

# Getting Real about Reform II: *Estimating Revenue Gains from Changes to California's System of Assessing Commercial Real Estate*

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# Introduction

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This report is an update of *Getting Real About Reform: Estimating Revenue Gains for Changes to California's System of Assessing Commercial Real Estate*, a report released in May 2015 that sought to provide empirical analysis to help generate a new level of civic—and civil—conversation about structural changes to the state's property tax system and revenue implications (Ito, Scoggins, and Pastor 2015). It was intended to support discussions about reforms to a set of provisions ushered in under Proposition 13 specifically related to locally-assessed commercial and industrial properties.

Prior to 1978, real property (i.e., land and improvements) was assessed at market value at locally set rates. When voters approved Proposition 13 over 40 years ago in 1978, property assessment changed from a system based on market value to one based on acquisition value, with a maximum tax rate of 1 percent, and annual increases in a property's assessed value capped at the lesser of 2 percent or the rate of inflation. When the real estate market grows faster than inflation, assessed value stays below market value, and the gap widens over time.

In November 2020, the California electorate will have an opportunity to vote on the California Schools and Local Communities Funding Act, a constitutional amendment that would set the taxable value of commercial and industrial properties to market value while maintaining the 1-percent tax rate.<sup>1</sup> The initiative provides exemptions for owners of small business properties and for business tangible personal property; a phase-in of reassessments; recovery of direct administrative costs to counties for implementation; and other provisions intended to ensure oversight, transparency, and equitable allocation of new revenue.

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1 A version of the initiative was certified for the November 2020 ballot. Proponents have revised the initiative and are expected to withdraw the original initiative if the revised version qualifies. For the most recent information on the initiatives and their status, see the California Secretary of State website at <https://www.sos.ca.gov/elections/ballot-measures/initiative-and-referendum-status/>.

In this report, we explore one question: How much additional revenue would be generated through the 1-percent general tax levy if commercial and industrial property were assessed at market value? We estimate that under such a system, an additional **11.4 billion dollars, or between 10.3 and 12.6 billion dollars**, in property tax revenues **would be available in 2021-22**.<sup>2</sup> It is important to note that this estimate is not a fiscal analysis of the proposed initiative; in other words, it does not take into account the exemptions or phase-in period. Nor does it include the additional revenue that would be generated through local voter-approved, ad-valorem taxes, such as school and infrastructure bonds.

We first explored this question in the 2015 report *Getting Real About Reform* then released updated estimates in 2018. In the 2015 report, we estimated an additional 8.2 to 10.2 billion dollars in statewide property tax revenues would be generated in the year 2019-20. It was a conservative estimate given that the analysis was derived primarily from assessor roll data for the years 2012-13 and 2013-14, a period in which commercial real estate market prices were just starting to recover from the Great Recession. In 2018, we revised our estimates upward to between 10.8 and 12.0 billion dollars in additional revenue in the year 2019-20, with the increase primarily explained by a stronger market recovery in commercial and industrial real estate statewide than we had initially projected (Ito et al. 2018).

The range for the current estimate is about the same as the 2018 revised estimate. Although one might expect it to be higher given that it is two years later in time, the primary reason it is not is that in generating our current estimates,

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2 For the current research update, we use assessor roll data to generate baseline estimates for the 2017-18 tax year, and project the estimates forward to 2021-22. Our updated estimates rely on more recent data with sales during the 2017 calendar year informing our analysis of disparities between market and assessed values for all commercial and industrial properties (excluding agriculture and all residential uses including multi-family) statewide and for every county, and assume a more moderate outlook for growth in assessed and market values over the projected period than our previous estimates.

we updated our expectations of future growth in assessed and market values of commercial/industrial properties. While there has been strong growth in the commercial/industrial real estate market over the past several years, national and statewide indices suggest we are in the midst of a slowdown. For example, results from the Allen Matkins/UCLA Anderson Forecast California Commercial Real Estate Survey suggest a weak market over the next couple of years until around 2022 when a rebound is expected (Allen Matkins/UCLA Anderson Forecast 2019). Thus, while our previous mid-growth scenario assumed 8 percent annual growth in market value for commercial and industrial properties between 2015-16 and 2019-20, in this research update we assume a mid-growth scenario of only 2 percent annual growth between 2017-18 and 2021-22.

This report is organized as follows: We begin with three key starting assumptions and definitions underlying our research then provide a summary of the methods and basic approach underlying our analysis. We then present tables, maps, and figures with estimates of total revenue gains, per capita gains by county, and sources of the revenue gain. For those interested, we include a technical appendix that includes our data sources, methods in estimating revenue gains, and information on the methodological differences from our previous analyses.



Photo by Schplook, Flickr.



# Assumptions

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There are three basic assumptions underlying our analysis. The first involves clarifying what changes in current law we are assuming in order to generate the estimates. The second involves defining what we refer to as “commercial” properties throughout the report; as we will explain, we focus on “true” commercial uses and exclude all residential and agricultural uses. The third relates to assumptions about the future outlook for the real estate market that underlie projections forward to the year 2021-22.

## Estimates are based on changes to current law.

Currently, under Proposition 13, properties are reassessed at market value when the property is sold; thereafter, annual increases in assessed value are capped at the rate of inflation up to 2 percent until the property is sold again. New construction also triggers reassessment at market value, but any existing structures and the underlying land are not reassessed until the property is sold. Under Proposition 8, when a property’s market value falls below its assessed value, it qualifies for a temporary reduction in assessed value. Its annual assessed value may increase more than 2 percent thereafter until it reaches its allowable Proposition 13-determined base year value.<sup>3</sup> According to the Legislative Analyst’s Office (LAO), reduced assessments under Proposition 8 reached a peak in 2012-13. It estimates that commercial properties, apartments, and agricultural properties received, on average, a \$7,500 reduction in property taxes (California Legislative Analyst’s Office 2014:6, 9).

The estimates in this report are of new revenue that would be collected from a policy change that would assess commercial and industrial real property (i.e., land, buildings, and other permanent structures) at market value. Simply stated, the gains we estimate

are the difference between revenues that would be collected if all commercial and industrial properties were assessed at market value (regardless of the last date of sales) and revenues that would be anticipated under current law. We attribute only gains in revenue to the estimates since downward assessments to meet market value are already allowable under current law. Furthermore, the estimated revenue gains include only the 1-percent general tax levy and do not include voter-approved ad-valorem taxes, parcel taxes, or personal property taxes.

## All residential and agricultural uses are excluded from commercial.

In this report, we use the term “commercial properties” to refer to both commercial and industrial properties. We analyze only those properties that are dedicated to commercial and industrial land uses, such as offices, retail, manufacturing facilities, and hotels. We also include vacant commercial and industrial land. We exclude agricultural land uses, such as farms, pastures, and orchards, as well as all residential uses including multi-family apartments, vacation homes, and vacant residential land. We also exclude properties that are state-assessed such as rail transportation properties and utilities. Such properties are already assessed at an estimate of market value by the state, rather than by county assessors.

Our definition of commercial includes approximately 1.27 million parcels. In cross-checking our data, we find the total assessed value of these properties to be comparable to the unaudited local roll data reported by the State Board of Equalization in its annual reports on budgets, workloads, and assessment appeals activities. More information is provided on the data from which we draw our estimates in the technical appendix.

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<sup>3</sup> The allowable Proposition 13-determined base year value is the last sale price plus an annual inflation rate or a maximum of 2 percent increase in each year since its last sale.

**Estimates are based on scenarios of slow growth in commercial/industrial real estate valuation.**

In this report, we generate baseline estimates for 2017-18 tax year and project forward to 2021-22, which is the year after the vote on the November 2020 ballot initiative. We assume slow growth in aggregate market and assessed values over the projection period given signs that we are currently at or near the peak of the market expansion that followed the crash triggered by the Great Recession of 2008. The middle growth scenario assumes 2 percent growth in market value each year and 0.7 percent growth in assessed value each year. For more information on how we derived these rates, please see the technical appendix.

In our previous two analyses, we generated estimates of the gain in property tax revenues for the 2019-20 tax year by projecting forward from baseline estimates made in 2012-13 and 2015-16, respectively. Given that the baseline estimates at those times were near the beginning of the recovery, our assumptions around growth in assessed and market values in projecting forward to 2019-20 were much higher, with a middle scenario assumption of 8 percent growth in market value each year. Despite being higher, those earlier projections turned out to fall on the conservative side as compared to our baseline statewide estimate for the 2017-18 tax year generated in the current analysis. That the previous estimates were relatively close—and, in fact, understated—gives us further confidence in the methods used to estimate the current disparity and thus the potential revenue gains reported in the sections on results (for more on this, see the technical appendix).

**Table 1. Scenarios for Average Annual Growth Rates, Assessed and Market Value**

GROWTH SCENARIO	ASSESSED VALUE	MARKET VALUE
LOW	0.2%	0.5%
MID	0.7%	2.0%
HIGH	1.2%	3.5%

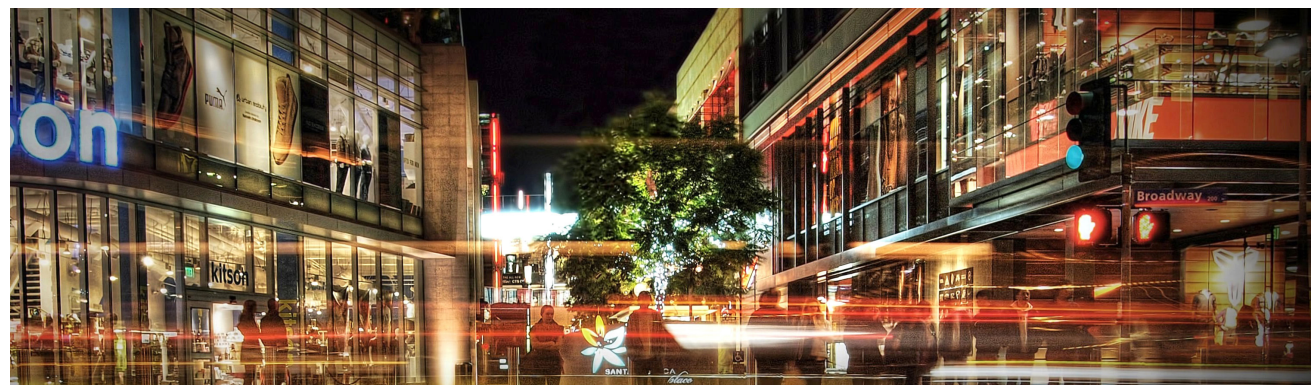


Photo by OM, Krazy Diamnd on Flickr.

# Methods

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The general method for estimating revenue gains is drawn from previous approaches conducted by Blue Sky Consulting Group and best documented by Arthur O'Sullivan, Terri Sexton, and Steven Sheffrin (O'Sullivan, Sexton, and Sheffrin 1993, 1995; Sexton and Sheffrin 2003; Sheffrin and Sexton 1998). To summarize, the approach requires determining disparity ratios, or the ratio of market value to assessed value, where market value is defined by a property's sales price and where sold properties are assumed to reflect non-sold properties.

This approach also requires classifying properties within a county by base year, which is the last year when the property was reassessed at market value. Properties with older base years have larger disparity ratios than properties with more recent base years. Therefore, we classify properties within a county by base year, calculate weighted-mean disparity ratios based on sales for each base year (weighted by assessed value), then apply the weighted-mean disparity ratio to the assessed value of all non-sold properties of the same base year to estimate their combined market value, and sum market values for both sold and non-sold properties to determine the total market valuation in 2017-18.

We then carry both total market and assessed values forward to 2021-22 using the assumptions described in Table 1.<sup>4</sup> Under the middle growth scenario, we apply a 2 percent average annual growth rate to market values and 0.7 percent average annual growth rate to assessed values. This is based on a variety of sources, including the trend suggested by our previous and current baseline estimates of aggregate assessed and market values (for 2012-13, 2015-16, and 2017-18), an assessment of the state's historical real estate market cycles, and information from commercial real estate experts. To provide lower- and upper-bound estimates, we applied 0.5

percent and 3.5 percent average annual growth rates to market values which correspond to 0.2 and 1.2 percent average annual growth rates for assessed values, respectively. Finally, we calculate new revenue for each county as the difference between revenue that would be collected from fair market valuation of all commercial properties and that which would be collected under current law. The statewide gain is the sum of gains across all counties.

For this report, we build upon our previous analyses by incorporating three new years of assessor data from CoreLogic for the 2016-17, 2017-18, and 2018-19 rolls. The disparity ratios we estimate are based on sales identified between the 2017-18 and 2018-19 rolls. In total, we have 15 consecutive years of assessor data that cover the roll years of 2004-05 through 2018-19. Despite challenges posed by the most recent three years of data for which we had to apply adjustments (see the technical appendix), this robust dataset allows us to generate estimates for all counties (including smaller counties with few sales of commercial properties) and to better understand how revenue gains perform under different market conditions. However, despite the efforts we make to improve estimates for small counties, our estimates are bound to be more accurate for larger counties given that disparity ratios for those counties are based on a larger number of sales.

For a longer discussion of the data sources and methodological differences in our analyses, please see the technical appendix.

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<sup>4</sup> For our subsequent county-level projections, we apply the same average annual growth rates for assessed and market values in the commercial real estate market to all counties. While we recognize that growth rates will not be even throughout the state's 58 counties, it is not feasible to predict how growth in the real estate market will vary in different counties and so this seems like a reasonable approach.

# Results: Estimated Revenue Gains

We find that under a system that assesses commercial and industrial property at market value, an estimated **11.4 billion dollars, or between 10.3 and 12.6 billion dollars**, in additional property tax revenues statewide would be available in 2021-22. While every county would gain additional revenue, the counties that would see the greatest gains include: Los Angeles (3.4 billion dollars), Santa Clara (1.2 billion dollars), Orange (1.0 billion dollars), San Mateo (770 million dollars), San Francisco (733 million dollars), Alameda (652 million dollars), and San Diego (631 million dollars). See Table 2 for the

estimated range and mid-point of total revenue gain for each county. To be clear, all estimated revenue gains by county reported in this brief reflect those generated by the 1-percent rate for municipalities, school districts, and special districts, and do not represent the amount that would be allocated to the county governments alone. Nor do these estimates take into account any of the specific conditions of the proposed legislation.

**Table 2. Estimated Revenue Gains by County, 2021-22**

Estimated Revenue Gains by County, 2021-22 (millions)					
County	Estimate Range	Mid Estimate	County	Estimate Range	Mid Estimate
ALAMEDA	591.6 - 715.6	652.1	PLACER	77.9 - 97.4	87.4
ALPINE	.1 - .1	0.1	PLUMAS	2.0 - 2.7	2.3
AMADOR	6.0 - 7.3	6.6	RIVERSIDE	283.3 - 362.4	321.8
BUTTE	11.4 - 16.1	13.7	SACRAMENTO	115.0 - 157.0	135.4
CALAVERAS	1.2 - 1.7	1.4	SAN BENITO	3.4 - 4.6	4.0
COLUSA	2.9 - 3.5	3.2	SAN BERNARDINO	386.3 - 486.5	435.1
CONTRA COSTA	348.8 - 421.8	384.4	SAN DIEGO	552.0 - 713.7	630.7
DEL NORTE	.8 - 1.0	0.9	SAN FRANCISCO	663.8 - 806.1	733.2
EL DORADO	4.7 - 8.0	6.3	SAN JOAQUIN	65.9 - 87.5	76.4
FRESNO	73.7 - 95.6	84.4	SAN LUIS OBISPO	44.0 - 56.0	49.8
GLENN	.9 - 1.3	1.1	SAN MATEO	709.4 - 833.7	770.0
HUMBOLDT	27.7 - 33.3	30.4	SANTA BARBARA	97.8 - 122.6	109.9
IMPERIAL	10.3 - 13.5	11.9	SANTA CLARA	1,106.7 - 1,332.3	1,216.7
INYO	10.4 - 13.0	11.7	SANTA CRUZ	52.1 - 63.1	57.5
KERN	75.3 - 97.9	86.3	SHASTA	9.5 - 13.8	11.6
KINGS	7.6 - 10.4	9.0	SIERRA	.1 - .2	0.2
LAKE	1.6 - 2.4	2.0	SISKIYOU	4.0 - 5.3	4.6
LASSEN	1.1 - 1.6	1.3	SOLANO	63.8 - 82.1	72.7
LOS ANGELES	3,072.9 - 3,750.1	3,403.0	SONOMA	152.0 - 182.5	166.9
MADERA	6.9 - 9.7	8.3	STANISLAUS	34.1 - 46.2	40.0
MARIN	86.2 - 104.0	94.9	SUTTER	11.9 - 14.8	13.3
MARIPOSA	1.8 - 2.3	2.0	TEHAMA	2.1 - 3.1	2.6
MENDOCINO	20.3 - 25.7	23.0	TRINITY	.7 - .9	0.8
MERCED	19.8 - 25.7	22.7	TULARE	60.5 - 74.7	67.4
MODOC	.2 - .3	0.3	TUOLUMNE	1.2 - 2.0	1.6
MONO	7.9 - 10.0	8.9	VENTURA	135.7 - 171.6	153.2
MONTEREY	183.8 - 215.8	199.4	YOLO	26.8 - 35.0	30.8
NAPA	111.1 - 132.5	121.5	YUBA	3.5 - 4.5	4.0
NEVADA	15.3 - 19.2	17.2	<b>Total</b>	<b>10,257.8 - 12,604.2</b>	<b>11,401.3</b>
ORANGE	890.1 - 1,102.5	993.6			



To understand the gains in relation to the size of the population, we calculated the per capita gain based on the 2017 5-year American Community Survey summary file. The per capita revenue gain by county ranges from 1,008 dollars for each person living in San Mateo to 29 dollars in Tuolumne County.

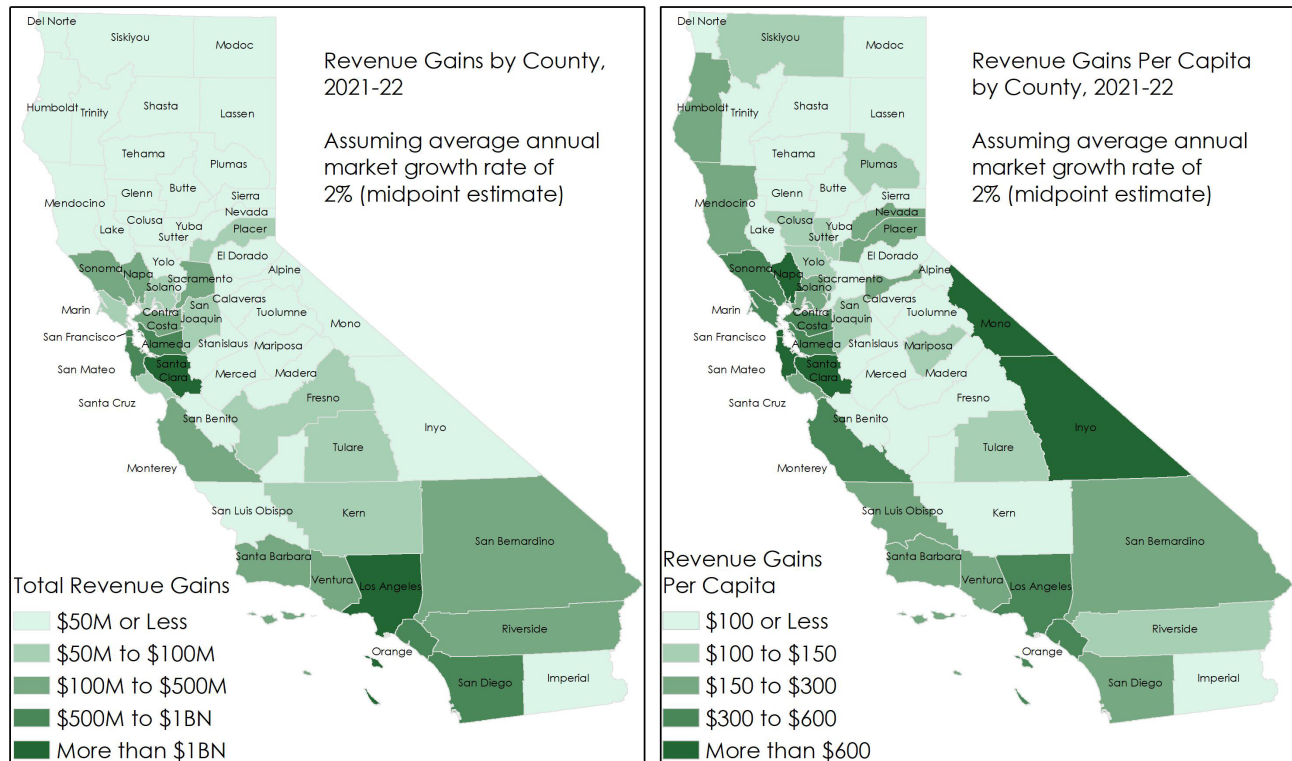
While the Bay Area counties of San Mateo, Napa (862 dollars), San Francisco (848 dollars), and Santa Clara (637 dollars) rank near the top, Inyo (643 dollars), Los Angeles (337 dollars) and Orange (315 dollars) also see significant gains per capita. The

estimated per capita gains for the Inland Valley are 205 dollars for San Bernardino and 137 dollars for Riverside. In the Central Valley, Kern would gain an additional 98 dollars per person; Merced, 85 dollars per person; and Fresno, 87 dollars per person. See Table 3 for estimated revenue gains per capita by county.

**Table 3. Estimated Revenue Gains Per Capita by County, 2021-22**

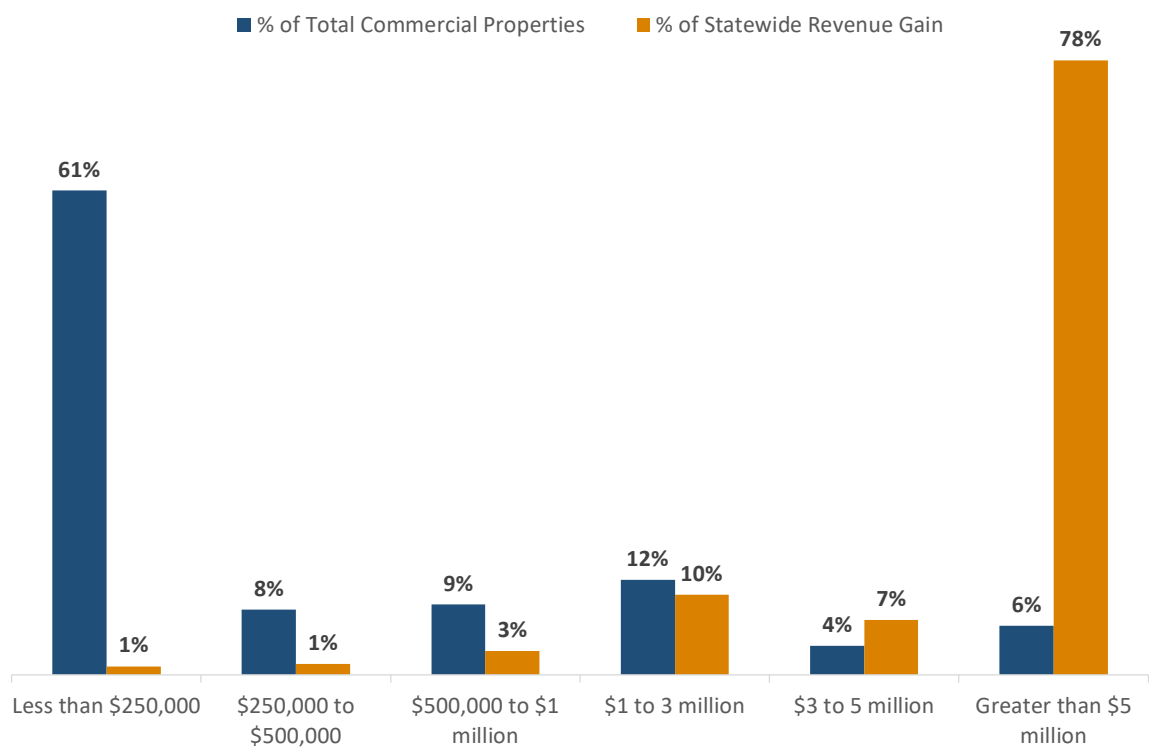
Estimated Revenue Gains Per Capita by County, 2021-22					
County	Estimate Range	Mid Estimate	County	Estimate Range	Mid Estimate
ALAMEDA	363.0 - 439.1	400.1	PLACER	207.6 - 259.7	233.0
ALPINE	67.8 - 98.5	82.7	PLUMAS	104.2 - 145.5	124.3
AMADOR	160.0 - 196.1	177.6	RIVERSIDE	120.3 - 153.9	136.6
BUTTE	50.8 - 71.6	60.9	SACRAMENTO	76.9 - 105.0	90.6
CALAVERAS	26.0 - 38.3	32.0	SAN BENITO	58.7 - 77.7	67.9
COLUSA	133.1 - 161.4	146.9	SAN BERNARDINO	182.1 - 229.3	205.1
CONTRA COSTA	310.4 - 375.4	342.1	SAN DIEGO	168.1 - 217.3	192.1
DEL NORTE	28.0 - 35.9	31.8	SAN FRANCISCO	768.1 - 932.7	848.4
EL DORADO	25.2 - 43.1	33.9	SAN JOAQUIN	91.0 - 120.8	105.5
FRESNO	75.8 - 98.4	86.8	SAN LUIS OBISPO	157.2 - 199.8	178.0
GLENN	33.8 - 46.7	40.1	SAN MATEO	929.2 - 1092.0	1,008.6
HUMBOLDT	204.7 - 245.6	224.6	SANTA BARBARA	220.7 - 276.8	248.0
IMPERIAL	57.3 - 75.0	66.0	SANTA CLARA	579.1 - 697.1	636.6
INYO	573.1 - 717.0	643.2	SANTA CRUZ	190.6 - 231.0	210.3
KERN	85.7 - 111.4	98.2	SHASTA	52.9 - 77.1	64.7
KINGS	50.8 - 69.4	59.9	SIERRA	47.0 - 64.2	55.4
LAKE	25.1 - 37.3	31.0	SISKIYOU	91.5 - 122.2	106.5
LASSEN	34.7 - 50.1	42.2	SOLANO	146.7 - 188.7	167.1
LOS ANGELES	304.1 - 371.1	336.7	SONOMA	303.5 - 364.3	333.2
MADERA	44.5 - 62.8	53.4	STANISLAUS	63.7 - 86.3	74.7
MARIN	330.6 - 398.8	363.9	SUTTER	124.7 - 155.3	139.6
MARIPOSA	99.6 - 129.8	114.3	TEHAMA	33.9 - 48.5	41.0
MENDOCINO	232.0 - 294.3	262.3	TRINITY	54.7 - 72.0	63.1
MERCED	73.9 - 96.1	84.7	TULARE	131.9 - 162.7	147.0
MODOC	27.5 - 38.3	32.8	TUOLUMNE	21.7 - 36.9	29.1
MONO	559.0 - 707.8	631.5	VENTURA	160.0 - 202.4	180.7
MONTEREY	424.3 - 498.1	460.3	YOLO	126.0 - 164.7	144.9
NAPA	787.8 - 939.7	861.9	YUBA	46.5 - 60.3	53.2
NEVADA	154.9 - 193.8	173.9			
ORANGE	282.0 - 349.3	314.8			

**Figure 1. Map of Estimated Revenue Gains and Revenue Gains Per Capita by County, 2021-22**



In addition, we calculated the distribution of commercial and industrial properties by estimated market value in 2021-22 and shares of the statewide revenue gain that would come from different groups of properties by estimated market valuation. Figure 2 shows that a small share of properties account for most of the revenue gain. Only 6 percent of properties account for 78 percent of the revenue gain—properties that we estimate will have a market value in 2021-22 of greater than five million dollars.

**Figure 2. Share of Total Commercial and Industrial Properties and Share of Statewide Revenue Gain by Estimated Market Value, 2021-22**



# Conclusion

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When we first released *Getting Real About Reform* in 2015, we presented a methodology for estimating county-level tax revenue gains from a change in law to assess commercial/industrial properties at market value in California. We subsequently updated the analysis in 2018, and here we update it again in 2020—the year an initiative will be on the November ballot to make such a change in law.

While we build on the methods developed in that earlier work, we use here more recent data and alter our assumptions around average annual growth rates for both assessed value and market value to reflect likely market conditions. We then project our baseline estimates forward to 2021-22, and offer an estimate of the revenue implications for the Golden State and its diverse 58 counties under a system that assesses commercial and industrial property based on market rather than acquisition value. That analysis suggests a shift to market value assessment on the commercial and industrial side could yield 10.3 to 12.6 billion dollars statewide in additional property tax revenue.

Ultimately, the decision about what to do about California's current property tax treatment of commercial and industrial property will take into account many factors, including issues of equity, practicality, and potential economic impact (Benner and Giusta 2018). We hope that this study contributes to the emerging civic conversation about how to further strengthen the state's finances and better prepare California and Californians for a prosperous, inclusive, and sustainable future.



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# Technical Appendix

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The general method for estimating revenue gains is drawn from previous approaches conducted by Blue Sky Consulting Group and best documented by Arthur O’Sullivan, Terri Sexton, and Steven Sheffrin (O’Sullivan et al. 1993, 1995; Sexton and Sheffrin 2003; Sheffrin and Sexton 1998). It employs the primary assumption that properties sold in any given year are representative of those that did not sell, and it requires the following information:

- *Assessed value:* The assessed value is the value of a property (including both land and improvements) for taxation purposes. These data are available in county assessor rolls.
- *Market value:* The market value is the price that a willing buyer would pay and a willing seller would accept. Sales prices is used as the measure of market value. This requires identifying sales, or arms-length transactions, and changes in ownership that trigger a reassessment.
- *Disparity ratio:* The ratio of market-to-assessed value for a property or class of properties. This ratio is applied to the assessed values of properties of that same class that did not sell in order to estimate their market values.
- *Base year:* The base year is the most recent year in which a property was re-assessed at market value. In general, the base year is the last sales date. For example, properties that last sold in 2005 have a 2005 base year. For properties that existed in 1975 and have never been sold, the base year is 1975.

The approach to estimating revenue gains requires determining disparity ratios where market value is defined by a property’s sales price and where sold properties are assumed to reflect non-sold properties. It also requires classifying properties within a county by base year. Properties with older base years have larger disparity ratios than properties with more recent base years. Therefore, we classify properties within a county by base year, calculate weighted-mean disparity ratios based

on sales for each base year (weighted by assessed value), then apply the weighted-mean disparity ratio to the assessed value of all non-sold properties of the same base year to estimate their combined market value, and sum market values for both sold and non-sold properties to determine the total market valuation in 2017-18. The final step is to calculate the difference between total market value and assessed value for all properties in a county and take 1 percent to determine the revenue gain.

While we follow this general approach in deriving our estimates, we make several modifications and adjustments to estimate market value (which requires accurately identifying properties that have been sold, sale prices, and base years prior to a sale); to generate estimates for all counties in California (including smaller counties), and to reduce the impact of sales that are at either extreme of the disparity ratio distribution by county and base year.

First, we note that our approach to identifying sales requires at least three consecutive years of assessor data. There are three key reasons for this. First, the dataset we use does not include sales price information so sales prices must be interpreted from assessed values. Second, it only includes the current base year, so if a sale occurs in 2017, the base year in the 2017-18 roll shows up as 2017 as we must retrieve the base year prior to the sale from the previous year’s assessor roll to implement our methodology. Third, there is inconsistency as to when the sale price becomes reflected (as a new assessed value) on the assessor roll, so we cannot rely simply on the reported base year to identify sales in a given year and take the follow year’s assessed value as the sales price. For those reasons, we use three years of consecutive data in order to gather all of the prior base year and sale price information for sales that resulted in an update of assessed value to market value between the 2017-18 and 2018-19 roll years.

To identify sales that triggered a reassessment to market value between the 2017-18 and 2018-19 roll years, we look for changes in assessed land value that diverge from the standard average

annual increase applied by assessors (the maximum allowable increase under current law is 2 percent).<sup>5</sup> We find that standard increases in assessed value vary by county and take this into account to identify sales more accurately. Once an apparent sale is identified by these criteria, we examine base year information to see whether and when a sale was indicated by the base years in the 2016-17 through 2018-19 rolls. For the majority of sales that triggered a reassessment to market value between the 2017-18 and 2018-19 rolls, the base year indicates a sale in 2017.

One difference in this current analysis from our previous analyses lies in the data. Our original analysis conducted in 2015 was based on the historical assessor roll files for all non-government-owned properties in all 58 counties of California for the roll years 2004-05 through 2013-14, purchased from DataQuick. The updated analysis released in January 2018 was based on additional data for the years 2011-12 through 2016-17 purchased from CoreLogic, which acquired DataQuick in 2014. The current analysis relies on additional data from CoreLogic for the years 2016-17 through 2018-19. While we presumed that the more recently acquired data for the 2016-17 roll would be the same as the 2016-17 data we already had on hand, it turned out to be somewhat different for reasons not explained by CoreLogic. We reached out to CoreLogic for clarification on the differences between the two files, but were unable to get a response as of the release of this report.

The first and greatest challenge of using the three new years of data for 2016-17 through 2018-19 was that they appeared to be missing a sizeable share of commercial/industrial parcels and assessed value. Based on a comparison with previous years of data and aggregate data for commercial/industrial properties from the California State Board of Equalization (BOE), the most recent three years of data appeared to be missing about 35 percent of all commercial/industrial parcels in the

state, accounting for about 24 percent of the total commercial/industrial assessed value.

To account for this, we used the 2016-17 data from the earlier data delivery (which align with BOE statewide totals) to supplement the missing parcels for that year. We then developed an approach to estimating the assessed value for each of the supplementary parcels for the following two years. We first increased them each year by the median percentage increase observed in each county. We then adjusted for likely sales that occurred for the supplementary parcels. Note that our approach to identifying sales relies on identifying abnormal changes in assessed land value between one year and the next, so without data on true assessed values in 2017-18 and 2018-19, no sales could be identified among the supplementary parcels. Failure to account for sales that are likely to have occurred would have tended to understate total assessed value (and overstate the revenue gain).

To minimize the possibility of any upward bias, we sought to adjust for sales that are likely to have occurred. To do this, we calculated the percentage of parcels that sold between 2016-17 and 2017-18, and between 2017-18 and 2018-19, among the non-supplementary parcels by county and broad land use. We assumed that the same percentage sold among the supplementary parcels in each of the two-year periods, and randomly tagged hypothetical sales among the supplementary parcels to match the calculated sales rates by county and broad land use. For hypothetical sales tagged between each two-year period, we adjusted their assessed values in the latter year upward to our estimate of market value based on disparity ratios (by county, base year, and broad land use) derived from the authentic sales that were identified between 2017-18 and 2018-19 among the non-supplementary parcels. While disparity ratios based on sales between 2017-18 and 2018-19 are likely to overstate our estimate of adjusted assessed value for hypothetical sales that occurred during the previous year, the difference is likely to be slight.

A second, much smaller challenge with the new three years of data for 2016-17 through 2018-19 is that all the data for El Dorado County was lagged by one year. For example, the data in the 2016-17

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<sup>5</sup> We focus on only land value (and not improvements) when identifying sales because land values are only reassessed to market value upon the sale of a property while major improvements are often reassessed to market value at the time they are made.

roll file was actually from 2015-16 and so on. This meant that the disparity ratios we derived for sales identified between the 2017-18 and 2018-19 rolls were also lagged by one year for El Dorado county—that is, they reflected sales that occurred between 2016-17 and 2017-18—and that the assessed values in the 2017-18 roll were actually for 2016-17. Correcting the assessed values in 2017-18 was simple: we plugged in the values from the 2018-19 roll. Correcting the disparity ratios to reflect the ratio of sale prices to previous assessed value in 2017-18 was more challenging. If market values of commercial/industrial parcels rose between 2017-18 and 2018-19 (which is likely the case), then the lagged disparity ratios would understate our estimate of total market value as well gains in tax revenue.

After examining the limited data available for the county, including the trend in estimated market value for residential properties on Zillow.com and the change in estimated disparity ratios for commercial/industrial properties from our previous analysis (for 2015-16) to the current analysis, the increase in market values appeared to be relatively modest. To err on the conservative side (i.e. avoid overstating revenue gains in the county), we simply applied the lagged disparity ratios to the corrected 2017-18 assessed values for unsold properties.

After completing such modifications and adjustments to tag sales in the more recent dataset, these properties were used to derive summary disparity ratios by county. In our original analysis, we tested three summary disparity ratios: median disparity ratio by county/base year, weighted-mean disparity ratio by county/base year, and a weighted-mean disparity ratio calculated statewide across all base years. O’Sullivan, Sheffrin, and Sexton used the median disparity ratio by county/base year; Blue Sky Consulting Group used the weighted-mean disparity ratio by county/base year in its 2009 estimates; and the BOE uses what is analogous to the weighted-mean statewide ratio across all base years in calculating the 4-R Equalization Ratio that is applied for assessing rail transportation property at the same percentage of market value as all other commercial and industrial property.

We tested each of the summary ratios by 1) comparing results with previous revenue estimates;

2) comparing against real estate market trends; and 3) using a randomly selected (80 percent) sample of all sales to derive the disparity ratios and examining how well they predicted market value for the remaining (20 percent of) sales. Based on the results, we chose to use the weighted-mean disparity ratio (weighted by assessed value). While O’Sullivan, Sheffrin, and Sexton opt to use the median disparity ratio to minimize the influence of outlying property-level disparity ratios on the summary disparity ratio for each county/base year, it is our view that because more valuable properties play a larger role in determining market value in a county, improving market value estimates for them by allowing them to carry more weight in deriving the summary disparity ratios improves estimates overall, and we take other measures to reduce the outliers (described below).

To the extent that different land uses within the commercial/industrial spectrum appreciate at different rates over time, a case could be made for calculating and applying separate disparity ratios for different land uses within each county/base year. However, the number of sales observations by county/base year is often already very small, making further division of the sales by land use imprudent. Therefore, in effort to adjust for the potential mismatch in land use distribution between sold and non-sold properties in each county/base year, we instead adjust the weights before calculating our weighted-mean disparity ratios so that the distribution of 2017-18 assessed value for sold parcels mirrors that for all parcels in each county/base year across four broad land use categories. In essence, the adjustment simply gives more weight to land use categories that are underrepresented among sales in a given county/base year and vice versa.

For counties/base years in which there are fewer than 10 sales to serve as the basis for the summary disparity ratio, we make a series of adjustments and substitutions that seek to use as much county-specific data as possible while incorporating disparity ratio information from surrounding counties and the state overall. We aggregate counties that are similar in terms of disparity ratios (for base years with more than 10 sales) and a series of demographic and housing characteristics from the



U.S. Census to divide the state into nine county groups. We also group base years together to create base year categories, and derive summary disparity ratios for each county group (and statewide) by base year and base year category. We then apply the disparity ratios by base year from the most detailed level of geographic aggregation for which they are based on at least 10 sales (either the county group or statewide), and adjust them up or down for each county using adjustment factors based on what we know about the county relative to its county group and (if necessary) the county group relative to the state from the variety of disparity ratios calculated, while ensuring that each adjustment factor itself that we apply is also based on at least 10 sales.

When our calculation of weighted-mean disparity ratios produce disparity ratios that are less than one for some counties/base years, it suggests that the market value for certain properties are below their assessed value. There are a variety of possible reasons for this: Property owners may not exercise their right to decline-in-value assessments under current law (perhaps to avoid negative externalities of a decline in asset values); our estimate of market value may be too low (to the extent that fire sales are prominent); or there may be lag time between when the market falls and when the decline-in-value assessments are reflected on the assessor roll. To focus our estimates on the impact of change to current law, we set a minimum of one for disparity ratios that are applied to non-sold properties. This has the effect of excluding from our results any estimated losses in tax revenue from (downward) assessment to market value, as these are to be expected under current law. Finally, to the extent that fire sales (i.e. distressed properties sold at extremely discounted prices) are prominent in our data, it is likely that they drive down all (or many) of our calculated disparity ratios—not just those for counties/base years in which our initial disparity ratio estimate came out below one. While such sales are bound to be far less prominent in our current analysis than in our original analysis released in 2015, given the point in the market cycle at which baseline estimates were made, evidence that they still exist in the data suggests that our baseline estimates of revenue gains in 2017-18 should be seen as conservative.

Another methodological choice we make aims to reduce the impact of outliers, as noted earlier. While this was the rationale behind O’Sullivan, Sheffrin, and Sexton’s choice of applying the median disparity ratio, given that we find the weighted-mean disparity ratio to be a better fit for other reasons, we sought to account for outlying property-level disparity ratios in our methodology. To do so, we run our model under three levels of outlier exclusion among sales, excluding the outlying 1, 2, and 5 percent of values from each end (top and bottom) of the property-level disparity ratio distribution by county/base year. Note that if there are fewer than 20 sales in a particular county/base year, no outliers are excluded, and so to capture any outliers in counties/base years with few sales, we also excluded observations found to be among the outlying 1, 2, and 5 percent of values (respectively) at each end of the property-level disparity ratio distribution statewide by base year. As we would expect, the outlier exclusion affects smaller counties more than larger counties. Baseline estimates of revenue gains for each county in 2017-18 were derived under each of the three levels of outlier exclusion separately, and the average of the three results was taken as our final estimate.

To carry our baseline estimates of revenue gains in 2017-18 forward to 2021-22, making them more relevant for policy discussion, we adjusted our growth assumptions for aggregate market and assessed value over the projection period and made substantial changes from our previous analyses. While there has been substantial growth in the commercial/industrial real estate market over the past several years, national and statewide indices suggest we are headed for a slowdown. For example, results from the latest Allen Matkins/UCLA Anderson Forecast California Commercial Real Estate Survey suggest a weak market over the next couple of years, until around 2022 when a rebound is expected. Partly because of this, our growth assumptions are lower than in our previous analyses for which our baseline estimates were relatively early in the market recovery and there was good reason to expect a robust market recovery over the projection period.

To determine the specific assumptions around growth in assessed and market values from 2017-18 to 2021-22, we relied on the limited data that

exists on trends in aggregate assessed values for commercial/industrial properties over time, as well as on the baseline estimates of aggregate assessed and market value for commercial/industrial properties that we have generated for three points in time: 2012-13, 2015-16, and 2017-18. We began by make a simple logarithmic projection forward to 2021-22 of aggregate assessed and market values based on the three data points we had for each measure. This yielded an average annual growth rate of 1.3 percent for market value and 0.5 percent for assessed value.

To validate these simplistic projections, we examined historical data from the BOE on assessed value growth for commercial/industrial properties as reported in the California Taxpayer Association's (CalTax) report, Proposition 13 Revisited: A look at California's property tax 35 years after passage of Proposition 13 (Gutierrez, Doerr, Kline, & Blocker, 2013, p. 19). We identified the period from 1991-92 through 1995-96 as the four-year time period in the data that best resembled the portion of the market cycle we might expect between 2017-18 and 2021-22, given that growth in assessed values (and presumably market values) slowed substantially during that period (and actually became slightly negative in the last two years). We found an average annual growth rate in assessed value for commercial properties (business and non-homeowner property) over the period to be 0.6 percent—very close the rate implied by our simple projection.

However, California experienced a major recession in the early 1990s, and while the state may fall into recession over the projection period, we do not expect it to be as deep if it does. Therefore,

we set our middle growth scenario assumptions around market growth a bit higher than suggested by our simple forecast, at 2 percent average annual growth in aggregate market value and 0.7 percent average annual growth in assessed value. We believe these middle-scenario assumptions to be on the conservative side. As in previous analyses, we stress that estimated tax revenue gains from assessing commercial property at market value are sensitive to changes in the market, and for this reason we also provide estimates based on low- and high-growth scenarios which assume average annual growth in market values of 0.5 percent and 3.5 percent, respectively.

As noted in the main body of the report, we have confidence in our baseline estimates for 2017-18 in part because they are based on disparity ratios derived from data on sale prices (and not projections of sale prices) and in part because our previous projections to 2019-20 have been close in predicting current disparities. In our previous analysis, we generated a baseline estimate of statewide revenue gains in 2015-16 and projected it forward to 2019-20. Our projection from that analysis for 2017-18 under the middle growth scenario was 9.0 billion dollars, whereas our estimated statewide revenue gains in 2017-18 in the current analysis is 9.9 billion dollars. Thus, the assumptions we made around market growth in our previous analysis seem to have understated revenue gains. As noted above, we suspect that may be the case with the assumptions made here as well, but prefer to err on the conservative side to avoid overstating the potential gains.

# Acknowledgments

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The authors would like to thank PERE staff and research assistants—present and former—who have assisted with this work over the years. For the 2015 report and early efforts leading up to it, we want to recognize the following people: Jared Sanchez, Madeline Wander, Pamela Stephens, Mirabai Auer, Jessica Medina, and Hilary Wilson. Jacqueline Wong and Gladys Malibiran were instrumental in the design of the original report. For this version, we thank Lance Hilderbrand, Sameer Nair-Desai, and Sarah Balcha. We also appreciate Terri Sexton for providing invaluable advice early in our analysis and Tim Gage and Matthew Newman of Blue Sky Consulting Group who have provided guidance throughout the years.



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