

Appraisal Engine's Cash Value Scarcity Factor



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To develop a scarcity index for adjusting a vehicle's value based on its availability within a certain radius, we need to consider several factors. The scarcity index could be influenced by the total number of vehicles of a specific model available for sale, the demand for that model, and perhaps the geographic size of the area you're considering. Here's a basic approach to devising such a formula:



Step 1: Define Variables

1. **A** = Total number of vehicles of the specific model available for sale within the radius.

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2. **D** = Demand for the vehicle model. This could be a more complex factor to quantify and might involve historical sales data, search frequency, etc.
3. **R** = Radius (in miles or kilometers) within which the availability is being measured.
4. **V_b** = Base value of the vehicle without considering scarcity.

Step 2: Calculate Scarcity Factor (SF)

The Scarcity Factor (**SF**) reflects how scarce the vehicle is within the specified radius. A straightforward approach could be inversely related to the number of vehicles available, adjusted by the demand.

$$SF = \frac{D}{A}$$

This formulation implies that as the availability (**A**) decreases, or as the demand (**D**) increases, the scarcity factor goes up, indicating a rarer find.

Step 3: Adjust Vehicle Value Based on Scarcity

To adjust the vehicle's value based on scarcity, we could use the scarcity factor to adjust the base value of the vehicle (**V_b**).

$$V_a = V_b \times (1 + k \times SF)$$

Here, **V_a** is the adjusted vehicle value, and **k** is a constant that determines how strongly the scarcity factor affects the vehicle's value. The value of **k** needs to be determined based on market research or experimentation, aiming to reflect how scarcity realistically impacts prices in the vehicle market.

Step 4: Consideration for Geographic Radius

The radius (**R**) could play a role in adjusting the scarcity factor, especially in large geographic areas. You might want to normalize the scarcity based on the area size or adjust **k** based on the radius to reflect that scarcity impacts are less pronounced in larger areas:

$$k = k_0 \times f(R)$$

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Where k_0 is the base sensitivity of the value to the scarcity factor, and $f(R)$ is a function that adjusts this sensitivity based on the radius. For example, $f(R)$ could decrease as R increases, reflecting that a vehicle being scarce in a larger area is less significant than being scarce in a smaller area.

Additional Considerations

- **Market Trends:** The scarcity index could be further refined by incorporating broader market trends or specific events that may affect vehicle demand.
- **Data Availability:** Reliable data on demand (**D**) and the number of available vehicles (**A**) are crucial for this formula to be effective.
- **Local Factors:** Consider local factors that may affect vehicle demand, such as economic conditions, which could be integrated into the demand variable (**D**) or as an additional factor in the formula.