

Discussion of “Financial Inclusion and Household Welfare: An Entropy-Based Consumption Diversification Approach”

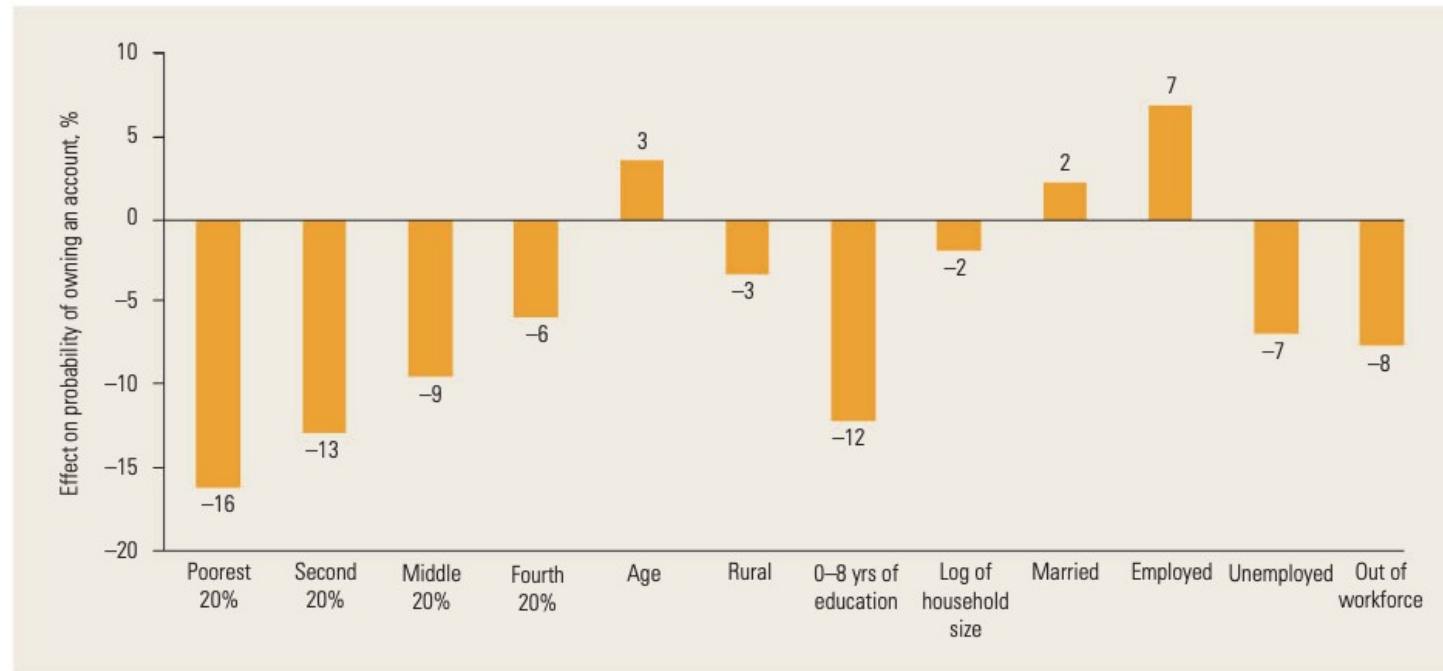
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Motivation: Financial Inclusion is Globally Important

- 1.7 billion people globally do not have a bank account
 - Some have no desire to own one, but many report frictions (cost, distance, paperwork) are reasons to avoid banking
- 34% of firms in developing countries have formal lending
 - Compare 51% in developed countries
- Financial inclusion linked to development and poverty reduction
 - Poor in particular benefit from payment technologies, savings, borrowing (income smoothing), insurance against shocks
 - Firms benefit from relieving financial constraints to boost innovation, job creation, and growth

Globally, the poorest have low financial inclusion

FIGURE 0.2 Correlates of Financial Inclusion

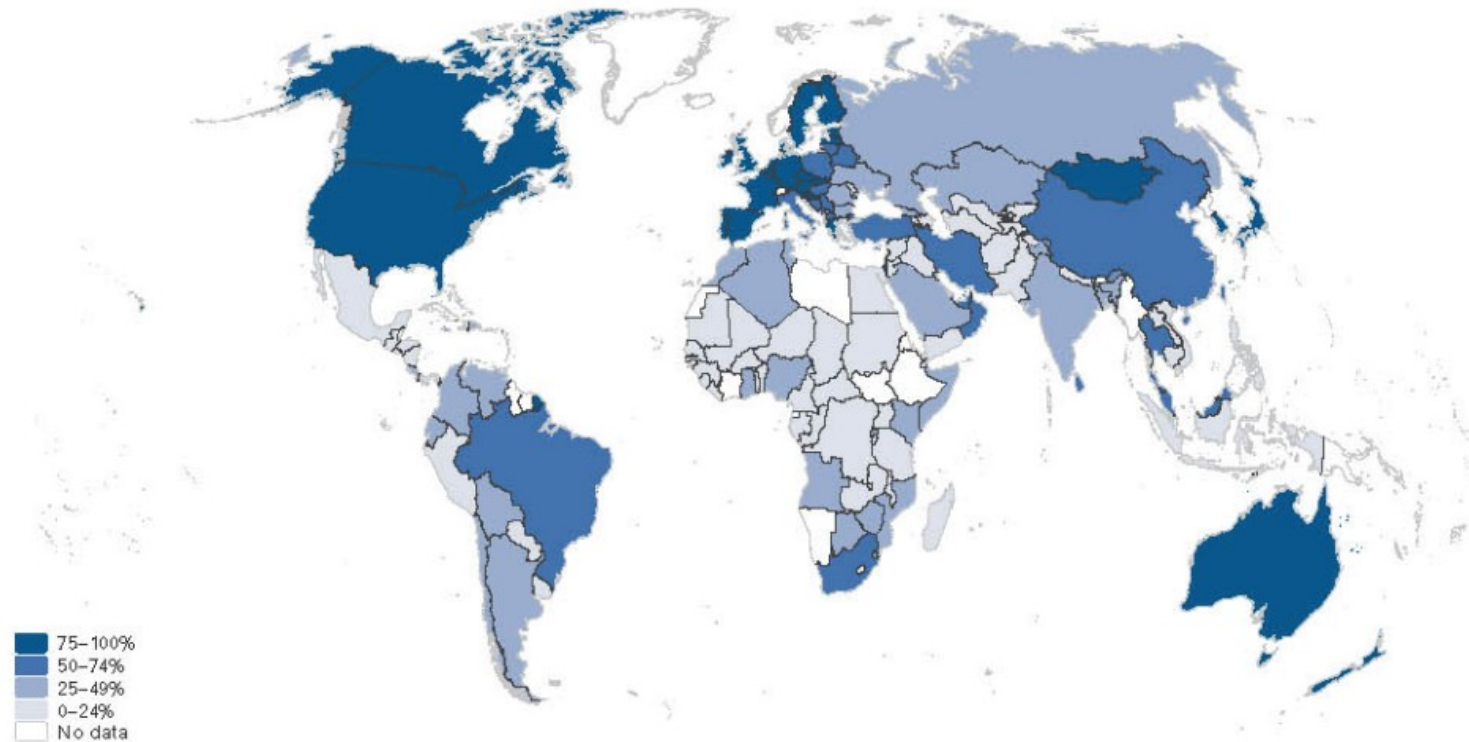


Source: Based on Allen, Demirgüç-Kunt, and others 2012.

Note: Results from a probit regression of a financial inclusion indicator on country fixed effects and a set of individual characteristics for 124,334 adults (15 years of age and older) covered in 2011 in the Global Financial Inclusion (Global Findex) Database (<http://www.worldbank.org/globalfindex>). The financial inclusion indicator is a 0/1 variable indicating whether a person had an account at a formal financial institution in 2011. See Allen, Demirgüç-Kunt, and others (2012) for definitions, data sources, the standard errors of the parameter estimates, additional estimation methods, and additional regressions for other dependent variables (savings and the frequency of use of accounts).

India had Low Global Bank Usage (2014)

MAP 0.1 Adults Using a Bank Account in a Typical Month



Source: Global Financial Inclusion (Global Findex) Database, World Bank, Washington, DC, <http://www.worldbank.org/globalfindex>.

Note: Percentage of adults (age 15 years or older) depositing to or withdrawing from an account with a formal financial institution at least once in a typical month.

Paper Studied PMJDY Program

- Announced by PM Modi on Independence Day speech, 15 August 2014
- Launched 28 August 2014
- World's largest financial inclusion program: goal to provide banking services for all unbanked Indian households
- Savings account access provided through debit cards and mobile banking. Ensures access to: savings account, overdraft facilities, insurance benefits
- By Nov 11: 255 million new accounts, 190 million new debit cards
- Direct Benefit Transfer implemented through these accounts

How might PMJDY Help Households?

- Access to savings account can increase household savings
 - Higher interest rate through bank account compare to other sources
 - Can address behavioral bias for present focus, or introduce new technology
- Can make money transfer easier
 - Within own family, or to other households as grants, loans
 - Easier to purchase goods and services through debit card services
- Can assist consumption smoothing
 - Have access to more personal savings
 - Potentially access to bank financing
- Might assist in better production and employment choices
- More dense “information file” at bank: easier to obtain future credit

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Prior work on PMJDY: Agarwal, Alok, Ghosh, Ghosh, Piskorski, Seru (2017)

- 77% of accounts maintain positive balance
- Average balance in JDY account is ₹ 482 (60% of Indian poverty line)
- 34% of households receive money in account in first six months
 - 21% of households sent money out
- Look at areas with high exposure to JDY program
 - (adults per bank, bank branches owned by state owned banks, fraction of unbanked households, financial inclusion index)
 - See more treatment (more accounts, more cash deposited)
 - Greater aggregate **bank lending** as well in these regions
 - Increase in savings, substitution away from informal lending, greater consumption smoothing against shocks

Paper Uses CMIE Data to Study Shock

- Cover data from January 2014 – December 2016 (followed by demonetization and GST)
- Keep major 20 states (excluding UT and Northeast)
- Drop observations with missing/invalid variables
- Balanced panel: households entering in each wave
 - 49,739 households in each wave
- Compare urban and rural households separately
- Look at change in households with bank accounts in data

Program Had Large Impact on Financial Inclusion

Table 1 Number of beneficiaries of PMJDY Scheme, from September 2014 to August 2019

Year	Total number of bank accounts opened under PMJDY scheme
End of September 2014	033,494,368
End of August 2015	179,002,257
End of August 2016	241,008,384
End of August 2017	300,929,441
End of August 2018	325,414,074
End of August 2019	367,943,255

Data Source: Official website of Government of India on PMJDY: <https://pmjdy.gov.in/>

Table 2 Mean of the proportion of household members holding a bank account, in each wave

Wave	Mean of proportion of bank accounts		
	Rural	Urban	Total
1	0.450	0.498	0.482
2	0.480	0.533	0.516
3	0.542	0.589	0.574
4	0.594	0.633	0.620
5	0.640	0.683	0.669
6	0.669	0.707	0.694
7	0.690	0.721	0.711
8	0.727	0.764	0.752
9	0.773	0.804	0.794
t-statistic before and after PMJDY implementation	1.1e+02***	1.5e+02***	1.9e+02***
t-statistic between waves 2 and 3	20.24***	25.49***	32.34***
t-statistic between waves 1 and 2	9.89***	15.89***	18.64***

There was almost a 6-percentage point jump in number of mean bank accounts per households from wave 2 to wave 3, in the sub-samples as well as in the overall sample (column—'Total'). The t-statistics values indicate that these differences are highly statistically significant. The t-statistics between the waves 1 and 2 are also significant capturing a general increasing trend. However, the values are much lower compared to the t-statistics between waves 2 and 3

Entry-based Measure of Household Welfare

$$H(w) = -\left(\sum_{i=1}^n w_i \log w_i\right)$$

- w_i are household weights on each category — min entropy when only one consumption category is consumed; max when equal share ($1/n$) consumed in each category
- Enables decomposition of entropy into between group + within-group (here, food vs non-food consumption)

PMJDY Impact

- Higher per capita consumption expenditure in response to PMJDY

Variables	(1) Rural	(2) Urban
PMJDY1	0.0159*** (0.00289)	0.0370*** (0.00197)
PMJDY2	0.132*** (0.00290)	0.133*** (0.00206)
Control variables	Yes	Yes
Constant	7.445*** (0.0132)	7.719*** (0.0122)
Observations	145,962	301,684
R-squared	0.166	0.118
Number of HH	16,218	33,521

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

Household Diversification of Food Consumption Expenditure

- PMJDY2 (one year after launch, sixth wave) increases “within food group” food diversification (controlling for total expenditure)

Variables	(5) Rural	(6) Urban
PMJDY1	- 0.00412*** (0.00129)	- 0.00356*** (0.000943)
PMJDY2	0.0239*** (0.00236)	0.0313*** (0.00180)

Possible Increases in food quality?

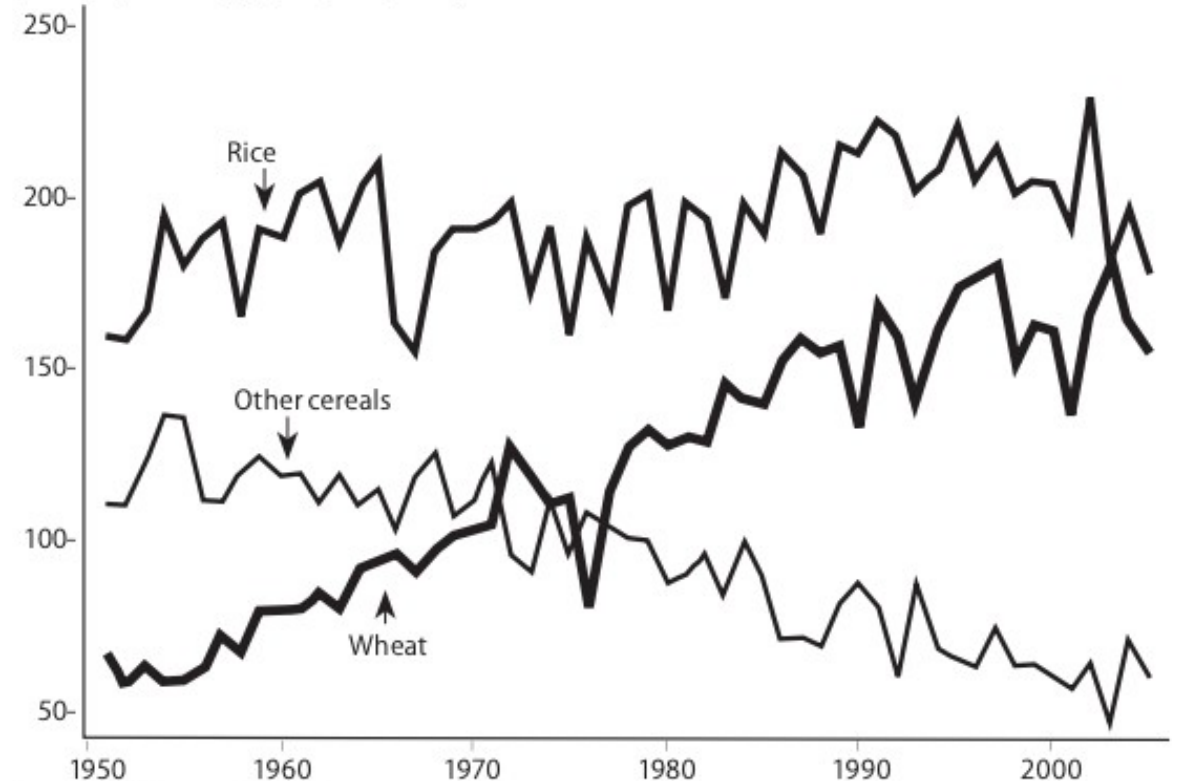
- From Deaton and Dreze (2009)

Table 1: Mean Per Capita Consumption of Calories, Protein, and Fats (per day)

Year	Round	Calories (kc)		Protein (gms)		Fats (gms)	
		Rural	Urban	Rural	Urban	Rural	Urban
1983	38	2,240	2,070	63.5	58.1	27.1	37.1
1987-88	43	2,233	2,095	63.2	58.6	28.3	39.3
1993-94	50	2,153	2,073	60.3	57.7	31.1	41.9
1999-2000	55	2,148	2,155	59.1	58.4	36	49.6
2000-01	56	2,083	2,027	56.8	55.3	34.6	46.1
2001-02	57	2,018	1,982	54.8	54.2	33.6	46.1
2002(2)	58	2,025	2,014	55.4	54.9	34.7	47
2003	59	2,106	2,020	58	55.5	36.4	46.7
2004(1)	60	2,087	2,036	56.9	55.9	35.5	46.8
2004-05	61	2,047	2,021	55.8	55.4	35.4	47.4

Figure 7: Availability of Rice, Wheat, and Other Cereals

(availability of cereals, gm per person per day)



Source: Ministry of Agriculture.

Evidence for Food Quality Upgrades

- Average *number* of food items decreases
- Paper suggests substitution from lower income elastic to higher income elastic foods: “We obtained income elasticities for a subset of food items within the food group by estimating the quadratic Engel curve (see Thomas et al. [1989](#)). We observe, an increase in share of expenditure over time for the items for which the income elasticities are either very close to 1, or greater than 1, such as non-veg items and packaged food (by approximately 21%). ”

Wave	Mean of Proportion of food items consumed		
	RURAL	URBAN	Total
1	0.783	0.807	0.799
2	0.780	0.797	0.792
3	0.770	0.788	0.782
4	0.772	0.789	0.783
5	0.779	0.790	0.786
6	0.792	0.806	0.801
7	0.790	0.803	0.799
8	0.774	0.782	0.779
9	0.775	0.788	0.784

Non-Food Diversification

- For *non-food* category, increase in diversification in consumption in both periods
- Also shift from food to non-food consumption

Variables	non-food diversification		Between food non food	
	(5) Rural	(6) Urban	(5) Rural	(6) Urban
PMIDY1	0.00447*** (0.000453)	0.00190*** (0.000269)	0.00447*** (0.000453)	0.00190*** (0.000269)
PMIDY2	0.0118*** (0.000788)	0.00662*** (0.000497)	0.0118*** (0.000788)	0.00662*** (0.000497)

Comment 1: Contrast Banked, non-Banked Households

- In CPHS data, can measure the change in entropy for households that have always had bank accounts (control group), and households that received bank accounts for the first time (treatment group)
- Some of the treated households may have also received bank accounts anyway (trend), but discontinuous jump makes it more likely the policy is attributable
- Can compare the entropy based measures for these treatment and control groups separately
- Will isolate the specific role of financial inclusion on these outcomes (as opposed to other background trends, etc.)

Comment 2: Test the Income Channel Further

- Paper emphasizes the possibility that credit access may better enable productivity
- Other channels: savings technology, better smoothing against shocks, transfers within or across households
- To better test for this: use the income data in CPHS to see whether financial inclusion *increases* income directly
- Can also test whether the increase in income appears to drive the changes in consumption diversification
- Two stage model:
 - First stage: regress financial inclusion on income
 - Second stage: use predicted increased *income* against consumption diversification

Comment 3: Do changes in Consumption have other Effects?

- Descriptively: would be helpful to know *which* consumption categories see diversified increases
- Financial inclusion should also have large impacts on *firms*
- More lending, more retail sales (increases in consumption, changes in diversity of consumption)
- Does this then change the income potential in different areas?
- Can try to look at this using the occupational and income variables in CPHS
 - Do you see increases in employment or income for professions which provide goods that are in greater demand post PMJDY?

Conclusion

- Really interesting paper which introduces new measures of consumption inequality
- Suggests the value of financial inclusion to improve household consumption diversification
 - Very interesting results on “upgrading” food quality among households
- In (maybe future) work, would be interesting to better understand some mechanisms and consequences of these financial inclusion shifts

Thanks!