The Evolution of Market Power in the US Auto Industry

Greico, Murry & Yurukoglu (Working Paper, 2021)

Research Questions

- How has the US automobile industry changed over the last 40 years?
- What do these changes imply for consumer welfare?

Approach

- Estimate a BLP demand model allowing for heterogeneity in product and consumer characteristics
  - Study both domestic and foreign produced autos (make-model-year)
  - Price instrument: real exchange rate
  - Year effects capture the mean utility of new autos (τ_t) and value of outside good (γ_t)
  - Require assumptions of no collusion and static Nash-Bertrand equilibrium
- Infer markups and measure consumer surplus to study changes in industry performance and welfare

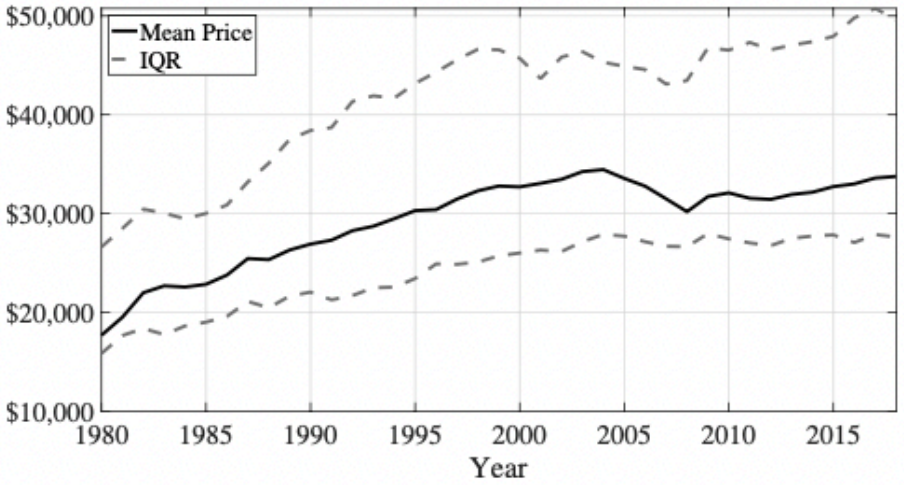
Data

- Consumer data gathered from several sources
  - Annual new car purchases from 2 sources (expenditure surveys)
  - Reported second choices (survey by research and marketing firm)
- Automobile market data on sales, prices, product characteristics etc.
- Household demographics from Current Population Survey

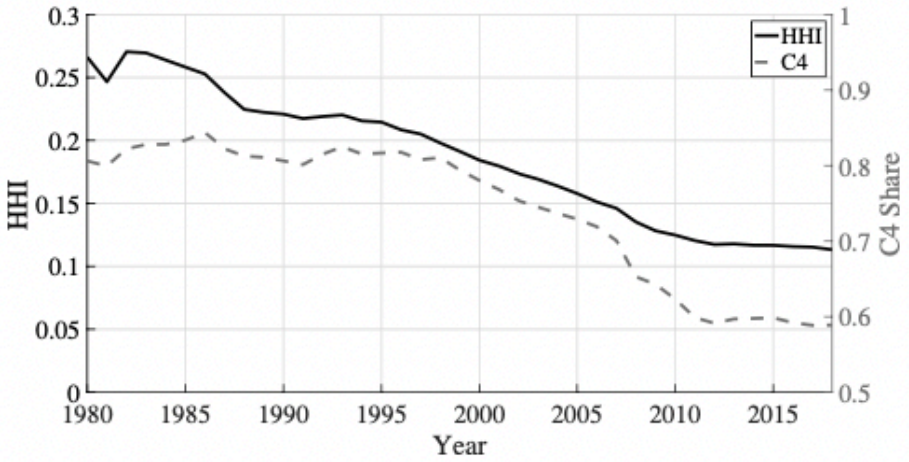
Note: data on second-choice auto purchases provides many more moment conditions that allow the model to estimate a larger number of parameters

Higher prices, lower concentration

Figure 2: Prices and Market Structure, 1980-2018



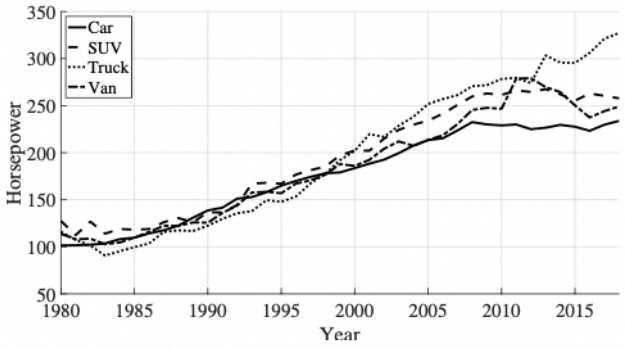
(a) Prices



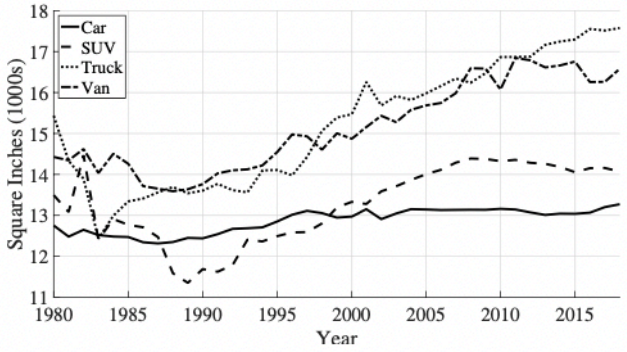
(b) Measures of Concentration

Product quality has increased

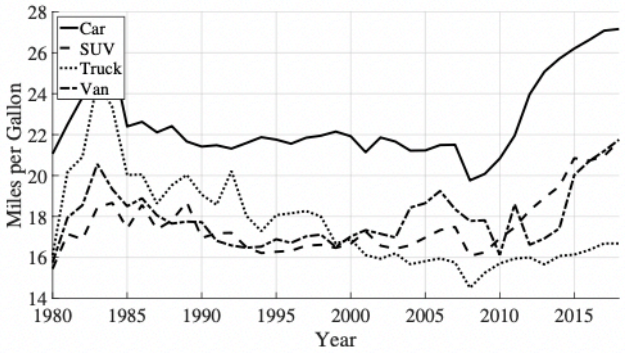
Figure 3: Physical Vehicle Characteristics, 1980-2018



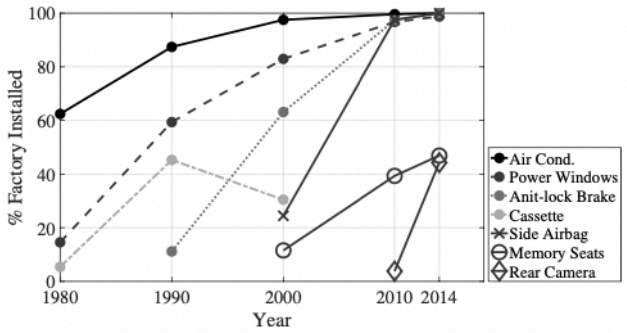
(a) Horsepower



(b) Size (length × width)



(c) Fuel Economy



(d) Additional Factory Installed Features

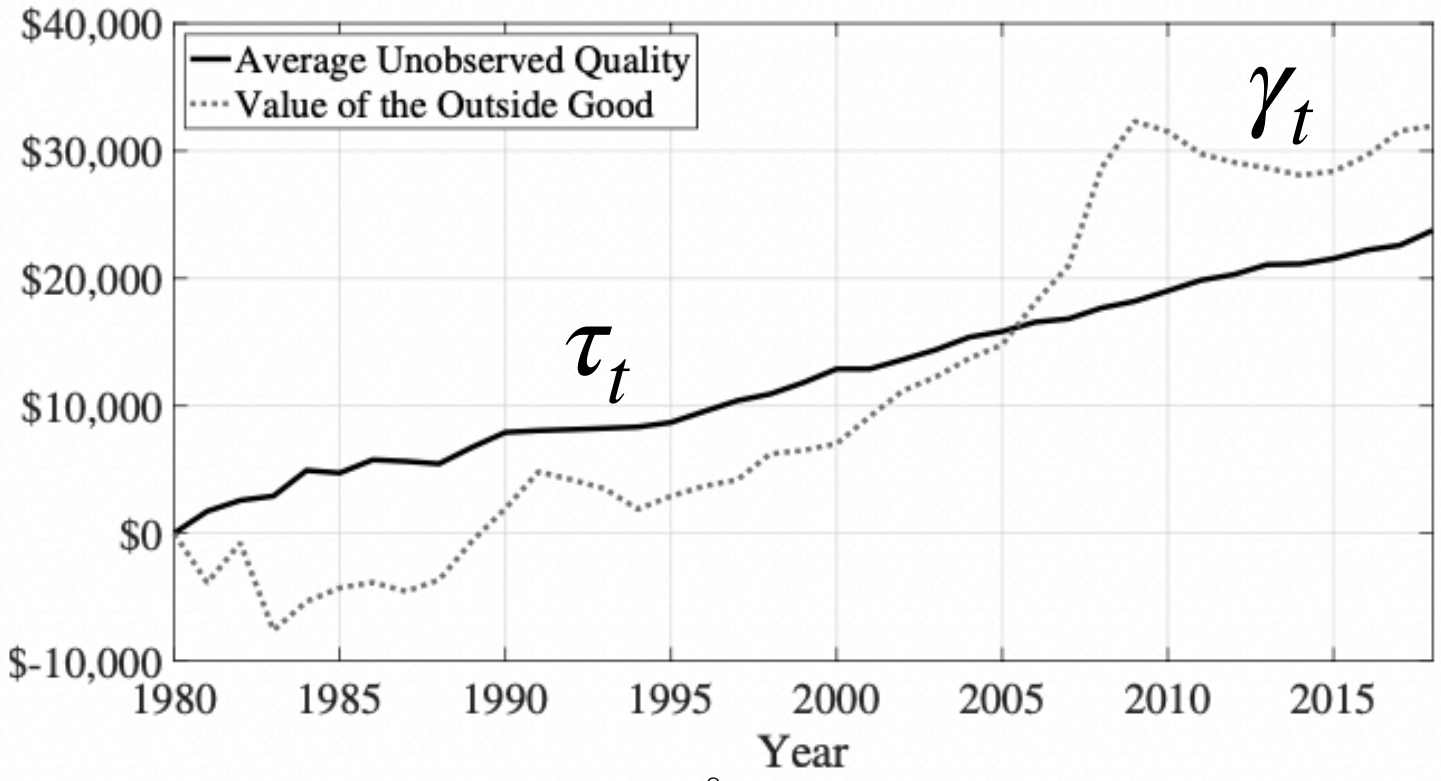
Model

- Utility function: $u_{ijt} = \beta_i' x_{jt} + \alpha_i p_{jt} + \xi_{jt} + \epsilon_{ijt}$
- Product quality: $\xi_{jt} = \tau_t + \Delta\xi_{jt}$
- Outside good: $u_{i0t} = \gamma_t + \epsilon_{i0t}$
- BLP model: $u_{ijt} - u_{i0t} = \beta_i' x_{jt} + \alpha_i p_{jt} + \boxed{\tau_t - \gamma_t} + \Delta\xi_{jt} + \epsilon_{ijt} - \epsilon_{i0t}$

Need an additional restriction to separate time-effects; assume that $\mathbb{E}[\xi_{jt} - \xi_{jt-1}] = \mathbb{E}[(\tau_t - \tau_{t-1}) + (\Delta\xi_{jt} - \Delta\xi_{jt-1})] = 0$ and $\tau_0 = 0$

Time effects

Figure 4: Quality and Aggregate Components of Time Effects



Own-price elasticities

Table 5: Own Price Elasticities by Income Quintile Over Time

	Income Quintile				
Year	1	2	3	4	5
1980	-5.96	-5.78	-5.49	-5.13	-4.30
2000	-8.24	-7.83	-7.40	-6.88	-6.21
2018	-9.37	-8.56	-7.69	-6.90	-6.46

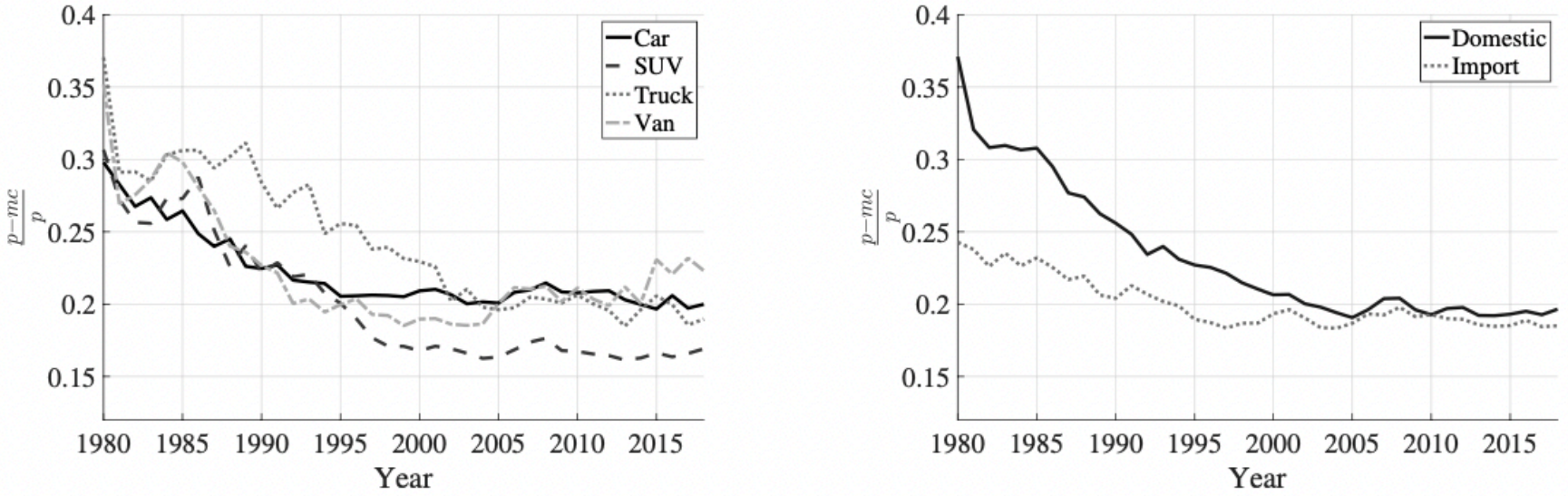
Notes: This table reports the mean own price elasticity across products individuals conditional on income quintile of individuals in each reported year.

Auto industry has become more price elastic over time

Higher income individuals are less sensitive to price

Markups have fallen

Figure 6: Markups over Time



(a) Markups by Vehicle Style

(b) Markups by Import Status

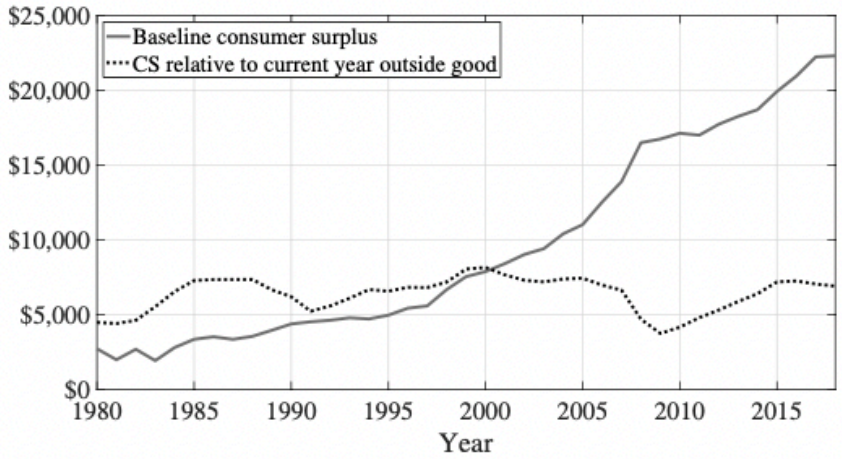
Note: Median markups across all vehicles. Vehicle style defined in the text. "Domestic" are those cars produced in the U.S., regardless of brand headquarters.

Consumer surplus

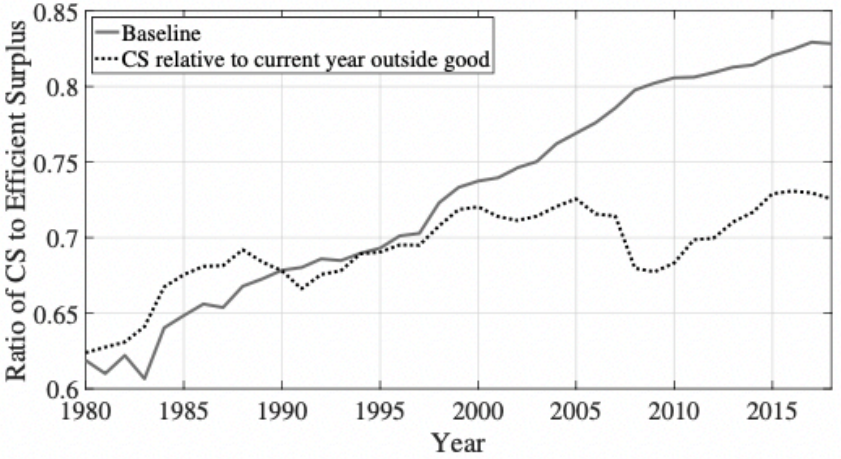
- CS_t is measured relative to the value of the non-purchase option γ_t
- Change in consumer surplus over time is thus sensitive (and inversely related) to $\Delta\gamma_t$
- Remove the influence of changes in outside good over time by averaging over the outside good across all years

Increase in consumer welfare

Figure 11: Consumer Surplus Comparison



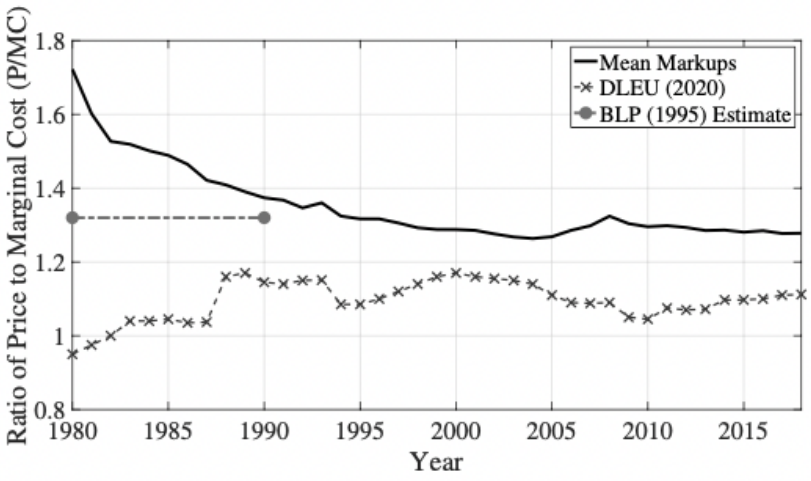
(a) Consumer Surplus Comparison



(b) CS as a Share of Total Available Surplus

Notes: Panel (a) displays consumer surplus computed two ways: the baseline definition described in the text, and consumer surplus computed as the compensating variation to the current year outside good. Panel (b) displays the ratio of consumer surplus to total efficient surplus both way, where efficient surplus is computed as consumer surplus when prices equal estimated marginal costs of production, vehicle by vehicle.

Vs. Production Approach



(a) Price over Marginal Cost

- Intermediate inputs may not be fully flexible
- Each firm produces a single product
- Accounting costs do not accurately capture true production costs
- No data on foreign-produced autos
- No direct measure of welfare changes

Conclusion

"Most importantly, to speak to the broader question of the performance of antitrust and industry regulation, more long term studies of specific industries are necessary. While broad based studies using accounting or production data are important and attractive due to their feasibility, specific industry studies are useful to validate measurements. Furthermore, as proxies for welfare such as concentration or markups can be misleading in an environment where products are improving over time, specific industry studies often lend themselves to direct welfare calculations thereby avoiding the use of proxy measurements."