

# Digital India

Too far, or not far enough?

# Outline

- Development economics background
- What is Digital India?-components
- What made it possible-key characteristics?
- Live examples of how its working?
- What did it disrupt?
- View from the west and the east
- What is the backlash and why?
- Is this a model for other countries?

# DEVELOPMENT ECONOMICS AND TECHNOLOGY

# Development and ICT

- Digital frontier or digital divide
- Growth = investment, labor force, innovation (productivity-technology)
- Natural endowment
- Government policies
- Success/failure examples worldwide
- Controversies

# Indian Household Study 2017

REPORT OF THE  
HOUSEHOLD FINANCE COMMITTEE

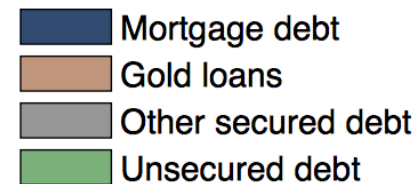
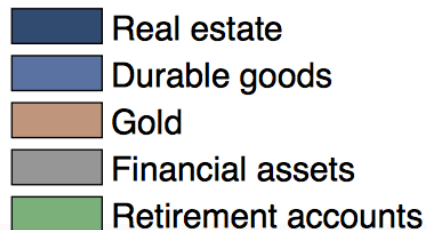
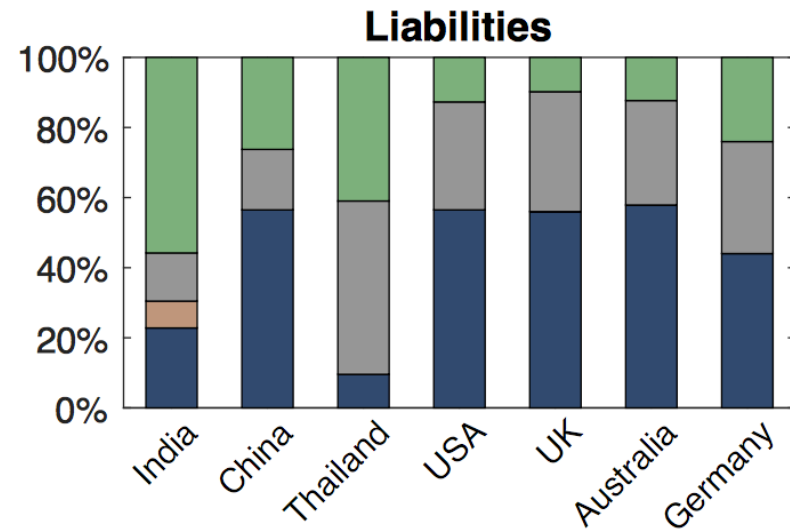
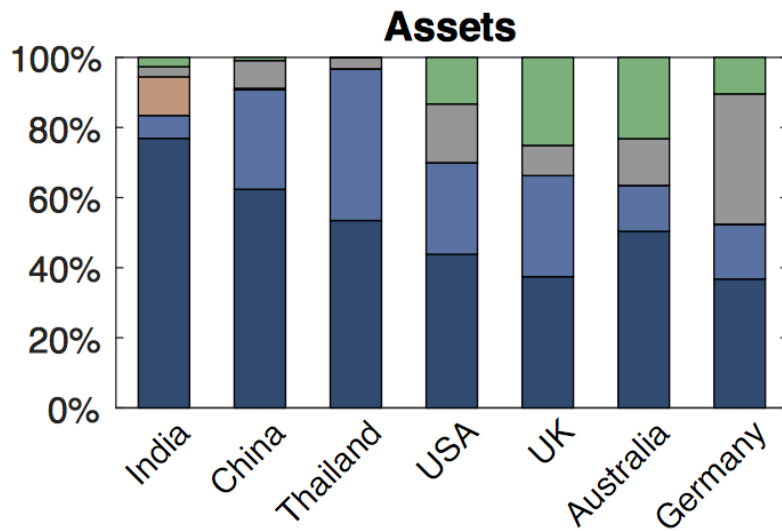
INDIAN HOUSEHOLD FINANCE



# Cross-country comparison: Indian household balance sheets

- Disproportionately high share of wealth allocated to **physical** (non-financial) **assets** like gold and real estate
- Under-investment in **long term insurance and pension products**
- Disproportional reliance on **unsecured debt**, mostly from non-institutional sources (**money-lenders**)

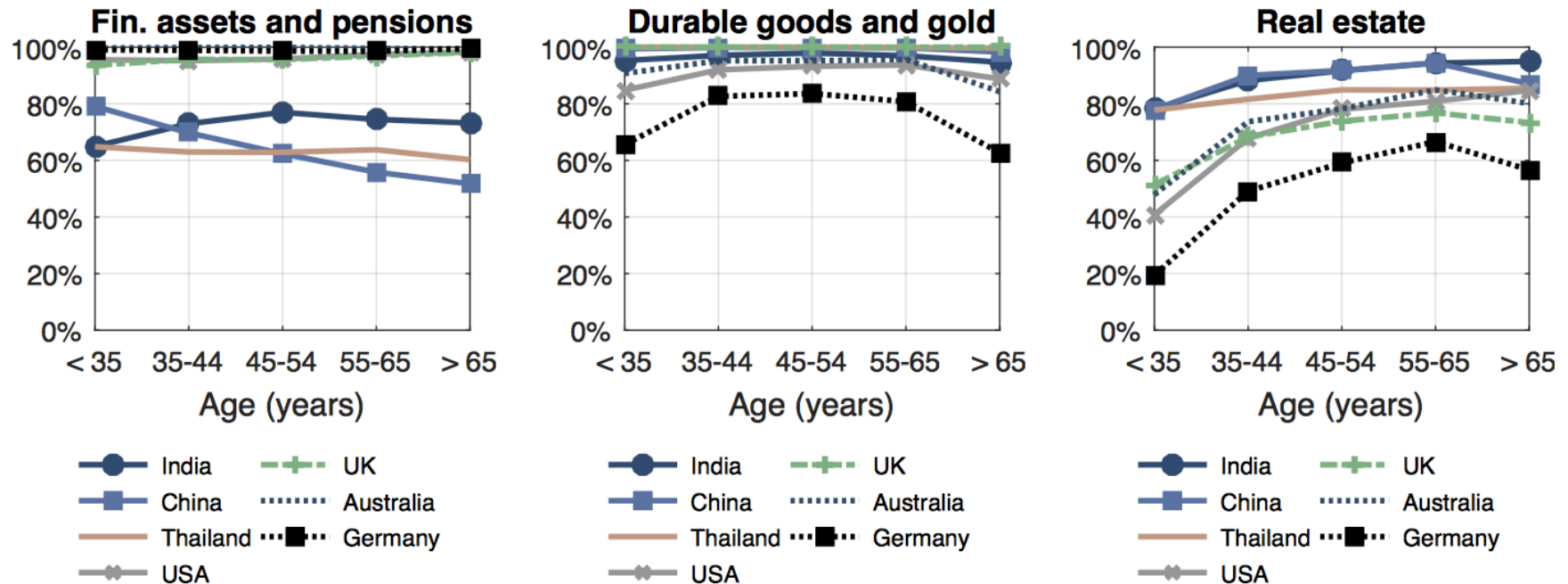
# Household balance sheet comparison



# Balance sheet over lifetime: assets

## Panel A

The assets side of the household balance sheet

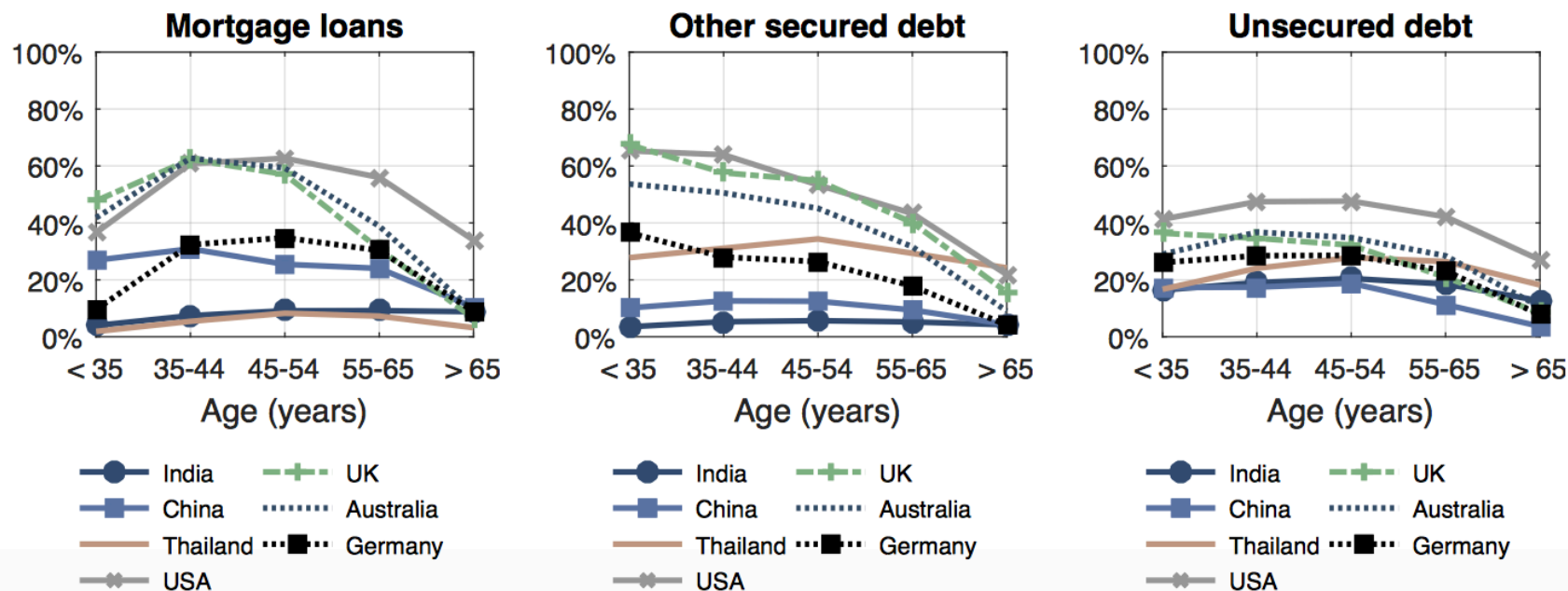




# Balance sheet over lifetime: liabilities

## Panel B

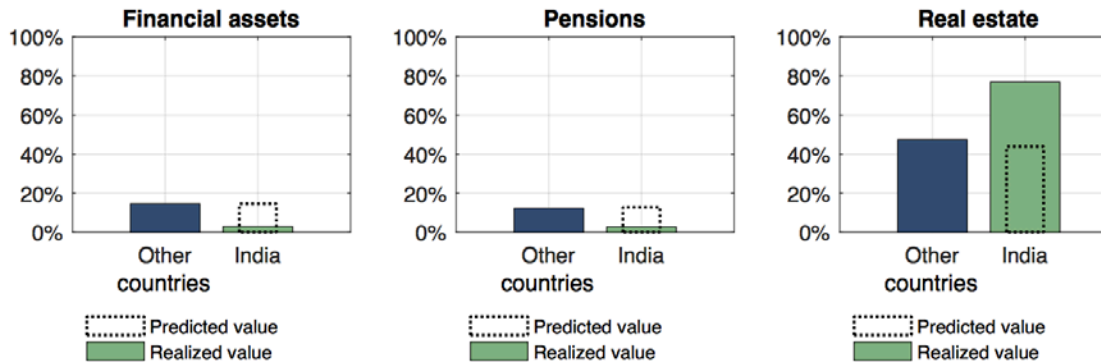
The liabilities side of the household balance sheet



# If India household balance sheet looked like other countries (counterfactual)

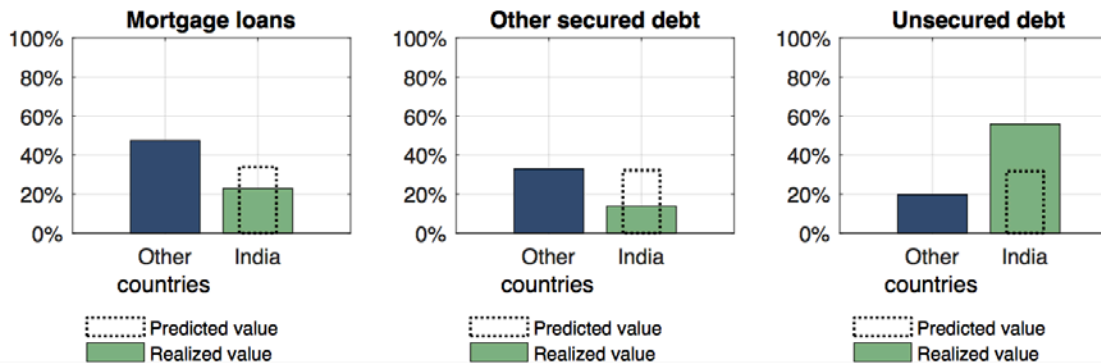
**Panel A**

The assets side of the household balance sheet

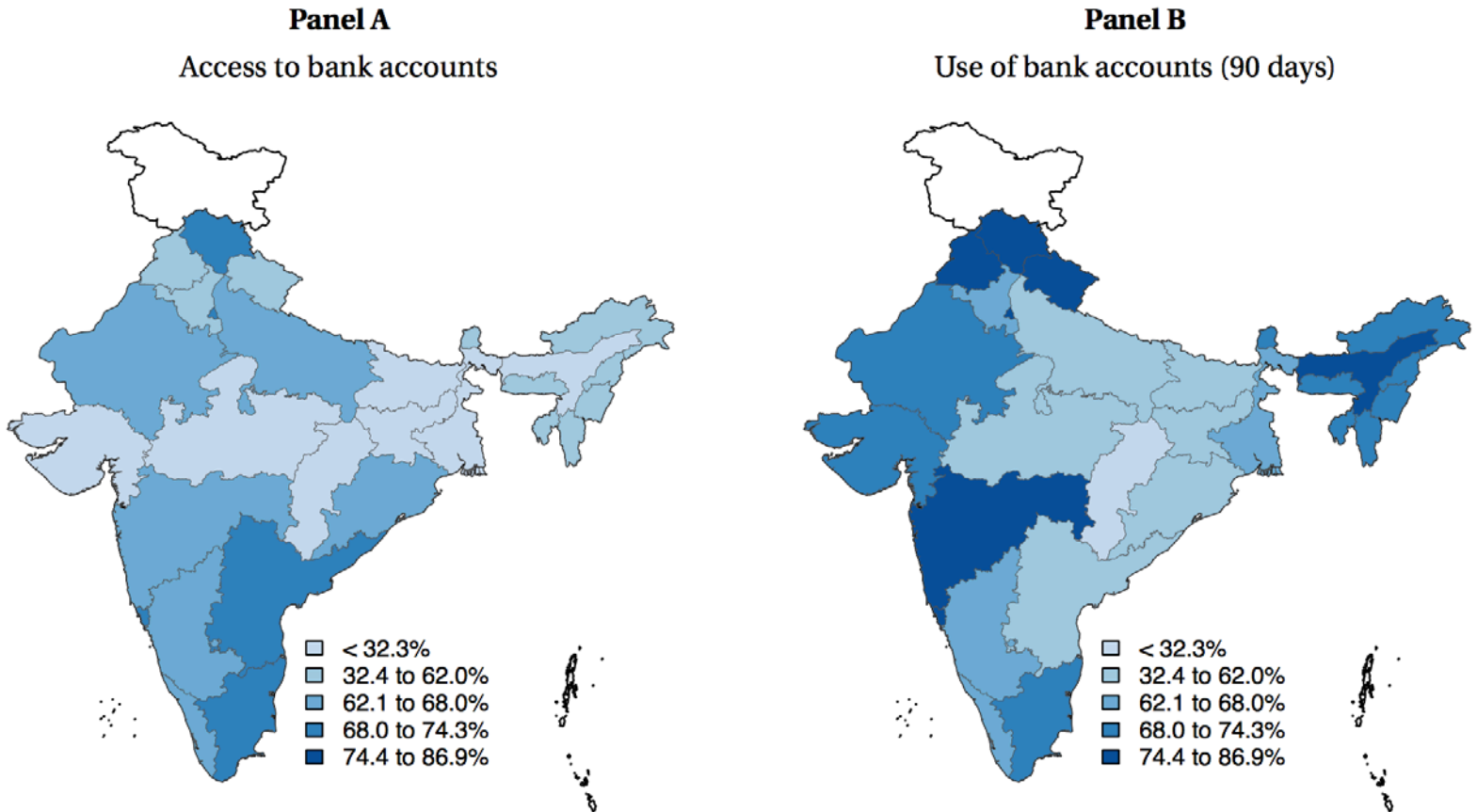


**Panel B**

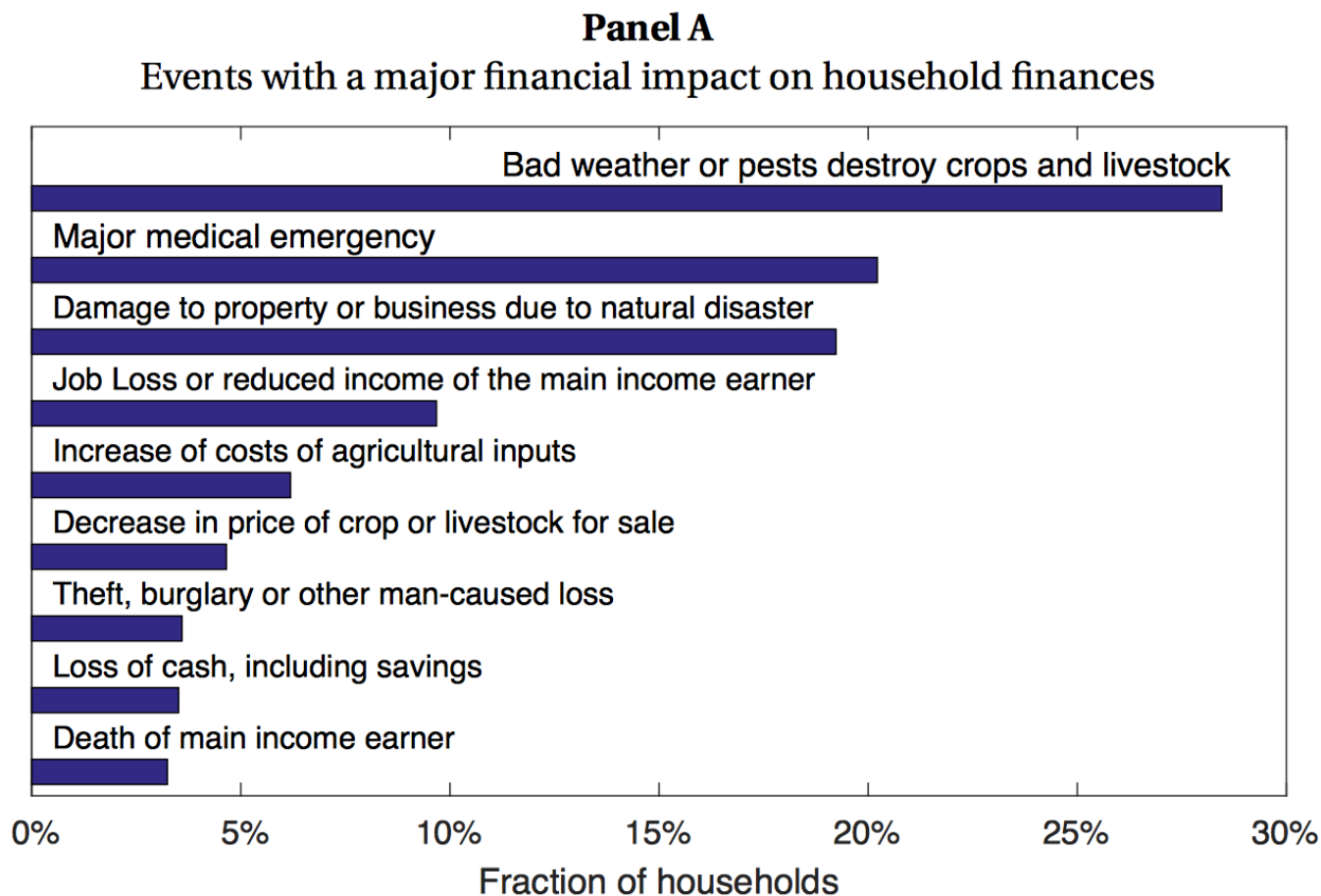
The liabilities side of the household balance sheet



# Access and use of bank accounts

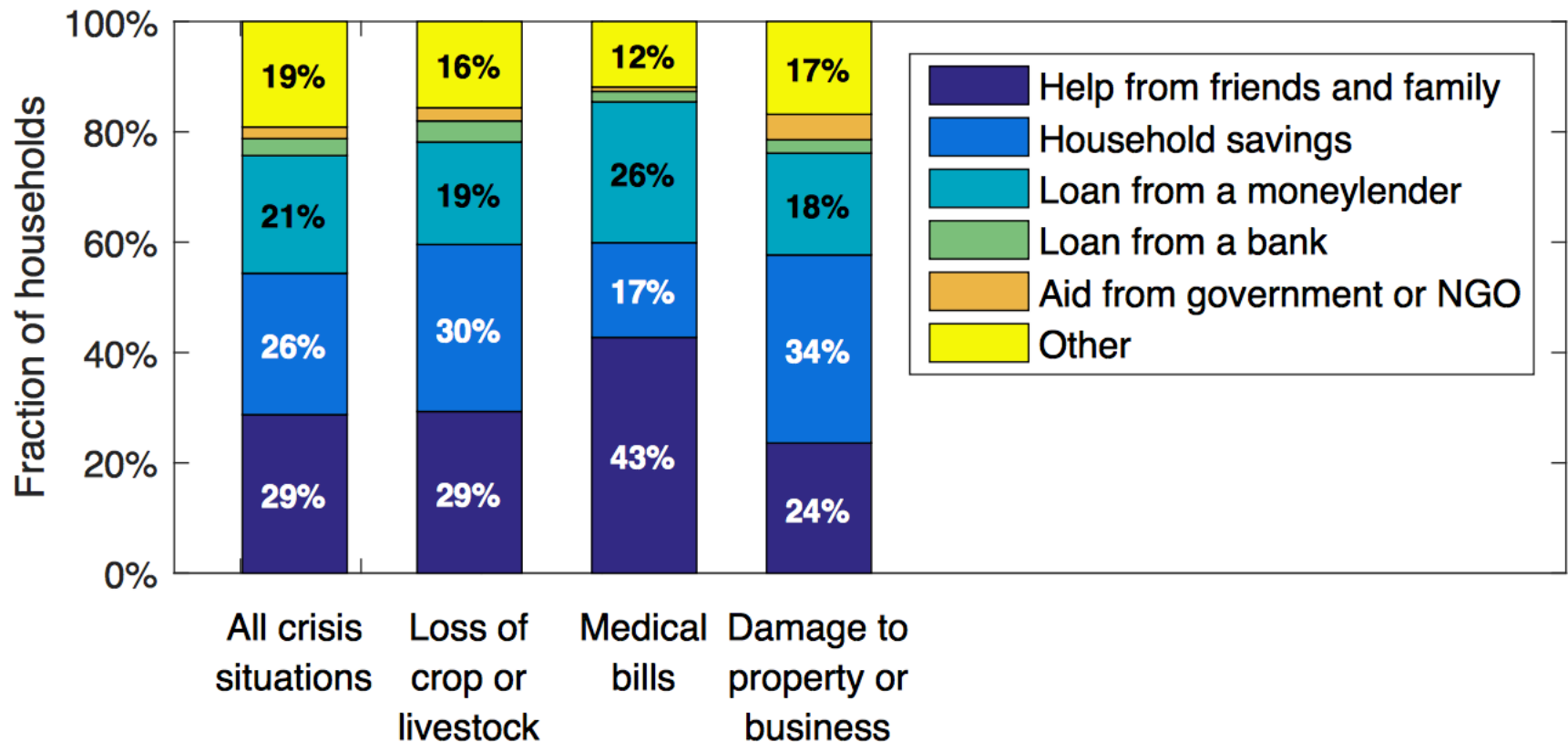


# Financial emergencies



# Emergency funds: moneylenders, family

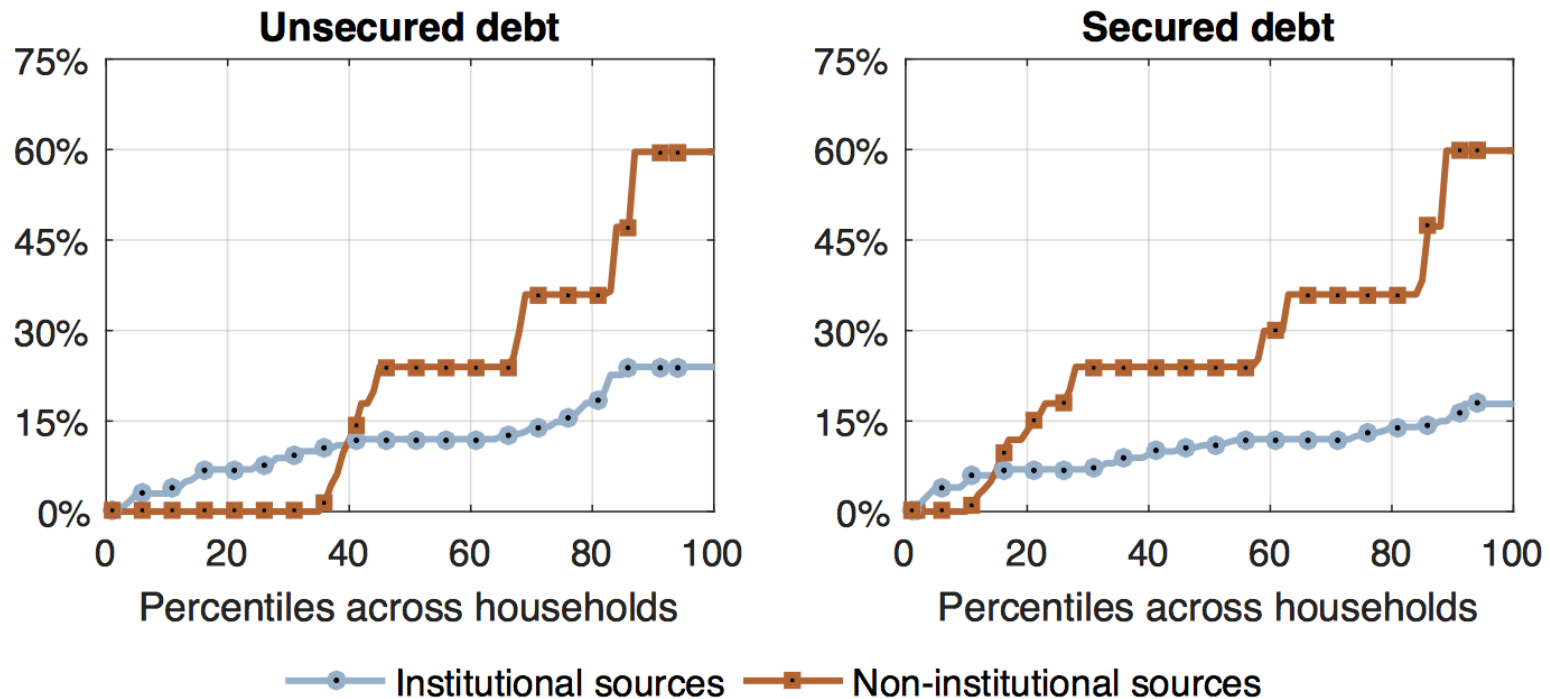
**Panel B**  
Sources of emergency funds



# Cost of borrowing

**Panel A**

Loan interest rates (per year)





# Reasons for

- Informal economy
  - Volatile income
  - Borrowing instead of insurance
  - Family instead of pension (more than half of households say their children are their retirement funds)
  - Corruption, cost (trust issues)
- Heterogeneity across states and regions
- Behavioral biases



# Needs

- Substitute institutional debt for money-lender debt to save interest costs
- Increase use of financial assets over physical ones
- Better public health system or insurance to reduce catastrophic health care costs
- Pensions to help old age problem





# Can Fintech fulfill needs?

- Substitute institutional debt for money-lender debt to save interest costs
  - **Bank accounts adoption**
  - **Reduce use of cash (black money)**
- Increase use of financial assets over physical ones
  - **Robo advice usage**

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## Omidyar Network to invest \$250 million in Indian ventures

Citizen-focused legal services, public platforms on investor's radar

Last Published: Fri, Oct 05 2018. 09 30 AM IST

### FINANCIAL INCLUSION

How do you  
measure impact?

4/30/2019

Kathleen DeRose

#### FINANCIAL INCLUSION

##### AffordPlan

AffordPlan is a FinTech platform designed to help low- and middle-income Indian consumers to better manage planned healthcare expenses.

##### Alliance for Financial Inclusion

The Alliance for Financial Inclusion works to increase access to financial services for the poor in developing countries.

##### Aspiration

Aspiration is an online financial firm offering retail banking and investment services to help people improve their financial situations.

##### Better Than Cash Alliance

The Better Than Cash Alliance focuses on shifting from cash to electronic payments in order to improve lives in low-income areas.

##### Bon

Bon empowers self-employed and gig-economy workers in India with easier access to working capital, many of whom are first-time borrowers of formal credit.

##### Center for Financial Services Innovation

CFSI leads a network of committed financial services innovators to build better consumer products and practices.

##### Centre for Digital Financial Inclusion

The Centre for Digital Financial Inclusion (CDFI) is an early-stage Indian organization creating evidence-based commercialization pathways for innovations in the digital financial inclusion space.

##### Chime

Chime is a mobile-only bank account that helps consumers in the US lead healthier financial lives.

Digital India

# KEY COMPONENTS



# Key components

- Three components:
  - Secure and stable digital infrastructure
    - Digital infrastructure as a utility (connect rural areas)
  - Deliver government services digitally
    - Governance and services on demand
  - Universal digital literacy
    - Citizen empowerment

# Narendra Modi

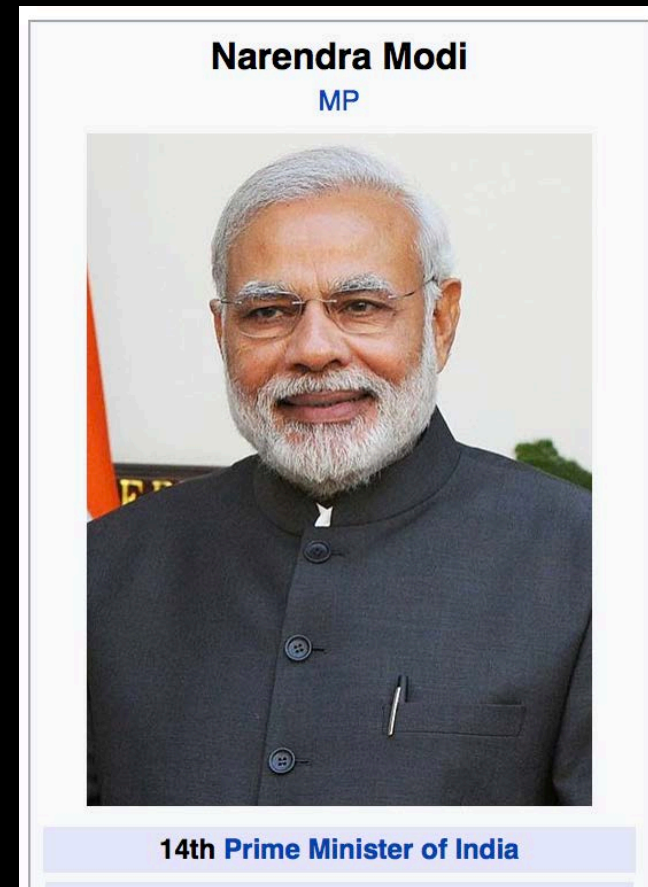
PM since May 2014

Former chief minister of Gujarat  
(controversies over  
development success and  
Hindu nationalism)

Father of "Digital India"

Pioneered biometric ID

- Government workers who skipped work
- Students who skipped school
- Get rid of "black money"



# "Digital governance evangelist"

## 'Magic' Modi uses hologram to address dozens of rallies at once

BJP leader Narendra Modi has solved the puzzle of how to reach the world's largest electorate – to address rallies throughout the country simultaneously as a hologram



Bharatiya Janata Party (BJP)'s prime ministerial candidate Narendra Modi pictured during a live "3D hologram" telecast in Mumbai Photo: AFP



# Modi app



Mac

iPad

iPhone

Watch

TV

Music

Support



## App Store Preview

This app is only available on the App Store for iOS devices.



**Narendra Modi** 4+

Narendra Modi

★★★★☆ 3.7, 128 Ratings

Free

Launched so Modi can  
communicate directly with  
citizens  
5 million downloads at launch  
Found to be accessing data  
(contacts) and selling it  
Privacy policy since changed

<https://www.youtube.com/watch?v=N9bxw1IZzDo>

Digital India = live fintech  
experiment!





A woman had her irises scanned for inclusion in India's national biometric database, at a village in Rajasthan, in 2013. Mansi Thapliyal/Reuters

# Aadhaar

<https://www.youtube.com/watch?v=7AngJKfDgEY>

- 12-digit unique identity number based on biometric and demographic data
  - Fingerprints, eyes and faces
- Collected by the Unique Identification Authority of India (UIDAI) under the Ministry of Electronics and Information Technology
- World's largest biometric ID system and "most sophisticated national ID system in the world" -*Paul Romer*

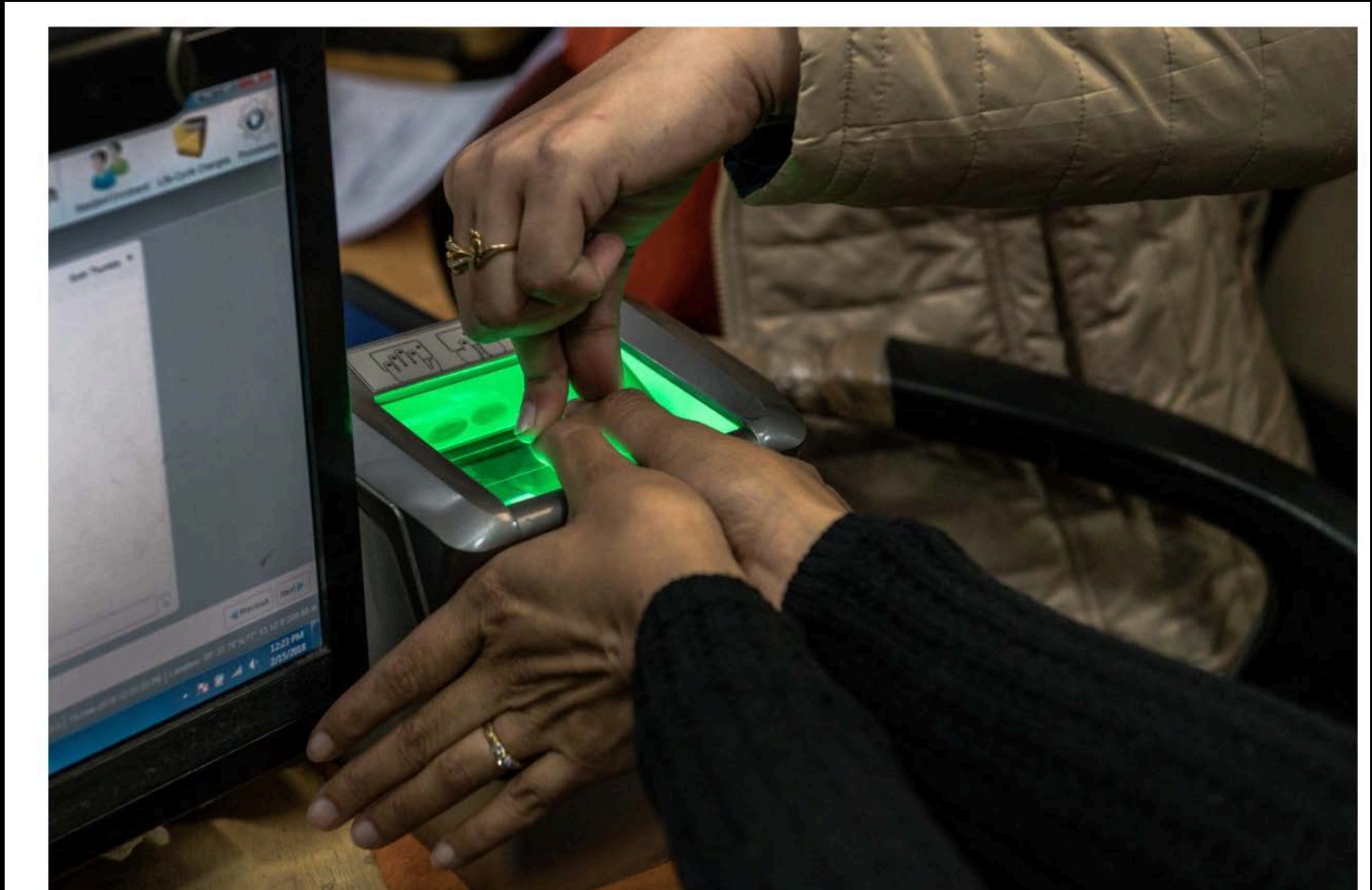


# Aadhaar scale

“No one has approached that scale and that ambition,” said Jacqueline Bhabha, a professor and research director of Harvard’s FXB Center for Health and Human Rights, who has studied biometric ID systems around the world. “It has been hailed, and justifiably so, as an extraordinary triumph to get everyone registered.”

“It’s the equivalent of building interstate highways,” said Nandan Nilekani, the technology billionaire who was [tapped by the government in 2009 to build the Aadhaar system](#). “If the government invested in building a digital public utility and that is made available as a platform, then you actually can create major innovations around that.”

# Rice ration coupons to pension payments



# Is Aadhaar voluntary?

## Yes

- Can chose to opt in
- For public services
- Fights corruption-has saved billions so far

## No

- Expanding from public to private services
- From birth to school, to death
- Extent of services that require it expanding—banks, phones
- Mission creep to build a national database on citizens?



# Key fintech components

- National biometric ID: Aadhaar
- **End of cash**: demonetization Dec. 2016
- Open banking with state banks and APIs
- Accessible **banking** for all: **PMJDY**
- Real time payments app: BHIM Bharat Interface for Money
- India debit card alternative to Visa: RuPay
- **Robo advice**
- Additional Digital services
  - Signatures (eSign)
  - Lockers to store important documents

# EXAMPLES



# 3 Examples

- **End of Cash**-informal economy, corruption and money-lenders
- **Free bank accounts**-unbanked, institutional borrowing
- **Robo advice**-asset allocation

## LIVE EXPERIMENTS:

Do these address the big problems identified in the household balance sheet study?



# 1. End of cash 2016

- 1946 and 1978 attempts to curb black money
- November 2016 surprise de-monetization
- End of 500 and 1000 notes: 50 days to deposit them or lose
- **“the politics of disruption”**
- 99.3% deposited in the banking system
- Stock market fell 6%
- GDP growth took a hit-chaos especially for farmers relying on cash
- Tax receipts went up
- Immediate jump in use of debit cards and payments apps

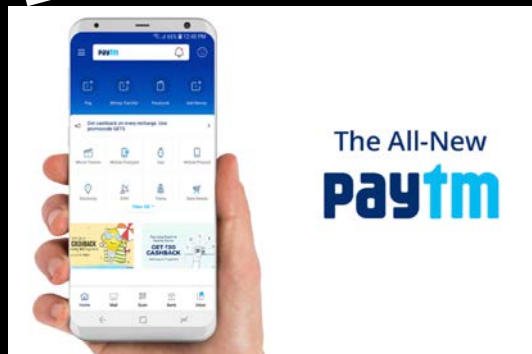
# 1. End of cash: results 2 years later

Forbes, Sept. 2018  
Accelerated digitization  
especially payments apps  
and debit cards use

The Guardian, Aug. 2018  
Fails to curb corruption

India's Demonetization Drive: A Necessary Jolt Towards A More Digital Economy?

Demonetisation drive that cost India 1.5m jobs fails to uncover 'black money'  
Costly banknote recall did not flush out untaxed wealth, as PM Narendra Modi had promised

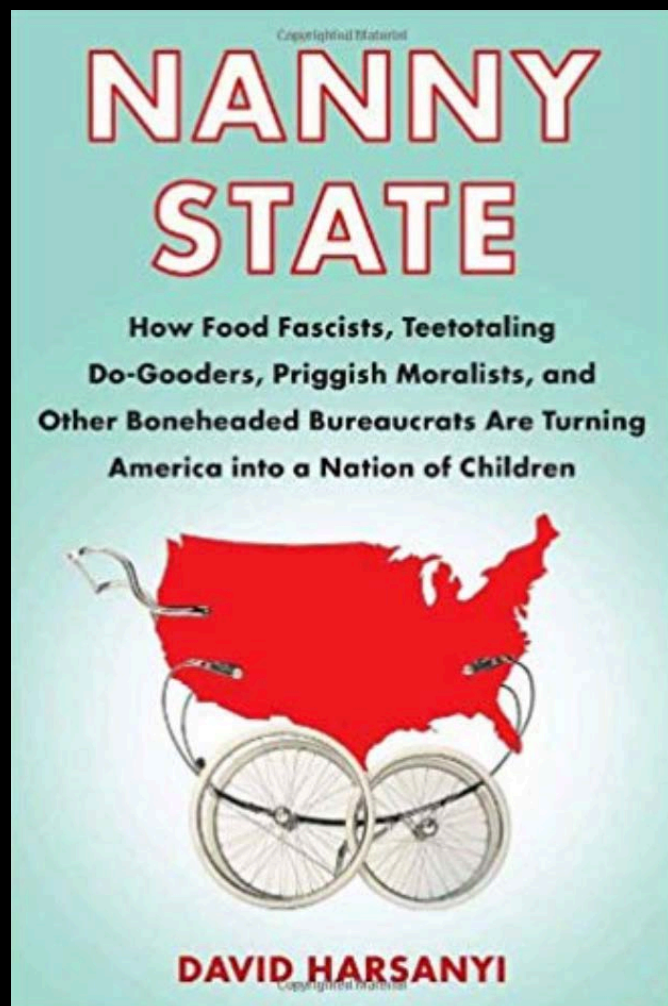


4/30/2019

Kath



## 2. Free bank accounts



How to bring people into the financial system without infantilizing them

- Training them?
- Providing free goods? (universal basic income?)



## 2. Free bank accounts

“ Pradhan Mantri Jan-Dhan Yojana ”

- Chopra, Prabhala, Tantri
- “ *Bank accounts for the unbanked: evidence from a Big Bank Experiment* ” (2018)
- Study the 2014 PMJDY financial inclusion program to provide bank accounts to **ALL of the 280 million unbanked** within two years (which was successful)
- This study uses data from the new accounts to **track the actual activity**

## 2. Bank accounts (con't)

- 38.5% of the world is unbanked. 2.5 billion people! Why?
- **No demand for accounts?**
- **Or No supply of accounts?**
- PMJDY is an exogenous “supply shock” to the unbanked
- Hypothesis: If demand was there, people with new accounts should use them (if not, they remain dormant)
- Hypothesis: If usage requires some learning by doing, diffusion patterns should follow those adopting technology

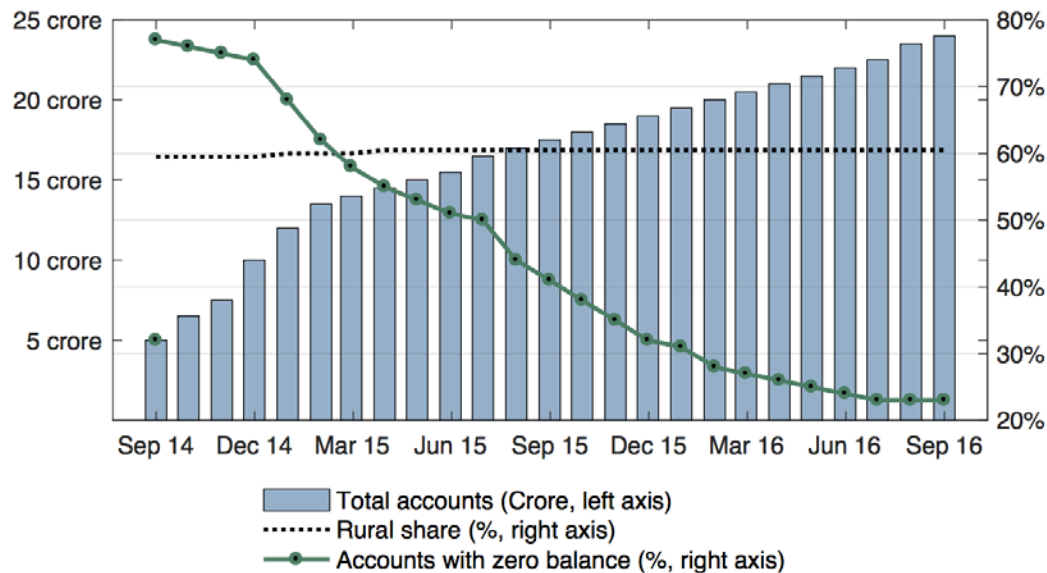
250 million  
accounts (25  
crore = 250  
million)

# PMJDY accounts

**Figure 2.3**

*Access and use of PMJDY accounts*

The State Bank of India, in its submission to the committee, presented statistics on the uptake and non-zero balance PMJDY accounts. This figure reports the total number of accounts per month since September 2014, the share of the total with non-zero account balance and the fraction of the total that have been opened in rural areas.



## 2. Bank accounts (con't) results

- Uptake: 100%
- **Usage**: 70% use the accounts (30% dormant), usage is more than in non-PMJDY accounts
- **Users**: are poorer and transactions sizes are smaller than non-PMJDY accounts
- **Usage level**: The number of transactions is 1.12 per quarter versus the World Bank average of 1 transaction per year
- **Usage growth**: Controlled for various demographic variables, usage increases with time. The most common use is an ATM withdrawal
- **Savings**: Account holders also start to accumulate savings and their balances increase and this is not all due to government direct benefits transfers-users are learning by doing



# Bank accounts: **summary**

- Suggests **huge unmet demand**; uptake, usage, growth in usage, and savings all expand
- No “control” but World Bank evidence of underbanked and underutilized suggests “**experiment**” has been highly successful at reducing financial exclusion
- Users want the accounts and begin to save
- **As policy**, free accounts work better than literacy training, etc. –learn by doing



### 3. Robo advice

- D'Acunto, Prabhala, and Rossi
- *"The Promises and Pitfalls of Robo-advising"* (2017)
- Study of Indian investors using a fintech robo advisor
- Data all the times users used the portfolio optimizer 2015-2017, full transactions and trading history, what each clients holdings were, and how many time they logged in

### 3. Robo advice (con't)

- Fintech robo-advising tool
- Automated portfolio optimizer introduced by a brokerage firm to clients in India
- **Most investors benefit from stock market participation.** Benefits depend on whether investors hold diversified portfolios. (In practice they don't).
- **Will fintech tool help investors make better financial choices?**
- Who uses the optimizer and how? What is the effect on portfolio outcomes? How does it shape the incidence of behavioral biases?

### 3. Robo-advice (con't)

- **Data** = all the times users used the portfolio optimizer 2015-2017, full transactions and trading history, what each clients holdings were, and how many time they logged in
- **Users** = Optimizer adopters were slightly older and 71% male-other characteristics of adopters and non-adopters similar
- Optimizer users are more active, log in more, trade more

### 3. Robo-advice (con't)

- Users have a higher \$ of assets (SUM) and hold more stocks
- Users outperform non-users
- Everyone underperforms the market
- Analyze results for users **before and after** use of optimizer
- **Will optimizer use increase portfolio diversification?**



### 3. Robo advice (con't): results for diversification and risk

- For users with **under-diversified portfolios**, optimizer use increases the number of stocks held and the diversification, and improves (lowers) the volatility or risk of the portfolio by 2% per year across all investors
- For users who are already diversified, the optimizer does not have any real impact on diversity and risk

### 3. Robo-advice (con't) results for trading and performance

- For the under-diversified users, performance by trade and for the portfolio both improve with use of the optimizer. For those that already had diversified portfolios there was no change in performance
- Usage and fees go up-investors pay more attention to their portfolios

### 3. Robo-advice (con't) results for 3 **behavioral** biases

- Higher (trade more) or lower? (trade more objectively)?
- Disposition effect (selling winners not losers)
  - **Using the optimizer reduces the disposition effect**
- Trend chasing (buying stocks that are already up)
  - Using the optimizer **reduces the momentum effect** but not to as great a degree as the reduction in disposition effect
- Rank effect (selling best and worst)
  - No effect visible (small baseline in selling worst performers)

# Summary robo advice

- Unsophisticated investors (those under-diversified before use) see substantial benefits from the use of the optimizer (fintech robo tool) in more diversified portfolios and lower risk portfolios
- Sophisticated investors (those already diversified) see zero to slightly negative impact from more frequent trading
- Robo tools address behavioral biases-everyone exhibits lower biases, though biases do not disappear
- **Generalization? Fintech tools can help less sophisticated investors diversify and get better results from portfolios. Robo advisors should target these investors not sophisticated ones. Further, this might encourage more emphasis on financial assets instead of hard assets, ie help improve a structural problem in indian household balance sheets**



# Takeaways three experiments

- Cash: mixed results
- Bank accounts: giving people free accounts works
- Robo advice: improves diversification

# INDIA-WHAT MADE IT POSSIBLE

# What made it possible

- Top-down authority (political power)
- State bureaucracy
- Form of financial services regulation (state owned banks and open APIs)
- Natural endowment (engineering skill)
- Social motivation
  - Corruption
  - Financial underclass

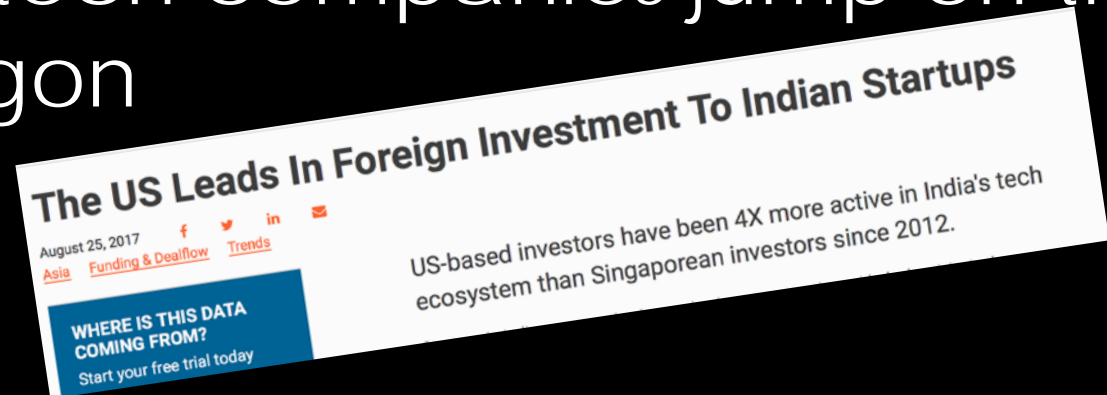
# VIEW FROM THE WEST AND THE EAST

# Policy copycats? Countries studying Aadhaar

- Sri Lanka
  - Britain
  - Russia
  - Philippines
- 
- Potential uses—“from surveillance to administering government benefits”

# View from the east and west: investors

- West: US tech companies jump on the bandwagon



- East: China invests in India (Ant and others)

## **Chinese fintech firms explore investment & partnerships with Indian firms**

*At least half a dozen Chinese fintech companies have held multiple meetings with the founders of digital lending startups in India for investment as well as partnership opportunities*

# DISRUPTION

# Tech penetration

- Internet subscribers increased to 500 million by 2017
- 10 million daily active users, highest of all countries (that # sounds wrong)



# Economic savings

Savings (per Modi government) \$12 billion in corruption costs-this number was later de-bunked by economists-number is now \$2 billion “estimate” of future savings by the World Bank

# RuPay disrupts Visa

- National Payments Co of India (NPCI) mandates state owned banks to issue RuPay debit cards with faster speeds and lower processing and transactions fees
  - 500 million cards
- Visa slashes debit card fees to compete with RuPay cards



# PAYTM



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Products

Business Offerings

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Once in a lifetime,  
God gives us an opportunity  
to create a dent in the universe.

**This is ours.**



# PAYTM

- Owned by One97 Communications
- Alibaba and Ant are investors, so are Softbank and Berkshire Hathaway (CNN video)
  - <https://money.cnn.com/video/technology/2018/09/19/paytm-ceo-berkshire-hathaway-india.cnnmoney/index.html>
- \$10 billion valuation
- Like WeChat and Alipay, combines multi-services (mobile top up, utility bills, travel, purchases, etc.) in one wallet app and uses QR codes
- 230 million users

# PAYTM fights FB

## Keeping IT Safe

Paytm says India needs to strictly enforce data laws

- Experts say though third party apps help facilitate transactions between banks and users, they do not have access to UPI pin or bank account details

- Paytm says problem is with how cos share data for commercial purposes

“We are not a third world country with respect to digital issues, we do not need western companies to come in with superior technology per say and solve payments for us,” he said. “These players are into payments not because they want to solve the payments problem in India. They are here because (for them payments) data is the missing point in the puzzle right now.”

The fall out of the [Facebook](#) and Cambridge Analytica scandals has directly affected [Whatsapp](#) Payments in India, which ran into a wall of data privacy issues. The company was reported to have been sharing payments data with third parties including parent Facebook. The debate it stoked in

the payments circles made Whatsapp issue a clarification saying that they use sensitive data for commercial purposes.

“Facebook does not use Whatsapp payment information for commercial simply helps pass the necessary information to the bank partner and [NF](#) company on its own website as a FAQ.



▲ Facebook CEO Mark Zuckerberg announces an Internet.org initiative in New Delhi in 2014. Photograph: Chandan Khanna/AFP/Getty Images

In the charged days before Facebook went public in May 2012, its official filings contained a faint warning about the company's future

# PAYTM reviews



jain\_kanishq

Sagar India

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POOREST CUSTOMER SERVICE! I AM DECEIVED! ROD



Feb 21, 2017 04:11 PM 9698 Views

This Review is in concern with my experiences with some recent transactions that I made with Paytm.com! It was not a good experience with Paytm and I also had raised complaints with Paytm care but my issues have not been resolved yet.LAST COMPLAINT TICKET NUMBER:- 22079351I have tried to...[Read More](#)

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Kolkata India

14 Reviews

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Best For Recharge, But Pathetic Customer Care ROD



Dec 26, 2016 04:17 PM 8807 Views

Now a days many online recharge & shopping site launched . Some of them are bad . But, no one is 100% good . One example is Paytm for online recharge . Paytm is very good website for online mobile recharge & bill payment . But, Paytm care which may be big...[Read More](#)

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Paytm

Reviews 48 • Bad



Go to Paytm

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Reviews 48

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# But then BHIM disrupts Paytm

- NPCI creates BHIM – Bharat Interface for Money-
  - open payments platform (bank to bank exchange) and app allows direct real time payments via mobile phone using UPI (virtual address or alias for bank account)
  - or QR codes if no UPI
- Bad for wallets and POS systems

# BHIM payments app

Bharat Interface for Money (BHIM) is a payment app that lets you make simple, easy and quick transactions using Unified Payments Interface (UPI). You can make direct bank payments to anyone on UPI using their UPI ID or scanning their QR with the BHIM app. You can also request money through the app from a UPI ID.



Send Money



Request Money



Scan & Pay



Transactions

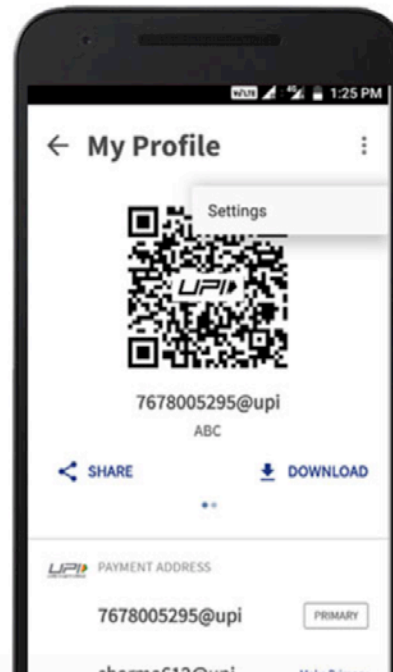


Profile



Bank Account

Manage your UPI profile here to switch your UPI ID. Share your QR code or download it in the profile section



Link bank account  
(almost all local AND  
int'l banks are  
participating) to mobile  
phone  
Or  
Use QR code if not UPI  
enabled or to pay at  
specific merchants





# Disruption summary

- Private (local and international) companies disrupting legacy systems (wallets replace cash)
  - but then...
- Government disrupting private companies
- Top down policy driven digitization, enabled by state owned banking system-government building utilities for further innovation?
- Or risk of government disrupting innovation?
- Is this creating a pro-innovation environment?
- **Will future of digitization from here be privately led or publicly mandated?**

# BACKLASH AND WHY

# A year after demonetisation, India's black money market is thriving

As businesses rekindle their love affair with cash, Narendra Modi is coming under pressure to explain whether his most controversial policy was worth the economic pain

Last Published: Wed, Nov 08 2017. 06 00 PM IST

 AFP

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The government had hoped demonetisation would encourage a switch to traceable digital payments in a country where just 3% had been paying taxes. Photo: AFP

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- ▶ Fear of coalition fissures

# Criticism

- **General ICT top down criticisms** (ie technology not a panacea, need policy and capacity)
- Voluntary or involuntary as **Aadhaar** becomes systemic (public and private services)
- **Gaps in info security infrastructure**, govt' bureaucracy – incorrect IDs that cannot be fixed, ability to protect data – threat of invasiveness and loss of privacy
- Repeated (200+) **data breaches** that expose private data
- Digitally **illiterate parts of society** do not fully understand consent
- Tech being used to reinforce a dysfunctional **bureaucracy** – replacing one form of corruption with something equally bad
- **Failure in some areas** like delivering food in places where the internet is still poor or people lack fingerprints
- Plans to use it for **surveillance**
- Becoming a tool to “harass” people



# Aadhaar and food rations in rural India

- Poor internet connections
- Lack of fingerprints after lifetimes manual labor
- Study (“Pain without Gain”) finds Aadhaar has 5x the failure rate of old system in delivering food rations in Jharkand state
  - 25 people die of starvation
- Gov’t of Delhi region stops using Aadhaar for food benefits

# Aadhaar court challenges

## *India's Top Court Limits Sweep of Biometric ID Program*



The government says its identification system for public services has already saved billions of dollars, but critics are worried about data security and a surveillance state.  
Sept. 25, 2018

By Vindu Goel

# Aadhaar landmark case:

## September 2018

- India Supreme Court, 4:1 decision to uphold but curb Aadhaar
- Dissenting opinion calls Aadhaar unconstitutional
- Series of challenges to Aadhaar since 2014
- Upheld use of Aadhaar for public benefits
- Struck down use of Aadhaar for other purposes like student IDs
- Established new protections to prevent the government from using the data in the name of national security-blocks some nascent surveillance plans
- Threw out 2016 provision allowing private companies (banks, phones, tech) to use the ID to verify customer identities-disappointing those who wanted to use it for new businesses like online car insurance and background checks for employment
- Asks state to pass a new data protection law currently under consideration
- Widely seen as a global precedent for other developing and developed countries





# Reaction from Modi finance minister

However, Mr. Modi's finance minister, Arun Jaitley, said the court had recognized the vast savings to the taxpayers from the program, which he estimated at \$12 billion a year, from weeding out fake or duplicate recipients of government benefits.

“Technology as a tool of governance, as an instrument of conferring benefits to people, as an instrument of revenue collection, I think is a concept which nobody now really can deny,” he said. “We were entering uncharted areas, and one of the purposes of judicial review is what is the direction in which you can move and how much.”



# Dissenting opinion

Supreme Court Justice Dhananjaya Y. Chandrachud, who wrote [the dissenting judgment](#), gave voice to these fears: “When Aadhaar is seeded into every database, it becomes a bridge across discreet data silos, which allows anyone with access to this information to reconstruct a profile of an individual’s life.”

Although the Supreme Court upheld the Aadhaar program, Justice Chandrachud’s dissenting judgment is of great importance. It articulated the nature of the relationship between technology and power and that the collection of citizens’ personal information at Aadhaar’s scale could be used for surveillance. He was critical of how data was demanded, controlled, and protected. Justice Chandrachud’s dissent will be vital to judicial challenges in the future.

# WHAT SHOULD CHANGE?



# What should change? Aadhaar

- Public v. private use
  - Does limiting use by private enterprise block innovation and economic opportunity?
- Privacy and data protection
  - Data breaches
- Blocks on surveillance state
  - Moved to surveillance mode very quickly



# What should change: fintech

- “experiments” suggest **financial inclusion can happen** by government fiat
- Government creating **digital infrastructure** on which to build (internet, open banking) positive
- Government **trying to operate all services is negative**

# MODEL FOR THE WORLD?

# Digital India

## Model for the world

- Top down discipline required (leader and policies)
- Bottom of the pyramid conditions
- Corruption fighter that saves money
- True financial inclusion
- “Technology as governance”

## Not a model for the world

- Top down discipline required (leader and policies)
- **Democracy and rule of law** played a key role in limiting scope and protecting privacy
- Bureaucracy to administer (pros and cons)
- Size of the country (scale)
- Local bank set up unique (state owned banks)
- Indian household balance sheet unique
- Data and privacy breaches indicate problems

# Takeaways

- Development and tech **leapfrogging** example- not without some bumps
- Instructive Digital **security and privacy** debate
  - Government role, whose government, checks on government-issue of politics and **democratic institutions** as key protections from top-down mandates
- Some **conditions specific to India**- bureaucracy, bottom of the pyramid needs
- **Fintech experiments broadly effective**, clearly public infrastructure and private initiative both needed, positive for future of lower intermediation costs, more accessibility and transparency