

Sonoma Clean Power

Forecast Discussion May 2020

Economic Forensics and Analytics

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Overview

- Forecast to 2025, with emphasis on 2020-2021 for:
 - US Gross Domestic Product (GDP), California Gross State Product (GSP), California Personal Income (PI), all in 2012 dollars.
 - California, Sonoma County, Mendocino County Employment
 - Establishments to Small and Large Commercial Meters
 - Occupied Housing Units in Sonoma and Mendocino counties
 - Permits, Sonoma and Mendocino counties
 - Electric Vehicles, California
 - Delinquencies in California (data not available at county level)
 - **SCP area when applicable = Sonoma and Mendocino counties less Healdsburg and Ukiah**
- Assuming history is a guide, as are the connections of national to state to county economies.

Caveats

- Data paucity and volatility make forecasting in this environment tricky
- April Jobs data likely move the “better” forecast to somewhere between the median and the terrible, think 40% movement along that continuum toward terrible
- Do not expect precision, the key is capturing trend and cycle

US GDP, CA GSP

- These are the core forecasts, assuming that history repeats with some minor differences
- Forecasts are **median, good and terrible**, based on consensus forecasts from professional forecasters
 - NABE, IMF, Goldman, UCLA, DOF
 - Forecasts for remainder of 2020 and for 2021
- We shaped 2022-2025 to be generally slow growth on average
 - 1.5-3% per quarter SAAR for US GDP
 - This implies 2.0% to 4.6% for California GSP
- We assume based on statistical properties that US GDP and CA, Sonoma and Mendocino employment strongly enough related to use US GDP forecast as baseline

Note on Data Frequency

- US GDP and Forecasts are Quarterly
- Employment and Establishments are Monthly
- Permits are Monthly
- Car Sales for US are monthly, but electric car sales data are annual
- Housing units are annual
- Delinquency data are quarterly
- Use of employment seasonal factors to convert quarterly to monthly data for employment estimates from quarterly GDP forecast

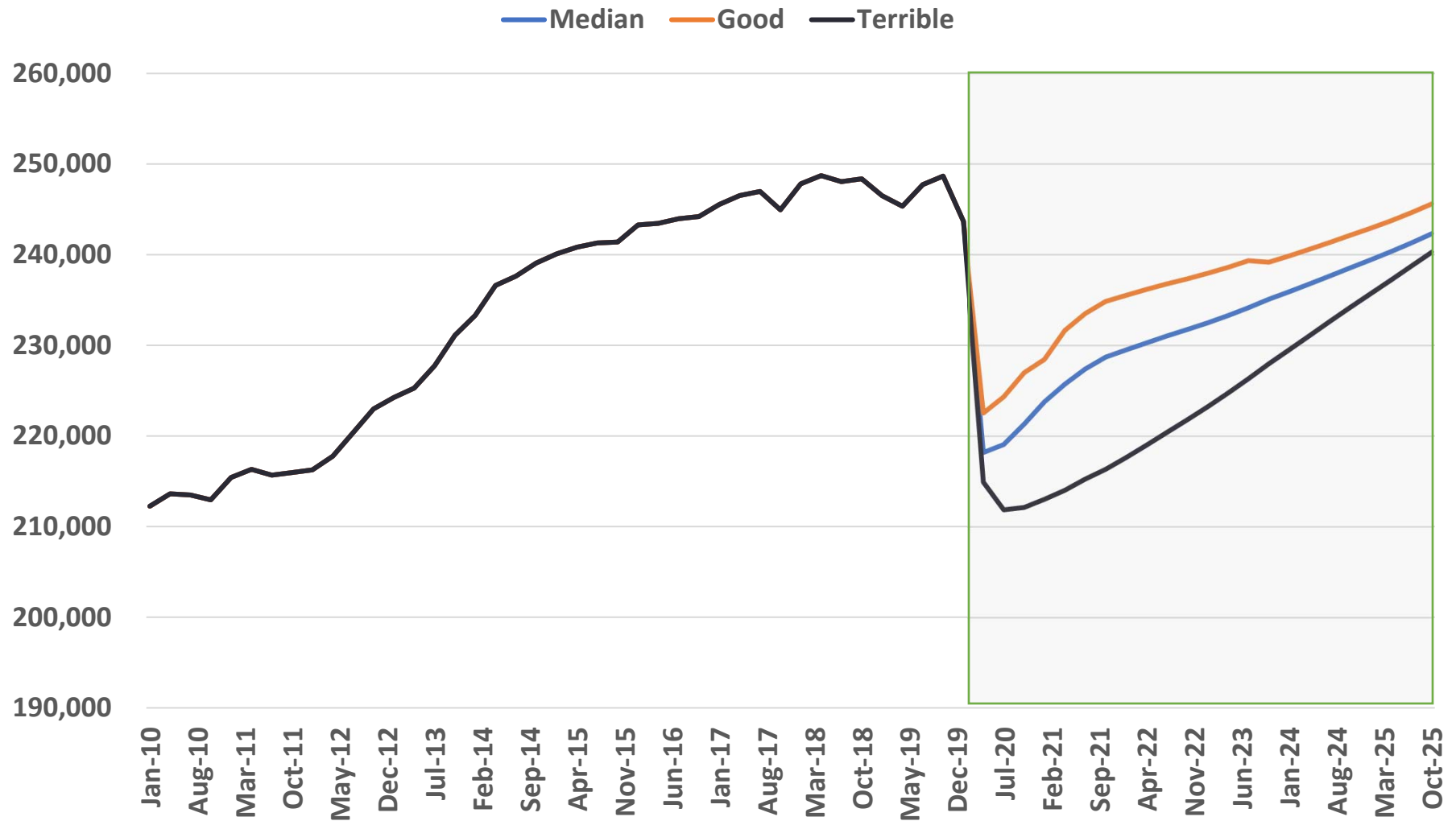
US GDP Forecasts as Baseline (% SAAR)

	US	US	US	CA	CA	CA
Quarter	Median	Good	Terrible	Median	Good	Terrible
Mar-20	-4.8	-4.8	-4.8	-4.7	-4.7	-4.7
Jun-20	-26.5	-20.0	-36.5	-40.5	-31.0	-54.7
Sep-20	2.0	5.0	-12.6	3.0	7.7	-18.0
Dec-20	5.8	7.0	0.0	8.9	11.0	0.0
Mar-21	6.0	4.0	2.1	9.3	6.4	3.0
Jun-21	4.5	8.0	2.1	7.1	13.0	3.0
Sep-21	3.8	5.0	2.0	6.0	8.2	2.9
Dec-21	2.9	4.0	1.1	4.6	6.6	1.6
Mar-22	1.6	2.6	1.6	2.6	4.4	2.4
Jun-22	1.6	2.6	1.6	2.6	4.4	2.3
Sep-22	1.5	2.5	1.5	2.5	4.3	2.2
Dec-22	1.4	2.4	1.4	2.2	4.0	2.0
Mar-23	1.4	2.4	1.4	2.3	4.1	2.1
Jun-23	1.5	2.5	1.5	2.5	4.3	2.2
Sep-23	1.7	2.7	1.7	2.7	4.6	2.4
Dec-23	1.8	2.8	1.8	3.0	0.9	2.7
Mar-24	1.5	2.5	1.5	2.5	4.2	2.3
Jun-24	1.6	2.6	1.6	2.6	4.2	2.3
Sep-24	1.6	2.6	1.6	2.6	4.3	2.4
Dec-24	1.6	2.6	1.6	2.7	4.3	2.4
Mar-25	1.5	2.5	1.5	2.5	4.2	2.2
Jun-25	1.5	2.5	1.5	2.6	4.3	2.3
Sep-25	1.6	2.6	1.6	2.7	4.5	2.5
Dec-25	1.7	2.7	1.7	2.9	4.6	2.6

Employment

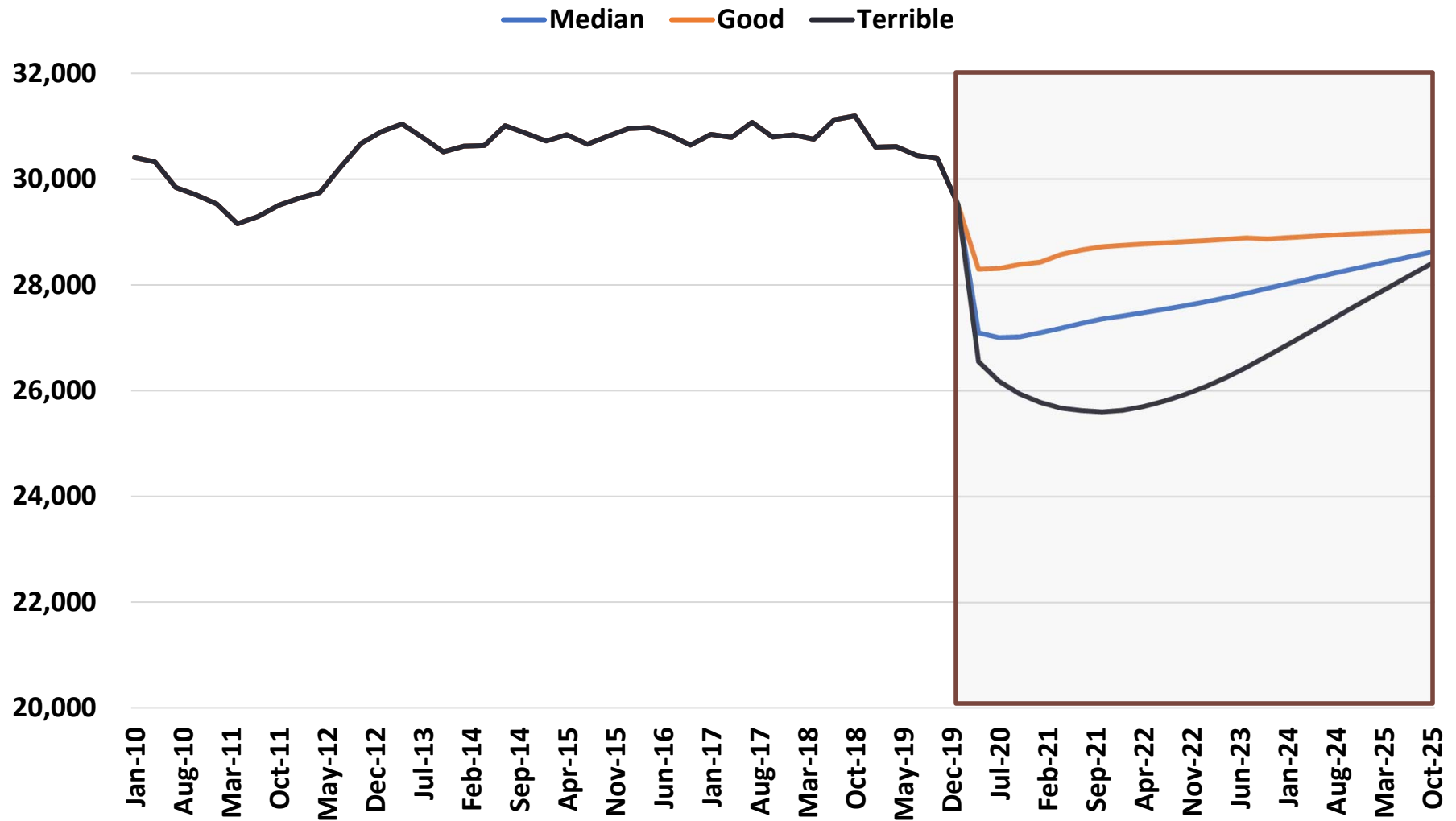
- We used US GDP forecasts to shape CA employment levels
 - Median
 - Good
 - Terrible
- Assume that CA forecast drives Sonoma and Mendocino
 - Use auto-regressive, moving average (ARMA) process to connect quarterly forecasts for US GDP to CA employment levels
 - Labor force changes based on last five years average growth to 2025
 - Unemployment rate implied by ratio of labor force less employment to labor force in each place.
 - Healdsburg and Ukiah backed out of Sonoma County and Mendocino County respectively as a percent of each county's employment level.

Employment: Sonoma County



Note: Shaded Area Forecast Window

Employment: Mendocino County



Note: Shaded Area Forecast Window

Establishments

- From the Employment Forecasts, the changes in businesses were estimated
- Using Industry Sector data (NAICS-2):
 - Use recent proportions of each sector in each county's economy
 - Use a “vulnerability” percentage as a way to increase precision on how businesses may be lost or preserved
 - Then map employment forecast to industry-sector level employment
 - Implies a certain number of businesses that remain (the change is the net loss of business) and then gain as employment grows
- Use Sonoma and Mendocino employment levels net of Healdsburg and Ukiah as baseline
- Source: Bureau of Labor Statistics, [Quarterly Census of Employment and Wages](#) and California Employment Development Department, [QCEW](#)

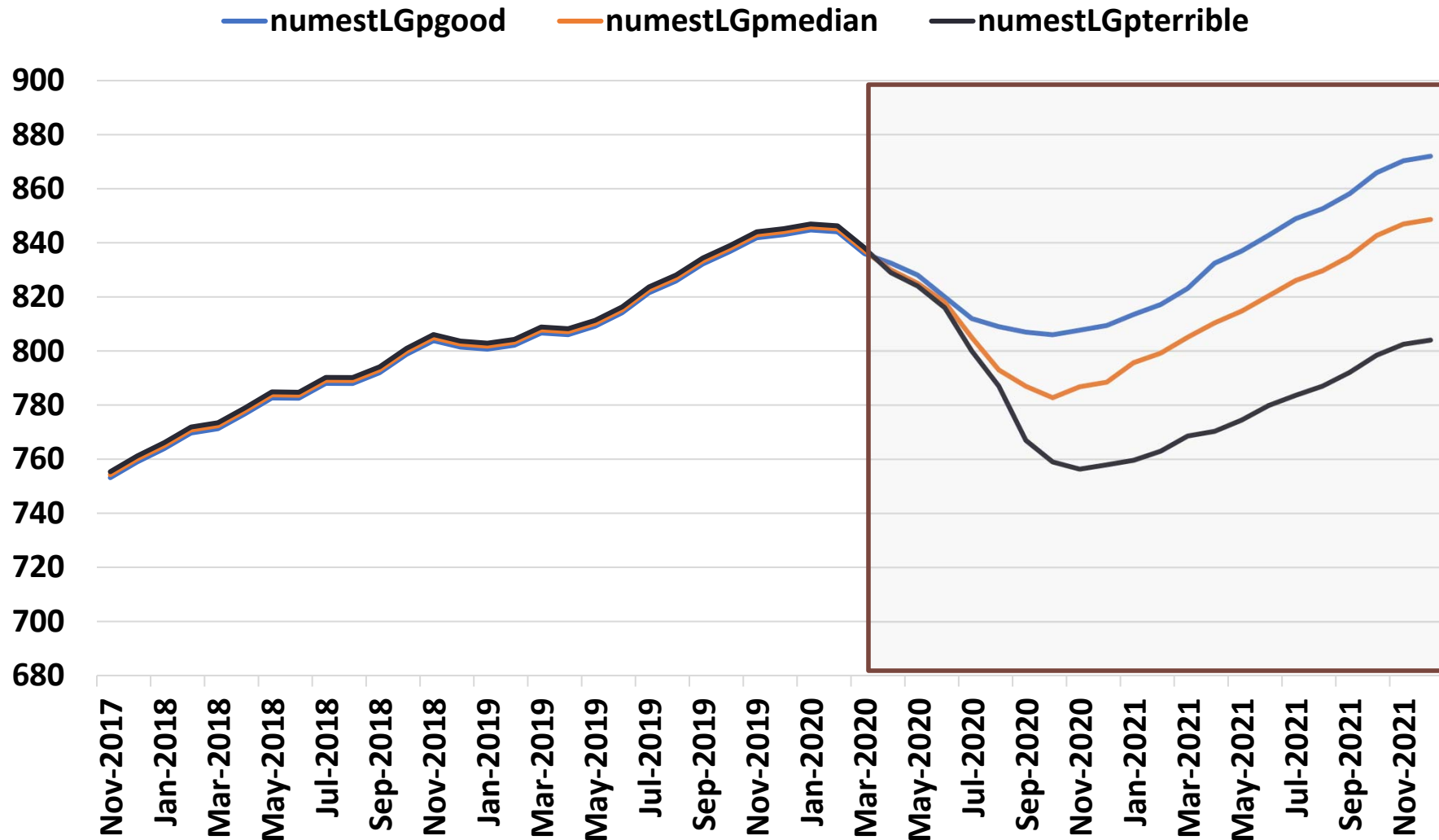
Vulnerability

NAICS-2 Code	Vulnerable (%)	Industry Sector
11	30	Agriculture, Forestry, Fishing and Hunting
21	30	Mining
22	30	Utilities
23	50	Construction
31-33	50	Manufacturing
42	40	Wholesale Trade
44-45	70	Retail Trade
48-49	35	Transportation and Warehousing
51	20	Information
52	30	Finance and Insurance
53	50	Real Estate and Rental and Leasing
54	40	Professional, Scientific, and Technical Services
55	0	Management of Companies and Enterprises
56	60	Admin, Support, and Waste Services
61	60	Educational Services
62	20	Health Care and Social Assistance
71	70	Arts, Entertainment, and Recreation
72	70	Accommodation and Food Services
81	50	Other Services (except Public Administration)
92	35	Public Administration
99	40	Other

Small and Large Commercial Meters

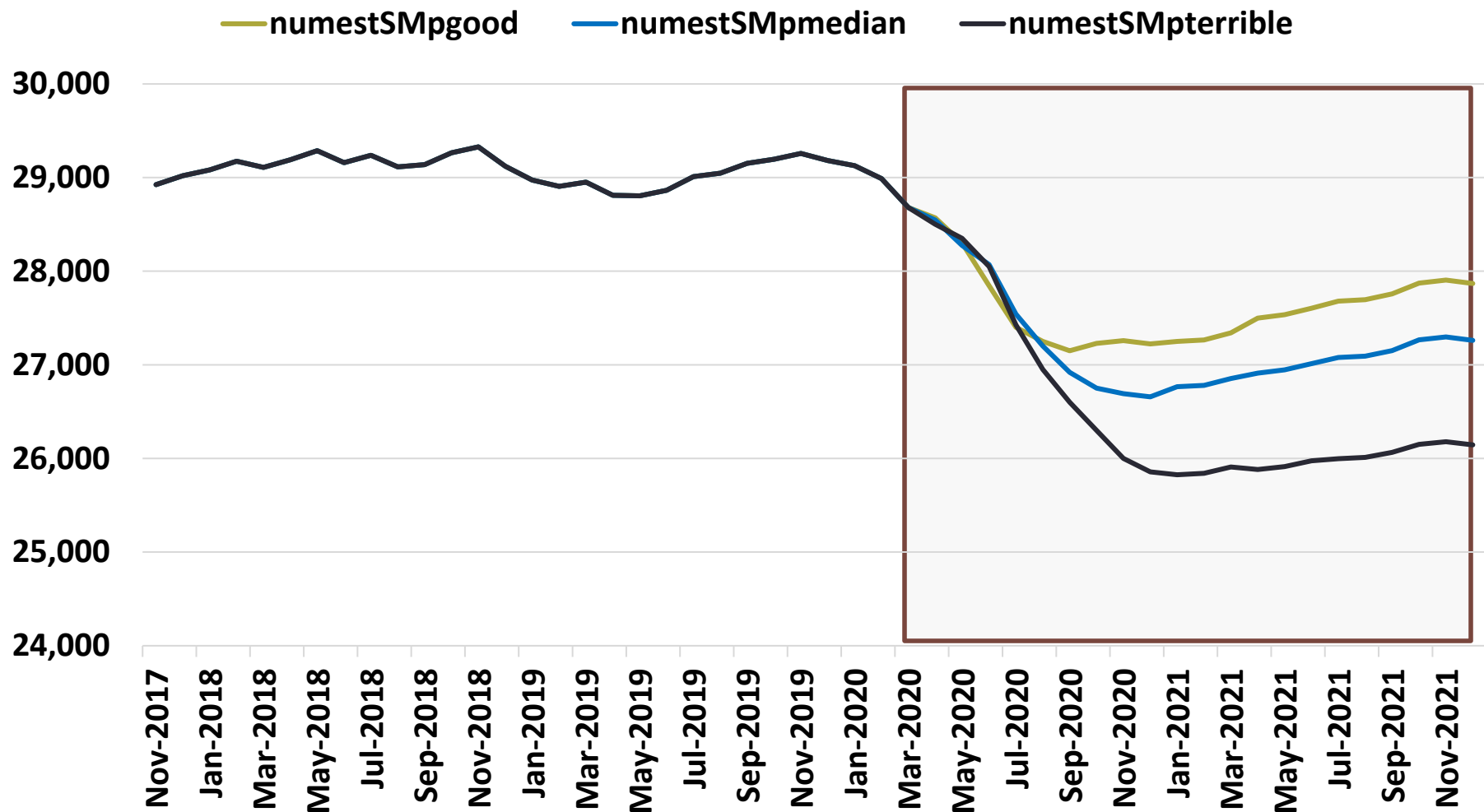
- Use of NAICS in meters data to imply what industry sectors more likely to have small versus large commercial users
- Use of SCP invoice data from 2019 as baseline for initial estimate of small versus large and then evolution from there
- Small users likely more vulnerable regardless of “vulnerability” otherwise.
 - Shock more complete in the small category
 - Also the quickest to grow again as establishments return with jobs growth
- Source: Bureau of Labor Statistics, [Quarterly Census of Employment and Wages](#)

Forecast: Large Comm Meters



Note: Shaded Area Forecast Window

Forecast: Small Comm Meters

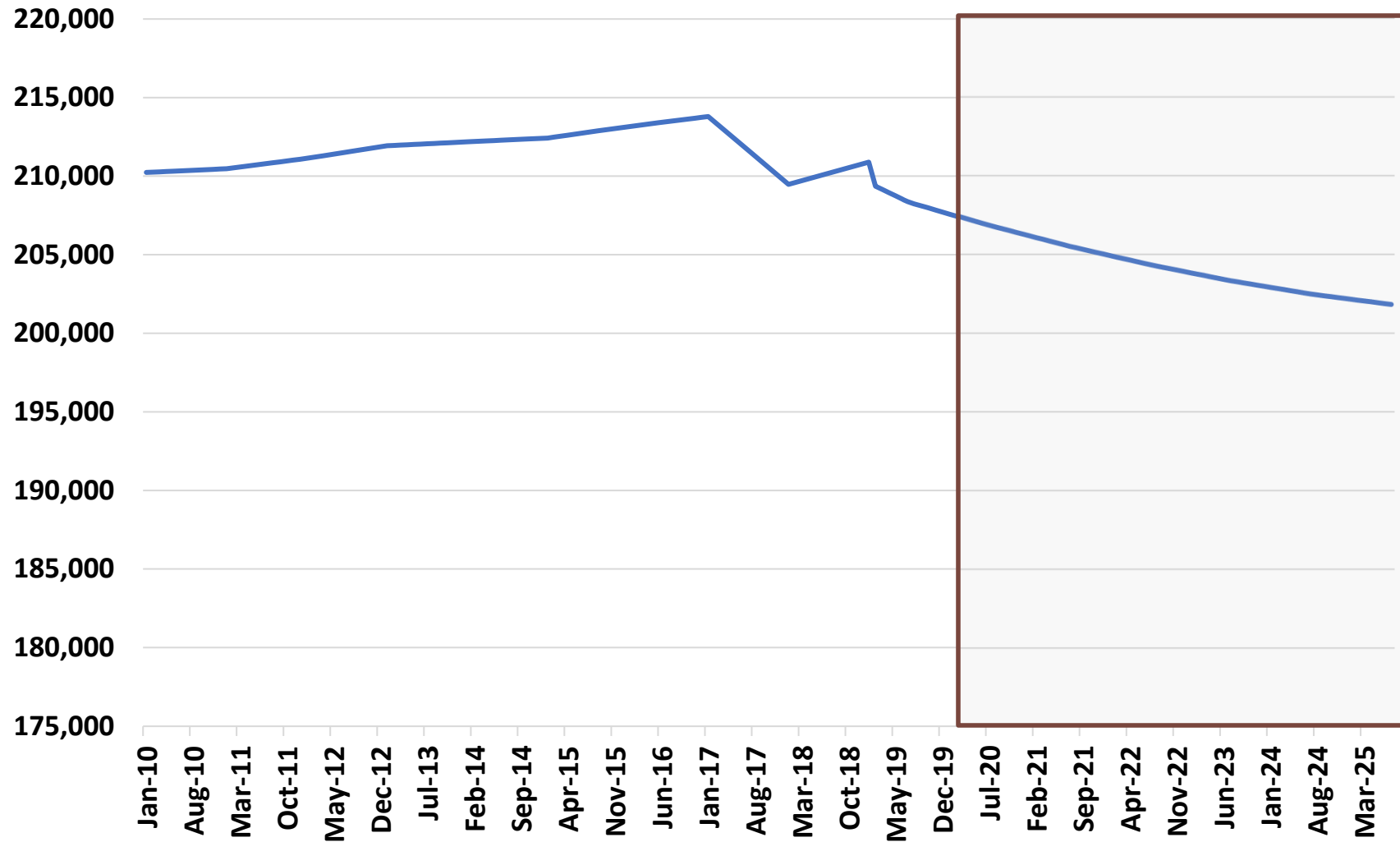


Note: Shaded Area Forecast Window

Occupied Housing Units

- Only a “median” forecast: long-term economic trends inside current demographic forecasts
- Past bi-annual data (CA DOF does two estimates, calendar year and then fiscal year) as foundation
- Use of population forecasts for Sonoma and Mendocino counties to 2030 by CA DOF
- Maintain percentage of occupied housing units in Healdsburg and Ukiah of respective county totals
- Hold people per household the same, as this parameter changes slowly
- Occupied housing units then a function of population growth (or devolution) using people per household to 2025
- Sonoma and Mendocino counties both slowly losing population
- Source: [California Department of Finance](#) (CA DOF)

Occupied Housing Units

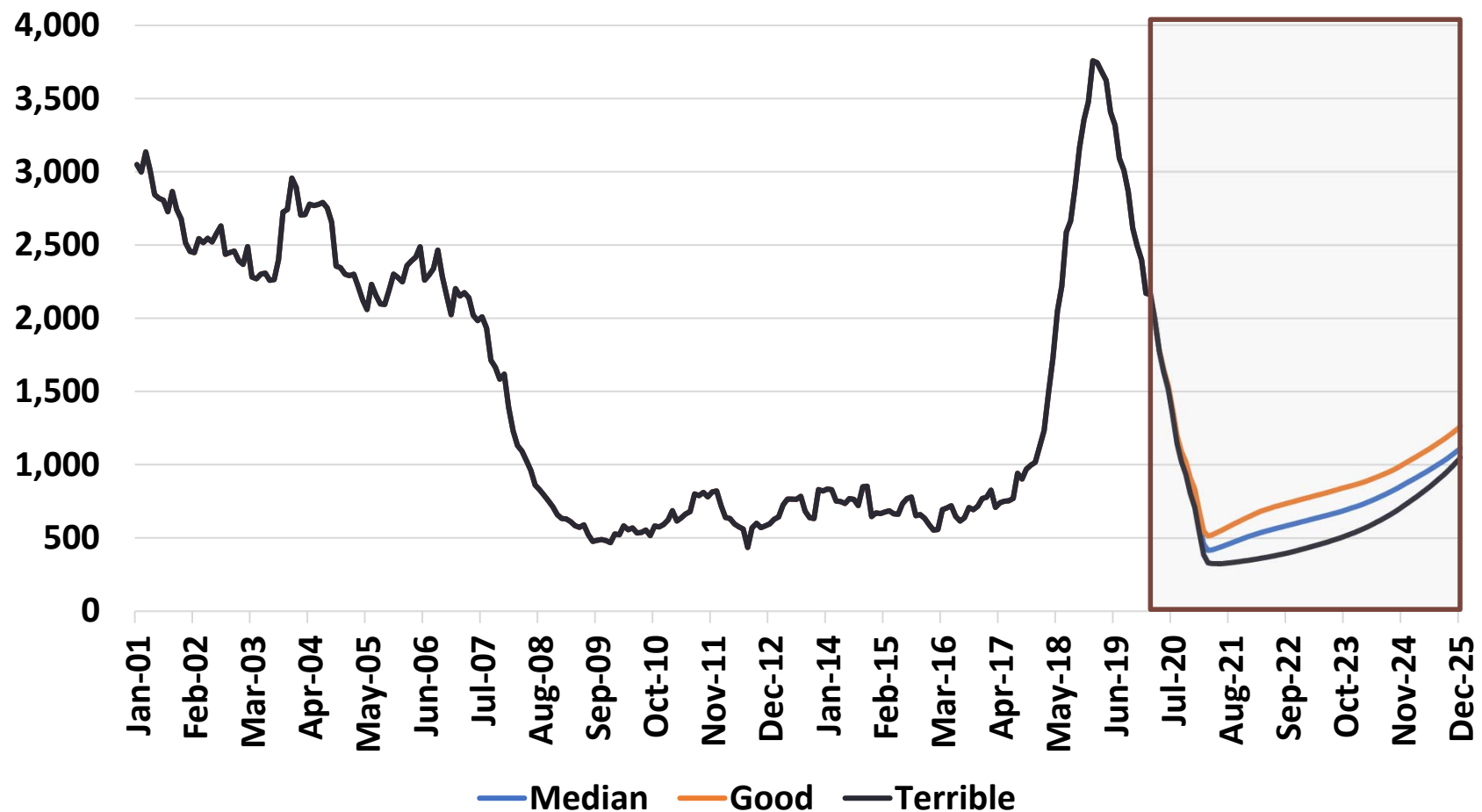


Permits

- Housing permits follow employment forecasts
 - Data show 12-month run rate
- Assume developers are going to use macroeconomic conditions and forecast to continue to pull permits
- Does not account for any additional natural disasters
- Assumes that solar is put on all new permits pulled after Jan 1, 2020
- Use of county unincorporated area data to add solar installs that are permitted by not tied to a housing unit
 - **Assume 9.5% of permits are for non-new residential solar**
- Permits growth assumed to change housing stock more slowly than permits growth (more permits pulled than new houses due to tear-downs and timing plus re-build activity)
- Sources: [Census Bureau](#) and County of Sonoma

Permits, 12-month Run Rate

SCP Area Forecasts: Permits

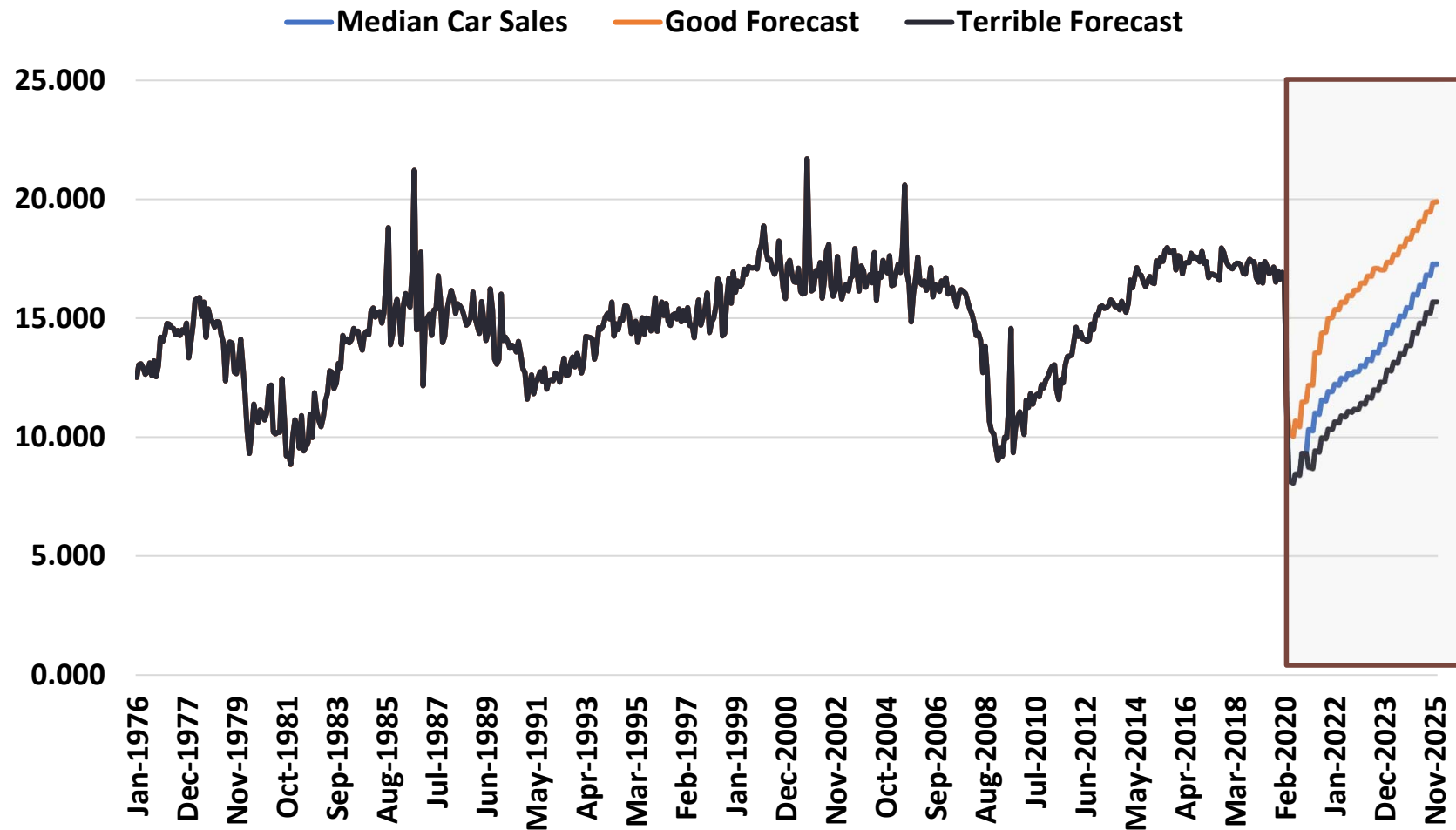


Note: Shaded Area Forecast Window

Electric Vehicles

- Use of unemployment rate to estimate car sales
 - Inversely related, ARMA process to estimate
- More reliable data is US, with California as a percentage of total car sales
- Electric car sales (plug-in) annual figure for CA, approximately 2 percent of overall car sales and rising
- 12 month run rate is how data are reported
- Assume plug-in sales in Sonoma and Mendocino counties follow overall CA sales
 - People from all over will access plug-in sites + overnight plug in at home
- Sources: US Department of Transportation, [Bureau of Transportation Statistics](#), US Department of Energy, [Alternative Fuels Data Center](#)

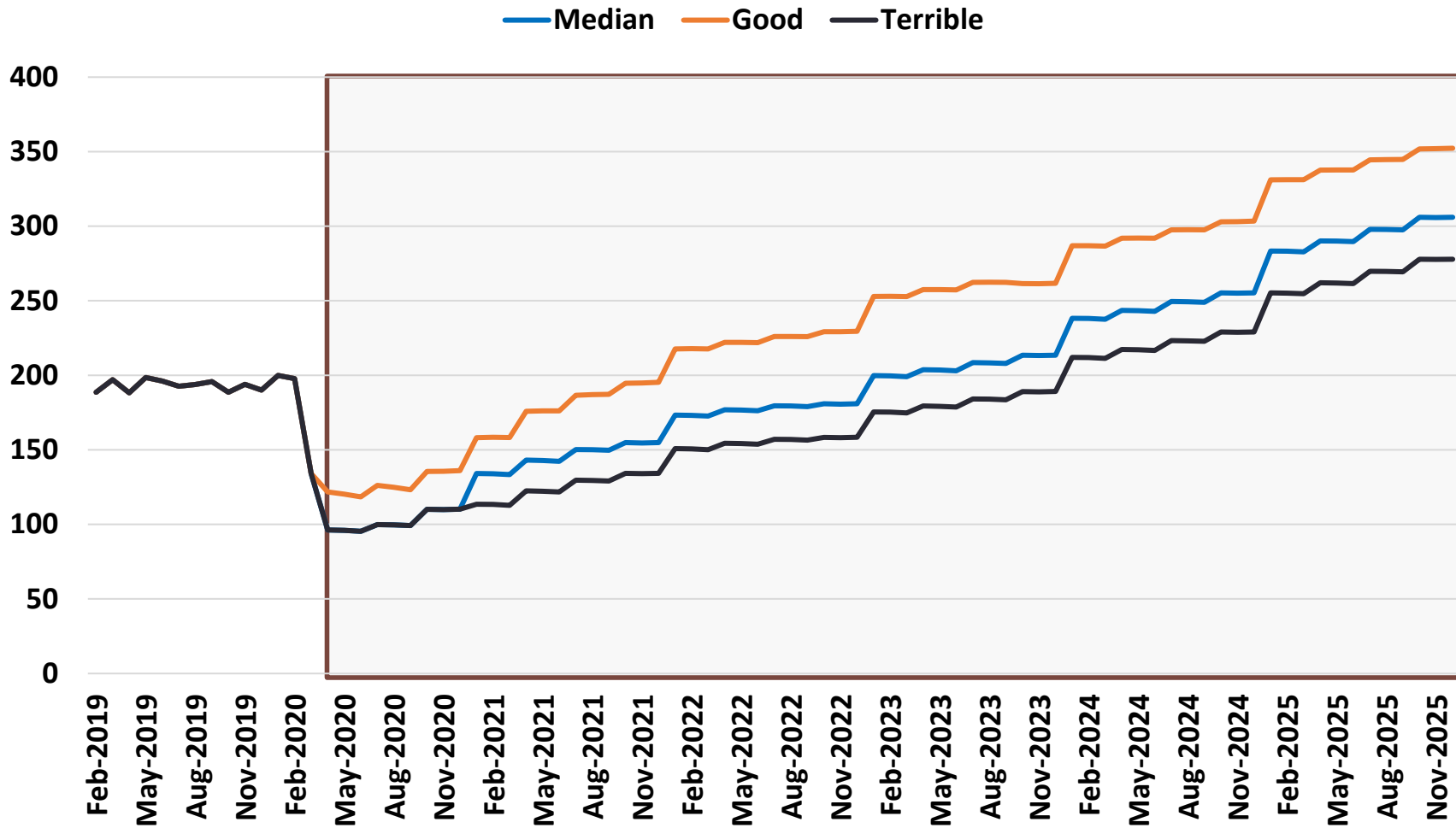
Vehicle Sales US, Millions of Units, 12-month Run Rate



Note: Shaded Area Forecast Window



EV Sales CA, Thousands of Units, 12-month Run Rate

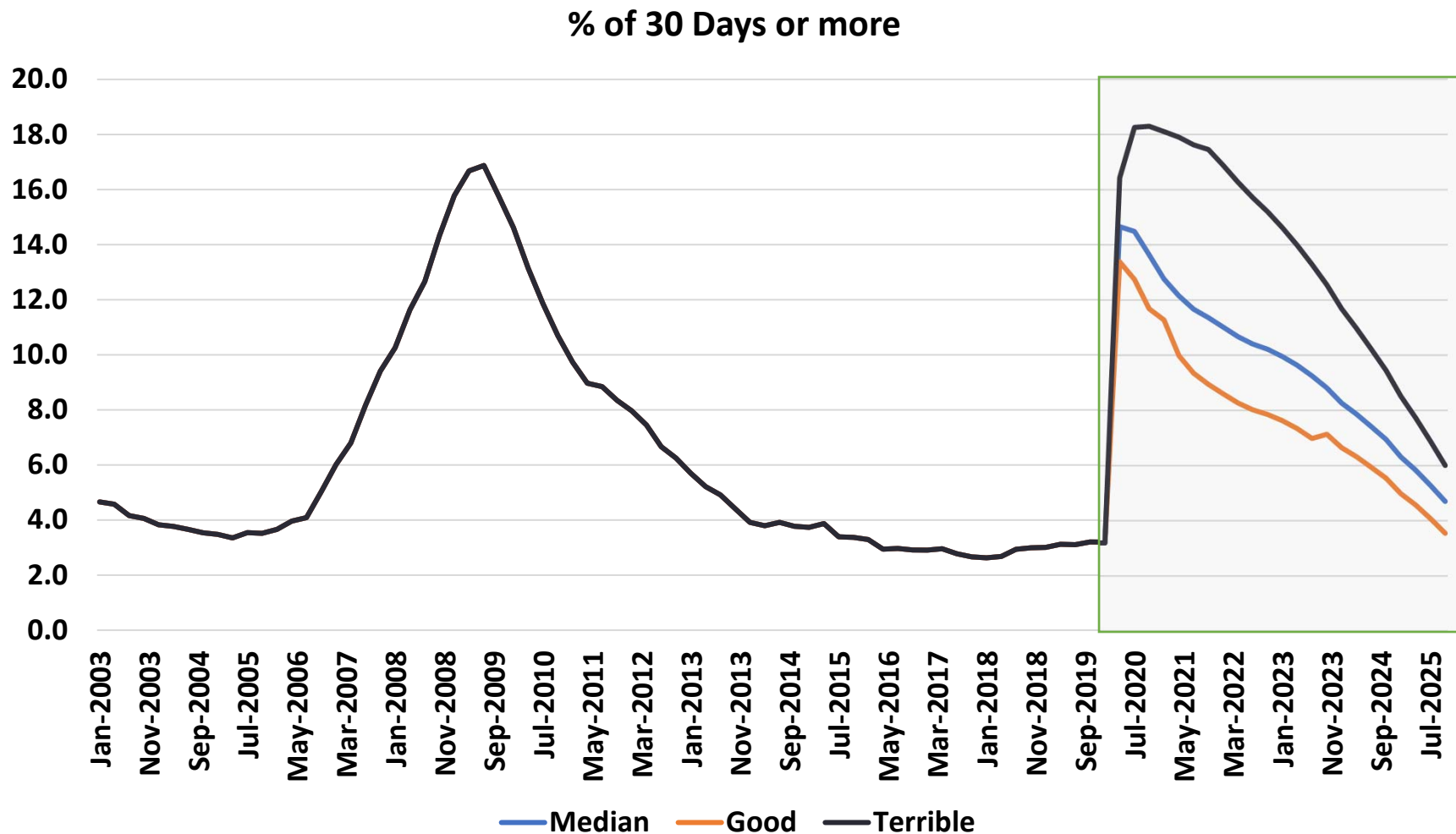


Note: Shaded Area Forecast Window

Delinquencies

- **Quarterly data for CA**
- Assume Sonoma and Mendocino counties follow CA averages
- Unemployment rate best macro variable connected to these data
- ARMA model again used for this, evolution of delinquencies connected to job loss or not
- Perhaps an indicator of delinquent billing
- Main Source = NY Federal Reserve, [Household Debt and Credit Report](#)

% Transition to 30 Days or more on Household Debt, Quarterly



Note: Shaded Area Forecast Window

Thanks!
Questions?
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