

## **Economic Impact of Healthy Davis Together on Davis Taxable Sales**

**PURPOSE:** To estimate the impact Healthy Davis Together (HDT) on the Davis business activity as measured by taxable sale.

**INTRODUCTION:** In addition to implementing comprehensive COVID-19 prevention measures in the City of Davis (starting in September 2020), HDT offered a Business Partner Program from January through June 2020 that offered the following:

- Grant reimbursement for eligible COVID-19 protective measures, such as installing hand sanitizing stations, plastic shields, or air filtration systems.
- Gift card incentives for employees and customers.
- Free weekly COVID-19 testing for Davis business employees and their families
- Free personal protective equipment (PPE)
- Public health and environmental design expertise for improving the safety of business spaces
- Marketing support with signage and publicizing names of partner business

### **METHODS**

**Data source:** January 2015 to March 2021 quarterly taxable sales data by city and category of taxable sales obtained from the California Department of Tax and Fee Administration (<https://www.cdtfa.ca.gov/dataportal/dataset.htm?url=TaxSalesAllCities>). We examined total taxable sales and sector-specific taxable sales from food services and drinking places (sectors most likely to have been impacted by the pandemic).

**Referent cities:** Davis was compared with San Luis Obispo and Folsom because these cities have similar demographic characteristics as Davis (see Supplemental Table 1). In addition, both Davis and San Luis Obispo are small college towns.

**Analysis:** Three time periods were considered:

- Before COVID-19: January 2015 to March 2020
- During COVID-19 and before HDT: April 2020 to September 2020
- During COVID-19 and HDT: October 2020 to March 2021

Using these three time periods and each referent city, three economic paths were estimated:

1. what would have happened if there was **no COVID-19**
2. what would have happened if there was **COVID-19 and no HDT**
3. what actually happened - **COVID-19 and HDT**

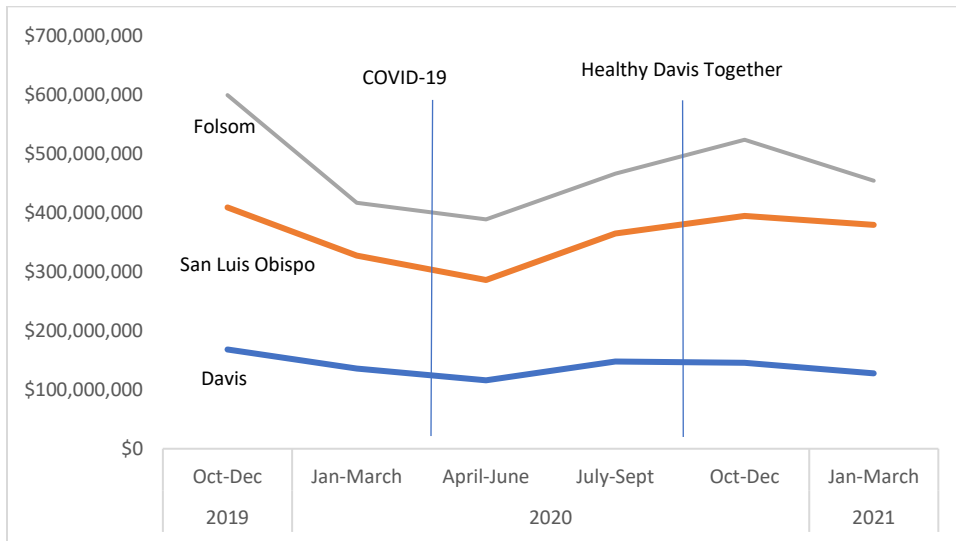
For our analysis, we assumed that without intervention, Davis, San Luis Obispo, and Folsom would have a similar pandemic-related change in taxable sales. The results provide estimates of the impact of COVID-19 as well as the impact of HDT on total taxable sales. These results were produced using San Luis Obispo and also Folsom as comparison cities for Davis. Additional statistical details are available in the Appendix.

## RESULTS

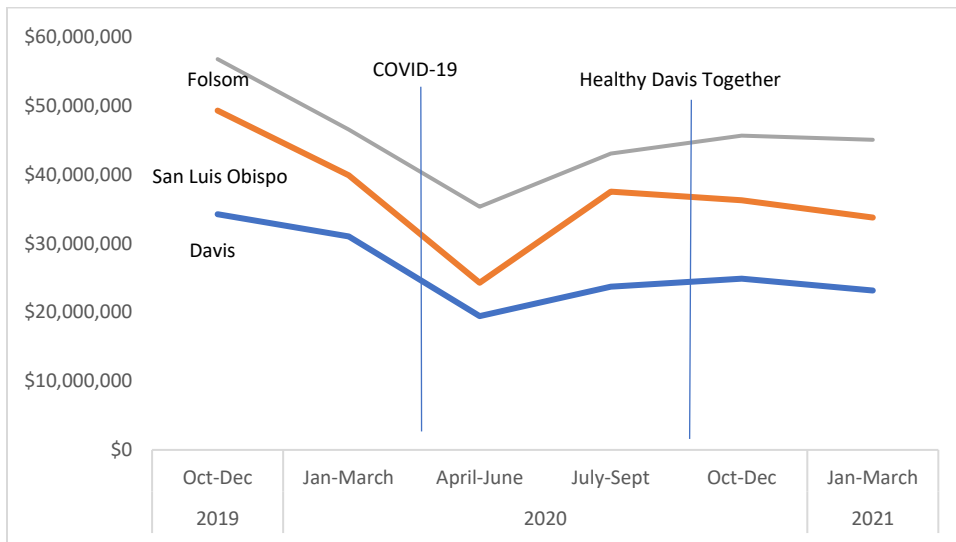
### Raw data

- The total taxable sales for all three cities decreased during the beginning of the pandemic (April – June 2020) and then slowly increased, but never quite reached pre-pandemic levels (Figure 1).
- Davis had less taxable sales, compared with San Luis Obispo and Folsom.

**Figure 1. Total taxable sales for Davis, San Luis Obispo, and Folsom**



**Figure 2. Taxable sales from food services and drinking places for Davis, San Luis Obispo, and Folsom**

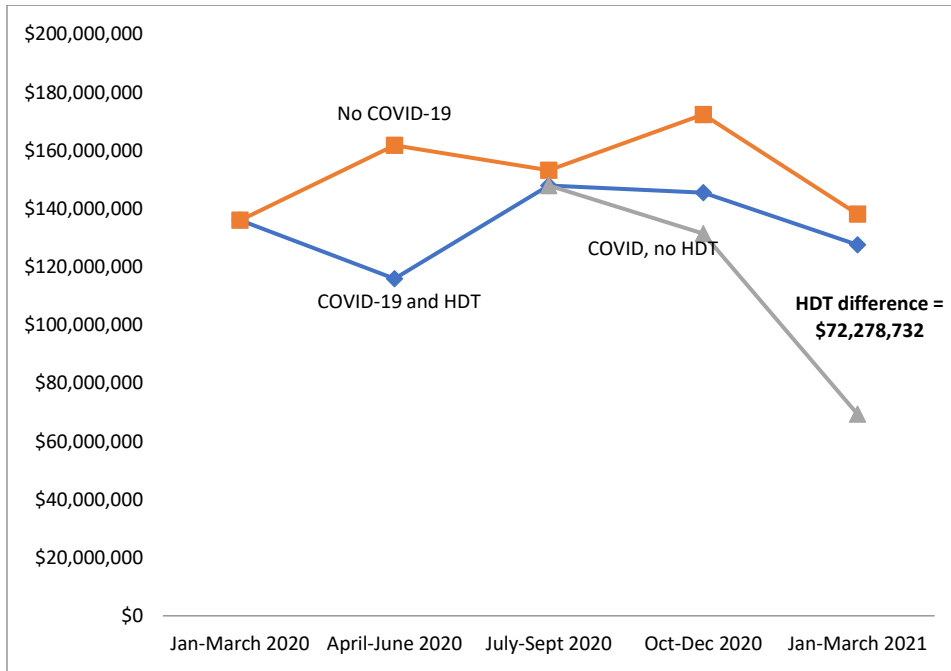


### Results from statistical models

- Taxable sales would have been greater without COVID-19 (Figure 3).

- Without HDT, total taxable sales would have been \$72,278,732 less in Davis, using San Luis Obispo as the referent group (Figure 3).

**Figure 3.** Estimated total taxable sales in Davis (San Luis Obispo as the referent)



- Without HDT, total taxable sales would have been \$69,026,771 less in Davis, using Folsom as the referent group (Table 1).

**Table 1.** HDT difference in taxable sales by category and referent group

Taxable sales category	Referent	HDT difference
<b>Total</b>	San Luis Obispo	\$72,278,732
	Folsom	\$69,026,771
<b>Food services and drinking places</b>	San Luis Obispo	\$32,427,458
	Folsom	\$6,337,041

## DISCUSSION

We estimate that HDT may have prevented a loss of total taxable sales in Davis of about \$70 million. This may have been a result of businesses being able to stay open due to financial help from the Business Partner Program in installing COVID-19 protective measures (i.e. hand sanitizing stations, plastic shields, or air filtration systems) or free PPE. It may also have been due to the fact that people felt safe shopping at Davis businesses because of these protective measures. Last, the Davis population may have been healthier as a result of comprehensive HDT COVID-19 prevention measures and thus been able to continue using Davis businesses.

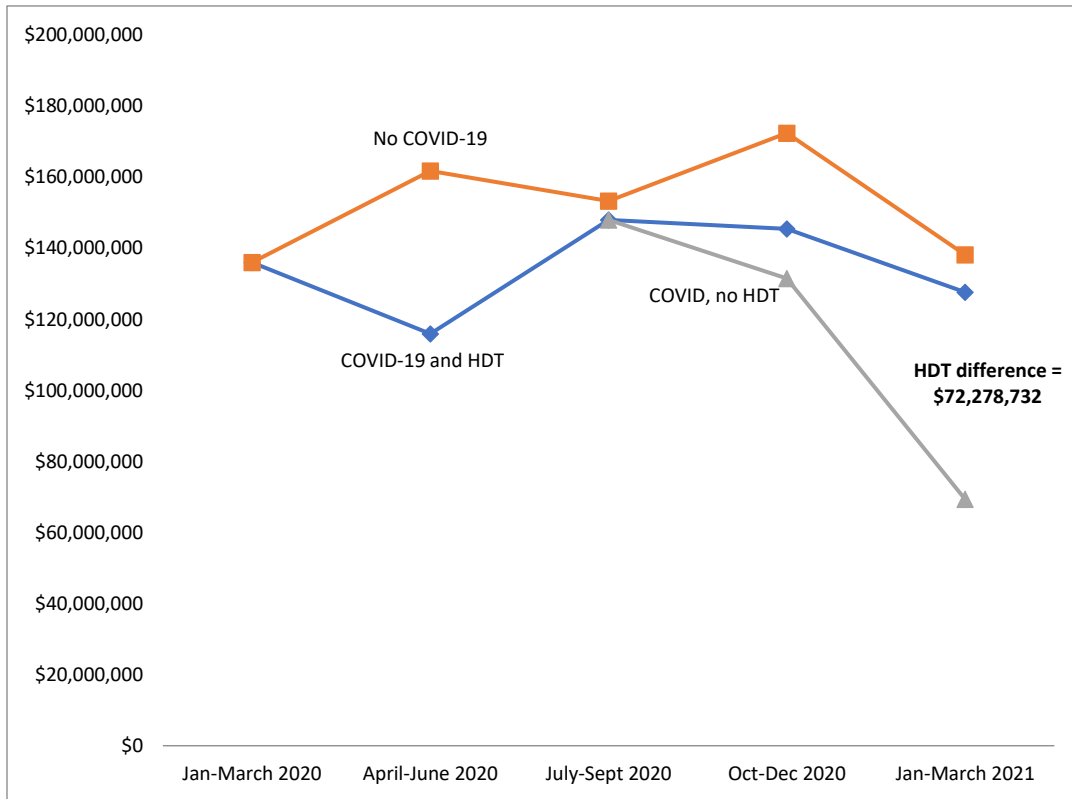
**SUPPLEMENTAL Tables and Figures**

**Table 1.** Population characteristics of Davis, San Luis Obispo, and Folsom

	<b>Davis</b>	<b>San Luis Obispo</b>	<b>Folsom</b>
Population	68,543	47,302	78,159
Median age (years)	25.5	26.7	40.7
% 65 years or older	11.3%	13.2%	12.6%
Race/ethnicity			
% Hispanic	13.6%	18.2%	12.2%
% Non-Hispanic White	55.5%	70.6%	61.8%
% Non-Hispanic Black	2.1%	1.9%	3.3%
% Non-Hispanic American Indian/Alaskan Native	0.4%	0.4%	0.3%
% Non-Hispanic Asian	22.7%	5.3%	16.9%
% Non-Hispanic Native Hawaiian/Pacific Islander	0.3%	0.0%	0.5%
% Non-Hispanic other	0.4%	0.2%	0.2%
Total housing units	25,844	20,767	28,775
% College graduate or higher (25 years and older)	73.8%	50.0%	51.2%
Median household income	\$69,379	\$56,071	\$114,405

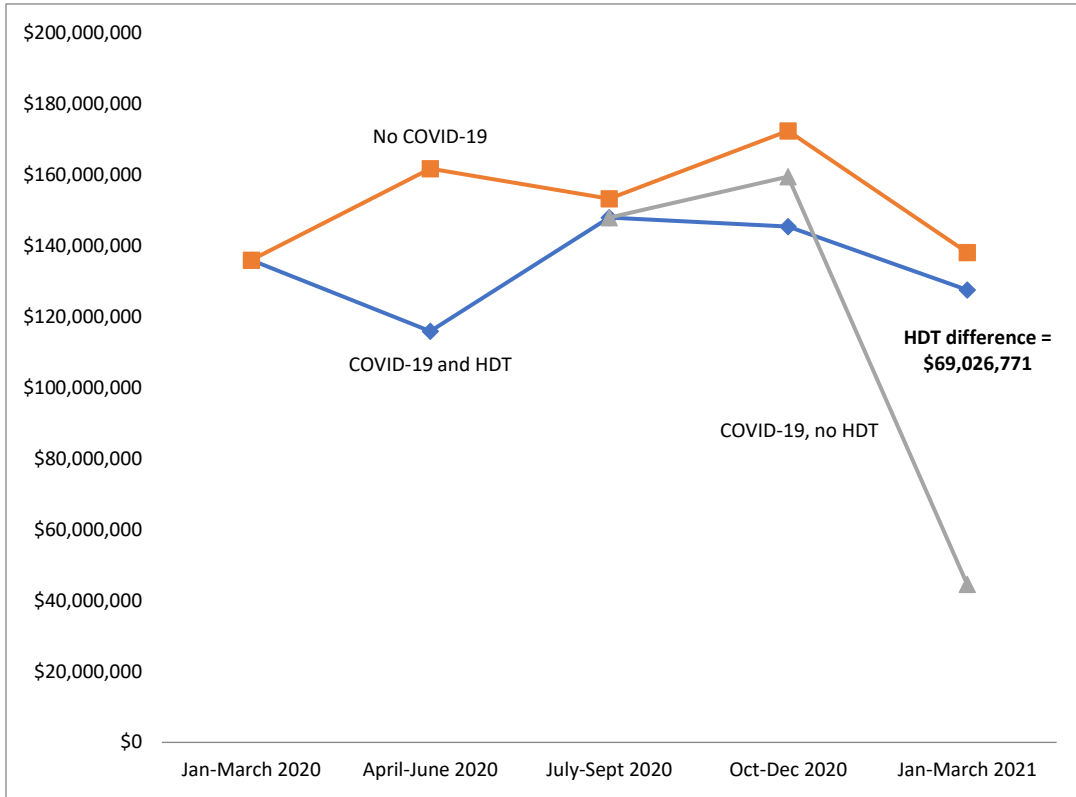
Sources: 2015-2019 American Community Survey (Table IDs: DP05, S1501, S1903)

**Figure 1. Estimated total taxable sales in Davis (San Luis Obispo as the referent)**



	<b>Oct- Dec 2020</b>	<b>Jan – March 2021</b>	<b>Total HDT difference</b>
<b>COVID-19 and HDT</b>	\$145,528,381	\$127,636,953	
<b>COVID-19, no HDT</b>	\$131,526,330	\$69,360,272	
<b>HDT difference*</b>	\$14,002,051	\$58,276,681	\$72,278,732

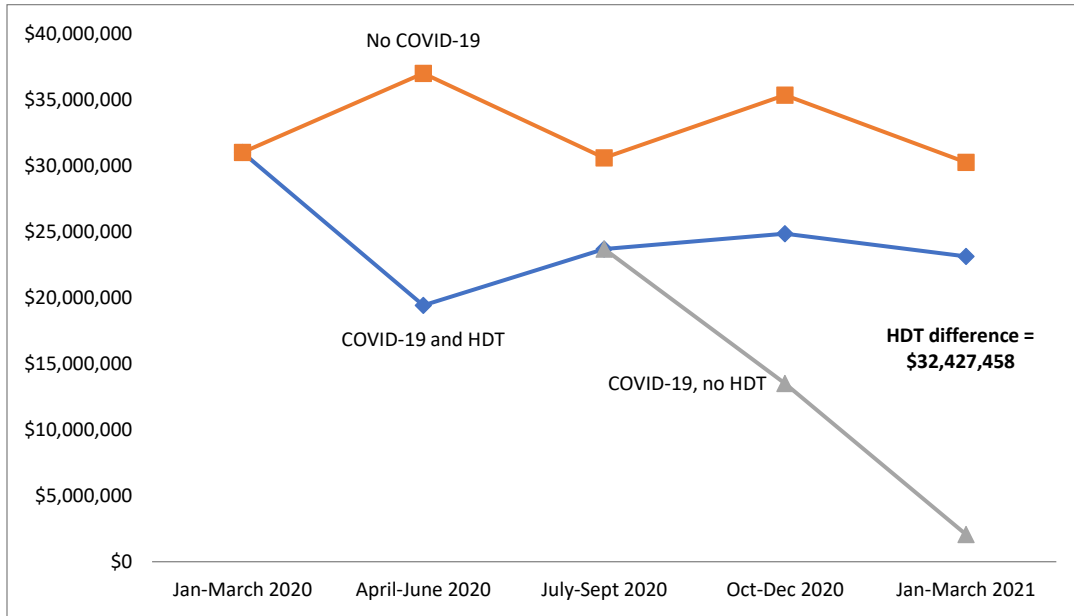
**Figure 2. Estimated total taxable sales in Davis (Folsom as the referent)**



	Oct- Dec 2020	Jan – March 2021	Total HDT difference
<b>COVID-19 and HDT</b>	\$145,528,381	\$127,636,953	
<b>COVID-19, no HDT</b>	\$159,566,366	\$44,572,197	
<b>HDT difference*</b>	-\$14,037,985	\$83,064,756	\$69,026,771

\* COVID-19 and HDT estimate minus COVID-19 no HDT estimate

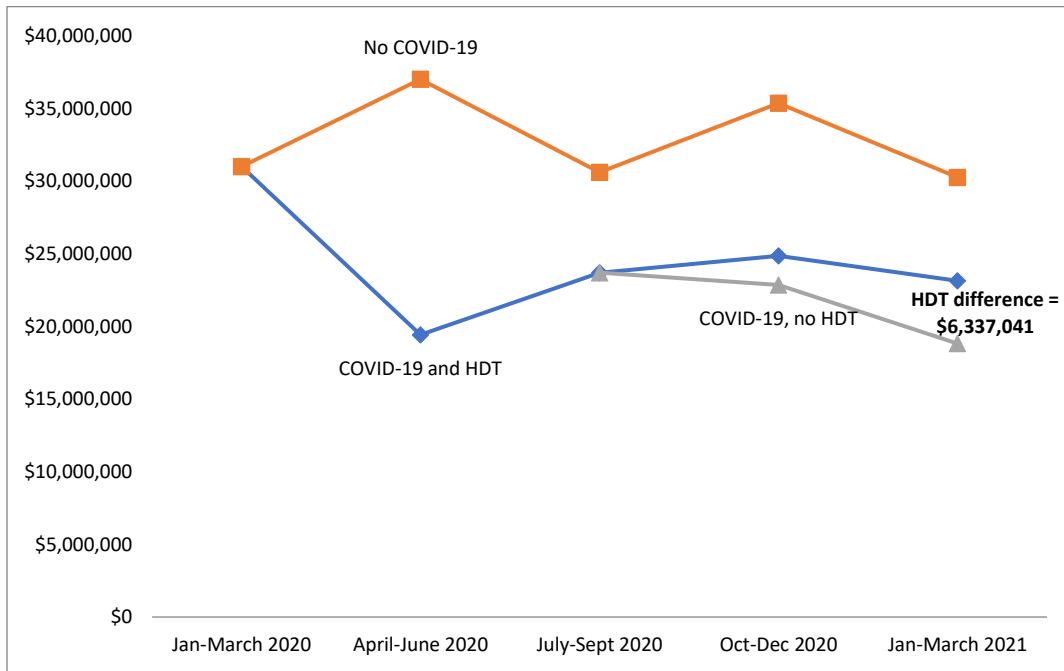
**Figure 3.** Estimated taxable sales from food services and drinking places in Davis (*San Luis Obispo* as the referent)



	Oct- Dec 2020	Jan – March 2021	Total HDT difference
<b>COVID-19 and HDT</b>	\$24,873,372	\$23,147,829	
<b>COVID-19, no HDT</b>	\$13,522,833	\$2,070,910	
<b>HDT difference*</b>	\$11,350,539	\$21,076,919	\$32,427,458

\* COVID-19 and HDT estimate minus COVID-19 no HDT estimate

**Figure 4.** Estimated taxable sales from food services and drinking places in Davis (Folsom as the referent)



	Oct- Dec 2020	Jan – March 2021	Total HDT difference
<b>COVID-19 and HDT</b>	\$24,873,372	\$23,147,829	
<b>COVID-19, no HDT</b>	\$22,860,437	\$18,823,723	
<b>HDT difference*</b>	\$2,012,935	\$4,324,106	\$6,337,041

\* COVID-19 and HDT estimate minus COVID-19 no HDT estimate



### Statistical model

AR(4): Autoregressive model with 4 lags for quarterly data

$$x_t = k_1x_{t-1} + k_2x_{t-2} + k_3x_{t-3} + k_4x_{t-4} + u_t$$

Where  $E_t u_{t+1} = 0$

1-step ahead forecast

$$E_t x_{t+1} = k_1x_t + k_2x_{t-1} + k_3x_{t-2} + k_4x_{t-3}$$

iteration forward for p-step ahead forecast:  $E_t x_{t+p}$