California Surplus Lines Market Seasonality Analysis

1. ### Seasonality Explained:

   Seasonality (statistical) is defined as the presence of variations that occur at specific regular intervals less than a year, such as weekly, monthly, or quarterly. Seasonality may be caused by various factors, such as weather, vacation, and holidays and consists of periodic, repetitive, and generally regular and predictable patterns in series of data.

   Seasonal fluctuations in a time series can be contrasted with cyclical patterns. The latter occur when the data exhibits peaks and valleys that are not of a fixed period. Such non-seasonal fluctuations are usually due to economic conditions and are often related to the "business cycle"; their period usually extends beyond a single year, and the fluctuations are usually of at least two years.

2. ### California SLA Seasonality Assumptions:

   For purposes of evaluating the California Surplus Lines Market and within-year premium and transaction results, this analysis will focus on calendar quarter data and utilize data from 2018 through Q1'2021. Its intended use would be to evaluate total premium and transactions for a particular quarter, to determine an annual forecast based early in the year, and provide indicators of a hardening or softening market.

   In addition, data from 2018-Q1'2021 will be used as a basis for seasonal analyses, regression models, and forecasting. This assumption is due to a large "jump" in annual premium and transactions from 2017 to 2018 and lower standard deviation in more recent years. The chart below represents this:

Std Dev Using 2016-21 Data:	1,797,764,950
Std Dev Using 2018-21 Data:	1,583,782,898

Seasonality Analysis: Premium and Transactions – DRAFT V1.0
April 28, 2021
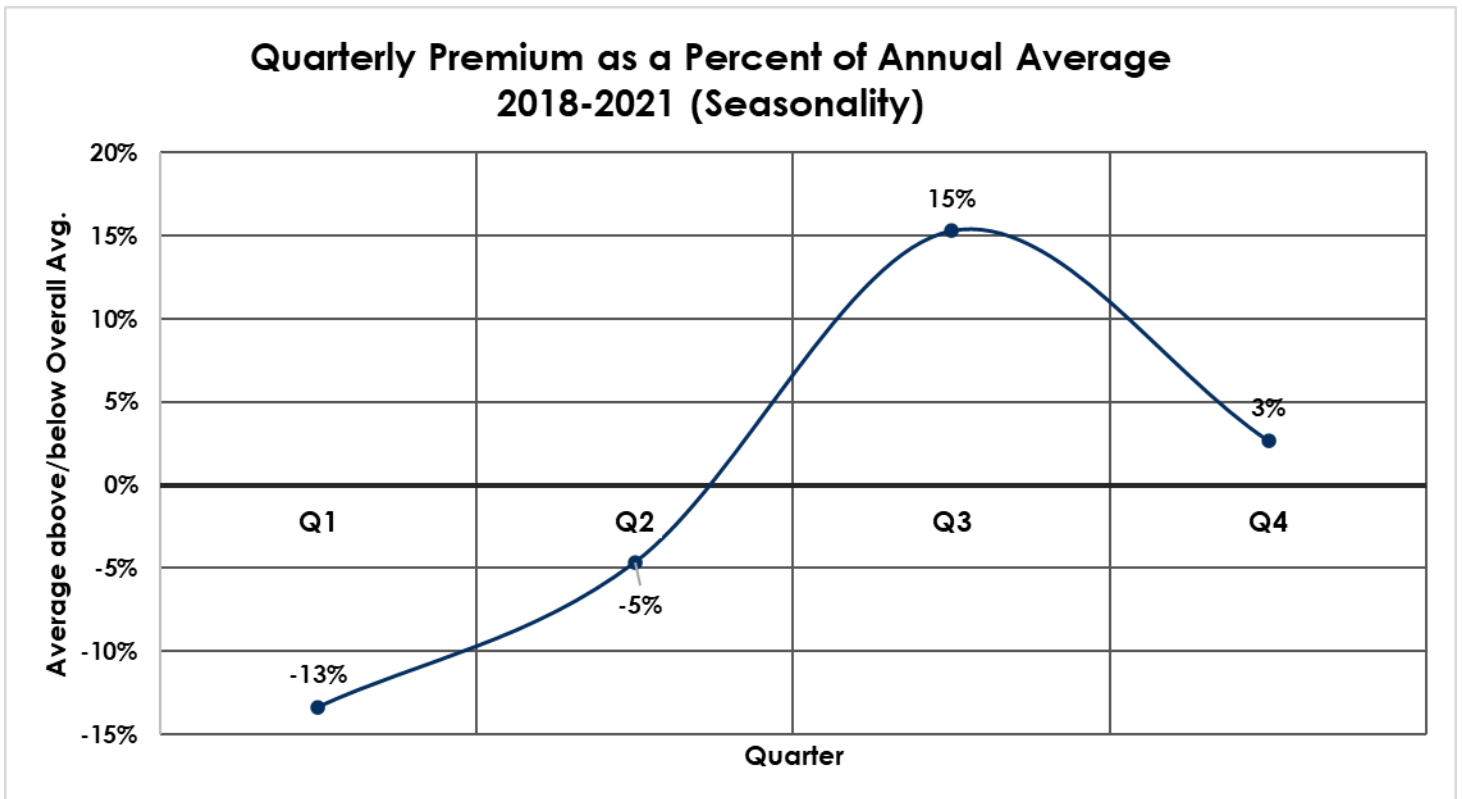Michael Caturegli, EVP

3. Seasonal Analysis:

The following graphs represent the seasonality differences for premium and transactions for each quarter during the calendar year, as well as average premium. As previously noted, these metrics are based on 2018-2021 data and should be adjusted/updated for forecasting and estimating 2022 and beyond.

Charts 1 and 2: Seasonal differences in premium by quarter.
These two charts represent the seasonal differences in *premium* by quarter as a percent above and below average annual premium. It also includes actual values. These quarterly values can be used to seasonally adjust actual premium for a particular quarter and forecast an entire year. One method for adjusting observed values for seasonality and forecasting an entire year is explained in Section 4 of this document.
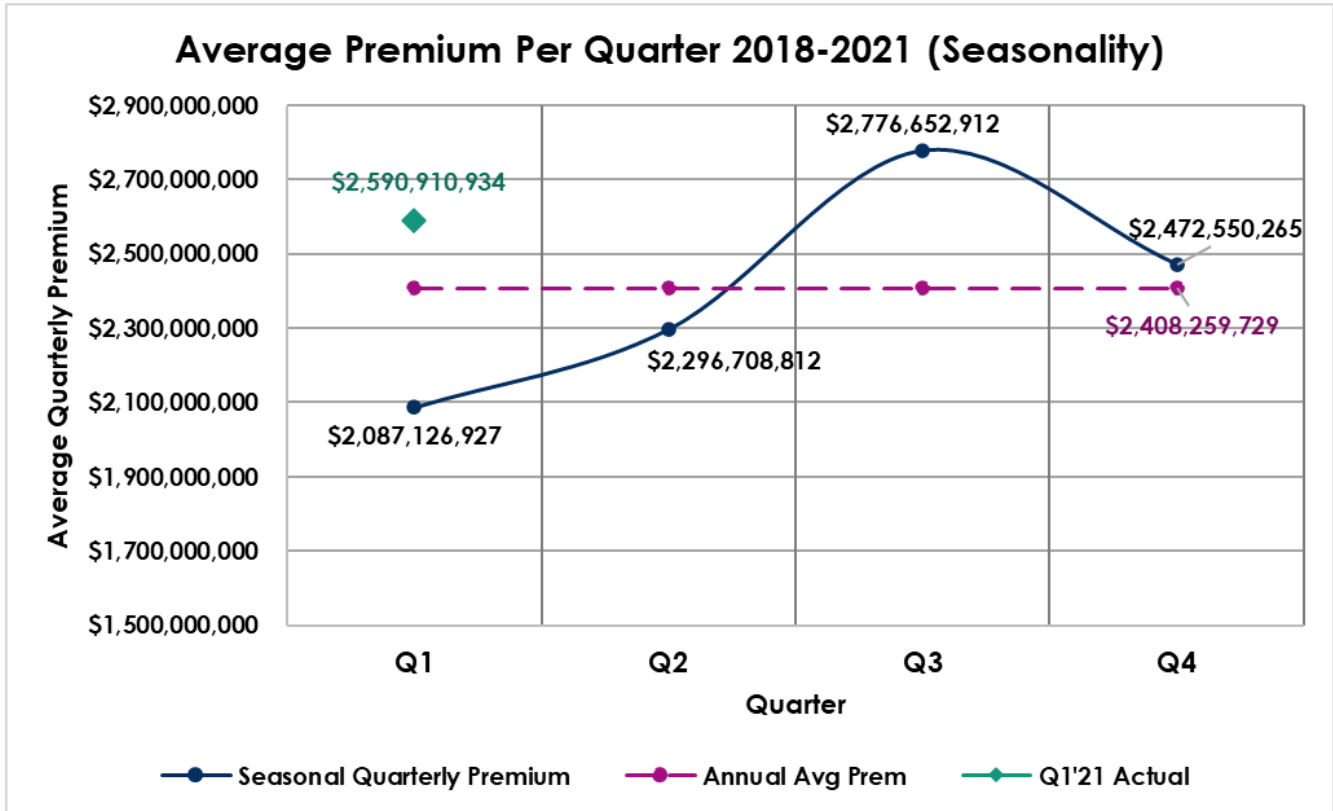
Chart 1:

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Chart 2:

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Charts 3 and 4: Seasonal differences in transactions by quarter.

These two charts represent the seasonal differences in *transactions* by quarter as a percent above and below annual transactions as well as actual quarterly average transaction values. These quarterly values can be used to seasonally adjust actual transactions for a particular quarter and forecast an entire year.
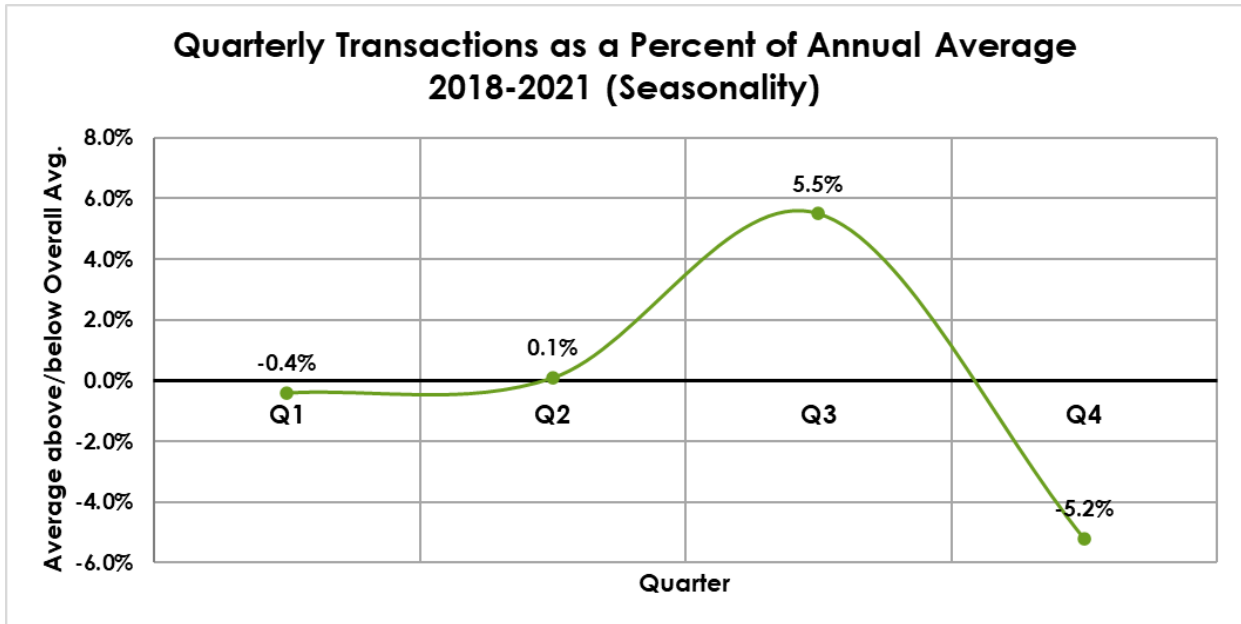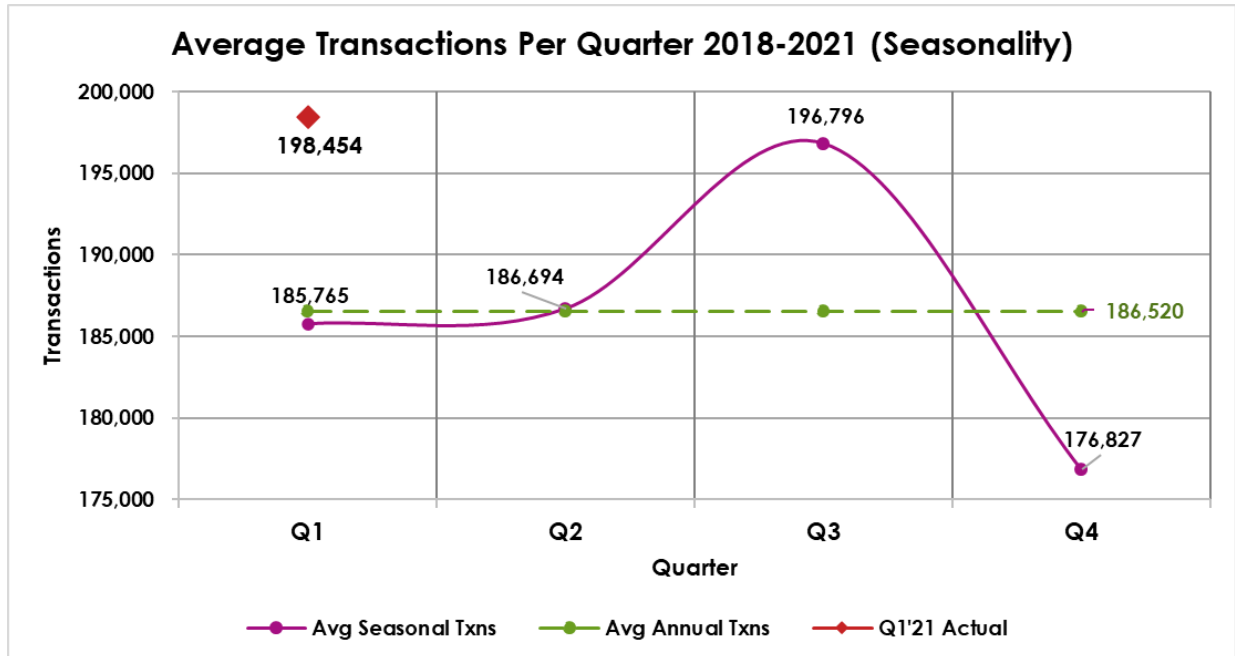
Chart 3:

Chart 4:

<u>Seasonality Analysis: Premium and Transactions – DRAFT V1.0</u>
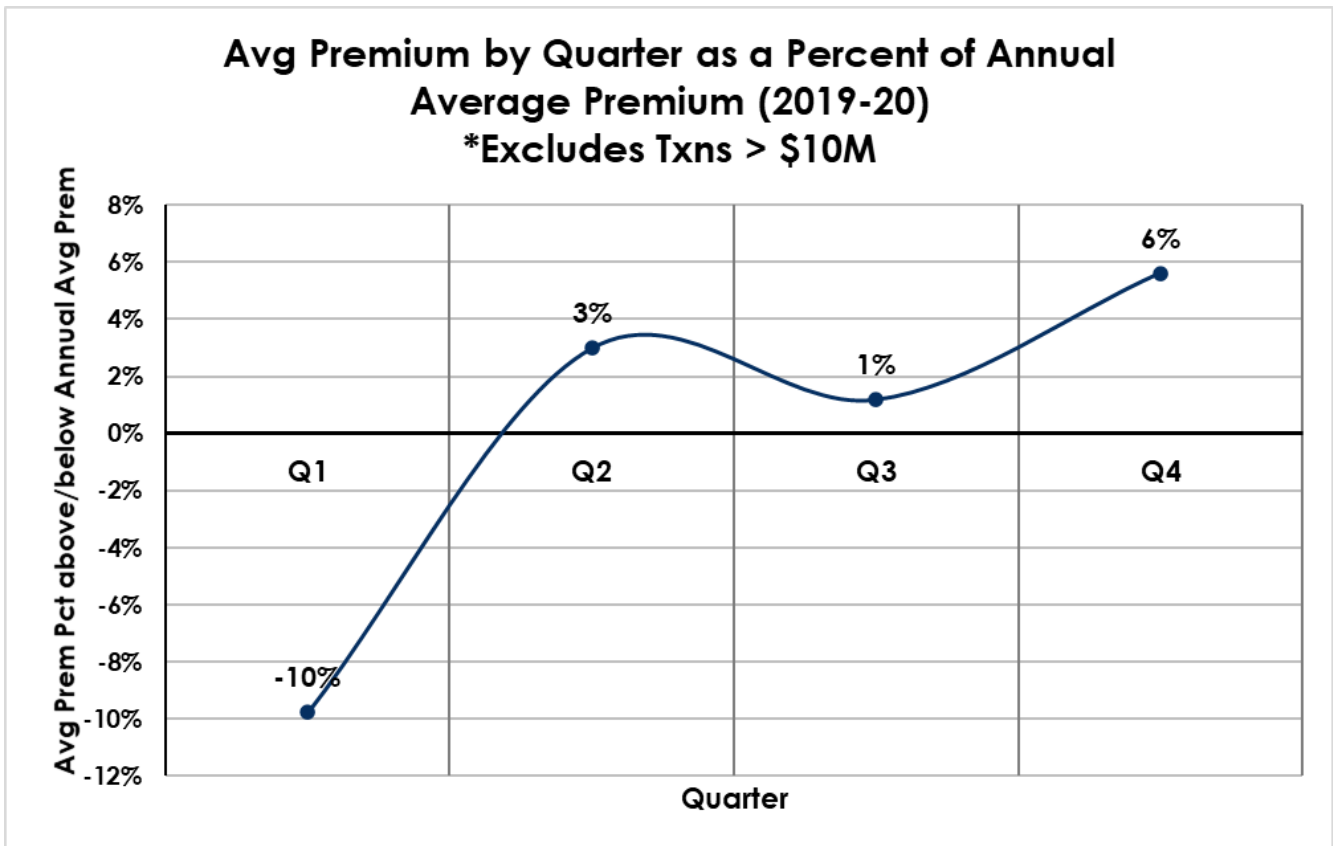<u>April 28, 2021</u>
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Charts 5 - 7: Seasonal differences in average premium *per transaction* by quarter.
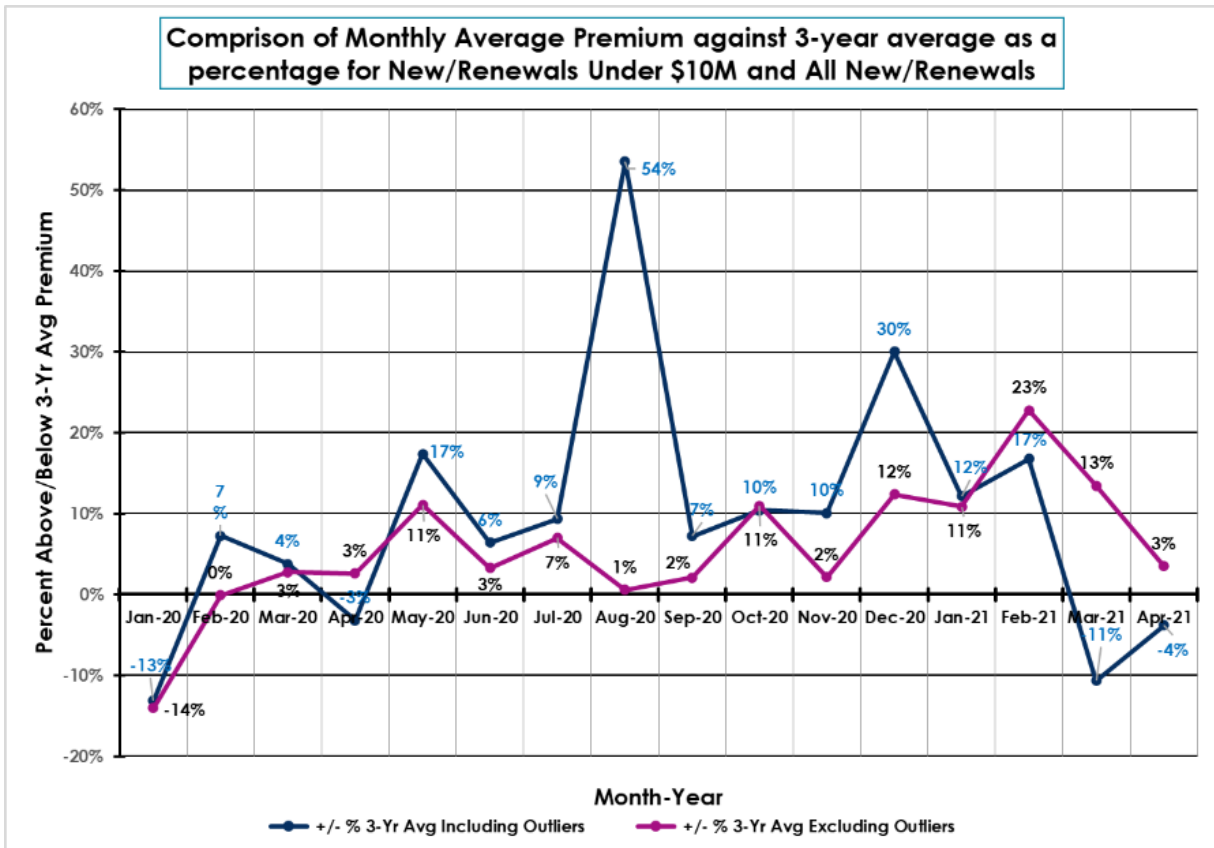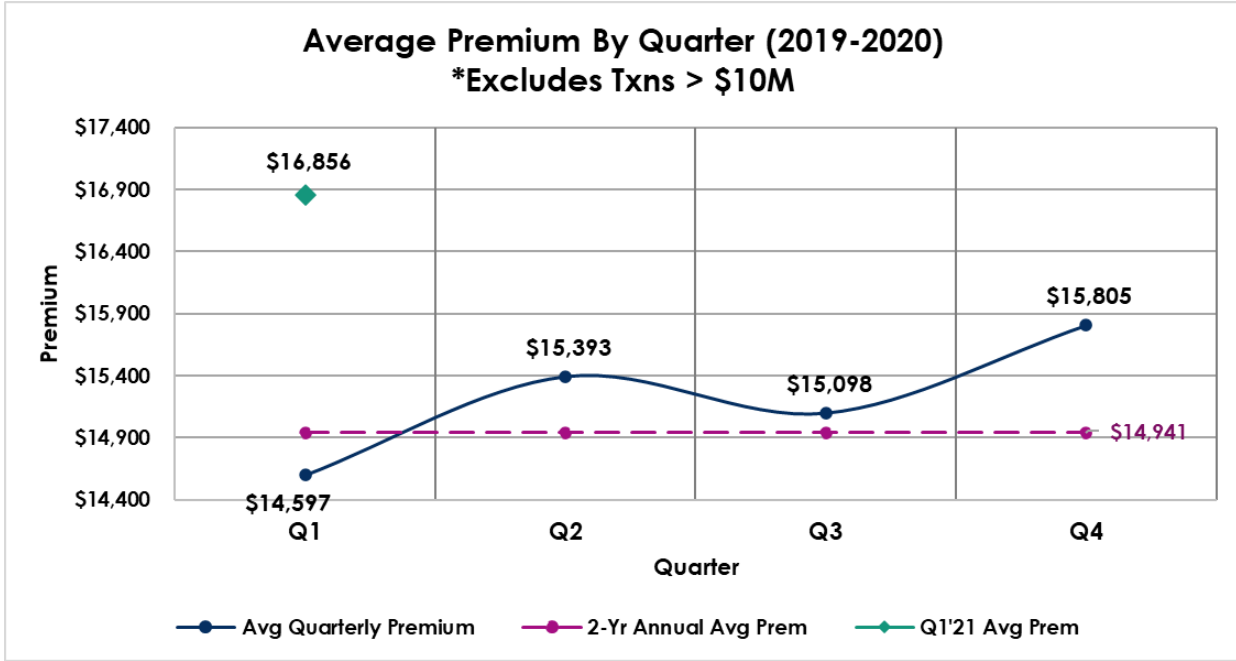One method of evaluating a hardening or softening market is to review the average premium per policy. In this case, new business and renewal policies are applicable, and in the interest of omitting outliers (<1% of the policies), only policies with premium less than $10M are factored. Because of high seasonal volatility on average premium and speculation that season does not affect average premium, this section is primarily for informational purposes and should be used with other kpi's on specific markets.

There are three charts in this section for average premium: the first two are consistent with the previous charts, and the third chart illustrates the effect of outliers on average premium. This last graph compares the *monthly* average premium for 2019 through April 2021 for data with and without outliers as a percent above or below the overall average. In this case, *outliers* are defined as policies with premium greater than $10M, which represents less than 1% of the transactions.

Avg Premium by Quarter as a Percent of Annual Average Premium (2019-20)
*Excludes Txns > $10M

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Average Premium By Quarter (2019-2020)
***Excludes Txns > $10M**

- Avg Quarterly Premium
- 2-Yr Annual Avg Prem
- Q1'21 Avg Prem

Comprison of Monthly Average Premium against 3-year average as a percentage for New/Renewals Under $10M and All New/Renewals

- +/- % 3-Yr Avg Including Outliers
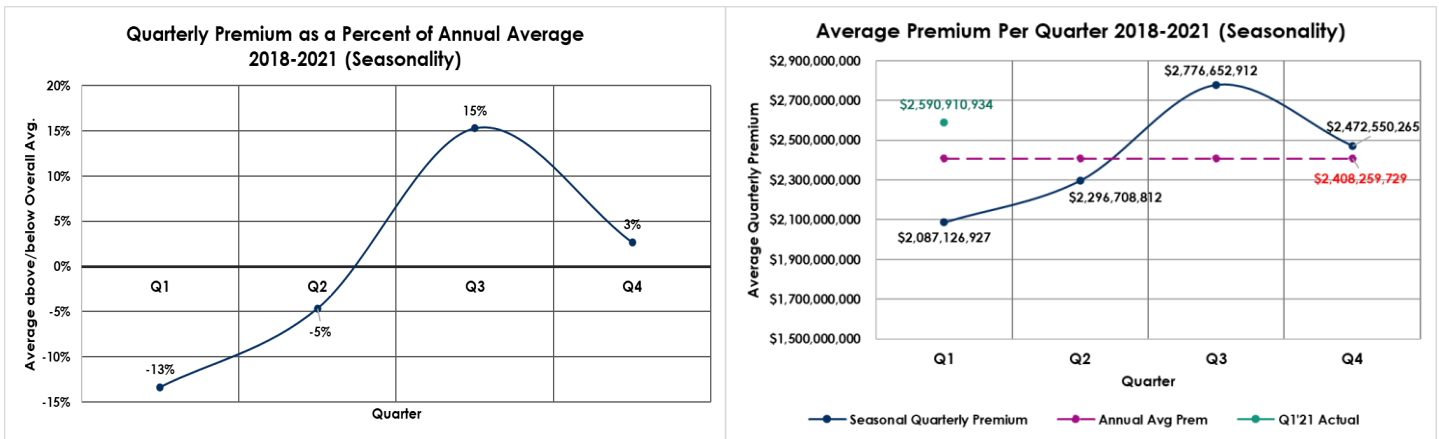- +/- % 3-Yr Avg Excluding Outliers

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4. <u>Seasonal Adjustment for Observed Values:</u>

This section will address how to adjust observed values to accommodate for seasonality. In this case, we will use the Q1'2021 premium numbers from Charts 1 and 2. As a reminder, they are listed below:

In Q1'2021, we observed total premium equal to $2,590,910,934 (Jan., Feb., and March submitted premium). Because we know that we would have expected around $2.087B from our three year average graph, this current quarter was exceptionally high. We also know that we expect Q1 premium for any recent quarter to be around 13% less than the annual average for that year.

To understand what that observed premium of $2.59B in Q1 would represent adjusted for the Q1 season, the following formula is applied:

Seasonal Adjusted Value = Observed Value ÷ (1 + Quarterly Percentage from Annual Avg)

Premium Seasonal Adjustment for Q1'21 = $2,590,910,934 ÷ (1+(-13.3%)) = <u>$2,989,557,743</u>

The chart below represents the use of this method to forecast annual submitted premium:

Actual Observed	Adjusted for Seasonality	Adjusted 2021 Est.
Q1'2021 Premium	2021 Premium (Q1)	Annual Premium
$ 2,590,910,934	$ 2,989,557,743	$ 11,958,230,970

5. Conclusion:

Quarterly seasonality plays a factor in understanding the California Surplus Lines Market. Unfortunately, these seasonal trends shift over time, and the models should be updated on an annual basis if not more frequently by integrating current data into historical trends. It is also worth noting that these models are in part affected by human behavior (i.e. timeliness of filings, policy effective dates, and external factors such as the Covid-19 pandemic), and the seasonality relationship is assumed to not be a "cause and effect" one. For example, an ice cream shop having more customers in the summer vs. winter is a cause and effect relationship with the seasons, since warmer weather means people eat more ice cream. This is not the case in our models.

As mentioned in Section 4 regarding the applicability of the average premium analysis, these models should be utilized in conjunction with other models, compared against other economic indices, and deconstructed to evaluate which facets of the market are influencing others.