

# The Economic Contribution of ZooMontana



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## 1. An Analysis of the Economic Contributions of ZooMontana

### Introduction

For almost 30 years, Montana’s only zoo and botanical park – ZooMontana -- has provided the hundreds of thousands of visitors who take in its 70 acres of exhibits, gardens and educational facilities each year a unique and rewarding experience. The world-class facility, located in Billings, is a major attraction for visitors of all ages from both within and outside the region. In a state economy with a larger share of its total economy in outdoor recreation and tourism than all but one other state, the continued successful operations of ZooMontana represent a key component of the vibrant visitor economy of the region that supports jobs and brings spending to other businesses.

The Bureau of Business and Economic Research at the University of Montana (BBER), the state’s pre-eminent applied economic research center, conducted an analysis of how the operations of the zoo ultimately translate into higher levels of economic activity in the Billings region. Using data and information on operations during calendar year 2023, including the jobs and spending by the facility itself as well as the arrivals of those who travel, the analysis constructed a hypothetical, “no zoo,” scenario of the regional economy that represented how the local economy would perform if ZooMontana did not exist.

**Table 1 The Economic Contribution of ZooMontana: Summary**

<b>Category</b>	<b>Units</b>	<b>Impact</b>
Total Employment.....	Jobs	144
Personal Income.....	\$ Millions	\$7.6
Disposable Personal Income.....	\$ Millions	\$6.5
Output.....	\$ Millions	\$16.6
Population .....	People	177

A comparison of this hypothetical economy with the actual economy measures how the presence of ZooMontana contributes to economic activity. As summarized in Table 1, those contributions are substantial. The BBER analysis finds that the presence of ZooMontana in the Billings area economy ultimately adds

- 144 year-round, permanent jobs in a wide range of industries and occupations;
- \$7.6 million in permanent, recurring income to Billings area households, of which \$6.5 million is disposable, after-tax income available for spending in the region;
- \$16.6 million in economic output, defined as gross receipts of business and non-business organizations in the Billings region, and

- 177 people to the local population, an increase that is dominated by working-aged people and their families.

These economic impacts are larger than the employment and spending directly associated with ZooMontana operations, as we explain in greater detail in this report. This comes about due to (i) the additional economic activity supported by the spending of visitors to the Billings region elsewhere in the economy, and (ii) the knock-on effects of any new spending received as income and subsequently re-spent in part in the local economy.

## How These Results Were Produced

These findings are based on data and information on the operations of ZooMontana for 2023 that were provided to BBER by the zoo for use in this study. This included details on employment, compensation, vendor spending, and the number, type, and origin of visitors over that year. The latter were converted to local spending estimates using visitor spending profiles published by the University of Montana Institute for Tourism and Recreation Research (Grau 2024).

The approach taken to this analysis involved producing two projections for the Billings region economy, as shown in Figure 1. The baseline, or status quo projection, makes no changes to the economy, while the alternative projection estimates the level of economic activity that would be achieved if the operations of Zoo Montana today were no longer present. This “no zoo” scenario is not a realistic or practical outcome for the regional economy, but a conceptual way of demonstrating the linkages between the presence of the zoo and economic activity overall. Since this alternate project cannot be directly observed we estimate it with an economic model.

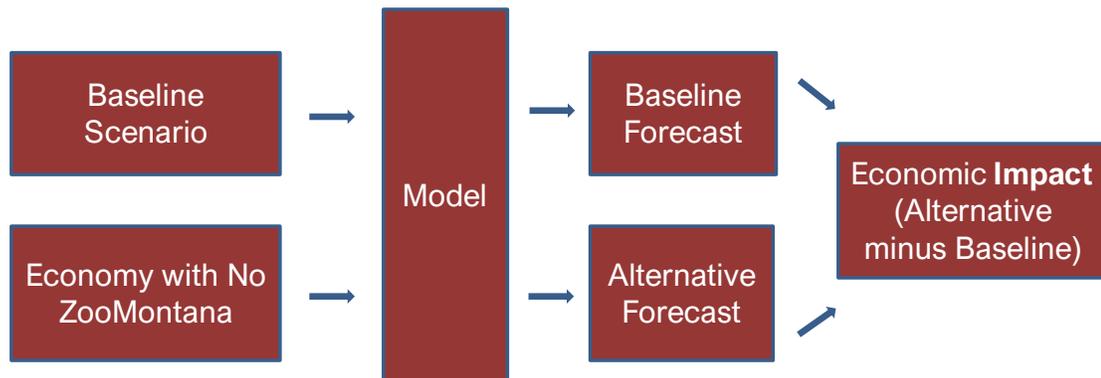
There are three basic steps to carrying out the analysis:

- Constructing the “no zoo” scenario. Operations data were obtained from ZooMontana, with details on employment, compensation, vendor spending, and revenues. These data represent the economic flows that are lost in an economy with no zoo operations.

Additionally, the “no zoo” scenario also removes the spending of out-of-area visitors who come to the region to go to ZooMontana. These are estimated by applying ITRR visitor spending profiles to visitor count information provided to BBER by the zoo.

- Projecting economic activity with no zoo operations or visitors. An economic model that recognizes the interdependencies between sectors of the economy is a useful tool in assessing how the removal of the economic flows from zoo operations and the associated visitor spending propagate throughout the rest of the economy.
- Calculating economic impacts. The results presented in this report represent the difference between the status quo and “no bank zoo” economic projections.

Figure 1 Policy Analysis with the REMI Model



The BBER utilized this information to construct a “no zoo” scenario for the regional economy using its policy analysis model specifically designed and calibrated for this purpose. The REMI model is a dynamic, multi-sector representation of the regional economy that incorporates inter-industry linkages, demographics, and migration. It is a well respected tool for policy analysis that has been used in more than 100 studies and dozens of peer-reviewed publications (Treyz 1993).

### About This Study

This study was conducted by the Bureau of Business and Economic Research at the University of Montana in May-June of 2023. It was sponsored by ZooMontana. The primary author of this report is Patrick Barkey, BBER Director. All findings, errors or omissions in this report are the sole responsibility of BBER.

### About the BBER

The Bureau of Business and Economic Research is the preeminent business research center in Montana. Established in the University of Montana’s College of Business in 1948, the BBER is involved in survey research, economic analysis, industry studies, and its long-running Economic Outlook Seminar programs, now in their 50th year. The BBER mission is to provide an understanding of the economic environment in which Montanans live and work.

## 2. The Direct and Indirect Economic Contributions of ZooMontana

The first step in the analysis is to carefully enumerate the economic flows – jobs, spending, and revenues – that ZooMontana directly contributes to the regional economy. These are the flows that the facility itself is responsible for, known as direct contributions. A second, related, step is to assess the spending not directly associated with the zoo that nonetheless takes place because of its presence. In this category the most important indirect contribution is the spending of visitors who come to Billings to experience ZooMontana on other goods and services in the local economy.

### Direct Contributions

ZooMontana is a year-round zoo, botanical garden and education facility operates on a 70 acre campus on the west side of Billings, Montana. Physically smaller than some other urban zoos, with an emphasis on wildlife native to Montana and other colder regions north of the 45<sup>th</sup> parallel, ZooMontana differs from most facilities nationwide in that it does not receive public tax support.

While fluctuating over the course of the seasons, headcount employment at the facility averages approximately 31 workers. In addition to the compensation paid to the workforce, ZooMontana purchased more than \$750,00 of supplies from vendors in fiscal year 2023, which ended on September 30, 2023. Another type of spending comes from capital projects, which are less regular but have been significant in recent years.

The hypothetical “no zoo” economy created in this analysis, the employment, spending, and physical presence of the zoo are removed from the local economy.

### Indirect Contributions

ZooMontana is an attraction for visitors to Billings, who participate in other activities and spend in the local economy as part of their trips to the area. Attendance information collected by the zoo facilitated the estimate of attendance sourced from outside the region. Using estimated spending profiles maintained and updated by the University of Montana Institute for Tourism and Recreation Research (ITRR), it was possible to estimate the new spending in the community.

In 2023, 79,560 non-local visitors attended ZooMontana. To convert this figure to a level of spending, we utilized ITRR information corresponding to that year’s spending profile of all Montana visitors.

The first stage of this process was to convert the attendance figure to an estimated number of groups. In 2023, ITRR estimates that the average group size of non-local Montana visitors was 2.27 persons, thus it is estimated that ZooMontana is responsible for visitation by 35,048 groups of visitors in 2023.

The daily spending of Montana visitors in 2023 was \$195.13 in 2023, according to ITRR. This estimate reflects the average over seasons of the year, as well as visitor types. The latter include campers, those visiting friends, and those using hotels and motels. Under the assumption that the average length of stay for visitors to Zoo Montana is 1.5 days, we conservatively estimate that non-local visitors to ZooMontana spent an additional \$10.25 million in the Billings economy in 2023. The composition of spending across local industries was estimated using the Tourism and Recreation Satellite Accounts maintained at the state level by the U.S. Bureau of Economic Analysis.

In an economy where ZooMontana did not exist, this spending – and the jobs and income it supports – would not occur.

### 3. Economic Contribution of ZooMontana

What would the Billings area economy look like if ZooMontana did not exist? This is a purely hypothetical question that we pose in this study for an important purpose – namely, to assess how economic livelihoods across the entire range of commercial activities in Billings ultimately depend on the operation of the zoo. In this exercise ZooMontana’s activities are removed from the overall economy, and the spending flows that currently support jobs, income, and revenues in the local economy are interrupted. This leads to a new, lower, level of economic activity. The difference between this hypothetical, no-zoo economy and the actual economy is the economic contribution of the zoo.

As we summarized above, the top-line results of the analysis show that a Billings economy that does not include ZooMontana is ultimately smaller by:

- 144 jobs, across a wide spectrum of industries;
- \$7.6 million per year in income received by Montana households;
- \$16.6 million in annual economic output, defined as gross receipts received by local business and non-business organizations; and
- 177 people, dominated by those of working age and their children.

Those results came about not only because of the loss of the zoo’s own employment and revenues, but also because of the loss of visitors to the area and the associated knock-on effects of the loss of these economic flows to the rest of the economy. We can gain additional insights into how the zoo’s operations ultimately support local economic activity by considering the findings in greater detail.

#### Employment Contributions

Disaggregating the overall employment contributions of ZooMontana into the short list of industry categories shown in Table 2 reveals the breadth of activity that is impacted directly or indirectly by the zoo’s existence.

**Table 2 The Economic Contribution of ZooMontana: Employment Impacts**

Industry	Impact
Construction.....	11
Manufacturing.....	1
Retail Trade.....	14
Transportation and Warehousing.....	3
Professional and Technical Services.....	3
Administrative and Waste Services.....	3
Health Care and Social Assistance.....	4
Arts, Entertainment, and Recreation.....	38
Accommodation and Food Services.....	52
Other Services, except Public Administration.....	3
Other.....	14
<b>Total</b>	<b>144</b>

The largest employment impact of ZooMontana is felt in the Accommodation and Food Services industry, which reveals the importance of the spending of visitors to the zoo in influencing the aggregate impacts.

The second largest employment impact is in Arts, Entertainment, and Recreation industries, which includes the jobs of the zoo itself.

There are also modest employment impacts felt in industries with connections to the zoo that are much less apparent. These include construction, health care, and other industries, which include government. These job impacts are induced by the second and subsequent rounds of spending that occur as workers and vendors who receive wages and revenues, respectively, from either the zoo or its visitors re-spend a portion of that money received in the local economy, supporting additional jobs and income streams.

Some of this induced new spending comes about because of ZooMontana’s impact on population. The greater job opportunities in a local economy that includes the zoo results in more people moving to Billings and/or more residents retained who would otherwise have relocated elsewhere. Those new residents add to demand for goods and services provided by local industries as well.

### Personal Income Contributions

Another dimension of the economic contributions of ZooMontana is the impact of the zoo’s presence on income received by local households, or personal income. These impacts are permanent, annual flows of income from all sources that comes about because of the zoo.

**Table 3 The Economic Contribution of ZooMontana: Personal Income Impacts (\$ millions)**

Category	Impact
<b>Total Earnings by Place of Work</b>	<b>\$6.4</b>
Total Wage and Salary Disbursements.....	5.0
Supplements to Wages and Salaries.....	1.3
Employer contributions for employee pension and insurance funds.....	0.8
Employer contributions for government social insurance.....	0.5
Proprietors' income with inventory valuation and capital consumption adjustments.....	0.1
Less:	
Contributions for government social insurance.....	0.9
Employee and self-employed contributions for government social insurance.....	0.5
Employer contributions for government social insurance.....	0.5
Plus:	
Adjustment for residence.....	(0.0)
Gross In.....	0.0
Gross Out.....	0.1
Equals: <b>Net earnings by place of residence.....</b>	<b>\$5.4</b>
Plus:	
Property Income.....	1.1
Dividends.....	0.4
Interest.....	0.5
Rent.....	0.2
Personal Current Transfer Receipts.....	1.0
Equals: <b>Personal Income.....</b>	<b>\$7.6</b>
Less:	
Personal Current Taxes.....	1.0
Equals: <b>Disposable Personal Income.....</b>	<b>\$6.5</b>

The disaggregation of the \$7.4 million in annual income received by Billings households because of the presence of the zoo shown in Table 3 produces additional insights on the nature of the contributions of the zoo to the local economy. Most of the additional income Billings households receive because of ZooMontana consists of income associated with employment, or earnings. But there are also increases in income from property and in income received from transfers. The latter include both government payments as well as pensions. These increases in so-called unearned income come about because a local economy that contains ZooMontana is larger, with more assets and wealth.

The results shown in Table 3 also help explain how the contributions of the zoo spill over into gains for industries and jobs with no direct relation to the zoo’s own activities. Thanks to the presence of the zoo, there is \$6.5 million in additional spending capacity of Billings households, some fraction of which is spent in the local economy to support jobs and revenues across the entire range of locally produced goods and services.

**Output Contributions**

Businesses and other organizations in the local economy are recipients of new spending as well. REMI defines economic output as gross receipts of business and non-business organizations in payment for goods and services, with the exception of retail and wholesale trades businesses, where markup is used instead. A more detailed examination of output impacts, as shown in Table 4, turns the focus to area businesses in detailing what the existence of ZooMontana in Billings means to their own operations.

**Table 4 The Economic Contribution of ZooMontana: Output Impacts (\$ millions)**

<u>Industry</u>	<u>Impact</u>
Construction.....	1.7
Real Estate.....	1.9
Retail Trade.....	1.7
Transportation and Warehousing.....	0.6
Professional and Technical Services.....	0.5
Administrative and Waste Services.....	0.4
Health Care and Social Assistance.....	0.8
Arts, Entertainment, and Recreation.....	2.9
Accommodation and Food Services.....	4.3
Other Services, except Public Administration.....	0.3
Other Private.....	0.5
Government.....	1.1
<b>TOTAL.....</b>	<b>\$16.6</b>

The distribution of output impacts across industries reveals more insights on how the overall economic contributions that ZooMontana makes to the local economy occur. There is considerable spillover from the activities of the zoo to additional gross receipts realized by businesses in unrelated industries such as construction, real estate and even health care. The table shows the additional spending that occurs in Billings because of the presence of the zoo that is captured by local businesses and non-business organizations. This is the revenue that supports their own additional hiring and spending.

**Population Contributions**

A larger and more prosperous economy that comes about because of the operations of ZooMontana has great employment and investment opportunity as well. The population increase in the Billings region that is ultimately supported by the zoo is both a cause and effect of its economic contribution. The increase represents a combination of new individuals and families relocating to the region as well as the retention of residents who may have otherwise relocated elsewhere.

**Table 5 The Economic Contribution of ZooMontana: Population Impacts**

<b>Age Cohort</b>	<b>Impact</b>
Ages 0-14.....	46
Ages 15-24.....	22
Ages 25-64.....	106
Ages 65+.....	4
<b>Total.....</b>	<b>177</b>

The net increase in residents creates demand as well, which is reflected in some of the outcomes on spending and employment reported in this study. One of the most prominent aspects is the demand for government services, especially K-12 schools. The population contributions of ZooMontana are dominated by working aged people and their (in some cases yet to be born) children, as shown in Table 5. This has important implications for the provision of public services and schools.

### **Summary**

The detailed examination of how the economy of the Billings region is supported by the presence of ZooMontana presented in this report was conducted by asking a basic question: What would the economy look like if ZooMontana did not exist? It is a hypothetical question – no shutdown or disinvestment is analyzed. Instead, we imagine a Billings economy in which the zoo is not present, to be used as a basis of comparison to the actual economy in order to judge the zoo’s economic contributions.

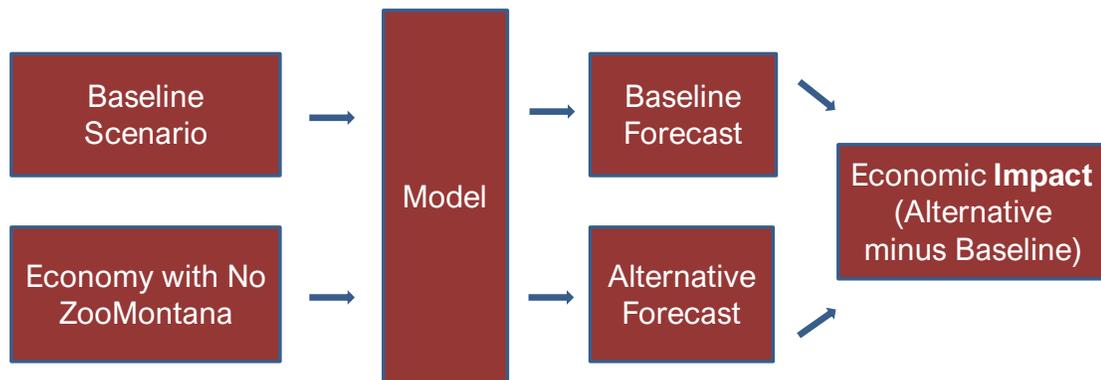
The basic conclusion of this study is that the operations of ZooMontana contribute to making the Billings regional economy larger, more prosperous, and more populous. The jobs, incomes, and business revenues that owe their existence to the presence of the zoo can be found across the entire spectrum of economic activity in the region. They come about because of the new spending flows that originate from the zoo itself, its employees, and visitors attracted to the region to take in its rich tapestry of zoological and botanical offerings.

As significant as these economic contributions are, they by no means encompass all of the benefits of the zoo to the community. The zoo’s contribution to quality of life of Billings residents, the educational opportunities it affords students of all ages, and its central role in the cultural life of the area are not addressed in this analysis. Yet even with these kinds of contributions not included, it is easily seen that the contributions of Montana’s only zoo and botanical park to the economy of the Billings region are substantial.

## Appendix: The REMI Modelling Methodology

The basic approach of using the REMI model to produce the results for this study is illustrated in Figure A.1 below. The analysis started with a baseline projection for the Montana economy, where the operations the zoo are present. Next, the analysis employed the REMI model a second time, simulating an alternative scenario where ZooMontana and its associated economic activity are absent from the Montana economy.

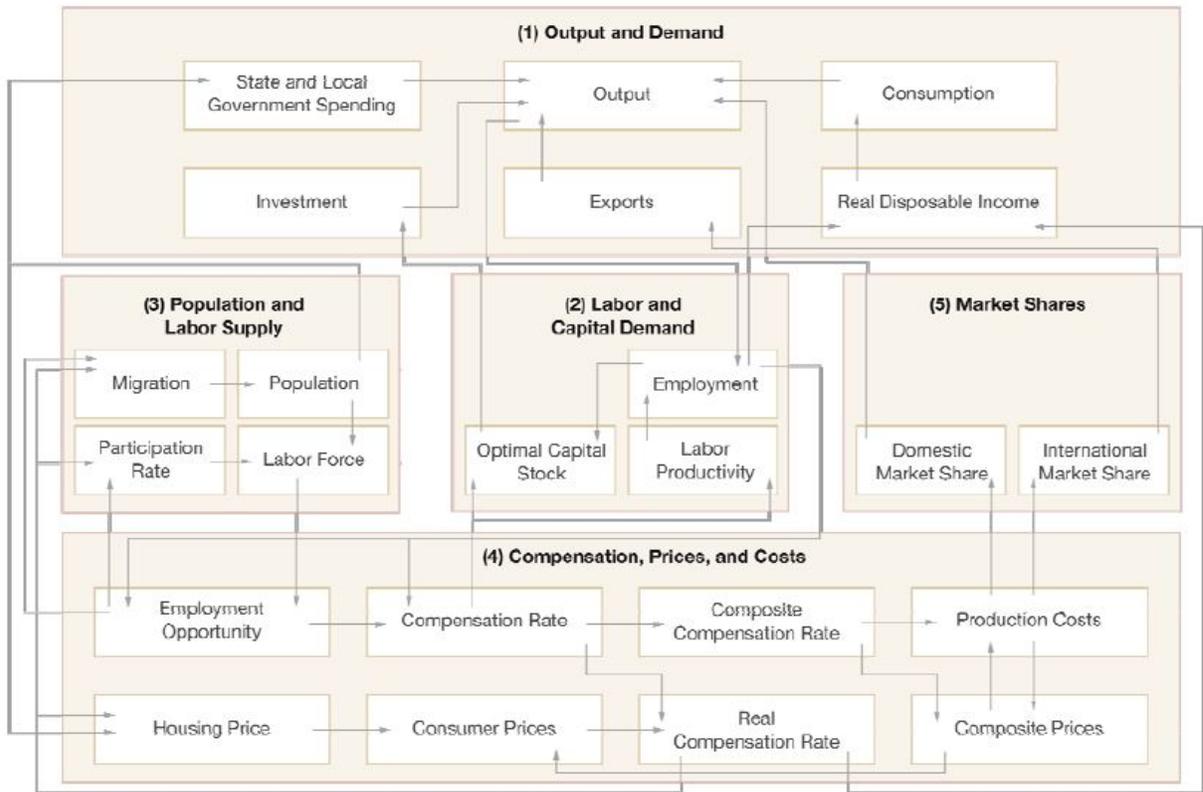
Figure A.1. Policy Analysis Using the REMI Model



The difference between the two economic projections represents the total economic contribution of ZooMontana.

The REMI model utilizes historical data on production, prices, trade flows, migration, and technological advances to calibrate the relationship between five basic blocks of the state economy: 1) Output and Demand; 2) Labor and Capital Demand; 3) Population and Labor Supply; 4) Compensation, Prices and Costs; and 5) Market Shares. These linkages are shown in Figure A.2, below.

Figure A.2. Schematic Model of REMI Linkages



The differences in production, labor demand, and intermediate demand associated with the absence of the zoo impact these blocks, causing them to react to the changes and adjust to a new equilibrium. This new equilibrium constitutes the alternative scenario referred to above—the absence of ZooMontana.

The underlying philosophy of the REMI model is that regions throughout the country compete for investments, jobs, and people. When events occur in one region, they set off a chain reaction of events across the country that causes dollars to flow toward better investment and production opportunities, followed over time by workers and households toward better employment opportunities and higher wages.

The REMI model consists of an 82-sector input/output matrix that models the technological interdependence of production sectors of the economy, as well as extensive trade and capital flow data. Together, these components enable the estimates of the shares of each sector’s demand that can be met by local production. Simplified illustrations of the schematic model in Figure A.3 are provided on the following pages, in figures A.3 through A.7.

Figure A.3. Output Linkages

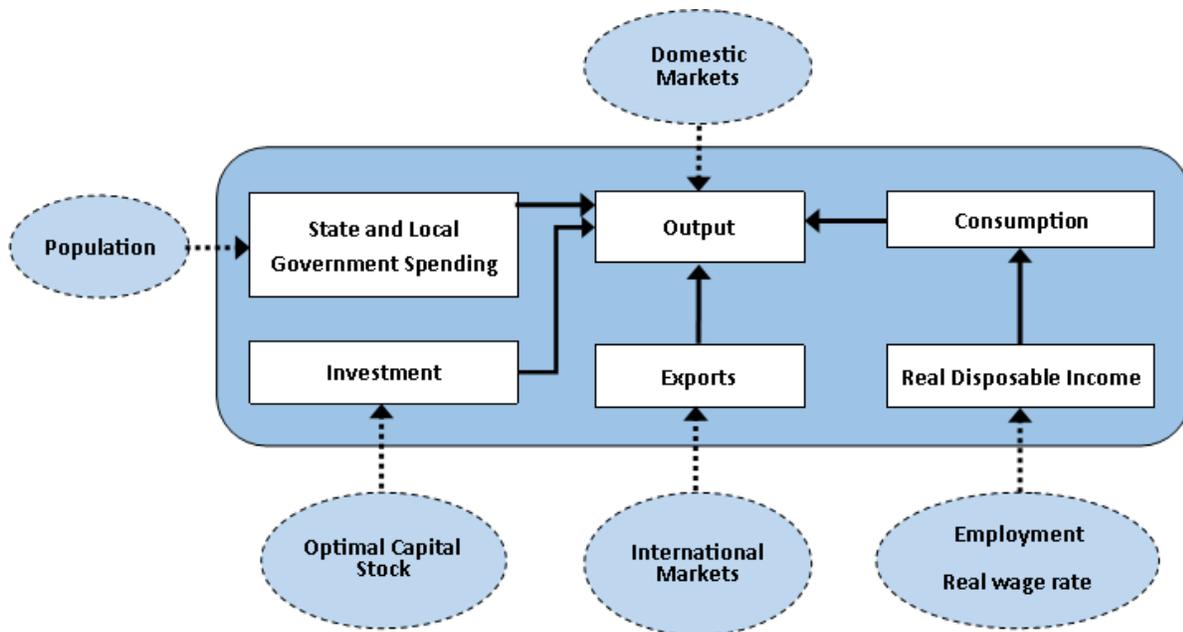


Figure A.4. Labor and Capital Demand Linkages

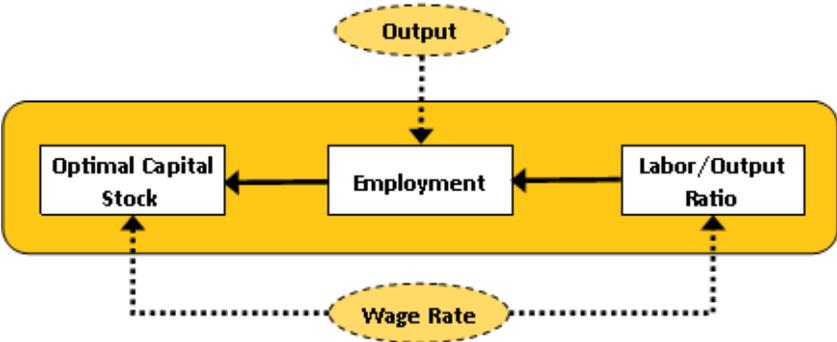


Figure A.5. Demographic Linkages

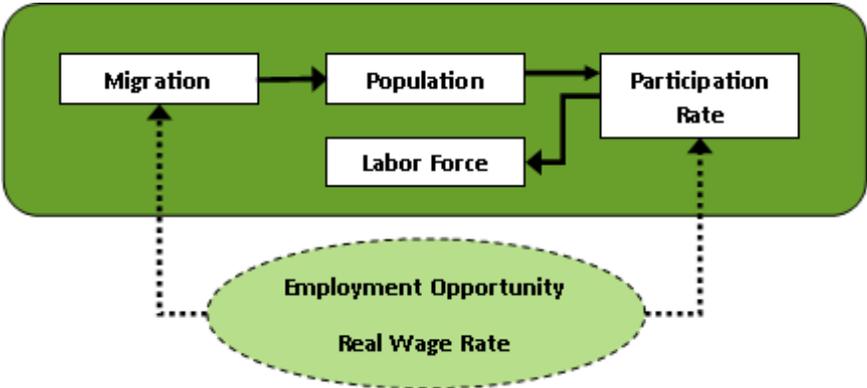


Figure A.6. Wages, Prices and Production Costs Linkages

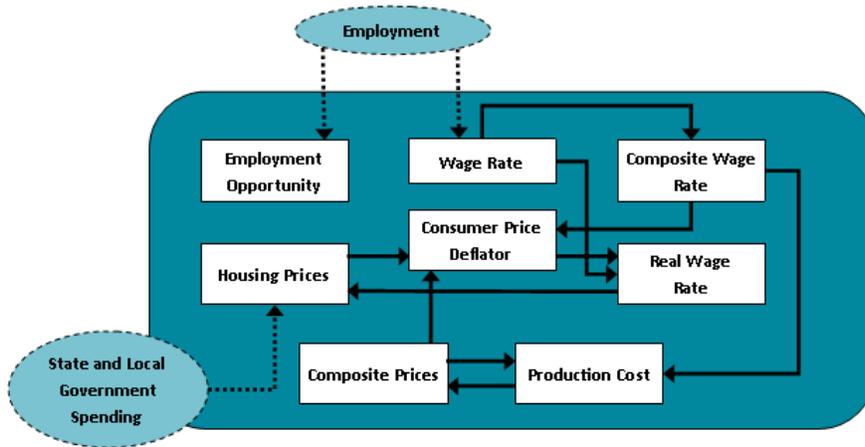
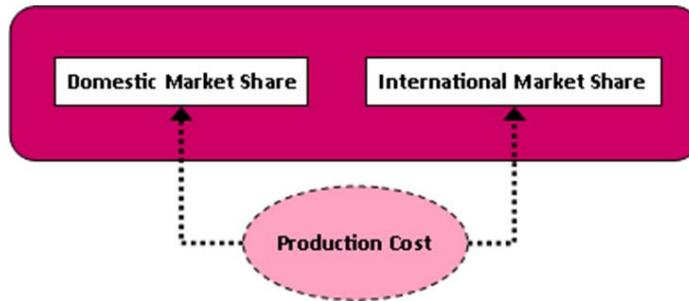


Figure A.7. Market Share Linkages



As powerful and flexible as this tool is, the output it provides is only as good as the inputs provided. The majority of the work for this study was to carefully craft the inputs used to construct a scenario for the economy that faithfully represents all of the events, income flows, and the direct and indirect activity that would not occur in the absence of the economic flows generated by ZooMontana.