Impacts of San Francisco's Proposed Tax On Sugar-Sweetened Beverages

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Executive Summary

The Board of Supervisors of the City and County of San Francisco has put before the voters a proposed tax of two-cents per ounce on sugar-sweetened beverages (SSBs). The proceeds of the tax would be used to support City and school district programs related to active recreation, food access, health, and nutrition.

While results of empirical studies attempting to link soda taxes to positive health outcomes have been decidedly mixed, the immediate economic consequences of the proposed tax on people and businesses in San Francisco are clear and measurable. It would *reduce* incomes and purchasing power of people in the City that consume SSBs (and potentially other products). It will cause them to reduce the quantity of SSB purchases, and, importantly, *where* they buy them. These changes will have negative effects on the many businesses located in the City – such as grocers, convenience stores, restaurants, drinking places, and food stands – that rely on SSB sales to support their operations. These businesses will also be affected by recordkeeping requirements and other complexities related to compliance with the proposed tax.

The purpose of this report is to identify the potential size and distribution of these effects, as well as the aggregate impact of the new tax on jobs and income in the City. It also evaluates the potential impacts of the proposal on the budget of the City and County of San Francisco.

The Proposal

The 2-cent per ounce tax, which would be implemented January 1, 2016, would apply to non-alcoholic liquid beverages that have added caloric sweeteners and contain 25 calories or more per 12 fluid ounces. It also would apply to syrups and concentrates that, when mixed according to manufacturer specifications, produce liquid beverages containing 25 or more calories per 12 fluid ounces.

Exemptions. The measure exempts several types of beverages, including liquids or concentrates used for infant formula, milk (including flavored milk with up to 40 grams of sugar), milk alternatives, products sold for weight reduction, medical food, and any beverage containing 100 percent natural fruit or vegetable juice. It exempts concentrates used for coffee and tea, as well as concentrates that are sold for individual mixing by the consumer.

Collection of the tax. The proposal requires the tax to be collected at the *first point of distribution* into the City and County of San Francisco – unless the distribution is by common carrier, in which case it is paid by the entity in the City that is receiving the product for resale. Similarly, if a retailer uses self-transport (cash-and-carry) to bring the product into the City for resale, it would be responsible for payment of the tax. The City tax collector would be responsible for administering and collecting the tax.

Set-aside for administration. The measure specifies that up-to 2 percent of the tax proceeds (about $740,000 per year) may be used by the tax collector and other departments in the City and County of San Francisco for the administration of the tax, and for support of a newly established Oversight Committee (discussed below).

Recordkeeping requirements on businesses. Businesses distributing SSBs would be required to keep records determined by the tax collector to be necessary for purposes of ensuring compliance. These recordkeeping requirements are likely to be extensive, given the magnitude and complexity of this tax, and the strong incentives it will create for evasion.

Allocation of tax proceeds. After deducting up to 2 percent for administration, the measure specifies that the remaining proceeds of the tax would be allocated to the following entities to support nutritional, recreational, and educational programs: 40 percent to the San Francisco Unified School District; 25 percent to the Department of Public Health and the Public Utilities; 25 percent to the Recreation and Park Department; and 10 percent to the Department of Public Health to fund grants for community-based organizations.

Other provisions. The measure creates an Oversight Committee that would be required to (1) make recommendations to the City on the expenditure of the tax proceeds, (2) evaluate the impact of the tax on beverage prices, consumer purchasing behavior, and health outcomes, and (3) submit strategic plans every five years. The proposal requires that expenditures of the SSB tax proceeds be for new or expanded funding for the purposes designated, and places restrictions on the ability of the City to use SSB tax funds to backfill reductions in spending from existing sources.

Approach and Information Sources

We developed information for our estimates using a variety of government and industry data sources. Examples of government sources include County Business Patterns from the U.S. Census Bureau (which we used to identify the number and type of businesses affected by the proposal), household income data from the American Community Survey (which we used to help identify the distributional effects of the tax), and cost-of-living data from the U.S. Census Bureau. Key industry data sources include the Beverage Digest Fact Book (2014 edition), which contains substantial information on U.S. and regional consumption of beverages, and two proprietary sources from Nielsen Company (*Homescan* and *Scantrack*) that provide information on SSB purchases in the San Francisco Metropolitan Statistical Area.

To supplement these government and industry sources, we also conducted an informal survey of about 15 businesses in the City that sell SSBs and thus would be directly affected by the proposal. We sought feedback from these representatives on such issues as the importance of SSBs to their operations, how the likely recordkeeping requirements of the measure would affect their operations, and their expected pricing strategies if the tax were to be enacted.

Key Assumptions

Our estimates of the proposed SSB tax's impacts are based on the following key assumptions:

Current SSB consumption and prices. We estimate that consumption of SSBs by San Francisco residents averages *30.8 gallons* per person and a weighted average price of SSBs sold through all channels in San Francisco is *$6.74 per gallon.*

Pass-through of SSB tax from businesses to consumers. For purposes of our estimates, we assume that *100 percent* of the tax (which is collected from businesses at the wholesale level) is passed through to consumers in the form of higher product prices for SSBs. While our assumption is consistent with Board of Supervisor's intent that the tax passed along to SSB consumers to discourage consumption, it is also possible that businesses selling SSBs will adopt alternative pricing strategies to recoup their wholesale tax payments. For example, businesses wishing to maintain some degree of parity between regular and diet varieties of carbonated soft drinks could pass through only part of the tax on SSBs, and recoup the rest of the tax through price increases on non-SSB products. Should this occur:

- The "price signal" effect of the tax on SSB consumption would be diminished (since if prices of sugared and non-sugared brands were raised equally, their relative prices would be unchanged). As a result, the tax would be much less effective in terms of meeting the Board of Supervisors' goal of discouraging SSB consumption;
- The tax would affect a wider spectrum of households in San Francisco. Even those that never purchase SSBs would face higher product prices and thus be adversely affected by the tax.

We discuss the implications of alternative business decisions regarding pass-through of the tax to consumers in Part 9.

Consumer behavioral responses to SSB price increases. Our estimates are based on explicit assumptions about the impact of tax-induced increases in SSB prices on consumer behavior. First, we assume a price elasticity of demand of -1.1. This implies that each 1 percent increase in SSB prices resulting from a beverage tax would result in a 1.1 percent reduction in overall SSB consumption. We also assume a cross-border elasticity of 1.0, meaning that each 1 percent increase in relative prices of SSBs in San Francisco will result in a corresponding 1 percent shift in purchases to merchants outside the city boundaries. Part 6 summarizes key empirical economic studies that serve as the basis for these elasticity estimates.

Impact of Proposal on San Francisco Households

Based on the assumptions described above, we estimate that the tax would have the following effects on households.

Total SSB taxes paid

We estimate that if consumers made no changes to their purchasing behavior, the proposal would result in $75 million new taxes paid in San Francisco. This consists of $66 million in taxes paid by San Francisco residents, plus another $9 million paid by commuters and tourists in the City.

However, the tax will almost certainly result in two interrelated behavioral changes by consumers.

Price elasticity of demand effect. First, consumers will likely consume less SSBs. Assuming the price elasticity of demand of -1.1 discussed above, and ignoring, for a moment, cross-border shopping effects, we estimate that reduced spending on SSBs would lower taxes paid to $52 million, consisting of $46 million paid by City residents and $6 million paid by commuters and tourists. This estimate is near the high end of the range provided by the City's Office of Economic Analysis for the proposed tax. (The City estimate assumes a price-elasticity-of-demand effect, but does not include a cross-border shopping effect.)

Cross-border shopping effect. In addition to reducing overall consumption, the proposed tax will create a strong incentive for San Francisco consumers to shift purchases of SSBs to merchants located outside the City's boundaries. This will have two effects on consumers. First, it will diminish the amount by which overall SSB consumption would fall relative to the pure-price elasticity of demand calculation, since San Francisco consumers will be able to avoid the higher-prices by purchasing beverages outside the city. Second, it will reduce taxes paid, since over one-fourth of purchases will be shifted to outside the City and no longer be subject to the tax.

After taking into account the combination of price elasticity of demand and cross-border shopping effects, the estimated taxes paid would be about $37 million, consisting of about $32 million from City residents and $5 million from commuters and tourists.

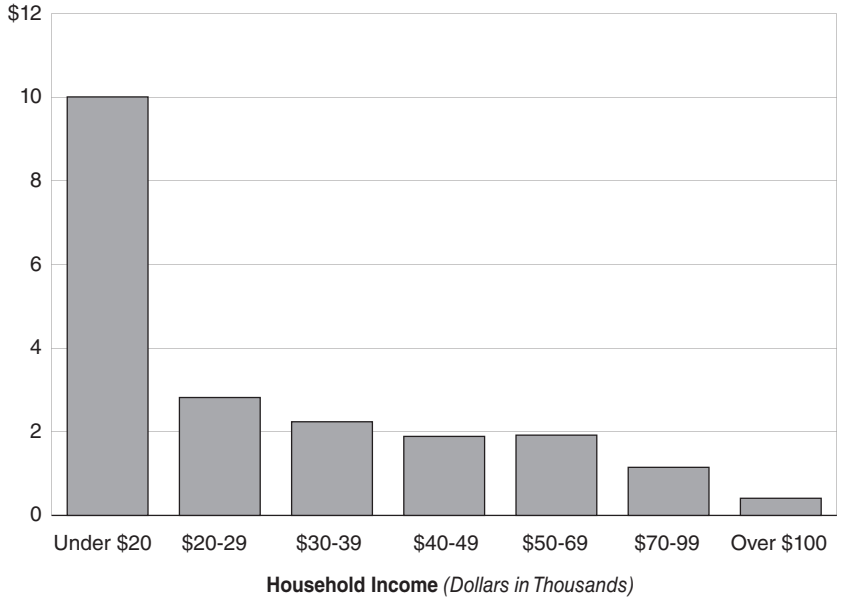
Distributional effects on households in San Francisco

The SSB tax is highly regressive, meaning it would hit San Francisco's poorest households the hardest. As a result, it would enhance the large degree of income disparity already present in the City. Examples of the proposed tax's regressivity are:

- Taxes paid would average $10 per each $1,000 of income for households with incomes below $20,000, but would decline to just 40 cents per $1,000 of income for households with incomes exceeding $100,000 per year (see Figure Exec-1). These estimates are after taking into account the behavioral changes made by consumers to avoid the tax (discussed above). Absent these changes, the tax rates would be more than double those shown in Exec-1.

FIGURE EXEC-1

SSB Taxes Paid Per Thousand Dollars of Income



- Over $7 million of the tax would be paid by households with an annual income of less than $20,000. This group accounts for just 2 percent of total income in the City, but would pay 22 percent of the tax.
- On a per-household basis, the under $20,000 group would actually pay 40 percent more SSB taxes than their counterparts at the top of the income scale.

Impact on discretionary incomes is dramatic. The tax would consume a large share of the limited amount of discretionary income available to low- and moderate-income households after they pay for food, rent, utilities, health care, and other basic necessities. This is of special concern in San Francisco, where the cost of living is already 64 percent above the nationwide average, according to estimates published by the U.S. Census Bureau.

Impact on Businesses

The SSB tax would have substantial adverse effects on businesses that sell beverages in San Francisco, particularly the many *small* independent businesses operating in the City. These businesses would be squeezed by higher administrative costs and lower sales revenues.

Higher administrative costs. Given the complexity of the proposal and the size of the tax, we expect all San Francisco merchants selling beverages to incur significant costs related to identifying and tracking products subject to the tax, as well as maintaining records for the City tax collector. These burdens will fall most heavily on smaller independent businesses, which often handle their own wholesale purchases and distributions, and thus would be considered distributers under the proposal. Small independent businesses also frequently lack the sophisticated technology that would be needed to track SSB sales, instead relying on paper invoices, electronic spreadsheets, and outside bookkeeping services for this purpose. To comply with the new requirements, these independents would incur significant costs associated with either developing an enhanced level of manual tracking or for purchasing and implementing system upgrades. These costs would likely total several thousands of dollars per year for even the smallest of businesses.

Lower sales. In addition to higher administrative costs, businesses would lose about $63 million in annual revenues, related to (1) customer purchases redirected to lower-price competitors located outside the City's borders, and (2) a reduction in overall demand for SSBs (and potentially other products).

The added administrative costs and reduced revenues are of particular concern to the food and beverage businesses because of the extremely thin profit margins (1 percent to 2 percent) that exist in the industry. As shown in Part 8, the combination of these two factors would more than eliminate the net profit margins of many small businesses.

Impact On The San Francisco Economy

The San Francisco economy would be negatively affected by both (1) the nearly $63 million reduction in business sales and (2) the loss of disposable income by San Francisco residents due to the $32 million in new taxes they would have to pay.

Businesses facing reduced sales and profits would have to scale back operations to maintain profitability, by purchasing less products and services from their suppliers and by curtailing their employees' hours of work. These cutbacks would reverberate through the economy, affecting businesses that provide goods and services to the affected retailers and their employees. Similarly, consumers of SSBs, facing declines in disposable income, will cut back purchases of other goods and services in the City.

To calculate the full (direct, indirect, and induced) effects of these developments on employment, income, and output in San Francisco, we used a version of the IMPLAN input output model customized for San Francisco County.

Results. We estimate the proposed tax would result in losses of about 1,000 jobs in the City. This estimate has two components:

- First, the $63 million reduction in beverage sales by San Francisco businesses would translate into total losses of 840 jobs, mostly in food and beverage retail stores, restaurants, and related establishments directly affected by the lost SSB sales. However, many other industries would be indirectly affected, including wholesalers, transportation companies, and business-service providers.
- Second, the decline in disposable income of SSB consumers would translate into a further reduction of 150-200 jobs.

The loss of 150-200 private sector jobs associated with the additional taxes paid by San Francisco residents would be offset to some degree by the spending of the new tax proceeds by the City and school districts for the various purposes designated by the ordinance. The magnitude of the offset depends partly on how the proceeds would be spent and what percentage would go employees and businesses that reside in San Francisco.

Even if this were to occur, however, there would still be dislocations to the private sector employees and businesses facing the cutbacks. More importantly, there would be *no* government offset to the 840 jobs lost because of the reduction in sales faced by San Francisco businesses to merchants located outside the City.

Effect On San Francisco Government

The proposed tax would result in $37 million in new taxes that the City could earmark specifically for new or expanded nutritional, recreational and related anti-obesity programs. However, the tax would also have other revenue and cost effects on the City's budget, which together could hamper the City's efforts to provide basic services in the areas of police and fire protection, public health, and human services when the budget tightens in the future. The main concerns are:

Administration costs would likely exceed the 2 percent set-aside by a substantial margin. The measure sets aside a maximum of only 2 percent of annual revenues, or about $740,000 for administration of the new SSB tax (including enforcement and collections), as well as for the activities of the Oversight Committee. Given the high tax rate and complexity of the San Francisco proposal, actual costs of administering, collecting, and enforcing the tax would likely exceed the 2-percent set-aside limit by a substantial margin. Funding the significant workload costs of the newly formed Oversight Committee would further aggravate the annual shortfalls. Administrative costs exceeding the 2-percent set-aside limit would have to be covered from funds that would otherwise be available to pay for basic City services.

Other City tax revenues would be negatively affected. While the SSB tax would raise revenues dedicated to new recreational and nutritional programs, it would, at the same time, depress other City revenues (which support police, fire protection, public health, human services programs, and transit programs) by nearly $2 million per year. The losses would be from the reduction in sales taxes on carbonated beverage sales, and, more generally, the negative effects of reduced economic activity on the City's major revenue sources.

Proposal would make it harder to balance the budget during economic slowdowns. The minimum funding requirements established for the programs supported by the new SSB tax will further limit flexibility in a budget that already has eight such financial requirements for other programs. An effect of these minimums is that they sharply narrow the options that City leaders have for dealing with budget shortfalls when they arise.

Impacts of San Francisco's Proposed Tax On Sugar-Sweetened Beverages

Part 1 – Introduction

The Board of Supervisors of the City and County of San Francisco has put before the voters a proposed tax of two-cents per ounce on sugar-sweetened beverages (SSBs). The proceeds of the tax would be used to support City and school district programs related to recreation, food access, health, and nutrition. The tax and most other provisions of the measure would be operative January 1, 2016.

According to the proposed ordinance, the Board believes that taxing SSBs will "make San Franciscans healthier by discouraging consumption of the main source of added dietary sugars, and by raising funds to support health promotion and obesity prevention, particularly targeting children in San Francisco's low-income communities."

The purpose of this study is to estimate the economic consequences of the SSB tax on consumers, businesses, and the government of the City and County of San Francisco. It does not attempt to quantify potential impacts of the proposal on public health, as there have been numerous academic studies over the past two decades that have attempted to quantify this relationship. We note, however, that the results of these studies have been decidedly mixed. Many have found no measurable effects, and those that did, generally found the effects to be minimal.[1]

While the long-term effect of the proposed tax on health outcomes is highly uncertain, its near-term impacts on consumers and businesses in the City are clear and measurable. The tax will *reduce* incomes and purchasing power of people in the City that buy SSBs (and perhaps other products depending on business pricing strategies). It will cause them to change *how much* they buy and, importantly, *where* they make the purchases. These changes will in turn affect the many businesses located in the city - such as grocers, convenience stores, restaurants, drinking places, and food stands - that rely on SSB sales to support their operations. The purpose of this report is to identify the potential size and distribution of these effects, as well as the aggregate impact on jobs and income in the City.

Previous Economic Impact Analyses of California Proposals

This is not the first analysis of the impacts of proposed SSB taxes in California. In 2010, a study prepared by Professor Robert Hahn reviewed the potential impacts of a proposed tax of 1 cent per teaspoon of sugar in SSBs levied by the State of California.[2] The study concluded that such a tax would raise SSB prices by between 9 and 22 percent, depending on the taxed beverage category. This would, in turn, result in a 15 percent reduction in retail sales and a loss of 19,000 jobs.[3]

In 2012, the Berkeley Research Group analyzed the likely economic impacts of the City of Richmond's proposed 1

1 See, for example, Powell, Chriqui, Khan, Wada, and Chaloupka,"Assessing the Potential Effectiveness of Food and Beverage Taxes and Subsidies for Improving Public Health: A Systematic Review of Prices, Demand and Body Weight Outcomes," in *Obesity Reviews*, 2012. In this paper, the authors review recent U.S. studies of the price elasticity of demand for SSBs and the direct association of tax increases with weight outcomes. They find that studies attempting to link soda taxes to weight outcomes have found minimal impacts, though the authors note that this may be because existing state-level sales taxes are relatively low. A more recent study (Zhen, Finkelstein, Karns, and Todd."Predicting the Effects of SSB Taxes on Food and Beverage Demand in a Large Demand System," *American Journal of Agricultural Economics*, 2014) predicts that a one-half cent increase in SSB taxes would produce a measurable decrease in energy intake from SSBs, but that nearly one-half the reduction would be compensated for by higher a intake of calories from other foods. The authors further find that an unintended consequence of such a policy is a higher intake of fats and sodium. They conclude that "because energy intake is just one of many dimensions of nutrition, the results on sodium and fat highlight the complexity of using targeted food and beverage taxes to improve nutritional outcomes."

2 Robert Hahn. "The Potential Economic Impacts of the California Beverage Excise Tax." Submitted to American Beverage Association. June 7, 2010.

3 The study also estimated the impacts of a hypothetical 1-cent per ounce tax on SSBs in California. It concluded that such a tax would raise prices of SSBs by between 15 and 25 percent, reduce retail revenues to businesses by 21 percent, and reduce employment by about 25,000 jobs.

cent per ounce tax on SSBs.[4] It found that, given the small size of Richmond and the large number of retailers located immediately across the city's boundaries, the tax would likely prompt a large amount of cross-border shopping (hurting sales and profits of businesses in Richmond), and produce only modest reductions in consumption of sweetened beverages.

These studies provide valuable general guidance on the potential economic impacts of SSB taxes on households and businesses in San Francisco. Given the many circumstances unique to each study, their results are not directly applicable to San Francisco. However, the earlier studies used similar methods and assumptions, and touched on many of the same issues that will be raised in our analysis. A key factor separating the current proposal from those studied in the previous studies is the enormous size of the San Francisco tax. It is double the size of the taxes analyzed in the earlier studies, which has major implications for both the size of the economic impacts and the challenges related to tax compliance.

Part 2 – The SSB Tax Proposal

The proposal would levy a tax of two-cents per ounce on sugar-sweetened beverages (SSBs) distributed in San Francisco, with the proceeds used to support City and school district programs related to active recreation, food access, health, and nutrition.

Beverages subject to the tax

The tax would apply to non-alcoholic liquid beverages that have added caloric sweeteners and contain 25 calories or more per 12 fluid ounces. It also would apply to syrups and concentrates that, when mixed according to manufacturer specifications, produce liquid beverages containing 25 or more calories per 12 fluid ounces.

The measure contains exemptions for liquids or concentrates used for infant formula, milk (including flavored milk with up to 40 grams of sugar), milk alternatives such as soy or almond-based products (regardless of caloric content), products sold for weight reduction, medical food, and any beverage containing 100 percent natural fruit or vegetable juice.

It would also exempt concentrates used for coffee and tea, as well as concentrates (powder or liquid) that are sold for individual mixing by the consumer. This would appear to include frozen orange, apple, and grape juice concentrates – regardless of caloric content – as well as powdered concentrates for tea, sport drinks, and lemonade.

Who would pay the tax?

The proposal requires the tax to be collected at the *first point of distribution* into the City and County of San Francisco – unless the distribution is by common carrier. The measure further specifies that a manufacturer, wholesaler or bottler located outside San Francisco and shipping products into the city using its own carrier would be required to pay the tax. If the SSB is shipped into San Francisco using a common carrier, however, the tax would be levied on the entity receiving the shipment for resale – meaning the retailer, wholesaler, or warehouse located in the City. Similarly, if the retailer uses self-transport (cash-and-carry) to bring the product into the City, it would be responsible for payment of the tax. Purchases by the final consumer made outside of San Francisco and brought into the city for consumption would not be subject to the tax.

City responsibilities for collecting and distributing the tax

The City Tax Collector would be responsible for administering and collecting the tax. The measure specifies that up to 2 percent of the tax proceeds (about $740,000 per year) may be used for the administration of the tax and support of the Oversight Committee (discussed below).

Administrative requirements imposed on businesses

The measure requires that each distributer register with the San Francisco tax collector and maintain records

4 William Hamm, Jeannie Kim, and Rebecca Reed. "The City of Richmond's Proposed Tax on Sweetened Beverages: The Likely Economic Impact on Richmond's Residents and Small Businesses." *Berkeley Research Group, LLC*. March 2012.

determined by the tax collector to be necessary to ensure compliance. The earlier version of the measure specified that the records would include: the names of the buyer and seller; the date of the transaction; the invoice number; the kind, quantity, size of packages of bottled sugar-sweetened beverages or concentrate sold; and amount of taxes due. Given the magnitude of the tax and the negative effects that illegal evasion would have on the great majority of businesses that follow the law, the City will likely find it necessary to require all businesses in the supply chain to maintain the type of detailed specified in the earlier version of the proposal.

How the tax proceeds would be spent

The measure specifies that, after the up-to 2 percent set-aside for administration is deducted, the remaining tax proceeds would be allocated as follows:

- 40 percent to the San Francisco Unified School District for: (1) various school and after-school programs, including nutrition, cooking, school-based gardens, and healthy snacks; and (2) expansion and improvement of physical education, athletic equipment, training, and programming.
- 25 percent to the Department of Public Health and the Public Utilities Commission for healthy food access initiatives, drinking fountains and water bottle filling stations, oral health services, chronic disease prevention, and public education campaigns.
- 25 percent to the Recreation and Parks Department for recreation centers, organized sports, and athletic programs, of which 15 percent would be set aside for allocation to community-based organizations for active recreation programs, with a priority on programs serving lowincome and underserved communities.
- 10 percent to be allocated through the Department of Public Health to fund grants for community-based organizations that support physical activity, food access, public education campaigns, and health programs.

Oversight Committee

The measure creates an Oversight Committee, consisting of fifteen unpaid members that would meet six times per year. The Committee would be required to make recommendations to the City on the expenditure of the tax proceeds, evaluate the impact of the tax on beverage prices, consumer purchasing behavior, and health outcomes, and submit strategic plans every five years.

Minimum funding requirement

The proposal requires that expenditures of the SSB tax proceeds be for new or expanded funding, and places restrictions on the ability of the City to use SSB tax funds to backfill general fund reductions in spending on the designated programs.

Part 3 – Our Approach and Methodology

Our analysis of the San Francisco proposal includes the following elements:

- Background information on the City and County of San Francisco, including its income and demographic characteristics, the characteristics of its businesses that would be affected by the tax, and the market for SSBs.
- Estimated impacts of the tax on (1) *city residents* who purchase SSBs, looking specifically at distributional impacts on households at various income levels; and (2) *businesses* in the City that sell SSBs.
- Estimation of the broader economic impacts of the tax, taking into account the secondary effects of the lost business sales and reduction in household incomes on employment, income, and output in the City.
- Discussion of the potential effects of the tax on the City's budget.

Our estimates of these effects are based on the following approach and methodology:

Step 1 – Gather data

Our first step involved the collection of data needed to make our estimates of current SSB consumption and prices

in San Francisco, along with our estimates of the various estimates of the impacts of the SSB tax on households, businesses, and the government of the City and County of San Francisco. This included:

Industry data. A key industry source of beverage sales and pricing used in the report is the Beverage Digest Fact Book (2014 edition).[5] This document includes information necessary for our tax impact estimates, including per-capita consumption for each category of beverages, a breakout between regular and diet brands, and detailed information on prices (including some regional data).

To supplement the national data, we used two proprietary data sources from the Nielson Company, LLC that focused on beverage-related spending in the San Francisco metropolitan statistical area. One is the National Consumer Panel (formerly called the Homescan panel), which is a detailed survey of food and beverage purchases made by a panel of consumers. The other is Scantrack, which is a compilation of all products scanned at checkout by retail merchants. These two regional data sources provided us with helpful San Francisco-specific information on household spending patterns on SSBs by income level, the allocation of spending between regular and diet brands, and the relative importance of SSBs to overall sales of supermarkets and convenience stores.

Government data. To determine the impacts of the SSB tax on businesses in San Francisco, we gathered county-specific information from the U.S. Census Bureau that included the number, size, and general location of establishments affected by the proposal.

To determine the distributional impacts of the tax, we gathered information from the *American Community Survey* on the distribution of household incomes for San Francisco County.[6] As a crosscheck, we also reviewed published state personal income tax data from the Franchise Tax Board, which shows the distribution of adjusted gross incomes filed on returns of the residents of San Francisco county.

Lastly, to measure the impact of the tax on the San Francisco budget, we gathered published budget-related information, primarily from the City's Controller's Office.

Step 2 – Seek feedback from San Francisco merchants potentially affected by proposal

To supplement the information gathered from public and private data sources discussed above, we contacted about 15 businesses in the City that would be directly affected by the tax. These included grocers, delicatessens, convenience stores, restaurants, distributers, bars, and eateries of various sizes. We asked them numerous questions about their business, including its size, income and characteristics of their customers. We also asked the representatives about the importance of SSBs to their overall sales and profits, their customer base, their likely pricing strategies in response to the tax, their current system for tracking inventory and sales, and any upgrades needed to track SSBs and comply with the record-keeping requirements of the proposal.

Step 3 – Review empirical literature on business and consumer behavioral responses to price increases

The impact of the SSB tax will depend not only on current per-capita consumption of SSBs, but also on how businesses and consumers in San Francisco respond to the tax increase. Specifically, it will depend on (1) the extent to which the tax (which is levied on businesses) is passed forward from businesses to consumers in the form of higher product prices, and (2) how consumer-purchasing behavior will change as a result of any such increase in product prices. We reviewed numerous economic studies in each of these areas. This review included empirical studies that focused on the overall price elasticity of demand for SSBs, as well as on a subset of studies that focused on at the impact of price increases imposed in a single jurisdiction on crossborder purchases.

Step 4 – Develop estimated impacts of the proposed tax consumers and businesses

To make these calculations, we combined our assumptions regarding current consumption and prices of SSBs with our assumptions about behavioral effects of businesses and consumers derived from our empirical literature review to arrive

5 "Beverage Digest Fact Book, 2014. Statistical Yearbook of Non-Alcoholic Beverages." *Beverage Digest Company, L.L.C.*

6 U.S. Department of Commerce, Census Bureau. "Income in the Past 12 Months (in 2012 Inflation-Adjusted Dollars), San Francisco County. 2010-2012." *American Community Survey 3-Year Estimates*, (S1901).

at estimates of the impact of the tax on San Francisco consumers, businesses, and government.

Step 5 – Estimate the impact of the SSB tax on the broader San Francisco Economy

In addition to its *direct* impacts on consumers and businesses, the tax would have significant *indirect* impacts on other areas of the economy. For example, sellers of SSBs would respond to the loss of sales and profits by cutting back orders from suppliers and curtailing employee hours worked. Consumers facing higher taxes will have less to spend on other goods and services in the City. To measure these effects we employed employment, income, and output multipliers for San Francisco County derived from the IMPLAN input-output modeling system.

Step 6 – Estimate SSB tax's impact on San Francisco's budget

In addition to estimating the proceeds of the SSB tax, we looked at the potential impact of the proposal on other revenues and costs for the City and County of San Francisco. These include the cost of administering the new tax and the losses in other revenues it will experience because of the reduced economic activity in San Francisco.

Part 4 – Background Information on The City and County of San Francisco

In this Part, we provide background on San Francisco, with an emphasis on factors that have an impact on our estimates of the proposed SSB tax.

San Francisco is the only consolidated city and county in California. It has a population of 837,442 residents, which live in 341,000 households. It also has 105,000 businesses, including about 4,800 in the food service industry and about 1,100 in the retail food and beverage industry. About 520,000 employees work in the City. [7]

High degree of mobility. The City is an integral part of the San Francisco-Oakland-Hayward metropolitan statistical area (MSA) – the 11th largest in the U.S. This MSA has a population of 4.5 million and a combined workforce of 2 million. There is a particularly high degree of mobility in the region. According to the U.S. Census Bureau, over one half (265,000) of the total work force employed in San Francisco commutes into the City from other counties. This includes 75,000 from San Mateo County, 72,000 from Alameda County, and 48,000 from Contra Costa County. Meanwhile, 103,000 residents of San Francisco leave the county for work, with 43,423 going to San Mateo, 22,000 going to Alameda County, and 19,000 going to Santa Clara County.[8] This mobility across county borders has significant implications for the effects of the proposed tax. Consumers in San Francisco have many options regarding when and where to purchase food and beverages.

San Francisco is also a major tourism center. According to the San Francisco Travel Association, the City hosts an average of 134,000 visitors per day, which spend over 25 million daily on hotels conventions, restaurants and various attractions.[9]

Above-average income. The median household income of San Francisco residents during the 2008-2012 period was $73,802 compared to the California statewide average of $61,400. During the same period, 13.2 percent of the city's residents lived below the U.S. designated poverty level, slightly less than the statewide average of 15.2 percent.[10]

High cost-of-living. While the City's median income is above the statewide average, its residents also face much higher-than-average costs for housing, food, transportation, municipal taxes and fees. According to a recent survey published by the U.S. Census Bureau, San Francisco was the fourth most expensive metropolitan area in the country in 2010,

7 U.S. Department of Commerce, Census Bureau, "State and County Quick Facts, San Francisco (City), California."

8 U.S. Department of Commerce, Census Bureau. " Census Bureau Reports 265,000 Workers Commute into San Francisco County, California Each Day." *U.S. Census Press Release*, Tuesday, March 5, 2013.

9 San Francisco Travel Association, "San Francisco Visitor Industry Statistics."

10 U.S. Department of Commerce, Census Bureau, "State and County Quick Facts, San Francisco (City), California."

with composite living costs that were 64 percent above the national average.[11] Each dollar buys less in San Francisco than elsewhere, which puts considerable strain on the budgets of low- and moderate-income households in the City.

High degree of income disparity. A recent comparison by the Brookings Institute found that San Francisco has the second highest degree of income disparity of any city in the U.S., trailing only Atlanta.[12] As noted below, the proposed SSB tax would fall heavily on lower-income households, thereby increasing the after-tax disparity of income in the City.

Part 5 – Current Consumption and Prices of SSBs

In this Part, we briefly discuss the market for sugar-sweetened beverages in the U.S., California, and San Francisco. We also provide our estimates of two key inputs into our estimates of the proposed SSB tax – the average per-gallon consumption of SSBs and the weighted average price of SSBs sold in San Francisco.

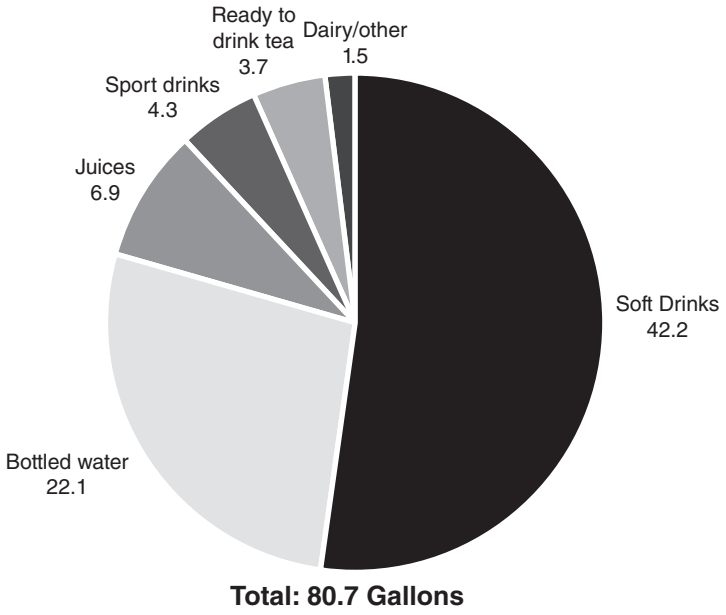
Background – U.S. Liquid Beverage Consumption

U.S. consumption of non-alcoholic liquid refreshment beverages totaled 22.9 billion gallons in 2013, or 81 gallons per person.[13] As indicated in Figure 1, about 42 gallons of the total were for carbonated soft drinks (such as Coke, Pepsi, and Dr Pepper). Another 22 gallons were for bottled water, and 16 gallons were for non-carbonated beverages such as fruit juices, sport drinks, and tea.

The long-term trend in liquid beverage sales has been downward. The decline has been led by falling consumption of carbonated soft drinks over the past 15 years, which has been only partly offset by rising consumption of bottled water, energy drinks and other emerging varieties.

FIGURE 1

U.S. Consumption of Liquid Beverages
(Gallons Per Capita)



11 U.S. Department of Commerce, Census Bureau. "ACCRA Cost of Living Index – Selected Urban Areas." *The 2012 Statistical Abstract*, Table 728.

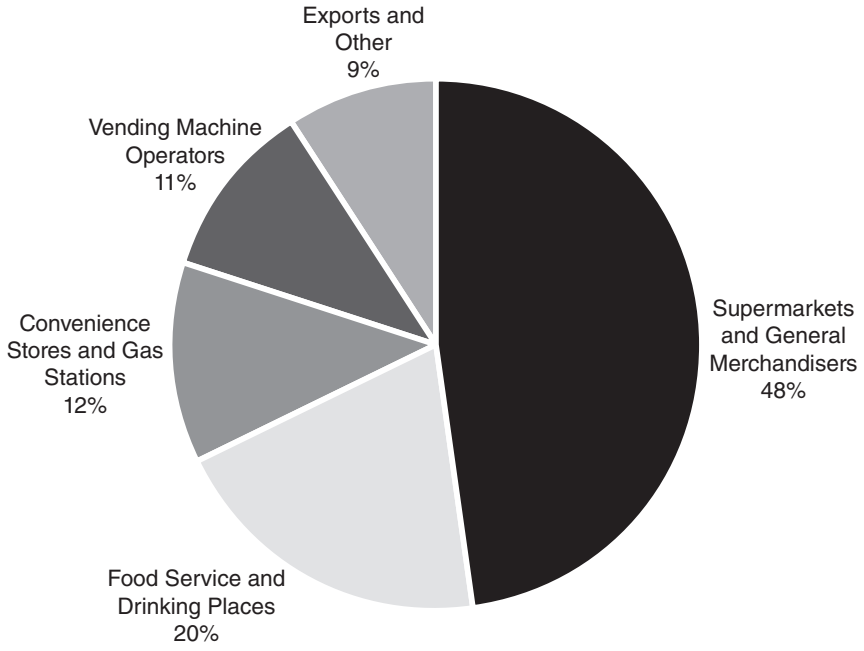
12 Alan Barube, "All Cities Are Not Created Unequal." *Brookings Institute*. February 20, 2014. The study, which is based on the *American Community Survey* for 2012, found that household income at the 95th percentile was 16.6 times the level of household income at the 20th percentile in San Francisco County. This compares to an average ratio of 10.8 for the 50 largest U.S. cities.

13 This section uses data and categorizations from the *Beverage Digest Fact Book, 2014.*

Liquid beverages are sold to consumers through six main channels.[14] Figure 2 shows that slightly less than one-half of the total volume is sold through supermarkets and general merchandisers (such as Walmart and Target), 20 percent is sold through food service and drinking places (including full service restaurants, fast food outlets and bars), and the remainder is distributed between convenience stores, vending machines, and a variety of smaller outlets such as drug stores, community centers, and private clubs. A small amount (1 percent in 2011) is exported to Japan, Canada, Mexico, and other foreign countries.

FIGURE 2

Channels of U.S. Liquid Beverage Sales



Estimate of SSB Purchases By San Francisco Residents

Comprehensive all-channel consumption data similar to that shown in Figure 1 for the U.S. is not available at the county level. However, we are able to develop a reasonable estimate by combining the national all-channel sales information with more targeted information available for California and San Francisco. Based on this approach (which we discuss more fully below), we estimate that:

- Per-capita liquid beverage consumption by San Francisco residents is about 68 gallons annually.
- Of this total, just-under 31 gallons is for sugared varieties that would be subject to the proposed San Francisco SSB tax.[15]

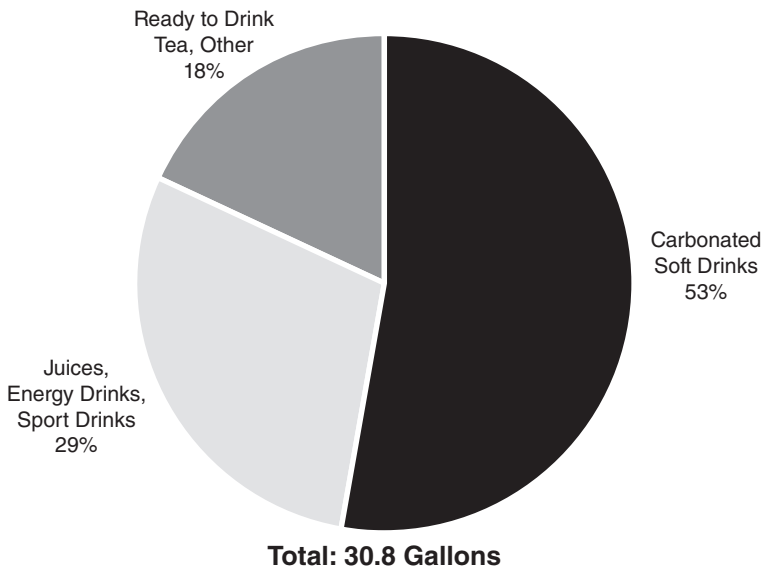
Figure 3 shows that of the total SSB consumption in San Francisco, slightly over one-half is for carbonated soft drinks, slightly less than one-third is for sports drinks, energy drinks, and fruit juices, and the remainder is for ready-to-drink tea, flavored bottled water, and other categories.

14 Sierra Services, Inc, and Supply Chain Management Center at Rutgers University. "Breaking Down the Chain: A Guide To the Soft Drink Industry." 2011. In this discussion, "liquid beverages" includes any type of nonalcoholic beverage produced by a soft drink manufacturer. It includes bottled water, but not tap water.

15 This total reflects consumption of SSBs by San Francisco residents that are purchased from San Francisco businesses. This estimate does not include consumption by San Francisco residents of beverages purchased outside the City (and therefore excluded from the proposed tax), which we estimate would raise per-capita consumption by approximately 10 percent.

FIGURE 3

Estimated Per-Capita Consumption of SSBs By Residents of San Francisco



Key Factors Behind Our Estimate

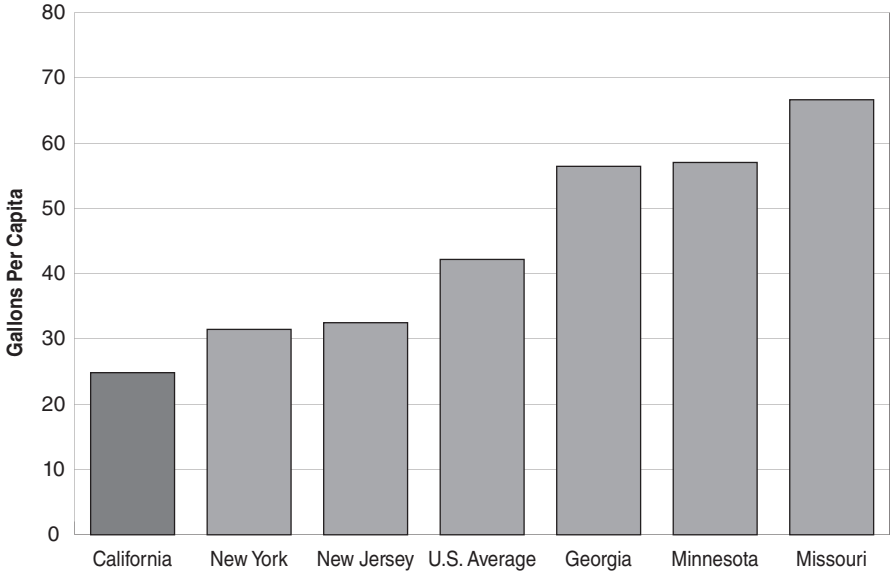
Our estimate of SSB consumption in San Francisco is based on the national consumption data depicted in Figure 1, as adjusted for (1) state-specific data on consumption of carbonated soft drinks (the largest component of SSBs) and (2) national and regional information on the share of liquid beverage sales that are sugared beverage products subject to the San Francisco tax.

State-specific data on consumption of carbonated soft drinks. Our estimates reflect the much-lower-than-average consumption of carbonated soft drinks in California. Figure 4 shows that per-capita consumption was 24.8 gallons in California during 2013, or 40 percent below the 42.2 gallon U.S. average. The *Digest* also reports that the lower-than-average consumption of carbonated soft drinks in California is partly offset by higher-than-average consumption of bottled water and, to a lesser degree, other beverage categories in the state. Retail spending data from the Nielson Company indicates that this consumption pattern is also present in San Francisco.

FIGURE 4

Comparison of Carbonated Soft Drink Consumption in 2013 U.S. Average and Selected Large States

Source: Beverage Digest: Fact Book 2014



Estimated share of total liquid beverage consumption that is attributable to sugar-sweetened varieties. Overall, we estimate that about 45 percent of total liquid beverage consumption in San Francisco would be subject to the proposed tax. This includes slightly over 70 percent of carbonated beverages, about 60 percent of fruit juices, 90 percent of sport drinks, 65 percent of ready to drink tea, but only about 5 percent of bottled water (some of the flavored varieties). Our estimates for carbonated beverages are based on breakouts available in the *Beverage Digest* and the Nielsen *Scantrack* data. For noncarbonated beverage categories, the overall split between sugared and nonsugared versions is not displayed. Therefore, our estimates for the noncarbonated beverage categories are based on national consumption totals for individual brands published in the *Beverage Digest*, which we placed into regular and diet categories based on our review of nutritional information provided on the packaging labels.

Weighted Average Price of SSBs Subject To Tax

A second factor affecting our estimate of the impact of the tax is the weighted average price of SSBs sold through all channels in the City. While the tax is imposed on the physical volume of the products sold (2 cents per ounce) and not the price of the beverage, average prices still matter for two main reasons.

First the average price affects the magnitude of revenue losses that businesses would experience following the imposition of the tax, as consumers curtailed spending on SSBs in the City.

Second, the average pre-tax price of SSBs affects the percentage increase in average SSB prices that would result from the tax. As discussed in Part 6 of this report, the percentage increase in the average SSB price is an important determinant of how much the tax would reduce SSB purchases in the City (through the price elasticity of demand and cross-border elasticity calculations).

As a simple example, a 2-cent per ounce tax would add 32 cents to a 16-ounce serving of an SSB. This represents a 32 percent tax rate if the average price of the SSB serving is $1.00. However, if the price were $5 per serving, the tax would represent only about 6 percent of the price (and presumably have a much smaller impact on demand for the beverage).

Findings. San Francisco price levels are significantly higher than the national average. For example, according to the *Beverage Digest*, average prices for all brands of carbonated beverages purchased through supermarkets and other retail stores in 2013 was $3.75 per gallon in San Francisco, or 14 percent above the nationwide average of $3.28. We do not have detailed San Francisco-specific data for the remaining categories and channels of beverage sales. However, we believe the 14 percent margin for carbonated soft drinks is a reasonable proxy for the other categories. As a crosscheck, we note that according to the *ACCRA Cost of Living Index,* food and beverage prices in the San Francisco-Oakland-Fremont MSA are about 12 percent higher than the national average.[16]

Figure 5 shows average prices for different categories of liquid refreshment beverages, assuming the 14 percent price margin in San Francisco for carbonated soft drinks applies to other beverage categories.

FIGURE 5

U.S. and San Francisco Prices of Liquid Refreshment Beverages, Sales Through All Channels

Category	Price per Gallon\a	
	U.S.	Estimated San Francisco
Carbonated Soft Drinks	$5.72	$6.52
Bottled Water	$2.78	$3.17
Juice Drinks	$6.87	$7.83
Sport Drinks	$5.32	$6.07
Ready to Drink Tea	$5.31	$6.06

a\U.S. data from Beverage Digest. San Francisco data for all non-carbonated soft drink categories is estimated assuming the observed 14 percent price margin for retail sales of carbonated soft drinks applies to other categories of liquid refreshment beverages.

Estimated all-channel price per gallon of beverages subject to the proposed tax. Based on the prices shown in Figure 5 for San Francisco, as weighted by our estimates of consumption of SSBs subject to the proposed tax, we estimate the weighted average price of beverages subject to the proposed tax is *$6.74 per gallon.*

16 Supra 5

Part 6 – Impact of SSB Tax On Consumers

The impact of the tax on San Francisco consumers depends on three main factors: (1) the quantity of SSBs they currently purchase, (2) the magnitude of the price increases on SSBs they will face because of the tax, and (3) the behavioral response of consumers to the higher product prices. We have already estimated that the current "baseline" per-capita consumption level of SSBs for San Francisco residents is 30.8 gallons.

How much of the tax will be passed forward to customers?

As noted in Part 2, the proposed SSB tax would be imposed at the first point of distribution into the City. Hence the tax would be collected from businesses – either on wholesalers or bottlers that ship the product into San Francisco for resale, or on retailers that receive shipments from common carriers or pick up the products from warehouses located outside of the City. Because the tax is collected from businesses, the impact on consumers will depend on (1) *how much* of the tax is "passed forward" to customers in the form of higher product prices, and (2) *which* product prices will be affected.

Clearly the intent of the Board of Supervisors is that the tax be passed forward in the form of higher prices for SSBs in order to achieve its objective of discouraging consumption of these sugared beverages.[17]

We believe that it is reasonable to assume that a 100 percent pass-through will indeed occur. Empirical studies have generally found that a full pass-through (and in some cases more than 100 percent pass-through) of excise tax increases has been the norm with regard to past tax increases on beverages.[18] Moreover, feedback from business representatives in San Francisco indicates that a pass-through rate of significantly less than 100 percent is unlikely given the large size of the tax and the small wholesale and retail profit margins in the food and beverage industry.

A more difficult question to answer is whether businesses will pass through the tax by raising prices solely on SSBs, or on other products as well.

For purposes of the estimates that follow, we assume that businesses recoup 100 percent of the tax by raising prices solely on SSBs. It is possible, however, that businesses would adopt alternative pricing strategies to recoup the tax. For example, retail stores have historically maintained parity between regular and diet varieties of soda, and it would be possible to maintain such parity by lowering the pre-tax price of regular brands and raising prices on diet varieties to compensate. Indeed, some of the representatives we spoke to felt that continued parity between regular and diet prices would be a desirable goal in terms of customer relations.

Achieving full parity may be difficult, given the enormous size of the tax (which will be greater than the wholesale price of the beverage in some instances). However, any adjustment made by retailers to prices of other food and beverages to recoup a portion of the tax would have significant implications. While the *aggregate* impacts of such alternative pricing strategies on households, businesses and the economy would be similar to the estimates we show in subsequent sections, efforts by businesses to shift a portion of the tax onto other products would have two very important effects:

First, if businesses recouped the wholesale taxes through price increases on both SSB and diet products, the "price signal" effect of the tax would be significantly diminished (since the relative price of SSBs and non-SSBs would remain reasonably constant). As a result, cutbacks in SSB consumption (a key goal of the San Francisco proposal) would be substantially less.

Second, if businesses raised prices on diet sodas and other non-SSB products, the impact of the tax would be felt by a broader spectrum of San Francisco households. Even those that never purchased SSBs would face higher prices on items they purchase.

17 For example, the "Findings and Purpose" section in the front of the proposed SSB ordinance states that the main purpose of the tax is to *discourage consumption* (emphasis added) and provide revenues for City nutritional and recreational programs.

18 See, for example, Donald Kenkel, "Are Alcohol Tax Hikes Fully Passed Through to Prices? Evidence from Alaska." *American Economic Review* (2005), 95, 273-277. This study found that the pass-through rate of alcoholic beverage tax increases in Alaska was significantly greater than 100 percent.

We discuss the specific implications of alternative pricing strategies on our estimates in Part 9 of this report.

How will consumers respond?

As indicated previously, an increase in the price of SSBs will result in significant behavioral changes by consumers. It will cause them to *reduce* the amount of SSBs they purchase and it will create an incentive for them to *redirect* their purchases to merchants outside of the City's boundaries. In this section, we estimate the impact of the tax taking into account each of these effects.

- First, we discuss the static impact – that is, the effect before taking into account any behavioral changes consumers may make.
- Second, we discuss the impact assuming that the tax causes consumers to reduce overall spending on SSBs, using *price elasticity of demand* estimates derived from the economics literature.[19] This estimate provides insight into the pure price effect of a tax on overall SSB consumption levels. In the case of San Francisco, it is one of two important consumer behavioral effects that must be considered in conjunction with one-another – the other being the geographic substitution effect (or the cross-border elasticity of demand).
- Third, we discuss the impact taking into account both the price elasticity of demand effect and the geographic substitution effect – that is, the shift in SSB purchases to lower-price merchants located just outside the San Francisco border. Our estimates in this area draw on a subset of economic studies that have looked at effects of price differentials in adjacent regions on cross-border shopping for food, beverages, gasoline, and other consumer items.

Before discussing these specific calculations, it is important to emphasize that in virtually all cases, consumers of SSBs will be worse off because of the tax. Those that continue to consume SSBs at the same rate will have less financial resources to spend on other goods and services, or less available to save and build wealth. Those that substitute purchases of alternative products will also be poorer. This is because they will experience a decline in satisfaction from these substitute products (which they could have purchased in lieu of SSBs before the tax, but chose not to). Economists refer to this as a loss in consumer utility. Even those that shift purchases to lower-tax jurisdictions will be worse off, in the sense that cross-border purchases can involve some added travel time and inconvenience. While these impacts are not directly measured here in terms of dollar losses to consumers, they are nevertheless quite real.

Impact before taking into account behavioral changes

Economists refer to the impact of a tax change before taking into account behavioral responses as its "static effect." In this case the static effect will overstate the amount of revenues generated by a substantial amount. This is because a tax of this magnitude will almost certainly cause consumers to take actions to avoid purchases of higher priced SSBs. However, we show the static effect estimate because it provides a good baseline for measuring the impacts of consumer behavioral changes. It is also relevant because, as noted above, any actions taken to avoid this higher tax will leave the consumer worse off.

The calculation of the static effect is shown in Figure 6. It is derived by simply multiplying the current level of San Francisco per-capita consumption (30.8 gallons) by the per-gallon tax rate ($2.56) and the population of San Francisco (837,442). The product of these three factors is $66 million, which is the total amount of SSB taxes that would be paid by San Francisco residents. In addition to the amounts shown in Figure 6, the tax would result in approximately $9

19 While price elasticity of demand estimates provide information on the impact of a tax on overall SSB consumption, they do not provide any insight into how consumers will reallocate their purchases, and whether these substitutions will result in positive health outcomes or even a reduction in calorie intake. In the context of the current proposal, consumers could avoid the tax by shifting purchases to bottle water, which would result in lower caloric consumption. However, they could also shift purchases to high-caloric (but untaxed) products such as chocolate flavored milk, candy, high-fat snack foods, or alcohol – all of which would offset calorie savings from reduced SSB consumption. Indeed, studies that have looked at health effects of product-specific taxes have consistently found these substitution effects to be complex. As one example, a field study released by Cornell University in 2012, partially funded by the National Institutes of Health, found that while a 10 percent tax on SSBs and related caloric foods *temporarily* reduced consumption of the taxed items, it also resulted in a significant increase in the consumption of beer (which was not subject to the tax). For households that consumed beer, the additional consumption resulted in a net gain in calories consumed each month. (Source: Wansink, Hanks, and Just, "From Coke to Coors: A Field Study of a Fat Tax and its Unintended Consequences." *Cornell University* (Working Paper). May 26, 2012.)

million in revenues from non-residents – specifically, the 265,000 in the City workforce that commute in from other counties, as well as the 134,000 in tourists visiting the City each day. This would bring total taxes paid up to $75 million.

FIGURE 6

Static Effect of a 2-cent per ounce SSB Tax in San Francisco Before Behavioral Changes

Per-capita consumption of SSBs in SF (gallons)	30.84
- Times: Tax per gallon	$2.56
Equals: Annual Taxes per capita	$78.96
- Times: SF Population	837,442
Equals: Total taxes from residents (millions)	**$66.13**

Impact assuming consumer behavioral changes

As noted above, a tax of the magnitude of the San Francisco proposal would almost certainly result in significant behavioral changes by consumers. It would cause consumers to reduce total consumption of SSBs and to shift a significant share of these purchases to merchants outside the City's borders.

Effect #1 – Reduced consumption (price elasticity of demand), ignoring cross-border purchases

Economists have long recognized that an increase in a product's price will affect consumer behavior in two key ways.

- First, it will reduce the purchasing power of consumers, because after purchasing units of the higher-priced commodity, they will have less income left over to spend on all goods and services. This is referred to as the *income effect*.
- Second, it will cause consumers to shift purchases to less expensive substitute goods. This is referred to as the *commodity substitution* effect.

Both of these factors work toward reducing demand for the product whose price has increased. Economists refer to the degree of price sensitivity for specific products as the *price elasticity of demand.* This concept is specifically defined as the percent change in consumption of a product resulting from a 1 percent change in price. As an example, a price elasticity of -1.1 implies that a 10 percent increase in the price of a product would translate into an 11 percent decline in purchases of that product.

Price elasticities can be statistically estimated from historical relationships in particular markets or regions between a product's price and the corresponding level of observed purchases.

What SSB price elasticity studies indicate. There have been numerous empirical studies over the past 75+ years that have statistically measured the price elasticity of demand for beverages and food products. A 2010 analysis published in the American Journal of Public Health reviewed 160 empirical studies completed between 1938 and 2007 that estimated the price elasticities for 16 categories of food and beverages.[20] It found a wide range of estimates, with an average of -0.79 for studies focusing on all non-alcoholic beverages (excluding milk) and a slightly higher -1.0 average for studies focused on narrow categories, such as carbonated sodas or fruit juices.

A more recent study, published in *Obesity Reviews* in 2013, reviewed 21 price elasticity studies completed between 2007 and 2012, including 12 that involved SSBs. It also found a relatively wide range in elasticity estimates, with an average of -0.86 for all soft drinks and -1.21 for SSBs[21].

A general pattern evident from these reviews is that studies focusing on narrow categories of beverage purchases tend to show higher price elasticity than studies focusing on broader spending categories. This makes intuitive sense, given that the opportunity to find substitute purchases is greater when a single item experiences a price increase as opposed

20 Andreyeva, Tatiana, Long, and Brownell."The Impact of Food Prices on Consumption: a Systematic Review of Research on the Price Elasticity of Demand for Food."*Amercian Journal of Public Health*, 2010

21 Powell, Chriqui, Khan, Wada, and Chaloupka."Assessing the Potential Effectiveness of Food and Beverage Taxes and Subsidies for Improving Public Health: a Systematic Review of Prices, Demand and Body Weight Outcomes." *Obesity Reviews*, February 2013.

to when a whole group of items experiences a price increase.

Based on these results, we believe that a reasonable price elasticity of demand assumption is approximately -1.1 if we assume that the tax will be passed through solely on SSB prices. This is the average of the results for narrower categories of beverages from the 2010 and 2013 reviews.

Estimated impact. The decline in SSB consumption resulting from the proposed 2-cent per ounce tax can be calculated by multiplying the percentage increase in the average price of SSBs resulting from the tax by the assumed price elasticity of demand (-1.1). Figure 7 shows that per-capita consumption would fall to 21.6 gallons, and taxes paid by San Francisco residents would fall to $46 million under this alternative. SSB purchases by commuters and tourists would result in an additional $6 million in tax payments, bringing total taxes paid to $52 million. This is at the high end of the $35 million to $54 million range that has been estimated by the City for the impact of its proposed tax. The City uses alternative price elasticity of demand assumptions of -0.8 and -1.2 to arrive at this range. Its estimates do not include cross-border shopping impacts.[22]

FIGURE 7

Consumption and Revenues from SSB Tax, Assuming Price-Elasticity of Demand of -1.1 and No Cross-Border Effects

(San Francisco Residents)

	Amounts
Per-capita purchases of SSBs from inside SF before tax (gallons)	30.84
Average price per gallon before SSB tax (including sales tax on CSDs)	$7.04
Price after new tax	$9.71
Percent increase	38.0%
Resulting decline in per-capita consumption (gallons)\a	-9.21
Equals: Per capita consumption after tax (gallons)	21.64
Times: Tax per gallon	$2.56
Equals: Per-capita tax	$55.39
Times: Population	837,442
Equals: Total SSB taxes paid by residents (millions)	**$46.38**

a\ Calculation uses the arc elasticity formula, where the percent changes in price and quantity are based on the average of the initial (before tax) and ending (after tax) values of price and quantity, instead of just the initial values. The arc elasticity formula (sometimes referred to as a "mid-point" elasticity formula) is commonly used by economists measuring the effects of large changes in price, such as is the case here.

Effect #2 – Cross-border purchases

As noted above, the price elasticity of demand analysis provides a good indication of how a newly imposed tax would affect overall consumption, ignoring the impact of cross-border shopping. In this regard it is a good measure of what a tax imposed in a broad economic region would yield. However, it will overstate revenues from a tax imposed in a single jurisdiction, particularly in a compact geographic region. This is because it fails to take into account the potential for consumers to legally avoid the tax by shifting the location of their purchases to outside the jurisdiction of the taxing authority. It is clear from news reports, industry analyses, and economic studies that taxes and other factors leading to price differentials in neighboring jurisdictions have resulted in substantial cross-border shopping activity.[23]

There have been a large number of studies focused on this topic that provide a reasonable basis for estimating the potential effects of the proposed SSB tax on cross-border purchases. Before reviewing these studies, however, it is useful to look at typical savings that a shopper facing higher SSB prices in San Francisco could achieve by shifting purchases to merchants outside of the City.

22 City and County of San Francisco, Office of Economic Analysis. "Tax on Sugar-Sweetened Beverages to Fund Food and Health Programs: Economic Impact Report." July 2014.

23 See, for example: Jessica Barrett, "Cross-border Shoppers Cost B.C. Economy Billions Each Year: Study," *Vancouver Sun,* June 6, 2013; and Christine Roberts,"Canadians Swarm Across the Border of Washington State to Scoop Up Milk and Other Goods at Discount Prices," *New York Daily News*, August 15, 2012.

Potential savings from cross-border purchases. Figure 8 provides such an estimate. It specifically compares the after-tax price of three 12-pack cartons of a carbonated soft drink purchased in San Francisco versus in one of the surrounding counties (San Mateo, Marin, Alameda, or Contra Costa). The estimate assumes that the price before taxes is the same in all localities, at $4.50 per 12-pack. Our estimates also take into account the slightly higher sales tax rates in the surrounding counties (an average of 9.1 percent versus 8.75 percent in San Francisco).

The figure shows that the consumer making this purchase would owe $13.50 before taxes in each of the localities. After adding the SSB tax in San Francisco then applying the respective sales taxes, the after-tax price would be $24.08 in San Francisco versus an average of $14.73 in the nearby counties.

FIGURE 8

Potential Savings to San Francisco Shopper From Shifting a CSD Purchase To Outside the City

(Assumes purchase of three 12-pack cartons of a 12-oz carbonated soft drink)

Price	San Francisco County	Nearby Counties[\a]
Average Selling Price before taxes	$13.50	$13.50
SSB Tax	8.64	0
Sales and Use Tax	1.94	1.23
Equals: Total price	$24.08	$14.73
Savings From Cross Border Shopping		
Dollars	--	$9.35
Percent		38.8%

a\Assumes an average sales tax rate of 9.1 percent in nearby counties, versus 8.75 percent in San Francisco.

Given the 39 percent savings in this example, it is clear that there would be a strong incentive for San Francisco beverage customers to engage in cross-border shopping. There would be many opportunities to do so given the compact nature of the county and the high degree of mobility in the broader metropolitan region. The majority of residents in San Francisco live within five or six miles of the southern border of the county, and for the 150,000 residents living in the county's southernmost zip code areas, the average distance is less than 2 miles. Once San Francisco residents cross the border, they would find hundreds of businesses selling SSBs – including 170 merchants in Daly City and 150 merchants in South San Francisco. These include a superstore, dozens of supermarkets and convenience stores, and over 100 food service and drinking establishments. Customers motivated to avoid the tax would have many options to do so.

A similar incentive would exist for the 265,000 workers in the City that commute daily from surrounding counties, who would clearly have many options for purchasing SSBs outside the City.

What economic studies say about cross-border shopping. There have been numerous empirical studies attempting to measure the geographic substitution effects of price differentials between borders of states, nations, or localities. Most have involved broad categories of food and beverages, as opposed to just soft drinks, and none of the studies have been based on just SSBs. However, there have been a limited number of studies looking at the effects of tax-related price differentials for alcoholic beverages. These studies are relevant for the development of a cross-border price elasticity of the SSB tax, partly because alcoholic beverages purchases account for a roughly similar proportion of overall household spending as do SSB purchases.[24]

Of particular interest are two studies that look at the cross-border price elasticity for alcoholic beverages in Washington D.C. Elasticities derived from these studies are relevant because D.C, like San Francisco, is a densely populated locality with a relatively compact land mass (68 square miles versus 46 square miles in San Francisco). It also lies within a larger, highly populated, metropolitan area (the Washington–Arlington–Alexandria metropolitan statistical area, which is the seventh largest in the country). Hence consumers seeking to avoid higher taxes in D.C. – like residents of San Francisco – have plenty of opportunities to make cross-border purchases.

24 According to the *Beverage Digest*, per-capita U.S. consumption of beer, wine, and distilled spirits was 24.4 gallons in 2013. This compares to our estimate of SSB consumption in San Francisco of 30.8 gallons. Taking into account the higher prices of alcoholic beverages, the share of expenditures would appear to be similar.

A study by M. Stehr, published in the National Tax Journal in 2007, estimated a cross-border price elasticity in D.C. of 1.48 for alcoholic beverages.[25] Another, by Beard, Gant and Saba, published in the Southern Economic Journal in 1997, estimated a cross-border price elasticity of 0.47 for purchases of beer.[26]

There have been numerous other studies focusing on cross-border price elasticities for broader product groups, such as all food and beverages combined, which have found such elasticities ranging all the way up to 12. For example:

- A study by R.C. Fisher, published in the Public Finance Review in 1980, concluded that food sales in the District of Columbia decreased by about 7 percent for every one percent increase in the D.C. sales tax rate compared to neighboring jurisdictions.[27]
- A study authored by W.F. Fox, published in in the National Tax Journal in 1986, found that a one-percentage point difference in sales tax rates between two adjacent jurisdictions reduced sales in the high tax jurisdiction by 1 percent to 4 percent.[28]
- A study by Walsh and Jones, published in National Tax Journal in 1988, examined grocery store sales in West Virginia during the 1979 through 1984 period and concluded that each 1 percent increase in food prices reduced sales on border counties by 5.9 percent.[29]
- A more recent study by M. Tosun and M. Skidmore, published in the B.E. Journal of Economic Analysis and Policy in 2007, refined the techniques used by Walsh and Jones, and estimated a pure cross-border price elasticity for border counties in West Virginia of 1.38.[30]

The higher elasticities derived from studies looking at broader product categories are not surprising, given that the potential savings from cross-border shopping goes up as the number of products affected by price differentials increases. Because of the broader spectrum of products considered in these studies, they are less directly relevant to the San Francisco proposal than the studies based on alcohol purchases. However, the consistently large elasticities derived from these studies reinforce the contention that price differentials between local jurisdictions do matter.[31] A tax increase imposed by one jurisdiction creates a strong incentive for taxpayers to legally avoid the additional payment through modest changes in their shopping patterns.

Our assumption. For purposes of our estimates, we are assuming a cross-border price elasticity of 1.0. This is about equal to the average of the two studies involving beer and alcoholic beverage sales in Washington D.C. and is significantly less than other studies involving broader food and beverage groups.

Implications of cross-border purchases

Relative to the previous estimate, which looked at only the impact of higher prices on total SSB consumption and ignored the cross-border shopping effects, the introduction of a cross-border shopping elasticity into our calculation has the following implications:

- The reduction in SSB consumption by San Francisco consumers will be significantly less than what would be obtained using a pure price elasticity of demand calculation. This is because over 25 percent of purchases would no longer be subject to the tax.

25 Mark Stehr, "The Effect of Sunday Sales Bans and Excise Taxes on Drinking and Cross-Border Shopping for Alcoholic Beverages" in *National Tax Journal*, 2007, Vol. LX, No. 1, 85-105.

26 Beard, Gant and Saba, "*Cross Border Sales, Tax Avoidance, and State Tax Policies: An application to Alcohol" in Southern Economic Journal*, July 1997.

27 R.C. Fisher, "Local Sales Taxes: Tax Rates Differentials, Sales Loss, and Revenue Estimation in *Public Finance Review*, 1980, 8.

28 W. F. Fox, "Tax Structure and the Location of Economic Activity Along State Borders" in *National Tax Journal*, 1988, 14.

29 Walsh and Jones, "More Evidence on the 'Border Tax' Effect: The Case of West Virginia, 1979-1984" in *National Tax Journal*. 1988, 41.

30 Tosun and Skidmore, "Cross-Border Shopping and the Sales Tax: An Examination of Food Purchases in West Virginia" *in The BE Journal of Economic Analysis and Policy*, 2007.

31 The higher cross-border price elasticities found in studies examining broader food and beverage groups would be directly relevant to San Francisco if distributers and retailers were to recoup part of the proposed SSB taxes by raising prices on non-SSB products. Under these circumstances, a wider spectrum of products would experience price increases, resulting in a greater incentive for shoppers to engage in cross-border purchases. This would result in greater tax-related sales losses to San Francisco businesses than shown in our estimates.

- The negative effect that the tax has on consumer incomes will be less, since purchasers of SSBs will be able to avoid some of the tax by shifting purchases to outside the City.
- The adverse impact on San Francisco businesses, however, will be much larger, because they will lose sales of SSBs – and potentially other products – to merchants located outside the City.
- The tax proceeds to government will be smaller, because many consumers that continue to consume SSBs will do so by purchasing some of their products outside the City, thereby avoiding the tax.

Estimate taking into account both cross-border purchases and reduced consumption

Figure 9 provides our estimate of the impact of the tax on consumers, taking into account both the price elasticity of demand and cross-border price elasticity (as well as the interaction between the two). It shows that the implementation of the SSB tax will result in a shift of 27.5 percent of annual purchases (8.5 gallons per-person) to merchants outside of San Francisco.

This shift will have an interaction with the price elasticity of demand calculation, because it reduces the average price increase for all SSBs consumed by San Francisco residents from 38 percent to 28 percent. This occurs because, due to cross-border shopping, over one-fourth of SSB purchases are shifted to merchants outside the City and are no longer subject to the tax-induced price increases.

Because of the smaller increase in the average price of all SSBs consumed, the decline in per-capita SSB consumption by San Francisco residents is now 7.2 gallons. This is significantly smaller than the 9.2 gallons that occurred in the previous estimate, which assumed no cross-border shopping.

Taking into account the combined cross-border and price elasticity of demand effects, per-capita consumption is reduced to 23.6 gallons as a result of the imposition of the SSB tax (compared to the 21.6 gallon total under the pure price elasticity of demand calculation made earlier). Of this total, 15.1 gallons are purchased inside the City boundaries, and thus subject to the tax. The other 8.5 gallons are purchases that are shifted to merchants outside the City.

Taking into account both the reduction in overall SSB consumption and the increased cross-border shopping that will result from the proposed tax, taxes paid by San Francisco residents would be $32.4 million.

In addition to the total shown in Figure 9, an estimated $5 million in taxes would be paid by non-residents, including tourists and daily commuters into the City. This would raise total tax collections to slightly over $37 million.

FIGURE 9

SSB Tax Effects: Assuming a Cross-Border Price Elasticity of 1.0 and a Price-Elasticity of Demand of -1.1

Impacts of Tax	Assumptions/Amounts
1. Before tax increase:	
Quantity purchased in San Francisco (per-capita)	30.84 gallons
Average sales price (including sales tax on CSDs)	$7.04 per gallon
2. SSB tax effect	
New price after tax	$9.71 per gallon
Percent increase	38.0%
3. Effect on cross border shopping:	
Sales shifted outside of San Francisco (per-capita)\a	8.49 gallons
4. Effect on total consumption:	
Effective price increase after cross-border purchases	27.5%
Assumed price elasticity of demand	-1.1
Quantity reduction (per-capita)\a	7.24 gallons
After tax quantity purchased (per-capita)	23.6 gallons
Allocation of total consumption:	
Inside City (per-capita)	15.12 gallons
Outside City (per-capita)	8.49 gallons
5. SSB Tax	
Per-capita consumption inside City	$15.12 gallons
Times: Tax per gallon	$2.56
Equals: Per-capita taxes paid	$38.69
Times: Population	837,442
Equals: Total taxes paid by SF residents	**$32.4 million**

a\ Calculation uses the arc elasticity formula, where the percent changes in price and quantity are based on the average of the initial (before tax) and ending (after tax) values of price and quantity, instead of just the initial values. An arc elasticity formula (sometimes referred to as a "mid-point" elasticity formula) is commonly used by economists measuring the effects of large changes in price, such as is the case here.

Part 7 – Distributional Effects of the Proposed Tax

A key feature of a tax is its degree of progressivity. A progressive tax is one where the ratio of taxes paid to income goes up as household incomes rise. In contrast, a regressive tax is one where the share of income paid for taxes goes down as household income rises. Many economists and public policy experts consider progressivity a desirable feature of a tax system, especially in jurisdictions characterized by high degrees of income disparity. As noted in Part 4, San Francisco has the second highest degree of income disparity of any city in the U.S.

The proposed SSB tax would aggravate the after-tax income disparity in the City. This is because it is a highly regressive tax, hitting those at the bottom of the income distribution the hardest. This is demonstrated in Figure 10, which shows the share of household income devoted to SSB taxes. It shows that SSB taxes paid per $1,000 of income drops from $10 for households with incomes below $20,000 to just 40 cents for households with more than $100,000.

The estimates in Figure 10 take into account the behavioral changes made by consumers in response to the tax increase. Absent these changes, the static effect of the tax increase on households would be more than double the amounts shown.

FIGURE 10

SSB Taxes Paid Per Thousand Dollars of Income After Behavioral Changes

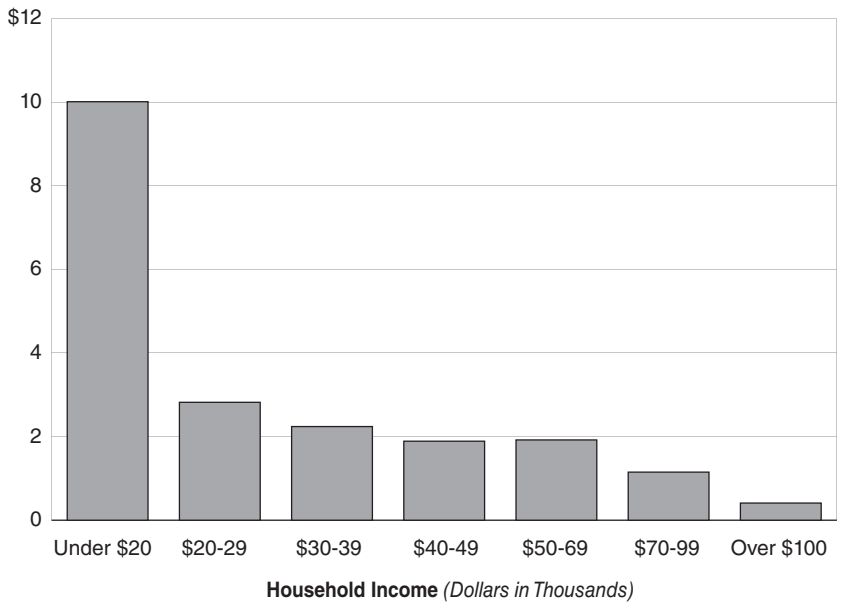


Figure 11 provides additional detail on the distribution of household incomes and taxes paid. It shows:

- Over $7 million would be paid by people in households with incomes of less than $20,000 per year. These households account for 2 percent of total household income in the City, but would pay 22 percent of the tax revenue.
- On a per-household basis, the under $20,000 group would actually pay more than their counterparts at the top of the income scale. Specifically, the under $20,000 group would pay an average of $120 in taxes per household, or 40 percent more than the $86 for households with incomes exceeding $100,000 per year.
- The households with income up to $70,000 (near the city's median household income) account for just 15 percent of total income in San Francisco, but account for a much higher 52 percent of the SSB taxes paid.

FIGURE 11

Distribution of Household Income and SSB Taxes Paid

Household Income	Avg. Taxes Paid Per Household	Share of Total Households, Income and SSB Tax Paid In San Francisco		
		Households	Income	Taxes
Under $20,000	$120	17.5%	2.0%	22.1%
$20,000-$30,000	71	7.7%	1.8%	5.7%
$30,000-40,000	78	6.4%	2.1%	5.3%
$40,000-50,000	85	5.8%	2.5%	5.2%
$50,000-$70,000	115	10.9%	6.1%	13.3%
$70,000-100,000	98	13.4%	10.7%	13.8%
Over $100,000	86	38.3%	74.8%	34.7%

The SSB tax may be more regressive than our estimates indicate. This is because our estimates assume that cross-border purchases would occur in equal proportions across all income groups. In reality, however, households at the bottom of the income scale tend to be less mobile in terms of having access to automobiles than their higher income counterparts. As one indication, a 2001 study by the City and County of San Francisco found that households with incomes below $15,000 in San Francisco were roughly one-half as likely to have access to an automobile as those in the middle and upper end of the income distribution.[32] The reduced mobility implies that members of lower income households would have comparatively fewer opportunities to avoid the tax by engaging in cross-border shopping.

32 City and County of San Francisco, "Technical Memorandum: Vehicle Ownership in San Francisco," 2002.

Tax would have major impacts on discretionary incomes of poorest households

Finally, the proposed tax's impact on low-income households is more dramatic when taxes paid are compared to the limited amount of *discretionary* income that is available to the many low- and moderate-income households in the City after paying for basic costs of living. Expenditure data from the 2011 Consumer Expenditure Survey shows that U.S. households with annual incomes of up to $70,000 spent an average of nearly 90 percent of their income on just *necessities* (food, rent, utilities, clothing, transportation, and health care).[33] For households with incomes below $30,000, the average was virtually 100 percent (or more) of household income. (In contrast, the average share was 40 percent for all households with incomes above $70,000).

The share of incomes devoted to necessities is likely to be even higher than the nationwide average in San Francisco, given that costs in the City for necessities – particularly housing – are well above the national average. As noted previously, the overall cost of living in San Francisco is 64 percent above the national average.

The limited (or non-existent) amount of discretionary income available to low- and moderate- income households implies that the tax would have a major impact on their finances. After paying bills for food, rent, utilities, and health care, lower income consumers would have virtually no room in their discretionary budgets to accommodate the SSB tax.

Why the SSB tax is so regressive

All consumption-based taxes are regressive to some degree. This is because spending for most products as a percent of income eventually falls as an individual moves up the income ladder. The reason for this is the diminishing satisfaction that a consumer receives from additional purchases of most items, particularly food and beverages.

Beyond this general principal, however, is the fact that a significant share of households at the lower end of the income scale tend to be young adults that are consume relatively larger amounts carbonated soft drinks, sport drinks, energy drinks, and other SSBs. Data from Nielson Company indicates that households in the San Francisco/Oakland/Fremont MSA with income of less than 20,000 spend 31 percent more on SSBs than would be predicted based solely on their share of total households in the MSA.

Part 8 – The Impact of the Proposed Tax on San Francisco Businesses

The SSB tax would have substantial adverse effects on businesses that sell beverages in San Francisco, particularly on the many small businesses operating in the City. These businesses would be squeezed by both (1) higher costs to comply with the recordkeeping and related requirements that are likely to be imposed if the measure passes, and (2) a large loss of sales to merchants located outside of the City boundaries.

Costs of Compliance

San Francisco businesses will face considerable administrative challenges associated with identifying and tracking SSB sales. This is partly due to the complexity of the proposal. Its calorie threshold, its special treatment for milk products, and its numerous exemptions would likely require a complex regulatory framework, and would present challenges to businesses related to identifying and monitoring products that are subject to the tax. The City is also likely to require businesses to maintain detailed records of inventory and sales transactions involving SSBs. Absent such records, tax compliance could become a significant issue, given the size of the tax and the strong incentive for avoidance it will create.

Disproportionate impact on small businesses. The detailed recordkeeping and related compliance costs will affect all businesses engaged in beverage sales and distribution in San Francisco. However, the impact will fall disproportionately on small independent establishments operating in the City. This is of particular concern in San Francisco because of the prevalence of small businesses operating in the City. Figure 12 shows, for example, that three-fourths of the 500

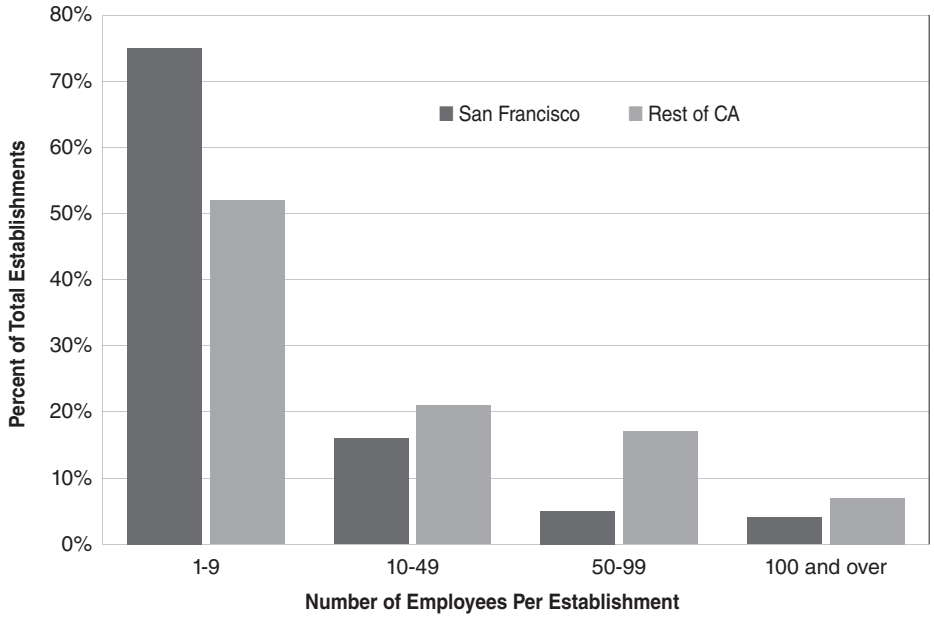
33 U.S. Census Bureau. "Consumer Expenditure Survey, 2011."

employers classified as grocery stores, convenience stores, and liquor stores in San Francisco have 10 or fewer employees. This compares to roughly one half of the total for the same type of businesses in other areas of the state.

FIGURE 12

Percentage of Grocery, Convenience, and Liquor Stores By Number of Employees 2012

Source: County Business Patterns, U.S. Economic Census



Smaller independent businesses are more likely to purchases directly from warehouses, and thus would be considered distributers under the proposal. These businesses also lack the financial resources that their larger counterparts have to deal with the new administrative requirements related to the proposal. For example, virtually all large- and most medium-sized grocery stores have sophisticated sales recording devices, such as bar code scanners and smart cash registers that track sales by stock-keeping unit (SKU). Hence, these stores already have much of the product information and capabilities needed to track SSB products. Representatives of these larger businesses indicated to us that even they would incur significant added costs for upgrades to software systems and increased monitoring to comply with the likely record-keeping requirements of the law. However, the larger businesses would at least have the needed technology and resources to effect the changes.

In contrast, many smaller businesses we contacted currently rely on paper invoices, electronic spreadsheets, and outside bookkeeping services to help them track purchases, sales, and inventory. While they must currently track carbonated beverage sales for sales tax purposes, none of the small retailers we contacted currently have the tracking systems needed to break out diet versus regular brands.

These small businesses would incur significant costs associated with either an enhanced level of manual tracking, or for the purchase and implementation of an automated system. The business owners indicating that they would track SSB sales manually estimated that they would need to devote an additional 3-10 hours per week to this activity, and several indicated that they would likely incur significant added expenses for outside bookkeeping expenses.

Those that choose to invest in an automated system would face significant up-front costs for the purchase, and some ongoing costs for support and software updates. Our review of current prices for entry level systems indicates that a typical system consisting of a touch-screen operated cash register, a product scanner, and inventory tracking software, costs $4,000 or more for a single cash register system.

Finally, several businesses owners indicated that, even if they were able to fully pass along the higher costs to their customers, the imposition of the tax at the wholesale level means that they will have to pay more to acquire SSBs for resale – in an environment where consumer demand for the higher-priced SSBs will be uncertain. The higher carrying costs will depress cash flows, and the uncertainties about consumers' response to price increases pose additional risks to the company. Those businesses that over-estimate consumer demand will be left with expensive inventory that they are

unable to sell. These costs and added risks are particularly significant for small businesses, which are already operating on paper-thin profit margins of between 1 percent and 2 percent.[34]

Loss Of Sales

In addition to higher operating costs and uncertainties resulting from the tax, businesses selling SSBs will face significant losses of SSB sales and profits. The main effect would be the loss that San Francisco businesses will experience as a result of SSBs purchases that are shifted to merchants located outside the City. As shown in Figure 13 we estimate the loss would be about $63 million per year.

FIGURE 13

Calculation of Sales Lost By San Francisco Businesses Resulting From SSB Tax

Assumptions	Sales
1. Purchases Before SSB Tax (millions)	
San Francisco Residents ($ millions)	$174.2
Tourists and Commuters ($ millions)	$22.5
Total ($ millions)	$196.7
2. Cross Border Sales Effects	
San Francisco Residents ($ millions)	-$47.9
Tourists and Commuters ($ millions)	-$3.1
Total ($ millions)	-$51.0
3. Price Elasticity of Demand Effect	
San Francisco Residents ($ millions)\a	-$10.2
Tourists and Commuters ($ millions)\a	-$1.3
Total ($ millions)	-$11.5
Total Sales Loss of San Francisco Businesses ($ millions)	**$62.6**

a\ This reduction is based on the assumption that 75 percent of the decline in SSBs sales that occur because of the price elasticity of demand effect are redirected to purchases of other food and beverage products within San Francisco.

The lost sales would represent a significant share of total revenues for those businesses that rely on SSB purchases to support their operations. Based on Homescan data for the San Francisco Bay area, we estimate that sugared beverages represent between 5 percent and 10 percent of total food and beverage sales by grocers, convenience stores and other food outlets.[35] Feedback from local business merchants indicates that the share for smaller outlets is significantly higher, ranging up to 15 percent.

Actual business losses could be greater. The full loss in sales to San Francisco merchants could be significantly greater if consumers making cross-border purchases of SSBs also shop for other food and beverages while at the out-of-town establishments. The contention that there would be losses related to sales of other items is supported by the use of loss-leader pricing by grocery stores and other retail outlets. The rationale behind this pricing strategy is that that once consumers are in the store, they will purchase enough profitable goods to more than offset any losses on the loss-leader product.

We have no basis for making specific estimates of the amount of related purchases that would be lost. Therefore we have not included these potential effects in our estimates. But as a general indication of the potential loss, if related food and beverage purchases equaled 25 percent of the redirected SSB sales, the total loss to San Francisco businesses would rise from $63 million to $75 million.

34 The Reinvestment Fund,"Understanding the Grocery Industry" in *Financing Healthy Food Options: Implementation Handbook*, September 30, 2011.

35 Homescan data compiled by the Nielsen Company for the San Francisco Bay area indicates that consumer expenditures on liquid beverages (excluding water) accounts for about 10 percent of total retail food and beverage purchases. We estimate that SSBs would account for about 7 percent of the food and beverage total.

Impact of SSB Tax On Business Profits

San Francisco businesses that sell SSB sales would be squeezed by higher recordkeeping and related administrative costs on one hand, and sharply reduced revenues from profitable beverage sales on the other.

An illustrative example. To illustrate the potential impact of these forces, Figure 14 shows a profit/loss statement for a representative small retail grocer having revenue and cost characteristics that are based on averages for the industry. [36]

We specifically assume that this small grocery store has annual revenue of $500,000, of which 8 percent ($40,000) is due to SSB sales. We assume annual expenses of $360,000 for cost-of-goods-sold (including $28,800 for SSBs), and $132,500 for payroll and overhead costs (for rent, utilities, depreciation, maintenance, licenses, supplies, and insurance), leaving net profits of $7,500 (or 1.5 percent).

Figure 14 shows the impact of the SSB tax on this business, assuming the cross-border elasticity estimate of 1.0 and a price elasticity of demand of -1.1. For purposes of this illustration, we also assume that 75 percent of the decline in consumption due to the price elasticity of demand is reallocated to expenditures in the same store on other (non-taxed) products, such as milk, fruit juice, snack foods or alcoholic beverages. Based on these assumptions we estimate the tax would reduce this small company's net sales by $13,355. This consists of a $20,400 decline in SSB sales, partly offset by a $7,045 increase in sales of other food and beverages due to the reallocation of customer spending to other (non-taxed) products in the store.

FIGURE 14

Illustration of Tax and Administrative Costs Effects on a Typical Small Business In San Francisco

Effect of SSB Tax on Revenues and Costs			
		Effects of SSB Tax on Sales and Costs	
	Current Law	Increase/Decrease	Increase/Decrease
Annual Sales			
SSBs (excluding tax)\a	$40,000	-$20,400	$19,600
Other	460,000	+7,045	467,045
Total Sales	**$500,000**	**-$13,355**	**$486,645**
Cost of Goods Sold			
SSBs (excluding tax)\a	$28,800	-$14,688	$14,112
Other	331,200	+5,072	336,272
Total	**$360,000**	**-$9,616**	**$350,384**
Labor Costs and Overhead	$132,500	+$3,900	$136,400
Total Costs	**$492,500**	**-$5,716**	**$486,784**
Profit/Loss	**$7,500**	**-$7,639**	**-$139**

a\ To simplify the presentation in this table, the sales and cost-of-goods-sold figures in the right two columns exclude the proposed excise tax itself. Assuming the SSB tax were fully passed forward to customers, it would add an identical amount to both the SSB sales and SSB cost-of-goods sold, with no net impact on the bottom-line profit totals in this table.

Assuming the owner proportionally scales back wholesale purchases of SSBs and steps up wholesale purchases of other products, the cost of goods sold would decline by a net of $9,616. This business would also incur $3,900 in added overhead costs related to a conservative estimate of 5 hours per week in additional employee time (at $15 per hour) to identify and track its SSB inventories and sales.

The combination of reduced profitable beverage sales and higher administrative costs would more than eliminate this company's profit margin, leaving it with a small loss. The impact would be greater for companies that rely more heavily on SSB sales, or where declining SSB sales (due to a shift of purchases to merchants outside the city) are accompanied by

36 These estimates are based on industry averages for supermarkets presented in "Understanding the Grocery Industry."

reduced sales of complementary goods. Companies that fail to pare SSB inventories would also face bigger losses.

For some small retail establishments operating close to the edge, the loss in profitable sales would be enough to force them to close. Others would be able to survive, but only by reducing labor costs through employee layoffs or reductions in hours worked.

Part 9 – Alternative Assumptions About Business Pass-Through of the Tax

Our estimates of the proposed SSB tax's impacts have thus far been based on the assumption that 100 percent of the SSB tax would be passed forward to purchasers of SSBs, and that no other product prices would be changed. However, businesses could adopt a variety of pricing strategies for recouping the tax, and each strategy would have different effects on consumers, businesses, and tax revenues to the City government. In this section, we explore the impact of two alternatives:

- Alternative 1, where the company recoups one-half of the tax from purchasers of SSBs and the other one-half from purchasers of diet sodas, bottled water, and other non-sugared beverages. (This alternative is consistent with responses we received from some businesses we surveyed, who indicated they would try to "spread-out" the price increases to avoid dramatic disparity between SSBs and other beverage prices);
- Alternative 2, where the business passes along 75 percent of the tax to SSB customers and absorbs the remainder in the form of lower gross profit margins. In this illustration we assume that the retail markup on beverages is 40 percent.

The results of our alternative simulations are presented in Figure 15. As noted previously, under our baseline assumptions, per-capita consumption of SSBs after imposition of the proposed tax would be 23.6 gallons, total SSB taxes paid by San Francisco residents would be $32.4 million, and sales by San Francisco businesses would fall by $63 million relative to current law.

Alternative 1 illustrates two important points about the proposed tax. First, if businesses recoup part of the tax by raising prices of products other than SSBs, the tax will be less effective in terms of achieving the Board of Supervisors' goal of reducing SSB consumption. In our example, the price increase on SSBs is one-half of what it would be if the tax were recouped by businesses solely from SSB purchases. As a result, per-capita SSB consumption in this scenario is higher - 26.2 gallons versus 23.6 gallons in our baseline scenario.

Second, if prices for non-SSB products were also raised in response to the tax, the tax burden would no longer be borne by just consumers of SSBs. Under this alternative, households that never purchase SSBs would also be affected by the SSB tax.

Taxes paid under this alternative would be higher ($45.6 million versus $32.4 million) because the smaller price increase on SSBs would result in higher overall consumption and less cross-border purchases relative to our baseline assumption.

The overall impact of this alternative on business sales would be similar to our baseline assumption. While the smaller price increase for SSBs would translate into a correspondingly smaller reduction in SSB sales under this alternative, San Francisco businesses would now also face reductions in non-SSB sales in response to the higher retail prices charged for other products.

Under Alternative 2, per-capita consumption and SSB taxes paid would be higher than our baseline, because the increase in product prices faced by consumers would be only 75 percent of the full tax increase. From the standpoint of San Francisco businesses, the reduction in their sales volume would be less under this alternative. However, the 25 percent reduction in the amount of taxes recouped from consumers on each unit of sale would translate into an aggregate loss of about $10 million of profits. This would equate to a roughly one-quarter reduction in the gross profit margin on each

unit of SSBs sold.[37]

FIGURE 15

Impacts of Alternative Assumptions Regarding The Pass-Through of The SSB Tax On Our Estimates

	Effect on SF Individuals		Aggregate Effect on SF Businesses		
	SSB Per-Capita Consumption (gallons)	Total SSB Taxes Paid ($ millions)	Reduction in SSB Sales ($ millions)	Reduction in Non-SSB Sales\a ($ millions)	Reduction in Profit Margins on remaining Sales ($ millions)\a
Baseline:100 percent recouped by businesses, all from SSBs purchasers	23.6	$32.4	-$62.6	none	none
Alternative 1: 100 percent recouped, ½ from SSBs and other ½ from non-sugared beverages	26.2	45.6	-31.3	-31.3	none
Alternative 2: 75 percent recouped from SSBs, remainder absorbed by seller	24.8	38.4	-47.0	none	-9.8

a\ Excludes additional overhead costs related to complying with the likely recordkeeping and related requirements imposed on businesses.

Part 10 – Effects Of The SSB Tax On San Francisco's Economy

To summarize its financial effects on businesses and consumers of SSBs, the proposed SSB tax would:

- Reduce profitable sales of San Francisco businesses by about $63 million, primarily because of purchases shifted to merchants located outside the city.
- Significantly increase administrative costs to businesses for identifying and tracking SSBs. The impacts would fall heavily on small independent businesses, many of which would have to either (1) automate their inventory and sales tracking systems, or (2) devote significantly more time and money to manually tracking SSB inventory and sales.
- Reduce disposable income of individuals purchasing SSBs by $32.4 million – the amount of taxes collected from distributers of SSBs and passed along to consumers in the form of higher product prices.

These factors will have significant adverse effects on the broader San Francisco economy. Businesses facing reduced sales and profits will likely scale back operations to maintain profitability. This may include (1) purchasing less products and services from their suppliers, and (2) curtailing their employees' hours worked.

These reductions imply a significant loss in sales, employment and income for other businesses that provide goods and services to the affected retailers and their employees, as well as reductions in income of the retailers' employees Similarly, consumers of SSBs, facing declines in disposable income, will cut back purchases of other goods and services in the City. Economists refer to these secondary losses as the indirect and induced effects on the broader economy.[38]

We estimate that the direct, indirect, and induced effects of the loss in business sales and the reduction in household disposable income would result in employment losses in the City totaling about 1,000 jobs. The key components of this estimate are discussed in more detail below.

37 Gross profit margins, which in the grocery industry are typically about 28 percent of total revenues, are defined as total revenues minus the cost-of-goods sold. Net profit margins, which in the grocery industry are typically about 1 percent to 2 percent of total revenues, are defined as revenues minus both (1) cost-of-goods sold and (2) operating expenses (including salary and benefits, property rental, utilities, maintenance and repairs, and insurance).

38 The indirect effects are the impacts on businesses and individuals supplying goods and services to the business experiencing the loss in sales. The induced effects are the impacts on businesses and individuals supplying services to the employees of the company experiencing the initial loss in sales.

Lost Business Sales

To calculate the full (direct, indirect, and induced) effects of the $63 million in lost business sales on employment, income, and output in San Francisco, we used a version of the IMPLAN input output model customized for San Francisco County.[39] To produce the estimate, we first allocated the lost sales to specific industries (such as grocery stores, convenience stores, eating and drinking establishments), based on the information depicted in Figure 2 regarding the distribution of beverage sales through various channels. We then used the multipliers derived from the IMPLAN model to estimate the indirect and induced effects on other industries in the local economy.

Figure 16 shows that the $63 million reduction in beverage purchases would translate into a total loss of 840 jobs, $46 million in labor income, and $89 million in economic output of goods and services in San Francisco. Most of the losses would be in food and beverage retail stores, food service, and drinking places directly affected by the lost SSB sales. However, many other industries would be indirectly affected, including wholesale trade, transportation, and business service providers.

FIGURE 16

Effects of Business Sales Losses on San Francisco Economy

(Direct, Indirect, and Induced Effects Using IMPLAN Multipliers)

Impact Type	Employment	Labor Income ($ Millions)	Output ($ Millions)
Direct	-688	-$34.0	-$62.6
Indirect	-65	-5.5	-12.0
Induced	-87	-6.1	-14.3
Total Losses	-840	-$45.6	-$88.9

Higher Prices Paid For SSBs by Households

The higher retail SSB prices resulting from the proposed tax would translate into an identical reduction in disposable income available to households for expenditures on products and services in San Francisco. Based on the IMPLAN model multipliers, we estimate that the direct, indirect, and induced effect of this reduction would be a loss of 150-200 jobs, $10-$13 million in labor income, and $24-$28 million in total economic output in the City. The precise effect would depend partly on the extent to which the loss in disposable income resulting from the tax would translate into reduced expenditures by households, and the share of these reduced expenditures that would occur within the City.

The loss of 150-200 jobs associated with the additional taxes paid by San Francisco residents would be offset to some degree when the additional tax proceeds were spent by the City and school district for the various purposes designated by the ordinance. The magnitude of the offset would depend partly on how much of the money spent by government went to local businesses and employees residing in the City.

It is important to note that, even if the 150-200 jobs lost due to household spending cutbacks were fully offset by new government sector spending of the tax proceeds, there would still be significant dislocations to the private-sector employees affected. Moreover, while the jobs lost due to higher taxes may be offset by government spending, there is no offset for the 840 jobs lost because of reduced business sales and profits.

Part 11 – Effects of Proposal on the San Francisco Government

Background

The 2014-15 budget signed by the Mayor on July 23, 2014 anticipates total revenues of $7.8 billion, total expenditures of $7.5 billion, and a year-end reserve of $233 million. About $3.1 billion of the expenditures total is for general fund programs (including police, fire, public health, and human services), and the remaining $4.4 billion is for self-supporting enterprises, such as the port, municipal transportation agency, the airport, and public utilities commission.[40]

39 IMPLAN is a widely used input-output modeling system that describes the interrelationships between purchases and sales of detailed industries in the U.S. and regional economies. It uses government data from the economic census and other sources to produce "social accounting matrices" for economic regions at the national, state, county, and MSA levels. From these accounting matrices, it is possible to develop job, output, and income multipliers that can be used to estimate the direct, indirect, and induced effects of an initial change in business sales and personal spending on the overall economy.

40 City and County of San Francisco. "Department Appropriations, Budget Year 2013-14 and 2014-15. Appropriation Ordinance 159-13." July 23, 2014.

The City's main revenue sources include taxes on property, business receipts and payroll, hotel occupancy, sales, and utility charges, as well as charges for services, licenses, intergovernmental transfers from the state and federal government, fines, rents, and interest.

The City and County budget includes $2.8 billion in discretionary local revenues that can be allocated by the Board of Supervisors among police, fire, public health and other General Fund programs each year. However, the flexibility over the budget has been somewhat limited by voter approval of minimum financial requirements for eight municipal agencies. These mandated expenditures total about $800 million in 2014-15, or about 30 percent of the total discretionary budget.

City continues to face longer-term budgetary pressures

Rapid revenue growth, spurred by the tech boom, has enabled San Francisco to eliminate its budget deficit and build a moderate-sized reserve. However, the City continues to face significant longer-term pressures related to infrastructure needs, costs for pensions, retiree health care, and health and human services. Moreover, its larger taxes – including those on the property, sales, property- transfers, and business payrolls and receipts – are highly sensitive to the economy, and thus are vulnerable to future economic slowdowns.

Impacts of SSB proposal

The proposed tax would result in $37 million in new revenues to the City's coffers that would be earmarked specifically for new or expanded nutritional and recreational programs. However, it would also have cost and revenue effects on the City's budget, which could hamper its efforts to provide basic services in the areas of police and fire protection, public health, and human services when the budget tightens again.

Administrative costs

The measure sets aside 2 percent of annual revenues, or about $740,000, for administration of the new SSB tax (including enforcement and collections), as well as for the activities of the Oversight Committee. We believe that this amount is well below the annual costs that the City will incur for these purposes. This is particularly true in light of the relatively high compensation levels in San Francisco City and County government (an average of $150,000 for wages and benefits). Given these relatively high costs, additional staffing and overhead costs will quickly consume the allotted revenues.

Regarding the Oversight Committee, the duties assigned to this entity are extensive. They include evaluation of programs funded by the tax, development of strategic and expenditure plans, and an evaluation of the proposed tax's impact on SSB consumption, prices, and health outcomes in San Francisco. These evaluations would involve significant amounts of data collection, surveying, and analysis by either City employees or contractors.

Regarding administration of the tax, there will be significant up-front costs associated with developing regulations, registering vendors, modifying IT systems, and communicating filing and payment requirements to the over 6,000 businesses affected by the tax.[41] There will also be significant ongoing costs for collection and enforcement.

As a general indication of administrative costs associated with complex business taxes, San Francisco's 2014-15 budget includes over $9 million for implementation of the City's new gross receipts tax (which is replacing the existing payroll tax over a multi-year period).[42] This is in addition to $6 million that was authorized to fund the administration of the existing payroll tax, which is being phased out.

The administrative costs for the SSB tax will presumably be less than those of the gross receipts tax, due to the smaller (though still substantial) number of businesses involved. At the same time, however, the proposed tax would have its own complexities that will likely result in substantial administrative challenges.

41 U.S. Department of Commerce, Census Bureau, " County Business Patterns, 2012. San Francisco County" Estimate includes employer and non-employer establishments. The total consists of approximately 1,100 food and beverage retail stores, 4,800 eating and drinking establishments, and over 100 establishments in other categories (such as general merchandizing).

42 City and County of San Francisco, "Department Appropriations, Budget Year 2013-14 and 2014-15. Appropriation Ordinance 159-13. July 23, 2014." For a news account of the high administrative costs associated with San Francisco's implementation of its gross receipts tax, see Joshua Sabatine, "San Francisco's Switch to Gross Receipts Tax Will Be Costly" in *San Francisco Examiner*, January 14, 2013.

For example, the high tax rate – double that of beverage taxes that have been contemplated by other jurisdictions – would create a major incentive for evasion. One of the key concerns raised by our business contacts was that their sales and profits would be severely undermined if even a small number of distributers or vendors were to avoid the tax. Such venders would be able to offer SSBs at a sharp discount, putting in great jeopardy the operations of the great majority of law-abiding businesses.

Beyond this, the proposed tax is complex. As noted earlier, its minimum calorie threshold, special treatment for milk products, and numerous exemptions, all have the potential to create considerable confusion among businesses regarding which products are taxable. This could result in significant non-compliance unless the City devotes considerable resources for auditing, communications, and development of clear regulations and guidelines for businesses to follow.

While a specific estimate of costs needed to administer the new tax and support the Oversight Committee is beyond the scope of this report, we believe that they could exceed the amount set aside for this purpose by a substantial margin.

Also, as noted in Part 3, the long-term trend in SSB soft drink consumption is clearly down. This implies that the revenues received to fund any newly established program will decline over time, while the costs associated with supporting new programs, administering the tax, and providing support to the Oversight Committee, will rise in line with employee compensation costs and general inflation. These divergent trends will put additional pressure on the city's budget in the future.

General tax reductions

While the SSB tax would raise revenues dedicated to new recreational and nutritional programs, it would, at the same time, depress other City revenues in two ways.

Reduction in sales taxes on purchases of carbonated soft drinks. First, the imposition of the SSB tax will cause consumers to shift purchases of SSBs to merchants located outside of San Francisco, and to substitute other food and beverages for SSBs. In both cases, there would be a reduction in sales taxes, since City sales taxes would no longer apply to sales redirected to other localities, and sales redirected to other food and beverages purchases would likely be tax exempt. Partly offsetting this loss is the gain in sales taxes that will occur on the more expensive sugar-sweetened carbonated beverages that continue to be sold in the City (as the sale tax would be imposed on full price of the beverage, including the portion attributable to the new excise tax). The net impact of these changes is a loss in sales tax revenues of about $800,000 annually, of which one-half would come from the City's General Fund and the other half from special transportation funds.

Effect of reduced economic activity on general tax receipts. Most of San Francisco's major tax sources are linked to the strength of economic activity in the City. As noted earlier, the imposition of the SSB tax would likely reduce business sales by $63 million annually. The direct and indirect impact of these losses would be a reduction of $46 million in personal income. We estimate that this income loss would translate into a reduction in City General Fund tax receipts of about $1.1 million annually.

Combined with the potentially significant amount of unbudgeted administrative costs, the loss of revenues would diminish funds that would otherwise be available to fund the City's basic services in the areas of street repair, police, fire, health or human services – potentially by the low millions of dollars.

Beyond these monetary effects, the proposed ordinance would make it harder to balance the budget during periods of economic slowdowns. It would do so by adding a new mandated funding requirement to a budget that already has eight such requirements. An effect of annual financial minimums for so many programs is that they significantly narrow the options that City leaders have for dealing with budget shortfalls when they arise.

Part 12 – Summary of Major Effects

In summary, the proposed measure would impose a new SSB tax that would raise $37 million, which would be used by the City and County of San Francisco to support a variety of recreational, nutritional, and related programs aimed at countering obesity and improving health outcomes in the City. While previous academic studies suggest that the impacts of beverage taxes on health outcomes are minimal, the economic impacts are clear and direct.

- The proposed tax would be regressive, having a disproportionate impact on households at or below the citywide median income level of $73,000, and particularly those with incomes of less than $20,000.
- It would impose new administrative expenses and result in a major loss of revenues and profits to businesses operating in the City.
- The loss in business sales will have significant impacts on the broader San Francisco economy, as businesses cut back purchases from suppliers and curtail employee hours to maintain profitability. These cutbacks will reduce employment in the City by 840 jobs, and will result in personal income losses of $46 million per year.
- Combined with another 150-200 job losses related to the reduction in consumer discretionary incomes caused by the taxes, total employment losses in San Francisco would reach approximately 1,000 jobs.
- New government spending may replace some or all of the 150-200 private sector losses related to the tax's burden on households. However, there would be no offset to the 840 private sector job losses related to reduced sales and profitability of San Francisco businesses.
- Though the City and County government would receive new tax proceeds to finance recreational and nutritional programs, it would also face significant cost pressures and revenue reductions in its general fund budget (which supports police, fire protection, public health and other programs). The main components are:
    - Potentially large unbudgeted costs related to the establishment, collections, and enforcement of the new tax, as well as covering the costs of the newly created Oversight Committee.
    - A significant loss in other tax revenues, which would occur because of the SSB tax's negative impact on economic activity in the City.
- The minimum spending provisions of this measure would also make it harder to balance the City and County budget during economic slowdowns.

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