A. Proof that Equilibrium Is Unique When Consumers Don’t Care about Survival (γ = 1)

When γ = 1, Equation 3 becomes \( a(p - c) = 1 + \exp(\delta - ap) \). The left-hand side increases monotonically in \( p \), while the right-hand side falls monotonically in \( p \) and is larger than the left-hand side when \( p = c \), its minimum value. Thus the optimal price is unique. In Equation 2, \( \sigma \) disappears from the left-hand side when \( \gamma = 1 \). Thus the derivative of the left-hand side with respect to \( \xi \) is \(-1 + r < -1 \). The derivative of the right-hand side with respect to \( \xi \) is \(-(1 - F(\xi)) > -1 \), so this side falls slower in \( \xi \) than the left-hand side. Because the left-hand (right-hand) side falls from \( \infty \) to \(-\infty \) (\( \infty \) to 0) as \( \xi \) rises from \(-\infty \) to \( \infty \), the two sides of the equation have a unique crossing \( \bar{\xi} \).

B. Examples of How Parameters \( a, c, \) and \( \delta \) Affect Equilibrium Uniqueness and Multiplicity

Price sensitivity \( a \):
Marginal cost $c$:

Mean utility $\delta$:

C. Data Sources

Total market size, $M$:
\( M = 13.493 \text{ million. From U.S. “New Vehicle Sales and Leases” series, Bureau of Transportation Statistics.}


Debt service obligation, \( b \):

\( b = $4.5938 \text{ billion. From “Financial Highlights - Exhibit 1 General Motors Company and Subsidiaries Supplemental Material,” (http://media.gm.com/content/dam/Media/gmcom/investor/2010/Q1FinancialHighlights.pdf). The number was obtained from multiplying the sum of “short-term borrowings,” “current portion of long-term debt,” and “long-term debt” from the consolidated balance sheet as of 3/31/09, by } r = 10 \text{ percent, which we take to be a reasonable rate on a consol analog to the entire reported composition of short- and long-term GM debt.}

Survival probability \( \sigma \):

We averaged daily five-year maturity credit default swap (CDS) spreads on GM debt over 1/1/08-12/31/08. These data were obtained from Thomson Financial DataStream. Assuming risk-neutrality, CDS spreads reflect the market’s perception of default probabilities. Thus GM’s average CDS spread over 2008 was 3217.5 basis points implies a survival probability of 0.67825.

New car price \( p \):

From

http://www.carbuyersnotebook.com/archives/2008/02/average_new_vehicle_cost_1.htm,

which is itself based on the Comerica Auto Affordability Index data.

GM’s operating margin:
The margin we used, 3 percent, is a rough average of GM’s reported operating margins over 2004-2008.