Digital Payments Induce Over-Spending: Evidence from the 2016 Demonetization in India

Sumit Agarwal, Pulak Ghosh, Jing Li, Tianyue Ruan(2019)

Yi Huang
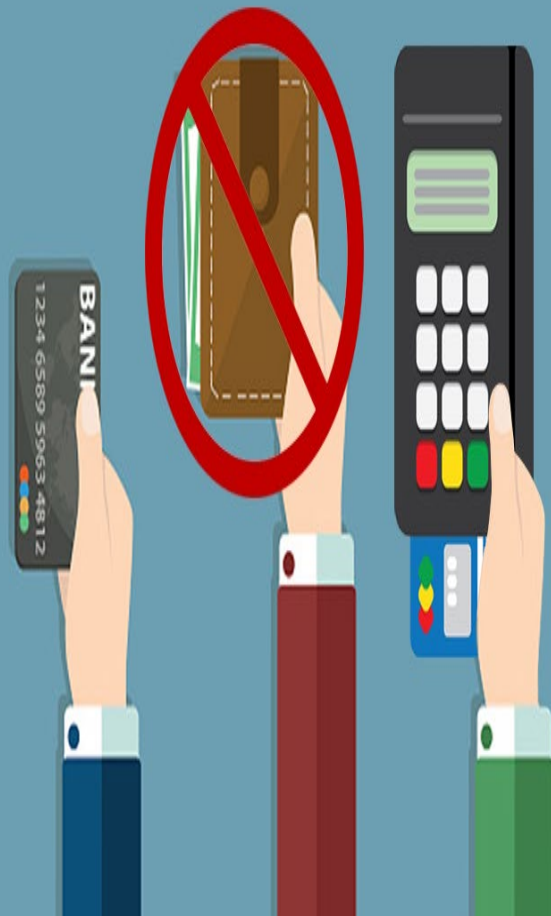
Associate Professor of Economics
Pictet Chair in Finance and Development & CEPR
Graduate Institute, Geneva

The 7th Annual Conference, Asian Bureau of Finance and Economic Research
May 28, 2019

Cash vs. Digital Payment
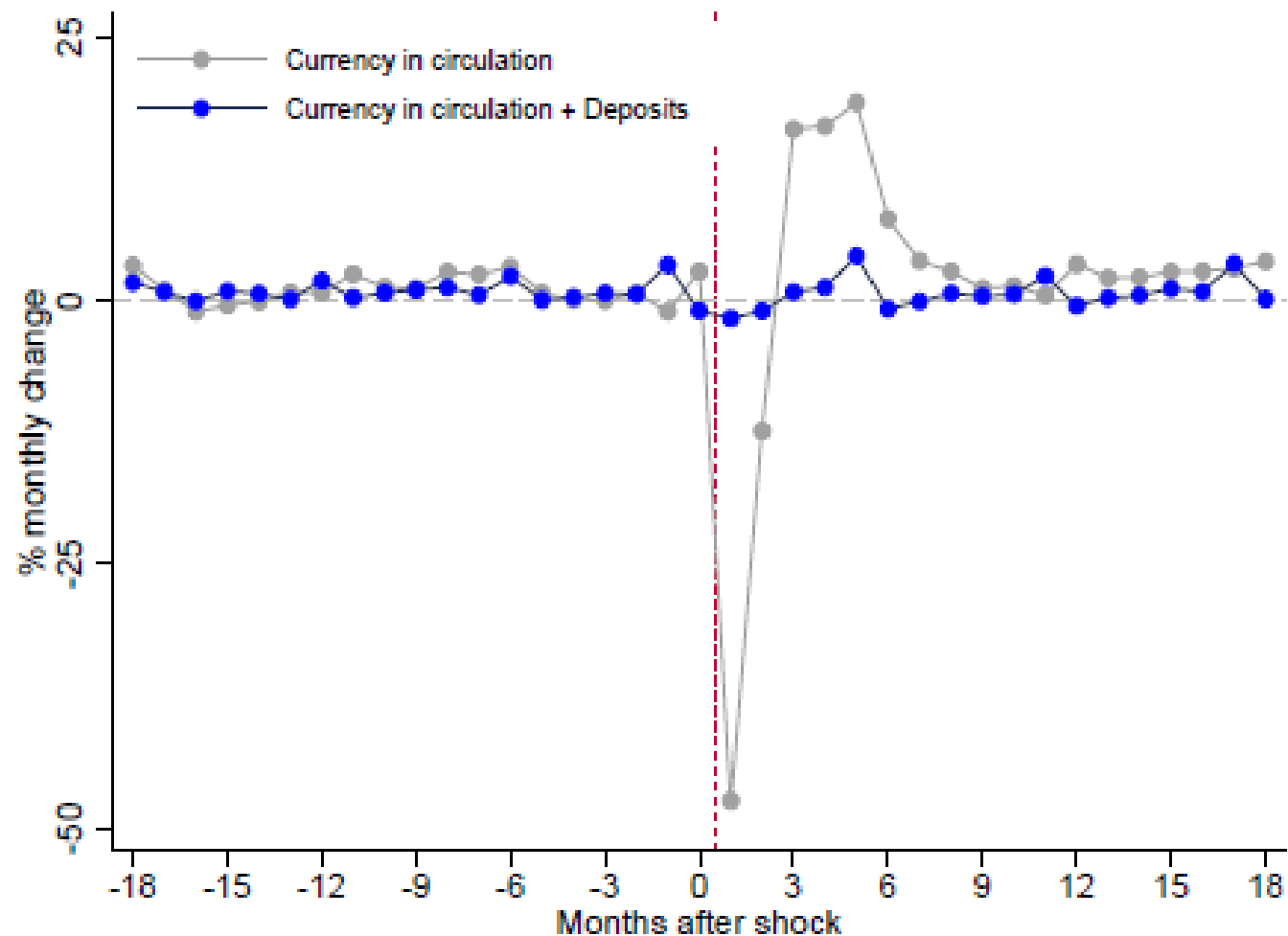
2016 Demonetization in India: Anti-corruption and promote the digital payment and E-commerce....
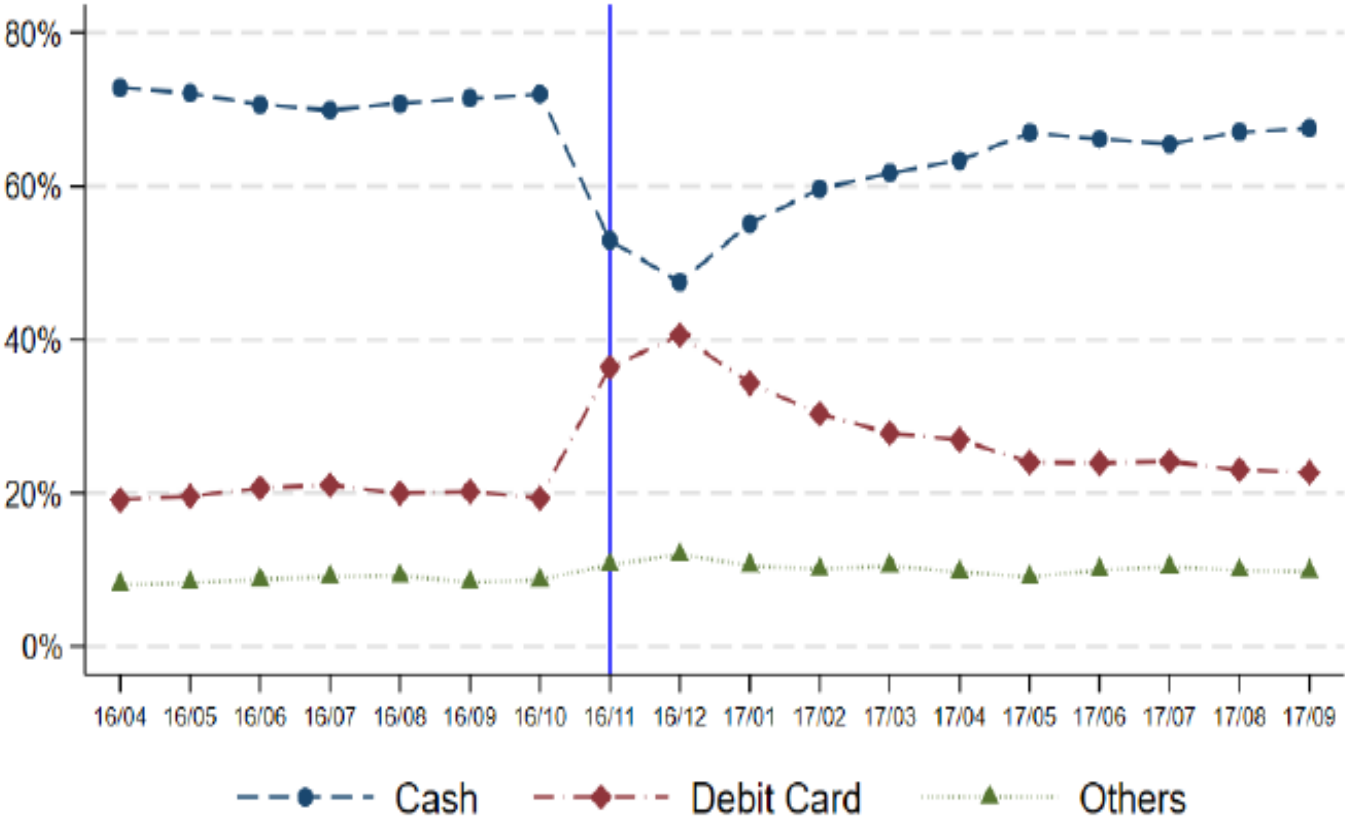
2016 Demonetization in India:
86% cash in circulation becomes the illegal tender overnight.
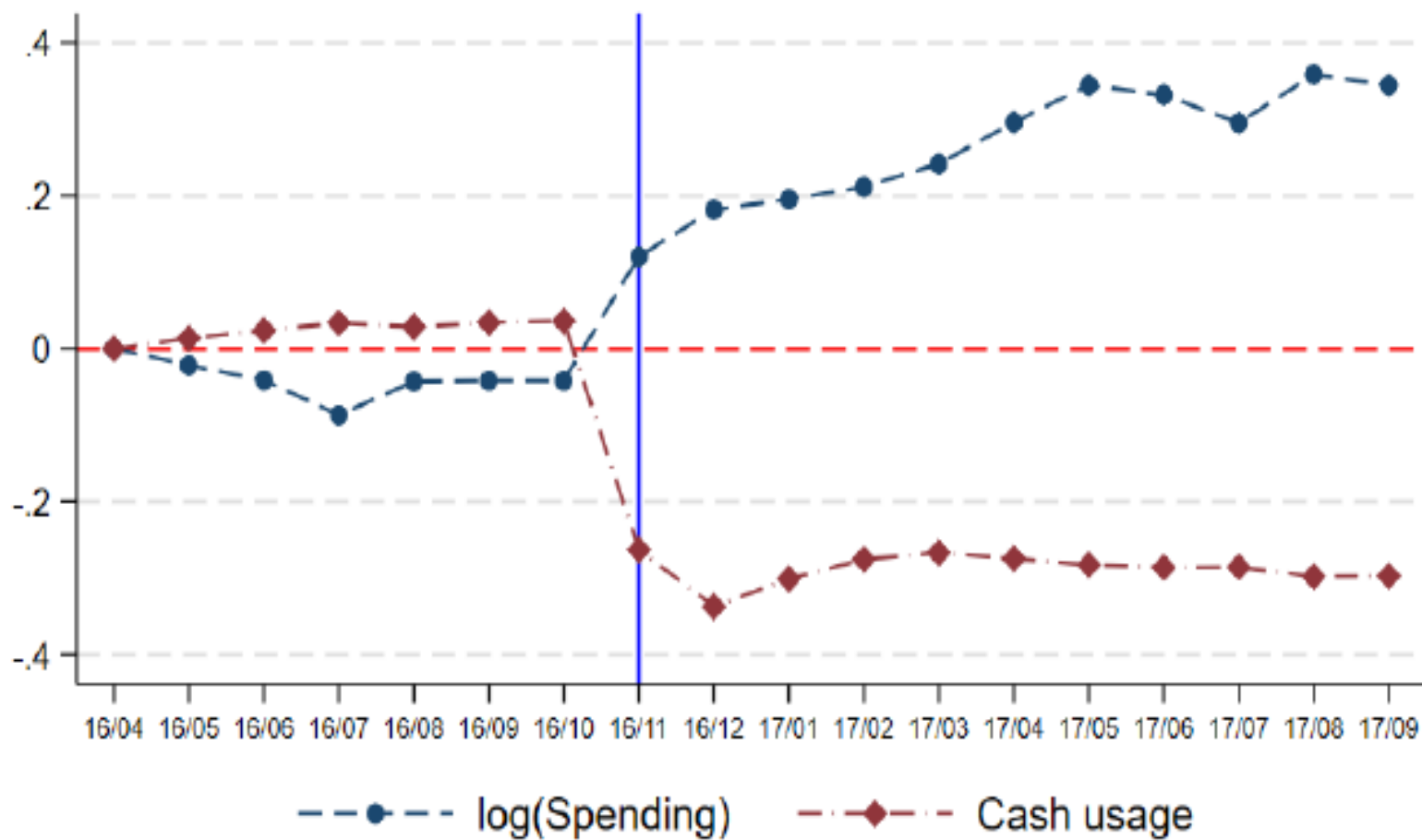

Source: Crouzet, Gupta and Mezzanotti (2019)

2016 Demonetization in India: Rising the non Cash payment

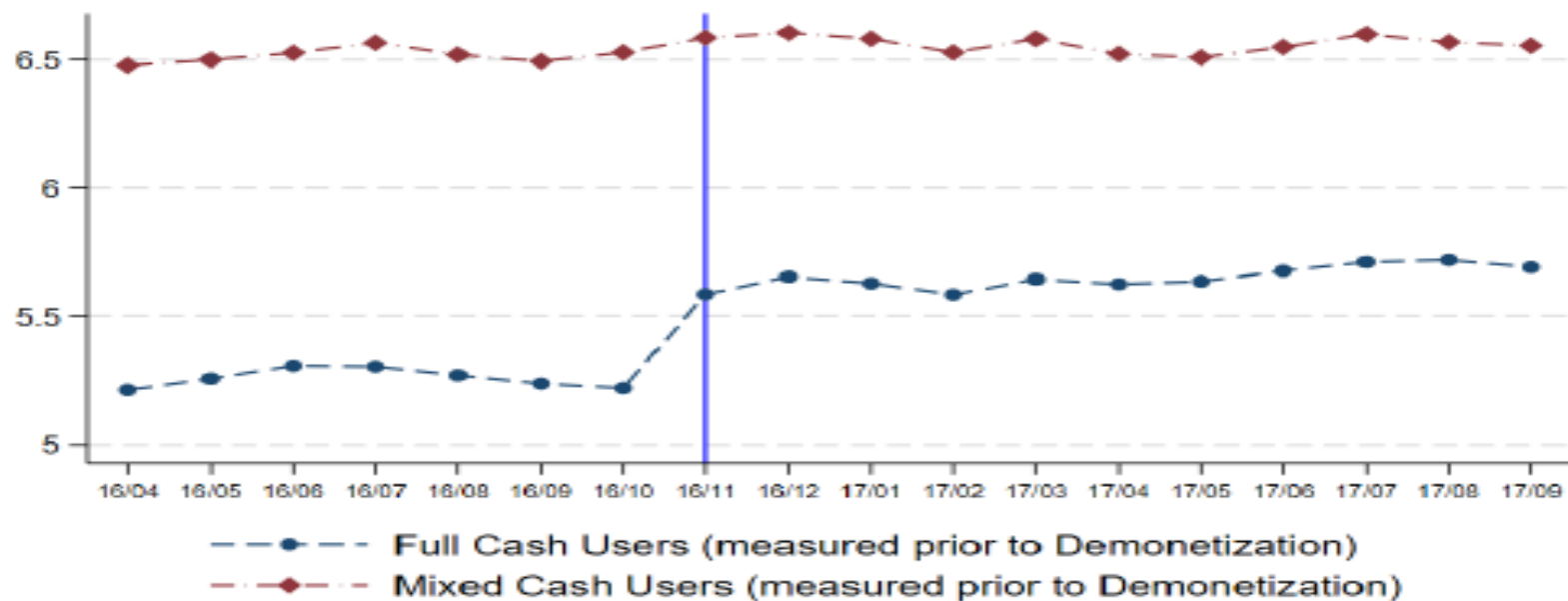# Main Findings: less cash payment and more spending

Overview: Contributions

- **Cash vs. Digital Payment?**
  - **Cash-in-advance constraint** (CIA) models(Clower, 1976 ; Rao and Wallace, 1991 ; Hellwig, 2000)
  - **Money in the utility function** (MIU) models(Ramsey, 1928 ; Sidrauski, 1967 ; Walsh,2003)
  - **Money illusion** (Fisher, 1928 ; Shafir, Diamond, and Tversky, 1997)
  - **Behavior approach** : Salience on the decision point, memorability, Pain in payment, degree of coupling and quality of feedback, carry cost...

- **Evidences?** confounding factors and endogeneity of the financial technology adoption (Higgins, 2018 Mexico debit card experiment ; Economides and Jeziorski, 2017 Tanzania transaction fee experiment)

- Effects on the Demonetization (Chodorow-Reich et al. 2018): Districts experiencing more severe demonetization had relative **reductions in economic activity**, faster **adoption of alternative payment technologies**, and **lower bank credit growth.**

- A very smart and cute identification using cross sectional variations of the Demonetization shock across the pre-event cash dependence household.

- The important and timely research on the **consumption behavior** by the digital payment comparing with the cash usage. Existing literature focuses on the unanticipated income shocks by fiscal, monetary policies.... **shop level granular transactional data and unexpected external shock on the payment.**

Main Identification : DID setting

(b) Log spending amount over time

--•-- Full Cash Users (measured prior to Demonetization)
--◆-- Mixed Cash Users (measured prior to Demonetization)

$$y_{i,t} = \mu_i + \pi_t + \beta \left(PriorCash\,Dependence_i \times Post_t \right) + \varepsilon_{i,t} \tag{1}$$

Overspending or unintended consequence ?

$$y_{i,t} = \mu_i + \pi_t + \sum_t \beta_t \times PriorCashDependence_i \times \mathbb{1}_t + \varepsilon_{i,t}$$
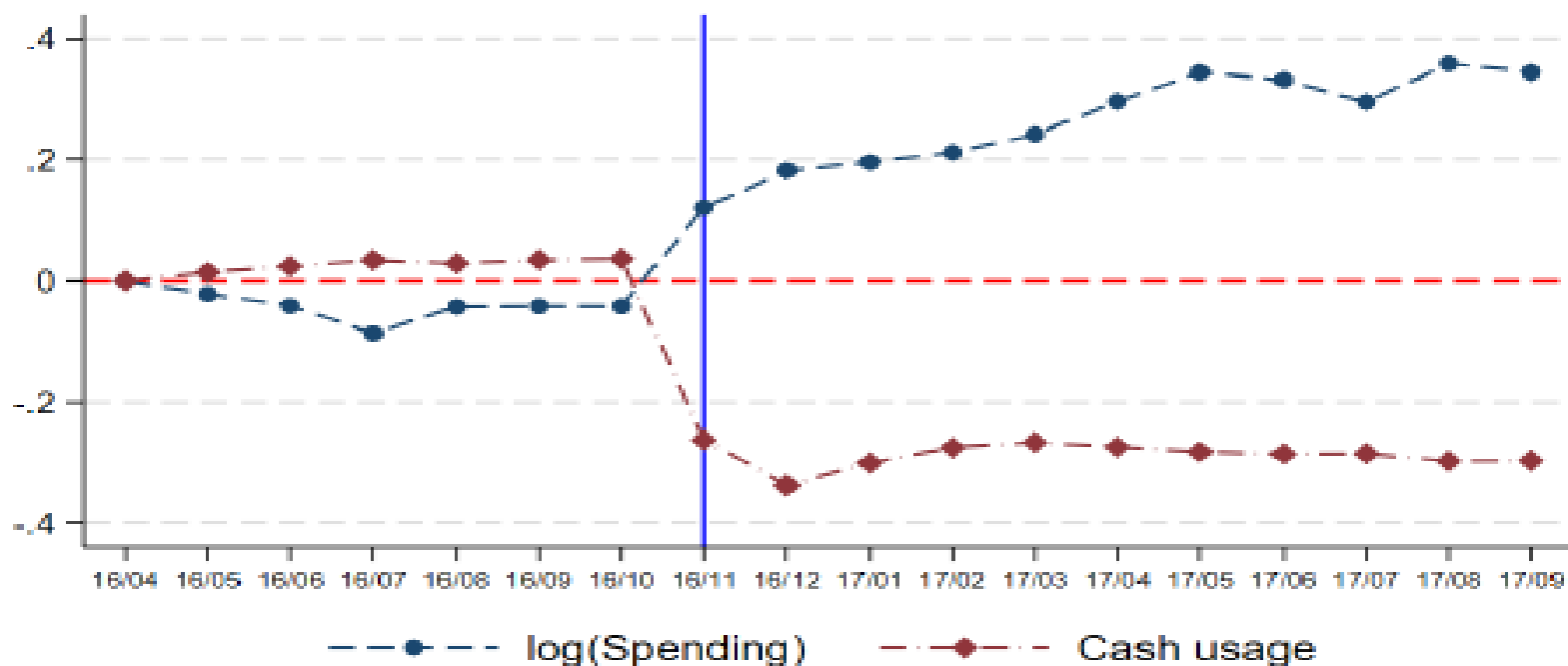
Potential issues

- **1. Income Shock**

- **2. Credit Supply**
  - Effects on the Demonetization (Chodorow-Reich et al. 2018) shows the opposite.

- **3. Supplier Pricing Adjustment**
  - No evidence that high exposure products experienced a larger price increase vs. low exposure products

- **4. Moving purchases to the formal market**
  - Low prior grocery spending household (< 95%) is associated with a higher spending response, opposite of the hypothesis.

Corruption perceptions map
2005 Survey

Corruption Index
6.0 - 7.0
5.5 - 6.0
5.0 - 5.5
4.5 - 5.0
4.0 - 4.5
3.0 - 4.0
No data

Figure 2.2.1
Estimated % of population with bank accounts in urban and rural areas for various districts of India

2.2.1a Urban

Data Not Available
0-10%
10-30%
30-50%
50-70%
70-100%
>100%

2.2.1b Rural

Data Not Available
0-10%
10-30%
30-50%
50-70%
70-100%
>100%
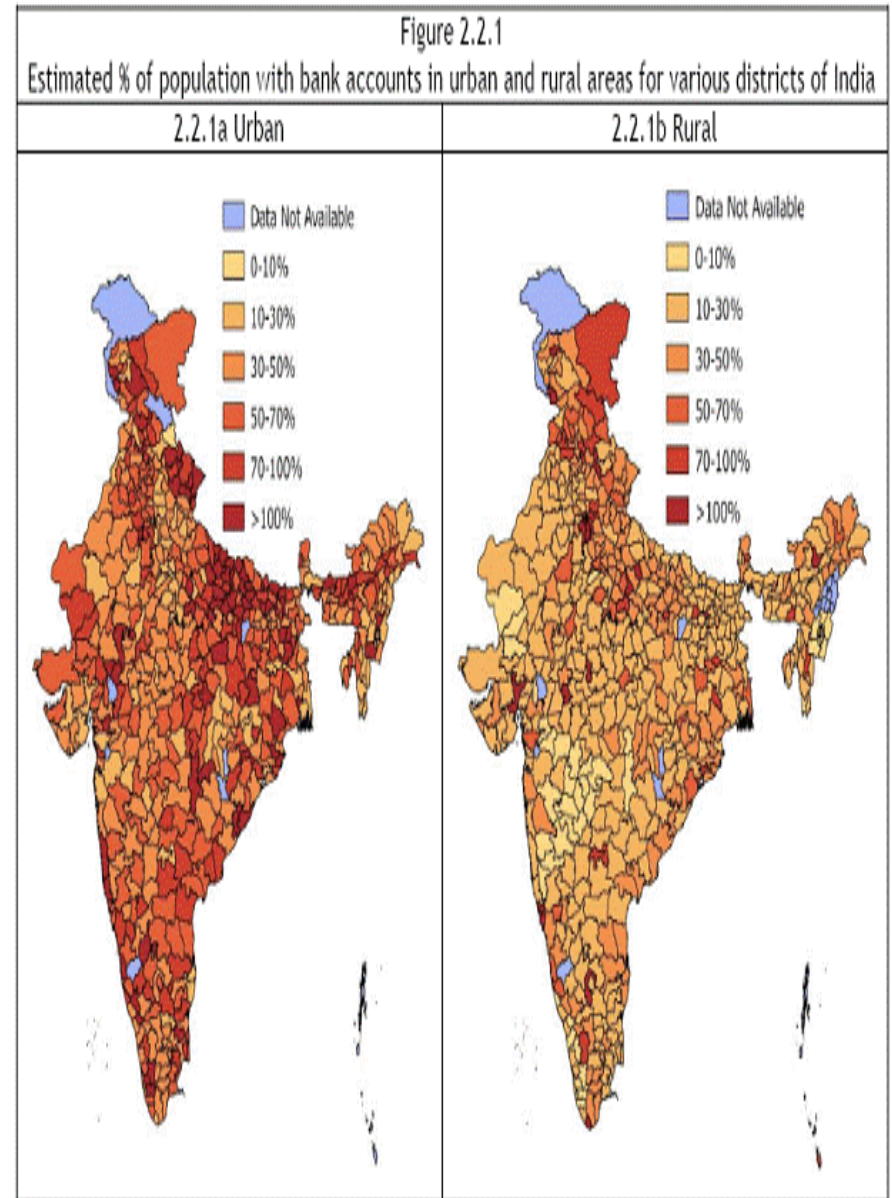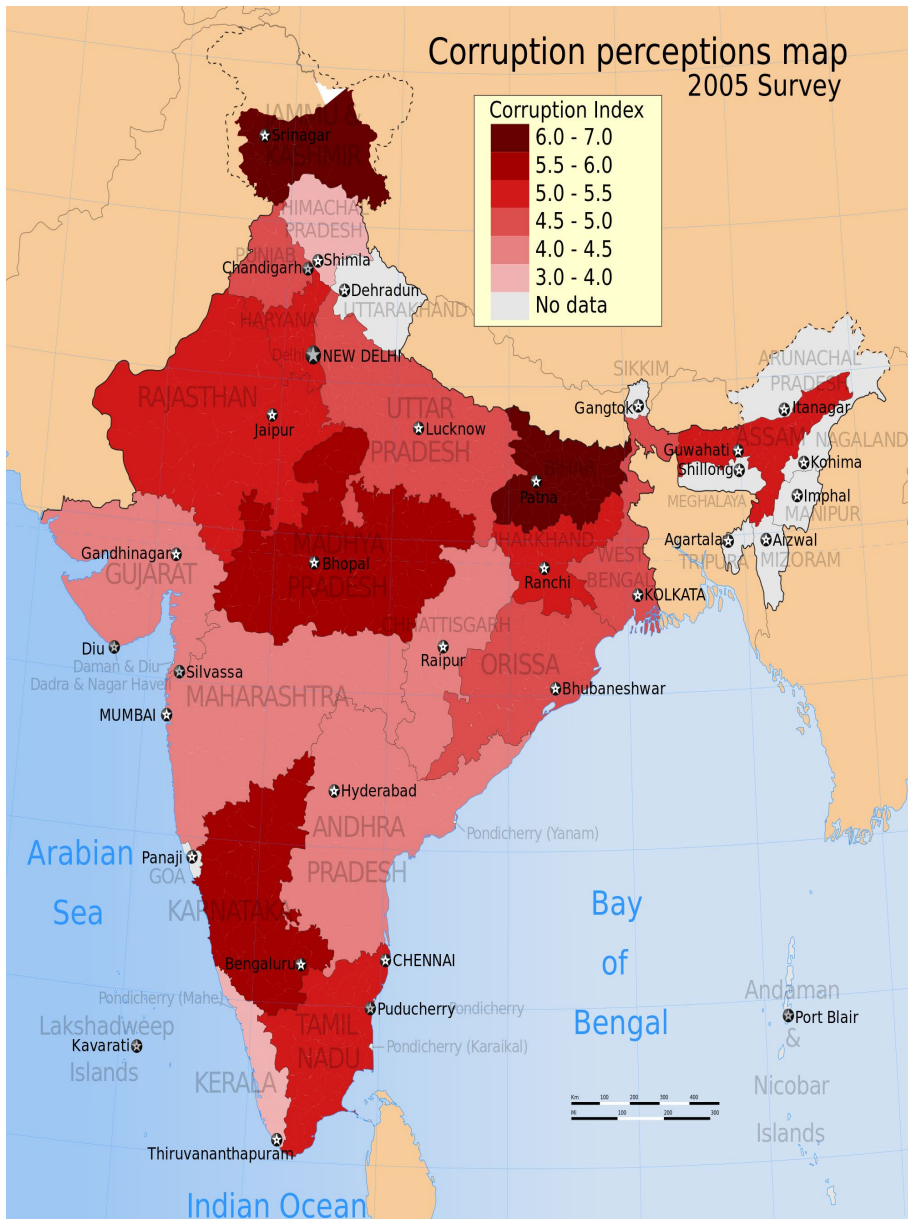
Distributions , consumer personal characteristics, consumption categories with durable vs. non durable...

Table 1: Summary statistics

Summary stats

Variables	Mean	Standard Deviation
Purchase Amount per Transaction	373.92	969.95
Log(Purchase Amount per Transaction)	4.96	1.65
Dummy for Non-cash Payment	0.34	0.47
Purchase Amount per Month	1018.64	24219.97
Log(Purchase Amount per Month)	6.02	1.44
% of Non-Cash Spending per Month	0.36	0.45
% of Cash Spending per Month prior to the Shock	0.7	0.38

Debit card and Credit Card Substitution by Interest rate channel?

	(1) Cash usage	(2) Debit usage	(3) Mobile usage	(4) Credit usage
PriorCashDependence × Post	-0.313***	0.268***	0.001***	-0.024***
	[-429.49]	[311.06]	[6.71]	[-55.26]
Consumer Fixed Effects	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes
R^2	0.626	0.568	0.359	0.368
No. of Observations	7,644,270	7,644,270	7,644,270	7,644,270

Panel A: Results using the second most granular definiton of categories

	Amount		Quantity		Unit Price		Use Offer	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PriorCashDependence × Post	10.828***	19.255*	0.084*	0.281	1.932***	1.616***	-0.002***	-0.004***
	[2.86]	[1.84]	[1.69]	[1.56]	[23.30]	[21.13]	[-4.87]	[-9.72]
Consumer Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Consumer-Category Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Category-Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.111	0.432	0.139	0.434	0.558	0.682	0.407	0.649
No. of Observations	47,182,408	47,182,408	47,182,408	47,182,408	47,182,408	47,182,408	47,182,408	47,182,408

Rate of Inflation goes down

WPI Inflation
(YoY%)

- Fruits and Vegetables
- Pulses
- All commodities

37.27

9.55

DEMONETISATION

-1.83

-2.53

2.6

-24.26

Jan-16

Sep-17
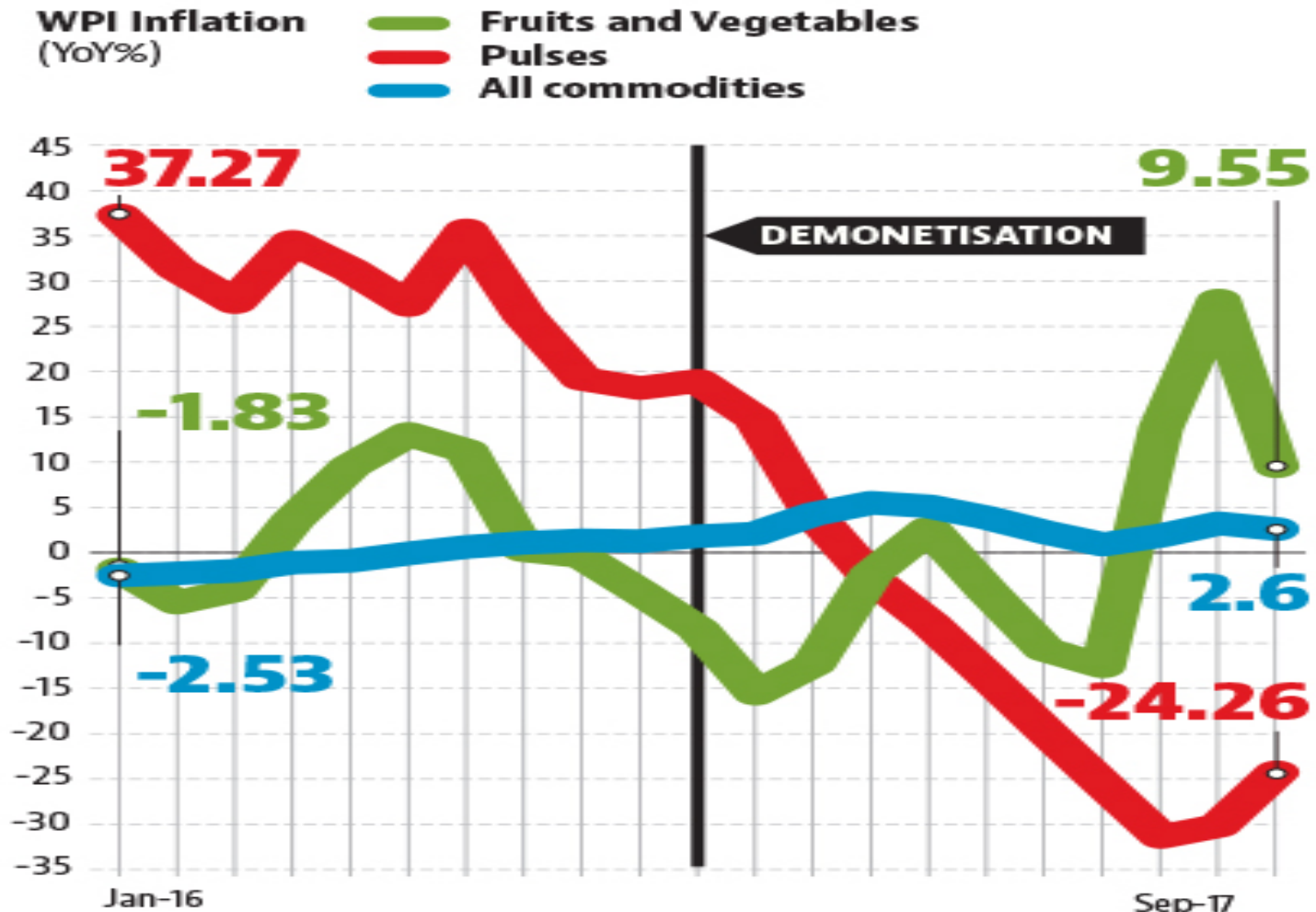
Source: CMIE, MOSPI

Minor comments:

Online VS. Offline ?

 Low income group?

Durable vs.. Non Durable?

 Variety of consumption?

Winner or loser?

Conclusions

- Great paper with policy implications: enjoy reading it and learn a lot!

- I can not recommend it highly enough(citation, and reading list/syllabus ...)

- Good luck: next version for the top publication

- Few practical suggestions

谢谢
고맙습니다
Thanks
Grazie
Merci
Danke
Gracias
Obrigado
Tack

Yi.huang@iheid.ch