Social Protection and Vulnerability to Climate Shocks : A Panel Data Evidence From Ethiopia

Side Event at TICAD 8

Evidence Based Policy Making (EBPM) for Development Challenge in Africa

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Introduction

- Recent literature suggests that Social Protection (SP) can be effective in supporting adaptation actions

- **Adaptive Social Protection (ASP)** (Bayer, 2008; Davis et al., 2009; 2013) many of SP policy instruments have **targeted** & **contributed** to reducing **vulnerability**

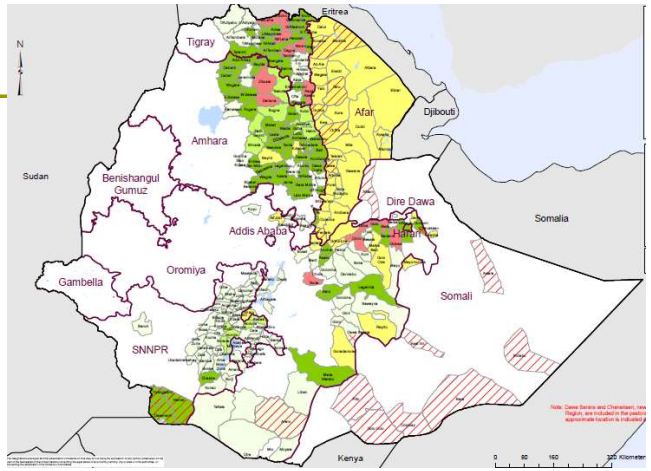
- However, little empirical evidence exists on the **extent** & **conditions** by which SP contributes to climate change adaptation

Motivation

- There are several household strategies to manage climate-related risks.
- **Diversification:** Is the most common adaptation practice pursued by agricultural households in Africa (Below et al., 2010)
- To what extent the existing SP programme influence diversification as adaptation strategy?
  - Diversifying within the natural-resource use can reinforce vulnerability to climate change (Thomas & Twyman, 2005)
  - Many nonfarm activities have lower risk profiles than farm & off-farm activities

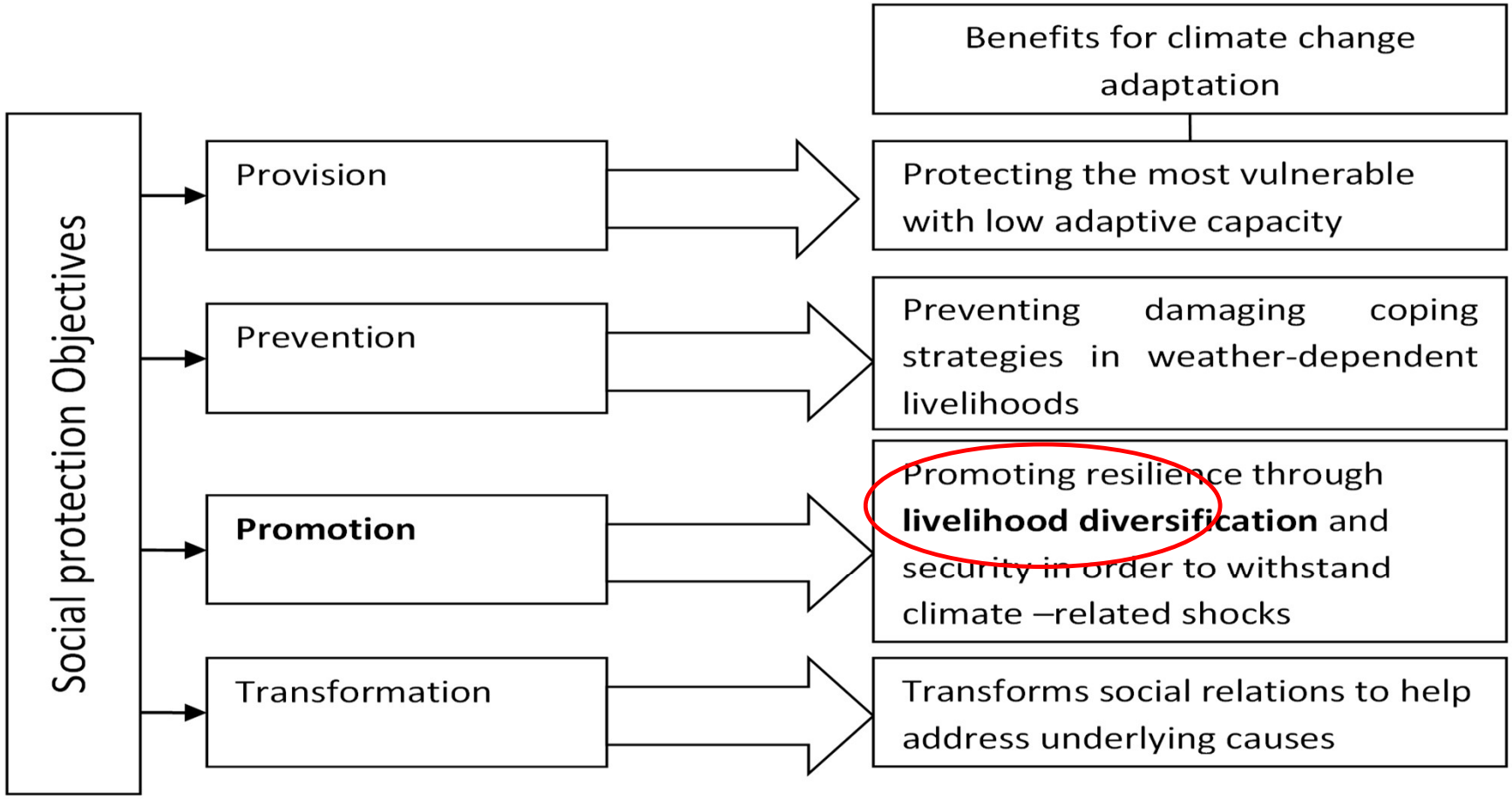
Context

- The Productive Safety Net Programme (PSNP), launched in 2005 as part of Food Security Program (FSP).



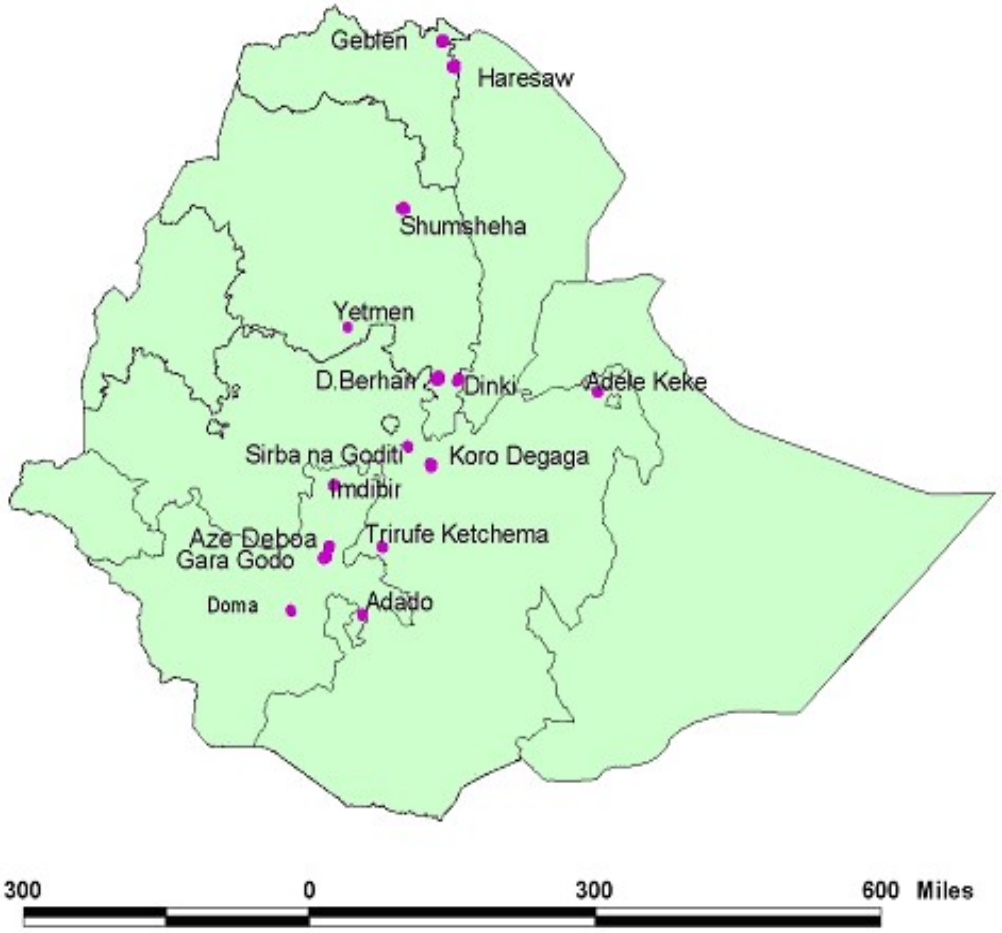
- Largest social protection program in SSA, 8.3 million beneficiaries
- Aims to achieve 3 objectives: protection, prevention & promotion
- Has two component- labor based public works and direct support
- Targets chronically food insecure households in food insecure districts

Social protection and its benefits for climate change adaptation



Source: Davies *et al* (2008) and Devereux and Sabates-Wheeler (2004)

Data

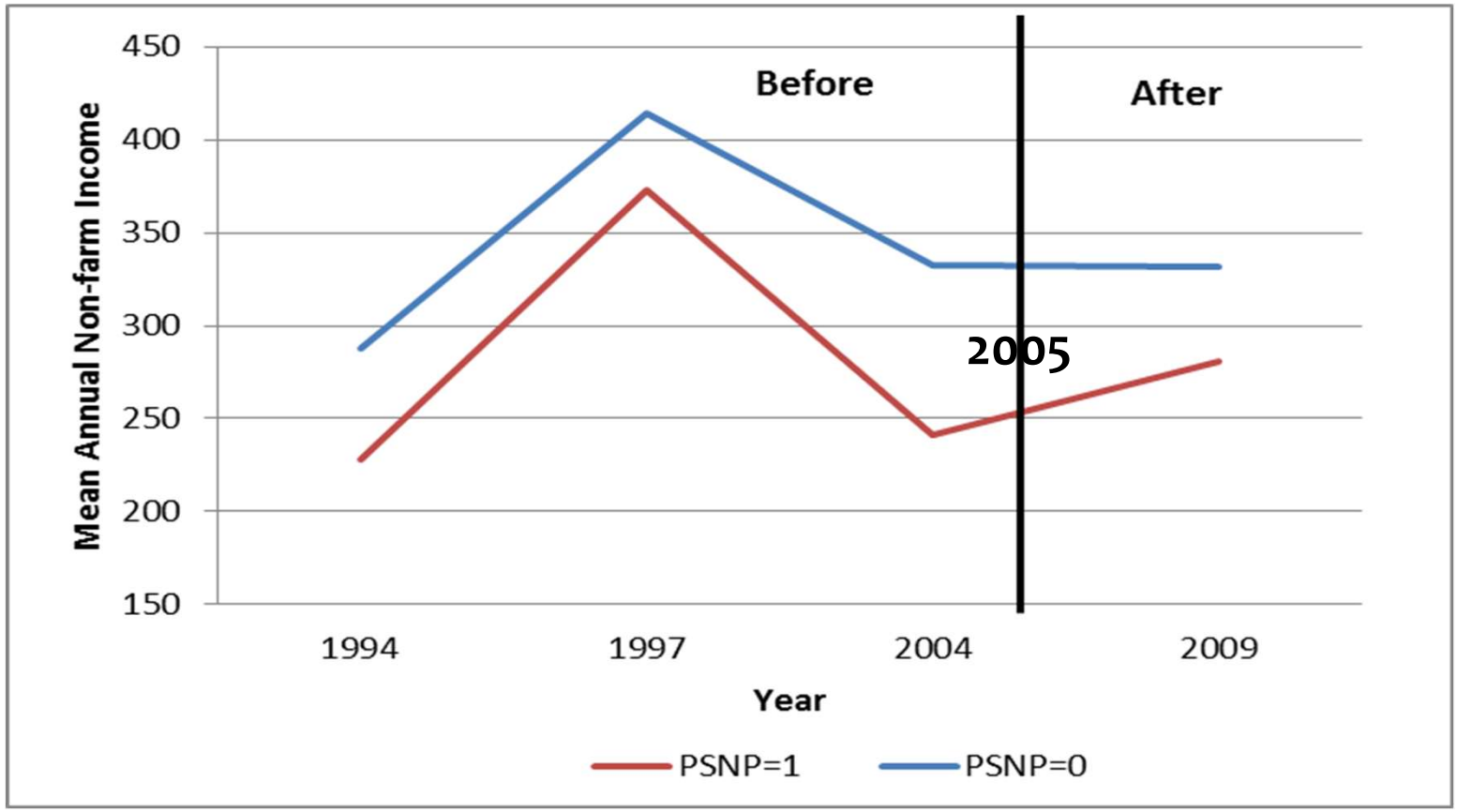


- ERHS longitudinal survey; 15 PAs; 4 regions
- Broadly representative (SFL) (Dercon et al., 2011)
- 2 rounds (2004-2009); 1306 households
- LSMS data 2015

Methods

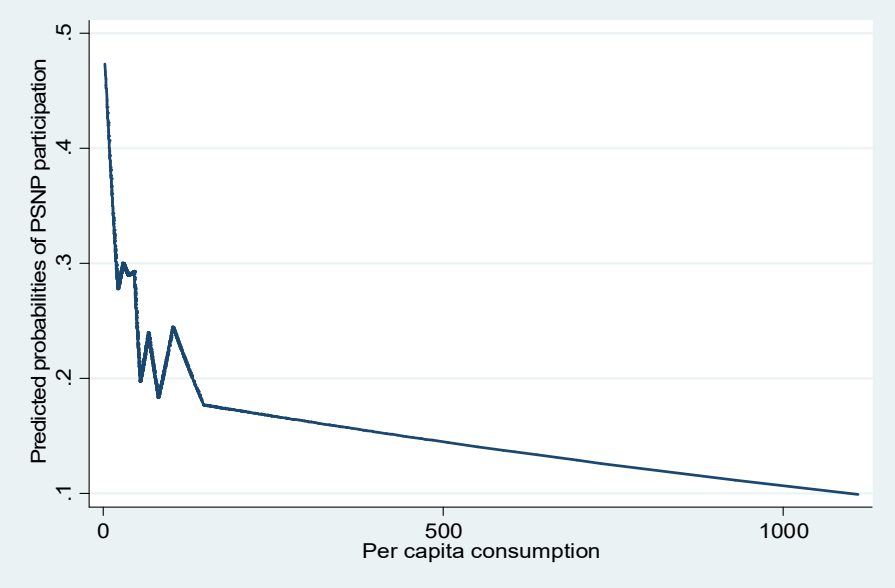
- Non-experimental approach–**DID** & **Matching** to estimate the Treatment Effects of the program. DID= $E(Y_1^T - Y^T_0 | T_1=1) - E(Y_1^C - Y_0^C | T_1=0)$
- Depends on the assumption that **trends are the same** in the absence of treatment for both treatment & control groups (Heckman & Smith, 1999). *TT*
- Applied **Propensity Score Matching (PSM)** to match treated units with similar non-treated units **FE, Kernel PSM-DID & Quintile**
- **Targeting assessment** exclusion (type I error) & inclusion (type II error) (Cornia & Stewart, 1993) & **Spline regression**
- Outcome variable: **Nonfarm income** (– public works income) + vulnerability was measured using Index based approach (IPCC) & VEP (**FGLS**)

Falsification tests (common trends)



Targeting evaluation

- Targeting indices and spline regression:
- PSNP is among the **well-targeted anti-poverty** programs

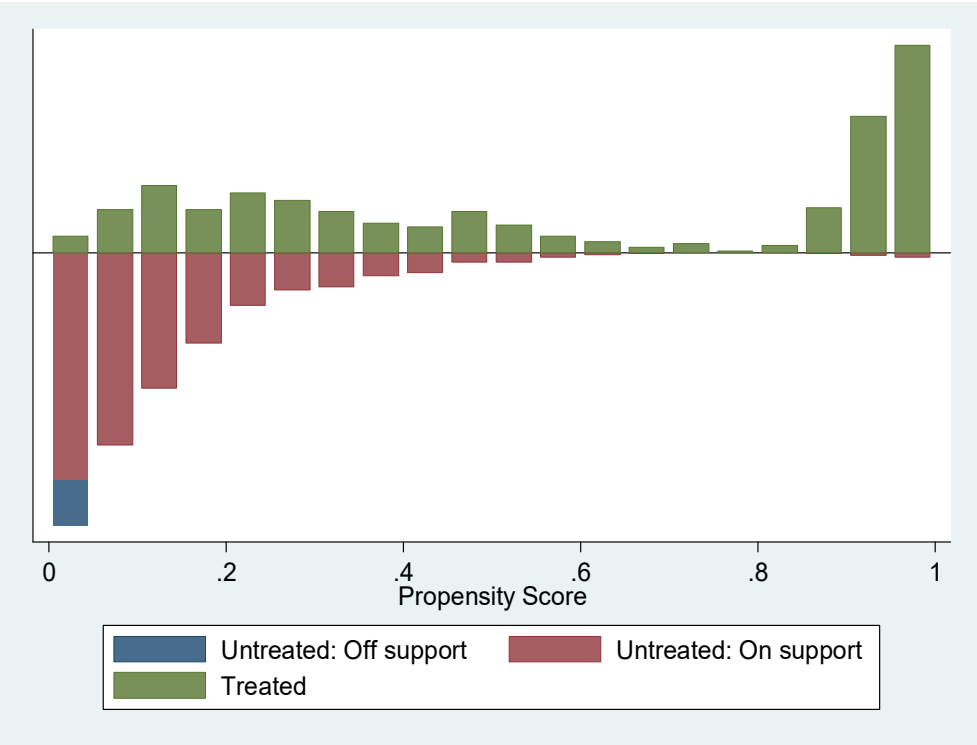


- The leakage index (type II error) is about 35 % (for the sample)
- *This targeting error can be an advantage for our empirical strategy ➔ common support*

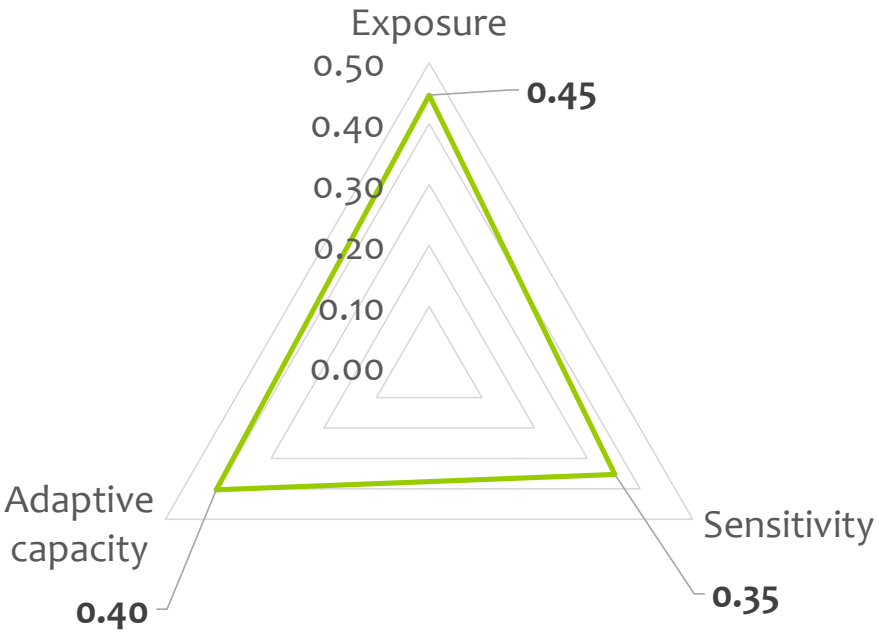
Table Probit Estimations of Variables used in the PSM

Male head (=1)	-0.719*
	(-2.37)
Education of household head(years)	-0.0387*
	(-2.26)
Poor dummy (=1)	0.158
	(1.27)
Number of oxen	-0.0959
	(-1.57)
Participation in *Iddir* dummy	0.608***
	(3.30)
Climate Shocks index	0.472***
	(5.15)
Male head and Age	0.0133*
	(2.27)
Tigray region dummy	2.473***
	(9.50)

Propensity score distribution among treatment & comparison observations



Summary of Results



Participating in the PSNP is likely to reduce vulnerability by up to 0.038 points as compared to non-participation (t=7.23,Pr(T>t)= 0.0000)

Summary of Results

Impact PSNP on income diversification, for matched sample (FE)

	Farm	Nonfarm	Off-farm
ATT	-.0727	.4276**	-.1109
	(-0.70)	(2.26)	(-0.15)
CI	-.278 .132	.0575 .8176	-1.611 1.389
R.sq	0.3759	0.0069	0.0288
No.	1084	904	213

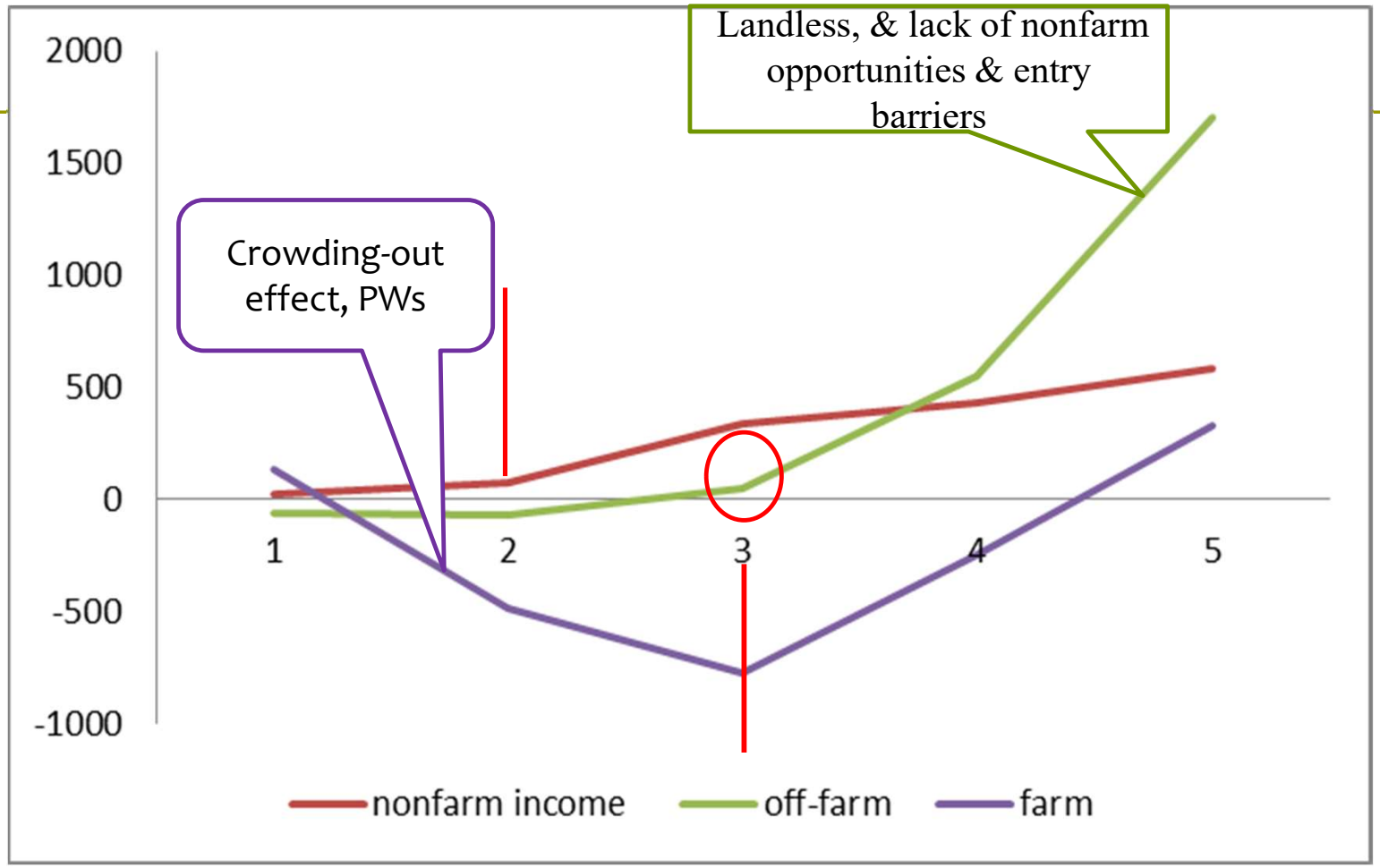
Results contd.

Kernel Propensity Score Matching Difference-in-Differences

Outcome Variable	Control	Treated	Diff(BL)	Control	Treated	Diff(FU)	DID
Ln farm income	6.684	6.733	0.049	6.861	7.136	0.275**	0.227
Std. Error	0.077	0.064	0.101	0.085	0.064	0.107	0.147
T	86.44	104.63	0.48	80.30	110.71	2.57	1.54
N	696	309	1005	687	308	995	2000
Ln nonfarm income	5.440	5.198	-0.242***	5.268	5.758	0.490***	0.732***
Std. Error	0.073	0.058	0.094	0.081	0.051	0.096	0.134
t	74.17	89.21	-2.58	64.76	113.35	5.11	5.46
N	390	206	596	318	271	589	1185
Ln off-farm income	6.391	6.515	0.124	5.583	5.464	-0.119	-0.243
Std. Error	0.128	0.093	0.158	0.273	0.122	0.299	0.338
t	49.97	70.39	0.79	20.48	44.62	-0.40	-0.72
N	78	63	141	31	36	67	208

Kernel Propensity Score Matching Quintile Difference-in-Differences

	(.10Q)	(.25) Q	(0.5 Q)	(.75 Q)	(.90 Q)
Farm	133.045***	-486.3**	-775***	-249.3	328.4
	(38.99)	(-2.38)	(-3.27)	(-0.34)	(0.32)
Nonfarm	27.40	77.75***	339.97***	433.45***	584.21**
	(1.41)	(2.74)	(4.21)	(4.35)	(2.46)
Off-farm	-57.2***	-65.9***	49.42	546.1**	1700.3***
	(-19.65)	(-27.44)	(0.70)	(2.27)	(4.67)


Landless, & lack of nonfarm opportunities & entry barriers
Crowding-out effect, PWs
2000
1500
1000
500
0
-500
-1000
1
2
3
4
5
nonfarm income
off-farm
farm

Discussion

- Results provide evidence of positive impact of the PSNP on non-farm income.
- An increase in non-farm income suggest PSNP encourages positive forms of income diversification.
- But, an increase in *off-farm* income can indicate a maladaptation➔ environmental degradation
- Result on farm income suggests PSNP may not promote farm investment.

Conclusion

- In the short-run, PSNP contributes positively to autonomous climate change adaptation
- In the long-run, however, the impacts of climate change could overwhelm existing strategies and capacities at household level
- The PSNP need to make a positive impact on farm income for 2 reasons
- Increased farm income can be used to cope with & reduce vulnerability to climatic shocks
- It creates positive spill-overs (increase demand for goods and services)

Conclusion contd.

- ASP, the PSNP should strive to meet the some conditions if it is to contribute to climate change adaptation:

1. A long-term perspective that accounts for the increasing vulnerability to climatic shocks
2. A focus on transforming livelihoods

Further research agenda

- Assessing evidence for crowding out effect of PSNP for nonfarm activities, self-employment vs. wage
- The research could be extended using rainfall and temperature data
- **Migration as a diversification** strategy could be further studied
- The role of informal social protection e.g. *iddir, iqqub* in highlands Ethiopia & low lands
- The role of rural towns in the rural non-farm economy

The importance & challenge of realizing EBPM in Africa

- EBPM: using high-quality information to inform decisions
- EBPM has high appeal & considerable promise, but faces multiple challenges
  - Provision of causal evidence,
  - Lack of data,
  - dissemination of findings
  - Lack of resources
  - Weak demand for evidence from policymakers
  - Absence of incentives

Thank you !

Cash For Work, Ethiopia
Photo: Stein T Holden