier	2.165
Output Contribution from Non-Payroll Expenditures	\$ 3,438,455,409

According to Table 4, the industry's non-payroll expenditure, in 2010, was estimated to total to \$2.0 billion. This figure was estimated by subtracting the payroll expenditure from the industries' value added contribution to the State's GDP. We applied a leakage factor of 20% to the above estimate. This resulted into a total in-state non-payroll expenditure of \$1.6 billion for calendar year 2010. Finally, we applied a multiplier of 2.165 to this class of spending. This resulted into an estimate of output impact from non-payroll expenditure of \$3.4 billion.

The total output impact of the commercial construction industry in Alabama, on the State's economy, is the sum of these two subcomponents. This estimate is presented in Table 5. Our calculation indicates that the total output impact of the non-residential construction industry on Alabama's economy, in 2010, was in excess of \$9.3 billion.

Table 5: Total Economic Impact – Output (Payroll and Non-Payroll Expenditure Contribution)

Total Economic Impact - Output	\$ 9,349,436,147
---------------------------------------	-------------------------

Next we concentrate on the employment impact. Similar to the output case, we compute the employment impact using both the payroll and non-payroll spending. It is important to note that these two classifications of spending have their own distinct multipliers. The exact process and the results are reported in Table 6. As reported, it is our estimate that the commercial construction industry was responsible for a total of 150,000 full time equivalent (FTE) jobs in Alabama in 2010.

Table 6: Employment Impact

Total In State Non-Payroll Expenditures	\$ 1,587,981,069
Employment Multiplier	20.290
Added Jobs from Non-Payroll Expenditures	32,220
Direct Job	61,858
Direct Employment Multiplier	1.9034
Jobs Created from Direct Employment	117,741
Total Employment Impact (from Non-Payroll Expenditures and Direct Employment)	149,943

Finally, we use the established industry-wide statistical relationship between output and earning to estimate the total earning impact attributable to the Alabama's commercial construction industry. The earnings estimate along with the output and employment impacts is presented in Table 7. It is our estimate that economic impact of the commercial construction in 2010 can be summarized as follows:

- ✓ Total output impact of \$9.349 billion
- ✓ Total earnings impact of \$6.984 billion
- ✓ Total employment impact of 150,000 FTE jobs

Table 7: Total Economic Impact – Output, employment and Earning

Total Economic Impact - Employment	149,961
Total Economic Impact - Expenditure (output)	\$ 9,349,436,147
Total Economic Impact - Earnings	\$ 6,986,679,114

For the second approach, direct commercial construction industry data, as presented in Table 1, was directly inputted into our model. In general, this practice produces the same set of statistics, namely, the total output, employment, and earning impact. The primary difference between the two approaches is that this alternate approach uses a bottom-up or industry-by-industry approach. The economic impact estimates generated here serves twofold. They are:

- ✓ First, we will be able to validate the earlier results.
- ✓ Two, we will be able to produce a map of economic interaction between the commercial construction industry and all other industries in Alabama economy.

This result of this exercise is presented in Tables 8 - 9 and figures 1 - 2.

According to our model, as presented in Table 8, the employment, output, and earnings impacts of the commercial construction industry in Alabama are as follows:

- ✓ Total output impact of \$9.353 billion
- ✓ Total earnings impact of \$6.963 billion
- ✓ Total employment impact of 150,000 FTE jobs

Table 8: Total Economic Impact: Alternative Approach

Total Economic Impact - Employment	149,943
Total Economic Impact - Expenditure (output)	\$ 9,353,637,583.16
Total Economic Impact - Payroll	\$ 6,963,524,718.72

The two set of estimates are extremely close. The difference between the two sets range from a negative 0.04% for output impact to positive 0.33% for payroll (earnings) impact.

Next, Table 7 shows the inter-industry interaction between all sectors of the State's economy and the non-residential (commercial) construction sector. According to our model, the largest beneficiaries of the economic impact of the commercial construction are as follows:

- ✓ Construction
- ✓ Manufacturing sector
- ✓ Service sector
- ✓ Wholesale trade
- ✓ Finance sector
- ✓ Transportation sector

Table 9: Industry Share

	Output	Earning (Payroll)	Employment
Agriculture, Forestry, and Fisheries	1%	0%	1%
Mining	0%	0%	0%
Construction	41%	77%	56%
Manufacturing	19%	6%	9%
Transportation, Communication, and Utilities	6%	2%	2%
Wholesale and Retail Trade	9%	4%	10%
Finance, Insurance, and Real Estate	8%	1%	3%
Services	16%	9%	18%
Total	100%	100%	100%

Figure 1: Industry Share – Output

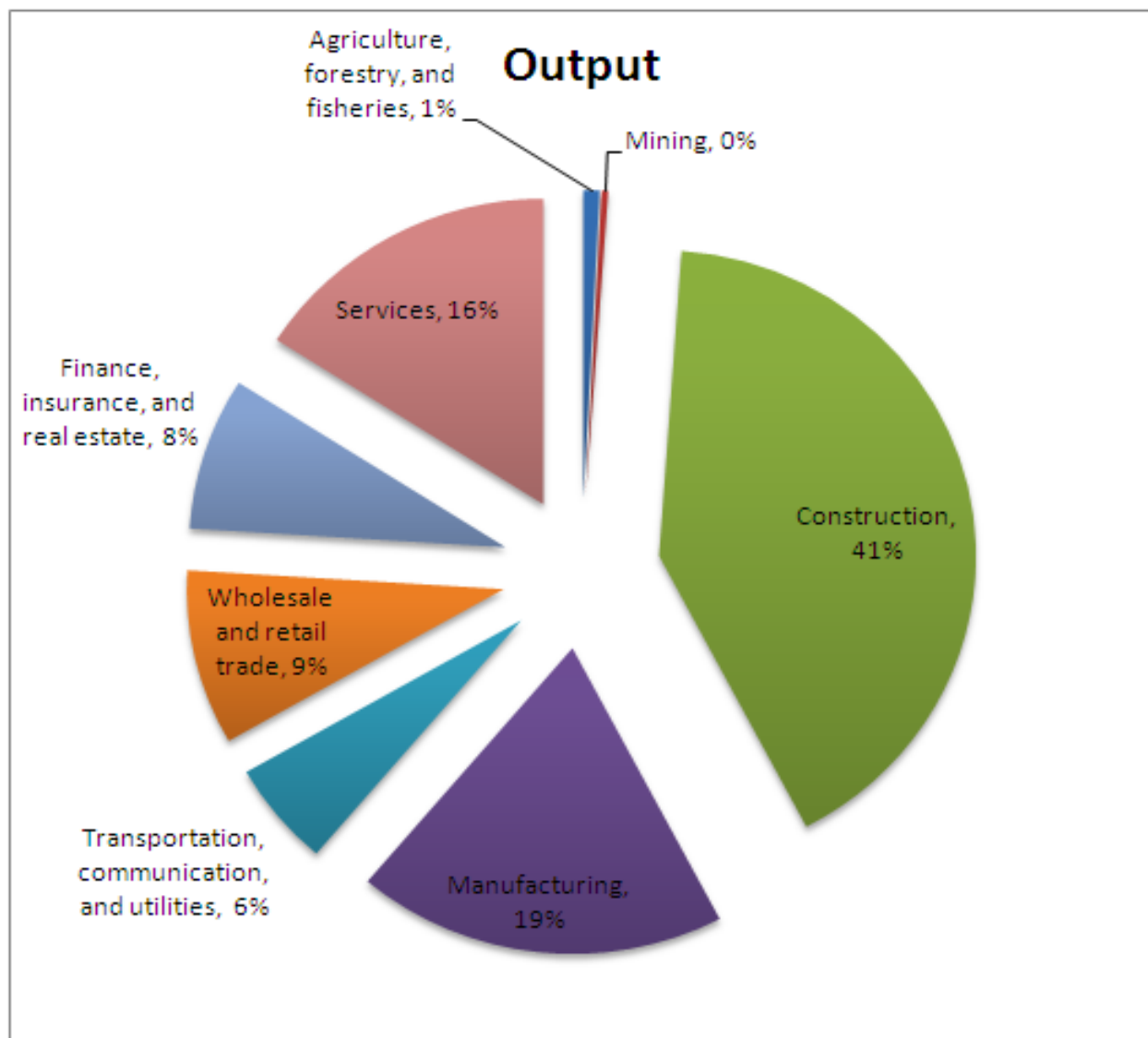
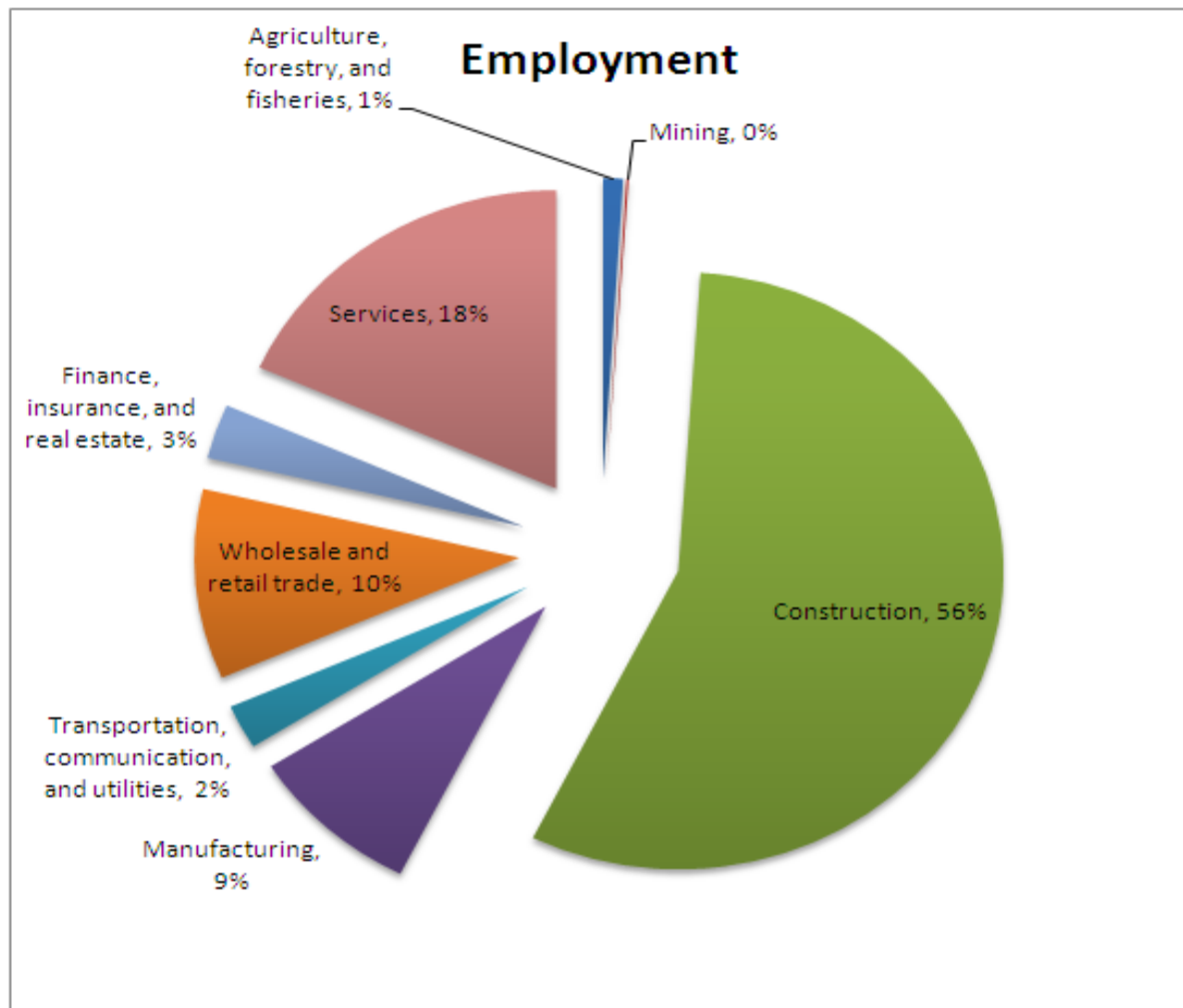


Figure 2: Industry Share - Employment



Finally, according to our model, the commercial construction industry is estimated to have generated a total of \$400 million of taxes for the State coffers. These are the category of taxes that we can directly attribute to the operation and spending of this industry. Based on our estimate, the commercial construction was responsible for \$216 million in income taxes, \$158 in sales and use taxes, and \$27 million in utility taxes. These taxes are net of deduction and collection fees and are net contribution to the State's Education Trust Fund.

Table 10: Alabama Selected Tax Collection Estimates – Attributable to Commercial Construction

Income Tax (Individual & Corporate)	\$216,675,758
Sales Tax	\$139,847,711
Use Tax	\$18,892,660
Utility Tax	\$27,360,759
Total Selected-Taxes	\$402,776,888