The Economic Impact of Advanced Technology Group

January 2018

Prepared by:
Bureau of Business and Economic Research
University of Montana
Missoula, Montana 59812

Prepared for:
Advanced Technology Group
216 W. Main St., Suite 110
Missoula, Montana 59802

BUREAU OF BUSINESS AND ECONOMIC RESEARCH
UNIVERSITY OF MONTANA

UNIVERSITY OF MONTANA

Acknowledgements

This report was produced and authored by Patrick Barkey and Brandon Bridge, director and economist, respectively, at the University of Montana Bureau of Business and Economic Research. The research was supported by the Advanced Technology Group (ATG). Thanks to Tom Stergios of ATG for supplying information used in the analysis. All errors in this report, of course, remain our own.

Contents

1. Background and Overview

This is a study on the ongoing, permanent contributions made by Advanced Technology Group (ATG) to the economy of Missoula, Montana. ATG is a consulting company that works in the technology domain of businesses. ATG provides its clients with the information needed to make smart business decisions, from contracts and billing to reporting revenue to Wall Street. ATG helps businesses manage systems, processes, and organizational structures that allow businesses to work with their customers or revenue more efficiently. ATG has been providing these consulting services in Missoula, MT since 2011.

Economic impacts in general occur because of events or activities by individuals and firms that create new expenditures. The spending created by the presence and activities of ATG in Missoula – which is over and above previously existing expenditures and does not simply displace spending elsewhere in the region – not only adds to economic activity in its own right, but it also induces further spending as the recipients of wages, sales, and tax revenues spend a portion of their income in the Missoula economy. Quantifying the economic effects of these new expenditures is the purpose of this report.

ATG's corporate headquarters is located in Kansas City, Kansas. ATG also has offices in St. Louis, Missouri, Cincinnati, Ohio, and Missoula, Montana. ATG currently employs about 300 people, 104 of whom are located in the Missoula, Montana office.

ATG is a fast growing company. ATG management reports that they anticipate that revenues will grow by 20% in 2018. In addition, ATG anticipates hiring another 50 employees in the Missoula office during 2018. ATG is also a high wage employer when compared to other Montana employers. The average ATG employee in Montana earned $77,481 in 2017, while the average annual wage in Montana was only $41,440 (U.S. Bureau of Labor Statistics, 2016).

The Bureau of Business and Economic Research at the University of Montana (UM BBER) carried out this report. This was done first by using data that UM BBER received from ATG on Missoula-specific payroll, revenues, and employment. This data was then used in an economic model to estimate how the new expenditures created by ATG add to economic activity directly, how they induce further spending, and how all of these interactions impact the city's economy. More details on the specifics of the economic modeling methodology are contained in the following section.

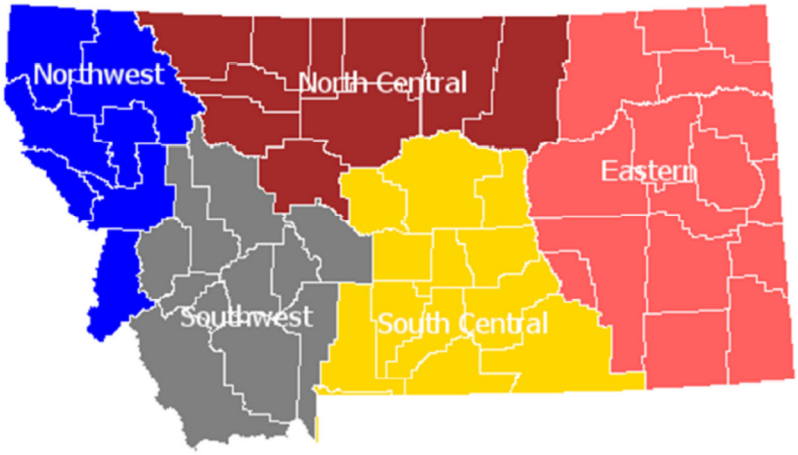
2. Policy Analysis with the REMI Model

Economic impacts occur because of events or activities that create new expenditures. Spending which is new – which is over and above existing expenditures and does not simply displace spending elsewhere in the region – not only adds to economic activity in its own right, but it also induces further spending as the recipients of wages, sales, and tax revenues spend a portion of their income in the local economy. Changes in the path of investment, migration, and prices and wages are possible as well.

The basic tool used in this study to assess the economic contribution of ATG is an economic model, calibrated to represent the interactions in the Missoula economy, leased from Regional Economic Models, Inc. The REMI model is one of the best known and most respected analytical tools in the policy analysis arena and has been used in more than 100 previous studies as well as dozens of peer-reviewed articles in scholarly journals. It is a state-of-the-art econometric forecasting model that incorporates dynamic feedbacks between economic and demographic variables. The REMI model forecasts employment, income, expenditures, and populations for counties and regions based on a model containing over 100 stochastic and dynamic relationships as well as a number of identities. A full explanation of the design and operation of the model can be found in Treyz (1993).

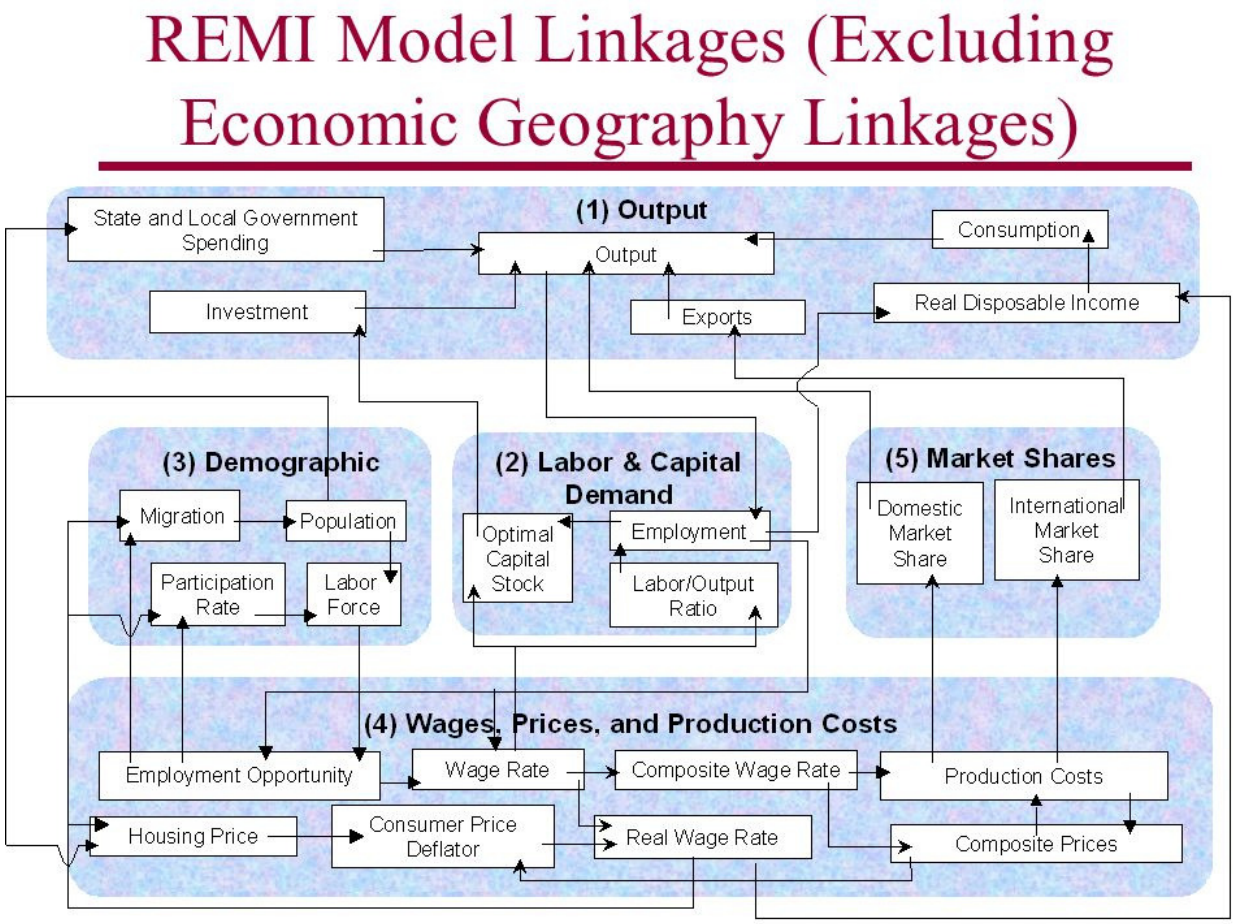
The model used in this study disaggregated the state economy into five regions: Northwest, Southwest, North Central, South Central, and Eastern. It explicitly recognizes trade flows that exist between these regions, as well as between the regions and the rest of the world. The impacts reported here represent the totals for the five regions. The definition of the regions is shown in Figure 2.1 below.

Figure 2.1
Economic Regions



In the model, the operations of ATG act as a stimulus to the city's economy, reflecting not only the addition of the production, employment, and expenditures of ATG, but how the rest of the economy reacts to those changes.

The model utilizes historical data on production, prices, trade flows, migration, and technological change to calibrate the relationship between five basic blocks of the regional economy as depicted in the figure on the following page: output, labor and capital demand, population and labor force, wages and prices, and market shares. The changes in production, labor demand and intermediate demand caused by the operations of ATG causes these blocks of the economy to react and adjust to a new equilibrium.



The essential philosophy of the model is that regions throughout the country compete for investment, jobs, and people. When events occur in a region they set off a chain reaction of actions causing dollar flows toward better investment and production opportunities, followed over time by a flow of workers and households toward employment opportunities and higher wages. The model embodies an 82-sector input-output matrix that describes the technological interdependence of production sectors of

the economy, as well as extensive trade and capital flow data to determine the share of each sector's demand that can be met by local production.

As powerful and flexible as this tool is, the answers it provides are only as good as the questions posed to it. The majority of work in this study is carefully crafting the inputs used to construct a scenario of the Missoula economy that faithfully represents all of the income flows that result from ATG operations. We now turn to this task.

3. The Economic Impact of ATG Operations

The fundamental question asked by this study is: what would the economy of Missoula look like if ATG did not exist? We assess this economic contribution by comparing two scenarios for the Missoula economy.

- The baseline scenario, which includes ATG and everything else in the Missoula economy, exactly as it exists today, and

- The alternate, no-ATG scenario, which removes all of the jobs, spending and income that occurs in Missoula that is part of ATG, and brings the Missoula economy to a new, lower equilibrium point.

The difference between these two economic scenarios – the differences in jobs, income, spending, revenues and population – represents the total economic impact of ATG. Because a substantial portion of the money that is earned as income or revenue by Missoula workers and businesses is spent again in the local economy, this total impact can be expected to be greater than the activity of ATG itself.

The presence of ATG in the Missoula economy ultimately grows the regional economic pie through three different mechanisms:

i. The direct impact of ATG, which consists of the spending of the company itself on employees, vendors, and other inputs:

ii. The indirect impact, which include companies and/or activities that exist in Missoula because of the existence of ATG, and

iii. The induced impacts, which occurs as money spent in Missoula is received by households and businesses as income, and is in turn spent (in part) in the regional economy.

The analysis begins with a careful assessment of the operations of ATG. The jobs, income and spending flows which are part of ATG operations add to the economic pie, as described above. They also form the basis for the formulation of the alternate, no-ATG scenario used to estimate the total economic impact.

Direct Impacts

The direct effects of ATG are measured by the spending, employment, and output of the company itself. One of the challenges of this study has been the rapid growth of the company. We chose a point in time – the fall of 2017 – when the company's Missoula operations:

- Employed 104 workers;
- Paid total wages of $8.1 million, or $77,481 per worker;

The company's operations were classified in the Professional, Scientific and Technical services industrial classification (NAICS 54). The company's purchases of everything from real estate to transportation services were estimated using the input-output relationships embedded in the REMI model, which in turn, are based on income and production flows published by the U.S. Bureau of Economic Analysis for that industry.

ATG operates in a competitive, dynamic industry landscape. The levels of employment and compensation have moved up significantly in the six months prior to this study, and are certain to change again. Thus the results of this analysis can be understood as the impact of ATG in Missoula at a specific point in time – the fall of 2017.

There are several other aspects of ATG's Missoula presence that merit attention in the analysis:

- Full-time employees can realize an equity position in the company in the event that the company is sold.
- Regular training sessions are held in Missoula, with 20-30 people from outside the area flying in and staying 3-4 nights each in local hotels;
- Occasional conferences take place with attendance of 100 or more people.

Since the equity position is only realized in the event of company sale, we have not formally incorporated it into this analysis. It is undoubtedly of value to company employees, however, and in this respect it makes it likely that the estimates of total ATG impacts presented in this report slightly conservative to some degree.

The visitation and associated spending that is due to the presence of ATG is included in the analysis as an indirect impact.

The indirect effects of ATG activities represent the reaction of the economy as the direct spending by ATG is received by Missoula businesses, households, and governments. The direct and indirect effects are combined to form the total economic impacts. These total impacts are estimated with the use of the REMI model discussed in the previous section.

Bear in mind that the total effects estimated in this report do not include activities such as charitable giving or local philanthropic efforts undertaken by the ATG corporation or its individual employees. Nor do we calculate relatively intangible effects that ATG may have on the local economy such as an increase in overall human capital or productivity.

Total Impacts Summary

The results of this study show that ATG provides a boost to the economy of Missoula. This comes in the forms of the economic indicators seen in table 3.1. Specifically we find that:

- the presence of ATG in Missoula adds a total of over 200 long-term jobs to the economy;
- $15 million per year of additional income is received by households in the region each year that is due to the activities of ATG;
- Missoula-based businesses realize an increase in gross receipts of over $21 million per year;
- ATG increases the total population of Missoula by over 200 people.

Table 3.1
Impacts Summary

Category	Units	Impact
Total Employment	Jobs	204
Personal Income	$ Millions	15.0
Disposable Pers. Income	$ Millions	12.9
Output	$ Millions	21.8
Population	People	215

Employment Impacts

As mentioned in Section 1 above, ATG is a purveyor of relatively high-wage jobs in the region. The wages paid to employees induce further spending throughout the economy. This spending results in an increased demand for workers in various employment sectors. This is shown in more detail in Table 3.2.

While the majority of the new employment activity takes place within ATG itself (Professional, Scientific and Technical Services), the employees of ATG increase the demand for all the standard economic goods and services in Missoula. More employees increases the demand for housing, which results in an increase of employment in the construction sector as well as the real estate, rental and leasing sector. These economic effects carry through to other sectors such as health care, leisure activities, and food service.

Table 3.2
Employment Impacts

Industry	Impact
Construction	7
Retail Trade	22
Real Estate and Rental and Leasing	5
Professional and Technical Services	109
Health Care and Social Assistance	11
Arts, Entertainment, and Recreation	2
Accommodation and Food Services	11
Other Private Employment	19
State and Local Government	0
TOTAL	187

Personal Income Impacts

Since ATG operations make the Missoula economy larger, it is not surprising to learn that the income received by Missoula households is higher as a result. The detail on personal income impacts, shown in Table 3.3, illustrates this point. Total wages and salaries paid to Missoula workers are $11.1 million higher due to the activities of ATG.

The induced impacts of ATG show up in other forms of income as well. Income from rents, interest, and dividends is higher by an average of $1.2 million per year due to the impact of ATG spending on population and the capital stock.

Table 3.3
Personal Income Impacts Per Year ($ millions)

Category	Impact
Total Earnings by Place of Work	15.1
Total Wage and Salary Disbursements	11.1
Supplements to Wages and Salaries	2.7
Employer contributions for employee pension and insurance funds	1.7
Employer contributions for government social insurance	1.0
Proprietors' income with inventory valuation and capital consumption adjustments	1.3
Less: Contributions for government social insurance	2.1
Employee and self-employed contributions for government social insurance	1.1
Employer contributions for government social insurance	1.0
Plus: Adjustment for residence*	-0.1
Gross In	0.0
Gross Out	0.1
Equals: Net earnings by place of residence	12.9
Plus: Rental, interest, and dividend income	1.2
Plus: Personal current transfer receipts	0.9
Equals: Personal Income	15.0
Less: Personal current taxes	2.1
Equals: Disposable personal income	12.9

*** Total earnings data are derived from records of employers who are located in Missoula. Since some Missoula workers are employed by out-of-city firms, and some Missoula firms employ workers from other cities, the adjustment for residence nets out these two impacts to produce an estimate of Missoula resident's income.**

Output Impacts

Missoula businesses realize higher gross sales of their products and services due to the operations of ATG. When looking at these gross sales, or output, impacts in Table 3.4, we see that most of these gains are realized by companies and organizations in the Professional and Technical Services category. The operations of ATG create an economy where these firms (including ATG) have sell about $13.2 million more per year.

Additionally, and in a similar fashion to the employment impacts seen in Table 3.2, the gross sales of the other industries in the city such as construction, retail trade, and health care are also positively impacted because of ATG.

Table 3.4
Output Impacts Per Year ($ millions)

Category	Impact
Construction	1.0
Wholesale Trade	0.4
Retail Trade	2.0
Real Estate and Rental and Leasing	1.0
Professional, Scientific, and Technical Services	13.2
Administrative and Waste Management Services	0.5
Health Care and Social Assistance	1.4
Arts, Entertainment, and Recreation	0.1
Accommodation and Food Services	0.7
Other Services, except Public Administration	0.4
State and Local Government	0.0
TOTAL	21.8

Compensation Impacts

While the jobs that have been created in the Missoula economy because of the operations of ATG are spread across a wide spectrum of economic activity, the company's focus on technology directs funds disproportionately to industries that pay higher than average wages. Over $11 million more in wages and salaries are paid in Missoula that are attributable to the existence of ATG, as shown in Figure 3.5.

Compensation, which add benefits to this figure, is increased by $13.6 million. When business proprietor income is added to this last figure, the total earning increase in the economy due to ATG per year is $14.9 million.

Table 3.5
Compensation Impacts

Category	Units	Impact
Wages and Salaries	$ Millions	11.8
Compensation	$ Millions	13.6
Earnings	$ Millions	14.9
Earnings per Job, New Jobs	$ Dollars	73,279

Population Impacts

A larger economy, with more job opportunity, is an attraction to potential workers outside Missoula. It also can cause a Missoulian, who might have migrated to another area, to stay in Missoula instead. Thus ATG operations have an impact on the city population, as shown in Table 3.6.

Table 3.6
Population Impacts

Age Cohort	Population Increase
Ages 0-14	58
Ages 15-24	27
Ages 25-64	127
Ages 65+	7
TOTAL	219

The pattern of the population impacts is slower and more gradual than other economic impacts. Increased job opportunities in Missoula relative to other locales due to ATG cause in-migration from other regions only gradually. Those who do migrate for job opportunities tend to be younger, and bring their children (existing or yet-to-be born) with them.

The results of this model show that population of the city is 219 people larger than would be the case if ATG did not exist. As shown in the table, the age distribution of the new residents is skewed to the younger cohorts, with 85 additional school-aged residents and 127 working age residents in Montana as a result of ATG.

4. Summary and Conclusions

This has been a study of how the Missoula economy has been impacted by the ongoing operations of Advanced Technology Group (ATG), a consulting company that works in the technology domain of businesses. The Bureau of Business and Economic Research, the main research unit of the School of Business Administration at the University of Montana, was contracted by ATG to research the impacts that ATG has on the city economy.

Using data from ATG on Missoula-specific payroll, revenues, and employment, an economic model was used to estimate how ATG impacts the city economy, and our basic findings are that these impacts are significant. Specifically, we find that the economy in Missoula is larger, more prosperous, and more populous due to the activities of ATG. We find that:

- 187 jobs have owed their existence in the city economy to ATG operations;
- average earnings for these new jobs have been $73,279 per year;
- Missoula households receive $15 million in additional personal income per year, as a result of ATG operations;
- Missoula businesses realize $21.8 million in additional gross sales of products and services, due to ATG operations;

By almost any measure, the company's impacts are substantial, and it clearly has been a boon to the region's economy.

References

Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis; George I. Treyz, 1993. Norwell: Kluwer Academic Publishers.

"Design of a Multiregional Policy Analysis Model," George I. Treyz, Journal of Regional Science, Volume 20, Issue 2, pp. 191-206, May 1980.

"The REMI Economic-Demographic Forecasting and Simulation Model," George I. Treyz, Dan S. Rickman, and Gang Shao, International Regional Science Review, Volume 14, pp. 221-253, December 1991.

"May 2016 State Occupational Employment and Wage Estimates," U.S. Bureau of Labor Statistics. May 2016. https://www.bls.gov/oes/current/oes_mt.htm#00-0000. Retrieved January 2, 2018