



Relationships and Trends between Applicant FPL and EV Purchase Prices

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Electric Vehicle Affordability Study

Purpose

The Clean Vehicle Rebate Project (CVRP), administered by the Center for Sustainable Energy (CSE) for the California Air Resources Board (CARB), provides rebates to California residents who purchase qualifying Zero Emissions Vehicles (ZEVs). The analysis conducted for this report is centered around identifying relationships between electric vehicle (EV) model price and CVRP applicant federal poverty level (FPL). The goal was to examine and test the relationships and trends, or lack thereof, between these variables to explore how the FPL of applicants may influence vehicle choices within CVRP and the EV market in general. CVRP participation data was used to identify what types of makes, models and price ranges are typically bought or leased by various FPL groups. For this analysis, only applications from January 1st, 2021, until March 19th, 2022, were considered to look at the most recent trends and applicant purchasing behavior. Federal poverty level (FPL) rather than participant income was also chosen for the analysis because FPL determines applicant eligibility to receive the Increased Rebate and considers the applicant's household size and household income, not just their individual income level.¹

Background Information

The CVRP Increased Rebate provides an additional rebate incentive to CVRP participants who are of low to moderate-income (LMI) status. The majority of CVRP recipients are not LMI. The eligibility requirements for applicants to receive this Increased Rebate changed on January 27th, 2021. The previous criteria for the Increased Rebate were applicants to be at or below 300% FPL. On January 27th in, 2021, the eligible FPL level for the Increased Rebate was raised to 400% or below.²

On December 3rd, 2019, the CVRP introduced a vehicle base MSRP cap of \$60,000 (excluding fuel cell electric vehicles). A second update was made to program eligibility requirements for vehicle base MSRP caps on February 24th, 2022, with a base MSRP of \$60,000 or less for large vehicles (minivans, pickups and SUVs) and \$45,000 or less for vehicles under the cars category (hatchbacks, sedans, wagons and two-seaters).³ Applicants that lease vehicles are still included in this analysis, and their vehicle MSRP is counted as the purchase price. Previous work by CSE examined the relationship between applicant income and vehicle purchase price pre-COVID. This report examines the relationship in a more recent context, focusing on 2021 and 2022.⁴

¹ Poverty Guidelines: U.S. Federal Poverty Guidelines Used to Determine Financial Eligibility for Certain Programs. ASPE. (n.d.). Retrieved May 25, 2022, from <https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines>

² Center for Sustainable Energy for the California Air Resources Board. (2021). Summary of CVRP Rebate Eligibility and Funding Availability Over Time. California Clean Vehicle Rebate Project. Retrieved May 25, 2022, from https://cleanvehiclerebate.org/sites/default/files/attachments/Disruptions_Fact_Sheet_9_2021.pdf

³ Clean Vehicle Rebate Project. (n.d.). Eligibility & requirements. Eligibility & Requirements | Clean Vehicle Rebate Project. Retrieved August 12, 2022, from <https://cleanvehiclerebate.org/en/eligibility-guidelines>

⁴ Tamerius, J. (2020), Applicant Income and After-Rebate Vehicle Price Trends, Center for Sustainable Energy. https://cleanvehiclerebate.org/sites/default/files/attachments/cvrp_income_msrp_report_3-5-21.pdf

Key Findings

Before conducting the analysis for this report, a stronger relationship between applicant FPL and vehicle purchase price was expected. Upon completing the analysis, it became clear that applicant FPL cannot be as indicative for the vehicle purchase price, make or model as one would think. The key findings for each main section are given below:

- **Linear Relationship Between Applicant Income and Vehicle Price**

When linear regression was performed on applicant FPL and vehicle purchase price, there was only a negligible or no relationship depending on the FPL group. This shows that applicant FPL cannot be a great indication of the vehicle purchase price. Overall, only 2% or less of the CVRP vehicle's purchase price could be determined by applicant income through modeling the linear relationship between the two.

- **Percentage of CVRP Applications by Vehicle Purchase Price**

Vehicles within the \$35k-\$40k range accounted for 12% of all CVRP vehicles, the \$40k-\$45k range accounted for 21%, the \$45k-\$50k range accounted for 12%, the \$50k-\$55k range accounted for 24%, and the \$55k-\$60k range accounted for 11%. Most vehicles in the CVRP fell within the \$40k-\$45k or \$50k-\$55k purchase price range. No vehicles fell below \$10k or above \$80k for the purchase price. When breaking down the percentage of CVRP Applications by vehicle purchase price for non-Tesla and Tesla vehicles, non-Tesla vehicles' purchase prices are more evenly distributed through low and mid-range prices than Tesla. From \$50k and up, Tesla vehicles have about double the percentage amounts compared to non-Tesla vehicles for each \$5k grouping. [See Figure 1](#) and [Figure 2](#).

- **Average Vehicle Purchase Price by FPL**

When breaking down the average vehicle purchase price by FPL for all vehicles in CVRP, differences were observed between groups. Those who were at or below 100% of the FPL had an average purchase price of \$45.2k, between 100-200% of the FPL had an average vehicle purchase price of \$44.2k, between 200-300% of FPL had an average purchase price of \$45.2k, and 300-400% FPL had an average vehicle purchase price of \$45.2k as well. Those at 400% and above of the FPL had an average purchase price of \$48.3k.

Non-Tesla participants below 400% FPL had an average purchase price of around \$40k, and above 400% FPL had an average price of \$44k. When excluding Tesla, the average purchase price dropped by at least \$5k for those below 400% and \$4.3k for those 400% FPL and above. [See Figure 3](#).

- **Difference Between Vehicle Purchase Price and Applicant FPL for Standard vs Increased Rebate Applicants**

Standard Rebate applicants purchased vehicles averaging \$48.1k, and Increased Rebate applicants purchased vehicles averaging \$44.7k. Note a difference of about \$3.4k, indicating that Increased Rebate applicants' vehicle purchase prices are about 7.07% lower. However, when comparing Standard Rebate applicants' FPL (760%) to Increased Rebate applicants' average FPL (245%), the 7.07% difference observed between purchase prices is hardly proportional to the

difference in FPL. Increased Rebate applicants had about a 68% lower FPL than their Standard Rebate counterparts. See [Figures 4](#) and [5](#).

For non-Tesla vehicles, Standard Rebate applicants purchased vehicles averaging \$43.8k and Increased Rebate applicants purchased vehicles averaging \$39.7k. This represents a difference of about \$4.1k, or Increased Rebate purchase vehicles' purchase price is about 9% lower. Comparing Standard Rebate non-Tesla applicant's FPL (789%) to Increased Rebate applicant's average FPL (243%), the differences are much larger. Increased Rebate applicants had about a 69% lower FPL compared to their Standard Rebate counterparts. See [Figures 6](#) and [7](#).

- **Purchase Price and Applicant FPL Income by Top 10 Most Common CVRP Vehicle Makes**
Among the top 10 most common makes, the highest average vehicle purchase prices by make were observed for Ford (\$52.2k), Tesla (\$50.4k) and Chrysler (\$47.3k). The lowest vehicle purchase prices by make were observed for Honda (\$36.2k), Chevrolet (\$36.9k) and Nissan (\$37.2k). See [Figure 10](#).

The makes with the highest average applicant FPL were Ford (753%), Toyota (694%) and Volkswagen (685%). The makes with the lowest average applicant FPL were Chevrolet (612%), Kia (613%), Chrysler (616%) and Honda (616%). Note that none of the average FPLs associated with makes included any that would fall within the LMI range of up to 400% of the FPL. This is because Standard Rebate recipients participate at higher rates than LMI individuals. See [Figure 11](#).

- **Purchase Price and Applicant FPL by Top 10 Most Common CVRP Vehicle Models**
The highest vehicle purchase prices for the top 10 most common models of CVRP were the Tesla Model Y (\$55.9k), Toyota Mirai Fuel Cell Vehicle (\$53.9k) and the Ford Mustang Mach-E (\$53.6k). The models with the lowest average purchase price were the Toyota Prius Prime (\$29.9k), Chevrolet Bolt EV (\$36.9k) and the Kia Niro Electric (\$41.9k). See [Figure 12](#).

The models with the highest average applicant FPL were the Toyota Mirai Fuel Cell Vehicle (840%), the Ford Mustang Mach-E (761%) and the Toyota Rav4 Prime (720%). The models with the lowest average applicant FPL were the Toyota Prius Prime (521%), Tesla Model 3 (599%) and the Chevrolet Bolt EV (608%). Note that none of the average FPLs associated with models included any that would fall within the LMI range of up to 400% of the FPL. This is because Standard Rebate recipients participate at higher rates than LMI individuals. See [Figure 13](#).

Methodology

Linear regression is used for modeling a relationship between an independent and dependent variable. In this analysis, linear regression was performed, FPL was the independent variable, and the vehicle purchase price was the dependent variable. Linear regression was also performed on applicant FPL, and

vehicle purchase price for the top 10 makes and models in CVRP. Only applications from January 1st, 2021, until mid-March 2022 were used. Federal poverty level (FPL) rather than participant income was chosen for the analysis because FPL determines applicant eligibility to receive the Increased Rebate and considers the applicant's household size and household income, not just their individual income level. FPL was also binned by increments of 100% for values under 400% in some analyses to be able to examine further differences within the LMI group, which is also the increased rebate group. Average purchase price and applicant FPL were also broken down into all vehicles, non-Tesla and Tesla, for some analyses to provide some more insight for CVRP moving forward since Tesla vehicles exceed the MSRP cap with recent price increases.

Linear Relationship Between Applicant FPL and Vehicle Price

The overall purpose of this report was to examine the relationship between the vehicle purchase price⁵ and applicant FPL. However, linear regression analysis was conducted, and the results showed there was not a strong relationship between the two at all. In fact, the linear relationship was extremely weak, or there was none at all. The linear regression was conducted between the purchase price and applicant FPL and then broken down more specifically by different FPL levels, the top 10 most common makes in CVRP and the top 10 most common vehicle models in CVRP. Overall, only 2% (a very low amount) of the CVRP vehicle's purchase price could be determined by applicant FPL through modeling the linear relationship. Interestingly, the applicant's FPL level did not significantly affect their vehicle purchase price, which was the initial assumption.

As stated above, all the linear regression analyses between the vehicle purchase price and applicant FPL level showed weak or negligible relationships. Those who were at 100% or less of the FPL exhibited an extremely small negative correlation between the vehicle purchase price and applicant FPL. However, it is still important to remember just how small this correlation was, with only 1.6% of total vehicles in this category being accounted for by applicant FPL.

Percentage of CVRP Applications by Vehicle Purchase Price

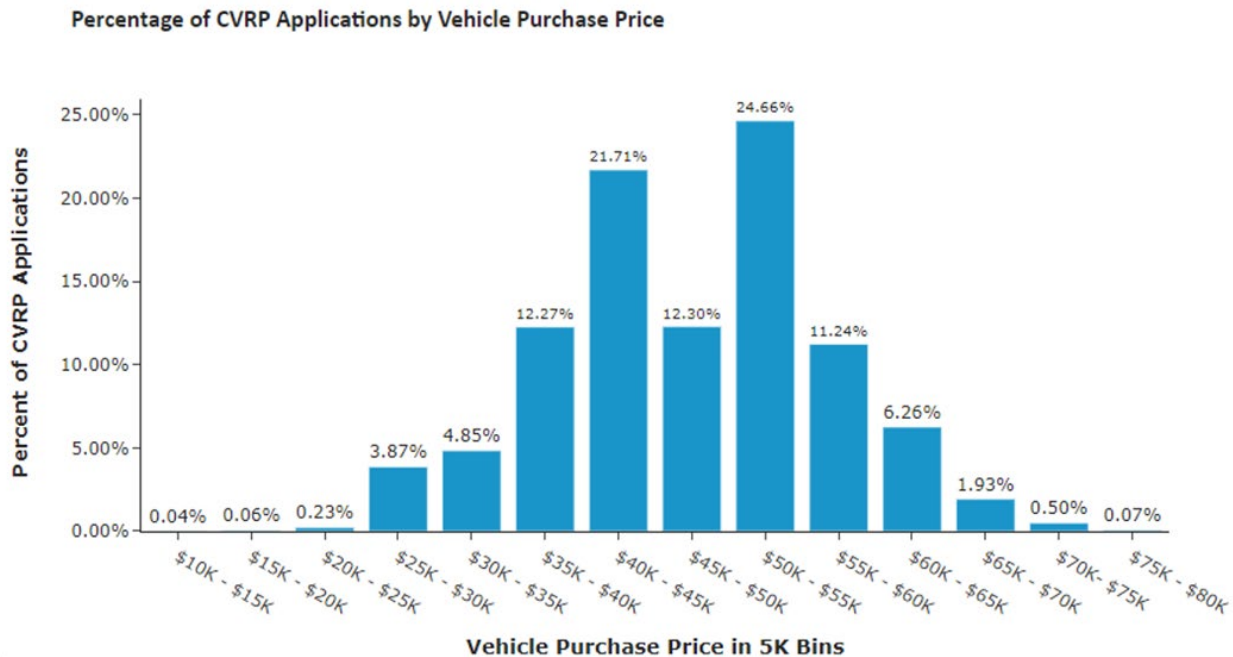
Referenced in [Figure 1](#), vehicles within the \$35k-\$40k range accounted for 12% of all CVRP vehicles, the \$40k-\$45k range accounted for 22%, the \$45k-\$50k range accounted for 12%, the \$50k-\$55k range accounted for 25%, and the \$55k-\$60k range accounted for 11%. Majority of vehicles in the CVRP fell within the \$40k-\$45k or \$50k-\$55k purchase price range. No vehicles fell below \$10k or above \$80k for the purchase price. Some vehicles did fall above the \$60k amount; however, the MSRP caps in CVRP are based on the vehicle base MSRP, not the actual vehicle purchase price.

The higher percentage observed for the \$40k-\$45k and the \$50k-\$55k groups, with a dip observed for the middle category of \$45k-\$50k, could be due to the variance in purchase prices between vehicles that are considered cars versus large vehicles. These results coincide with the new program eligibility requirements for CVRP made on February 24th, 2022, that placed MSRP caps of \$60,000 or less for large vehicles (minivans, pickups, and SUVs) and \$45,000 or less for vehicles under the cars category

⁵ Applicants that lease vehicles are still included in this analysis, and their vehicle MSRP is counted as the purchase price.

(hatchbacks, sedans, wagons, and two-seaters). The previous eligibility requirements placed a base MSRP cap of \$60,000 (excluding FCEVs) on December 3rd, 2019.

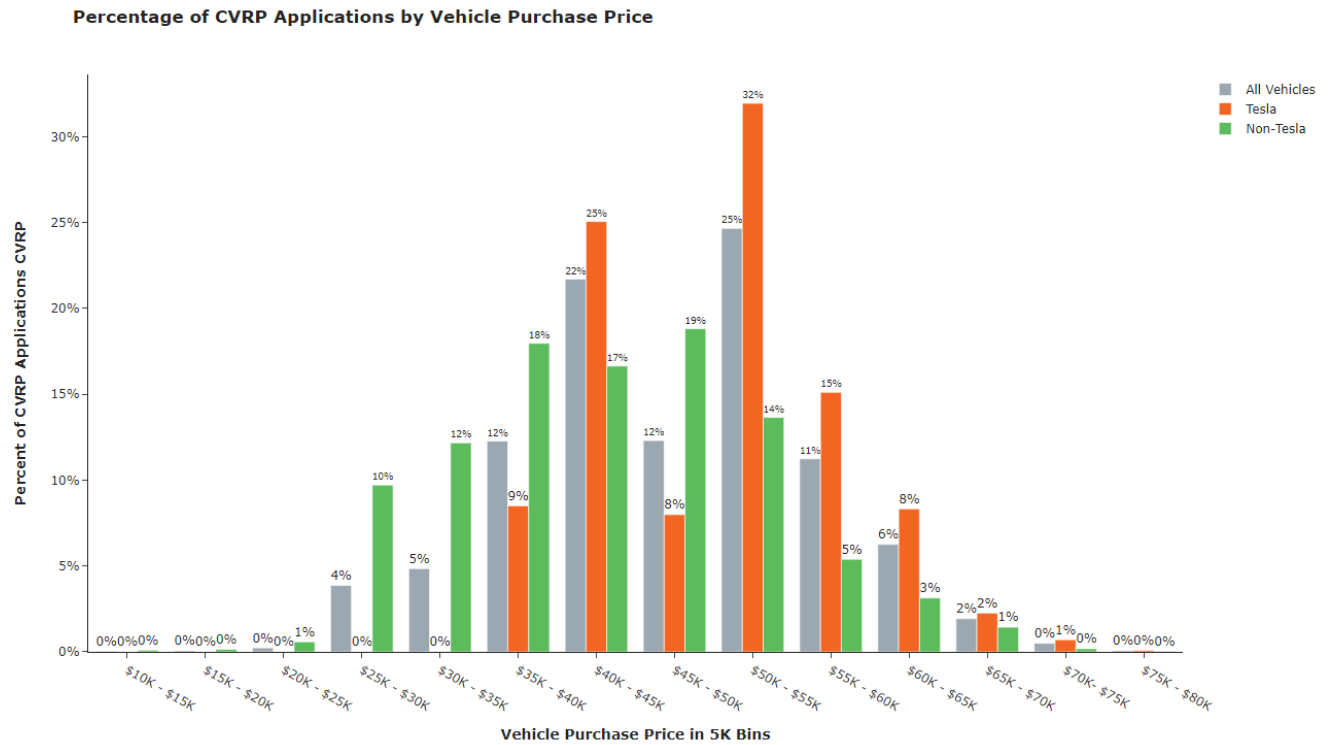
Figure 1
Percentage of CVRP Applications by Vehicle Purchase Price



Referencing [Figure 2](#), which breaks down the percentage of CVRP applications into vehicle purchase price bins by all vehicles, Tesla only and non-Tesla vehicles, there are some significant differences between values observed in Tesla and non-Tesla groups. Non-Tesla vehicles have most vehicles in the \$35-\$40k, \$40-\$45k, \$45-\$50k and \$50-\$55k range. This group does not have the same drop in values for vehicles in the \$45-\$50k range that Tesla does, which shows that moving forward the difference between car and SUV prices might not be a big indicator for vehicle distribution in the \$45-\$50k range where Tesla experience a significant drop in applications. Non-Tesla vehicles make up higher percentages of lower-priced vehicles in groups up to \$40k. Tesla vehicles have a much higher percentage of applications compared to non-Tesla vehicles when looking at groups within the \$50k and up range. Tesla vehicles have around double the percentage observed as non-Tesla vehicles in the more expensive vehicle groups.

Figure 2

Percentage of CVRP Applications by Vehicle Purchase Price by Tesla vs. Non-Tesla

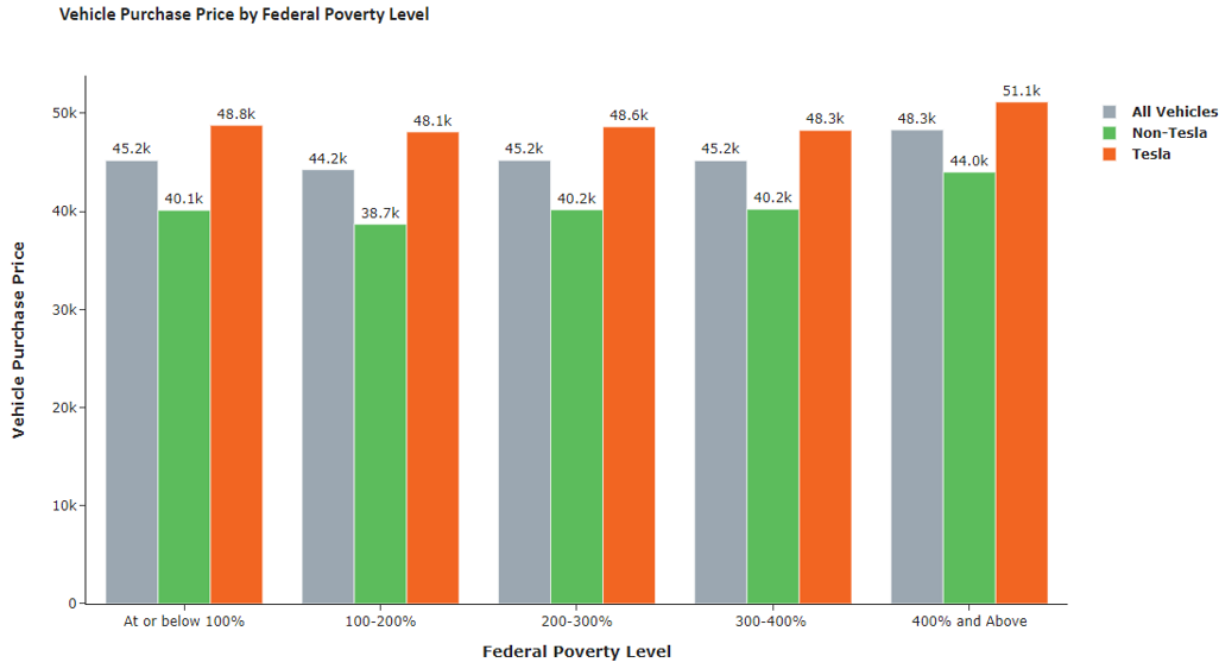


Average Vehicle Purchase Price by FPL

Referenced in [Figure 3](#), which breaks down average vehicle purchase price by FPL, there were differences observed between FPL groups for all vehicles. Those who were at or below 100% of the FPL had an average purchase price of \$45.2k, between 100-200% of the FPL had an average vehicle purchase price of \$44.2k, between 200-300% FPL had an average purchase price of \$45.2k, and 300-400% FPL had an average vehicle purchase price of \$45.2k as well. Those who were at 400% and above of the FPL had an average purchase price of \$48.3k. The difference between these groups was determined to be statistically significant by conducting an ANOVA analysis. Interestingly, the 400% and above FPL group had a higher vehicle purchase price, but, notably, vehicle price did not go up as the FPL increased for the other groups. It even decreased for the 100-200% FPL group.

When separating out vehicle purchase prices by FPL groups for all vehicles, Tesla and non-Tesla, non-Teslas have a lower average vehicle purchase price in every FPL group. Non-Tesla vehicles exhibit the same trend as all vehicles for having similar average purchase prices for those below 400% of the FPL (around \$40k) and an increase in the purchase price for those above 400% of the FPL (\$44k). When Tesla vehicles are excluded, the average purchase price drops by at least \$5k for all groups below 400% FPL and is eligible for the increased rebate. The average vehicle purchase price for those above 400% FPL dropped by around \$4k when Tesla vehicles were excluded.

Figure 3
Vehicle Purchase Price by Federal Poverty Level



Difference Between Vehicle Purchase Price and Applicant FPL for Standard vs. Increased Rebate Applicants

Until January 27th 2021, applicants at or below 300% of the FPL were eligible for the Increased Rebate. From January 27th, 2021, onwards, applicants at 400% or below the FPL were eligible to receive the increased or additional rebate.

Referenced in [Figure 4](#), Standard Rebate applicants purchased vehicles averaging \$48.1k and Increased Rebate applicants purchased vehicles averaging \$44.7k. Note a difference of about \$3.4k, or Increased Rebate purchase vehicles' purchase price is about 7% lower. However, in [Figure 5](#) when comparing Standard Rebate applicant's (760%) to Increased Rebate applicants' average FPL (245%), the differences are much larger. Increased Rebate applicants had about a 68% lower FPL compared to their Standard Rebate counterparts.

Figure 4

Average Vehicle Purchase Price for Standard vs. Increased Rebate: All Vehicles

Vehicle Purchase Price for Standard vs Increased Rebate: All Vehicles

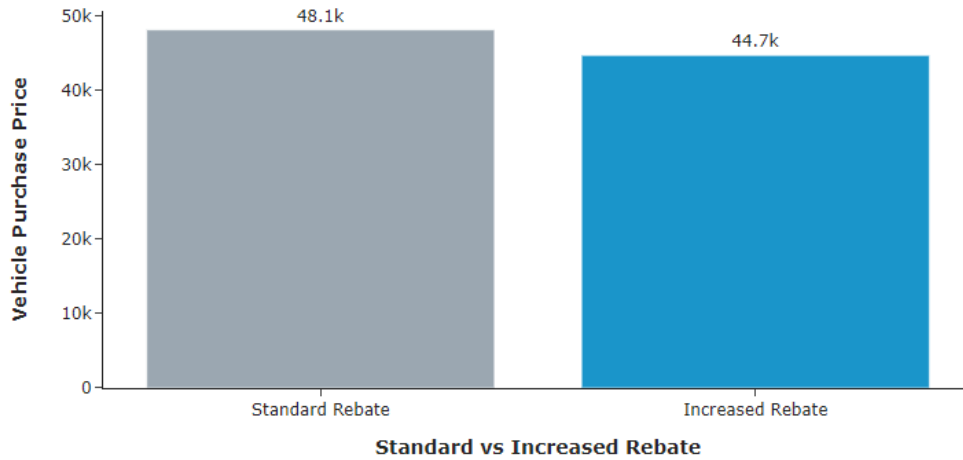
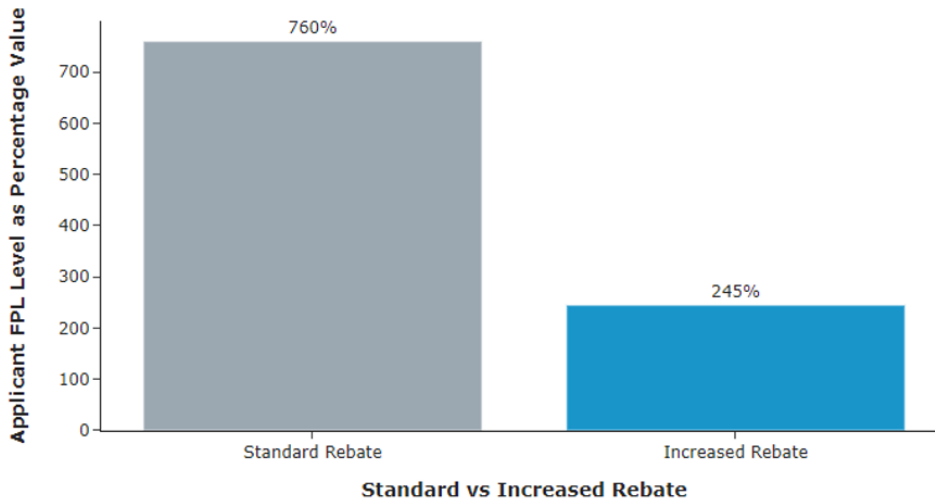


Figure 5

Average Applicant FPL for Standard vs. Increased Rebate: All Vehicles

Applicant FPL for Standard vs Increased Rebate: All Vehicles



Referenced in [Figure 6](#), Standard Rebate applicants with non-Tesla vehicles purchased vehicles averaging \$43.8k and Increased Rebate applicants purchased vehicles averaging \$39.7k. Note a difference of about \$4.1k, or Increased Rebate purchase vehicles' purchase price is about 9% lower. However, in [Figure 7](#) when comparing Standard Rebate applicant's FPL (789%) to Increased Rebate applicants' average FPL (243%), the differences are much larger. Increased Rebate applicants had about a 69% lower FPL compared to their Standard Rebate counterparts for non-Tesla vehicles.

Figure 6

Average Vehicle Purchase Price for Standard vs. Increased Rebate: Non-Tesla

Vehicle Purchase Price for Standard vs Increased Rebate: Non-Tesla

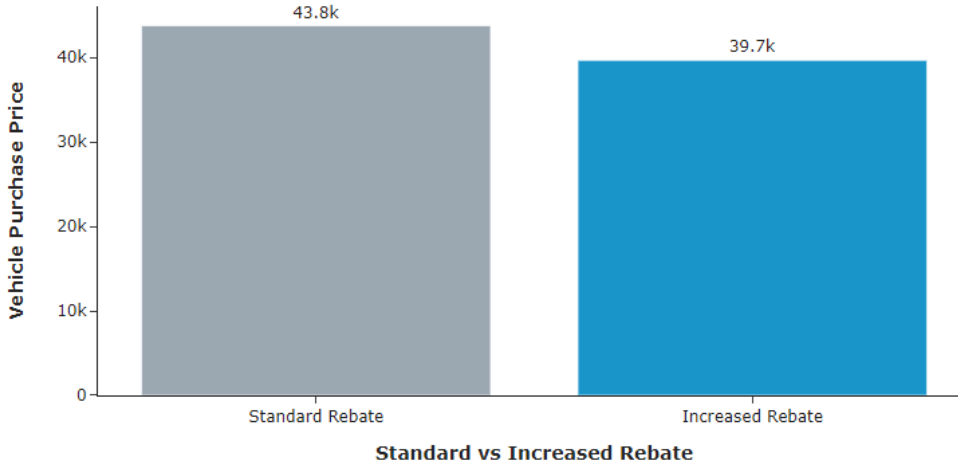
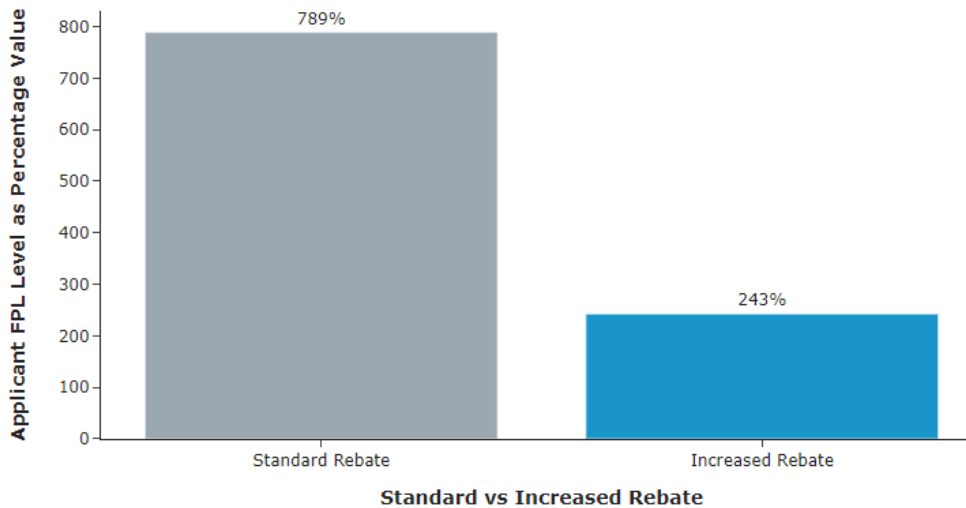


Figure 7

Average Applicant FPL for Standard vs. Increased Rebate: Non-Tesla

Applicant FPL for Standard vs Increased Rebate: Non-Tesla



Referenced in [Figure 8](#), Standard Rebate applicants who purchased Tesla vehicles averaged \$50.9k for the purchase price, and Increased Rebate applicants averaged \$48.3k. Note a difference of about \$2.6k, or Increased Rebate purchase vehicles' purchase price is about 5% lower. However, in [Figure 9](#) when comparing Standard Rebate applicant's FPL (741%) to Increased Rebate applicants' average FPL (246%), the differences are much larger. Increased Rebate applicants had about a 67% lower FPL compared to their Standard Rebate counterparts for Tesla vehicles.

Figure 8

Average Vehicle Purchase Price for Standard vs. Increased Rebate: Tesla

Vehicle Purchase Price for Standard vs Increased Rebate: Tesla

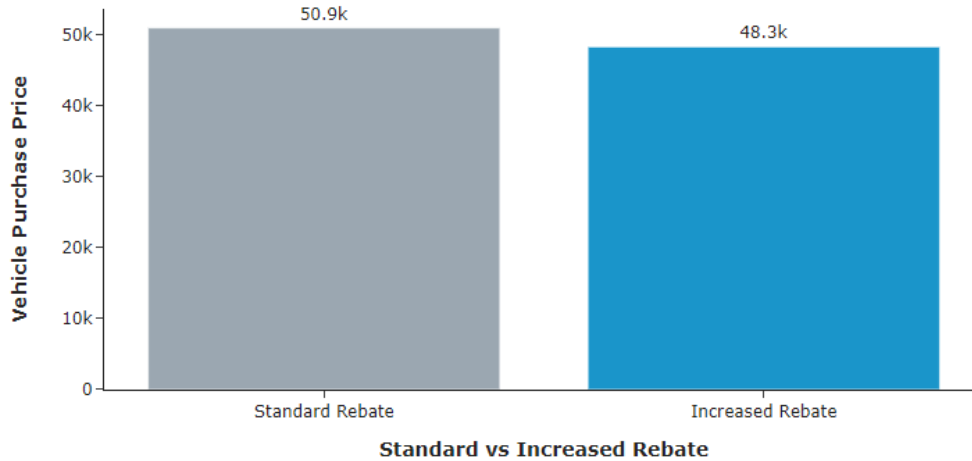
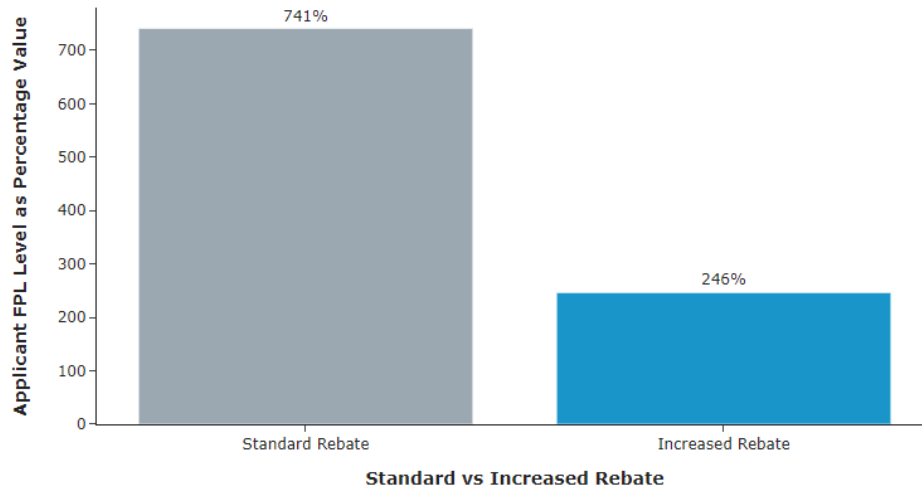


Figure 9

Average Applicant FPL for Standard vs. Increased Rebate: Tesla

Applicant FPL for Standard vs Increased Rebate: Tesla



Purchase Price Applicant FPL and by Top 10 Most Common CVRP Vehicle Makes

The ten most common CVRP makes, highest to lowest, are Tesla, Toyota, Chevrolet, Hyundai, Ford, Volkswagen, Kia, Honda, Nissan, and Chrysler. Referenced in [Figure 10](#), the top three highest vehicle purchase prices by make were observed for Ford (\$52.2k), Tesla (\$50.4k) and Chrysler (\$47.3k). The

lowest vehicle purchase prices by make were observed for Honda (\$36.2k), Chevrolet (\$36.9k) and Nissan (\$37.2k).

Referenced in [Figure 11](#), the highest average applicant FPL by make were observed for Ford (753%), Toyota (694%) and Volkswagen (685%). The lowest average applicant FPL by make were observed for Chevrolet (612%), Kia (613%), Chrysler (616%) and Honda (616%).

Referenced in [Table 1](#), which is a summation of the information presented in previous Figures [10](#) and [11](#), it is evident that applicant FPL and purchase price do not always coincide. For example, Tesla is the second-highest average purchase price but is 5th when it comes to applicant FPL level. Ford was the only make in the top three for both categories. Chevrolet and Honda were the only two automakers in the bottom three for both categories.

Figure 10
Average Vehicle Purchase Price by Make

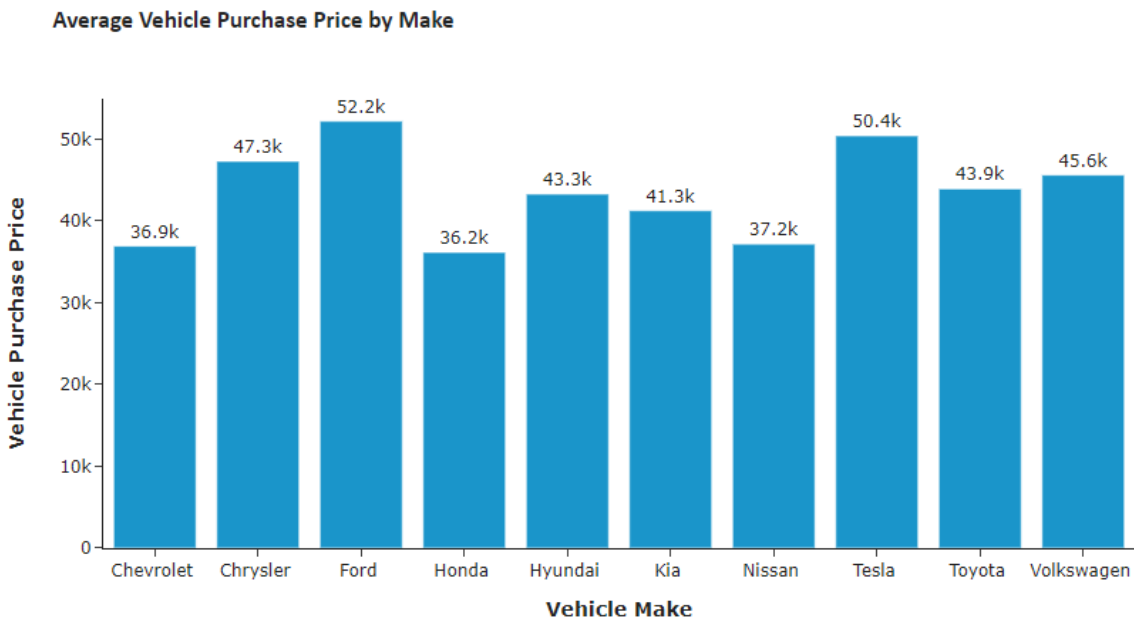


Figure 11
Average FPL Level of Applicants by Make

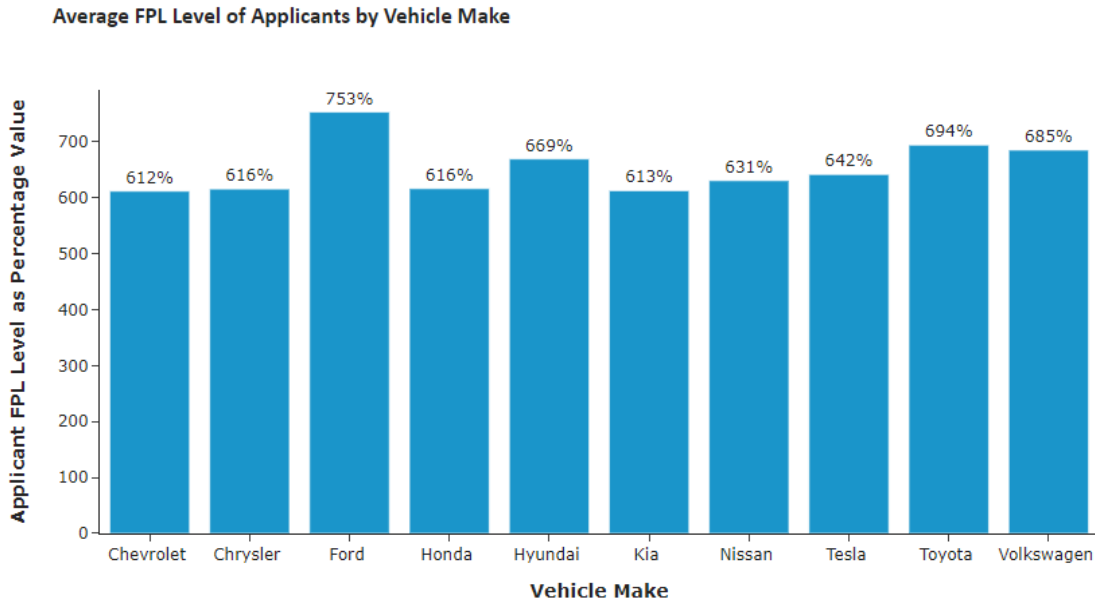


Table 1
Summary of Figures 10 and 11 with Sample Sizes

	Purchase Price	Applicant FPL	Sample Size
Chevrolet	\$36.9k	612%	3,525
Chrysler	\$47.3k	616%	491
Ford	\$52.2k	753%	1,742
Honda	\$36.2k	616%	867
Hyundai	\$43.3k	669%	1,874
Kia	\$41.3k	613%	988
Nissan	\$37.2k	631%	673
Tesla	\$50.4k	642%	27,825
Toyota	\$43.9k	694%	5,918
Volkswagen	\$45.6k	685%	1,475

Purchase Price and Applicant FPL by Top 10 Most Common CVRP Vehicle Models

The top 10 most common vehicle models in CVRP, in order of most to least common, are Tesla Model Y, Tesla Model 3, Chevrolet Bolt EV, Toyota RAV4 Prime, Toyota Prius Prime, Toyota Mirai Fuel Cell Vehicle, Ford Mustang Mach-E, Volkswagen ID.4, Hyundai Kona Electric, and the Kia Niro Electric. The highest vehicle purchase prices were the Tesla Model Y (\$55.9k), Toyota Mirai Fuel Cell Vehicle (\$53.9K), and the Ford Mustang Mach-E (\$53.6k). The vehicles with the lowest average purchase price were the Toyota Prius Prime (\$29.9k), Chevrolet Bolt EV (\$36.9k) and the Kia Niro Electric (\$41.9k). See [Figure 12](#).

The models with the highest average applicant FPL were the Toyota Mirai Fuel Cell Vehicle (840%), the Ford Mustang Mach-E (761%) and the Toyota Rav4 Prime (720%). The vehicles with the lowest average applicant FPL were the Toyota Prius Prime (521%), Tesla Model 3 (599%) and the Chevrolet Bolt EV (608%). See [Figure 13](#).

Looking at [Table 2](#), which is a summation of the information presented in previous Figures [12 and 13](#), it is evident that applicant FPL and purchase price do not always coincide by vehicle model either. The Ford Mustang Mach-E and Toyota Mirai Fuel Cell Vehicle were in the top three for both categories. The Chevrolet Bolt EV and Toyota Prius Prime were in the bottom three for both categories.

Figure 12
Average Vehicle Purchase Price by Model

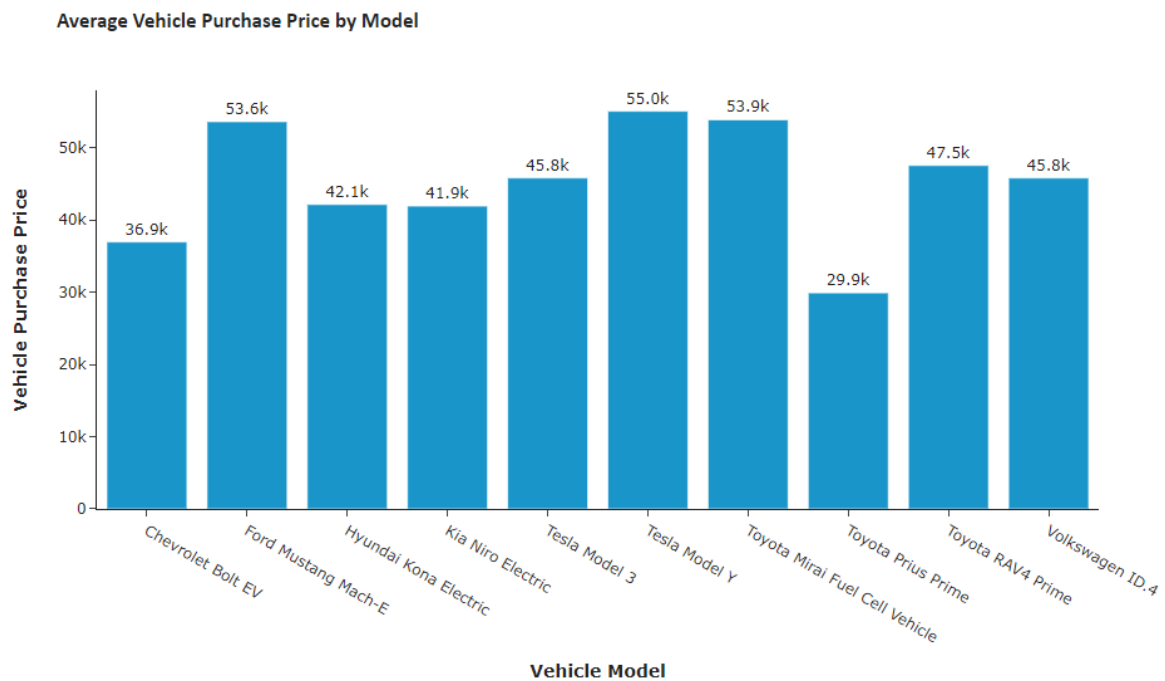


Figure 13
Average FPL of Applicants by Vehicle Model

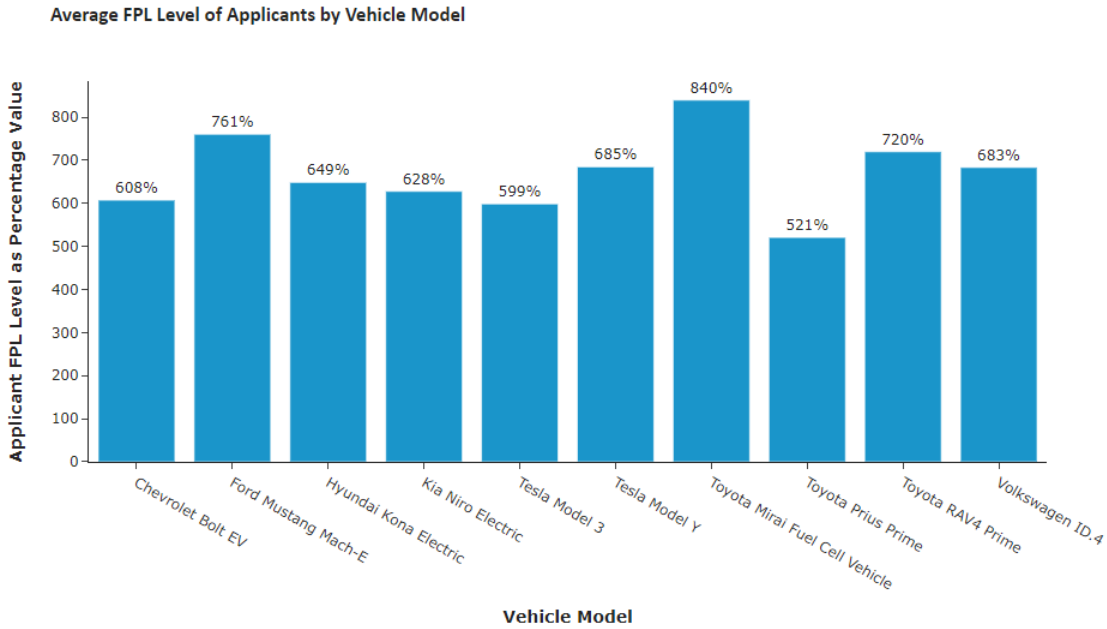


Table 2
Summary of Figures 12 and 13 with Sample Sizes

	Purchase Price	Applicant FPL	Sample Size
Chevrolet Bolt EV	\$36.9k	608%	3,313
Ford Mustang Mach-E	\$53.6k	761%	1,596
Hyundai Kona Electric	\$42.1k	649%	1,044
Kia Niro electric	\$41.9k	628%	786
Tesla Model 3	\$45.8k	599%	13,962
Tesla Model Y	\$55.0k	685%	13,863
Toyota Mirai Fuel Cell Vehicle	\$53.9k	840%	1,832
Toyota Prius Prime	\$29.9k	521%	1,867
Toyota RAV4 Prime	\$47.5k	720%	2,218
Volkswagen ID.4	\$45.8k	683%	1,459

Conclusion

While there were statistically significant differences between the average vehicle purchase price and applicant FPL group, there was not a strong linear relationship between the two variables, even when broken down by FPL groups, the vehicle makes and vehicle models. This analysis of CVRP data from January 2021 onwards shows that CVRP applicant FPL cannot be a good linear indication for the purchase price of vehicles. However, when looking at averages aggregated into groups above and below 400% FPL, applicants who were below 400% of the FPL, and therefore receiving an Increased Rebate, did purchase vehicles that were lower in price than applicants receiving a Standard Rebate.

In previous work done by CSE pre-COVID, CSE found similar results: the linear relationship between applicant FPL and vehicle purchase price was weak or negligible.⁶ It is somewhat surprising that the relationship between FPL and vehicle purchase price is not more consistent and that many lower-income applicants purchase higher-priced vehicles. This could partly be because there are base MSRP caps, thus excluding any high price vehicles that could strengthen the relationship between income and vehicle purchase price.

The average vehicle purchase price of applicants who received an Increased Rebate was only 7% lower compared to Standard Rebate applicants, and their FPL was 71% lower. This finding shows that EV purchase prices take up a significant portion of Increased Rebate applicants' income, thus being less affordable. The average purchase price for Increased Rebate vehicles was \$44.7k, and \$48.1k for Standard Rebate vehicles. Excluding all Tesla vehicles did yield different values, with averages coming in lower at \$43.8k for Standard Rebates and \$39.7k for increased rebates. Some Increased Rebate applicants are purchasing more expensive vehicles, which is surprising considering there are lower-priced EVs (like the Chevrolet Bolt and the Toyota Prius) available and well known.

Comparing applicant FPL, income and purchase price across the ten most common makes and models in CVRP also did not yield any meaningful results in terms of lower-income individuals purchasing lower-priced cars. Specifically, while some vehicles or models may have been the most or least expensive to purchase, that did not always coincide with the applicant's FPL or income level. It is evident that while there may be some relationship between income and vehicle purchase price, it is not a strong one and can even vary between different makes and models.

Recommendations

On average, vehicle prices for Increased Rebate recipients were \$3.4k lower than Standard Rebate recipients, but there was no linear relationship between the two. Moving forward with program design, forecasting or marketing, it is important to know that there is not a strong or significant linear relationship between applicant FPL and vehicle purchase price. The relationship between those two variables cannot be assumed when thinking about past, present or future CVRP applications. While this may seem counterintuitive, this is what data has shown, and the assumption that applicants with higher FPL status will purchase more expensive cars cannot be supported fully. A future analysis could be valuable as the EV market continues evolving to evaluate if additional product availability changes purchasing habits.

⁶ Tamerius, J. (2020), Applicant Income and After-Rebate Vehicle Price Trends, Center for Sustainable Energy. https://cleanvehiclerebate.org/sites/default/files/attachments/cvrp_income_msrp_report_3-5-21.pdf