Zooming In on Choice: How Do Consumers Search for Cameras Online?

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Online Appendix

This online companion appendix contains several robustness checks and auxiliary results to the published version of this paper.

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Part I
Additional Tables

Table 1: Descriptive statistics on camera searches

	mean	10^{th}pct	25^{th}pct	75^{th}pct	90^{th}pct	std dev	N
domain	3.547	1.000	1.000	4.000	8.000	4.461	967
brand	2.786	1.000	1.000	4.000	6.000	2.245	967
model	6.425	1.000	2.000	8.000	14.000	8.573	967
product	9.043	1.000	2.000	10.000	21.000	13.836	967
searches	13.935	2.000	3.000	15.000	32.000	24.460	967
passed time	15.261	0.007	0.024	19.537	53.169	26.239	967

Note: Domain denotes the number of domain names visited, e.g., www.amazon.com, a product is a combination of domain/brand/model, the number of searches is the sum of the number of different URL's times the frequency that each URL was visited by a single consumer, passed time is the time elapsed in days between the beginning of search and purchasing a camera.

Table 2: Estimates of Equation (1) across all attributes

	slope	intercept	R^2	F	p
Canon	0.919	-0.023	0.580	13.915	0.000
	(0.029)	(0.010)			
Nikon	1.001	-0.019	0.566	1.889	0.152
	(0.032)	(0.012)			
Kodak	1.054	0.030	0.527	8.421	0.000
	(0.036)	(0.012)			
slr	0.903	-0.023	0.709	28.551	0.000
	(0.022)	(0.006)			
image stabilization	0.989	0.028	0.485	1.459	0.233
	(0.038)	(0.024)			
face detection	0.741	0.272	0.340	35.885	0.000
	(0.039)	(0.036)			
movie	0.669	0.344	0.405	84.848	0.000
	(0.030)	(0.029)			
log_display	1.341	-0.335	0.496	27.759	0.000
	(0.050)	(0.052)			
log_pixel	0.685	0.810	0.327	49.850	0.000
	(0.037)	(0.091)			
log_price	0.911	0.279	0.626	52.853	0.000
	(0.026)	(0.133)			
log_zoom	1.061	-0.082	0.649	2.690	0.069
	(0.029)	(0.049)			
Amazon.com	1.027	0.069	0.545	21.360	0.000
	(0.034)	(0.015)			
BestBuy.com	0.964	0.021	0.499	2.293	0.102
	(0.035)	(0.010)			
Walmart.com	0.990	0.052	0.594	10.435	0.000
	(0.030)	(0.013)			

Note: Standard errors in parentheses. The F test is on the joint hypothesis that the effect of the mean attribute level in search on the attribute of choice is 1 and the intercept is 0. The reported p is the associated p-level of the test.

Table 3: Estimates of Equation (1) across all attributes using only early search

	slope	intercept	R^2	F	p
Canon	0.675	0.017	0.370	61.259	0.000
	(0.032)	(0.012)			
Nikon	0.659	0.051	0.292	43.017	0.000
	(0.038)	(0.015)			
Kodak	0.644	0.108	0.236	41.331	0.000
	(0.042)	(0.015)			
slr	0.674	-0.007	0.487	104.827	0.000
	(0.026)	(0.009)			
image stabilization	0.635	0.221	0.245	41.139	0.000
	(0.042)	(0.026)			
face detection	0.324	0.658	0.108	208.936	0.000
	(0.035)	(0.032)			
movie	0.331	0.666	0.165	330.700	0.000
	(0.028)	(0.026)			
log_display	0.501	0.534	0.067	32.445	0.000
	(0.070)	(0.072)			
log_pixel	0.270	1.839	0.110	347.420	0.000
	(0.029)	(0.071)			
log_price	0.714	1.254	0.455	102.424	0.000
	(0.029)	(0.151)			
log_zoom	0.783	0.366	0.382	17.616	0.000
	(0.037)	(0.062)			
Amazon.com	0.785	0.160	0.338	46.161	0.000
	(0.040)	(0.017)			
BestBuy.com	0.639	0.063	0.258	43.360	0.000
	(0.040)	(0.012)			
Walmart.com	0.678	0.144	0.312	49.794	0.000
	(0.037)	(0.017)			

Note: This table reports on how informative early search is about choice. Early search is defined as the average attribute level computed over the first half of the search sequence for each household. Standard errors in parentheses. The F test is on the joint hypothesis that the effect of the mean attribute level in search on the attribute of choice is 1 and the intercept is 0. The reported p is the associated p-level of the test.

Table 4: Estimates of Equation (3) across all attributes

	machine-id fixed effects	search sequence fixed effects	machine_id plus sequence fixed effects
Canon	0.446	0.000	0.446
Nikon	0.410	0.000	0.410
Kodak	0.467	0.000	0.467
slr	0.658	0.000	0.659
image stabilization	0.433	0.001	0.433
face detection	0.239	0.002	0.240
movie	0.320	0.002	0.323
log_display	0.269	0.003	0.272
log_pixel	0.284	0.003	0.287
log_price	0.707	0.001	0.707
log_zoom	0.452	0.000	0.453
Amazon.com	0.487	0.003	0.490
BestBuy.com	0.495	0.001	0.497
Walmart.com	0.565	0.000	0.565

Note: Reported are R^2 statistics of fixed effects regressions of the searched levels of attributes.

Table 5: Robustness of Table 3 reported in the paper using searches and only first time visits

	intercept	first lag	χ^2	p	N
Canon	0.155	0.251	256.829	0.000	742
	(0.005)	(0.016)			
Nikon	0.159	0.255	264.064	0.000	742
	(0.005)	(0.016)			
Kodak	0.113	0.192	152.328	0.000	742
	(0.004)	(0.016)			
slr	0.133	0.208	151.128	0.000	736
	(0.004)	(0.017)			
image stabilization	0.459	0.135	59.896	0.000	736
	(0.010)	(0.017)			
face detection	0.814	0.098	30.408	0.000	736
	(0.016)	(0.018)			
movie	0.760	0.169	91.438	0.000	736
	(0.016)	(0.018)			
log_display	0.859	0.162	79.367	0.000	736
	(0.019)	(0.018)			
log_pixel	2.043	0.168	77.351	0.000	736
	(0.047)	(0.019)			
log_price	4.193	0.205	96.316	0.000	728
	(0.111)	(0.021)			
log_zoom	1.319	0.179	100.159	0.000	734
	(0.029)	(0.018)			
Amazon.com	0.179	0.216	178.905	0.000	742
	(0.005)	(0.016)			
BestBuy.com	0.053	0.426	696.684	0.000	742
	(0.003)	(0.016)			
Walmart.com	0.091	0.443	787.707	0.000	742
	(0.004)	(0.016)			

Note: This is a robustness check to the results reported in the paper. See the notes of Table 3 in the paper.

Table 6: Robustness of Table 3 in the paper using deciles based on only first time visits

	intercept	first lag	χ^2	p	N
Canon	0.152	0.253	87.554	0.000	504
	(0.008)	(0.027)			
Nikon	0.158	0.279	104.406	0.000	504
	(0.008)	(0.027)			
Kodak	0.090	0.298	120.934	0.000	504
	(0.006)	(0.027)			
slr	0.129	0.210	56.294	0.000	500
	(0.006)	(0.028)			
image stabilization	0.468	0.103	13.081	0.000	500
	(0.016)	(0.028)			
face detection	0.847	0.066	4.486	0.034	500
	(0.028)	(0.031)			
movie	0.867	0.060	3.946	0.047	500
	(0.028)	(0.030)			
log_display	0.741	0.277	102.866	0.000	500
	(0.028)	(0.027)			
log_pixel	2.136	0.129	17.797	0.000	500
	(0.075)	(0.031)			
log_price	4.431	0.160	22.069	0.000	491
	(0.180)	(0.034)			
log_zoom	1.351	0.159	27.925	0.000	500
	(0.049)	(0.030)			
Amazon.com	0.181	0.195	47.372	0.000	504
	(0.008)	(0.028)			
BestBuy.com	0.054	0.466	304.714	0.000	504
	(0.005)	(0.027)			
Walmart.com	0.098	0.374	174.194	0.000	504
	(0.006)	(0.028)			

Note: This is a robustness check to the results reported in the paper. See the notes of Table 3 in the paper.

Table 7: Robustness of Table 4 in the paper using first visits only

	intercept	slope	carry-over	σ	$\chi^2(2)$	p	N
Canon	-0.012	0.919	0.732	0.209	27.089	0.000	914
	(0.008)	(0.023)	(0.029)				
Nikon	0.002	0.933	0.527	0.218	10.436	0.005	914
	(0.009)	(0.024)	(0.047)				
Kodak	0.030	0.935	0.465	0.233	11.491	0.003	914
	(0.009)	(0.025)	(0.060)				
slr	-0.004	0.955	0.518	0.128	11.020	0.004	880
	(0.005)	(0.017)	(0.043)				
image stabilization	0.028	0.955	0.657	0.311	2.695	0.260	880
	(0.018)	(0.029)	(0.035)				
face detection	0.167	0.842	0.634	0.148	43.120	0.000	880
	(0.029)	(0.030)	(0.039)				
movie	0.233	0.770	0.372	0.109	86.928	0.000	880
	(0.026)	(0.027)	(0.069)				
log_display	0.023	0.984	0.446	0.095	4.543	0.103	879
	(0.024)	(0.023)	(0.039)				
log_pixel	0.153	0.945	0.628	0.141	18.616	0.000	880
	(0.064)	(0.026)	(0.029)				
log_price	0.271	0.923	0.730	0.465	66.744	0.000	913
	(0.110)	(0.022)	(0.032)				
log_zoom	-0.049	1.034	0.721	0.335	2.357	0.308	875
	(0.037)	(0.022)	(0.025)				
Amazon.com	0.061	0.963	0.674	0.293	28.962	0.000	914
	(0.012)	(0.028)	(0.039)				
BestBuy.com	0.020	0.945	0.423	0.196	9.688	0.008	914
	(0.007)	(0.023)	(0.036)				
Walmart.com	0.040	0.954	0.414	0.224	18.630	0.000	914
	(0.009)	(0.018)	(0.049)				

Note: This is a robustness check to the table reported in the paper. See the notes of Table 4 in the paper.

Table 8: The effect of domain switching on exploration of the attribute levels

	display	pixel	price	zoom
constant	0.251	0.168	0.114	0.129
	(0.040)	(0.008)	(0.009)	(0.008)
domain switch	-0.014	-0.011	-0.014	-0.006
	(0.023)	(0.004)	(0.005)	(0.005)
decile fixed effects	yes	yes	yes	yes
machine fixed effects	yes	yes	yes	yes
R^2	0.662	0.729	0.501	0.548
N	4590	4591	4502	4585

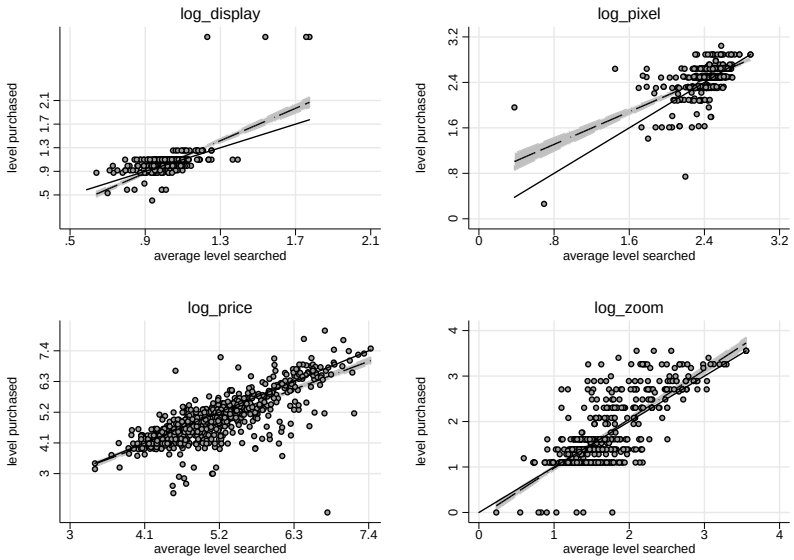
Note: Reported estimates are for α_k and β_k in the regression equation

$$\delta_{ikd} = \alpha_k + \alpha_{ik} + \alpha_{dk} + \beta_k \mathbb{I}(\text{domainswitch}_{id}) + \varepsilon_{ikd},$$

where $\mathbb{I}(\text{domainswitch}_{id})$ has the value 1 if there was at least one domain switch in decile d for machine i, and where δ_{ikd} is defined in equation (7) in the paper.

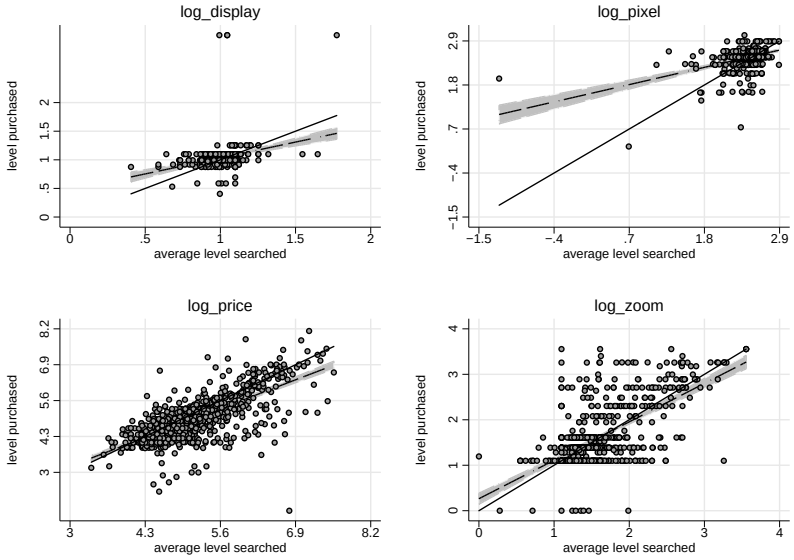
Part II
Additional Figures

Figure 1: Reproduction of Figure 2 without revisits



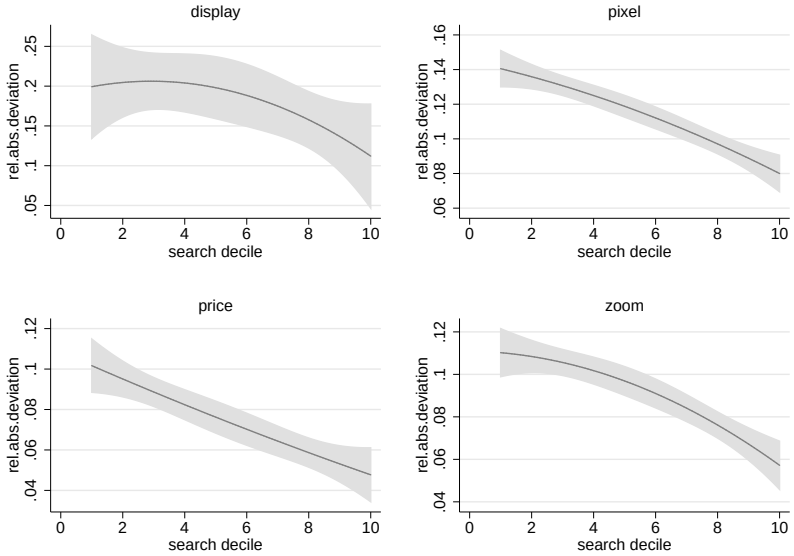
Notes: The same notes apply as to Figure 2 in the paper.

Figure 2: Reproduction of Figure 2 without the chosen product in the search sequence



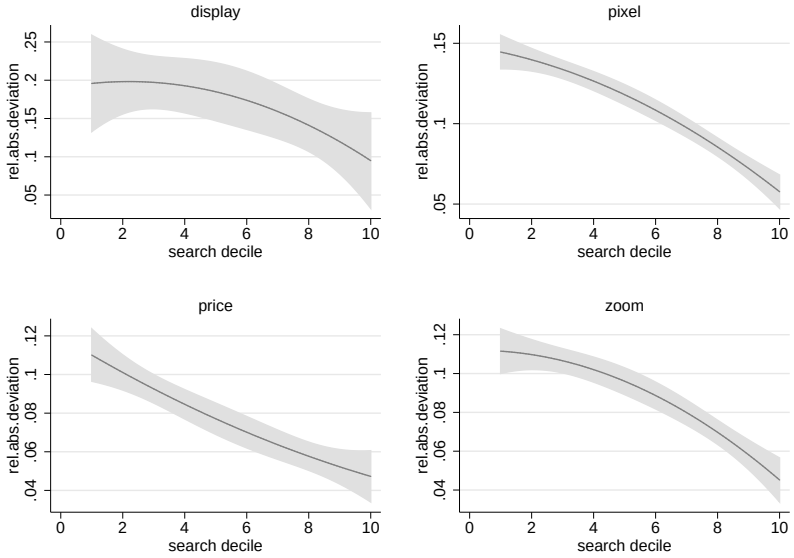
Notes: The same notes apply as to Figure 2 in the paper.

Figure 3: Reproduction of Figure 4 without the chosen product in the search sequence



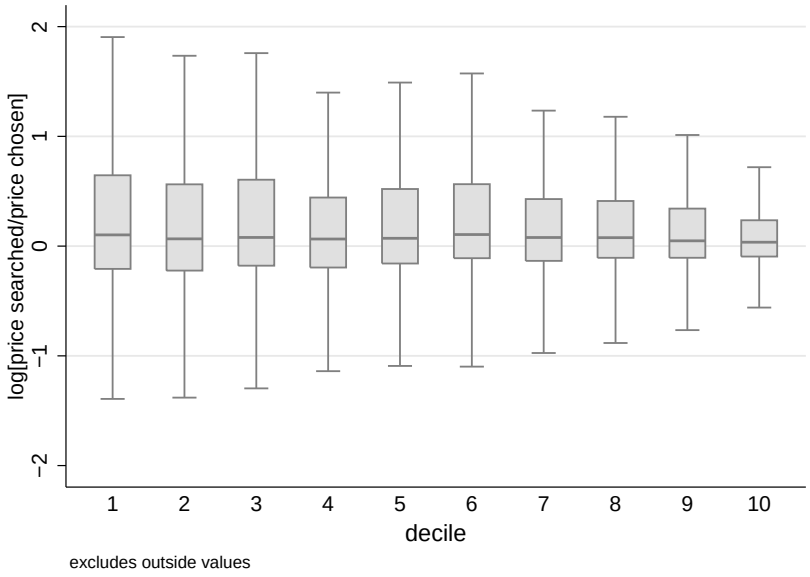
Notes: The same notes apply as to Figure 4 in the paper.

Figure 4: Reproduction of Figure 4 for search sequences across multiple domains



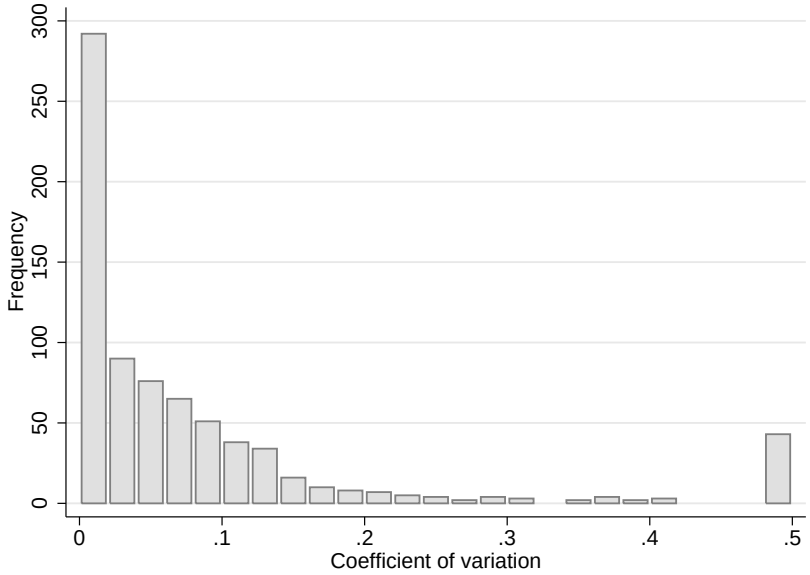
Notes: The same notes apply as to Figure 4 in the paper.

Figure 5: Reproduction of Figure 5 when dropping revisits



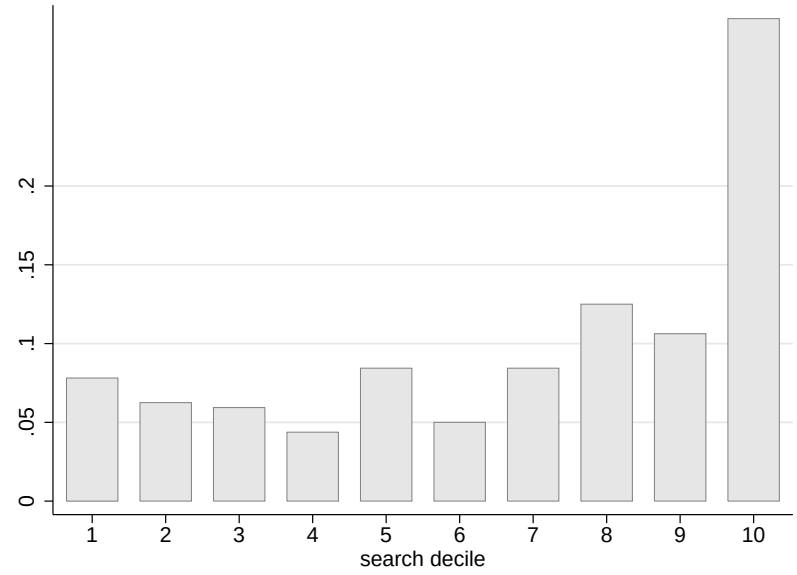
Notes: The same notes apply as to Figure 5 in the paper.

Figure 6: Price dispersion for the same camera across top-3 sellers



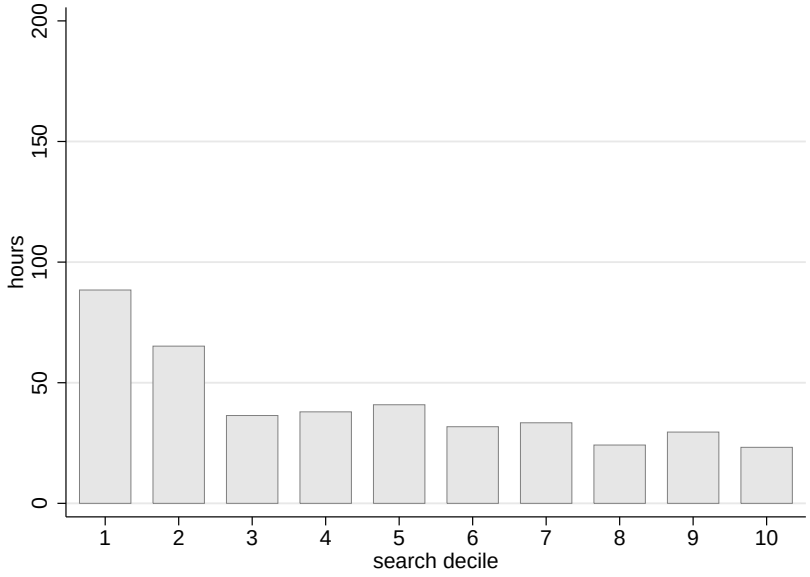
Notes: This figure plots the histogram of the coefficient of variation for price across the top-3 sellers, i.e., for which we have high quality price data. The histogram shows the coefficient of (price) variation for combinations of brand/model/month with at least two observations of price in our search data. All observations with a coefficient of variation larger than .5 are represented at the right side of the axis.

Figure 7: Reproduction of Figure 7 for long search strings (>10 searches)



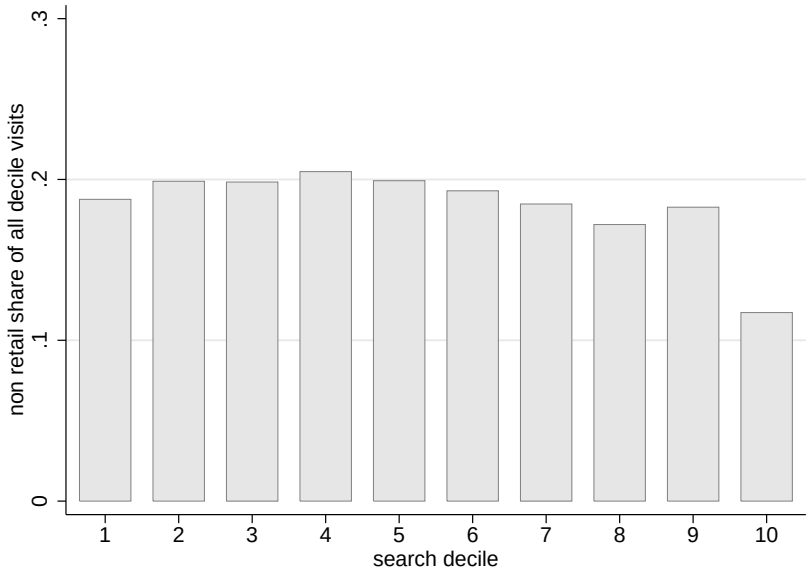
Notes: This same notes apply as to Figure 7 in the paper.

Figure 8: Time lapse by decile



Notes: This graph represents the average time lapse for each search decile. The data used to create this graph involve search processes with at least 10 searches.

Figure 9: Share of non-retail visits across deciles



Notes: This graph represents the share of domain visits in a given decile that was not to a retailer domain.