

Discussion of Aydin (2017)

The Marginal Propensity to Consume Out of Credit

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Northwestern University and NBER

Very interesting paper! Lots to think about.

I applaud Deniz

- for getting access to the data AND
- for being involved in the bank's RCT!

Large literature on estimating MPCs out of income, wealth, and credit. These are different but related concepts

- e.g. in a buffer stock model, MPC depends on Y , A , and credit constraint

My own research is on household consumption dynamics, focusing on the role of expectations (anticipated vs unanticipated shocks), including MPC out of income.

Challenge is to find credible exogenous variation that is also large.

- We have become very clever at finding exogenous variation.
 - Problem:
 - settings are very special (particular country episode; particular set of individuals, etc.)
 - size of the shocks is typically small (that is why they are credibly exogenous)
- ⇒ results often not robust to small deviations from rational benchmark model ("near rationality")

Deniz addresses both issues

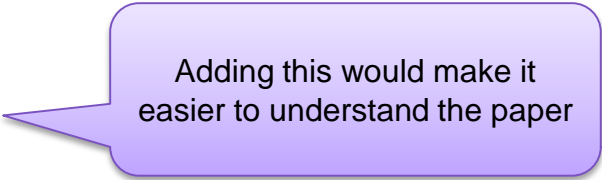
- **Exogenous** variation: RCT
- **Large** shock: Median increase in credit limit is 1.2x monthly income (with legal max of 4x monthly income)

In order to understand the results and to put them in context, we need to understand

1. **Institutional setting**: Credit card contracts in Turkey from June 2014 - May 2015
2. What the **intervention** does exactly and who is affected.

Outline

1. Institutional Background about Credit Cards in Turkey
2. Explain RTC Experiment
3. Which Theory Fits Best?

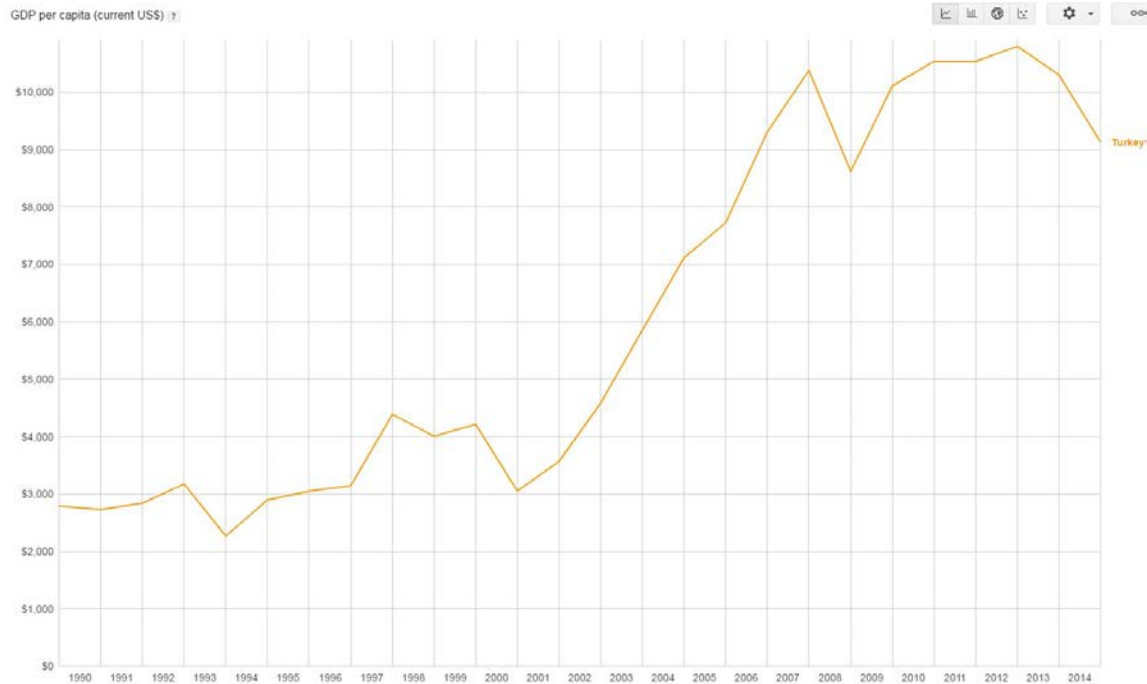


Adding this would make it easier to understand the paper

1. Institutional Background about Credit Cards in Turkey

Stylized facts

- Spectacular economic boom in Turkey in 2000s



1. Institutional Background about Credit Cards in Turkey

Stylized facts

- Spectacular economic boom in Turkey in 2000s
- Rapid **expansion of credit card** usage & loans (from low baseline)
 - 57 million credit cards in 2013 (population of 76M)
 - CC revolving loans increased 86% from 2010-13, installment credit by 140%.
 - Loan-to-Income up from 37% to 51%
 - Highest fraction of credit card debt to total consumer debt in Europe (53% vs 25% in UK or 5% in Holland).

This (credit-fueled?) boom has raised concerns among policy makers, who called for additional consumer protection...



“My citizens, please be careful with credit cards.

Don’t fall prey to them: they would take whatever you have.”

- Speech by Recep Erdogan, July 19, 2013.

Banking Regulation and Supervision Agency (BDDK) took action...

1. Institutional Background about Credit Cards in Turkey

Reform in October 2013

- **Cap on credit card limits**
 - 2x monthly income for new cardholders for the first year, then
 - 4x monthly income for other users
 - existing credit limits not affected – until cardholders ask for increases
- No new lending to borrowers who fail to make minimum payments 3 times in a row
- **Interest rate cap** of 27% in 2014 (24% APR).
- Tightening of many consumer credit contracts. E.g.
 - “Paper agreements with consumers must include a handwritten statement by the consumer ...”
 - Credit card issuers must offer a membership fee-free credit card to their customers.

Suggests lots of policy-induced variation to explore in future research (w/o RCT)!

Reform in February 2014 imposes **maturity limits** on **installment credits**:

- 4 months for jewelry; 9m for appliances, furniture, education; 36m for housing renovation
- no installment credit for food, gas, telecommunications

Probably more regulations of consumer credit that I missed – **time with very active policy.**

2. Randomized Controlled Trial (RCT)

Nice thing about RTC

We can be pretty sure that we are estimating a causal effect

⇒ no need to fuss about identification

The main issue is **how to interpret this causal effect.**

- We already saw that the Turkish consumer credit market underwent some drastic changes in this period.
- Need to understand
 1. **What** is manipulated by the RCT?
 2. **Who** is affected? (“compliers and non-compliers”)

Let me start by explaining the experiment as far as I understand...

2. Randomized Controlled Trial (RCT)

Bank has +5 million customers. Each month, some **pre-existing customers become eligible** for a credit limit increase, presumably because

- (i) they are **inexperienced customers** that are initially more protected (2x income limit expires after 1st year)
(consistent with summary stats about age)
- (ii) because they **recently** had their **salary increased** (increase of 4x monthly income limit)
- (iii) some other reason?

Would be super useful

- to know more about why they become eligible
- to explore response heterogeneity across types

The **bank** pools these eligible customers and then **decides whether to increase their limit**.

At this step, **Deniz helps the bank run a RCT**

“The experiment is conducted by the bank as a quality and pricing improvement project, in order to understand the determinants of customer risk and profitability.” (Appendix, p.1)



2. Randomized Controlled Trial (RCT)

The **bank's decision rule** is what Deniz calls the credit supply function:

Table 6: Credit Supply Function

#	Type	Variable	Range	Cutoff
(1)	Profitability	Expected value added	$(-\infty, \infty)$	≥ 0
(2)	CRM	Months since limit increase	$[0, \infty)$	> 6
(3)		Months since card opening	$[0, \infty)$	> 2
(4)	Risk	Score 1	$[\underline{s}, \bar{s}]$	$< \bar{s}_1$
(5)		Score 2	$[\underline{s}, \bar{s}]$	$< \bar{s}_2$
(6)		Score 3	$[\underline{s}, \bar{s}]$	$< \bar{s}_3$
(7)		Non-performing loans	$[0, \infty)$	$= 0$
(8)		Late payments	$[0, \infty)$	$= 0$
(9)	RCT	Control group	$\{0, 1\}$	$= 0$
(10)	Regulatory	Credit line to monthly income	$[0, \infty)$	< 4

(1) Only positive NPV projects

- How does the bank calculate expected value added (profit)?
- Seems to be hard to calculate this before steps (2)-(10), which affect default probability, hair cuts, and recovery rates.

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(2) - (8) filters out risky borrowers

- It would be useful to connect this algorithm to the regulatory environment.
 - Which steps are dictated by the regulator, which are the bank's choices?
 - Regulators seem to affect maximum credit limit, interest rate, etc. So I think the regulator affects more than just step (10).
- It would be great if we could get number/fraction of customers that pass each steps.

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- Credit limit increase is done with this algorithm, hence it's automatic and mechanical.
 - **Important:** Rational consumers should expect automatic limit increase after income increase
- Bank runs algorithm regularly on all customers
 - Customers allow the bank to automatically pass on this credit limit increase
 - Every month 4% of customers get an increase
 - Median customer's limit increases every 15 month
 - Credit lines decrease for less than 1%
 - Probably because of significant inflation?

TURKEY INFLATION RATE



2. Randomized Controlled Trial (RCT)

Intervention:

- From June-August 2014, 54k customers pass steps 1-9 = RCT subject pool
- If they also pass step (10) they would get automatic credit limit increase starting in September 2014.
- From this pool, the bank uses a subset of 13k customers to run an experiment.

Similar as in Parker Souleles tax rebate study:

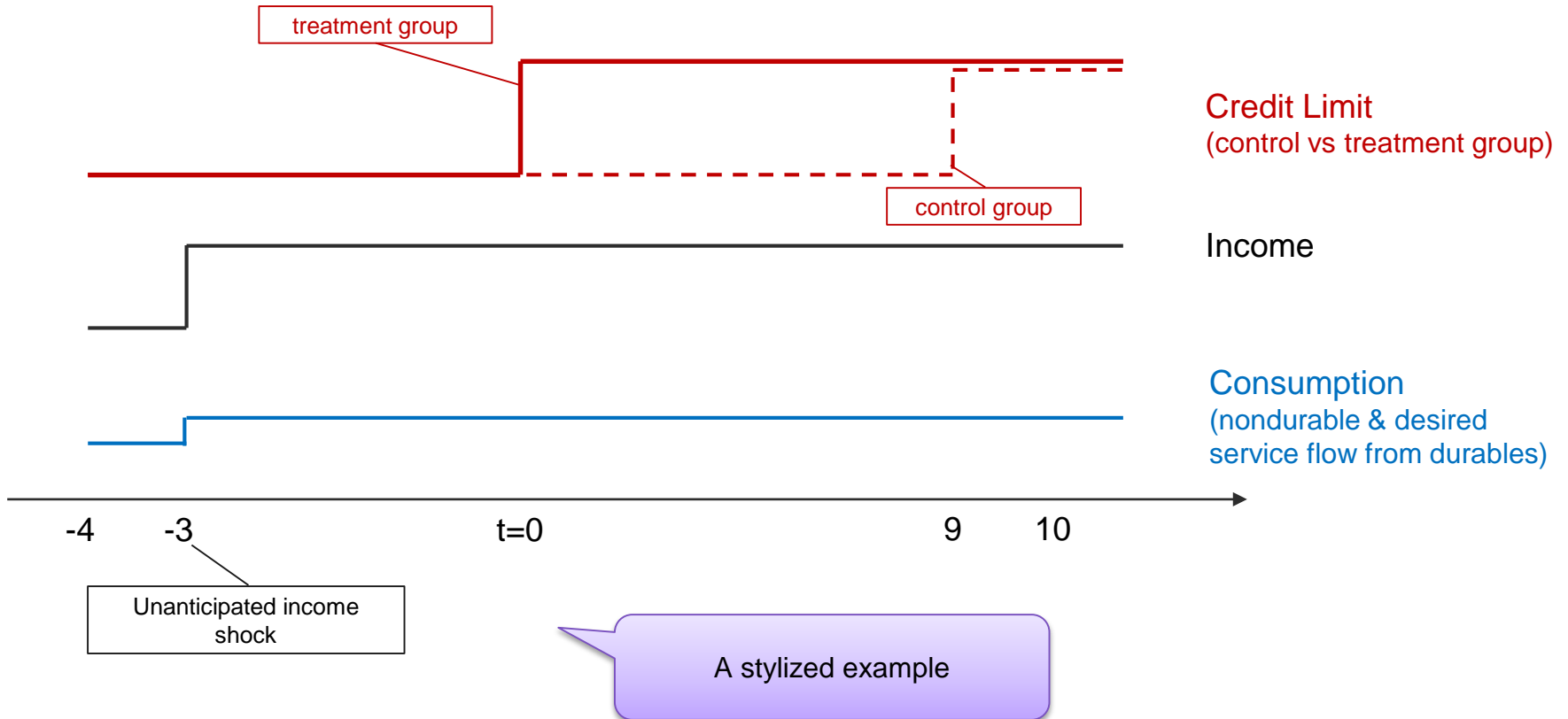
Timing is randomized, not the limit!

The experiment is to **DELAY** these customers a **LIMIT INCREASE** for 9 months!

Regular group (41,084) could get increase
(= “**intent to treat group**”)

Intervention group (13,438): don't get increase for 9 month (= “**control group**”)

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Is it also 16%?

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- 16% don’t pass step (10)
- Remaining 84% are eligible
 - receive increase in **staggered way**: 41% in September, 34% in October.
 - Starting in March, some customers get 2nd increase

intervention group (13,438): don’t get increase for 9 month (= “**control group**”)

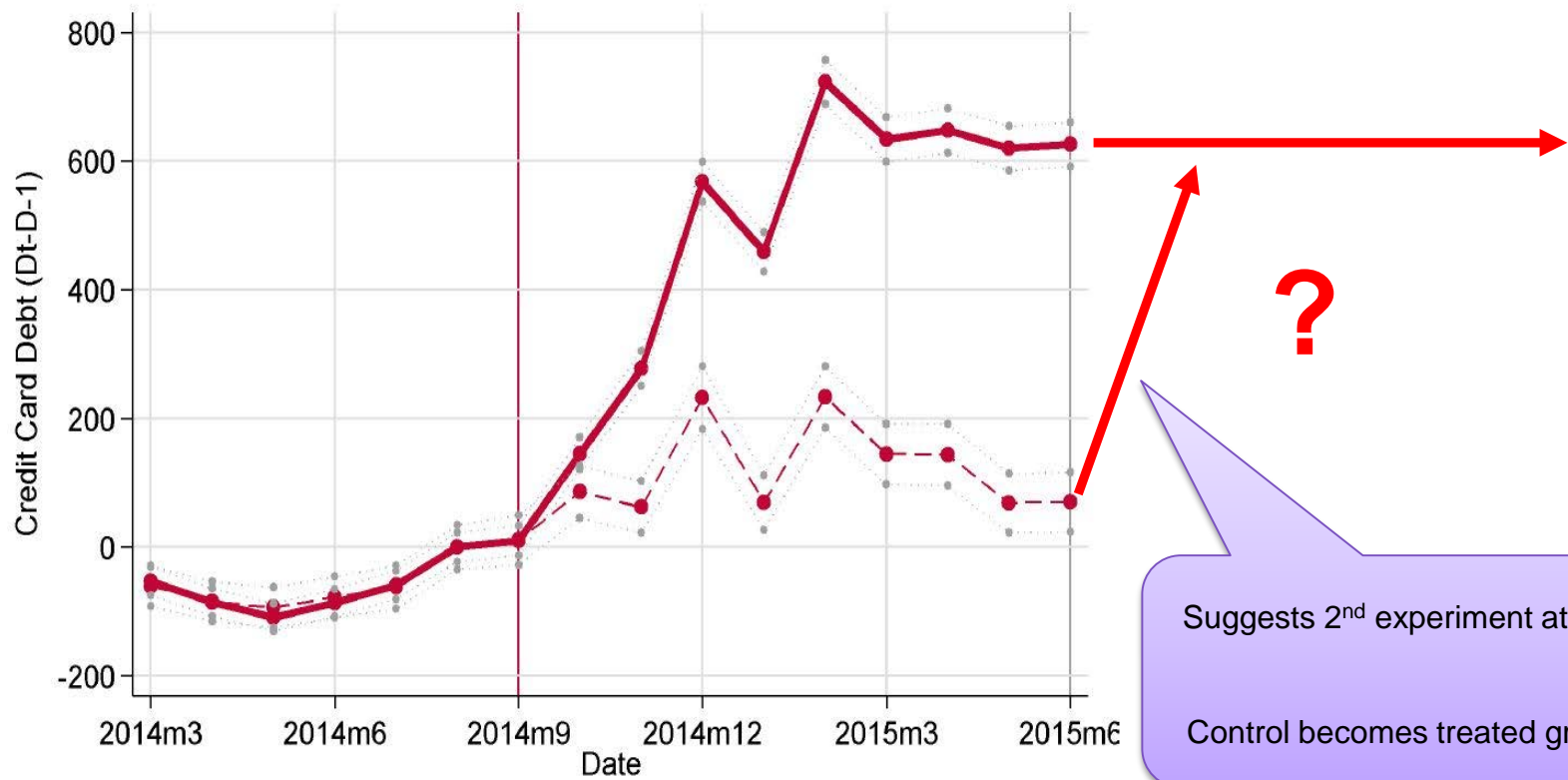
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2. Randomized Controlled Trial (RCT)

Staggered Implementation:

		Group without automatic increase : 13,438			Group with automatic increase : 41,084		
t		no inc.	increase	cumul.	no inc.	increase	cumul.
Sep	0	13,332	106	0.8%	24,067	17,017	41%
Oct	1	13,389	49	1.2%	27,191	13,893	75%
Nov	2	13,381	57	1.6%	39,861	1,223	78%
Dec	3	13,376	62	2.0%	40,230	854	80%
Jan	4	13,366	72	2.6%	40,546	538	82%
Feb	5	13,382	56	3.0%	40,582	502	83%
Mar	6	13,365	73	3.5%	37,362	3,722	92%
Apr	7	13,353	85	4.2%	38,851	2,233	97%
May	8	13,363	75	4.7%	35,957	5,127	110%

- Is Figure 1 really an event study graph, i.e. is the x-axis in calendar time, not event time?
- If so, is the delayed response due to this staggered implementation?



Suggests 2nd experiment at t=9:
Control becomes treated group

Could show same figure for
income and consumption

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- If so, is the delayed response due to this staggered implementation?
- **Note:** Deniz does his best to convert ITT to ATE, but there are so many **selection issues** that is difficult...

3. Which Theory Fits Best?

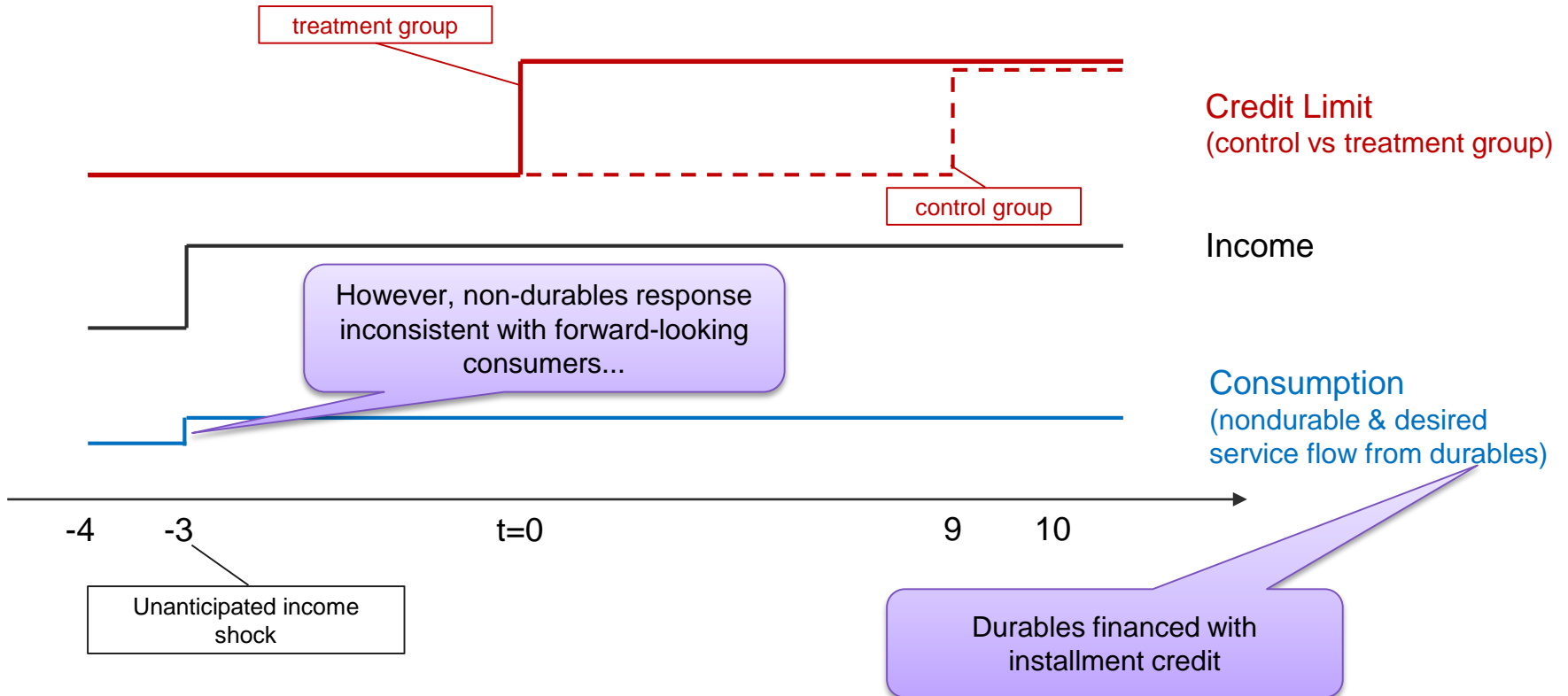
Table 1: Intertemporal models: MPC and Testable Predictions

Prediction	MPC-C				
	0				1
	PI	Buffer-stock	Buffer-stock w/Durables	Myopia	Spender- saver
(1) <i>Credit affects behavior?</i>	N	✓	✓	✓	✓
(2) <i>Unconstrained respond?</i>	N	✓	✓	✓	N
(3) <i>Delivers magnitude?</i>	N	N	✓	✓	N
(4) <i>Dynamics mean-reverting?</i>	N	✓	✓	N	N
(5) <i>Composition of spending?</i>	N	N	✓	N	N

Let me suggest some alternatives focusing

- on the dynamic responses and
- on the fact that customers might expect this credit limit increase well in advance

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Instead of income rule, consumers might follow a credit limit rule:

“borrow up to x% of credit limit”

If multiple credit cards and increase spending on several cards, then this predicts that spending on the banks card should be below 45-degree line relative to pre-RCT utilization

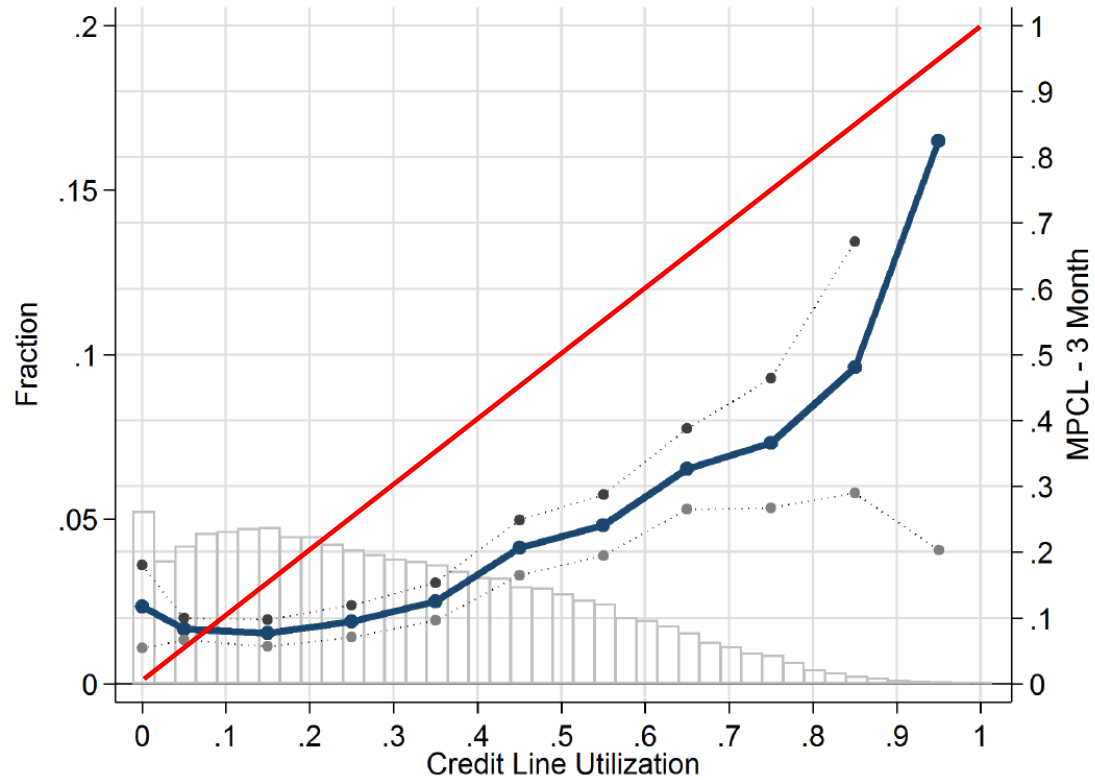
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Figure 3: Heterogeneity by credit line utilization



Summary

Very interesting paper!

Large extension of Credit Card Limit

- to customers who have low credit risk, high income, but still borrow on credit card (highly profitable),
- in an emerging market economy,
- which is undergoing rapid changes in regulation of consumer credit.

These policy changes suggest additional sources of variation that could be explored, without having to run a RCT

Thank you!