ECONOMIC IMPACT ASSESSMENT,
SANDIA SCIENCE & TECHNOLOGY PARK

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Introduction

The Mid-Region Council of Governments (MRCOG) provides the Sandia Science & Technology Park (SS&TP) with annual assessments of how growth at SS&TP affects the MRCOG Region. SS&TP was established in southeast Albuquerque in May of 1998.

MRCOG employs the Regional Economic Models, Inc (REMI) Policy Insight (PI+) model to produce the numbers presented in this report. The PI+ model is calibrated and updated annually by REMI staff based on local data and allows analysis for three geographic areas: The City of Albuquerque; Bernalillo County (which includes Albuquerque); and the MRCOG Region (which includes Bernalillo, Sandoval, Torrance, and Valencia Counties). The impact on the region can be considered a proxy for the impact on the State of New Mexico, since the largest share of the economic impact of SS&TP occurs within the four-county region.

This report presents an estimate of the economic impact of SS&TP in 2008 and 2009, along with an estimate of the cumulative impact of SS&TP since its inception. It also explains the key inputs and assumptions used to derive these impacts. MRCOG works in close coordination with SS&TP to ensure that the inputs and assumptions that serve as the basis for this assessment are current and accurate. For a more in-depth methodology regarding model functionality and the economic assumptions that are used to produce results, please refer to Appendix A, an overview of the PI+ model.

Notes on the PI+ Model

Each year REMI staff reevaluates their methodologies and makes improvements in response to user input. In addition, the local data on which the model is based is updated. These annual changes to the modeling tool mean that in any given year, results are not directly comparable with other years. This makes it challenging to perform historical analysis or to analyze cumulative impacts for SS&TP over time. A summary table (Table 5) of estimated impacts of SS&TP since inception takes this into account and represents a best effort at combining data from past versions of PI+ into a reasonable estimate of a cumulative Park impact on the region.

A key assumption that underlies this analysis is that there is little local competition to provide the goods and services produced at SS&TP, and as such, sales displacement from other local firms is minimized. This assumption is based on the understanding that much of the goods and services developed at SS&TP are highly specialized and generally supplied under exclusive contracts. For example, several of the businesses located at SS&TP are a strategic supplier to Sandia National Labs such as K-Tech and TEAM Technologies, or produce a highly specialized good such as that which Emcore provides to NASA. For this reason, model inputs were adjusted to reduce sales competition in the overall region, which serves to better reflect the true economic impacts of SS&TP.

Another model adjustment was an upward wage adjustment in order to better reflect the local average wages for Research and Development and. This is necessary due to the broad employment sectors that drive the PI+ model. In PI+, the Research and Development category does not exist, so these jobs are most appropriately classified under the broad umbrella of Professional and Technical Services. While this sector encompasses Research and Development services, it also includes other lower skilled positions. The wage adjustment factor introduced to PI+ was based on the Albuquerque metropolitan area's average wage for "Scientific Research and Development Services", which is available from the Bureau of Labor and Statistics (BLS). In 2010 the Computer and Electronic Product Manufacturing jobs were also provided an upward wage adjustment due to the nature of the jobs at the Park, based on the BLS average MSA wage for that sector.

Lastly, information from SS&TP staff states that local talent is being utilized for most of the design and construction of Park facilities, and that local vendors are used to purchase supplies and equipment to companies located at SS&TP whenever possible. Local investment is assumed within the PI+ model in order to capture the full regional impact of SS&TP.

Inputs

Inputs to REMI as provided by SS&TP include total employment by sector as well as an estimate of construction costs, equipment costs and other miscellaneous spending. The number of jobs generated at SS&TP impacts economic factors such as wage and salary disbursements and consumer spending, as well as demographic factors such as migration and population growth. The total number of jobs at SS&TP by estimate year is shown in Table 1.

TABLE 1	
Employment	
Year	Park Employment
End of Year 2008	2111
End of Year 2009	1942

Source: Sandia Science and Technology Park

In the midst of a major recession both locally and nationwide, SS&TP lost approximately 170 jobs within the Park over the past 2 years. When it is considered that 116 of those jobs were held by Sandians, many of whom were relocated to the Base, the Park has experienced a relatively small drop in employment in comparison to the level experienced throughout the City.

Private and public investment spending are important factors in determining overall impacts of SS&TP, including indirect job creation and intermediate demand for goods and services used in the production process. Private investment in SS&TP since inception exceeds $259 million. It is estimated that $140 million of that investment was spent on construction and $119 million went towards equipment for operations. At the time of this analysis the construction of a 25,000 square foot addition to Applied Technololgy Associates was underway with expected completion in the summer of 2010.

Public investment since inception is estimated at $69.6 million. Included in this investment is the U.S. Department of Energy's contribution for construction and equipment, Sandia National Laboratories management of the Park, land from Albuquerque Public Schools and NM State Land Office, landfill cleanup from Bernalillo County. In addition, the U.S. Economic Development Administration, the New Mexico State Legislature, and the City of Albuquerque also provided assistance to the SS&TP in the form of grants and matching funds for infrastructure improvements including a fiber optic network and Point-of-Presence building.

Economic Indicators

The indicators selected to measure economic impacts include employment growth by sector; population; consumption; taxable consumption; gross receipts tax revenue; and the wage and salary distributions that are estimated to be a result of SS&TP. These indicators, as provided in tables 2 through 4, are defined as follows:

Employment Impact: Employment includes all jobs created at SS&TP (direct jobs) plus others that were spin-off jobs created from the increased economic activity in the greater community that can be attributed to SS&TP (indirect jobs).[1] Indirect jobs result from the new demand created by the increase in population due to new jobs at the park, as well as the goods and services required by those jobs such as equipment and supplies. The number of indirect jobs is calculated

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[1] The multiplier effect in REMI is not a single factor for all jobs rather it is calculated from a number of equations based on the type of new job that is being created. The multiplier effect will also vary depending on the amount of excess supply that the model calculates in the local economy; if the model estimates that new consumption generated by new jobs can be met by the current level of employment there will be no new multiplier effect jobs created. Likewise, REMI will not estimate new migration into the region or lower out-migration from the region unless the characteristics of the existing labor force indicate a need for workers from outside the region.

by subtracting the total direct jobs (Table 1) from the total employment impact as shown in Tables 2 through 4.

When considering indirect employment it is important to note the difference between construction work and other types of jobs generated by SS&TP. Construction has an immediate and considerable impact on employment, consumption, gross receipts, and wage disbursements, but this impact disappears once the construction is complete. Conversely, other indirect jobs are likely to grow as workers have families and expand their need for goods.

Population Impact: Population reflects the population growth generated by SS&TP, which is mainly a result of both anticipated migration due to SS&TP employment and persons born to the new migrants after they arrive in the region. Population is affected by estimated changes in total migration, special populations, fatality rates, and survival rates. Like employment, estimated impact to population is presented as totals, so the 2008 estimate includes total population generated from SS&TP since inception.

Consumption Impact: Consumption is the increase in expenditures on goods and services out of local real disposable income due to the impacts of SS&TP. It is a measure of final local demand for goods and services purchased by persons and businesses. Consumption is affected by changes in Real Disposable Personal Income, Population, and Commodity Prices.

Taxable Consumption impact: Taxable Consumption is generated directly from consumption as an estimate of the total purchases subject to the gross receipts tax. It is calculated by using the percentage of gross receipts that were actually taxable as available from the State of New Mexico Taxation and Revenue Department Combined Reporting System.

State Gross Receipts tax revenue impact: This impact is generated by isolating taxable consumption by the City, unincorporated Bernalillo County, and the remainder of the Region and applying the appropriate state tax rate as reported by the New Mexico Department of Taxation and Revenue. For unincorporated Bernalillo County, and other non-municipalities, that rate is 5.0%. Albuquerque's share to the State is 3.775% because from the State's 5.0% rate, 1.225% of the taxable gross receipts within a municipality are distributed to the municipality.

Bernalillo County Gross Receipts tax revenue impact: This impact is calculated by isolating taxable consumption by the City from unincorporated Bernalillo County and applying the appropriate tax rate for Bernalillo County as reported by the New Mexico Department of Taxation and Revenue. County imposed tax rates were 0.8125% in 2008 and 0.9375% in 2009 within unincorporated Bernalillo County. Within the City of Albuquerque, the County imposed tax rates were 0.6875% in 2008 and 0.8125% in 2009.

<u>City of Albuquerque Gross Receipts tax revenue impact:</u> This impact is calculated by applying the appropriate tax rate for the City of Albuquerque as reported by the New Mexico Department of Taxation and Revenue. This was 1.0625% in 2008 and 2009. Added to this is 1.225% from the State rate of 5.0% that is distributed to the City.

<u>Wage and Salary Disbursements impact:</u> Wage and Salary Disbursements are the monetary remuneration of employees, including the compensation of corporate officers; commissions, tips, and bonuses; voluntary employee contributions to certain deferred compensation plans, such as 401(k) plans; and receipts in kind that represent income. The estimated change in disbursements is directly related to the type of employment generated at SS&TP. Since Park jobs are primarily high technology, mainly engineering and research and development jobs, a high wage rate is associated with them.

Results

Tables 2 through 4 display the estimated annual impacts of SS&TP for three geographic areas: The City of Albuquerque; Bernalillo County; and the Region. The impacts shown are inclusive of lower geographic levels with the exception of tax revenue impacts which are not inclusive of lower geographies. Therefore, Bernalillo County data include the City of Albuquerque, and the Region includes both Bernalillo County and the City of Albuquerque.

Employment Impact represents the *total employment* generated by SS&TP, therefore 2009 jobs include all jobs (direct and indirect) associated with SS&TP up through that year. Population Impact should be interpreted in the same manner. Consumption, tax and wage data estimate the impact to each individual year and can be summed to estimate the impact of both years combined.

TABLE 2		
Economic Impacts of the Sandia Science and Technology Park		
MRCOG Region (Bernalillo, Sandoval, Torrance and Valencia Counties)		
Measure	**Estimated 2008 Impact**	**Estimated 2009 Impact**
Impact on Total Employment	7,006	6,688
Construction	546	501
Manufacturing	768	700
Retail Trade	639	592
Professional/Technical Services	1,604	1,521
Other Services	2,402	2,343
Population Impact attributed to the Park	1,556	1,604
Annual Impact on Consumption	382,500,000	368,750,000
Annual Impact on Taxable Consumption	188,572,500	192,118,750
Annual Impact on Gross Receipts Tax Revenue to the State	7,828,224	7,970,486
Annual Impact on Wage and Salary	375,284,000	363,000,000
Source: PI+		
Dollar amounts are presented in 2009 dollars.		
Employment includes all private non-farm employees.		

TABLE 3		
Economic Impacts of the Sandia Science and Technology Park		
Bernalillo County (including City of Albuquerque)		
Measure	**Estimated 2008 Impact**	**Estimated 2009 Impact**
Impact on Total Employment	6,713	6,419
Construction	505	465
Manufacturing	758	693
Retail Trade	577	536
Professional/Technical Services	1,597	1,514
Other Services	2,278	2,226
Population Impact attributed to the Park	1,230	1,262
Annual Impact on Consumption	327,500,000	317,500,000
Annual Impact on Taxable Consumption	161,457,500	165,417,500
Annual Impact on Gross Receipts Tax Revenue to Unincorporated County	1,148,521	1,383,906
Annual Impact on Wage and Salary Disbursements	364,974,000	354,000,000
Source: PI+		
Dollar amounts are presented in 2009 dollars.		
Employment includes all private non-farm employees.		

TABLE 4		
Economic Impacts of the Sandia Science and Technology Park		
The City of Albuquerque		
Measure	Estimated 2008 Impact	Estimated 2009 Impact
Impact on Total Employment	6,443	6,162
Construction	433	402
Manufacturing	754	689
Retail Trade	539	501
Professional/Technical Services	1,576	1,494
Other Services	2,171	2,117
Population Impact attributed to the Park	977	1,010
Annual Impact on Consumption	265,000,000	256,250,000
Annual Increase in Taxable Consumption	130,645,000	133,506,250
Annual Impact on Gross Receipts Tax Revenue to the City	2,988,504	3,053,955
Annual Impact on Wage and Salary	353,633,000	343,000,000
Source: PI+		
Dollar amounts are presented in 2009 dollars.		
Employment includes all private non-farm employees.		

The analysis shows that the largest economic impact of SS&TP occurs within City of Albuquerque's boundaries, which attracted 92% of the job growth associated with SS&TP in 2008 and 2009. However, impacts also extend outside of City boundaries. The distribution of new jobs by industry indicates that construction and retail jobs are slightly more likely to occur outside Albuquerque than other types of jobs. While 8% of all new Park related jobs are estimated to occur outside of the City, 20% of new construction jobs and 15% of new retail jobs related to the new economic activity is located outside Albuquerque in 2009. This is to be expected considering that 37% of the new population attributed to SS&TP is anticipated to reside outside of the City, and they will increase the demand for homes and shopping. Manufacturing and Professional and Technical Service employment growth occurs primarily within the City of Albuquerque.

Population increases are primarily due to economic migration, which assumes that new workers who come to the area for employment will bring their families. This in turn affects consumption, which also increases substantially as the new population spends their dollars within their community. Likewise, this raises the estimate of gross receipts tax revenues.

Summary
The Sandia Science and Technology Park is an asset to the MRCOG Region and is responsible for improving the local economy. It is estimated that for every new job created within SS&TP, 2.6 other jobs were created in the Region. Although some of these are temporary jobs related to construction, many will not

only stay, but also continue to grow in future years as workers expand their families and their need for goods and services.

Additional jobs draw new people to the region and generate higher tax revenues and increased economic activity. This is particularly true with SS&TP because of the high caliber of jobs. It is estimated that SS&TP has generated $57 million in gross receipts tax revenues to the State, and $2.2 billion in wage and salary disbursements. The average salary for jobs located within SS&TP, estimated to be $71,612, far surpasses the region's average wage. Equally as important as its direct economic benefit is the boost to the reputation of New Mexico as a viable and attractive location for high-tech companies. Table 5 presents the estimated economic impacts of SS&TP in the MRCOG Region since its inception.[2]

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[2] . The process of developing this estimate involved some smoothing that was necessary due to the inherent comparability issues that occur when using an economic model that is updated annually.

	TABLE 5	
	Cumulative Economic Impacts of the	
	Sandia Science and Technology Park	
Economic Indicators	**Estimated Impact**	
	through 2009	
Jobs Created		
Direct Jobs Created		2,284
Indirect Jobs Created		5,441
Indirect plus Direct Jobs Created		7,725
Average Number of Jobs Created for Each Direct Job		2.6
Increase In Tax Revenue		
Cumulative Impact on Taxable Consumption (goods and services)	$	1,214,344,969
Cumulative Impact on gross receipts tax revenue to the State of New Mexico	$	57,519,508
Cumulative Impact on gross receipts tax revenue to the City of Albuquerque	$	8,231,707
Wage and Salary Impacts		
Cumulative Impact on Wage and Salary Disbursements	$	2,262,753,211
Average Salary for All Park Employees	$	71,612
Average Salary for Private Park Employees Only	$	68,658
Average Salary for the Metro Area	$	39,342

Notes:

Employment includes all private non-farm employees.

Monetary figures are in current dollars.

Average Park Salary is calculated from sources that include the PI+ Model, the Bureau of Labor Statistics, and payroll information provided to MRCOG from SS&TP.

The average salary for the Albuquerque Metropolitan Area is from the New Mexico Department of Workforce Solutions Quarterly Census of Employment and Wages (QCEW).

The number of direct and indirect jobs created represent a highest point in time rather than a cumulative.
Due to the employment sectors, wages, and level of investment at SSTP in terms of equipment and construction it is estimated that for every new park job, 2.6 jobs are created in the community.

In order to maintain consistency with previous reports, the cumulative estimate of the impact on gross reciepts tax revenues for Albuquerque is calculated using the city-imposed tax rate and does not include the 1.225 percent of the state rate that is redistributed to the City.

The above figures are based on economic analysis over several years generated with the PI+ Model.
Numbers used to estimate a cumulative total were derived from different versions of the model and therefore do not represent a true time series and should be considered rough estimates.

The community that directly surrounds SS&TP has also experienced significant growth and investment. Since SS&TP was established, approximately 1,550

new homes have been constructed in the immediate vicinity, south of I-40 between Eubank and Juan Tabo. This includes a large residential subdivision, Juan Tabo Hills, and a townhome and condo community, Presidio. And, in addition to the recently erected buildings at SS&TP, there are over 36 new businesses in the area including major restaurants, retailers and several office buildings. The East Central Avenue area has been the point of focus for planning and revitalization efforts, and currently is undergoing a major transportation study for circulation enhancements as well as intersection upgrades at Eubank and Central. Improvements to the nearby community park and recreation facilities, a new senior center and an elementary school, and the location of the National Museum of Nuclear Science and History are other examples of investment in the area. The East Central community is undergoing a positive revitalization process and SS&TP is an important catalyst for this growth.

Sandia National Laboratories, a partner in the SS&TP, has contributed to the growth of jobs and innovation at SS&TP. Likewise, SS&TP has served to benefit the Laboratories in many ways. SS&TP provides a key link between the Labs and the private sector as it offers greater flexibility for communication and operations in areas that are not subject to the security and access restrictions that exist on base. This manifests itself in two important ways; one, through peer mentoring and information exchange between park tenants and Lab employees, and two, through physical movement of personnel, goods and services. The proximity between the Labs and their supporting facilities located at SS&TP has the impact of minimizing expenses associated with personnel travel and the movement of goods, which in turn has the affect of maximizing productivity at the Labs. This is furthered by easy access to 2 major interstates, cargo and commuter rail, and the International Sunport which offers the benefit of a free trade zone. As the primary sponsor of Sandia National Laboratories, the U.S. Department of Energy is also a major beneficiary from any and all activities at SS&TP.

Sandia Science and Technology Park advances the economic well-being of the New Mexico, most specifically in the Central New Mexico Region. Its impacts are wide and varied, felt in areas as small as the East Central Avenue community within the City of Albuquerque and as large as the nation's U.S. Department of Energy. SS&TP is of great benefit to local business owners, home builders throughout the Region, the high technology sector in the State and scientific research and development affecting the nation as a whole.

REMI Policy Insight is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to wage, price, and other economic factors.

The REMI model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the model. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Wages, Prices and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figures 1 and 2.

REMI Model Linkages
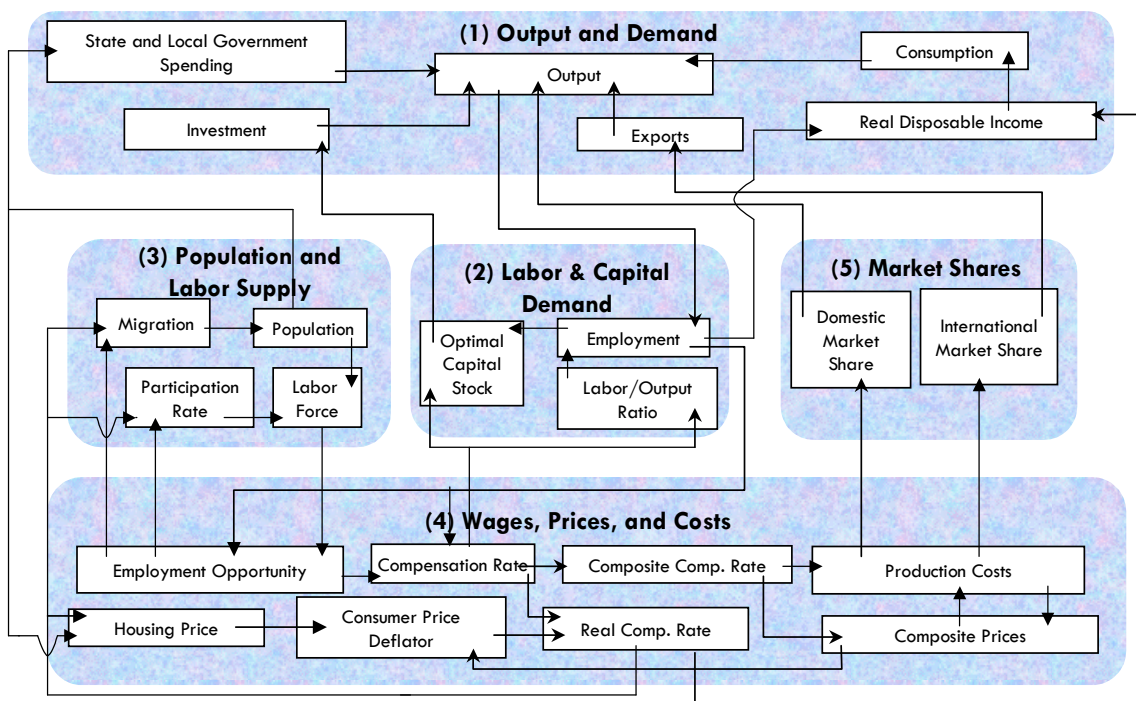# (Excluding Economic Geography Linkages)

Figure 1

Block 1. Output and Demand

This block includes output, demand, consumption, investment, government spending, import, product access, and export concepts. Output for each industry in New Mexico is determined by industry demand in the state and its trade with the US market, and international imports and exports.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities and population. Input productivity depends on access to inputs because the larger the choice set of inputs, the more likely that the input with the specific characteristics required for the job will be formed. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

Block 2. Labor and Capital Demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

Block 3. Population and Labor Supply

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age and gender, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after tax compensation rate. Migration includes retirement, military, international and economic migration. Economic migration is determined by the relative real after tax compensation rate, relative employment opportunity and consumer access to variety.

Block 4. Wages, Prices and Costs

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the wage

equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods and services.

These prices measure the price of the industry output, taking into account the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of output in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by cost of labor, capital, fuel and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing price changes from their initial level depend on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

Block 5. Market Shares

The Market Shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.
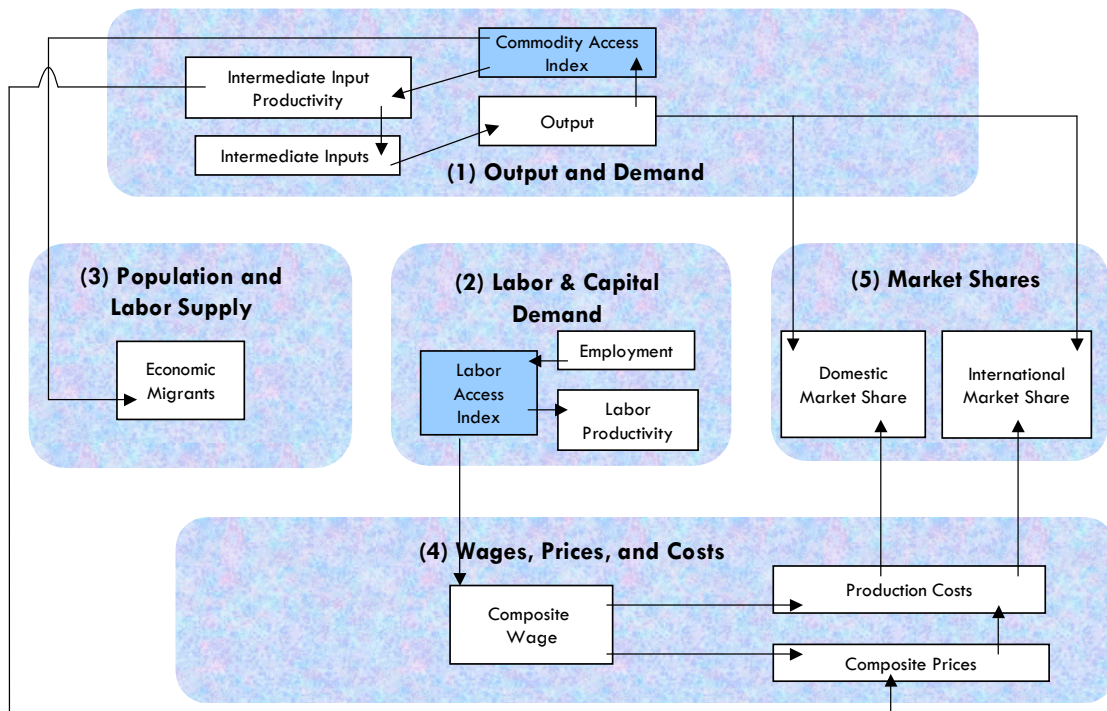
Economic Geography Linkages

Figure 2

As shown in Figure 2, the Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Wages, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the wage equations. The proportion of local, inter-regional and export markets captured by each region is included in the Market Shares block.