Do consumers not switch because they are not optimising?

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Search and Switch Costs

Search and Switching costs have been shown to affect many relevant economic activities as the energy, telecommunication and insurance industries (e.g., Giulietti et al., 2005; Honka, 2014)

The **search cost** is the cost of gathering information about alternative suppliers;
The **switching cost** is the cost that consumers pay for changing supplier.

These frictions are a source of market power for firms: impede the achievement of a competitive equilibrium and undermine consumers welfare.

Research Question

The present experimental analysis aim to test the relative importance of search and switch costs when they occur together.

Previous experimental study have studied search and switch costs in isolation.
One strand of experimental literature has studied the individual decision making when there are search cost (e.g.,Hey 1981) and the impact on the market of introducing search costs (e.g.,Davis and Holt, 1996; Abrams et al., 2000; Moellers et al., 2016).
Another strand of experimental literature has studied custumer market, i.e. market where at least a part of the subject are locked-in with the current supplier (Cason and Friedman, 2002; Morgan et al. 2006).

Wilson (2012) provides a theoretical framework the impact of search and switch costs on the market.

Theoretical Framework

J firms with differentiated products

N consumers, matching value $\epsilon_{i,j}$ drawn from a distribution G(ϵ)

Local firms: no search and switching cost

Non-local Firms: search cost c and switching cost s

Consumer's Decision-Making

Sequentially comparing the offers to a reservation utility.

$$\epsilon_j - s = -c + \int_x^{\bar{\epsilon}} (\epsilon_{j+1} - s) g(\epsilon_{j+1})\, d\epsilon_{j+1} + \int_{\underline{\epsilon}}^{x} (\epsilon_j - s) g(\epsilon_{j+1})\, d\epsilon_{j+1}$$

The reservation utility $\hat{x}$ is the value where the consumer is indifferent in doing an additional search.

$\hat{\mathrm{x}}$ **is the non-local reservation utility.** Notice that it does not depend on s.

When the consumer chooses to start searching among non-local firm:

$$\epsilon_1 = -c + \int_x^{\bar{\epsilon}} (\epsilon_2 - s) g(\epsilon_2)\, d\epsilon_2 + \int_{\underline{\epsilon}}^{x} (\epsilon_1) g(\epsilon_2)\, d\epsilon_2$$

It can be shown that **the local reservation utility is** $\hat{\mathrm{x}} - \mathrm{s}$

Consumer's Decision-Making

STEP 1- Start Search
If $\epsilon_1 > \hat{x} - s$ not start search.

STEP 2- Non-local Search
If the consumer starts to search, she stops when $\epsilon_j > \hat{x}$.

STEP 3- Choose the best option.
After they stop search, the consumer choose the best deal $max\{\epsilon_1, eps_j - s\}$
It can be shown that if the consumer stops searching before the entire market has been searched, the best option is the last searched.

The experiment

Experiment on **individual decision-making** with search and switch cost.

Is the individual behavior in line with the optimal strategy? Are they search and switching optimally?

Test of both comparative static predictions and quantitative predictions from Wilson's model.

Comparative statics predictions

1. Both a rise in search costs c and in switching cost s decreases the likelihood that a consumer starts to search beyond her local firm, and it increases the likelihood of acceptance of low local offers.
2. An increase in search cost c has a stronger impact on the choice of starting search that an increase in the switch cost s.
3. A rise in cost c reduces the number of non-local searches and decrease the minimum offer necessary to stop search, given that the consumer started to search, while the cost s does not affect the non-local search.
4. If the consumer stops searching before the entire market has been searched, the last searched non-local offer is accepted.
5. If all the market has been searched, a rise in s reduce the likelihood that a consumers that have searched switches to a non-local firm; instead, a rise in c does not affect the final choice.

Experimental Design

124 subjects in EXEC Lab
80 tasks:

- one *initial offer* and 4 offerS that they can search sequenTially.
- to discover any *non-initial offer* they have to pay a search cost c=[0,0.25,0.5,1].
- to accept a non-initial offer they have to pay a switching cost s=[0,1,2,4].
- each offer is drawn from a uniform distribution that goes from 8 to 22 (convertion rate 1 point=$0.70)
- no firms, i.e. there are no prices.

Results

Table: Comparative Statics 1 and 2

	(1) Start search	(2) Start Search $s, c > 0$	(3) Initial Points Accepted
c	-3.537***	-1.925***	-0.904***
	(0.176)	(0.209)	(0.225)
s	-0.649***	-0.678***	-0.294***
	(0.0345)	(0.0511)	(0.0557)
eps1	-0.768***	-0.947***	
	(0.0177)	(0.0293)	
Observations	9920	5580	3323

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Results

Table: Regressions Comparative Statics 3

	(1) nsearch	(2) nsearch	(3) nsearch12	(4) nsearch23	(5) nsearch34
c	-1.716***	-0.553***	-0.961***	-1.690***	-3.539***
	(0.0535)	(0.0525)	(0.156)	(0.189)	(0.201)
s	-0.0416***	-0.00383	-0.207***	-0.0671	-0.0148
	(0.00841)	(0.0145)	(0.0366)	(0.0420)	(0.0405)
period	0.00238***	0.00106	0.00528**	0.00178	0.00961***
	(0.000507)	(0.000709)	(0.00215)	(0.00249)	(0.00267)
Observations	6597	3081	2965	2110	3632

Standard errors in parentheses

$^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Results

11% of the observations shows an inconsistent behavior: accepting an offer not chosen before (Comparative statics 4)

Table: Regressions Comparative Statics 5

	(1) Initial
c	0.494
	(0.439)
s	0.941^{***}
	(0.0777)

Standard errors in parentheses
$^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Results

The qualitative predictions based on the reservation utility strategy for search and switching are mostly correct: the search cost has a greater impact on the individual choices overall.

However, the introduction of the switching cost has an impact also in the non-local search.

Results: Quantitative Predictions

stocastic specification

Normalized optimal reservation value $\hat{x}$ has a beta distribution, cdf G(.), centred in the true optimal value x^*, and variance equal to $\frac{x^*(1-x^*)}{p}$:

$$\hat{x} \sim \beta(\alpha = x^*(p-1), \beta = (1-x^*)(p-1)$$

Tremble probability t

Individual contribution to the likelihood:

if search starts: $tG(\frac{\epsilon_1+s-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}) + (1-t)(1-G(\frac{\epsilon_1+s-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}))$

if search does not start: $(1-t)G(\frac{\epsilon_1+s-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}) + t(1-G(\frac{\epsilon_1+s-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}))$

if non-local search stops: $(1-t)G(\frac{\epsilon_j-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}) + t(1-G(\frac{\epsilon_j-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}))$

if non-local search continues: $tG(\frac{\epsilon_j-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}) + (1-t)(1-G(\frac{\epsilon_j-\underline{\epsilon}}{\bar{\epsilon}-\underline{\epsilon}}))$

Deviation from quantitative predictions

deviations in search=opt. searches-act. searches (0.34: less searches than optimal)

Table: Deviations

	deviations in search
c	-0.236***
	(0.0345)
s	-0.0481***
	(0.00863)
Observations	9920

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Higher search and switch costs reduce the deviations from the optimal predictions.

Directions for future research

- Introducing risk-attitudes can explain the deviations from the optimal number of search (a CARA utility function fit better the data) and inconsistent behavior.
- Market experiment