The stabilising effect of irrigation on seasonal consumption: evidence from Andhra Pradesh

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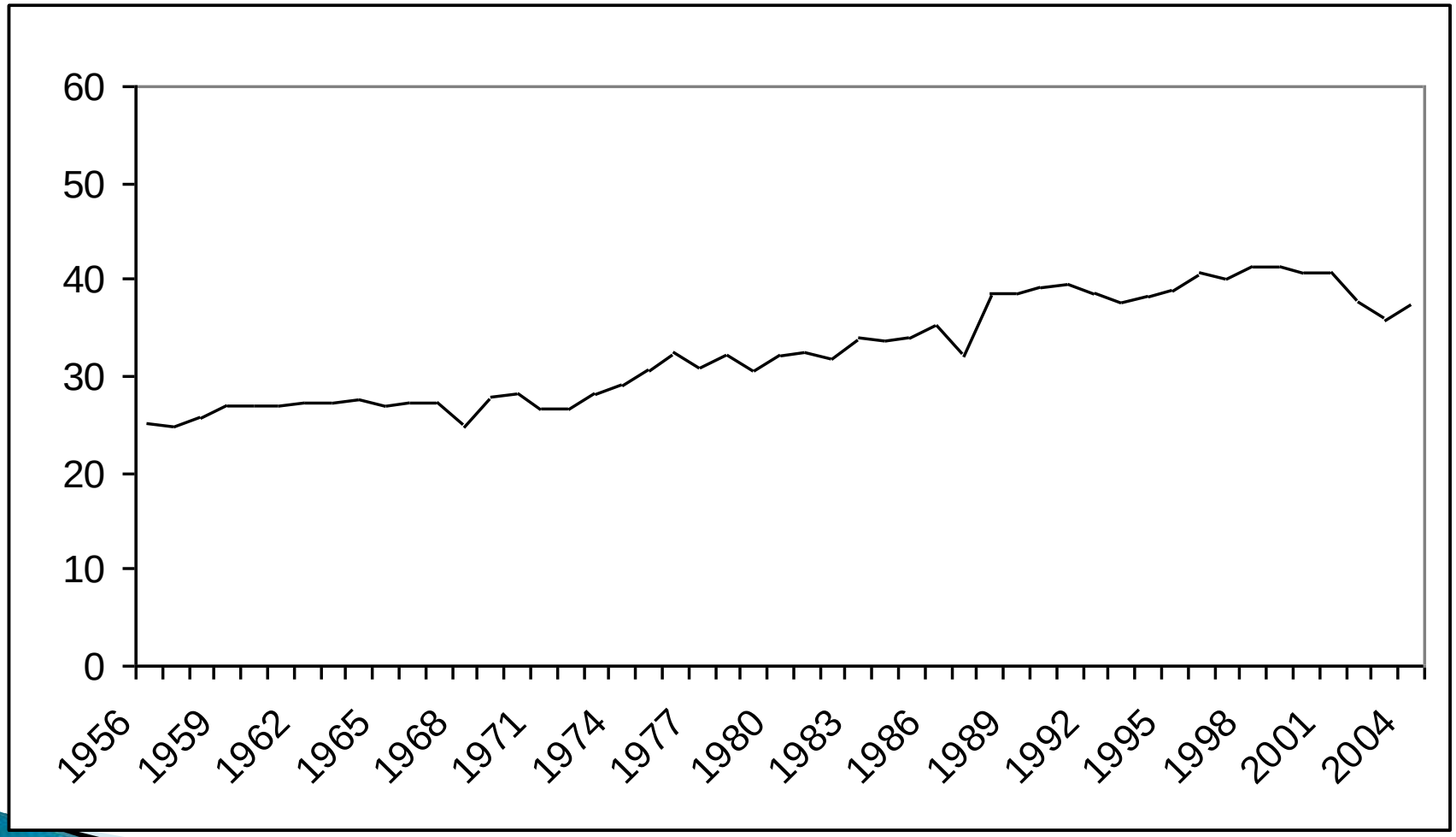
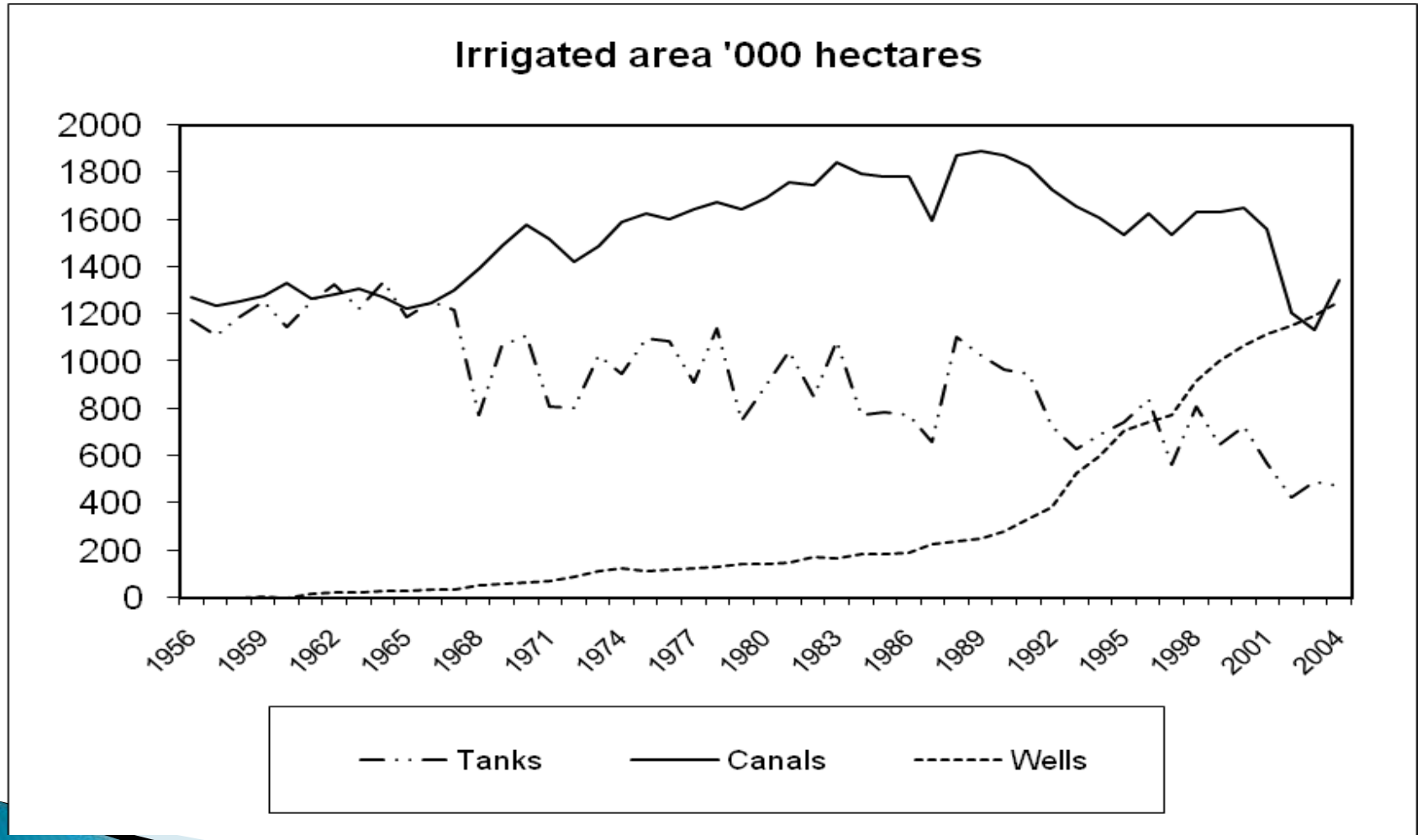
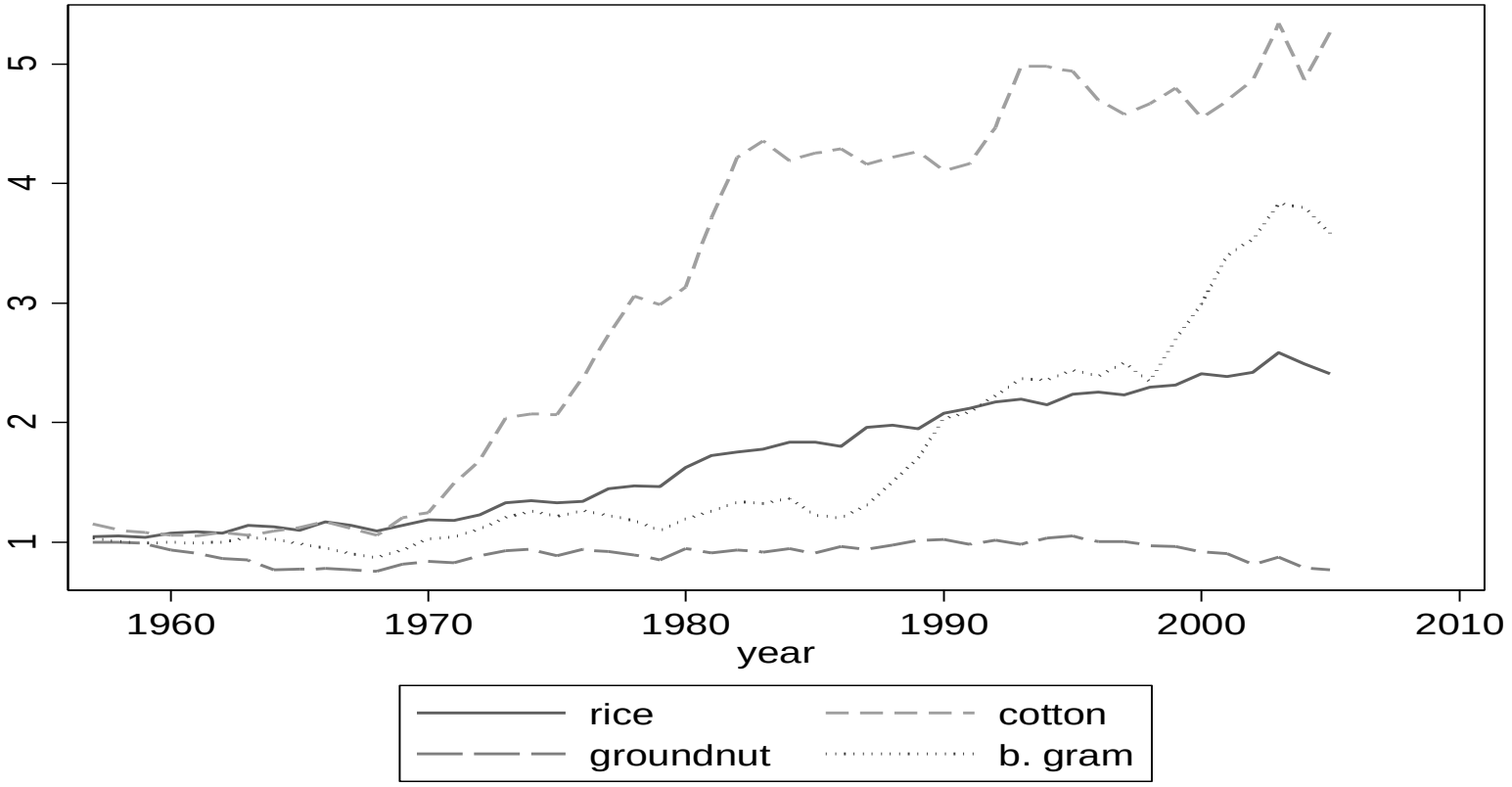
Irrigated area in Andhra Pradesh



Irrigation by source



Productivity increase



Irrigation and income

- Obvious and documented effects on farm incomes
- Irrigation expands the cultivated area
- Irrigation allows more productive crops and technologies

Stabilising effect of irrigation on income

- Stabilises output over years insulating from droughts
- Stabilises output within year
- Allows cropping in Rabi season (dry season)
- It stabilises incomes of farmers and agricultural labourers

Stabilising effect on consumption

- If PIH, no uncertainty and no borrowing constraint then no effect
- Build a precautionary saving model of seasonal consumption
- Seasonal consumption is function of seasonal income
- Seasonal consumption is a function of the variability of expected future income

Hypotheses

- Seasonal consumption of irrigated farmers and agricultural labourers is more stable
- Irrigated farmers and agricultural labourers save less for precautionary reasons

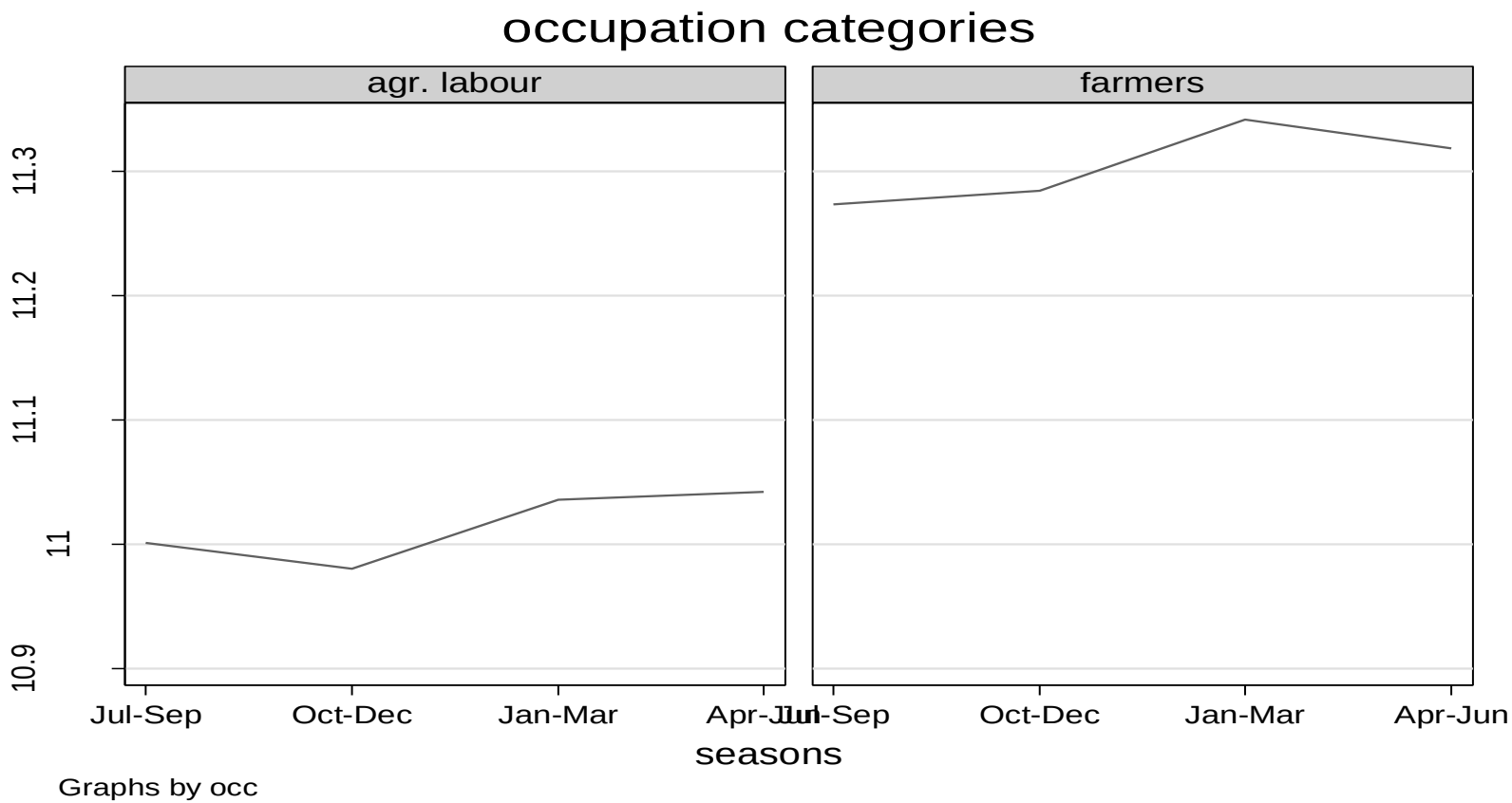
Data used

- NSSO expenditure data for Andhra Pradesh
- 4 large surveys 5 year apart covering 20 years
- Data are seasonally representative

Enodogeneity: Roy model

- Selection of occupation and of irrigation is correlated with the outcome
- Farmers may be more able to stabilise consumption in first place (for example drought resistant crops)
- Irrigated farmers may be better positioned to stabilise consumption in first place (ex they are wealthier)

Seasonal consumption



Seasonal consumption

Farmers

Variable	Irrigated farmers	Non-irrigated farmers
2nd season (Oct-Dec)	-0.020	0.060**
3rd season (Jan-Mar)	0.024	0.114***
4th season (Apr-Jun)	0.020	0.032

Agricultural labourers

	Labourers in irrigated villages	Labourers in non-irrigated villages
2nd season (Oct-Dec)	-0.022	-0.006
3rd season (Jan-Mar)	0.008	0.051***
4th season (Apr-Jun)	-0.023	0.046***

Summary of results

- Irrigation reduces fluctuations to zero
- Fluctuations are larger for farmers compared to agricultural labourers
- Seasonal fluctuations not very high

Precautionary savings

Season July to September				
	Irrigated farms		Non-irrigated farms	
	Coeff.	St. error	Coeff.	St. error
Rainfall deviation	-0.169	0.231	-0.677	0.539
Rainfall deviation squared	-0.268	0.489	-1.941*	1.020
Rabi rainfall variability	0.001	0.001	-0.001*	0.000
Selection term	-0.715***	0.174	0.843***	0.221
Observations	1163		449	
R-square	0.51		0.44	

Summary of results

- Some evidence of precautionary savings in Kharif
- No evidence of precautionary savings for agricultural labourers

Conclusions

- Welfare gains for households in irrigated areas due to more stable expenditure
- Farmers in irrigated areas save less for precautionary reasons
- Benefits not accounted for in impact analysis of irrigation projects