



# THE EFFECT OF RETAIL MERGERS ON VARIETY: AN EX-POST EVALUATION

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# Motivation

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- Competition in grocery markets has attracted a lot of interest from a policy perspective
  - Great deal of merger activity both in the US and in the EU
  - Sectoral inquiries in several countries (e.g. UK, Germany)
- In grocery retailing not only price but other dimensions of competition are key, especially at local level
  - E.g., variety of assortment, service quality, ancillary services
- Few merger retrospectives on retailing markets (Aguzzoni et al., JIE 2016, Allain et al, 2015; Hosken et al, 2015)

# The merger

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- We analyze the effect on prices and on variety of a merger between two major Dutch full-service grocery chains operating across the country: Jumbo and C1000 (combined national market share 20-30%)
  - ▣ Last of a series of mergers that took place in this industry between 2000 and 2012
- The Dutch competition authority (ACM):
  - ▣ Identified potentially problematic areas where the chains competed door-to-door and had joint  $MS > 50\%$
  - ▣ Cleared the merger in February 2012, conditionally on the divestiture of 18 stores in these areas
- Our **main results**: the merger did not affect prices but it reduced variety

# Empirical strategy

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- We evaluate the effect of the merger on prices and on variety (product assortment) with differences-in-differences techniques
- Potential anti-competitive effects are likely to be stronger in local markets where both merging parties directly competed before the merger (overlap areas)
  - ▣ We compare the evolution of prices and variety in the overlap areas with the evolution in areas where only one chain was present pre-merger (non-overlap areas)
  - ▣ We need to make sure that the control areas are comparable to the treated ones → Selection of the areas by propensity score matching based on observable characteristics
- We analyze the effect of the merger at the market level, disentangling the effect on the merging parties from the effect on competitors (Albert Heijn and Coop), and controlling for the strength of discounters

# The data

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- Product-level data at the store level for the 171 selected stores (both merging parties' and competitors') from IRI
  - Data on prices (monthly, 2009-2013): turnover over volumes
    - 11 product categories (coffee, cola, cleaners, diapers, fresh milk, frikandels, mayonnaise, olive oil, sanitary napkins, shampoo, and toilet paper)
    - For each category, we have two A-brand SKUs and one private-label SKU

	Mean	St. Dev.	Min	Max
Price	2.52	3.18	0.03	40
Price A Brand	2.86	3.5	0.03	40
Price Private label	1.79	2.17	0.05	10.5

- Data on variety (number of SKUs in each store's assortment) for 125 product categories (quarterly, 2010-2013)

	Mean	St. Dev.	Min	Max
Variety	93.50	109.96	0	1689

# Econometric model

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- Evidence of a local component in strategic decisions on prices and variety
  - Prices: some but limited variation (e.g., discount variability)
  - Variety/Assortment: main strategic dimension for local competition
- Diff-in-diff analysis comparing the change in prices/variety before and after the merger in the overlap areas (treatment group) with that in the non-overlap locations (control group):

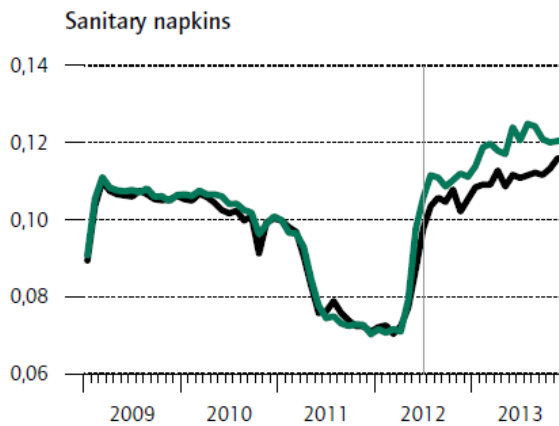
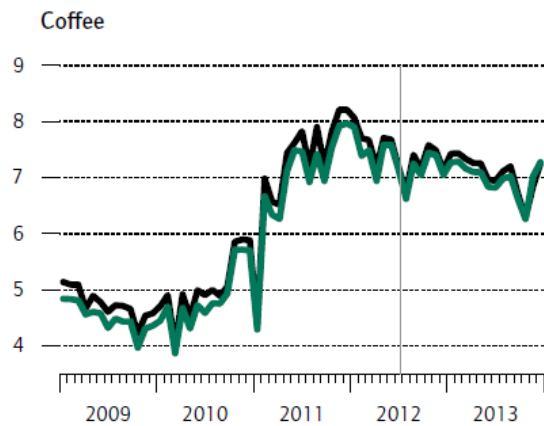
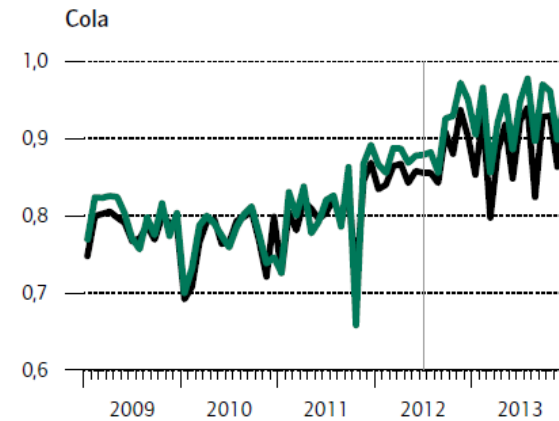
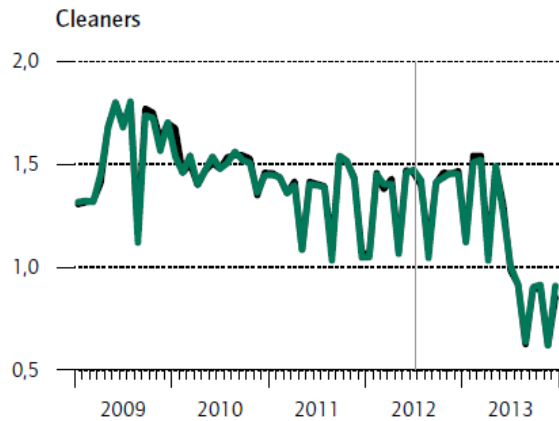
$$Out_{ist} = \alpha + \beta \cdot post_t + \lambda \cdot overlap_s + \delta \cdot post_t \times overlap_s + \lambda \cdot Z_{st} + \mu_{is} + \tau_t + \varepsilon_{ist}$$

‘post x overlap’ is the DiD variable, whose coefficient measures the average effect of the merger on the outcome variable

- We then look at possible sources of heterogeneity in these average effects

# Price effects: Descriptive

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— Overlap

— Non-overlap



# Price effects: Regressions

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	Full sample (1)	Merging parties (2)	Competitors (3)
Post	-0.100*** (0.017)	-0.0934*** (0.020)	-0.0617 (0.089)
Overlap × post	0.00379 (0.028)	0.00536 (0.033)	0.0827 (0.112)
Population	-0.0000820 (0.000)	-0.000000736 (0.000)	0.00380 (0.008)
Average income	0.00816* (0.004)	0.00152 (0.002)	0.116 (0.096)
Discounters market shares	0.106* (0.043)	0.0804** (0.028)	-0.381 (1.362)
HHI	0.000383 (0.000)	0.000367 (0.000)	-0.00146 (0.013)
Net Sales Floor	0.00000748 (0.000)	0.00000276 (0.000)	-0.0000787 (0.000)
House Value	-0.0000723 (0.000)	0.0000719 (0.000)	-0.000859 (0.002)
Constant	-5.255*** (0.486)	-4.831*** (0.545)	-0.448 (2.132)
Observations	123107	78762	44345
$R^2$	.9392576	.9509883	.0047054

# Price effects: Findings

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- No significant average treatment effect of the merger both for merging firms and competitors
- No evidence of price effects along any dimensions of heterogeneity (both for the merging parties and for competitors):
  - Very concentrated markets ( $HHI > 4000$ )
  - Areas where C1000 stores were not rebranded after merger
  - Areas where divestitures took place
- Results are robust to dropping 3-month and 6-month windows around the merger date

# Variety effects: Regressions

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	Full sample (1)	Merging parties (2)	Competitors (3)
Post merger	-2.338*** (0.556)	-2.710*** (0.608)	-1.065 (0.726)
Overlap × post	-3.067*** (0.364)	-4.148*** (0.492)	0.657* (0.286)
Population	-0.0762*** (0.011)	-0.0971*** (0.015)	-0.00274 (0.017)
Average income	0.311** (0.094)	-0.577*** (0.136)	2.027*** (0.247)
Discounters market shares	-0.172 (1.227)	-6.735*** (1.807)	15.51*** (2.832)
HHI	-0.0855*** (0.011)	-0.115*** (0.015)	-0.140*** (0.038)
Net sales floor	0.00429*** (0.000)	0.00512*** (0.001)	0.00170*** (0.000)
House value	0.0256*** (0.004)	0.0428*** (0.006)	-0.0122** (0.004)
Constant	58.26* (22.891)	32.29 (24.217)	79.28** (25.927)
Observations	225,667	162,540	63,127
$R^2$	0.8809	0.8614	0.9427

# Variety effects: Main findings

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- The merger **negatively affected** the average level of product variety at the market level
  - Decrease in the merging parties' variety (-4.6%) only partly outweighed by an increase in competitors' variety
  - The negative effects of the merger on variety are particularly severe in areas where concentration is high:
    - All players in the market significantly reduce their assortment
- The overall effect of the merger in areas affected by the remedies is still negative and significant, though much smaller than in other treated areas where no divestiture was issued
- The negative effect on variety is strongly driven by C1000 stores that were not rebranded (33 out of 49 stores in our sample)

# Variety effects – Additional results

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- In order to understand which categories are the main driver of this average result, we re-run our previous regression at the category level for the merging parties
  - 112 out of 125 coefficients' estimate of the average treatment effect are negative
- Results are robust to dropping 3- and 6-month windows around the merger date and seasonal products from the sample

# Conclusions

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- Important to look at non-price effects of mergers in retail markets
  - Variety (product assortment) is a key competitive variable at the local level
  
- The merger did not affect prices but it caused a reduction in the average depth of assortment in overlap areas, notwithstanding the remedies imposed by the competition authority
  - ▣ This effect was particularly strong in areas where concentration is high and where stores were not rebranded
  
- Not enough information to understand changes in the composition of assortment, nor how consumers evaluate a change in assortment
  - ▣ Potential cost savings were not passed on to consumers in terms of lower prices.

***THANK YOU!***

# Description of control variables

Control variables	Description	Time reference	Source
<b>Local market features: demand side</b>			
population	number of inhabitants per City	yearly	CBS - NL
population density	average number of inhabitants per square kilometer per City	yearly	CBS – NL
number of households with children	percentage of households with children (unmarried couples with children, spouses, couples with children and single-parent households) per City	yearly	CBS – NL
income	weighted average of income per capita per City (weights equal to number of income recipients per city)	yearly	CBS – NL
<b>Local market features: supply side</b>			
rental price	average value of residential real estate	yearly	VU University Amsterdam
HHI	HHI per city (stores market shares are proxied by the net sales floor)	quarterly	Supermarket Gids
number of stores	number of stores per City	quarterly	Supermarket Gids
average store net sales floor	average net sales floor of all the stores in the City	quarterly	Supermarket Gids
average net sales floor of Aldi	average net sales floor of all the Aldi stores in the City	quarterly	Supermarket Gids
average net sales floor of Lidl	average net sales floor of all the Lidl stores in the City	quarterly	Supermarket Gids
discounter market shares	Sum of the market shares of Lidl and Aldi stores (computed on the basis of the store's net sales floor) in the City	quarterly	Supermarket Gids



# Treated and control areas:

## Test on equality of means for explanatory variables

Variables	Mean		% bias	t-test	
	Treated	Control		t-test	p>t
<b>Pscore</b>	0.3906	0.3712	10.8	1.18	0.237
<b>Average population density</b>	13580	11830	8.4	0.78	0.434
<b>Average store size</b>	922.67	927.57	-1.6	-0.18	0.855
<b>Average income</b>	2407.7	2416.4	-2.8	-0.31	0.757
<b>Number of stores (squared)</b>	37.226	31.381	8.0	0.74	0.459
<b>HHI</b>	4731.1	5088.7	-11.7	-1.27	0.204
<b>Average land price</b>	142.34	147.41	-5.2	-0.52	0.604
<b>HHI Discounters</b>	1757.2	1776.9	-1.0	-0.11	0.916

# Areas' choice – Sample selection

	Overlapping Areas	Non-overlapping Areas
Full Sample	253	892
Selected Areas	56	57



		Price		Variety	
		Overlap Areas	Non-overlap Areas	Overlap Areas	Non-overlap Areas
C1000	Rebranded to Jumbo	7	9	7	10
	Not rebranded	19	13	20	13
Jumbo	SdB rebranded to Jumbo	12	10	1	3
	Jumbo	9	4	22	11
Competitors	Albert Heijn	14	15	14	15
	Coop	3	3	5	3

# Heterogeneous treatment effects on variety

	HHI			Divestiture			Re-branding		
	Full (1)	Merging (2)	Competit. (3)	Full (4)	Merging (5)	Competit. (6)	Full (7)	Merging (8)	Competit. (9)
[Item] Post	-2.060*** (0.533)	-2.336*** (0.576)	-1.297 (0.769)	-2.034*** (0.541)	-2.246*** (0.591)	-1.037 (0.718)	-2.423*** (0.558)	-2.615*** (0.606)	-0.312 (0.770)
DiD	-2.193*** (0.333)	-2.938*** (0.446)	1.240*** (0.295)	-3.178*** (0.383)	-4.208*** (0.491)	1.131*** (0.257)	-1.163** (0.347)	-0.611 (0.426)	-3.997*** (0.535)
DiD × HHI > 4000	-2.567*** (0.672)	-3.009** (0.894)	-6.991*** (1.589)						
DiD × Divestiture				2.589*** (0.740)	2.346*** (0.669)	-7.140*** (2.042)			
DiD × No re-branding							-6.536*** (0.979)	-9.464*** (1.161)	41.39*** (4.441)
Population	-0.0635*** (0.009)	-0.0741*** (0.012)	0.00195 (0.015)	-0.0846*** (0.012)	-0.104*** (0.015)	-0.0199 (0.016)	-0.0756*** (0.011)	-0.101*** (0.015)	0.0254 (0.021)
Average income	0.307** (0.091)	-0.524*** (0.127)	1.942*** (0.242)	0.224* (0.090)	-0.746*** (0.143)	2.137*** (0.252)	0.300** (0.092)	-0.502*** (0.134)	1.724*** (0.230)
Net sales floor	0.00375*** (0.000)	0.00427*** (0.000)	0.00129*** (0.000)	0.00453*** (0.000)	0.00548*** (0.001)	0.00154*** (0.000)	0.00429*** (0.000)	0.00484*** (0.001)	0.00128*** (0.000)
House value	0.0242*** (0.004)	0.0406*** (0.005)	-0.0168*** (0.005)	0.0272*** (0.004)	0.0463*** (0.006)	-0.0159*** (0.004)	0.0274*** (0.004)	0.0417*** (0.005)	-0.00573 (0.005)
Discounters market shares	0.985 (1.248)	-3.907* (1.706)	14.40*** (2.875)	-1.564 (1.262)	-8.602*** (1.894)	12.61*** (2.822)	0.132 (1.213)	-6.483*** (1.824)	21.82*** (3.682)
HHI				-0.0955*** (0.012)	-0.127*** (0.016)	-0.147*** (0.039)	-0.0895*** (0.012)	-0.122*** (0.016)	-0.118** (0.038)
HHI > 4000	-2.455*** (0.612)	-2.634*** (0.745)	0.133 (1.189)						
Divestiture		-10.26***				-11.28*** (1.033)	-5.151*** (1.108)	(0.969)	
No re-branding							-1.225** (0.421)	3.461*** (0.558)	-10.01*** (1.885)
Constant	55.45* (22.993)	28.89 (24.287)	73.52** (25.972)	43.55 (23.727)	13.33 (25.168)	76.01** (26.198)	50.64* (23.042)	23.20 (24.314)	92.60** (28.266)
Observations	225,667	162,540	63,127	225,667	162,540	63,127	225,667	162,540	51,969
R <sup>2</sup>	0.8809	0.8613	0.9427	0.8812	0.8618	0.9429	0.8811	0.8617	0.9402