The economic effects of algal blooms in the Lake Champlain basin

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Outline

- Research questions

- Circular flow model

- Social Accounting Matrix

- CGE Model/Aggregation in GAMS

- Connection to land use and phosphorus

- General conclusions and discussion

- Future directions

Research questions

- Over time, what will be the economic repercussions of the changes in land use necessary to reduce algal blooms in the Lake Champlain basin?

- Could a system of taxes and subsidies adequately address potential negative externalities occurring from disproportionate non point source phosphorus runoff?
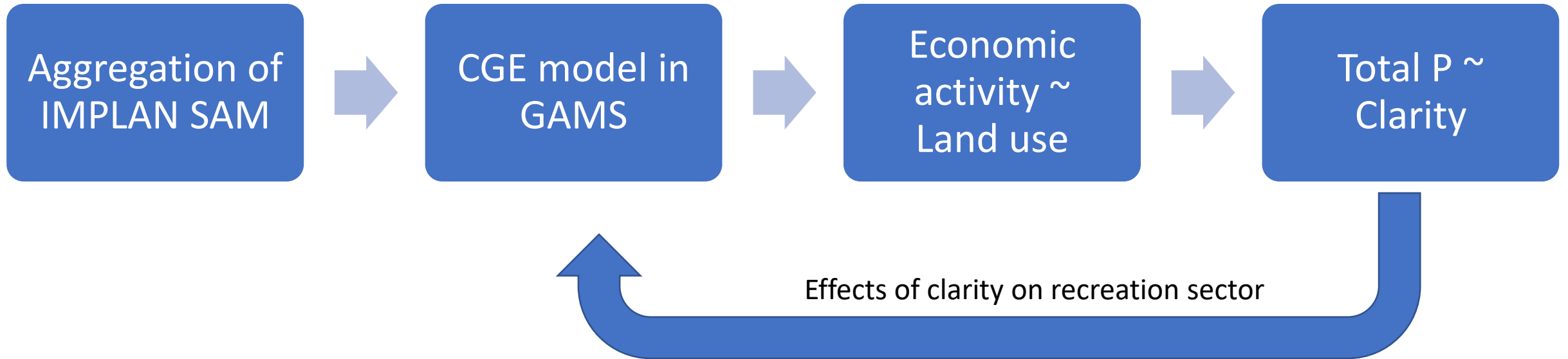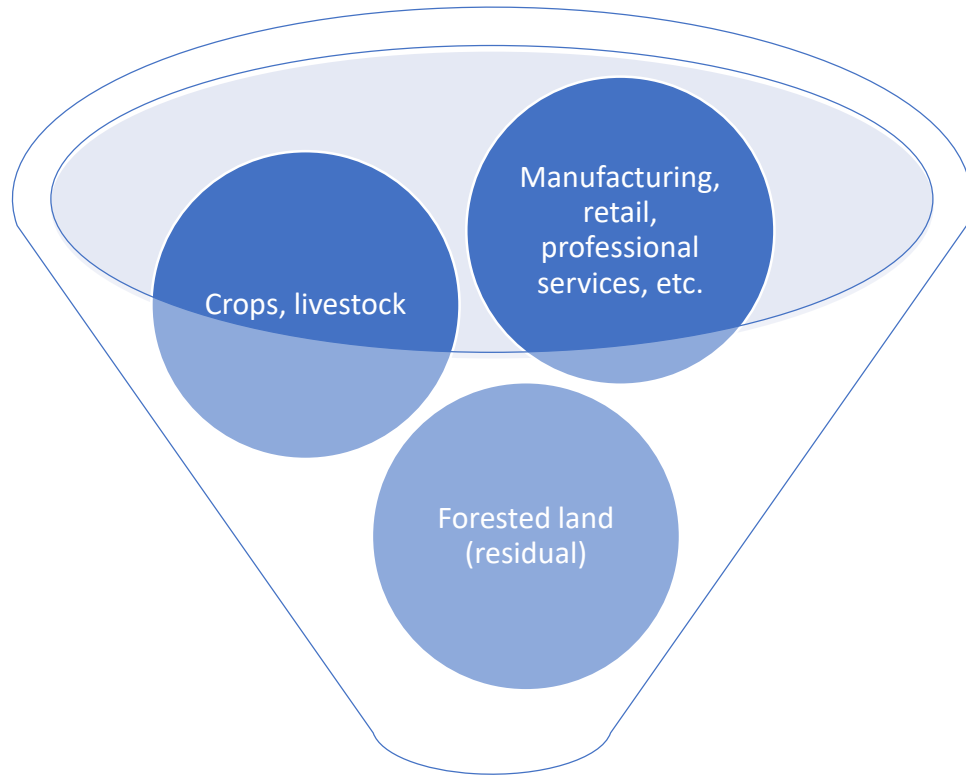
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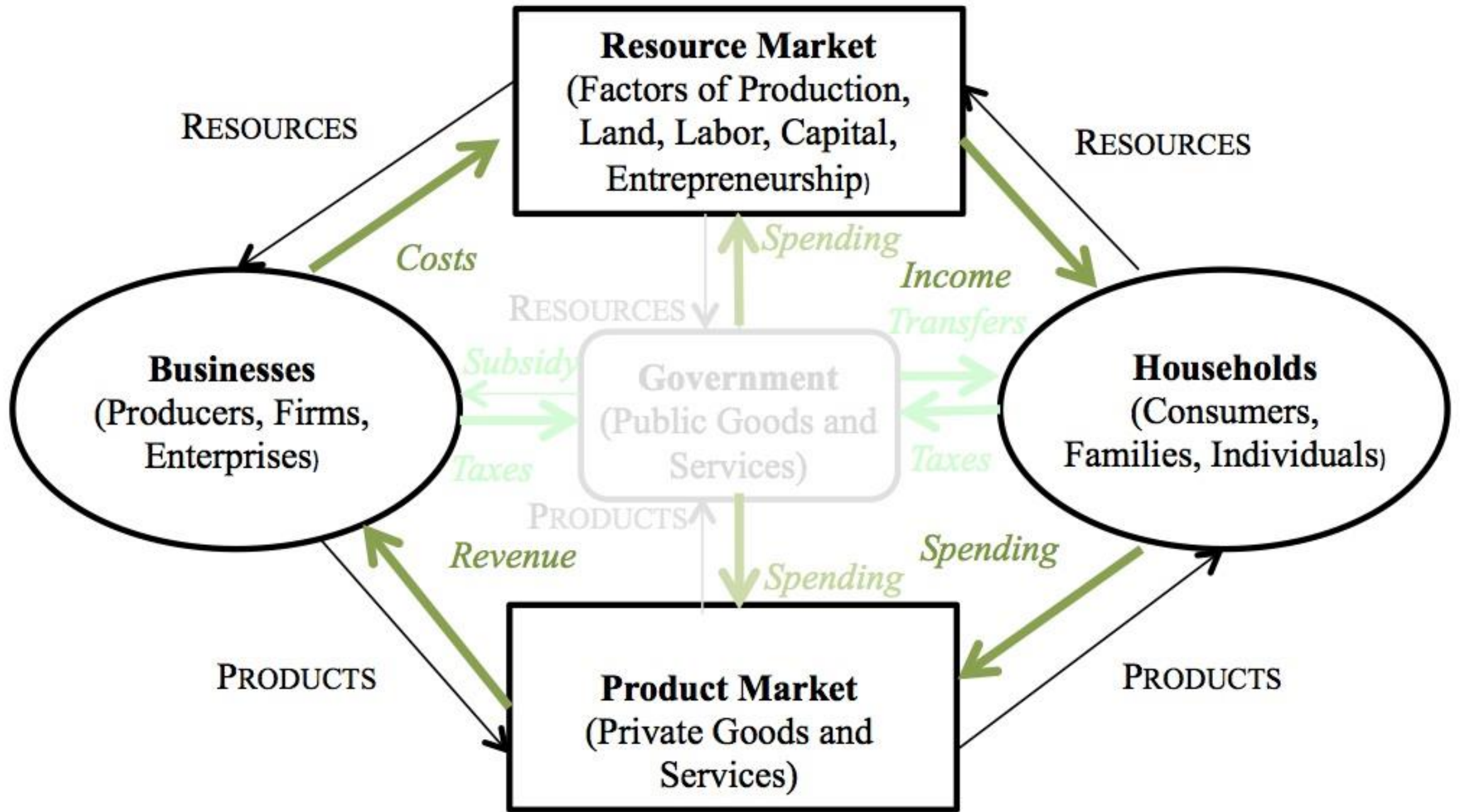
	Firms	HHs	Inv	Gov	Foreign	Total
Firms		150	40	20	-10	200
HH	200					200
Saving		20		10	10	40
Government		30				30
Foreign						0
Total	200	200	40	30	0	

CGE model in GAMS software

- Declare parameters

- Variables

- Constraints

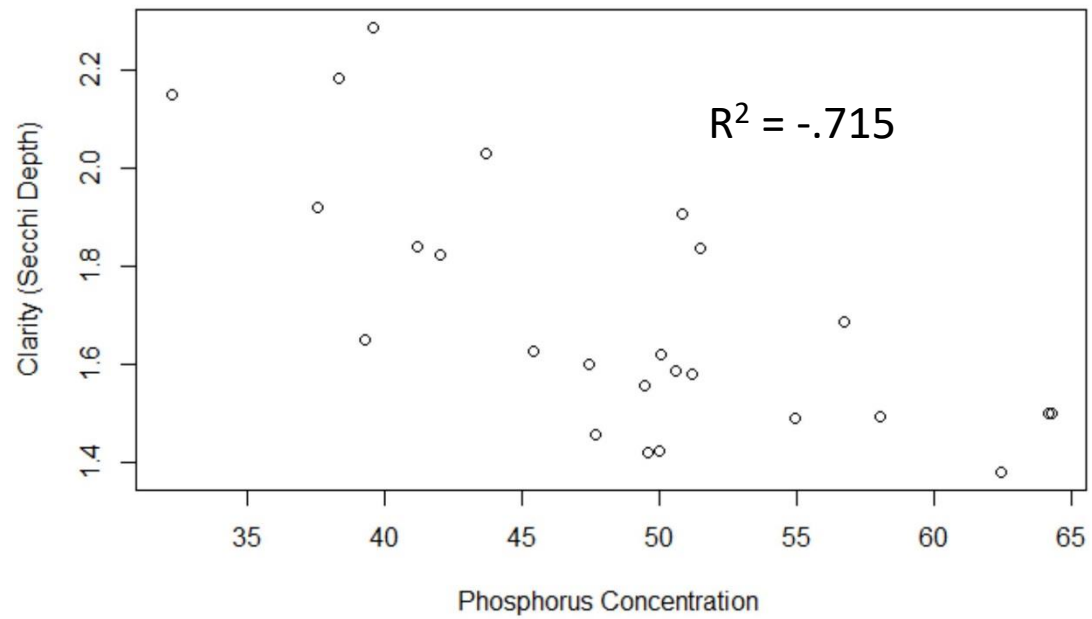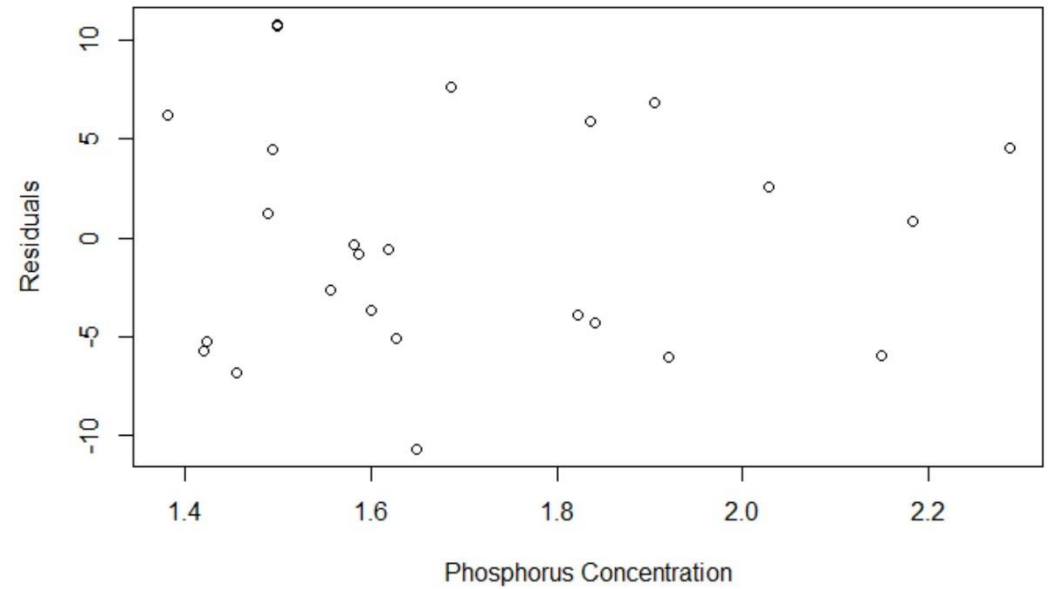- Equations

- Objective function

- Solve statement

Approach

Assumptions

- Economic activity is proportional to the percentage of land used in agriculture and developed sectors

- All remaining land is forested

$R^2 = -.715$

Clarity (m) = -23.4*Phosphorus concentration (ppm) + 88.6

Model Discussion

- "Developed" category is very broad

- Pop. growth affects developed land use and in turn phosphorus

- Model treats NY and VT as one giant reservoir

- Supply-constrained agricultural side

Future Directions

- Empirical model of elasticity of land use as it relates to economic activity

- Agent based model (fluctuations around growth path)

- Effects of climate change: population growth, increased agricultural yield

- Lake recreation sector?

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