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Introduction
- Forest sector plays an important role in carbon sequestration
- Potential role of NPFs for carbon sequestration (NPFs comprise around 59% of timberland in the U.S.)
- Paying incentive for carbon sequestration in forest is relatively low cost option. However, many studies have focused on landowners’ response to incentives for afforestation and timber harvest decision
- Extend rotation period (e.g. Sohngen and Brown 2008)
- Alternative source of carbon sequestration - Intermediate forest management practices (MFPs) to increase tree growth rate or enhance fire resistance, e.g. Fuel treatment, Fertilisation
- Few studies elicits landowners’ intermediate MP choices in response to incentive payment.
- Not well known how landowners’ intermediate MFPs choice response to incentive payments.

Objectives
- to predict landowners’ decision of intermediate MP and the factors affecting their decision
- to measure the carbon sequestration potential of MFPs with different incentive payment strategies, and
- to compare the results with those from other carbon sequestration methods.

Model specification
- Assume utility maximizing owner
- The probability of adopting a certain MP K is given by a Multinomial Logit model (Maddala 1983).

Selected MPs combinations from the survey
- Choice 1: Fuel Treatment – Fertilisation (FFT)
- Choice 2: Fertilisation only (F)
- Choice 3: Fuel Treatment only (FT)
- Choice 4: No activities (NA)

Estimation results
Key findings from factors affecting landowners’ choices
- Landowners’ demographic characteristics are not significantly affect the choice of MFPs
- Variables representing objectives of owning forests (for privacy, timber harvest, biodiversity), concerns about risk of fire or disease, spatial characteristics such as distance from road, slope are significantly affect the landowners’ MP decision

Semi-elasticities of probabilities w.r.t Annual net return

Carbon accumulation trends of each MP and baseline

Simulation of carbon sequestration
Incentive Design
- Payment Criteria: Practice based vs. Performance based
- Contract year: 10-year & Sensitivity Analysis with 5- and 15-year
- Possible incentive strategies to promote additional carbon are:
  - Pay incentive only for fertilisation
  - Pay for fertilisation with & without fuel treatment
  - Pay for only activities (MP)
  - Pay for fertilisation and no activities

Carbon supply function by MFPs (Western US)

Comparison with other study results (National Scale)

Conclusions
- Landowners’ management practice choice decision is not solely affected by its net return, but also affected by others such as objectives of owning forests (for privacy, timber harvest, biodiversity), concerns about risk of fire or disease, and spatial characteristics.
- The MFPs for timber growth enhancement are not always helpful to increase carbon sequestration. Doing nothing can be better option.
- Paying incentives only to change intermediate forest MP without extending rotation period cannot produce additional carbon sequestration as much as afforestation.
- Because physical carbon sequestration potential per acre is lower than that with afforestation.
- Because of property of reveal preference approach: tend to have higher marginal cost than other approach such as optimisation model or bottom-up engineering approach.

References

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