Industrial Policy with Home Market Advantage

Eugenio J. Miravete[1] María J. Moral[2]

[1]University of Texas at Austin & CEPR

[2]UNED & GRiEE

CRETE, July 2023

Motivation

- The Washington Consensus is dead (fiscal discipline, deregulation, competition, free trade).
- The Biden administration continued the Trump administration trade war with China despite its documented negative effects on prices and earnings of industrial workers.
- Passage of the *CHIPS and Science Act* in August of 2022 marked the clearest shift in American trade policy in decades.
- *CHIPS* was America's stark response to supply chain disruptions after the Covid-19 pandemic, allocating a budget of $280bn in new funding for research and manufacturing of semiconductors in the United States with the explicit goal of countering China's dominance in this strategic industry.

Motivation

- The end of globalization and the rise of protectionism has given way to an increased interest in long forgotten industrial policy as a mean to develop strategic economic sectors.
- Industrial policy might enhance welfare in non-competitive industries.
- Policymakers frequently argue that their interventions can booster economies of scale and/or consumer learning and favor domestic production and employment.
- Economists remain skeptical and perhaps for that reason do not study the subject enough.

Relevant Papers

- Choi and Levchenko (2023):
  - Evaluate the effect of loan guarantees to the Heavy and Chemical Industry in South Korea between 1973 and 1979.
  - They show that this temporary policy intervention relaxed financial constraints of the firm and prompted productivity through learning-by-doing.
  - South Korea's *Foreign Capital Inducement Act* had long-lasting effects, with subsidized firms growing faster than others well over 30 years after the policy ended.

Relevant Papers

- Jia Barwick, Kalouptsidi and Bin Zahur (2023):
  - They study the transformation of China's shipbuilding industry after the 11th (2006-2010) and 12th (2011-2015) national five-year plan as a *pillar industry in need of special oversight and support.*
  - Finding 1: Production and investment decisions were helpful in increasing China's worldwide market penetration.
  - Finding 2: Entry subsidies was mostly wasteful as it induced inefficient entry (about 60% of the financial support of the program).

Relevant Papers

- Preference for locally produced goods:
  - Bronnenberg, Dhar and Dubé (2009).
  - Coșar, Grieco, and Tintelnot (2018).
- Imports substitution:
  - Atkin and Donaldson (2015).
- Gravity models and border frictions:
  - Anderson and Wincoop (2003).
  - Balistreri and Hillberry (2007).
  - Coșar, Grieco, and Tintelnot (2015).
  - McCallum (1995).
  - Wolf (2000).

This Paper

- Document timing and duration of induced dynamic effects:
  - Immediate national home bias effect after entry.
  - Home market advantage disappears with trade liberalization.
  - Intranational home bias is smaller but permanent in the long run.
- Evaluate size of long term, steady-state, distortion in the 2010s of an industrial policy designed in the 1950s.
- Exploit a unique automobile registration data by (50) provinces in Spain going back to the dawn of the Spanish automobile industry, from 1961 to 2015.

Historical Background

- 1936-1939: Spanish Civil War.
- 1939-1959: Adoption of autarkic economic model.
- 1941: INI (Instituto Nacional de Industria).
  - 1950 SEAT (INI 51%, FIAT 7%, local banks 42%).
  - 1951 RENAULT.
  - 1951 CITROËN.
- 1959: Collapse of the autarkic economic model.
  - Near default.
  - IMF + WB led liberalization plan is adopted.
  - Spanish GDP grew at a yearly average of 6.2% between 1958 and 1973 (automobiles at 21%).
  - 359,000 registered passenger cars in 1961 (*vs.* 24.7 million in 2020).

Spanish Automobile Industry

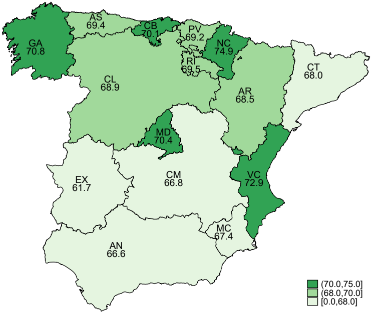
- Many other automobile manufacturers located in Spain.
- Fifth largest in the world at the end of the 1990s.
- Second largest in the EU after Germany (about 3 million cars produced a year).
- Spain produces 60 vehicles per 1,000 people *vs.* 34 in the U.S.
- Combined with automobile parts, it amounts to 8% of GDP and 20% of exports.
  - (There is a lot at stake as the EU pushes for electrification!).
- Documented regional market segmentation in an institutionally homogeneous market where local governments cannot award subsidies or set any differentiated industrial policy.

Local Automakers

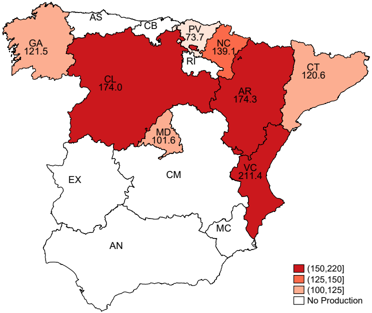
					Market Shares		
Group	Brands	Year	Location	Domestic Models	Region	SP	Dom
DAIMLER	MERCEDES*	1981	País Vasco	Clase V-Viano§	2.06	2.75	5.47
	SMART						
GM	OPEL*	1980	Aragón	Corsa, Meriva, Mokka, Adam	13.52	7.75	41.29
	CHEVROLET$^{(a)}$						
FORD	FORD*	1974	Valencia	Fiesta, Focus, Ka, Mondeo, S-Max§, Kuga†	16.89	7.96	97.62
	VOLVO$^{(b)}$						
NISSAN	NISSAN*	1987	Cataluña	Pathfinder, Pulsar†	6.64	4.88	4.52
PSA	CITROËN*	1957	Galicia	C-Elysée, C-Picasso§	8.97	7.93	56.08
	PEUGEOT*	1954	Madrid	C3, 207, C4§	8.31	8.44	56.08
RENAULT	RENAULT*	1951	Castilla-León	Clio, Laguna, Megane, Twingo, Captur§	14.78	8.46	79.53
	DACIA						
VW	VW*	1984	Navarra	Polo	12.44	8.97	25.70
	SEAT*	1950	Cataluña	Exeo, Toledo, Altea§, Ibiza§, León§	10.73	9.05	96.58
	AUDI*	2011	Cataluña	Q3	4.76	4.43	11.21
	SKODA						

Notes: Year and regional market where firms located, models produced locally, and local and national market shares of each brand for 2009-2015. The last column, Domestic, indicates the percentage of all domestic sales of this brand that are actually produced in Spain. Brands produced in Spain are marked by *, while models exclusively produced in Spain for the worldwide and European markets are identified by § and †, respectively.

Intranational Home Bias



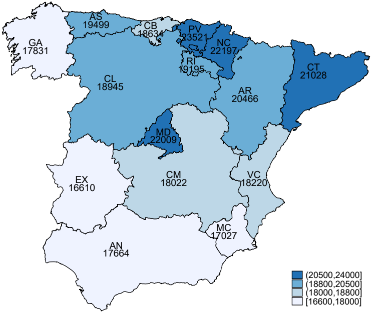
(A) Domestic Dominance



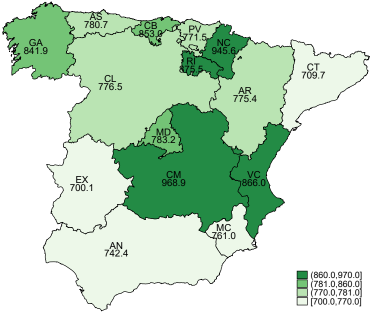
(B) Regional H.B.

- Panel (a) illustrates the regional market penetration of brands with some domestic production in Spain.
- Panel (b) shows the ratio of Regional to Spanish National Average Market Shares of Locally Produced Vehicles for 2009-2015.

Regional Market Features



(A) Household Disposable Income



(B) Market Concentration

- Panel (a) reports income, the *per capita* disposable income for each region in 2011 euros.
- Panel (b) illustrates the difference in regional market structure as measured by the Hirschman-Herfindahl Index.

Data Sources

- Mature market:
  - 2009-2015: Yearly car registration data for 47 mainland provinces (MSI Consulting).
  - Income and demographics (INE – Spanish Statistical Agency).
  - Energy cost data (Eurostat).
- Micro Data:
  - 2014-2015: Transaction Prices (car clusters) (AEAT – Spanish Tax Agency).
- DGT Statistical Yearbooks (1961-2015):
  - Yearly sales by automaker and (52) provinces and territories.
  - Software + hand coded data.
  - Unbalanced panel of 22,438 (mainland) region-year-automaker observations.

Uniform Pricing

	Model 1		Model 2		Model 3		Model 4	
CONSTANT	0.332	(0.002)***	−0.520	(0.785)	−0.489	(0.730)	−0.485	(0.591)
GDP_{pc}			−0.009	(0.005)*	−0.008	(0.004)*	−0.010	(0.004)***
DENSITY			0.010	(0.007)	0.009	(0.006)	0.009	(0.005)*
DIESEL					0.062	(0.003)***	0.031	(0.002)***
$1200 \leq CC < 1400$					0.151	(0.005)***	0.049	(0.004)***
$1400 \leq CC < 1600$					0.013	(0.004)***	0.006	(0.003)*
$1600 \leq CC < 2000$					−0.069	(0.004)***	−0.063	(0.003)***
$2000 \leq CC < 2500$					−0.143	(0.005)***	−0.074	(0.005)***
$2500 \leq CC < max$					−0.113	(0.014)***	0.006	(0.012)
$120 < CO2 < 160$					0.014	(0.005)***	0.034	(0.004)***
$160 \leq CO2 < 200$					−0.015	(0.006)**	0.011	(0.005)**
$200 \leq CO2$					0.037	(0.013)***	−0.064	(0.011)***
Province FE	Yes		Yes		Yes		Yes	
Make FE	No		No		No		Yes	
Uniform Pricing (95%)	39.70	(19)	0.0	(0)	0.0	(0)	6.4	(4)
Uniform Pricing (99%)	35.77	(15)	0.0	(0)	0.0	(0)	0.0	(0)
$Adj.\ R^2$	0.0121		0.0131		0.1389		0.4483	

OLS (15,726 market-time-cluster observations). To test for the null hypothesis of uniform national pricing, we report the total market share and number of province fixed effects (in parenthesis) that are significantly different from zero.

Entry – Stable Regional Effect

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	-6.1444***	-5.8789***	-5.6042***	-5.5807***	-5.5801***	-5.5488***
	(0.0148)	(0.0550)	(0.0997)	(0.1048)	(0.1048)	(0.1076)
NATIONAL H.B.	3.0993***	2.7117***	2.4226***	2.4209***	2.4052***	2.1482***
	(0.0263)	(0.0385)	(0.0379)	(0.0378)	(0.0381)	(0.0466)
REGIONAL H.B.					0.2127***	0.2123***
					(0.0631)	(0.0628)
Firm FE (55)	No	Yes	Yes	Yes	Yes	Yes
Year FE (54)	No	No	Yes	Yes	Yes	Yes
Region FE (14)	No	No	No	Yes	Yes	Yes
Leads/Lags (11)	No	No	No	No	No	Yes
$Adj.\ R^2$	0.3829	0.5888	0.6530	0.6544	0.6546	0.6582

- OLS (log of region-year market share of sales of all models of an automaker between 1961 and 2015); 22,438 observations.

Entry – Stable Regional Effect

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	-6.1444***	-5.8789***	-5.6042***	-5.5807***	-5.5801***	-5.5488***
	(0.0148)	(0.0550)	(0.0997)	(0.1048)	(0.1048)	(0.1076)
NATIONAL H.B.	3.0993***	2.7117***	2.4226***	2.4209***	2.4052***	2.1482***
	(0.0263)	(0.0385)	(0.0379)	(0.0378)	(0.0381)	(0.0466)
REGIONAL H.B.					0.2127***	0.2123***
					(0.0631)	(0.0628)
Firm FE (55)	No	Yes	Yes	Yes	Yes	Yes
Year FE (54)	No	No	Yes	Yes	Yes	Yes
Region FE (14)	No	No	No	Yes	Yes	Yes
Leads/Lags (11)	No	No	No	No	No	Yes
$Adj.\ R^2$	0.3829	0.5888	0.6530	0.6544	0.6546	0.6582

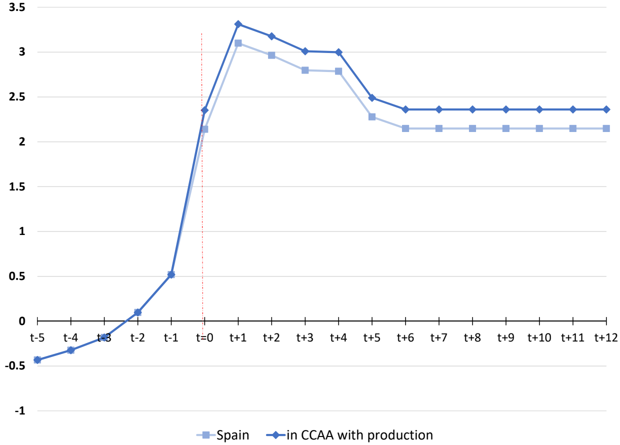
- Preference for domestically produced vehicles is significant and slightly larger in the short than in the long run.

Entry – Stable Regional Effect

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	-6.1444***	-5.8789***	-5.6042***	-5.5807***	-5.5801***	-5.5488***
	(0.0148)	(0.0550)	(0.0997)	(0.1048)	(0.1048)	(0.1076)
NATIONAL H.B.	3.0993***	2.7117***	2.4226***	2.4209***	2.4052***	2.1482***
	(0.0263)	(0.0385)	(0.0379)	(0.0378)	(0.0381)	(0.0466)
REGIONAL H.B.					0.2127***	0.2123***
					(0.0631)	(0.0628)
Firm FE (55)	No	Yes	Yes	Yes	Yes	Yes
Year FE (54)	No	No	Yes	Yes	Yes	Yes
Region FE (14)	No	No	No	Yes	Yes	Yes
Leads/Lags (11)	No	No	No	No	No	Yes
Adj. R^2	0.3829	0.5888	0.6530	0.6544	0.6546	0.6582

- A local production plant generates an additional average home market advantage of 23.41% in the regional market relative to the rest of Spain.

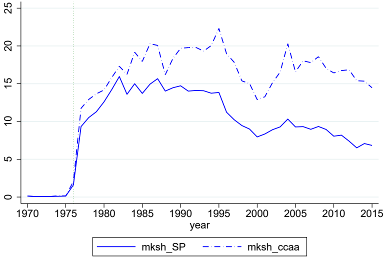
Short Run Overshooting



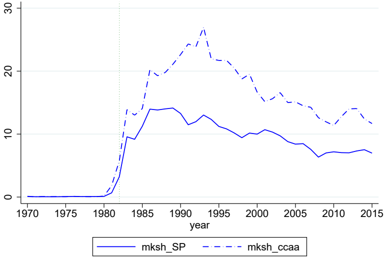
(A) National and Regional Home Market Advantage

- Both domestic and regional preference overshoots for a period of about five years after entry of an automaker in a local market.
- The incremental regional effect is stable over time.

Regional/Domestic Overshooting: Two Examples



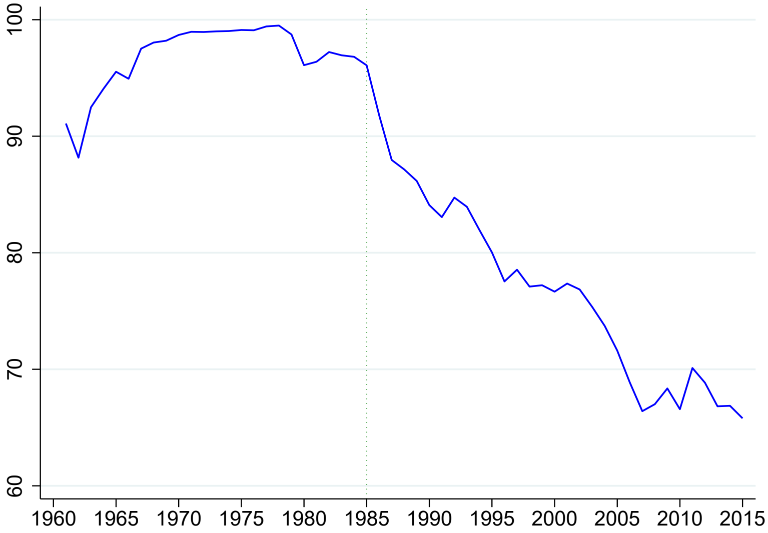
(A) FORD: Valencia *vs.* Spain



(B) OPEL: Aragón *vs.* Spain

- Panel (a) shows that Ford enjoys a substantial and increasing market presence in Valencia, the location of its second largest production plant by number of employees (first outside the U.S.).
- Panel (b) illustrates the more typical case of Opel.

Long Run Erosion of Domestic Home Market Advantage



(A) Market Share of Domestic Brands

Permanent Long Run Regional Home Market Advantage

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	-5.5801***	-6.7214***	-6.1819***	-5.4825***	-5.6294***	-5.4095***
	(0.1048)	(0.1157)	(0.0934)	(0.0893)	(0.0797)	(0.0827)
NATIONAL H.B.	2.4052***	2.3265***	0.4692***	-0.1505**	-0.2036***	0.07374
	(0.0381)	(0.0456)	(0.0652)	(0.0741)	(0.0783)	(0.1094)
REGIONAL H.B.	0.2127***	0.2321***	0.2086***	0.2426***	0.2681***	0.2575***
	(0.0631)	(0.0667)	(0.0650)	(0.0666)	(0.0674)	(0.0768)
Firm FE (55)	Yes	Yes	Yes	Yes	Yes	Yes
Year FE (varies)	Yes	Yes	Yes	Yes	Yes	Yes
Region FE (11)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,408	20,138	17,737	15,669	12,928	8,897
$Adj.\ R^2$	0.6546	0.6557	0.6987	0.7204	0.7660	0.7859
Sample Starting Year	**1961**	**1970**	**1980**	**1986**	**1992**	**2000**

- OLS (log of region-year market share of sales of all models of an automaker between different starting years and 2015).
- Domestic market advantage suffers from trade liberalization (accession to EU).
- Higher income in later decades increases demand of larger, imported vehicles.

Permanent Long Run Regional Home Market Advantage

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	-5.5801***	-6.7214***	-6.1819***	-5.4825***	-5.6294***	-5.4095***
	(0.1048)	(0.1157)	(0.0934)	(0.0893)	(0.0797)	(0.0827)
NATIONAL H.B.	2.4052***	2.3265***	0.4692***	-0.1505**	-0.2036***	0.07374
	(0.0381)	(0.0456)	(0.0652)	(0.0741)	(0.0783)	(0.1094)
REGIONAL H.B.	0.2127***	0.2321***	0.2086***	0.2426***	0.2681***	0.2575***
	(0.0631)	(0.0667)	(0.0650)	(0.0666)	(0.0674)	(0.0768)
Firm FE (55)	Yes	Yes	Yes	Yes	Yes	Yes
Year FE (varies)	Yes	Yes	Yes	Yes	Yes	Yes
Region FE (11)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,408	20,138	17,737	15,669	12,928	8,897
$Adj.\ R^2$	0.6546	0.6557	0.6987	0.7204	0.7660	0.7859
Sample Starting Year	**1961**	**1970**	**1980**	**1986**	**1992**	**2000**

- OLS (log of region-year market share of sales of all models of an automaker between different starting years and 2015).
- Instead, regional market advantage even grows over time.

Long Term Trade Distortions

- Does the industrial policy designed in the 1950s still affect the market outcome?
  - Evaluate domestic market advantage in the long run, 2009-2015, once the Spanish automobile market has matured and the share of domestic vehicles has stabilized (after 2005).
- BLP:
  - Equilibrium oligopoly model (demand + supply) allowing for national/regional home biased preferences.
- How distortive are today ethnocentric preferences induced by the industrial policy of the autarky?:
  - Combine two counterfactuals:
    - Shut down home bias preference estimates.
    - Set a shadow tariff to target groups of vehicles in order to match same market share for brands produced in EU or automobile models produced in Spain.

Mean Utility – Attributes

Variable	Description	Estimate	Std.Err
Mean Utility – Product Characteristics (β)			
CONSTANT		−11.0947	(0.2383)***
HPW	Horsepower per ton	2.0362	(0.1137)***
KPE	Kilometers per euro	0.1821	(0.0136)***
KPE × DIESEL	Kilometers per euro × diesel indicator	−0.1375	(0.0122)***
TREND × DIESEL	Time trend × diesel indicator	−0.0722	(0.0110)***
CITY	Segment A: FIAT *500*, RENAULT *Twingo*	−23.3986	(3.5769)***
COMPACT	Segment C: FORD *Focus*, VW *Golf*	0.6024	(0.0337)***
LARGE	Segment D: AUDI *A5*, VW *Passat*	−0.6219	(0.0417)***
MINIVAN	Segment M: FORD *S-Max*, VW *Touran*	−1.1594	(0.0409)***
SUV × TREND	Segment J: NISSAN *Pathfinder* × time trend	0.4511	(0.0337)***
SUV × TREND^2	SUV × quadratic time trend	−0.0524	(0.0051)***

- Consumers favor powerful, fuel efficient, and not too big (neither tiny) vehicles.
- Diesel models are losing its well-established appeal.

Mean Utility – Home Bias

Variable	Description	Estimate	Std.Err
Mean Utility – Home Bias (ζ)			
REGHBMODEL	Regional preference for model produced locally	2.7354	(0.1547)***
REGHBBRAND	Regional preference for brand producing locally	0.8324	(0.0973)***
HBMODEL	Preference for model produced in other region	1.4007	(0.0537)***
HBBRAND	Preference for brand located in other region	0.6595	(0.0534)***
EU	Preference for European brands (not in Spain)	0.7660	(0.0622)***
EURASIAN	Preference for Asian brands producing in Europe	0.8966	(0.0533)***
REGHBMODEL × DIESEL	REGHBMODEL × diesel indicator	0.7684	(0.2007)***
REGHBBRAND × DIESEL	REGHBBRAND × diesel indicator	0.8237	(0.1320)***
HBMODEL × DIESEL	HBMODEL × diesel indicator	0.2113	(0.0729)***
HBBRAND × DIESEL	HBBRAND × diesel indicator	0.7990	(0.0725)***
EU × DIESEL	EU × diesel indicator	−0.2240	(0.0807)***
EURASIAN × DIESEL	EURASIAN × diesel indicator	0.1554	(0.0725)**

- Home bias is stronger for models produced locally but it extends to other models produced in Europe.
- Regional bias always exceeds domestic bias.
- Home bias is stronger for popular locally produced diesel versions.

Idiosyncratic Preferences

Variable	Description	Estimate	Std.Err
Standard Deviations (σ)			
CITY	Segment A: FIAT *500*, RENAULT *Twingo*	14.2793	(1.9325)***
LUXURY	Expensive models from segments D, M, J	0.3184	(2.7730)
Interactions (Π)			
PRICE/INCOME	MSRP divided by income (both in thousands)	−4.0249	(0.0820)***
LUXURY × AGE	Log of the age of the HH × luxury indicator	0.9618	(0.0959)***
DIESEL × COLLEGE	College education × diesel indicator	3.4924	(0.2107)***
CHEAP × CHILD	Household with a minor × inexpensive indicator	1.8139	(0.0632)***

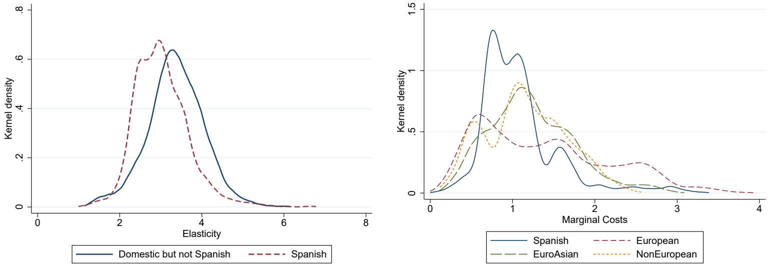
- Consumers are most heterogeneous regarding their preference for the smallest vehicles.
- Higher income households are less responsive to price.
- Older individuals favor luxurious vehicles while families with kids prefer inexpensive ones.
- Interestingly, educated drivers prefer diesel vehicles.

Supply – MC

Variable	Description	Estimate	Std.Err
Cost (γ)			
ln(HP × SPI)	ln(HP)× automobile raw material index	0.8215	(0.0187)***
ln(WEIGHT × SPI)	ln(WEIGHT)× automobile raw material index	1.1744	(0.0383)***
$\ln(CO_2)$	Log of CO_2 emissions in g/km	−0.5281	(0.0245)***
DIESEL	Diesel engine	0.0183	(0.0067)***
COMPACT	Segment C: FORD *Focus*, VW *Golf*	0.1029	(0.0056)***
LUXURY	Expensive models from segments D, M, J	0.1782	(0.0094)***
NON-LUXURY	Inexpensive models from segments D, M, J	0.1382	(0.0067)***

- Diesel, more powerful, larger, and less polluting vehicles are more costly to produce.

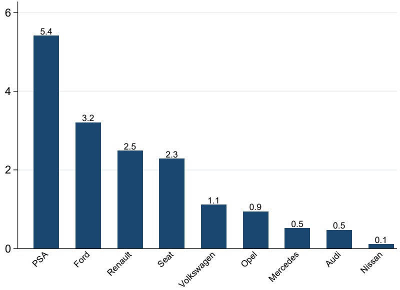
Sanity Check – Distribution of Estimates



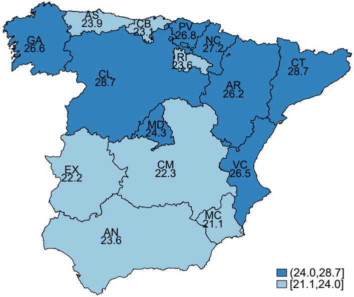
(A) Own-Price Elasticities (B) Marginal Costs

- Panel (a) shows that, among European automakers, demand is generally less elastic for models assembled in Spain than for models built in other European countries, which generally are more expensive and powerful.
- Panel (b) shows that the distribution of marginal costs of automobile models produced in Spain stochastically dominates any other imported models, regardless of their geographical origin.

Home Market Advantage – Sales



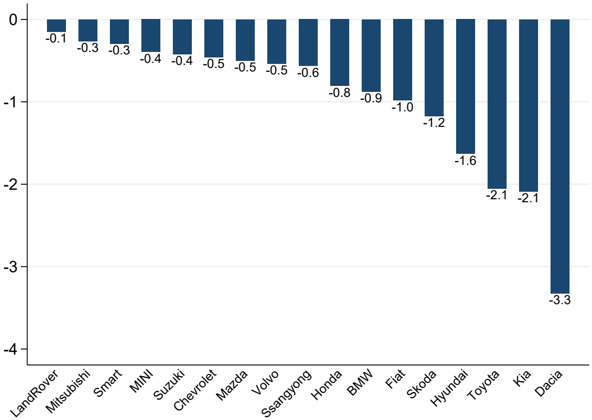
(A) Incremental Sales by Automaker



(B) Incremental Sales by Region

- Panel (a) shows the excess market share of sales of domestic automakers due to national/regional home bias.
- Panel (b) shows the heterogeneous geographical impact of domestic market advantage (to be revised).

Home Market Advantage – Imports



(A) Reduction of Imports by Automaker

- Reduction in market shares of sales of automakers not located in Spain due to home bias.
- Asian manufacturers without assembly plants in the EU suffer the most from ethnocentric preferences.

Tariff Equivalence

- The nominal automobile import tax into the EU is **10.50%**.
- No domestic market advantage: replace national/regional bias estimates for all domestic models with the weighted mean of European and Euro-Asian models, distinguishing by fuel.
- Counterfactual 1:
  - Set a tariff on imports from outside the EU (Non European models) of 26.39% to keep their market share in Spain at their current 8.93% level.
- Counterfactual 2:
  - Set a tariff on imports of any vehicle not produced in Spain of 45.02% to ensure that the market share of locally produced models in Spain remain the current level of 62.61%.

Contribution

- To our knowledge, we present the first evidence that home bias linked to the local production of a product is nearly immediate.
- We also show that this domestic market advantage dissipates with free trade agreements.
- However, intranational home bias of the region where the assembly plant is located is not only immediate, but permanent, surviving trade liberalization
- Despite being eroded by the accession to the EU, the domestic market advantage of the 1950s industrial policy favoring the establishment of foreign automobile manufacturers in Spain has important and long-lasting effects, protecting local manufacturers against non-European imports and favoring domestically produced models to others made in the EU.
- Future revisions will address the effect of home bias on the concentration of the Spanish automobile industry, its heterogeneous geographic incidence, and finally exploit the free-trade policy always implemented in the Canary Islands (which results in a secularly different composition of automobile sales).

Thank you!

www.eugeniomiravete.com