Tax Exempt Tribal Retail Sales:
An Economic Assessment of the Impact on Shawnee, Oklahoma

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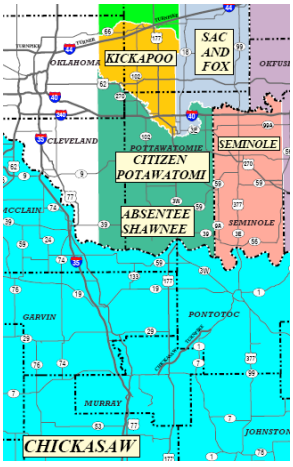

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Introduction

Oklahoma's Indian tribes are becoming an increasingly important component of state and local economic development and are expanding into most industry sectors, including the traditional retail trade sectors. While most efforts by tribes to expand local economic activity are generally viewed quite favorably, the tax-exempt nature of tribal owned businesses raises unique concerns for municipal government as tribes expand their presence in retail.

In Oklahoma, municipal governments are highly dependent upon the local sales tax to fund services (deriving an average of 40 percent of total revenues from sales taxes) and face the real concern that tribal retail expansion may redirect locally generated sales tax revenue to tribal governments and hamper their ability to provide necessary public services.[1]

The purpose of this project is to assist municipal governments better understand the economic implications of the expansion of tax-exempt tribal businesses into the sales tax-producing business sectors. The study focuses specifically on the Shawnee, Oklahoma (Pottawatomie County) region, a market area shared by the city with five tribes, and one that is experiencing rapid expansion of tribe-operated businesses. The study is likewise designed to help tribes better understand the economic impacts

[1] In addition to untaxed tribal retail sales, municipal governments face similar concerns over an eroding tax base and lost sales tax revenue as a result of Internet transactions, special tax exemptions, cross-border tax differentials, and sales tax holidays. While each represents an important challenge to municipal finance, in this study we examine only tax-exempt tribal retail sales.

they exert on the local economy by expanding in the tax-producing retail sector versus other industry sectors.

The project is further intended to serve as a bridge for dialogue between tribal and municipal governments that might lead to stronger intergovernmental cooperation and more effective local area economic development. The ongoing expansion of tribal governments and tribe-operated businesses is changing the basic definition of local government in many communities as tribal and municipal governments become increasingly intertwined in the process of providing public services in the cities in which they operate. Tribes are assuming many of the functions traditionally provided by municipal government such as the development of infrastructure and public utilities. In lieu of providing services directly, many tribes make voluntarily tax payments to municipal governments and contribute in meaningful ways to provide local social services, medical care, and cultural activities.

One of the major challenges in assessing the economic impact of tribal retail expansion is the inability of the traditional tools of economic impact analysis to capture many of the potential impacts from the shift into retail trade by tribal entities. Most economic impact models measure only the direct impact of tribal retail operations and fail to capture many of the changes in local economic activity that can be triggered by the shifting of retail trade to tribal ownership. A major task set forth in the study is the construction of a custom economic model of the Shawnee area economy that is capable of explaining a broad range of expected impacts from tribal retail expansion. We construct a custom Computable General Equilibrium (CGE) model for the Shawnee area economy that provides an effective framework for better understanding the often subtle ways in which tribal expansion into retail is likely to reshape the local economy - beyond the direct impact on sales tax revenue to the city.

CGE models represent the latest generation of economic modeling tools and are able to integrate the behavior of governments, businesses, and households into a detailed model of the local economy. The CGE model used in the study is unique in that it is structured specifically for the Pottawatomie County economy and contains an industry sector for tracking the tribal provision of retail goods and services and a separate tribal government sector that collects taxes and engages in government spending. The model can be used to evaluate shifts in revenue between governments, as well as changes in the price of goods and services, changes in tax rates, fluctuations in wage rates, variations in the use of capital and labor in the region, changes in imports and exports of goods and services, and other dimensions of the local economy.

The model is used to study the economic outcomes of a shift of a portion of the existing local retail industry to tribal ownership and the removal of these goods from the local tax base. Because the ultimate impact of tribal retail expansion is dependent upon how the revenue is spent, the impact is evaluated assuming various local uses of the revenue including income transfers, the provision of health care and social services, infrastructure development, and to fund business expansion in other industry sectors. Finally, the model is used to consider the impact from an increase in tax rates by local government in response to a decline in tax revenue and to evaluate the differing impact of local spending versus spending outside the region by the tribe.

Based on results from the CGE model, we find that tribal expansion into retail can generate a substantial economic boost to the local region, but simultaneously creates a budget gap at the state and local levels as a result. However, at the city level, the tax revenue generated by the added economic activity offsets only a very minor portion of the tax revenue

diverted to the tribes regardless of the use of the funds by tribal government.

The economic boost in the local economy is driven by tax revenue that was previously forwarded to the state but is retained by the tribe for local spending. Local businesses normally remit the state's 4.5 percent share; however tribal retailers retain this portion of the revenue and can potentially re-inject it back into the local community through investment, spending, or transfer payments. Because the state does not reduce transfers to the community as a result of the lost revenue from tribal retail, a shift to tribal ownership has the potential to create tremendous economic stimulus in the local region.

Tribal spending of tax revenue outside the region always creates a negative impact in the region. The impact is mitigated somewhat by the fact that state spending in a local area is not dependent upon sales tax remittances from the area. Only the portion of revenue that would have been spent by city and county government is lost outside the region.

Assuming tribal revenue is spent locally, the results suggest that the intended use of the sales tax revenue plays a large role in determining the size of the resulting impact on the local economy. If the tribe provides the same types of goods and services as those provided by local government, the distortions to the local economy are minimized and very little net economic impact results. Using the revenue to fund income transfers is the least beneficial use of tribal revenue from an economic impact standpoint, as it encourage workers to reduce the amount of labor they provide to the labor market. Funding health care and social services provides a very strong boost to the local economy, while spending on infrastructure related construction projects has an even larger impact.

The CGE model is also used to evaluate the use of tribal revenue to fund the expansion of local export industries. The simulations suggest that the expansion of retail exports has a much smaller impact than increasing exports from the manufacturing, transportation and warehousing, and professional and business services sectors. Manufacturing exports have the largest overall impact on the economy, generating the largest gains in both output and income in the region. In general, retail exports provide the largest gain to tribal government but provide less that half the general economic impact generated by the other sectors.

The model is also used to assess the option of raising the city portion of the local sales tax rate to recover revenue lost to a tribal shift in retail. The findings suggest that the city would have to increase the city sales tax rate by approximately 0.25 percent in order to recover the revenue lost to a $25 million shift in retail sales to tribal ownership. However, it is unlikely that an increase in the sales tax rate can be used to offset anything other than a minor tribal shift in the retail base in the local economy. Either other means will have to be found to raise revenue or city-provided services will have to decline as tribal retail expands.

The remainder of the paper is organized as follows. The first two sections briefly review tribal sovereignty and taxation along with the factors that determine the potential economic outcomes of tribal retail expansion. The Shawnee area retail market and the influence of tribal retailers are examined in the following two sections. The role of CGE modeling in local area economic development, the structure of the Shawnee CGE model, and the dataset underlying the model are discussed next. CGE model simulations of tribal retail expansion are conducted in the following section, with implications for local government discussed in the final section.

Tribal Sovereignty and Retail Taxation

The issue of Indian tax sovereignty is a longstanding legal dispute that continues to generate contentious debate between the tribes and federal and state governments. Tribes represent sovereign governments that have taxing authority on tribal lands and are generally exempt from the collection and remittance of sales tax on behalf of state and local government. This exemption gives tribes a strong legal and economic incentive to enter the traditional retail business segments to generate tribal revenue for funding social services, income transfers, capital for other business ventures, and other tribal activities.

Tribes have full autonomy to levy taxes on tribal or trust lands and commonly assess retail, lodging, and other taxes. While current law bars state and local government from taxing transactions by or to tribal members that occur on tribal lands, tribal members are liable for sales taxes on transactions that occur off tribal land unless exempt under state law. A series of Supreme Court decisions have established that tribal governments are obligated to help states collect valid taxes on tribal sales to non-tribal members but the presence of sovereign immunity prevents the states from suing tribal governments that do not remit the tax.[2]

Historically the debate over tribal taxation has centered on the sale of a select set of retail products (namely motor fuels and tobacco), gaming, and on tax-exempt sales to non-tribal members on tribal land. Working relationships exist in most of these cases between the state and tribal governments in Oklahoma, as most tribes have entered into compacts with the state to pay taxes on motor fuels, tobacco, and gaming.[3] But the

[2] For a discussion of the unsuccessful action by the Oklahoma Tax Commission against the Citizen Potawatomi Tribe of Oklahoma to collect taxes on sales of tobacco to non-tribal members that occur on-reservation, see: http://neuro.law.cornell.edu/supct/search/display.html?terms=indians&url=/supct/html/89-1322.ZS.html.
[3] See the Oklahoma Office of State Finance, Gaming Compliance Unit for information concerning compacted gaming in Oklahoma: http://www.ok.gov/OGC/index.html.

ongoing expansion of tribal owned entities into large-scale retail storefronts serving the general community has brought the issue of tribal sovereignty to the local level where the sales tax is the primary funding mechanism for local public services. The issues concerning tobacco and fuel taxes are related but are less relevant economically to municipal government because of the larger possible budgetary impact at the local level of diminishing general sales tax revenue.

Modeling the Economic Outcomes of Tribal Retail Expansion

It requires more than mere tribal ownership of a local retail establishment to generate a meaningful change in economic activity in a local economy. A tribal retailer must instead alter current market conditions in the local retail sector in order to transmit changes to the remainder of the overall local economy. The exact outcome depends largely upon four characteristics of the tribal retail expansion in question. These include (1) whether the tribes create new retail activity or capture existing business; (2) the tax and pricing policy of the tribe relative to the local market; (3) the use of tribal tax revenue; and (4) the response by state and local government to any reductions in revenue.

New or Existing Retail Activity

The net effect of tribal retail expansion in a local economy is determined in large measure by whether a tribal retailer is generating new sales in the region or shifting existing sales from the tax base. Net new retail activity occurs when a tribal retail establishment attracts new shoppers from outside the region, generates local sales of goods and services that were formerly purchased outside the area, or opens a new establishment or expands an existing one in order to accommodate the natural expansion of the local retail market. New sales are not generated, however, when shoppers simply shift from a non-tribal to a tribal retailer or when a new

tribal retailer merely entices local shoppers to substitute a new type of retail good or service for an existing one in the market.

When a tribe-owned firm does in fact generate net new sales, the overall economic impact is decidedly positive and is likely to have no negative impact on local government finances or the structure of the local economy. Although local government will not receive any new direct tax revenue from this expansion in retail activity, it will likely receive a small amount of additional sales tax revenue generated by spillover economic activity in the local economy. The municipality will be impacted adversely only to the degree that the expansion of tribal retail generates the need for additional city services that cannot be funded through the spillover tax revenue. From an economic impact perspective, the prospect that tribal retail expansion will impact a region negatively is minimized when new sales are generated.

However, when a tribe-owned business captures existing retail trade and reduces the size of the sales tax base, meaningful changes in economic activity in the local economy are triggered. The primary channel of influence is through the municipal budget as tax revenue falls. Most cities, including Shawnee, must maintain a balanced budget on an annual basis and a reduction in sales tax collections will force the city to either reduce spending or defer the impact through some form of spending shift (i.e. funding short term spending through accumulated fund balances or delaying maintenance and capital expenditures). In either case, expected future municipal expenditures must eventually fall by the amount of the lost tax revenue unless additional revenue can be raised through other means. And because City spending tends to occur largely within the local area, a reduction in sales tax revenue can create negative ripple effects in the form of reduced spending on items such as infrastructure, education, public safety, or recreation.

Tribal Tax and Pricing Policy

The tax and pricing policy of a tribal retailer relative to the private market also influences the impact its presence will have on existing non-tribal retailers and existing market prices. Tax exemption provides a powerful incentive for tribes to enter the retail sector because it reduces the cost structure of a tribe-owned retailer by the amount of the local sales tax. The cost advantage is not simply equal to the local tax rate assessed by city government but is instead equal to the total tax rate levied in the local taxing jurisdiction. In the City of Shawnee the total tax rate is currently 8.5 percent: the state levies a 4.5 percent tax, the City of Shawnee 3.0 percent, and Pottawatomie County 1.0 percent. The cost structure of a tribal retailer is reduced by the full 8.5 percent although the city potentially loses only 3 percent.

It is important to note that both state and local governments are affected by lost sales tax revenue as a result of the expansion of tax exempt tribal retail trade. While the state is affected to a larger degree than the city in percentage terms because of a higher relative sales tax rate, municipal government is affected more in an operational sense because the lost sales tax revenue is a larger share of the overall budget at the local level.

Because of the built-in cost advantage of tax exemption, tribal businesses can significantly undercut the prevailing market price of retail items. A local price differential has frequently been observed with tribal sales of motor fuel and tobacco. A U.S. Department of Transportation study of tribal motor fuel sales found that price differentials were found to be an important determinant of the amount of on-reservation fuel sales.[4]

[4] The USDOT study is available online at http://www.fhwa.dot.gov/policy/ohpi/aismf/0.htm.

Price differentials frequently lead non-tribal merchants to become concerned with what they believe to be a competitive disadvantage relative to tax-exempt tribal owned businesses that are guaranteed a larger profit margin, and argue that it is a form of unfair competition for a tribe to use its cost advantage to leverage its way into a market and capture sales from existing retailers. But even if a tribal retailer matches prevailing market prices, a possible reduction in competition is created to the degree that the tribe uses tax revenue to subsidize the retail establishment rather than to fund general tribal expenditures.[5] Any subsidization would also present an incentive to expand the tribal retail presence at a rate greater than would occur without subsidization and create even more intense competition with existing retailers. For this reason, competing local merchants may face a competitive disadvantage even when tribes charge equal market prices.

While the cost differential creates a strong economic incentive for a tribal retailer to undercut market prices or charge a lower tax rate, tribes will not necessarily do so. In Shawnee, the largest tribal retail establishment charges competitive market prices, levies the same local sales tax rate, and retains the full amount of the tax revenue for tribal purposes. The combination of competitive market forces and an increasingly formal role for tribal government is working to minimize any price and tax differentials between tribal and non-tribal retailers. In addition, retail is generally considered by economists to be a near-perfectly competitive industry where firms are price takers and hence have no ability to raise prices above those in the market and no incentive to lower them below market prices. Assuming tribal retailers are equally efficient, they have a strong incentive to match market prices and impose the same tax as non-tribal

[5] It is possible that a tribe-owned retailer may have a competitive advantage that is unrelated to the tax exemption but that instead reflects the presence of large numbers of tribal members in the local economy. This type of 'loyalty shopping' may draw additional shoppers to the region due to tribal relationships. Other potential advantages include the ability to more easily extend store credit to tribal members or accept tribal vouchers for purchases.

retailers and simply retain the tax revenue for tribal purposes. It is also unlikely that a tribe would charge a higher sales tax rate due to competitive market forces, and equally unlikely that no sales tax would be charged as this would be equivalent to lowering prices substantially below the competitive level in the region and would result in foregone profit for the tribe.

As market forces are shaping the tax and pricing policy of tribal retailers, tribal economic development is becoming increasingly dependent upon a reliable stream of revenue from tribe-owned retail and gaming operations in order to fund tribal services and alternative business ventures. Because of increased reliance upon tax revenue to fund tribal activities, tribal tax revenues are becoming a segregated revenue stream for tribal retailers just as they have always been for non-tribal retailers. The degree to which the tribe insists on transferring the full amount of sales tax revenue collected to tribal government will influence whether a tribal retailer subsequently prices products at the prevailing market price or operates with a competitive advantage.

Further shaping the price and tax policy of tribal retailers is the pricing convention used in retail of establishing the price of goods exclusive of sales tax and then adding sales tax to the purchase price. Under this pricing system, the price of most retail goods cannot be obscured as with tobacco and motor fuels which are sold inclusive of sales tax. Consumers purchasing items from tribal retailers are able to evaluate both the price of the product and the amount of the tax relative to those charged by non-tribal retailers.

Tribal Uses of Tax Revenue

The net economic impact of tribal retail expansion on the local economy also depends upon the alternative uses of the tax revenue generated by

tribal retailers. Because of the shift in tax revenue, a portion of the public services previously provided by municipal government will now be replaced by tribal spending in some alternative form. These alternatives would likely include the provision of health care services and direct transfer payments to tribal members, or possibly the provision of infrastructure and utility services that have been provided historically by municipal government. This is akin to substituting one governmental source of public services for another and is unlikely to generate substantial net macroeconomic impacts in the local economy, either positive or negative. Tribal members are likely to receive a larger share of government-provided services, but this would only have any meaningful impact on the distribution of impacts and not on the total impact in the local economy.

Another alternative is that tribal funds are used to expand the output from local industry. Economic theory suggests that the choice of industry sector determines the resulting impact on the local economy and that export based industries are likely to have the largest impact. Tribes have a strong incentive to expand retail rather than other industries given the sales tax revenue generated from retail. However retail is known to have relatively small economic multiplier impacts relative to most export industries and further expansion of the industry may not be consistent with the desire to maximize employment opportunities for tribe members.

It is also possible that new tribal spending will occur outside the city jurisdictional boundaries. Tribal jurisdictions often extend beyond city and county boundaries and tribal governments can have competing governmental and business concerns that exist outside the legal boundaries of the immediate economic region. Redirecting the tax revenue from the local economy to outside the region will always have a decidedly negative impact

Government Response to Lost Revenue

There are two possible responses by state and local government that can influence the overall economic outcome of a tribal retail shift. The first is how state government responds to a decline in tax revenue from a local area. Currently, state funding formulas are not adjusted as tribal retail expands, and as a result, tribal retail expansion generates a net increase in the flow of intergovernmental funds from the state to the local economy as tribes retain revenue that otherwise would have been remitted to the state. If these additional funds are used locally, they can produce significant stimulus in the local economy. If the state instead reduces spending in the local region, any positive impact from a tribal shift in retail is mostly offset.

The second factor shaping the resulting economic impact is the response of local government to any lost revenue.[6] The presence of a local balanced budget requirement makes the prospect of shrinking local government budgets a reality as the sales tax base shrinks. The city has ongoing budgetary obligations and without compensating contributions from tribal government can adjust to a revenue decline in only a limited number of ways. One option is for the city to temporarily maintain spending through existing fund balances, which could be highly stimulative in the short run if tribal government spends newly generated tax revenue locally. The city can also reduce planned spending by postponing maintenance and capital outlays. This is at best a short run solution that may only exacerbate future budget problems. The city can also raise the city sales tax rate in order to recover lost revenue. However, it is unknown whether a sales tax increase would offset the tax loss from anything more than a modest shift in retail to tribal ownership.

[6] An alternative to raising tax rates is the spreading of the sales tax base to services. For a discussion of this topic at the state level see: Olson, Kent "State Finances in a Very Long Run Context: Lessons from Oklahoma." 2006. http://spears.okstate.edu/ecls/content/Olson%20Seminar%20Paper%20092906.pdf

Retail Trade in Shawnee and Pottawatomie County

The City of Shawnee continues to serve as the hub of retail trade activity in the region. The City captured $472.3 million (90 percent) of the $523.5 million in total taxable retail sales in Pottawatomie County in fiscal year 2006,[7] with very little retail activity occurring in the county outside the Shawnee taxing jurisdiction.

The degree to which a city serves as a retail hub is often measured by its *pull factor,* an economic measure of the relative size and importance of retail trade in a local economy.[8] Specifically, a pull factor provides a measure of the amount of retail sales expected for an economic region (usually a city or county) given its population and average income level. Estimates indicate that Shawnee has a pull factor of approximately 2.0, a relatively high figure among Oklahoma cities,[9] and suggests that the city captures roughly twice the amount of retail sales that would be expected given its population and average income level.

Closer examination reveals that the high pull factor largely reflects the fact that less than half of the county population lives within the city limits and that most retailers within the county are concentrated within the Shawnee taxing jurisdiction. Conversely, Pottawatomie County has a pull factor of approximately 1.0 which suggests that the county as a whole captures roughly the expected amount of retail trade given the purchasing power of county residents. This suggests that the combined city/county region is not a significant retail shopping destination for households outside the region and that the high pull factor for Shawnee merely reflects the high concentration of retail establishments within the city limits.

[7] Taxable retail sales estimates at the city and county level are from the ORIGINS database at http://origins.ou.edu/.
[8] The methodology for computing income-adjusted pull factors is available online from the Center for Applied Economic Research, Oklahoma State University at http://economy.okstate.edu/notes/retailsales.pdf.
[9] See: "1980-1999 City / County Taxable Retail Sales Analysis." Center for Applied Economic Research, Oklahoma State University. The data is available online at http://economy.okstate.edu/search/retailsales.asp.

The high pull factor for Shawnee relative to other cities surrounding the Oklahoma City/Oklahoma County region also suggests that it remains a fairly independent retail shopping region and is largely separated from the Oklahoma City metropolitan area. For example, cities in the region such as Norman (1.2), Edmond, (0.9), Moore (0.95), and Midwest City (1.3), have much lower pull factors because they are more closely integrated into the Oklahoma City metro area retail market.

Location quotients[10] provide an alternative way of evaluating the relative strength and size of the retail sector in a county by comparing the concentration of employment in each sector to the concentration at the state level. A location quotient greater than 1.0 suggests that the local economy has a relatively high concentration of employment in a given industry sector. Figure 1 shows that the county has an overall quotient of 1.13 for retail trade; in other words, the county has 13 percent more retail workers than would be expected given averages for retail employment on a statewide basis.

Location quotients by retail sector in Figure 1 suggest that the county has a highly developed local market for Building Materials - NAICS 444 (LQ=1.54), Health and Personal Care Stores - NAICS 446 (LQ=1.24), and General Merchandise Stores - NAICS 452 (LQ=1.59). These quotients reflect the strong presence of large national retailers in these sectors in the Shawnee market.

The location quotients also suggest that there are sectors where the Shawnee market may be experiencing significant sales leakages to other markets, particularly in those retail sectors where cities on the fringe of a

[10] Location quotients at the county level are available online from the Bureau of Labor Statistics at http://data.bls.gov/LOCATION_QUOTIENT/servlet/lqc.ControllerServlet.

metropolitan area traditionally lose sales to larger nearby markets. These sectors include Motor Vehicle and Parts Dealers - NAICS 441 (LQ=0.82), Furniture and Home Furnishings Stores - NAICS 442 (LQ=0.58), and Clothing and Clothing Accessories Stores - NAICS 448 (LQ=0.77) and represent logical areas where local retail activity would leak to the Oklahoma City metropolitan area. All three sectors have quotients well below 1.0 and reflect the economic necessity of large retailers in these sectors to locate near the core retail centers in metropolitan areas rather than in outer lying cities such as Shawnee.

Figure 1. Retail Trade and Location Quotients, Pottawatomie County (2002)

NAICS Industry	Industry Description	Establishments	Sales ($Thou.)	Annual Payroll ($Thou.)	Paid Employees	Location Quotient*
44-45	Retail trade	262	$489,367	$46,645	2,911	1.13
441	Motor vehicle & parts dealers	33	114,395	8,366	292	0.82
442	Furniture & home furnishings stores	9	4,735	746	37	0.58
443	Electronics & appliance stores	11	6,830	1,214	80	1.02
444	Bldg. material & garden equip. & supplies dealers	18	56,703	6,948	293	1.54
445	Food & beverage stores	15	43,232	4,072	366	0.79
446	Health & personal care stores	20	43,984	4,175	252	1.24
447	Gasoline stations	44	47,496	2,733	270	0.65
448	Clothing & clothing accessories stores	32	25,189	2,959	270	0.77
451	Sporting goods, hobby, book, & music stores	9	9,187	1,339	99	1.08
452	General merchandise stores	17	103,281	10,444	697	1.59
453	Miscellaneous store retailers	42	24,375	2,454	170	1.07
454	Non-store retailers	12	9,960	1,195	85	1.54

Source: Bureau of Census, Economic Census; Bureau of Labor Statistics, Location Quotient.
* Ratio of industry employment at the county level to total employment at the county level divided by the ratio of industry employment at the state level to total employment at the state level.

Tinker Air Force Base Commissary

In addition to tribe-owned retailers, Shawnee retailers must compete with the commissary at Tinker Air Force Base near Midwest City, Oklahoma. Tinker is one of three major Air Force maintenance, repair, and overhaul (MRO) facilities and the state's largest single-site employer. The base is home to approximately 26,000 employees, including 9,550 active duty and

reserve military personnel[11] and is only approximately 30 miles from the center of Shawnee.

Commissaries are primarily open to active duty and retired military personnel and their families[12] and allow eligible shoppers to purchase goods at below market prices by setting prices at cost plus five percent and charging no sales tax. The Congressional Budget Office (CBO) estimates that the price differential between commissaries and commercial supermarkets is 20 percent.[13] A 2006 federal assessment of the commissary program pegged the savings to shoppers at 32 percent and found that 90 percent of eligible shoppers visited a commissary each year.[14]

A significant percentage of Pottawatomie County households are eligible to shop at the commissary. Estimates indicate that at least 2,402 households in the county (9.4 percent of 25,321 households) have shopping privileges, including an estimated 512 active duty military members, 1,664 retirees, and 226 surviving spouses.[15] However, the degree to which commissary sales affect the Shawnee area retail market is limited by the distance between the two regions and the lack of complementary shopping opportunities in the area surrounding Tinker.

In addition, travel costs are well known to influence out-of-region retail shopping and the distance between Shawnee and TAFB has a significant dampening effect on commissary purchases by Shawnee-area

[11] See Snead (2006).
[12] In addition, active Reserve and National Guard members and their families, commissary employees, and certain non-military Department of Defense employees are eligible.
[13] See the CBO report "The Costs and Benefits of Retail Activities at Military Bases." Available online at http://www.cbo.gov/ftpdoc.cfm?index=158&type=0&sequence=0
[14] The 2006 federal assessment of the Defense Commissary Agency is available online at http://www.whitehouse.gov/omb/expectmore/detail/10003230.2006.html.
[15] Sources: "Economic Impact." Tinker Today. Tinker Air Force Base; U.S. Census Bureau, 2005 American Community Survey; Center for Applied Economic Research, Oklahoma State University; Dept. of Defense Statistical Report on the Military Retirement System, Fiscal Year 2005.

households.[16] To illustrate, CBO estimates indicate that each household of a retired service member within five miles of a commissary typically adds $3,600 a year to commissary sales; those between five and ten miles away add $2,800; those between 10 and 30 miles away add only $850.[17] Using the CBO estimate of $850 per year for Shawnee area households, Tinker commissary sales to eligible Pottawatomie County households would total only $2.04 million annually. A 20 percent upward adjustment to reflect the cost differential would raise the estimate to approximately $2.5 million annually.

Although this establishes a clear link between the Shawnee market and the commissary, the estimated sales leakage represents less than one half of one percent of total retail trade in the region and less than 5 percent of Food and Beverage Store sales and is therefore assumed unlikely to have a significant impact on retail activity in the Shawnee market area. Even if the estimate of commissary sales per household is doubled, the impact on the Shawnee area retail market remains modest. Consequently, the commissary is not modeled as a distinct retail market competing with the local Shawnee area retail market.

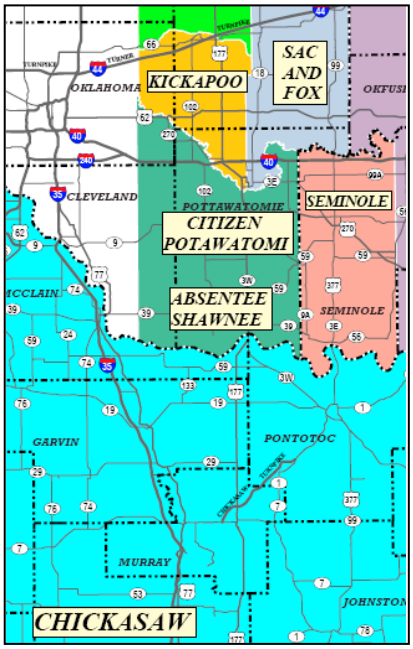
The Presence of Tribal Retail in Shawnee

The large and diverse tribal presence in the region makes Shawnee an excellent test case for the analysis of tribal retail expansion. The Kickapoo Tribe and Sac and Fox Nation boundaries extend into northern Pottawatomie County, while the Citizen Potawatomi Nation and Absentee Shawnee tribal boundaries cover the remainder of the county. The Seminole Nation borders Pottawatomie County on the east while the Chickasaw Nation is adjacent to the southern border of the county. Many

[16] Conglomeration effects are also important to shoppers who prefer retail stores that are in close proximity to other retail locations.

[17] See Chapter Two of the CBO report "The Costs and Benefits of Retail Activities at Military Bases." Available online at http://www.cbo.gov/ftpdoc.cfm?index=158&type=0&sequence=3.

Figure 2. Tribal Presence in Shawnee, Oklahoma



of the tribes have sophisticated economic development agendas which include tax-generating retail enterprises.

The Shawnee region also represents a relatively small market area that can be impacted in a significant way by the expansion of tribal retail activity. It is unlikely that tribal activity could have a significant impact on a city's fiscal health or overall level of economic activity in either a very large city or a city with a small tribal presence. Sales tax receipts comprise more than 47 percent of Shawnee city revenues in fiscal year 2006 (see Figure 3), making city finances sensitive to fluctuations in sales tax revenue generated by tribal retail expansion.

Figure 3. City of Shawnee Budget - FY2006

Expenditures	
General Fund	$14,353,462
Municipal Authority	8,119,418
Airport Authority	629,972
Civic and Cultural Dev. Auth.	500,000
Capital Improvement Fund	1,689,995
Street Improvement Fund	3,051,750
All Other Funds	1,771,696
Total Expenditures	$30,116,293
Revenues	
Sales Tax Revenue	$14,164,909
Municipal Authority Revenue	8,619,229
All Other Revenue	6,667,808
	$29,451,946
Existing Fund Balances	664,347
Total Revenues	$30,116,293

Source: City of Shawnee Annual Budget FY05-06

In addition, for economic modeling purposes, Shawnee is presently only loosely integrated into the Oklahoma City metropolitan area and has a highly developed and largely independent retail sector.[18] Travel costs to Oklahoma City

[18] Nevertheless, three retail sectors (Motor Vehicle and Parts Dealers - NAICS 441, Furniture and Home Furnishings Stores - NAICS 442, and Clothing and Clothing Accessories Stores - NAICS 448) are likely highly integrated with the Oklahoma City metropolitan area.

are quite significant for most retail purchases which means the local economy can be investigated to a large degree as a free-standing region.[19]

Tax Shift in Food Store Sales

The issue of expanding tax-exempt tribal retail sales surfaced as a definable budget issue for the City of Shawnee in 2001 when the Citizen Potawatomi Nation opened FireLake Discount Foods, an 84,000 square foot full service grocery store. The tribe-owned store charges the local 8.5 percent tax on purchases and retains the revenue for tribal expenditures.

As shown in Figure 4, city sales tax remittances from local food stores suffered a 16.8 year-over-year decline in FY2002, a decline of more than $270,000. This period corresponds roughly to the first full operating year of the store. Food stores represented the second largest single category of sales tax revenue in FY01, and as a consequence total sales tax receipts at the city level declined by 0.4 percent in FY2002 (Figure 5).

Although local economic conditions slowed in the same period and placed downward pressure on overall retail activity, all other categories of retail trade increased by a combined 1.85 percent in FY2002, with most major categories posting increases for the fiscal year. The opening of the store placed considerable pressure on the city budget in a period of generally weak tax receipts.

The exact amount of annual tax revenue redirected to tribal government due to the opening of FireLake Discount Foods cannot be determined with certainty because annual sales figures at the store are not known and

[19] As further evidence that Shawnee is only in the early stages of functional integration with the Oklahoma City area, the Census Bureau recently dropped Pottawatomie County from the Oklahoma City metropolitan area definition after being included as a component for several decades in prior definitions.

slowing economic conditions dampened overall retail sales in the period. We estimate that the shift in tax revenue from city to tribe resulted in a reduction in sales tax revenue to the city in the range of $350,000 to $750,000 annually.[20]

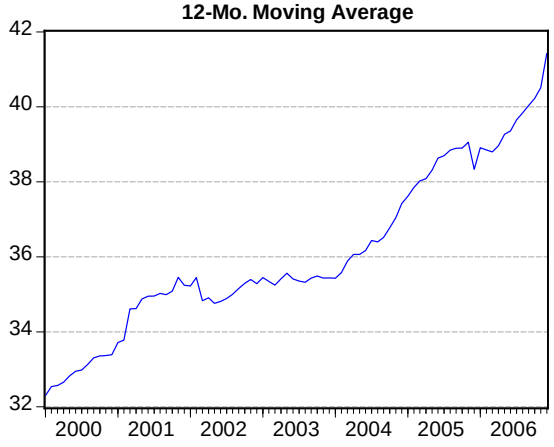
Figure 4. Sales Tax Collection - City of Shawnee, Oklahoma

Industry Group (SIC Code)	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006
General Merchandise Store	$2,838,857	$2,992,968	$3,171,936	$3,220,319	$3,232,288	$3,128,861	$4,115,395	$4,588,355
Eating & Drinking Places	1,164,121	1,257,899	1,391,640	1,520,957	1,547,108	1,622,235	1,729,412	1,848,354
Building Materials	1,121,014	1,189,616	1,229,800	1,268,718	1,332,749	1,399,657	1,422,809	1,455,494
Miscellaneous Retail	850,612	925,898	928,778	923,071	989,555	1,014,466	941,590	931,147
Electric, Gas, & Sanitary Services	627,911	636,791	834,238	726,737	762,174	775,998	767,760	896,846
Food Store	1,519,464	1,551,758	1,609,657	1,338,884	1,352,657	1,299,888	941,984	775,220
Wholesale Trade-Durable Goods	389,997	389,816	388,223	435,916	460,735	554,296	633,102	721,095
Furniture, Home Furnishing & Equip.	391,542	421,782	404,332	419,328	440,910	452,759	453,710	493,741
Communications	416,332	461,649	485,873	510,978	486,232	493,583	502,391	490,117
Automotive Dealers & Gas Station	407,552	409,115	452,074	464,608	464,296	461,822	499,849	440,890
Apparel & Accessory Store	320,400	308,503	308,381	351,487	363,852	358,186	384,562	376,345
Business Services	162,933	156,005	196,083	194,200	202,133	196,055	182,972	185,277
Hotel	142,309	144,966	146,911	141,565	135,106	145,140	141,082	139,904
Motion Picture	107,338	114,538	113,642	124,475	119,682	135,726	112,508	128,160
Automotive Repair Services	109,692	120,165	117,104	114,882	106,984	115,177	117,899	109,206
Wholesale Trade-Nondurable Goods	125,393	118,824	123,497	89,230	87,820	89,639	85,856	103,206
Non-Classified Establishments	27,267	23,281	21,470	7,886	44,306	15,246	35,749	78,206
Personal Services	86,215	84,892	93,059	81,150	63,496	65,465	65,919	69,759
Measuring, Analyzing & Control. Inst.	11,822	12,951	16,983	42,856	47,819	53,432	57,780	51,543
All other categories	166,276	191,899	214,025	225,698	238,548	251,626	254,653	282,044
Total Sales Tax Receipts	$10,987,045	$11,513,316	$12,247,706	$12,202,945	$12,478,450	$12,629,256	$13,446,982	$14,164,909
% Change Year-over-year	4.08%	4.79%	6.38%	-0.37%	2.26%	1.21%	6.47%	5.34%

Source: City of Shawnee, Comprehensive Annual Financial Report, Fiscal Year 2006.

The lower estimate of $350,000 is based on forecasts for food store sales in the Shawnee area from the Oklahoma State Econometric Model, a large-scale economic forecasting model maintained at Oklahoma State University and used to make annual economic forecasts for the Shawnee and Pottawatomie

Figure 5. Monthly Taxable Retail Sales - Shawnee 12-Mo. Moving Average



[20] This estimate does not take into account any offsetting positive economic impacts that would result from the local spending of tax revenue that is no longer forwarded to the state and county.

County regions. Forecasts from the model, taking into account weaker economic conditions in the region, indicate that food store sales tax revenue would have been approximately $350,000 higher in FY2002 without the tax shift.

The upper estimate of $750,000 is based on estimated annual sales for the store. Using industry estimates of average weekly sales of $6 per square foot for retail food stores with a single-location, the 84,000 square foot store would generate approximately $26.208 million in annual sales, and, if all sales are taxable, would result in $786,240 in lost city sales tax revenue given a 3 percent city tax rate.[21] This would slightly overstate the estimate though due to some products (e.g. tobacco) being exempt from sales tax. If five percent of sales are exempt, tax revenue generated by the store would total approximately $750,000.

The resulting range of $350,000-750,000 in estimated lost sales tax revenue represents a reduction in total city sales tax revenue of between 2.5 and 5.0 percent in FY2002. The shift in taxes represents roughly one year of total sales tax revenue growth based on average growth in sales tax revenue of 3.8 percent annually since FY1999. In other words, the shift to tax-exempt status by a large local retailer can create recession-like sales tax growth conditions in a local economy for a given fiscal year.

The Role of Economic Models in Regional Economic Development

The complex and evolving nature of local area economic development has made economic modeling a necessary component of the process. A coordinated effort to solve community problems requires a thorough

[21] The Retail Food Industry Center (2001) estimates that single-location grocery stores nationwide averaged approximately $6 per square foot in weekly sales in 2000. A news story in the June 3, 2001 issue of The Oklahoman indicates that the initial week of sales at the FireLake store generated $500,000 in sales, or the equivalent of $26 million in sales on an annual basis.

evaluation of the expected outcomes from economic development initiatives that considers the impact on all constituent groups in the local area. Economic models provide just such a structured platform for evaluating the broad range of potential economic outcomes and for determining the most efficient use of local resources.

Traditional economic impact models have been used successfully to estimate the total impact of an economic development event, but they provide limited information about the distribution of the impacts among the various participants in the local economy. Even more importantly, they are often inadequate for local policy-making purposes because they assume that many of the current linkages within the local economy are fixed (wages and prices in particular) and do not change in response to economic development activities. Models constructed using this assumption cannot be used in a reliable way to test the impact of changes to the basic underlying economic characteristics of the local economy when fundamental change occurs.

This increases the challenge faced by local economic development leaders when using traditional economic models to draw accurate policy conclusions about the desirability of a proposed change. Input-output[22] (IO) models are the most commonly used tool in economic impact analysis and are based on this fixed structural view of the local economy. Because IO models assume that worker's wages and the price of goods and services in the market are fixed, they cannot account for the resulting change in the decision to work or the purchasing behavior of consumers when wages and prices rise or fall. They further fail to capture many of the critical channels of influence that drive underlying economic outcomes such as tax rates, the production choices of local firms, trade flows in and out of the region, and the availability of capital. In short, traditional

[22] See Schaffer (1999) for a full treatment of input-output models.

economic impact models fail to capture the full range of economic effects generated by the local economic development process.[23]

As the questions generated within the economic development process become increasingly complicated, more capable economic models must be developed to address these questions. A modeling framework that is better suited for evaluating the detailed linkages between the various sectors of the local economy and the various groups of constituents is the class of Computable General Equilibrium (CGE) models.[24] CGE models have long been a preferred tool for performing policy analysis at the international and national levels and have been used extensively at the state level for the past decade. However, CGE models have only recently been introduced as a tool for use in evaluating economic development initiatives at the local level. Their limited use at the local level is due to the complex nature of the models, the historical lack of adequate data at the city/county level, the cost/benefit ratio of developing a custom CGE model versus using an IO model, and the relatively recent trend of local economic development groups demanding the same type of rigorous economic analysis routinely performed in larger geographic regions.

When evaluating potential economic outcomes at the local level, it is also important to use a model that adequately reflects the unique structure of the local economy and the particular inter-linkages that exist among the major participant groups in the economy. In the case of tribal retail expansion, traditional economic models are designed to evaluate only direct changes in demand in a local economy and are not able to evaluate the full set of changes set in motion when tribes expand their retail presence and change the distribution of government revenue. Without the more comprehensive view of the local economy provided by a CGE

[23] For a broader discussion of regional models see Koh, Schreiner, and Shin (1993).
[24] Partridge and Rickman (1998) provide a comprehensive survey and appraisal of the literature on regional CGE models.

model, important questions concerning the decision of workers to enter the labor force, the effects on worker productivity, the costs and benefits to the business sector, and the general distributive economic effects resulting from the economic development process remain unanswered.

CGE models can aid local policymakers in better assessing these critical public policy questions and in governing the efficient use of public resources. CGE models will not, however, provide the answer to the best political course of action to undertake; only inform the deliberative policymaking process by taking a neutral approach toward the political value of proposed development initiatives.

Shawnee/Pottawatomie County Regional CGE Model

Several state level CGE models of Oklahoma have been constructed as a part of studies evaluating the state's child care system, forestry products industry, historical boom-bust cycles, and other topics.[25] Very few studies have applied CGE modeling to economic development issues at the local level and none are known to have been developed for a local region in Oklahoma. Two early applications of CGE models at the local level include Schwarm and Cutler (2003) and Cutler and Strelnikova (2004). These works use regionalized CGE models to examine the economic impact of policy changes at the city and county levels. We are also aware of no CGE models that have been adapted to address the question of tribal retail expansion at any geographic level.

[25] See for example: Koh (1991), Budiyanti (1996), Vargas (1999), Endsley (1999), and Rickman and Snead (2007). A web book by Vargas, Schreiner, Tembo, and Mercouiller (1999) on constructing CGE models for regional analysis contains full documentation of an Oklahoma based CGE.

The model developed for the Shawnee region is based on the neoclassical approached used by Lofgren, Harris, and Robinson[26] in building CGE models for developing countries. It also closely follows the methodology used in two state CGE models, the Oregon Tax Incidence Model[27] and the Idaho and Washington State CGE[28] model. Both of these state models adapt the Lofgren, Harris, and Robinson approach. Because taxation is much less complex at the local level, the Shawnee model does not have a detailed tax sector as found in the Oregon model and the California DRAM[29] model, both of which are designed specifically for tax incidence modeling.

The Structure of General Equilibrium Models

A general equilibrium model attempts to provide a broad understanding of an economy by using a bottom-up approach to building a detailed model of the region that includes all relevant markets and agents (participants). This neoclassical view of macroeconomic behavior stands in sharp contrast to the Keynesian tradition of starting the analysis with the large economic aggregates such as total income and output and working downward.

General equilibrium models are based on Walrasian market behavior where prices are flexible and all markets clear. Supply and demand are perfectly matched for all product and factors markets when a general equilibrium is reached. The models typically include a number of markets for goods and services and provide detailed treatment of the factors of production (labor, capital, land, etc...). They also allow for trade flows in

[26] See Logren, et. al., "A Standard Computable General Equilibrium (CGE) Model in GAMS." Documentation for the model is available online at: http://www.ifpri.org/pubs/microcom/micro5.htm.
[27] Documentation for the Oregon model is available online at http://www.leg.state.or.us/comm/lro/rr2-01otim_finalreport.pdf.
[28] Documentation for the Washington State Model is available online at http://www.agribusiness-mgmt.wsu.edu/Holland_model/about_project.htm.
[29] See Berck et. al. (1996). Full documentation for the DRAM model is available online at http://www.dof.ca.gov/HTML/FS_DATA/DYNA-REV/DRAM.zip.

and out of a region and the influence of government spending and taxation. Modern general equilibrium models are often quite detailed and require complex numerical solutions and specialized software to solve.

General equilibrium models differ from their more widely used counterpart, partial equilibrium models, by addressing the interrelationships between the various markets in the model. Partial equilibrium models examine the behavior of a good in a market while assuming that the prices of other goods remain fixed. Partial equilibrium analysis also fails to capture the necessary interactions between markets. Input-output models, the most widely used tool in economic impact analysis, are partial equilibrium models based on fixed price assumptions.

In a neoclassical model, firms are assumed to exhibit profit maximizing behavior and either sell their output to local consumers or export it outside the region based on the relative price received in the market. Households are assumed to maximize the utility they receive from choosing an optimum mix of local and imported goods. Households supply labor and firms demand labor in the local market based on wage rates.

The mix of goods and services produced by firms in a local economy is determined by the relative prices of locally produced products versus imports. Governments also produce and purchase commodities and alter their mix of production and consumption given relative prices for goods and services. A general equilibrium solution to the model is found by solving for the set of equilibrium prices that simultaneously clears, or equates supply and demand, across all markets in the system.

Shawnee CGE Model Structure

The Shawnee model is constructed using the latest conventions suggested by the literature on regional CGE models.[30] The model includes firms, households, government at the federal, state, and local levels, and both domestic and foreign trade. Investment expenditures are tracked for firms, households, and governments.

Firm output is assumed to follow a constant elasticity of substitution-type (CES) production function where intermediate inputs are used in fixed proportions and capital and labor substitution is possible across industries. The quantity of capital and labor used in production is determined by the market clearing price for each factor. In the production function, output of commodities is a function of capital, labor, and indirect business tax rates.

Both final and intermediate demand for commodities is satisfied by an aggregate mix of locally-produced and imported commodities. The mix between domestic and import purchases is determined using an Armington CES aggregation function that allows for substitution between imported and domestically produced goods by both firms and households.

Consumers purchase goods and services so as to maximize utility subject to a budget constraint using a Stone-Geary utility function. The Stone-Geary function is popular because it provides a linear expenditure system for modeling the expenditures on any good as a linear function of prices and income.

Households receive income in exchange for labor, as a return on capital, as income from the production of commodities, as transfers from

[30] See Partridge and Rickman (forthcoming) for a discussion of the state of the art in regional economic modeling.

government and other households, and as transfers from outside the region and country. Households spend their income on the purchase of commodities, to pay taxes to government, on savings and investment, transfers to other households, and transfer payments outside the region and country. Household savings is determined as a constant fraction of after-tax household income.

The model further uses an Armington CES function to differentiate between domestic imports (within the United States but outside Pottawatomie County) and foreign imports (outside the country). The Armington function allows substitution between foreign and domestic imports, and the price of foreign imports is assumed fixed. Exports are derived using a constant elasticity of transformation (CET) production function and are a function of the ratio of local prices and export prices.

The model employs the "small country" assumption where the foreign exchange rate is assumed fixed and not affected by changes in trade activity within the local region. Because the exchange rate is fixed, the current account is allowed to balance through changes in foreign savings.

Federal government revenue from the local region is determined by household income tax and indirect tax payments, while spending on commodities is adjusted to maintain the base year budget balance. State and local government revenue is a function of the income tax, factor income, and indirect income tax revenue. State and local government spending must balance with revenue and adjusts through changes in the consumption of commodities. State and local government spending can alternatively be fixed at the base year value.

Model Closures

A critical issue in adapting the CGE methodology to a small regional economy is anticipating the various ways in which the local economy will adjust to the proposed changes in the system. Model *closures* dictate the behavior of the model as a change in one sector is transmitted to the remainder of the model. An appropriate set of closures must be representative of economic behavior in the local economy in question. When constructing national and state level models, closures are typically chosen by using accepted conventions in the literature. At the local level, closures often are chosen based on findings in the literature and the informed judgment of the modeler in choosing the most plausible outcomes.

In practical terms, the selection of closures is a matter of choosing which elements of the model are endogenous, or determined within the model, and which are exogenous, or determined outside the structure of the model. The closure rules determine to a large extent the simulation results and policy conclusions formed when using the CGE model. As a consequence, they must be chosen with care and the simulation results evaluated for sensitivity.

The labor market and capital market closures are especially important when constructing a CGE model for a small region such as Shawnee. The labor and capital market closures used in the Shawnee CGE model are designed to reflect, to the degree possible, the long run neoclassical adjustment in the economy in response to a change in the system. Hence, in the base model both labor and capital are flexible in the total amount available in the economy and are allowed to adjust between sectors as needed. Both the wage rate and the rental rate on capital are allowed to float and balance the respective market as needed. Consequently, the labor market is assumed to clear, which eliminates the

possibility of long-term involuntary unemployment in the model. Additional closure options are possible for labor and capital in the model. For labor, the total supply of labor can be fixed to simulate tight labor market conditions in the short run. For capital, the total supply of capital in the region can be fixed in amount but allowed to reallocate among industries as demand for capital changes.

The savings-investment closure assumes that the amount of local savings does not have to equal local investment in a local region as it must at the national level. The foreign exchange closure assumes that the trade activity generated within the region does not impact the foreign exchange rate. Foreign savings are assumed flexible and balance the foreign exchange market requirements in the local region.

CGE Model Customization – Data, Initial Equilibrium, and Tribal Adjustments

Making the CGE model operational requires a comprehensive dataset that maps the economic flows between the various participants in the local economy. Adjustments must then be made to the data to reflect the tribal presence in the region and that will allow for tests of a shift in retail trade to tribal government. The model must then be fitted to the data and an initial equilibrium established for the economy to use as a base case in evaluating simulations with the CGE model. Each step is described in the following sections.

Pottawatomie County Social Accounting Matrix (SAM)

The dataset underlying the CGE model is commonly called a Social Accounting Matrix (SAM), a double-entry economic accounting system used to document the broad set of economic transactions and flows in a regional economy. The SAM for Pottawatomie County is created using

the 26-file CGE output from the IMPLAN[31] input-output system. An aggregated version of the SAM used in the Shawnee model is shown in Figure 6 and illustrates the estimated $12.221 billion in economic transactions taking place between the economic participants in the region in 2003.[32] Economic flows in the economy are tracked by industries (productive enterprises including both local firms and governments), commodities (the types of goods and services produced), sources of value added (labor, capital, and taxes), households, governments, investment activity, and trade (both imports and exports).

Figure 6. Social Accounting Matrix – Pottawatomie County (2003)

	Payments											
			Value Added				Government			Exports		
Receipts	(1) Industry	(2) Commodity	(3) Labor	(4) Capital	(5) Indirect Business Taxes	(6) House-holds	(7) Federal	(8) State & Local	(9) Invest-ment	(10) Foreign	(11) Domestic	Total Payments
Industry		2,269.4										2,269.4
Commodity	1,137.4					1,450.2	40.2	260.4	171.8	119.7	801.0	3,980.8
Labor	621.7											621.7
Capital	428.4											428.4
Indirect Bus. Taxes	81.8											81.8
Households		2.4	540.3	218.1		27.9	245.7	65.1	327.2	0.0	294.4	1,721.0
Federal Govt.		1.0	78.2	5.5	11.1	186.2	36.1		63.7	0.0	0.0	381.9
State & Local Govt.		68.8	3.3	-0.1	70.7	46.4	53.2	158.0	83.2	0.0	0.0	483.5
Investment		13.1		243.6		3.2	5.2	0.0	10.5	42.2	338.6	656.3
Imports - Foreign		153.2		0.2		7.0	1.4	0.0	0.0	0.1		162.0
Imports - Domestic		1,472.9		-39.0		0.0	0.0	0.0	0.0			1,433.9
Total Receipts	$2,269.4	$3,980.8	$621.7	$428.4	$81.8	$1,721.0	$381.9	$483.5	$656.3	$162.0	$1,433.9	$12,220.7

Source: IMPLAN Input-Output Model

The SAM is structured to track information on the flow of dollars from purchasers to producers, or the flow of payments and receipts. Columns in the SAM represent payments to the recipients in each row, while rows represent receipt of payment from the paying entity in each column. For example, the household row shows the sources of income for households in the region, while the household column shows the spending, or

[31] Minnesota IMPLAN Group, 1998. IMPLAN Professional: User's guide, analysis guide, data guide. Stillwater, MN. Information describing IMPLAN is available online at www.implan.com.

[32] The SAM is from the IMPLAN Input-Output System and is created using the 26-file CGE format. The 2003 dataset is the most recently available release of county level data.

payments, by households in the region. Households, firms, commodities, governments, investment purchases, imports, and exports are tracked similarly in each section of the SAM.

The SAM describes the basic transaction flows within the Shawnee area economy in considerable detail. In column (1) of the SAM, local industries within the region made total payments of $2.269 billion to other entities in 2003, including $1.137 billion for commodities used as inputs to production and $1.132 billion in value added payments. Value added payments include $621.7 million to workers (column (3)), $428.4 million to capital owners (column (4)), and $81.8 million to governments in the form of indirect business taxes (column (4)).

The $2.269 billion in inputs in column (1) were used to produce the $2.269 billion in commodities in the first row of column (2) of the SAM. The commodity production detailed in column (2) includes $2.4 million by households, $68.8 million by governments, $13.1 million in investment commodities, $153.2 million in foreign imports, and $1.473 billion in imports from the rest of the U.S.. In total, commodity production from all sources totaled $3.981 billion in 2003.

The household sector in column (6) made payments of $1.721 billion in the period, comprising $1.450 billion for goods and services (commodities), $27.9 million in payments to other households, $232.6 million in payments to government, $3.2 million in investment purchases, and $7.0 million in direct foreign imports.

Federal, state, and local governments (columns (7) and (8)) injected a total of $865.4 million into the local economy. State and local government in column (8) purchased $260.4 million in local goods and services, made

$65.1 million in transfer payments to households, and transferred $158 million from state to local government.

Exports (columns (10) and (11)) play a major role in the Shawnee area economy, totaling $1.596 billion in the period. Most of the exports are for shipment within the U.S. ($1.434 billion) rather than to foreign buyers ($162 million). Investment contributions totaling $338 million were made by entities outside Pottawatomie County but inside the United States, while $42.2 million in investment funding was derived from outside the country.

Disaggregated SAM

The SAM actually used in the CGE model is disaggregated into multiple industry and commodity groups for the production side of the economy and into multiple income groups to categorize households. The full SAM used in the CGE model is shown in Appendix A.

Figure 7. Industry and Commodity Groups

Industry or Commodity	Industry / Commodity Description
AGR	Agriculture
MINING	Mining
UTIL	Utilities
CONST	Construction
MFG	Manufacturing
WHOLE	Wholesale Trade
RET	Retail
RETTAX	Sales Tax Generating Retail and Services
TRANS	Transportation
INF	Information
FIN	Finance and Insurance
REAL	Real Estate
PBS	Professional, Business, & Scientific Services
MGT	Management of Companies
ADMIN	Administrative and Waste Services
ED	Educational Services
MED	Health Care and Social Services
ARTS	Arts and Entertainment
ACCOM	Accommodations and Food Services
OTS	Other Services
FGMIL	Federal Government – Military
FGNMIL	Federal Government – Non-Military
SLGENT	State and Local Government – Enterprises
SLGED	State and Local Government – Education
SLGNED	State and Local Government – Non-Education
MISC	Miscellaneous Industries

The production side of the SAM is disaggregated using twenty-six industry and commodity sectors based on the structure shown in Figure 7. Each industry in the model can produce more than one commodity, and each commodity can be produced by more than one industry. Using a somewhat disaggregated industry and commodity structure allows more detailed analysis of the production side of the economy by tracking the flow of

commodities produced and purchased by each industry group. The industry and commodity groups largely follow the 2-digit NAICS industry classification system;[33] however both private sector firms and government entities are treated as productive industries within the CGE model.

Five government industry and commodity groups are tracked along with twenty-one private sector groups in the production side of the model. Federal government-produced commodities are categorized in the SAM using non-defense (FGNMIL) and defense (FGMIL) groups; state and local government commodities are categorized using non-education (SLGNED), education (SLGED), and enterprise (SLGENT) groups.

A special sector named Sales Tax Generating Retail and Services (RETTAX) contains the primary sales tax generating industry sectors for Pottawatomie County and is created for use in the CGE simulations of tribal retail trade. Specifically, RETTAX contains four IMPLAN retail and services sectors that generate a significant amount of sales tax revenue and contain the types of establishments that are either currently operated or commonly owned by tribal entities including Food and Beverage Stores (405), Gasoline Stations (407), General Merchandise Stores (410), and Food Services and Drinking Places (481). The sector currently represents approximately $160 million in taxable goods and services and roughly $12.5 million in annual sales tax revenue to state and local government. The City of Shawnee receives approximately $4.4 million annually from retail establishments in the RETTAX sector. In simulating a shift to tribal retail in the CGE model, a portion of this sector is reallocated to a new tribal operated retail sector.

[33] The Miscellaneous Industries (MISC) group includes the following IMPLAN industry groupings: Private households (494), Noncomparable imports (500), Scrap (501), Used and secondhand goods (502), Rest of the world adjustment to final uses (507), Inventory valuation adjustment (508), and Owner-occupied dwellings (509).

Trade also plays a critical role in local economic activity and is tracked in the CGE model using the commodity trade information in the SAM. Figure 8 illustrates Pottawatomie County imports and exports of commodities by industry for trade both within (domestic) and outside (foreign) the United States. The region imports ($1.626 billion) significantly more goods and services than it exports ($921 million), with an annual trade shortfall of more than $700 million. Manufactured goods represent both the largest import and export category, comprising more than half of all trade in and out of the region. Following Manufacturing (MFG - $579.6 million), other significant exports from the region include Agriculture (AGR - $26.6 million), Oil and Gas (MINING - $32.8 million), Retail (RET and RETTAX - $47.9 million), Transportation and Warehousing (TRANS - $30.4 million), Information Services (INF - $39.3 million), Professional and Business Services (PBS - $36.4 million), Administrative and Waste Management Services (ADMIN - $36.9 million), and private Education Services (ED - $31.0 million).

Figure 8. Imports and Exports of Commodities by Industry

(Millions)	Exports			Imports		
Commodity	Foreign	Domestic	Total	Foreign	Domestic	Total
AGR	$1.50	$26.60	$28.10	$2.23	$18.16	$20.38
MINING	0.60	32.30	32.80	4.14	9.96	14.10
UTIL	0.10	-	0.10	0.07	15.29	15.35
CONST	0.00	5.90	5.90	-	8.18	8.18
MFG	99.80	479.70	579.60	140.99	563.41	704.40
WHOLE	2.90	-	2.90	-	102.23	102.23
RET	0.00	4.60	4.60	-	35.94	35.94
RETTAX	0.10	43.20	43.30	-	26.00	26.00
TRANS	3.90	26.60	30.40	1.87	44.08	45.94
INF	0.70	38.50	39.30	0.64	87.24	87.88
FIN	2.10	9.80	11.90	0.94	113.48	114.41
REAL	1.50	3.30	4.80	0.03	116.62	116.64
PBS	0.80	35.60	36.40	0.41	99.47	99.88
MGT	0.40	-	0.40	-	30.01	30.01
ADMIN	0.20	36.70	36.90	0.00	27.71	27.71
ED	0.20	30.80	31.00	0.06	13.10	13.16
MED	0.00	-	0.00	0.00	67.33	67.33
ARTS	-	0.00	0.00	0.04	27.35	27.39
ACCOM	-	-	0.00	-	8.92	8.92
OTS	0.10	21.80	21.80	0.04	41.22	41.25
FGMIL	-	-	0.00	-	0.00	0.00
FGNMIL	-	0.00	0.00	-	0.03	0.03
SLGENT	-	0.70	0.70	-	-	0.00
SLGED	-	-	0.00	-	0.00	0.00
SLGNED	-	0.00	0.00	-	-	0.00
MISC	4.80	5.00	9.80	1.78	17.21	18.98
Total	$119.70	$801.00	$920.70	$153.23	$1,472.90	$1,626.14

Source: IMPLAN Input-Output Model

Imports into the region are vital to meeting local demand for most major commodity groups and reflect the diversity of the goods and services

made available locally through domestic and foreign trade. Along with Manufacturing (MANU - $704 million), major import categories include Wholesale Trade (WHOLE - $102.2 million), Information Services (INF - $87.9 million), Financial Services (FIN - $114.4 million), Real Estate Services (REAL - $116.6 million), Professional and Business Services (PBS - $99.9 million) and Health Care and Social Services (MED - $67.3 million).

The household sector is disaggregated into nine household groups using the household income brackets detailed in Figure 9. The use of multiple household groupings within the CGE analysis allows us to examine the differential impacts of tribal retail activity across the range of household income. Along with income, spending by the household sector on imports and exports is modeled in the CGE.

Figure 9. Households Groups

Group	Income Range	**Income** (Millions)	
HHD1	<$10,000	$112.25	6.5%
HHD2	$10-15,000	92.34	5.4%
HHD3	$15-25,000	188.33	10.9%
HHD4	$25-35,000	195.31	11.3%
HHD5	$35-50,000	322.84	18.8%
HHD6	$50-75,000	376.25	21.9%
HHD7	$75-100,000	200.57	11.7%
HHD8	$100-150,000	137.00	8.0%
HHD9	>$150,000	96.06	5.6%
TOTAL		$1,720.96	100.0%

Source: IMPLAN Input-Output Model

Calibration of Unknown Parameters and Elasticity Estimates

The CGE model is first fitted or 'calibrated' to the data in order to estimate a number of unknown economic parameters in the model and to find the equilibrium state of the local economy given the known data for the region.[34] The calibration process establishes estimates of any unknown parameters in the model equations so that they are consistent with the known data in the SAM. Simulations are then run by making an adjustment to one of the policy variables within the model and re-solving the model to find the 'counterfactual' solution. The changes from the

[34] The term 'calibration' was suggested by Mansur and Whalley (1984) to describe the process of estimating the parameter values within a CGE model.

calibrated model to the counterfactual solution represent the expected change in the local economy resulting from the policy action.

The Shawnee model is 'static' in nature in the sense that it evaluates the discrete transition in the local economy from the initial equilibrium to a new equilibrium in response to tribal expansion, without a time dimension or a detailed description of the adjustment process.[35] Using flexible capital and labor supply produces estimates that more closely approximate a long-run adjustment within the local economy.

Several of the elasticities underlying the equations in the model are specified by the user rather than estimated through the calibration process, and are chosen to be consistent with empirical findings in the literature.[36] Elasticities measure the responsiveness of the change in one variable to changes in another. Three types of elasticities are used in the CGE model; transformation, substitution, and income elasticities. The elasticity of transformation measures the substitutability of inputs in the production process. The higher the elasticity the less substitutable one input is for another. The elasticity of substitution measures the substitutability of final good or services by the end user. For consumers, this entails the relative willingness to forego consuming one commodity if offered another. A large elasticity of substitution denotes a high degree of substitutability between two goods. Income elasticities denote the extent to which changes in income lead to changes in consumption. High income elasticities imply that a small increase in income will result in large increases in consumer spending.

The elasticity of substitution between regional production and imports is set at 3.55 for MFG, 1.42 for AGR, 0.5 for MINING, UTIL, and CONST,

[35] Dynamic CGE models provide empirical estimates of the adjustment process but are in the early stages of use and have not been evaluated adequately for reliability as a policymaking tool.
[36] See Melo and Tan (1992).

and 2.0 for the services sectors. The elasticity of substitution in production between domestic and foreign demand is set at 3.9 for AGR, 2.9 for MINING, 1.0 for UTIL, 0.5 for CONST, 2.0 for MFG, and 0.7 for all services sectors. Services are not highly tradable and hence have lower elasticities than goods-producing industries.

Elasticities for imports are set at 1.42 for AGR, 0.5 for MINING, UTIL, and CONST, 3.55 for MFG, and 1.8 for all services sectors. Elasticities for exports are set at 1.5 for goods-producing industries and 0.65 for services-producing industries. Income elasticities are set at 1.0 for all household groups. Frisch parameters are set at -1.6 for all household groups. The demand elasticity for capital and labor is set at 0.99.

Figure 10. Initial CGE Model Solution ($Millions)

Industry Output	$2,269.378
Gross Region Product	1,223.547
Intermediate Comm. Use	1,137.400
Value Added	1,131.979
Labor	621.748
Capital	428.401
Indirect Business Tax	81.829
Fed Govt. Revenue	381.877
Fed Govt. Expenditures	376.632
State/Local Govt. Revenue	483.480
State/Local Govt. Expenditures	483.468
Sales Tax Revenue	43.264
State	22.904
City	15.270
County	5.090

	Income	Consumption
HHD1 <$10,000	$112.250	$109.900
HHD2 $10-15,000	92.339	89.028
HHD3 $15-25,000	188.334	177.61
HHD4 $25-35,000	195.313	177.941
HHD5 $35-50,000	322.842	285.018
HHD6 $50-75,000	376.252	298.918
HHD7 $75-100,000	200.568	157.329
HHD8 $100-150,000	137.003	95.809
HHD9 >$150,000	96.056	58.662
	$1,720.96	$1,450.22

	Exports	Imports	Balance
Foreign Trade	$119.710	$153.233	-$33.523
Domestic Trade	801.005	1,472.903	-671.898
Total Trade	$920.716	$1,626.136	-705.421

Initial CGE Model Equilibrium

The model is solved using data from the SAM and then evaluated for accuracy and consistency of both the data and model structure. A summary of the initial equilibrium solution for the model is shown in Figure 10 and illustrates the state of the economy described by the SAM. Gross regional product in Pottawatomie County (consumption + investment + government spending + exports – imports)

totals $1.224 billion. Total output by local industries is $2.269 billion, which requires $1.132 billion in value added payments (labor income ($621.7 million) + payments to capital owners ($428.4 million) + indirect business taxes ($81.8 million)).

Federal government revenue from the region is $381.9 million while Federal expenditures are $376.6 million. State and Local government revenues and expenditures both total $483.5 million due to a balanced budget requirement in the model. Shawnee sales tax in the 2003 period totaled $15.27 million, while county sales tax totaled $5.09 million.

Households receive a total of $1.721 billion in income and spend $1.450 billion on the purchase of commodities in the period. Households in the lower income brackets spend substantially all of their income on commodity purchases. In the model, approximately $921 million in commodities are exported from the region, with $801 million staying within the U.S. and the remainder exported outside the country; $1.626 billion in commodities are imported into the region, with $1.473 billion imported from other states and $153 million imported from other countries. The net trade balance in the period indicates that the region consumes $705 million in net imports.

Tribal Adjustments

Simulating the impact of tribal retail expansion requires us to make adjustments to the base SAM in order to reflect a shift in retail economic activity from private to tribal ownership and a shift of tax revenue from state, city, and county government to tribal government. The base case equilibrium in the local economy assumes no tribal government or tribal business presence. In the simulations, new industry and commodity groups called Tribal Retail (TRIBAL) are created to track the various

commodities produced by the tribes – in this case retail goods and services.

The simulations are based on a shift of $25 million in local retail activity from private to tribal operation. The SAM is adjusted by reducing the RETTAX sector by $25 million and shifting it to the new TRIBAL sector. The size of the shift represents approximately 5 percent of the local taxable retail base and would be roughly equal to the impact of the tribal grocery store opened in Shawnee in 2001; however the size of the shift is largely arbitrary and is not intended to reflect the expected outcome for any single tribal retailer or retail industry segment. Instead the TRIBAL industry sector is intended to represent a broad cross section of the local retail sector and is tracked in the model using the same characteristics as the larger RETTAX sector except for the payment of tax revenue to tribal government rather than to state, city, and county government.

A new Tribal Government (TGOV) sector is also created that collects taxes from the TRIBAL industry and engages in government spending. TGOV is considered another form of state and local government in the model. The breakdown of TGOV spending in the SAM can be adjusted within the model to simulate alternative uses of new tribal tax revenue.[37]

CGE Model Simulations of Tribal Retail Expansion

The CGE model is used to evaluate seven scenarios involving the expansion of tribal retail activity in the Pottawatomie County economy. In each scenario, tribal government is assumed to levy a tribal sales tax equal to the local sales tax rate and retain the proceeds. The simulation

[37] The exact breakdown of total tribal business activity and tribal government spending and revenue is not available. However, the CGE model allows us to examine an incremental change in the economy given an incremental change in tribal retail and does not require knowledge of the exact composition of the full tribal presence in the region.

assumes no retail price differentials in the market place as a result of the tax rate change. In the model, state and local governments are assumed to follow a balanced budget requirement and will shift expenditures to match an expected change in revenue. All of the simulations assume that tribal retailers do not suffer from operational inefficiencies relative to other retailers and that the profit margin earned by tribe-owned firms will equal the industry average.

The simulations are intended only to provide general budget guidance along with a thorough evaluation of the broader economic impacts that tribal expansion into retail is likely to produce. No attempt is being made to model any individual tax stream other than sales tax for state, local, or tribal government. The simulations are also not intended to determine the exact composition of the total tax impact beyond the sales tax impact. Total tribal tax revenue is not modeled due to the lack of available detailed budget information on the tribes.

Again, the simulations assume the shift of $25 million in existing retail trade from the RETTAX sector to the TRIBAL sector. In the CGE model, this equates to a $2.125 million shift in sales tax revenue to tribal government along with offsetting sales tax revenue declines to state, city, and county government of $1.125 million, $750,000, and $250,000, respectively. State government funding is assumed to be insensitive to local tribal activity and therefore the $1.125 million in tax payments formerly remitted to the state is modeled as an outside injection to tribal revenue that is available for spending in the local economy.

Scenario 1 serves as an initial base case evaluation of the shift of sales tax revenue from state and local government to tribal government. It assumes that tribal revenue is spent on general government purchases consistent with the current distribution of state and local government

spending.[38] Maintaining the existing government spending profile avoids any distortionary effects in the analysis caused by altering the mix of spending in any significant way while simultaneously making the conversion to tribal ownership.

Scenarios 2, 3, and 4 evaluate the economic impact of three common ways in which tribal revenue is spent - income transfers, the provision of health care and social services, and the construction of infrastructure. Scenario 5 evaluates the relative economic impact of alternative uses of tribal sales tax revenue in expanding local export industries. In this simulation, the expansion of exports of retail goods is evaluated relative to the expected impact of expanding exports from the Manufacturing (MFG), Transportation and Warehousing (TRANS), and Professional and Business Services (PBS) sectors, all major export industries in the Shawnee area economy.

Two final simulations are evaluated using the CGE model. Scenario 6 reexamines the base case where tribal revenue is spent on general government purchases; however the city raises the local sales tax rate in order to recover lost sales tax revenue. Specifically the scenario evaluates the ability of the city to use a sales tax rate increase to recapture sales tax revenue lost to tribal retail expansion. The seventh and final scenario examines the impact on the local economy assuming that the tribe transfers the sales tax funds outside the region.

[38] State and local education expenses are not included in the tribal government spending profile. While most government functions are routinely performed by tribal government, state funding of local education is unlikely to be used in a significant way to provide funding for tribe-operated local schools. Because the set of tribal governments in the region provide a broad range of government funded goods and services, the remaining spending categories are used in the same proportions as state and local government.

Simulation 1 – Retail Shift, Tribe Spends Revenue on General Government Services (Base Case)

The first CGE simulation is designed to establish a base case estimate of the general impact of a shift in tax revenue from state and local government to tribal government. The simulation assumes that $2.125 million in sales tax revenue is shifted to tribal government and used to make purchases using the existing spending profile of state and local government.

Figure 11. CGE Model Results - Simulation 1

(millions)	Base	Simulation	Change	%Change
Gross Region Product	$1,223.547	$1,224.100	$0.553	0.045
Output	2,269.378	2,270.336	0.958	0.042
Value Added	1,131.979	1,133.559	1.580	0.140
Labor	621.748	622.800	1.052	0.169
Capital	428.401	428.857	0.455	0.106
Indirect Business Tax	81.829	81.902	0.073	0.089
State/Local Govt. Revenue	$493.480	$494.913	$1.433	0.290
State/Local Govt. Expend.	493.468	494.901	1.433	0.290
Fed Govt. Revenue	381.877	382.230	0.353	0.092
Fed Govt. Expenditures	376.632	376.879	0.247	0.066
Sales Tax Revenue	$43.264	$43.322	$0.058	0.134
State Govt.	22.904	21.810	-1.094	-4.777
City Govt.	15.270	14.540	-0.730	-4.777
County Govt.	5.090	4.847	-0.243	-4.777
Tribal Govt.	0.000	2.125	2.125	na
Household Income	$1,724.629	$1,726.192	$1.562	0.091
Household Consumption	1,450.216	1,450.571	0.354	0.024
Exports	920.716	920.685	-0.031	-0.003
Foreign	119.710	119.664	-0.046	-0.039
Domestic	801.005	801.021	0.016	0.002
Imports	1,626.136	1,626.780	0.644	0.040
Foreign	153.233	153.561	0.328	0.214
Domestic	1,472.903	1,473.219	0.316	0.021
Trade Balance	-705.421	-706.095	-0.675	-0.096

The results for Simulation 1 are shown in Figure 11 and indicate that the local economy receives an important economic boost from the shift but creates a significant budget shortfall for state, city, and county government. Output in the region increases by nearly $1 million, value added increases by $1.6 million, and household income rises by $1.6 million. Total state and local government spending (including tribal government) increases by $1.43 million, though the increase consists mainly of added tribal spending.

The expansion of output in the economy is much less than the $2.125 million shift in revenue to tribal government. The $1 million spent by city and county government was already spent predominately in the local

community and does not reflect net new spending when shifted to tribal government. The stimulative response by output and income in the region is driven by the retention of $1.125 million in sales tax revenue that was formerly remitted to state government and spent outside the local region, but is now retained and spent locally by tribal government. The state's $1.125 million share of the sales tax represents a direct infusion of outside revenue to the tribe but does not reduce existing state government spending at the local level. State spending formulas do not currently adjust to account for tribal absorption of sales tax revenue in a local region and consequently the tax revenue previously forwarded to the state is re-injected back into the local economy and creates important economic ripple effects.

However, the net growth in the local economy does not generate enough new taxable economic activity to offset more than a small portion of the tax revenue shifted away from city and county government. While tribal sales tax revenue increases by $2.125 million, revenue to state, city, and county government falls by a combined $2.1 million, with the $58,000 in net new sales tax revenue representing the amount of net new tax revenue recovered by the state, city, and county as a result of new economic activity. The estimated sales tax impacts are unambiguously negative for state and municipal governments. Even after accounting for the multiplier effects from added economic activity, Shawnee sales tax revenue declines by an estimated $730,000 annually in the simulation. This is roughly equal to the upper range of estimated lost revenue due to the similarly sized local tribal grocery store opened in Shawnee in 2001.

Because of a balanced budget requirement at the municipal level, city expenditures fall in the model by the amount of the reduction in tax revenue. The exact timing of the impact on the local community would be determined by the degree of flexibility the city was afforded by existing

fund balances or by deferring maintenance or capital spending. In addition, the actual governmental impact on the local community as a result of reduced city spending would be offset to the degree that tribal spending was used to provide the same goods and services no longer funded by city government. If tribal government provided the same set of goods and services, any potential loss in public services could be mitigated in full.

Other macroeconomic effects are generated by the shift to tribal ownership. The expansion is expected to put slight upward pressure on local wages due to an increase in the demand for local labor. Total labor income paid to workers in the local economy is expected to increase by $1.05 million which pushes up the overall average wage rate and increases competition for workers in other sectors. Upward pressure on prices in the local region makes local retail products relatively more expensive and imports relatively less expensive. Hence, the overall trade balance weakens by $675,000 through an increase in imports of $644,000 and a slight decline in exports outside the region.

Simulation 2 – Tribe Spends Revenue on Household Income Transfer

The second simulation assumes that tribal government instead spends the sales tax proceeds on direct income transfers to tribal members living in the Pottawatomie County region. As with federal and state government, direct transfer payments are a common use of revenue by tribal government. The simulation assumes that new tribal tax revenue of $2.125 million is transferred to tribal households using the overall distribution of income in the region by income bracket shown in Figure

Figure 12. Income Transfer to Households by Income Group

Household Group	Household Income Range	Income Transfer
HHD1	<$10,000	$138,409
HHD2	$10-15,000	113,888
HHD3	$15-25,000	232,687
HHD4	$25-35,000	241,748
HHD5	$35-50,000	399,086
HHD6	$50-75,000	464,541
HHD7	$75-100,000	247,365
HHD8	$100-150,000	168,925
HHD9	>$150,000	118,351
Total		$2,125,000

12.[39] The bulk of the transfers accrue to households with annual earnings above $15,000 but less than $100,000.

The CGE model results for Simulation 2 are shown in Figure 13 and indicate that while a shift to tribal retail still exerts an overall positive economic impact when the revenue is used to fund an income transfer, the resulting impacts are generally smaller than those realized in Simulation 1 where the proceeds were used to make traditional government purchases.

Figure 13. CGE Model Results - Simulation 2

(millions)	Base	Simulation	Change	%Change
Gross Region Product	$1,223.547	$1,224.514	$0.966	0.079
Output	2,269.378	2,269.727	0.349	0.015
Value Added	1,131.979	1,132.060	0.081	0.007
Labor	621.748	621.563	-0.185	-0.030
Capital	428.401	428.601	0.199	0.047
Indirect Business Tax	81.829	81.896	0.067	0.081
State/Local Govt. Revenue	$493.480	$494.753	$1.274	0.258
State/Local Govt. Expend.	493.468	494.742	1.274	0.258
Fed Govt. Revenue	381.877	382.103	0.226	0.059
Fed Govt. Expenditures	376.632	376.674	0.042	0.011
Sales Tax Revenue	$43.264	$43.317	$0.053	0.123
State Govt.	22.904	21.808	-1.097	-4.789
City Govt.	15.270	14.538	-0.731	-4.789
County Govt.	5.090	4.846	-0.244	-4.789
Tribal Govt.	0.000	2.125	2.125	na
Household Income	$1,724.629	$1,726.802	$2.173	0.126
Household Consumption	1,450.216	1,451.868	1.652	0.114
Exports	920.716	920.807	0.092	0.010
Foreign	119.710	119.712	0.002	0.002
Domestic	801.005	801.095	0.090	0.011
Imports	1,626.136	1,626.935	0.799	0.049
Foreign	153.233	153.342	0.109	0.071
Domestic	1,472.903	1,473.594	0.690	0.047
Trade Balance	-705.421	-706.128	-0.707	-0.100

The basic outcome of using income transfers is that the economy is incrementally transformed away from production and toward consumption. Local government purchases are reduced as a result of the tax shift to tribal government and replaced with consumer spending. Household spending creates more leakages outside the region through tax payments and imports.

[39] While the distribution of income among tribal households may differ from the overall regional distribution, the simulation results are not highly sensitive to the distribution. The simulated changes in output and income in the region are slightly higher (lower) as a larger percentage of the income transfer is distributed to higher (lower) income households.

The purchases by local government tend to be more highly concentrated in the high value added production sectors than household expenditures. Total state and local government spending increases by $1.274 million (largely from added tribal spending) and is driving the $966,000 expected increase in gross regional product.

Output in the region increases only one-third as much ($349,000 versus $958,000 in Simulation 1) as a result of the shift away from using sales tax revenue to fund direct government purchases of goods and services. Value added increases only $81,000 because of both the reduced demand for goods and services by government and the reduced propensity to work by households who are now receiving added income through transfer payments. Labor income earned by workers actually falls by $185,000 in the simulation reflecting the disincentive for workers to enter the labor market.

Household income, however, increases by $2.17 million ($325,000 more than in Simulation 1) as a result of the direct transfer of income to households. Household consumption correspondingly increases by $1.65 million, but is not enough of an increase to prevent the output of commodities in the region from falling relative to Simulation 1.

Output in the region is also reallocated among the existing industries as a result of the shift in spending from government to households. The manufacturing sector is expected to experience a small decline in local production as a result of reduced purchases by local government. The core retail and services sectors which are supported by consumer spending are expected to experience the greatest share increases in activity. Demand for workers will also expand in the consumer driven sectors at the expense of manufacturing. Because the overall impact is stimulative and drives an increase in the demand for labor and capital, the

cost of labor and capital are expected to increase slightly in the local market.

Simulation 3 – Tribe Spends Revenue on Medical and Social Services

Alternatively, tribal government can use the added sales tax revenue to provide health care and social services to tribe members. In this simulation we assume that tribal government uses $2.125 million in shifted sales tax revenue to fund purchases of goods and services produced by the Health Care and Social Services (MED) sector.[40]

Figure 14. CGE Model Results - Simulation 3

(millions)	Base	Simulation	Change	%Change
Gross Region Product	$1,223.547	$1,226.956	$3.409	0.279
Output	2,269.378	2,270.400	1.021	0.045
Value Added	1,131.979	1,132.223	0.244	0.022
Labor	621.748	621.762	0.014	0.002
Capital	428.401	428.607	0.206	0.048
Indirect Business Tax	81.829	81.854	0.025	0.030
State/Local Govt. Revenue	$493.480	$494.663	$1.184	0.240
State/Local Govt. Expend.	493.468	494.652	1.184	0.240
Fed Govt. Revenue	381.877	381.910	0.033	0.009
Fed Govt. Expenditures	376.632	376.673	0.041	0.011
Sales Tax Revenue	$43.264	$43.284	$0.020	0.045
State Govt.	22.904	21.790	-1.115	-4.866
City Govt.	15.270	14.527	-0.743	-4.866
County Govt.	5.090	4.842	-0.248	-4.866
Tribal Govt.	0.000	2.125	2.125	na
Household Income	$1,724.629	$1,724.813	$0.184	0.011
Household Consumption	1,450.216	1,450.202	-0.014	-0.001
Exports	920.716	920.702	-0.013	-0.001
Foreign	119.710	119.702	-0.008	-0.007
Domestic	801.005	801.000	-0.006	-0.001
Imports	1,626.136	1,627.127	0.991	0.061
Foreign	153.233	153.243	0.010	0.007
Domestic	1,472.903	1,473.884	0.981	0.067
Trade Balance	-705.421	-706.425	-1.004	-0.142

Currently in the base model, a total of $256 million in local health care and social services are either produced by a combination of local private producers ($150 million) and state and local government ($38.3 million) or are imported from producers outside the region ($67.3 million). These providers make annual payments of nearly $68.8 million to workers, representing 11.0

[40] The simulation does not examine the case of tribal provision of the newly purchased services. The health and social services sector generates very little tax revenue and is not commonly viewed as a source of transfer funds for general state and local government spending. Since there is no expected tax revenue effect associated with tribal provision of health and social services, any net economic benefits to the local economy would be only generated to the degree that exports of medical services increase or additional government revenue is received if a tribe provides the services. Both of these outcomes are viewed as unlikely to occur merely as a result of a shift to tribal provision.

percent of the $621.8 in total labor payments to workers in Pottawatomie County.

The CGE model results for Simulation 3 are shown in Figure 14 and indicate that the overall impact of a tribal retail shift is much stronger when tribal tax revenue is spent on health care and social services rather than income transfers. Output increases by an estimated $1 million, an amount roughly equal to the output response in Simulation 1. City and county government reduce their combined purchases in the local region by approximately the amount of the tax revenue shifted to the tribes. Offsetting the local government decline is the added tribal revenue that is no longer forwarded to the state. The resulting tribal spending pushes total local government spending up by $1.184 million. Output also shifts away from other sectors in the region in order to accommodate the increased demand for health care and social services.

Purchases of health care and social services have much more impact than income transfers because they represent added demand that generates expansion in the local health care and social services sector that ultimately transmits economic ripple effects through the local economy. However the results indicate that the local economy experiences a relatively small impact to income in the region. Labor income paid to workers increases by only $14,000 and household income rises by only $184,000 (versus $1.6 million in Simulation 1). As a result household consumption falls by an estimated $14,000.

The primary reason is that the added output in the Health Care and Social Services (MED) comes at the expense of local government spending which typically provides greater income transfers to the household sector. Income transfers in Simulation 2 added only about one-third more to household income than general government services in Simulation 1.

The expansion of medical care and social services also requires a large increase in imports in order to satisfy the additional local demand. Approximately one-fourth of health care and social services are imported from outside the region. However, the additional leakage of spending to imports dampens the spillover impact of the spending in the local region.

The channels of impact stimulated by added health care and social services also differ from income transfers, as these firms tend to have strong linkages to some of the most productive sectors in the region and purchase relatively larger quantities from the Manufacturing (MFG), Professional and Business Services (PBS), Real Estate Services (REAL), and Administrative and Waste Management Services (ADMIN) sectors.

Simulation 4 – Tribe Spends Revenue on Construction

Tribal spending is commonly directed toward construction projects to develop infrastructure in a local region. Tribe funded projects often benefit the broader community and are routinely financed in full by the tribe or in cooperation with state and local government.

Simulation 4 examines the impact of tribal government spending the tax revenue on construction in the local community. The results in Figure 15 again illustrate that the expected impact on a region is closely tied to the economic characteristics of the industry that is expanded. Spending the added revenue on construction produces an estimated $2.209 million increase in local output, more than double the expected output change associated with an expansion of health care and social services in Simulation 3.

However, construction spending produces an $810,000 decrease in the amount of labor needed by local firms and a $498,000 decrease in

household income in the region. Construction is a much less labor intensive industry per unit of output, and the shift from government services to construction reduces the overall demand for labor by firms and puts slight downward pressure on the local wage rate.

Figure 15. CGE Model Results - Simulation 4

(millions)	Base	Simulation	Change	%Change
Gross Region Product	$1,223.547	$1,226.273	$2.726	0.223
Output	2,269.378	2,271.587	2.209	0.097
Value Added	1,131.979	1,131.659	-0.319	-0.028
Labor	621.748	620.938	-0.810	-0.130
Capital	428.401	428.869	0.467	0.109
Indirect Business Tax	81.829	81.852	0.023	0.028
State/Local Govt. Revenue	$493.480	$494.589	$1.109	0.225
State/Local Govt. Expend.	493.468	494.578	1.109	0.225
Fed Govt. Revenue	381.877	381.723	-0.154	-0.040
Fed Govt. Expenditures	376.632	376.620	-0.012	-0.003
Sales Tax Revenue	$43.264	$43.282	$0.018	0.042
State Govt.	22.904	21.789	-1.115	-4.870
City Govt.	15.270	14.526	-0.744	-4.870
County Govt.	5.090	4.842	-0.248	-4.870
Tribal Govt.	0.000	2.125	2.125	na
Household Income	$1,724.629	$1,724.132	-$0.498	-0.029
Household Consumption	1,450.216	1,449.815	-0.401	-0.028
Exports	920.716	920.895	0.179	0.019
Foreign	119.710	119.719	0.008	0.007
Domestic	801.005	801.176	0.171	0.021
Imports	1,626.136	1,627.216	1.080	0.066
Foreign	153.233	153.379	0.146	0.095
Domestic	1,472.903	1,473.837	0.934	0.063
Trade Balance	-705.421	-706.321	-0.901	-0.128

With construction, the net impact on total government revenue is essentially the same as in Simulation 3. Finally, lower labor costs faced by local firms make them more competitive which results in a slight increase in exports from the local economy.

Simulation 5 – Tribe Expands Output in Export Sectors

Tribal government can also use sales tax proceeds as capital to fund local business expansion. The tribal tax exemption exerts a strong incentive for tribal retailers to expand further into the local retail sector; however the relative economic impact on the local economy of expanding into retail versus other industries is unknown.

The objective of this simulation is to use the CGE model to evaluate the relative economic impact of tribal investment in retail versus investment in other industries that generate significant exports outside the region. Retail

is a major export generating sector in the local economy, supplying an estimated $40 million in retail goods and services annually to shoppers living outside Pottawatomie County. We examine the export side of retail because this type of expansion would represent net new retail sales in the region and would have a much more generous impact on the local economy than would the capture of existing retail sales.

Export generating sectors also play a prominent role in strategic economic development planning at the local, state, and national levels. In fact, the 'export base' approach to local area development has driven much of the policy debate within the economic development community since the 1950s.[41]

The first stage of the simulation assumes that goods and services exported outside the region by the tribal retail sector (TRIBAL) increase by $10 million. The CGE model is then used to estimate the economic impact generated by comparable amounts of exports for three other major exporting sectors - Manufacturing (MFG), Transportation and Warehousing (TRANS), and Professional and Business Services (PBS). The impacts are compared to the expected impact from further retail expansion to determine the relative impact on the overall economy.

The three additional export sectors are chosen primarily because they are among the largest exporting sectors in Pottawatomie County. They range from pure goods-producing (MFG) to pure services-producing (PBS) and produce their respective output using broadly different mixes of labor and capital. Consequently they illustrate the differing impacts on the local economy generated by the various types of local industries as exports increase.

[41] Works by North (1955) and Tiebout (1956) are among the earliest discussing exports as a strategy for economic growth. For a more recent discussion of local economic development strategies see Shaffer et. al. (2006)

Comparable amounts of exports must first be calculated for the three comparison industries. We use the ratio of output to capital usage across the industries to determine the relative amount of output to use in the impact simulation. Figure 16 provides a summary of the relative usage of labor and capital by industry for each sector.

Figure 16. Capital and Labor Usage by Selected Industry

Industry	Output	Capital	Output/ Capital Ratio	Labor	Output/ Labor Ratio
Tribal Retail (TRIBAL)	$25.000	$4.443	5.627	$7.115	3.514
Manufacturing (MFG)	644.676	54.193	11.896	120.599	5.346
Transportation & Warehousing (TRANS)	80.199	13.939	5.754	14.032	5.715
Professional & Business Services (PBS)	95.377	17.301	5.513	40.109	2.378
All Industries	2,269.378	428.401	5.297	621.748	3.650

Output, capital, and labor are in Millions.

Manufacturing is the dominant export sector in Pottawatomie County and produces more goods and services for export than all other sectors combined. Manufacturing also typically generates more output per unit of capital than all other private industry sectors. In Pottawatomie County, the manufacturing sector produces $11.9 million in output per $1 million of capital purchases, nearly twice the ratio across all industries. However, the sector uses more than twice as much labor as capital in the production process and generates well above average output per unit of labor used. The Transportation and Warehousing sector uses approximately equal amounts of both capital and labor in the production process, achieving roughly average output per unit of capital, but well above average output per unit of labor. In contrast, the Professional and Business Services sector has an average output-to-capital ratio, but has one of the lowest output-to-labor ratios among all industry sectors.

In order to equalize the amount of exports relative to the amount of capital invested by tribal government, the initial $10 million export increase used for the Tribal Retail sector is adjusted for the other industries to reflect the

differing output to capital ratios among the industries. Manufacturing produces more than double the amount of output per dollar of capital used, so the output used in the simulation for Manufacturing is adjusted upward proportionately to $21.139 million using the relative output-to-capital ratios ($10 million x 11.896 / 5.627) for the two sectors. Transportation and Warehousing exports are adjusted slightly upward to $10.225 million and Professional and Business Services adjusted slightly downward to $9.797 using the same methodology.

The CGE model is then used to simulate the impact on the local economy from the tribal shift detailed in Simulation 1 along with the estimated equivalent increase in exports calculated above. The results in Figure 17 indicate that the expansion of exports in retail transmits the smallest spillover effect to the local economy among the four industries evaluated. Although retail provides a larger incremental amount of new tax revenue to tribal government, it provides roughly half the output generated by the Transportation and Warehousing (TRANS) and Professional and Business Services (PBS) sectors, and only one-third the output by Manufacturing (MFG).

Similar differentials are present for new income generated in the household sector. Total household income increases by $6.85 million when retail exports increase by $10 million, while comparable increases in exports create an $11.66 million income gain for TRANS, a $17.31 income gain for PBS, and a $17.81 million income gain for MFG.

The increase in total state and local government revenue and spending is 33 to 89 percent higher under the three alternative export industries than under retail expansion. Tribal government receives an additional sales tax revenue increase of $450,000 when retail is chosen, however the balance of state and local government revenue falls by much as much as $2.0

million when retail is chosen over the other export industries. For example, total state and local government revenue is between $1.35 million (TRANS) and $2.3 million (MFG) higher relative to retail.

The choice of export industry also produces differing trade impacts. The shift to retail worsens the current trade imbalance by $4.02 million, while the other sectors produce trade balance gains of between $714,000 (TRANS) and $4.5 million (MFG). The total increase in exports after the shift is also lowest for retail ($4.19 million), which totals only roughly one-fifth the increase for MFG ($20.66 million).

Figure 17. CGE Model Results - Simulation 5

		Tribal Retail (TRIBAL)			Manufacturing (MFG)			Transportation & Warehousing (TRANS)			Professional & Business Services (PBS)		
(millions)	Base	Simulation	Change	% Change	Simulation	Change	% Change	Simulation	Change	% Change	Simulation	Change	% Change
Gross Region Product	$1,223.547	$1,232.286	$8.739	0.714	$1,242.024	$18.477	1.510	$1,236.732	$13.184	1.078	$1,242.274	$18.727	1.531
Output	2,269.378	2,278.141	8.762	0.386	2,296.413	27.034	1.191	2,285.434	16.055	0.707	2,284.705	15.326	0.675
Value Added	1,131.979	1,142.586	10.607	0.937	1,150.729	18.750	1.656	1,146.275	14.297	1.263	1,151.165	19.187	1.695
Labor	621.748	627.864	6.116	0.984	632.794	11.047	1.777	629.359	7.611	1.224	633.483	11.735	1.887
Capital	428.401	431.976	3.574	0.834	435.003	6.602	1.541	434.068	5.667	1.323	435.019	6.618	1.545
Indirect Business Tax	81.829	82.746	0.917	1.120	82.931	1.101	1.346	82.848	1.018	1.245	82.663	0.834	1.019
State/Local Govt. Revenue	$493.480	$496.090	$2.611	0.529	$498.402	$4.922	0.997	$496.961	$3.481	0.705	$497.684	$4.204	0.852
State/Local Govt. Expend.	493.468	496.079	2.611	0.529	498.390	4.922	0.997	496.949	3.481	0.705	497.672	4.204	0.852
Fed Govt. Revenue	381.877	383.597	1.720	0.450	385.843	3.966	1.039	384.545	2.668	0.699	385.795	3.918	1.026
Fed Govt. Expenditures	376.632	376.412	-0.220	-0.058	379.517	2.885	0.766	377.982	1.349	0.358	378.869	2.237	0.594
Sales Tax Revenue	$43.264	$43.997	$0.733	1.695	$44.145	$0.881	2.037	$44.079	$0.815	1.883	$43.931	$0.667	1.542
State Govt.	22.904	21.929	-0.975	-4.257	22.246	-0.659	-2.875	22.211	-0.694	-3.028	22.133	-0.772	-3.370
City Govt.	15.270	14.620	-0.650	-4.257	14.831	-0.439	-2.875	14.807	-0.462	-3.028	14.755	-0.515	-3.370
County Govt.	5.090	4.873	-0.217	-4.257	4.944	-0.146	-2.875	4.936	-0.154	-3.028	4.918	-0.172	-3.370
Tribal Govt.	0.000	2.575	2.575	na!	2.125	2.125	na	2.125	2.125	na	2.125	2.125	na
Household Income	$1,724.629	$1,731.171	$6.541	0.379	$1,742.434	$17.805	1.032	$1,736.285	$11.656	0.676	$1,741.940	$17.311	1.004
Household Consumption	1,450.216	1,457.063	6.847	0.472	1,453.864	3.648	0.252	1,454.838	4.622	0.319	1,455.964	5.748	0.396
Exports	920.716	924.907	4.191	0.455	941.380	20.664	2.244	927.786	7.070	0.768	926.896	6.180	0.671
Foreign	119.710	119.536	-0.174	-0.145	120.603	0.893	0.746	119.645	-0.065	-0.054	119.324	-0.386	-0.322
Domestic	801.005	805.371	4.365	0.545	820.777	19.771	2.468	808.141	7.135	0.891	807.571	6.566	0.820
Imports	1,626.136	1,634.370	8.234	0.506	1,642.305	16.169	0.994	1,632.492	6.356	0.391	1,630.015	3.879	0.239
Foreign	153.233	153.480	0.247	0.161	158.452	5.219	3.406	155.346	2.113	1.379	156.166	2.933	1.914
Domestic	1,472.903	1,480.890	7.986	0.542	1,483.853	10.950	0.743	1,477.146	4.242	0.288	1,473.849	0.946	0.064
Trade Balance	-705.421	-709.463	-4.042	-0.573	-700.925	4.496	0.637	-704.706	0.714	0.101	-703.120	2.301	0.326

Simulation 6 – Tribe Spends Revenue on General Government Services (Base Case), City Raises Sales Tax Rate

A potential response by municipal government to a decline in sales tax revenue as a result of tribal retail expansion is to increase the city sales tax rate. In order to gauge the size of the tax increase required to offset the tribal shift, the CGE model is used to extend the base case in Simulation 1 by increasing the city sales tax rate and examining the resulting estimates of tax revenue recovered by state, city, county, and tribal government. The city sales tax rate is increased on the eight primary sales tax generating sectors in IMPLAN which represent $532 million in goods and services.[42] The total retail activity in these sectors is approximately equal to the total amount of taxable retail transactions in the county.

In the simulation, the city sales tax rate is increased by 0.25 percent and the CGE model is re-solved. A 0.25 percent tax increase, without considering the dynamic changes in the local economy predicted from the CGE model, would raise an estimated $1.33 million in new tax revenue. However local goods will become more expensive and discourage shoppers coming to Shawnee from outside the region, while imports will be less expensive which encourages shopping outside the region. Tribal government is assumed to match the new higher local sales tax rate and will receive added revenue from the rate increase.

The expected tax revenue under the new sales tax rates is shown in Figure 18 and indicates that the city portion of the sales tax revenue would rise by nearly $1 million and would more than recover the tax revenue shifted to tribal government in the hypothetical $25 million expansion in

[42] The primary sales tax generating sectors include Wholesale Trade (WHOLE), Retail Trade ex RETTAX (RET), Retail Trade with Tribal Presence (RETTAX), Arts and Entertainment (ARTS), Accommodations and Food Service (ACCOM), Other Services (OTS), Tribal Retail (TRIBAL), and Miscellaneous Services (MISC).

tribal retail in Simulation 1. However the dynamic effects in the economy reduce the projected tax revenue more than 30 percent below the expected increase of $1.33 million. Total estimated city sales tax revenue is projected to increase to $15.456 million and would exceed the base sales tax revenue to the city before the tribal shift by $186,000.

Figure 18. City Sales Tax Rate Increase

City Tax Rate Increase	City Tax Rate	Total Local Tax Rate	Sales Tax Revenue ($Millions)				
			State	City	County	Tribe	Total
0.00%	3.00%	8.50%	$21.810	$14.540	$4.847	$2.125	$43.322
0.25%	3.25%	8.75%	21.817	15.456	4.848	2.188	44.308
Pre-Shift	3.00%	8.50%	22.904	15.270	5.090	0.000	43.264

However, this suggests that raising the local tax rate is not likely to serve as a viable option for city government when responding to a large shift in retail activity to tribal government. Tax rate increases always face intense voter scrutiny and would continue to encourage more retail shopping out of region and further dampen the ability of the city to raise additional revenue. Higher rates might also encourage tribal retailers to undercut the current local tax rate and create an even larger shift of spending to tribal retailers, exacerbating the budget gap at the city level.

Simulation 7 – Tribe Transfers Revenue Outside of the Local Region

The final scenario evaluates the economic implications of tribal government permanently shifting tribal tax revenue outside the region. Tribal governments are free to pursue investment opportunities outside the local economy and are under no obligation to spend locally generated sales tax revenue within the Shawnee area.

The expected impact of shifting the tax revenue outside the region is somewhat mitigated by the fact that state government spending in the local area is not tied to locally generated sales tax revenue. Hence, the

leakage of sales tax revenue outside the region will equal only the combined revenue that is shifted from city (3.0 percent) and county (1.0 percent) government. In the case of the $25 million shift in retail activity modeled in Simulation 1, the direct reduction in local government revenue and spending as a result of shifting the funds outside of the local region equals only $1.0 million - $750,000 for the city and $250,000 for the county.

Figure 19. CGE Model Results - Simulation 7

(millions)	Base	Simulation	Change	%Change
Gross Region Product	$1,223.547	$1,223.055	-$0.492	-0.040
Output	2,269.378	2,268.526	-0.852	-0.038
Value Added	1,131.979	1,130.574	-1.405	-0.124
Labor	621.748	620.812	-0.936	-0.151
Capital	428.401	427.997	-0.405	-0.094
Indirect Business Tax	81.829	81.765	-0.065	-0.079
State/Local Govt. Revenue	$493.480	$492.206	-$1.274	-0.258
State/Local Govt. Expend.	493.468	492.194	-1.274	-0.258
Fed Govt. Revenue	381.877	381.563	-0.314	-0.082
Fed Govt. Expenditures	376.632	376.412	-0.220	-0.058
Sales Tax Revenue	$43.264	$43.212	-$0.052	-0.119
State Govt.	22.904	21.752	-1.152	-5.031
City Govt.	15.270	14.501	-0.768	-5.031
County Govt.	5.090	4.834	-0.256	-5.031
Tribal Govt.	0.000	2.125	2.125	na
Household Income	$1,724.629	$1,723.240	-$1.389	-0.081
Household Consumption	1,450.216	1,449.901	-0.315	-0.022
Exports	920.716	920.743	0.027	0.003
Foreign	119.710	119.751	0.041	0.035
Domestic	801.005	800.992	-0.014	-0.002
Imports	1,626.136	1,625.564	-0.573	-0.035
Foreign	153.233	152.942	-0.291	-0.190
Domestic	1,472.903	1,472.622	-0.281	-0.019
Trade Balance	-705.421	-704.821	0.600	0.085

This $1.0 million loss of local government revenue and spending in the region, however, produces a significant economic drag on the local economy. The results from the CGE simulation of this scenario are summarized in Figure 19. Output of goods and services in the region declines by $852,000, with most industry sectors experiencing a small reduction in output. Value added declines by $1.4 million and is largely due to a $936,000 reduction in payments to labor. Wage rates also decline slightly in response to the reduced demand for workers by local industries.

Household income declines by $1.4 million, pushing local household purchases down by an estimated $315,000. However, the local trade

balance is expected to improve by $600,000 as exports rise and imports fall in response to the now relatively lower local price level.

Despite a $1 million reduction in total local government spending, tribal revenue increases by $2.125 million, the same increase realized in the previous simulations. However, total sales tax generated in the region declines by an estimated $52,000, with state, city, and local government suffering offsetting losses of $1.15 million, $768,000, and $256,000, respectively. The net effect on state and local government spending is a decline of $1.27 million which is comprised largely of the $1 million direct leakage of tribal revenue outside the region.

Sensitivity of Simulations to Model Closures

The structure imposed on the model is well known to influence the predicted economic outcomes when using a CGE model. In this section, we evaluate the conclusions reached in the previous sections by altering several underlying assumptions within the model. The simulation results are first evaluated using labor and capital market closures that restrict the amount of capital and labor available in the local economy. The results are then evaluated by multiplying the key elasticity measures in the CGE model by 0.5 and 1.5 and repeating the simulations. In the last sensitivity test, a subsidy from tribal government to tribal retailers is added to the simulations.

Labor Market Flexibility

The supply of labor in the model is assumed flexible and adjusts to meet the changing demand for workers as local firms expand and contract their output. However, some labor markets do not readily attract new workers which may dampen some of the expected output gains predicted by the CGE simulations. The proximity of the Shawnee market to the Oklahoma

City metropolitan area suggests that the local labor market has adequate access to additional labor supply. However, periods of extremely low unemployment may also limit the ability of the local labor market to supply new workers.

The simulations are re-evaluated assuming a fixed amount of labor in the local market. Results for Simulations 1-4 suggest that the impact of a tribal shift is still strongly expansionary because the external injection of funds formerly remitted to state government continues to stimulate local growth. Nevertheless, total output expands at a slightly slower rate in the simulations. Households fare better relative to producers as the fixed labor supply puts upward pressure on wages in order to expand output, which tends to raise household income in the simulations. In contrast, the tight labor market conditions exacerbate the shift away from labor when spending is for construction in Simulation 4. Output and household income decrease by roughly 40 percent from the initial results for Simulation 4.

The evaluation of various export industries in Simulation 5 produces much stronger results under fixed labor supply. The impacts approximately double for each scenario as the external demand for goods and services places tremendous upward pressure on local wage rates and produces large gains in household income. The demand for capital increases as well across all industries in the face of a sharply tighter local labor market. The extreme case of export driven economic development based on the injection of outside funding into a local region is illustrated in this case.

The result from Simulation 6, where an increase of slightly more than 0.25 percent in the local tax rate is needed to offset the loss of the tribal shift in Simulation 1, continues to hold under fixed labor supply. Fixed labor

supply has an increasingly restrictive impact in Simulation 7 in the case of tribal tax revenue spent outside the region.

Capital Market Flexibility

In small regions, the availability of capital may be restricted and serve as a restraint on the expansion of output by local industries. The simulation results using fixed capital availability are similar to those for fixed labor. In Simulations 1-4, a tribal retail shift remains expansionary in the local economy when the quantity of capital is fixed, however both output and household income are marginally lower. There is an increase in payments to capital owners while the reduction in output drives a general reduction in the use of labor. Similar to the case of fixed labor supply, a somewhat unique effect is present for construction spending in Simulation 4. Output declines by about 10 percent as the shift away from labor reduces the wage rate and eases the shift from capital to labor in the region. In other words, the negative impact on the labor market is eased when capital becomes relatively scarcer in a region.

In Simulation 5, the output impacts from an expansion in exports are approximately 50 percent larger for all four industries examined when capital is fixed. Because the new export driven growth cannot access additional capital to satisfy additional output, the labor market is again stimulated and wage rates increase as with fixed labor supply. The results for Simulation 6 also continue to hold under fixed capital supply. The 0.25 percent increase in the local sales tax rate remains adequate to recover the tax revenue lost to tribal retail expansion. The result for Simulation 7 again becomes more restrictive with fixed capital supply.

Key Elasticities

We also examine whether the simulation results are sensitive to key elasticity estimates in the model in order to determine if the model provides a fair representation of the net economic impact from tribal expansion under a broad range of economic conditions. Specifically, we examine the elasticity of substitution between labor and capital, the elasticity of demand for world exports, and the elasticity of substitution in production between domestic and foreign demand.

The elasticity of substitution between labor and capital describes how readily capital and labor are substituted in the production process. The sensitivity tests indicate that the simulation results are not highly sensitive to labor-capital substitutability. For example, the sensitivity tests indicate that the less substitutable are labor and capital, the more negative the impact on labor when construction spending occurs in Simulation 4. However, the response is only on the order of magnitude of a 10 percent change in household income when using 0.5 or 1.5 rather than the initial elasticity of 1.0.

The simulations are evaluated using 1.5 for the elasticity of demand for world exports. This elasticity determines the willingness of foreign buyers to consume exports from the region and is a critical parameter in determining the outcome of Simulation 5. The sensitivity tests indicate that the stimulative response to expanding the local export sector is only sensitive to extreme values of the elasticity and the original conclusions hold for any reasonable range for the elasticity.

The stimulative effect from a tribal retail shift is mostly unchanged under higher and lower values for the elasticity of substitution in production between domestic and foreign demand. This elasticity determines

whether production is exported or consumed locally and has only small marginal effects on the predicted changes in output and income for any reasonable range for the elasticity.

Tribal Retail Subsidy

The final test evaluates the sensitivity of the results to the assumption that local tribe owned retailers charge the full local tax rate and do not subsidize retailers. This sensitivity test evaluates Simulation 1 under the assumption that tribal government subsidizes tribal retailers in the amount of 1 percent of tribal sales, or $250,000, and that tribal retailers continue to charge market prices.

The results suggest that even with the subsidy the overall impact of a tribal retail shift remains decidedly positive. However, the magnitude of the overall positive economic impact is reduced as the size of the subsidy is increased, with output falling by $360,000 in this case. Tribal government is shifting resources away from general government expenses and using them to encourage expansion of the tribal retail sector. As a consequence, the economy experiences a general shift toward more retail activity and household consumption at the expense of other industry sectors. The expanded output in the retail sector increases the demand for both labor and capital in the local market and pushes wage rates and the cost of capital upward as retail competes with other sectors for these inputs. The gains in household income and household consumption are both reduced by approximately 10 percent.

Implications for Local Government

The CGE model simulations indicate that a shift in retail activity to tribal ownership can have a substantial positive economic impact on a local economy if the tax revenue is spent within the local region. The stimulative response is driven primarily by tax revenue that was formerly remitted to state government but is now retained and spent locally by tribal government. Because state spending formulas do not currently adjust for tribal absorption of sales tax revenue, this revenue is re-injected back into the local economy and can create important economic ripple effects.

However, tribal retail expansion simultaneously creates a budget gap for state and local government in every simulation. A simulated shift of $25 million in existing retail to tribal ownership produces a $730,000 loss in tax revenue to the city in the base simulation. The budget shortfalls lead to reduced local government spending under a balanced budget requirement. The simulations also show that the added economic activity generated by tribal spending will produce only enough revenue to offset a small portion of the revenue shifted from municipal government to tribal government. County government also incurs a revenue reduction, which in turn weakens economic activity in the local region. Hence, the impact of tribal retail expansion has the largest impact on those local governments most reliant upon the sales tax to fund public services and who face a statutory requirement to maintain a balanced budget.

Spending tribal tax revenue outside the region always has a decidedly negative economic impact. This represents a leakage of tax revenue outside the region that was formerly spent predominately in the local economy by city and county government. However, state government spending is assumed invariant to tribal activity so this portion does not leak outside the region.

The simulations also indicate that the expected impact differs based on the ultimate use of tribal sales tax revenue within the local economy. Spending tribal revenue on the same types of traditional government services currently provided by municipal government generates the smallest changes in the composition of the local economy. Income transfers have the smallest expected overall economic impact as they encourage a transition away from production and toward consumption. Spending on either infrastructure or health care and social services produces much larger relative impacts than income transfers, with construction expenditures having the larger impact of the two.

Tribal tax revenue may also be used to fund the expansion of local business activity. Relative to a group of other key export sectors, retail exports have a much smaller economic impact than manufacturing, transportation and warehousing, and professional and business services. The gains in local household income are 2-3 times greater with the other key export sectors than with an expansion in the retail sector. Output gains in the local economy are similarly 2-3 times greater with the other export sectors than with retail.

Total state and local government revenue is also significantly lower in the region when retail is expanded versus the other export sectors. For example, expanding manufacturing exports rather than retail exports produces nearly twice the gain in total state and local government revenue relative to retail, with the reduced amount of tribal revenue in this case representing only 20 percent of the total added revenue for state and local government.

If the local municipality must raise tax rates to recover sales tax revenue lost to a tribal shift, a 0.25 percent increase in the city tax rate will raise

nearly $1million in net tax revenue and offset a roughly $25 million shift in retail sales to tribal ownership.

Additional tests indicate that the conclusions about tribal retail generated from the CGE simulations are not highly sensitive to the structure of the model or to changes in key underlying assumptions. Even if capital and labor are restricted to the current amount available in the market, the general economic impact from tribal expansion remains quite positive. The positive economic impact is also present under modest subsidization of tribal retail by tribal government.

In summary, the CGE simulations provide municipal policymakers with the first detailed examination of tribal retail expansion in a local economy in Oklahoma. The simulations illustrate for local leaders the range of potential economic impacts of tribal retail expansion. Tribal governments are also afforded an evaluation of alternative uses of tribal tax revenue in order to better meet tribal economic development objectives. This information should also aid Shawnee and other Oklahoma cities that share a region with sovereign tribal governments to form more collaborative economic development agendas.

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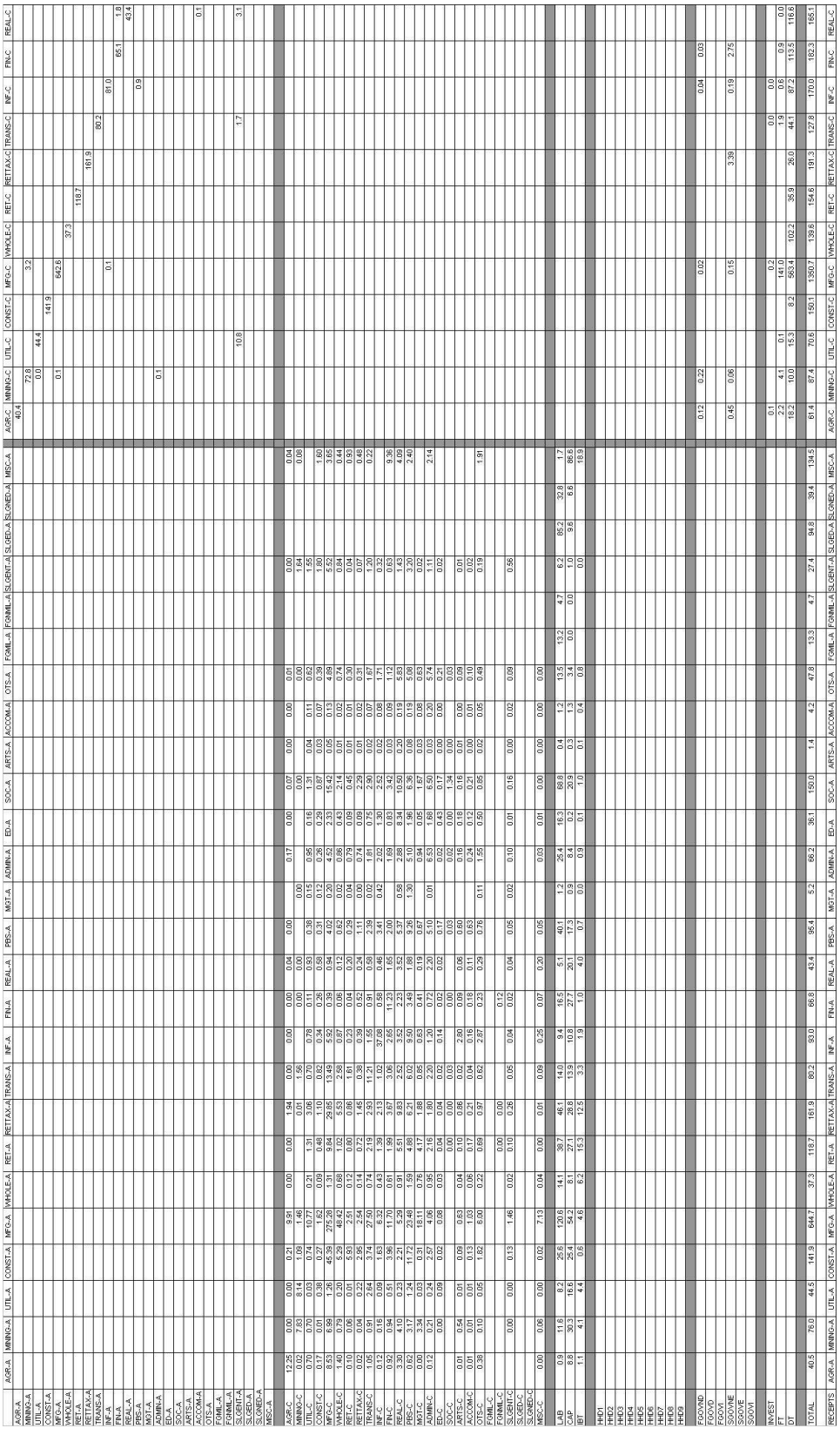
Appendix A **(Part 1) -** Detailed SAM (Pottawatomie County)



Appendix A (Part 2)