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# Contingent Valuation: A Comparison of Referendum and Voluntary Contribution Mechanisms

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# Context

- Contingent Valuation (CV) involves acquiring individual's stated preferences for environmental features, for example biodiversity.
- CV weakness due to it's stated preference nature (i.e. what people say rather than what they actually do)
- Persistent focus and attention on approaches of CV and WTP/WTA disparities
- Area of great interest by accredited academics, and opportunity for innovation

# Provision Point Mechanism (PPM)

- Sets a provision point, and project will go ahead if this threshold is met.
- Includes a rebate rule for excess contributions and a money back guarantee if threshold is not sufficiently reached
- Improves incentives relative to simple open-ended case, however is not incentive compatible
- This mechanism is widely applied and credited for reducing free riding

# Random Price Voting Mechanism (RPVM)

- If majority of participants bids are greater than or equal to a randomly selected price, the project proceeds, and each person is charged this random price
- Sparsely tested, and over limited conditions, however current literature by Messer *et al.* (2010). And Keisner *et al.* (2013). demonstrate promising results

# Undisclosed Cost Voting Mechanism (UCVM)

- Put forward by Green *et al.* (1998). Referendum contingent valuation, anchoring and willingness to pay for public goods
- Open-Ended Referendum Format- if majority of participants WTP is greater than or equal to an undisclosed equal share of project cost, the project proceeds, and each pays this undisclosed cost level
- Incentive Compatible

# Objective

- To apply three contingent valuation mechanisms, PPM, UCVM and RPVM to clearly compare the advantages and disadvantages of each mechanism
- This was achieved with use of economic experiments with induced values and monetary units under a generic public good context

# Hypotheses

- 1) RPVM and UCVM will both provide greater aggregate demand revealing properties compared to PPM
- 2) The WTP WTA discrepancy will be significantly different between PPM and the majority voting mechanisms
- 3) UCVM will maintain incentive compatibility of RPVM, even with its improvement in credibility



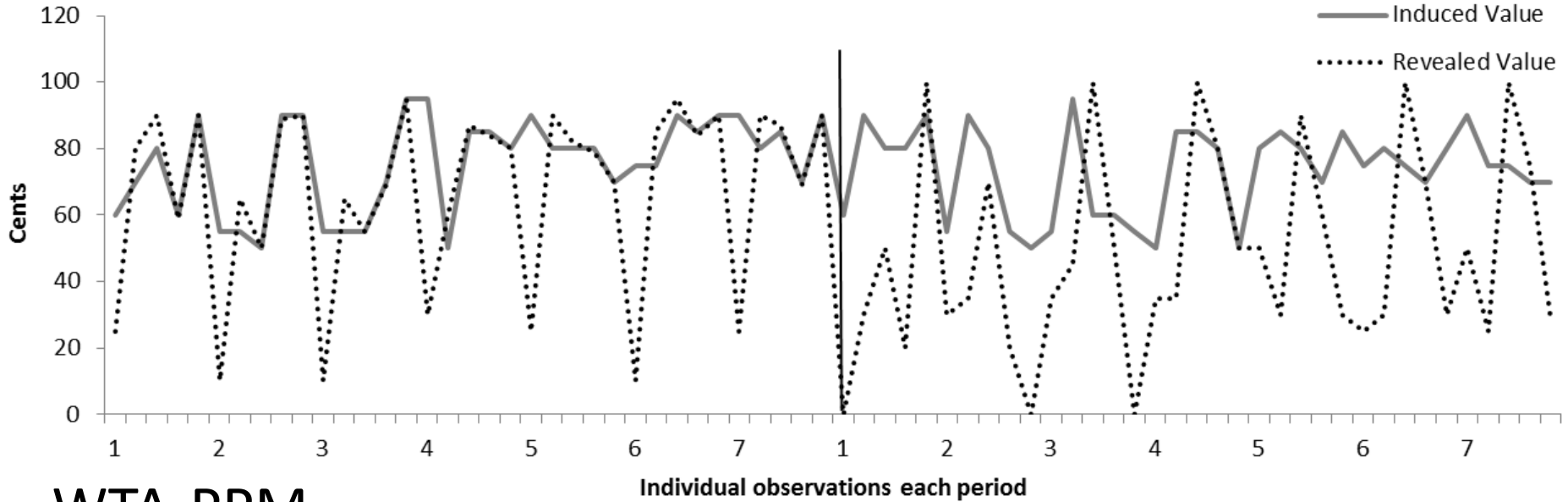
# Experiment Design

- 40 students were recruited from Sydney University ORSEE System
- Ztree software program was used
- 4 sessions overall, and each student participated in 2 sessions:
  - 1) WTP-PPM and WTA-UCVM  
WTA-UCVM and WTP-PPM
  - 2) WTA-PPM and WTP-UCVM  
WTP-UCVM and WTA-PPM
  - 3) WTP-UCVM and WTA-RPVM  
WTA-RPVM and WTP-UCVM
  - 4) WTP-RPVM and WTA-UCVM  
WTA-UCVM and WTP-RPVM

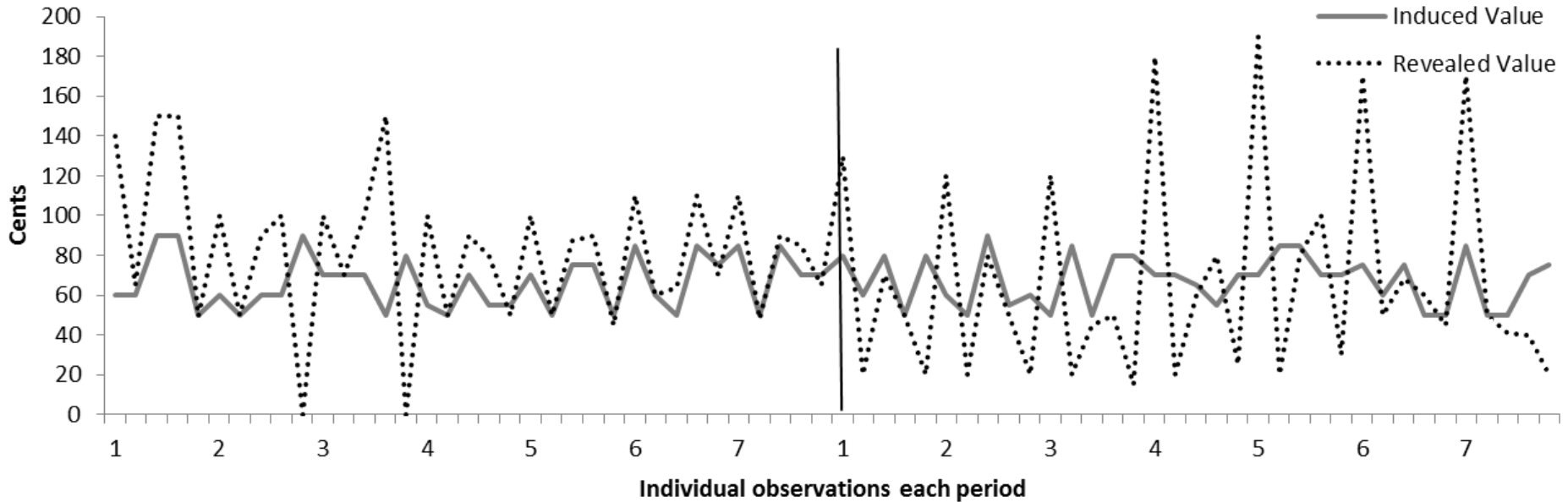
# Screen shot for WTP

Period	1	Remaining time [sec]: 28
<p>Your endowment: 100 Your individual payout: 80 Your contribution to the project: <input type="text"/></p>		
<input type="button" value="OK"/>		

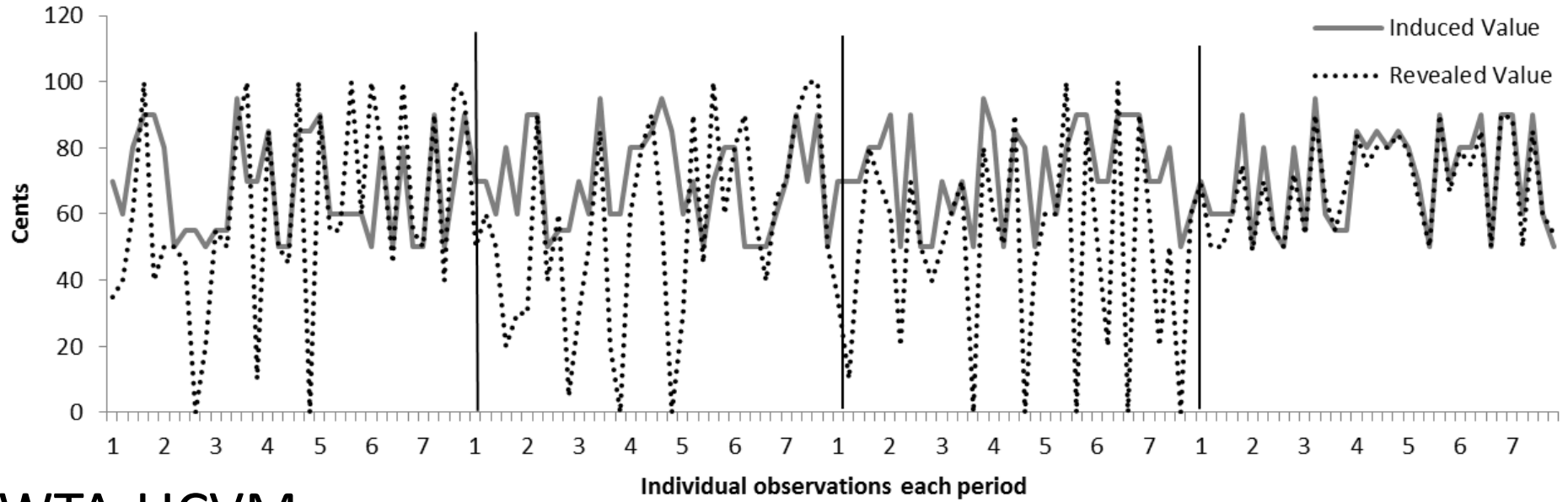
# WTP-PPM



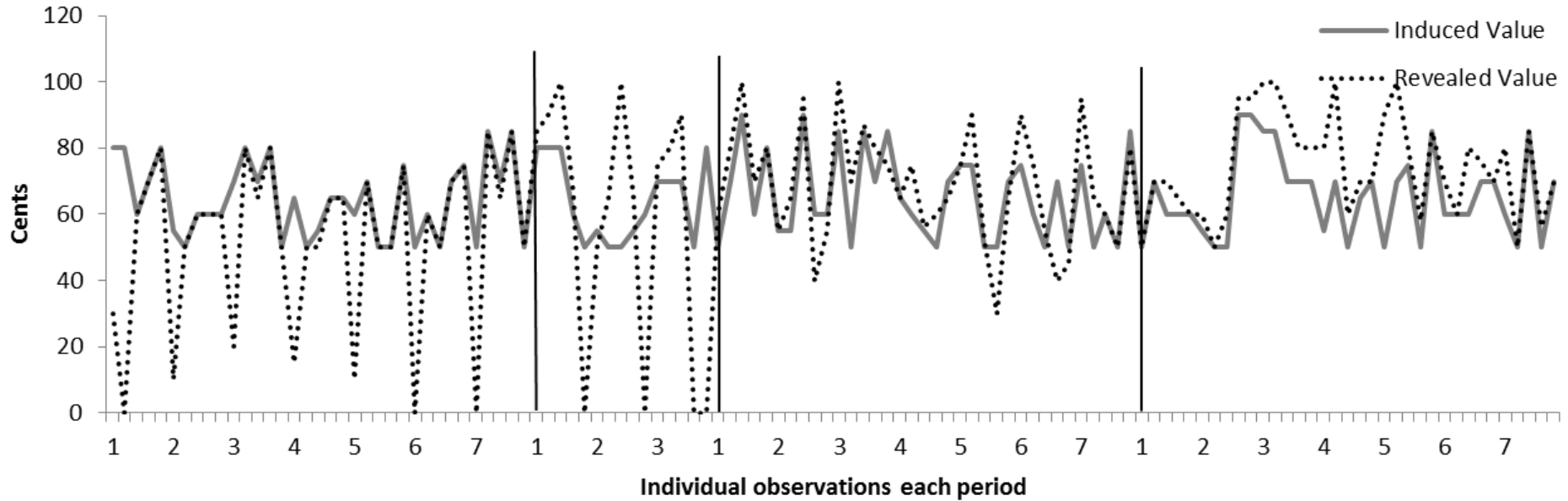
# WTA-PPM



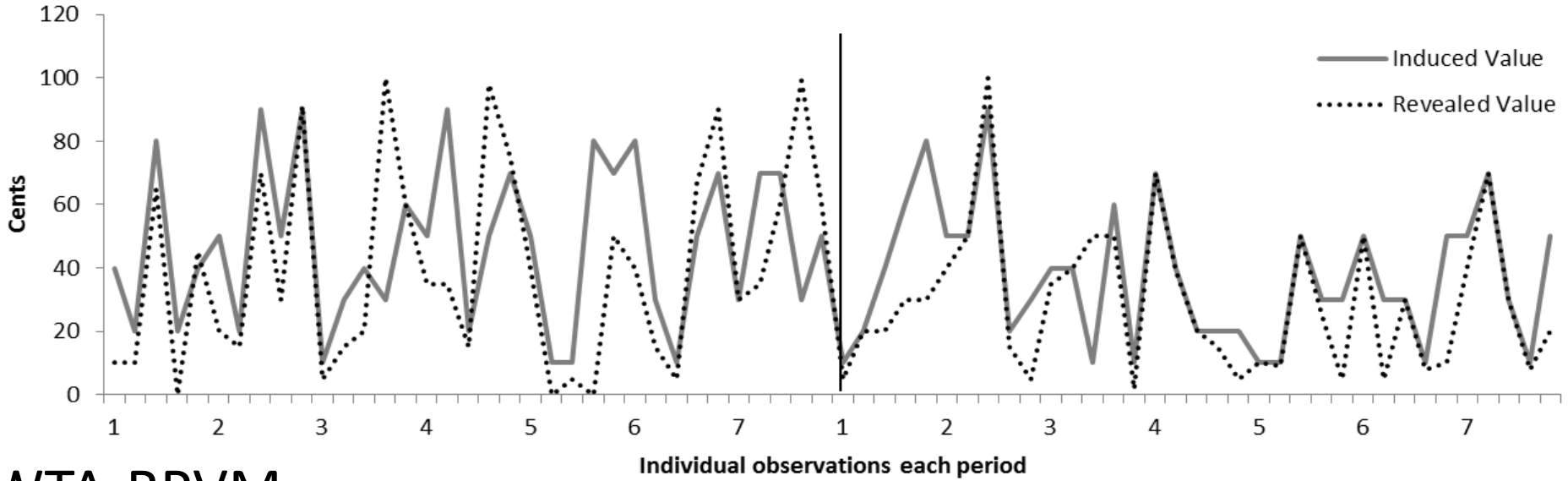
# WTP-UCVM



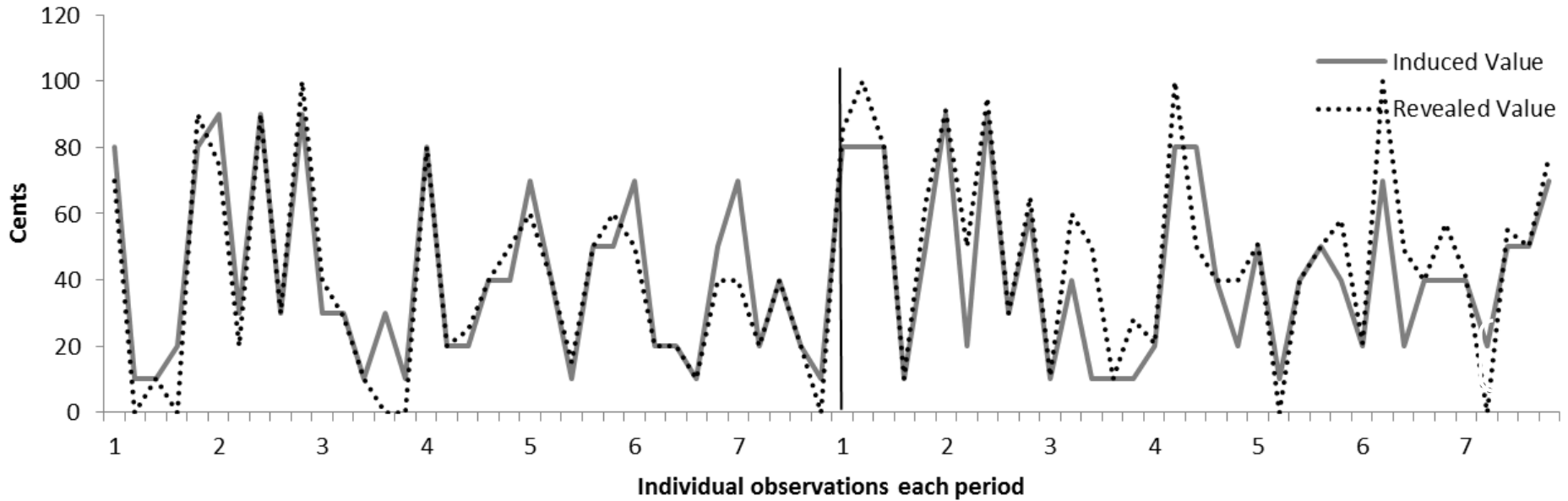
# WTA-UCVM



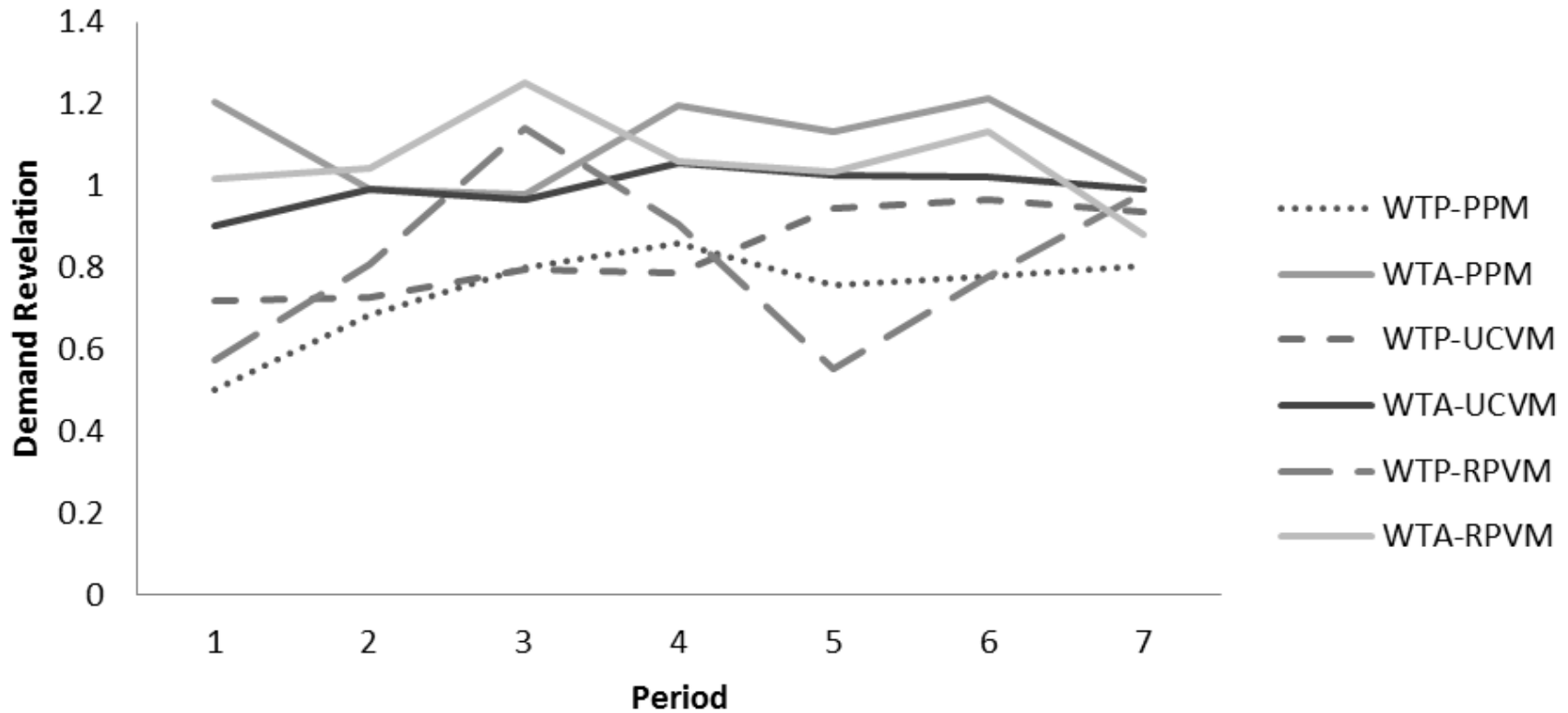
# WTP-RPVM



# WTA-RPVM



# Demand Revelation



# Demand Revelation

- UCVM had most demand revelation in first period
- PPM exhibited poorer demand revelation in first and last periods compared to UCVM and RPVM. This supports hypothesis 1 and 3.
- A surprising result is WTA was more demand revealing compared to WTP

# Failure Rate

- A period was considered a 'fail' when a project passed when it should have failed or when a project failed when it should have passed.
- RPVM and UCVM less subject to failure in first period compared to PPM
- Variance ratio test for failure rates between mechanisms

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	F	p-value
PPM-UCVM	36.0000	0.0150
PPM-RPVM	6.0000	0.1753
UCVM-RPVM	0.1667	0.1753

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# WTP WTA Discrepancy

- Summary of F test comparing equality of two samples variance between WTP and WTA, and between mechanisms:

		F	p-value
WTP-WTA	PPM	1.7779	0.0059
	UCVM	1.5281	0.0178
	RPVM	3.1966	0.0000
WTP	PPM to UCVM	1.1632	0.4511
	PPM to RPVM	1.5933	0.0550
	UCVM to RPVM	1.3697	0.1458
WTA	PPM to UCVM	3.1413	0.0000
	PPM to RPVM	9.0007	0.0000
	UCVM to RPVM	2.8653	0.0000

# Recommendations and Limitations

- Larger group sizes
- Replication of experiments to improve reliability of results
- Application of the RPVM and UCVM to a real world field setting to determine whether the promising results shown can be maintained
- This paper does not address persisting limitations in referendum format

# Concluding Remarks

- Overall results are consistent with literature
- Referendum format mechanisms induce more accurate revelation of truthful values, and are more efficient in terms of failure rates and WTP-WTA discrepancies compared to PPM
- UCVM is an efficient mechanism, and the promising results warrants further study
- Efficient WTA results, suggesting that the complexity of WTA is not due to incentive issues

# Questions