**Maximizing Value When Buying a Used Car**

When considering the purchase of a used car, two critical factors come into play: longevity and cost-effectiveness. In this essay, we delve into data analysis to guide our decision-making process.

**Data Collection and Variables**

We collected data from the cars.com website, amassing approximately 10,000 data points. Our variables include brand, model, year, mileage, deal rating, and price. Armed with this information, we aim to identify the most cost-effective car brand and model.

**Brand Analysis**

1. **Top 18 Brands:**
   * We narrowed our focus to the top 18 car brands.
   * Prices across these brands exhibited non-normal distributions, and the assumption of constant variance was false.
   * Employing a nonparametric KW-test, we discovered significant average price differences.
   * Notably, BMW stood out as significantly more expensive than Chevrolet, Ford, Toyota, and Nissan.

**Regression Insights**

1. **Predictors:**
   * Our regression model considered three predictors: deal rating, mileage, and year.
   * Given the positively skewed price distribution, we opted for a Gamma regression model.
2. **Deal Rating:**
   * “Good” and “great” deal ratings correlated with higher prices compared to “fair.”
   * Deal rating also impacted mileage: “fair” deals had less mileage than “good.”
   * Our recommendation: prioritize cars with a “fair” deal rating for affordability and lower mileage.

**Brand Comparison**

1. **Cost-Effective Brands:**
   * Nissan and Toyota emerged as the most budget-friendly brands.
2. **Toyota Models:**
   * Among Toyota models, the Camry, Corolla, and Rav4 were popular choices.
   * The Camry demonstrated impressive longevity.
   * The Rav4 commanded a higher price but offered reliability.
3. **Final Recommendation:**
   * If brand isn’t a primary concern, choose a car with a “fair” deal rating.
   * For those considering brand reputation, the Toyota Camry strikes a balance between affordability and longevity.

In conclusion, armed with these insights, you’re well-equipped to make an informed decision when buying a used car.