

# How Will Municipal Sales Tax Performance be Affected by COVID-Induced Income and Wealth Effects?

## Executive Summary

The study of how demand responds to certain economic circumstances is referred to as elasticity. Since demand can respond to a multitude exogenous changes, there are multiple elasticities. In this analysis, we examine the income elasticity of demand and its relationship with sales tax revenue. That is, how does demand for consumer goods and thus the sales tax respond to changes in household income? Two measures of income elasticity are calculated. The first, more narrow income elasticity measures the change in demand that results from a change in wage and salary income. Personal income, the second more broadly measured income concept includes other sources of income, particularly those related to investment income. While Personal Income is not a perfect proxy for the wealth effect on consumption, it does provide some insight into how changes in the earnings from assets (equities, real estate, etc) impact consumption. The findings show that the tax bases of cities vary significantly in their exposure to variations in income. Colorado municipalities likely will experience varying sales tax trajectories through this COVID induced economic event.

This work was partially supported by Municipal Fiscal Facts (MFF), a program of the Colorado Futures Center. MFF is an on-line fiscal data sharing community for Colorado municipalities. The initiative currently is supported by its inaugural members: Arvada, Brighton, Castle Pines, Centennial, Denver, Fort Collins, Greeley, Littleton, Loveland, Superior and Wellington. Access to the data shared by these cities facilitated the development of these research findings.

MFF is structured as a membership-based initiative, but the Center is waiving membership fees for cities during the COVID emergency. If you are interested in participating in this data sharing effort please visit [www.municipalfiscalfacts.org](http://www.municipalfiscalfacts.org) or contact Colorado Futures Center at [phyllis@coloradofuturescsu.org](mailto:phyllis@coloradofuturescsu.org)

## Why Consider Elasticities Now?

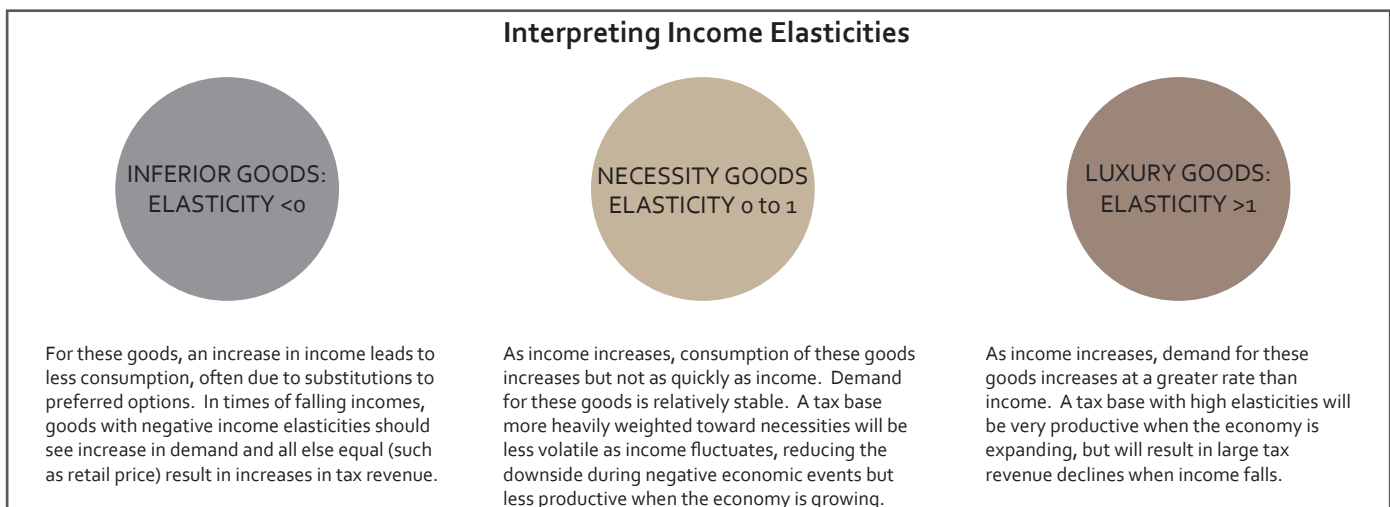
The COVID-19 pandemic forced a nearly full economic shut down. Assessing the short-term demand response from a near total shut down is devastating in its findings but rather straight-forward in its execution. Much economic activity, and thus demand, ceased to exist. However, Colorado slowly is beginning to reopen and with it will be some rebound in consumption. The open question surrounds the form and robustness of the rebound and what it means for sales tax dependent cities.

One consideration related to a recovery in consumption demand is that there will be a lingering income and wealth effect. Many Coloradans have lost wages, either temporarily or longer term, and that coupled with impacts to assets will leave consumers feeling less economically secure. Economists have long known that consumption is related to income and household perception of wealth.

Recovery of consumption activity will depend on factors such as what businesses reopen and whether and how consumers choose to assess health risks related to participation in the newly opened economy. At the same time, consumption also will respond to income and wealth effects. Projecting fiscal recovery will require a better understanding of how local tax bases respond to changes in income – the income elasticity of demand. This analysis uses data on the Colorado (state) retail sales base to assess the income elasticity for different components of the base. It then applies these findings to select local government members of Municipal Fiscal Facts (MFF) to demonstrate how an understanding of the income elasticity helps to better project the pattern of local sales tax during the downturn and recovery.

Elasticity is a measure of responsiveness. The larger the elasticity, the more demand changes as income changes. Elasticities are generally interpreted as symmetric. That is, demand is expected to respond according to the elasticity for bidirectional changes in incomes, increases and decreases.

A tax base consisting of highly income elastic components will generate significant growth in revenue when incomes are increasing but also result in steep revenue drops when incomes are declining. Cities with bases more heavily reliant on elastic components will experience more volatility, with larger declines in revenue as incomes decline but steeper revenue growth as incomes begin to recover. Cities with less elastic bases will experience relatively more stability.

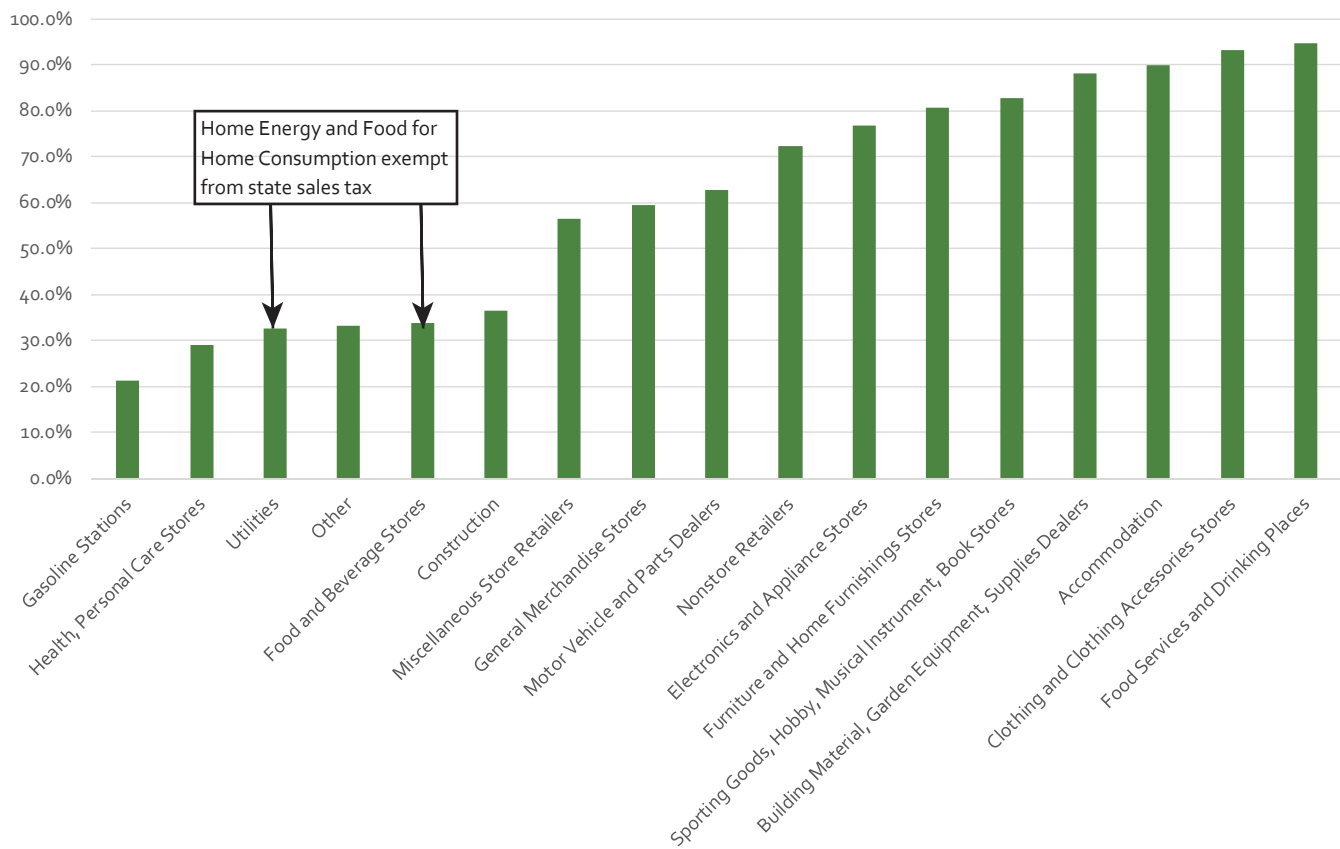


## Method

This study uses Colorado retail sales data by industry and statewide measures of wage and salary and personal income to estimate statewide income elasticities for major components of the tax base. In order to adjust out any timing or other issues in the data, the elasticities are calculated over a two-year period from 2017-2019. Population and price changes are accounted for by using per capita real measures with prices adjusted with the appropriate CPI measure, by industry, from the Denver-Aurora-Lakewood CPI (1982-84 = 100).

The Colorado state sales tax base is defined more narrowly than that of many of the state’s municipalities. Most prominently, the state base exempts food for home consumption and home energy while many cities do not. To ensure that the elasticities calculated in this analysis are more universally relevant, they are calculated from data on retail sales, not taxable sales. The relationship between retail and taxable sales in the Colorado base is shown in Figure 1.

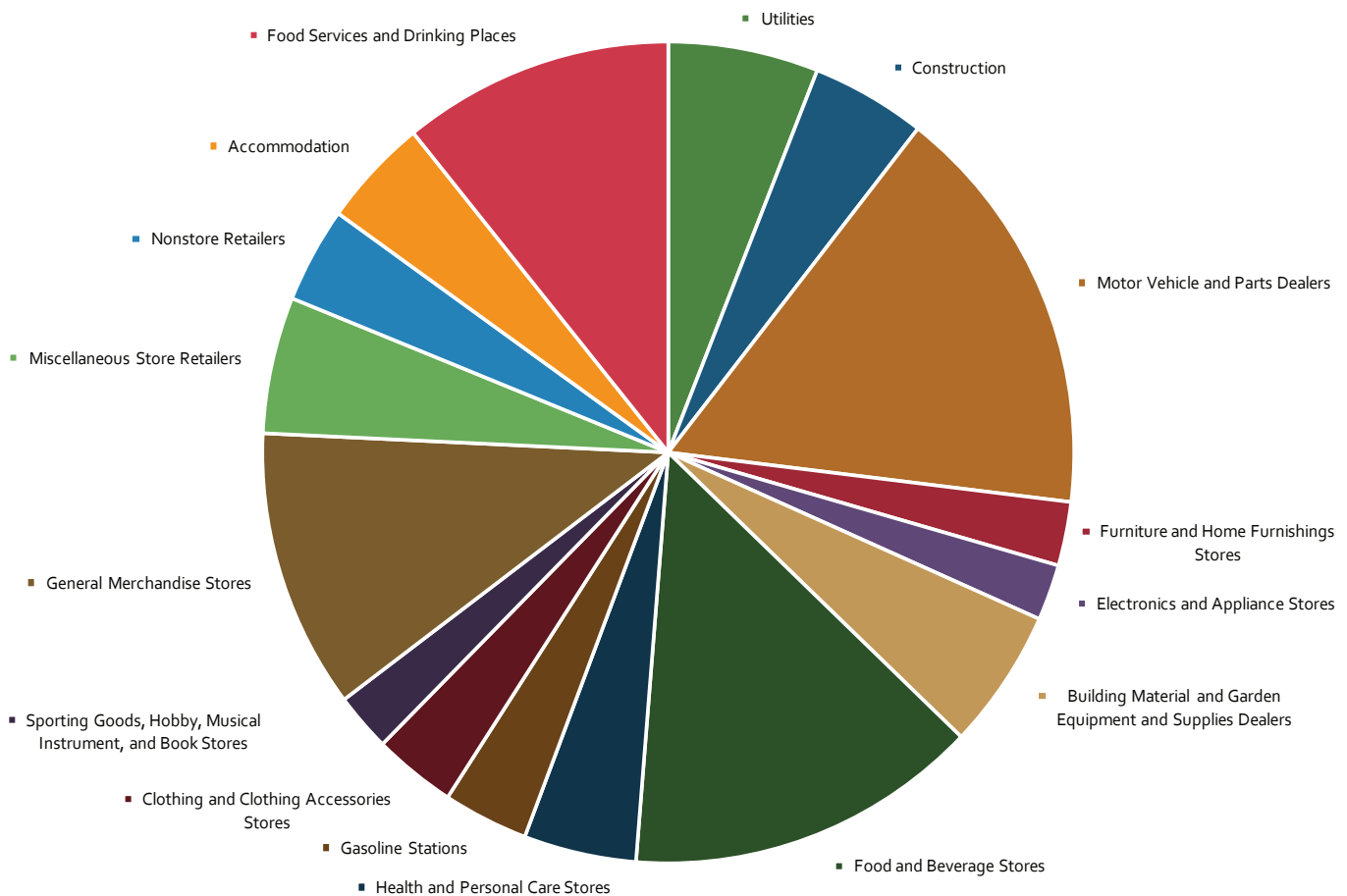
Figure 1: Colorado Taxable Sales as a Share of Retail Sales, 2019



Source: Analyst’s calculation from Colorado Department of Revenue data

The retail sales data are combined into major industrial categories, many of which closely mirror those used by MFF to classify local sales tax bases. Elasticities for these common categories are presented separately in the findings section. The remaining industrial categories are combined into a catch all Other, a large combination of sales unlikely to be subject to sales tax. In 2019, only 33% of the state level sales in the Other category were taxable and they are equally unlikely to be taxable by cities. The largest categories in Other are wholesale trade and health care services. The distribution of retail sales, excluding Other, for Colorado in 2019 are depicted in Figure 2.

**Figure 2: Colorado Retail Sales by Industry (excluding Other), 2019**



Source: Analyst's calculation from Colorado Department of Revenue data

## Findings

Cities in Colorado are heavily reliant on sales tax revenue, a relatively volatile tax revenue even under more stable economic circumstances. In this time of extreme volatility and uncertainty, projecting sales tax performance becomes increasingly difficult. The income elasticity of the various components of the sales tax base is one data point that will help cities better understand the likely pattern sales tax revenue in this extremely volatile and uncertain time. Municipal tax bases weighted toward less income elastic bases are likely to weather the downturn relatively better than those with highly income elastic bases. But on recovery, the less income elastic base will have a more muted recovery. The opposite is true for elastic bases.

For the majority of Colorado’s larger cities with tax bases that vary from the state base, the broader concept of retail sales is the better measure to ensure comparability. Colorado retail sales (excluding the \$90.4 billion largely untaxable “Other” category) in Colorado have income elasticities of 1.6 and 1.5 relative to wage and salary and personal income, respectively. Between 2017 and 2019, as income increased by 1%, retail sales (excluding other) increased by approximately 1.5%. To place this in context, all else held equal (such as prices, population and other impacts to the economy) for every 1 percent change in income, this portion of the statewide retail sales base (the majority of the taxable base) is expected to change by \$2.1 billion and \$2 billion, respectively, with respect to the wages and salaries and personal income concepts of income.

The elasticities of major industrial components of Colorado retail sales with respect to both income concepts are presented in Table 1.

**Table 1: Income Elasticity of Retail Sales: Colorado**

		<i>Wage and Salary Elasticity of Demand</i>	<i>Personal Income Elasticity of Demand</i>
LUXURY	<i>Non-store Retailers</i>	13.5	12.6
	<i>Other</i>	4.8	4.5
	<i>Accommodation</i>	3.4	3.2
	<i>Construction</i>	2.9	2.7
	<i>Food Services and Drinking Places</i>	2.8	2.7
	<i>Health and Personal Care Stores</i>	2.3	2.2
	<i>Miscellaneous Store Retailers</i>	2.0	1.8
	<i>Electronics and Appliance Stores</i>	1.7	1.6
	<i>Food and Beverage Stores</i>	1.5	1.4
	<i>General Merchandise Stores</i>	1.4	1.3
	<i>Sporting Goods, Hobby, Musical Instrument, and Book Stores</i>	1.3	1.2
NECESSITY	<i>Utilities</i>	1.1	1.0
	<i>Furniture and Home Furnishings Stores</i>	0.8	0.8
	<i>Clothing and Clothing Accessories Stores</i>	0.7	0.7
	<i>Motor Vehicle and Parts Dealers</i>	0.7	0.7
	<i>Gasoline Stations</i>	0.3	0.2
INFERIOR	<i>Building Material and Garden Equipment and Supplies Dealers</i>	-0.2	-0.2
	<b>Total</b>	<b>2.4</b>	<b>2.3</b>
	<b>Total Base less Other</b>	<b>1.6</b>	<b>1.5</b>

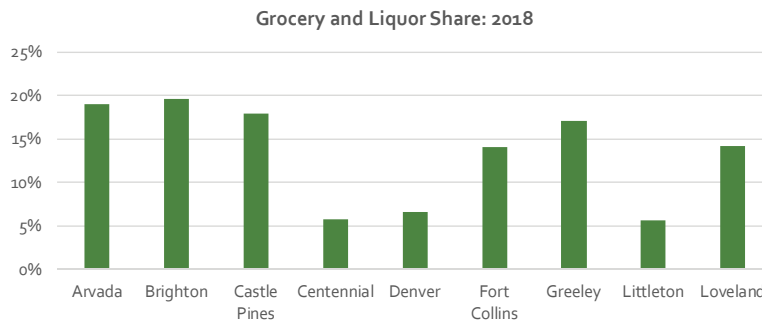
## Notes on the Interpretation and Application of the Income Elasticity of Food and Beverage Stores and Non-Store Retailers

### Food for Home Consumption

Food for home consumption is generally thought of as a necessity good, with a low, but positive, income elasticity (between 0 and 1). That is, as incomes increase, food consumption increases, but not wildly. However, the data show a larger elasticity. Why?

Food in grocery stores is subject to a high degree of substitution. When incomes are strongly increasing, consumers substitute up to more “gourmet” options and visa versa when incomes grow more slowly or decline. So, while “food” is generally considered a necessity with an expected income elasticity between 0 and 1, grocery purchases often will exhibit higher elasticities - as is the case with the Colorado data. And, in the near and mid-term future, as restaurants remain closed or operating at reduced capacity, the food for home consumption category will be further distorted as households likely will continue to substitute restaurant meals for those at home.

To help understand how this might affect municipal sales tax performance and to better interpret the individual city profiles below, the following figure shows the share of total sales tax revenue generated from grocery and liquor stores for the MFF member cities (base includes auto use but not marijuana).



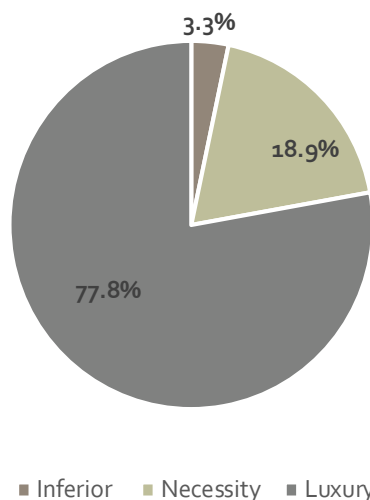
Source: Analyst calculation from Municipal Fiscal Facts data

### Non-Store Retailers

Non-store retailers are defined as establishments selling goods and services outside the confines of a retail facility. It is a broad category that is increasingly dominated by internet sales. The very large income elasticities associated with this category are a direct reflection of the substitution that is taking place between brick and mortar retailers and remote sellers. The analysis that follows maintains the classification of income elasticity greater than 1 (luxury goods) for this industry category since the majority of sales at non-store retailers are assumed to be in industrial categories that are otherwise more highly income elastic.

Classifying the state retail sales base as inferior (elasticity < 0), necessity (elasticity between 0 and 1) and luxury (elasticity >1), and applying the classifications to state retail sales data for 2019 demonstrates that the state base is heavily weighted toward highly elastic components.

**Figure 3: Colorado Retail Sales by Elasticity Classification, 2019**

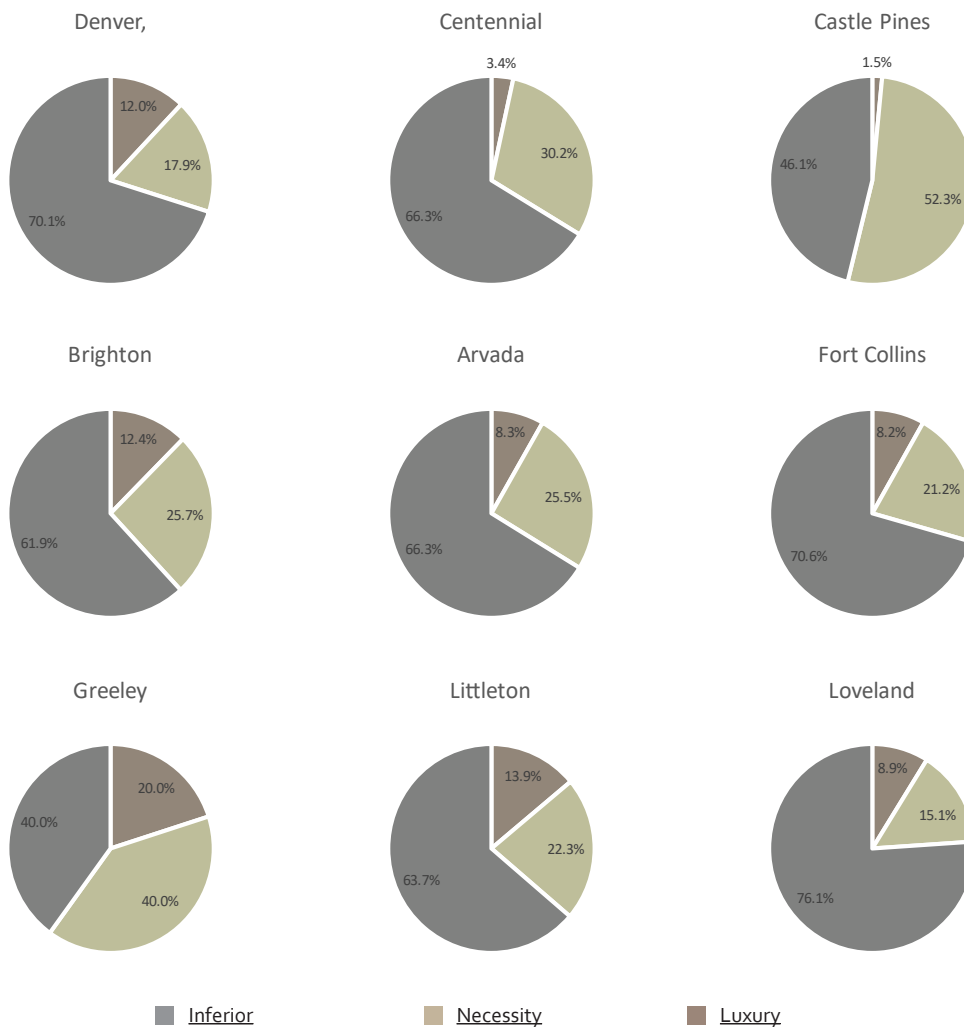


## What Can Cities Learn from State-Level Elasticities?

Income and wealth effects have strong impacts on consumption. In this time of potentially significant disruption in household income, income elasticities lend insight into the extent to which local revenue will be impacted. As demonstrated above, different components of the base have different elasticities. Local bases that are weighted with more inelastic components, all else equal, will have a more stable ride as incomes respond to COVID related economic disruptions. Highly elastic bases will result in far more volatility in revenue collections.

To determine the composition of a city's base, each category was characterized as inferior (elasticity <0), necessity (elasticity between 0 and 1) and luxury (elasticity >1). The analysis includes all sales tax revenue categories collected in MFF except for marijuana, for which there are no statewide data to measure income elasticity. Auto use tax was added to the sales tax base for local governments but the other use tax categories (business and construction) were excluded. This was done to best approximate household spending. 2018 was the latest year of full data available for MFF cities, and for that year sales tax data were not complete for MFF members Superior and Wellington. The city by city composition of the taxable bases for the other MFF cities is presented in Figure 4. Cities with heavier reliance on the more elastic components of the base (the luxury components) are expected to experience greater revenue volatility during this COVID related economic event, both as household incomes fall and upon economic recovery.

**Figure 4: Taxable Sales by Elasticity Classification, MFF Cities, 2018**



## How does this Translate to Municipal Sales Tax Revenue?

Changes in income are not the only determinant of tax revenue. Prices, demographics, industrial mix, and other economic activity can have profound impacts. But, holding all other considerations constant, the income elasticity allows for an approximation of the impact of changes in income on sales tax collections. Applying the elasticities by industrial category to the 2018 taxable sales base for each MFF city allows for a calculation of the relative magnitude of a change in household income on local collections. The extent of this revenue impact is directly related to the composition of each city's base and presented

Table 2: Income Elasticity Impact on Sales Tax Revenue, 2018

<i>MFF Member City</i>	<i>A 1 % change in wages and salaries results in a tax revenue change of</i>	<i>A 1 % change in personal income results in a tax revenue change of</i>
<i>Arvada</i>	\$ 1,388,276	\$ 1,300,462
<i>Brighton</i>	\$ 399,646	\$ 374,367
<i>Castle Pines</i>	\$ 32,115	\$ 30,084
<i>Centennial</i>	\$ 884,194	\$ 828,265
<i>Denver</i>	\$ 13,411,876	\$ 12,563,516
<i>Fort Collins</i>	\$ 2,096,173	\$ 1,963,581
<i>Greeley</i>	\$ 1,529,291	\$ 1,432,556
<i>Littleton</i>	\$ 4,742,846	\$ 4,442,840
<i>Loveland</i>	\$ 588,476	\$ 551,252

### Conclusion

The COVID induced economic disruption facing economies worldwide is dramatic, uncertain and potentially enduring. Among the economic legacies of this event will be impacts to earnings, income and wealth. For Colorado municipalities, disproportionately dependent on consumption taxes, the COVID induced income and wealth effects are likely to be key drivers of sales tax performance. This analysis provides an approach for municipal budget officials to better assess the impact of the income and wealth effect on local tax bases.



## Appendix A: Income Elasticity of State Taxable Sales

For local governments whose bases closely approximate the Colorado base, Table 3 shows the industry level income elasticities of taxable sales with respect to both concepts of income for the two-year period 2017-2019. As expected, income elasticities are slightly higher relative to the narrower definition of income, wages and salaries. Applying these elasticities to sales tax performance, every 1% change in income (wages and salaries, personal income, respectively) will result in \$2.2 billion and \$2 billion change in taxable sales statewide. At the state's 2.9% sales tax rate, this equates to just under \$60 million in tax revenue.

**Table 3: Income Elasticity of Taxable Sales: State Base, 2017-2019**

		<i>Wage and Salary Elasticity of Demand</i>	<i>Personal Income Elasticity of Demand</i>
LUXURY	<i>Non-store Retailers (this category includes internet sales)</i>	19.5	18.2
	<i>Construction</i>	4.4	4.1
	<i>Other</i>	3.6	3.4
	<i>Accommodation</i>	3.5	3.2
	<i>Food Services and Drinking Places</i>	2.8	2.6
	<i>Miscellaneous Store Retailers</i>	2.7	2.5
	<i>Sporting Goods, Hobby, Musical Instrument, and Book Stores</i>	2.0	1.9
	<i>Electronics and Appliance Stores</i>	1.5	1.4
	<i>General Merchandise Stores</i>	1.4	1.3
	<i>Food and Beverage Stores</i>	1.2	1.1
NECESSITY	<i>Clothing and Clothing Accessories Stores</i>	1.0	0.9
	<i>Furniture and Home Furnishings Stores</i>	0.9	0.9
	<i>Utilities</i>	0.9	0.9
	<i>Gasoline Stations</i>	0.8	0.8
	<i>Motor Vehicle and Parts Dealers</i>	0.6	0.6
INFERIOR	<i>Building Material and Garden Equipment and Supplies Dealers</i>	-0.1	-0.1
	<i>Health and Personal Care Stores</i>	-3.4	-3.2
	<b>Total</b>	<b>2.0</b>	<b>1.8</b>

The Colorado Futures Center is a 501 c 3 organization dedicated to informing about economic, fiscal and public policy issues impacting community economic health and quality of life.

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