Reliable estimates of sustainable biomass supply…

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Objectives

- **Lay out the structure of the problem**
- **Examine evidence regarding the structure of supply**
- **Make conclusions and identify the analytical challenges**

Sustainability?

- **Past fifty years of southern forest management indicates that the market can organize a sustained yield of wood products… forest investment responds to market signals**
  - **Vast expansion in production coupled with an expanding inventory**
  - **What's the max?**
- **Sustained yield is not equivalent to sustainability. Still unclear as to what other ecosystem services might become scarce….**
  - **Requires understanding of other factors**

Woody biomass supply

- **Coupling biophysical production (inventory, growth and yield) with behavioral model (harvest choice)**
- **Premise: structure of woody biomass supply is not qualitatively dissimilar to structure of pulpwood supply in the South.**
- **Supported by trend toward producing homogenous timber product: e.g., plywood to OSB, lumber to engineered wood**

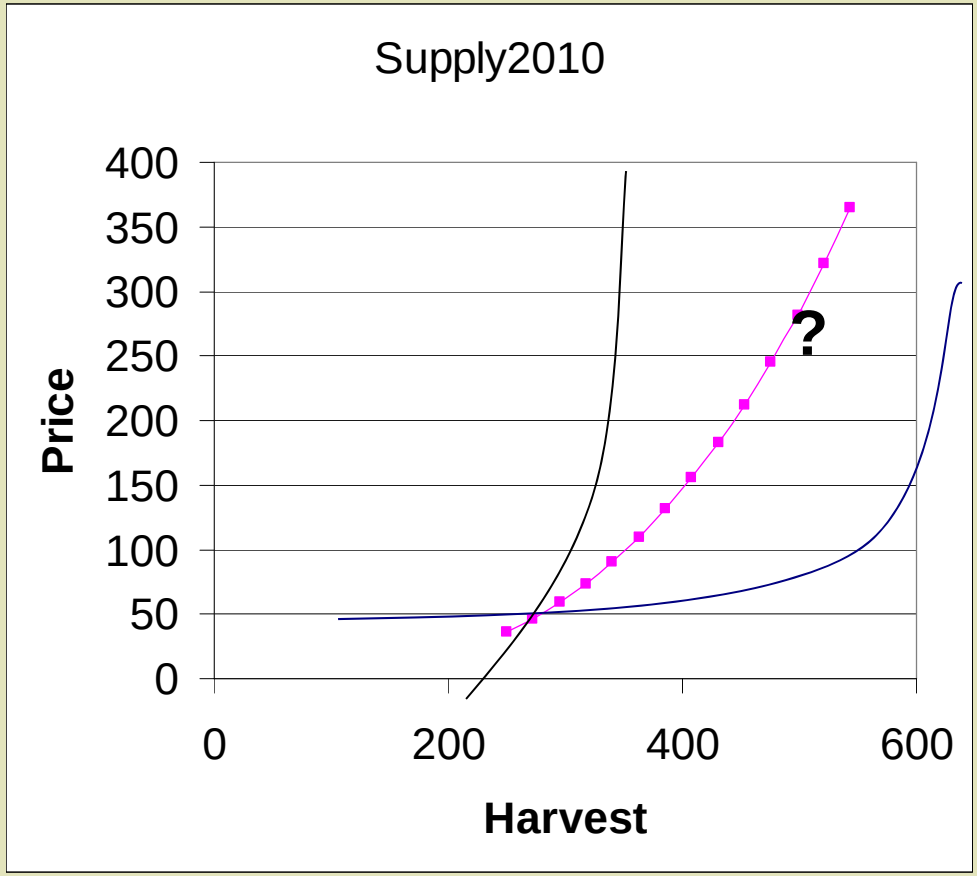
Harvest choice

- **Pr (Harvest)=f(prices, growth, costs, OTHER VALUES)**
- **Pr (Harvest)=f(prices, growth, costs, Landowner attributes)**
- **Pr (Harvest | commercial owner)> Pr(Harvest | family farm owner)**

Biophysical Production

- **Harvest = pr (Harvest) * Q (Forest type, age, costs, location)**
- **How will harvest change in the short run?**
  - **Changes in prices (harvest probability)**
- **How will harvest change in the long run?**
  - **Changes in inventory: investment, land use (Q)**
  - **Changes in landowner attributes (harvest probability)**

Short run supply structure



Evidence from recent supply modeling for RPA/SFFP

- **Empirical harvest choice models**
- **Tied to forest inventory plots**
- **Simulation over 50 year period**
- **Accounts for:**
  - **Growth and mortality**
  - **Investment**
  - **Land use changes**

Short run supply...

Elasticities with respect to…	Elasticity
Softwood sawtimber	
Price of softwood sawtimber	0.336‡
Price of softwood pulpwood	**0.019‡**
Price of hardwood sawtimber	**0.032‡**
Price of hardwood pulpwood	**0.009†**

Softwood Pulpwood

Softwood pulpwood	Elasticity
Price of softwood sawtimber	0.036‡
Price of softwood pulpwood	0.062‡
Price of hardwood sawtimber	0.010‡
Price of hardwood pulpwood	0.003

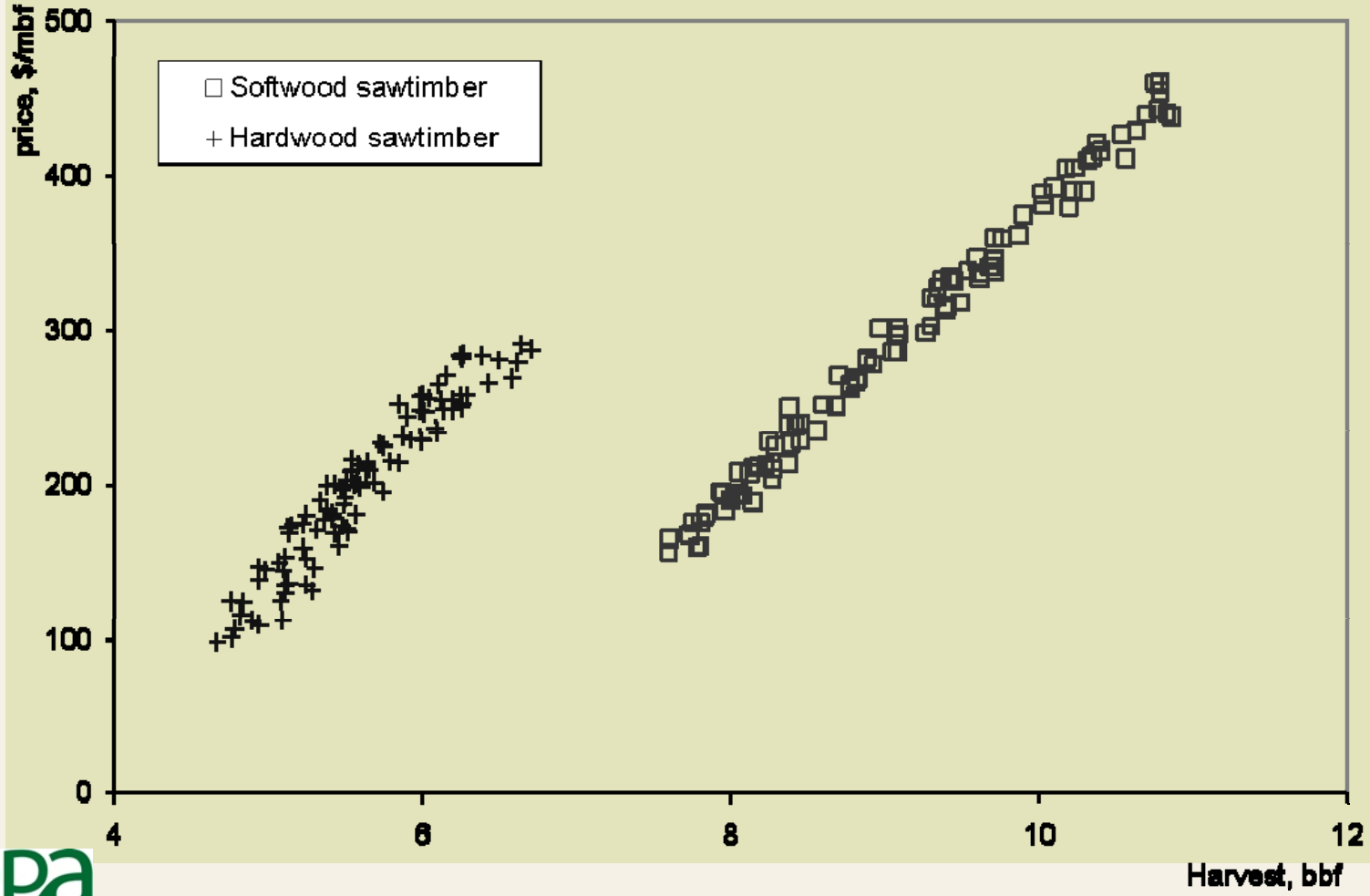
Hardwood Sawtimber

Hardwood sawtimber	Elasticity
Price of softwood sawtimber	0.080‡
Price of softwood pulpwood	0.008
Price of hardwood sawtimber	0.307‡
Price of hardwood pulpwood	0.026‡

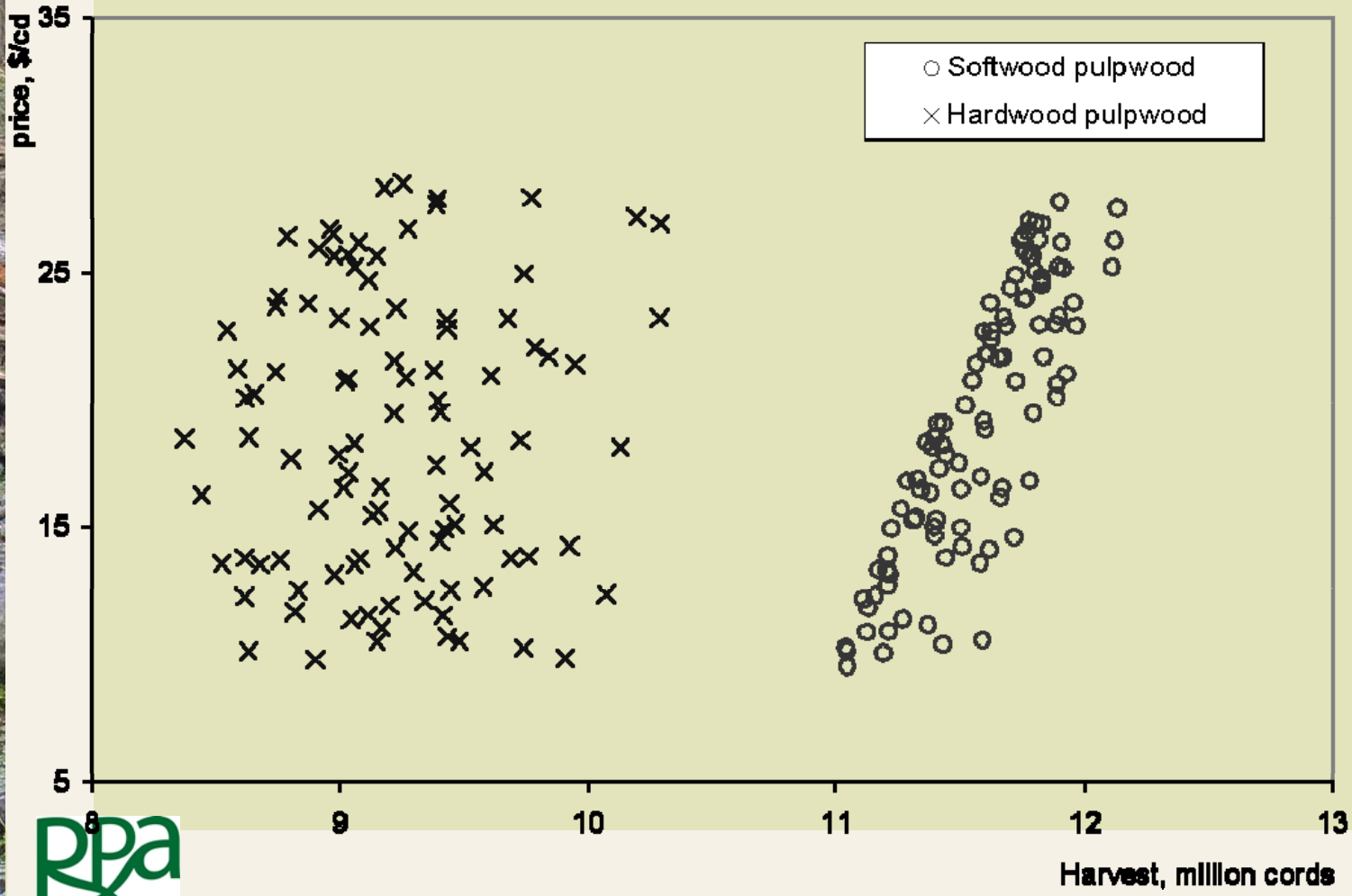
Hardwood Pulpwood

Hardwood pulpwood	Elasticity
Price of softwood sawtimber	0.097‡
Price of softwood pulpwood	0.008†
Price of hardwood sawtimber	0.130‡
Price of hardwood pulpwood	0.025‡

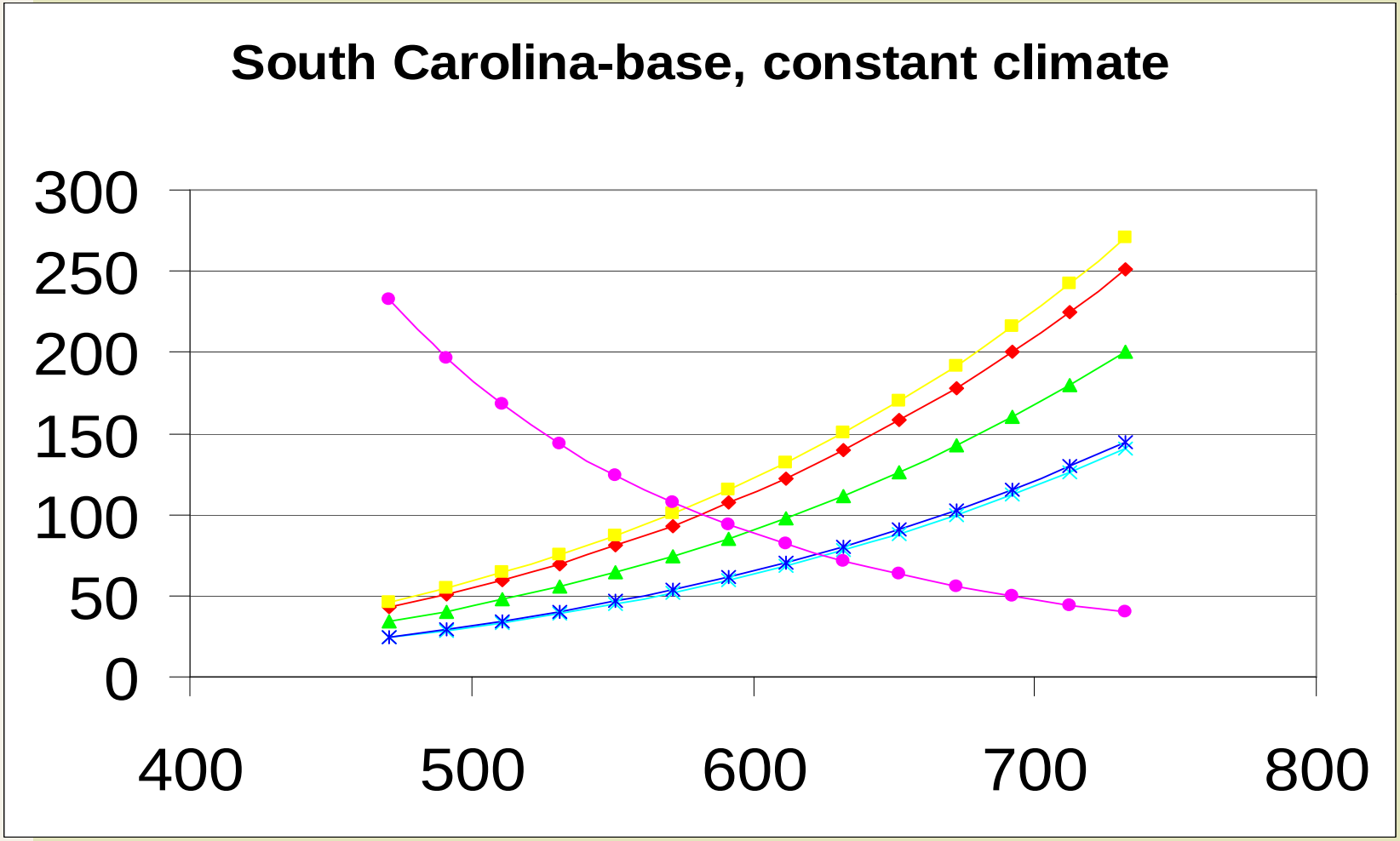
Short run sawtimber supply



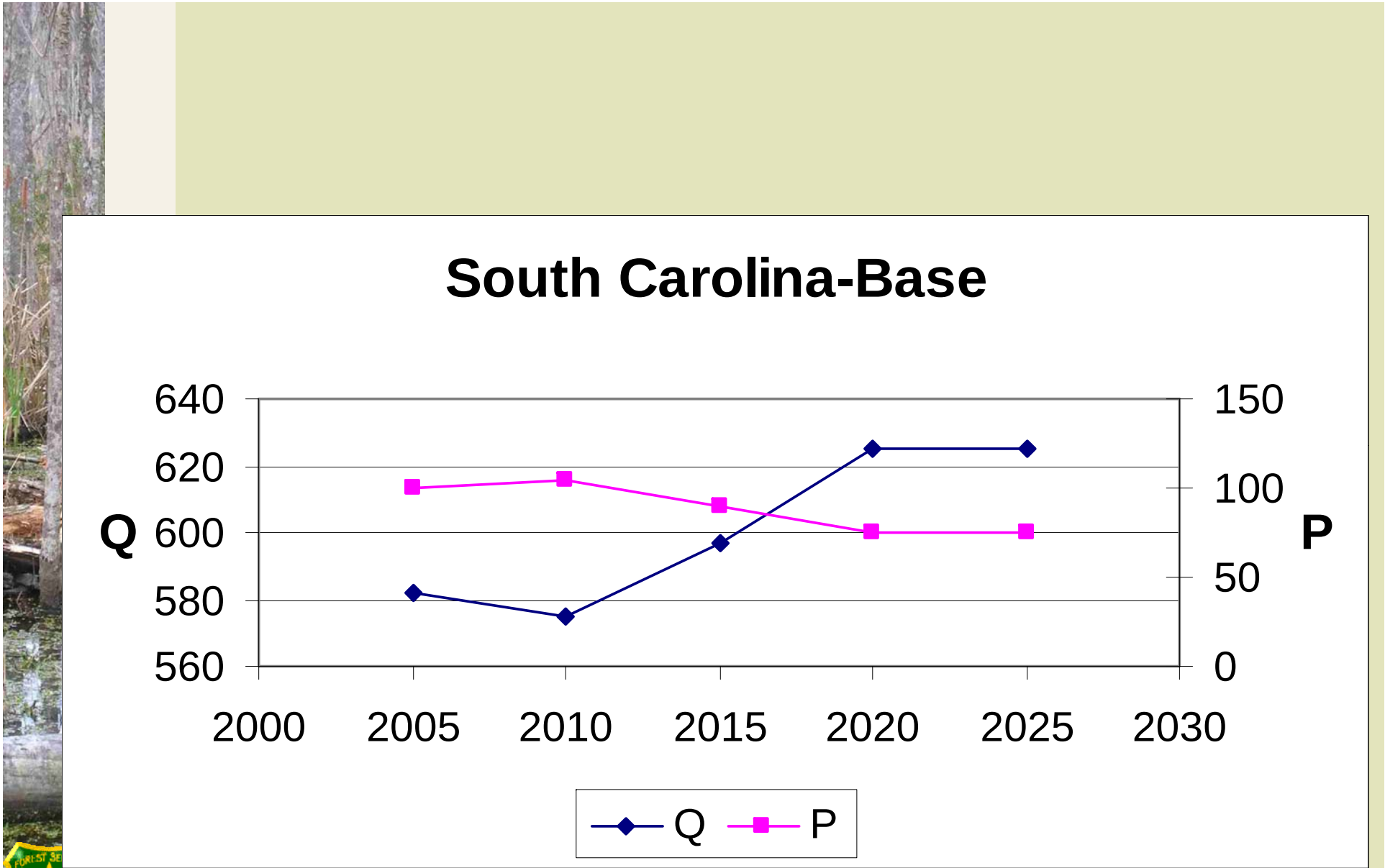
Short run pulpwood supply



Shifts in supply over time...

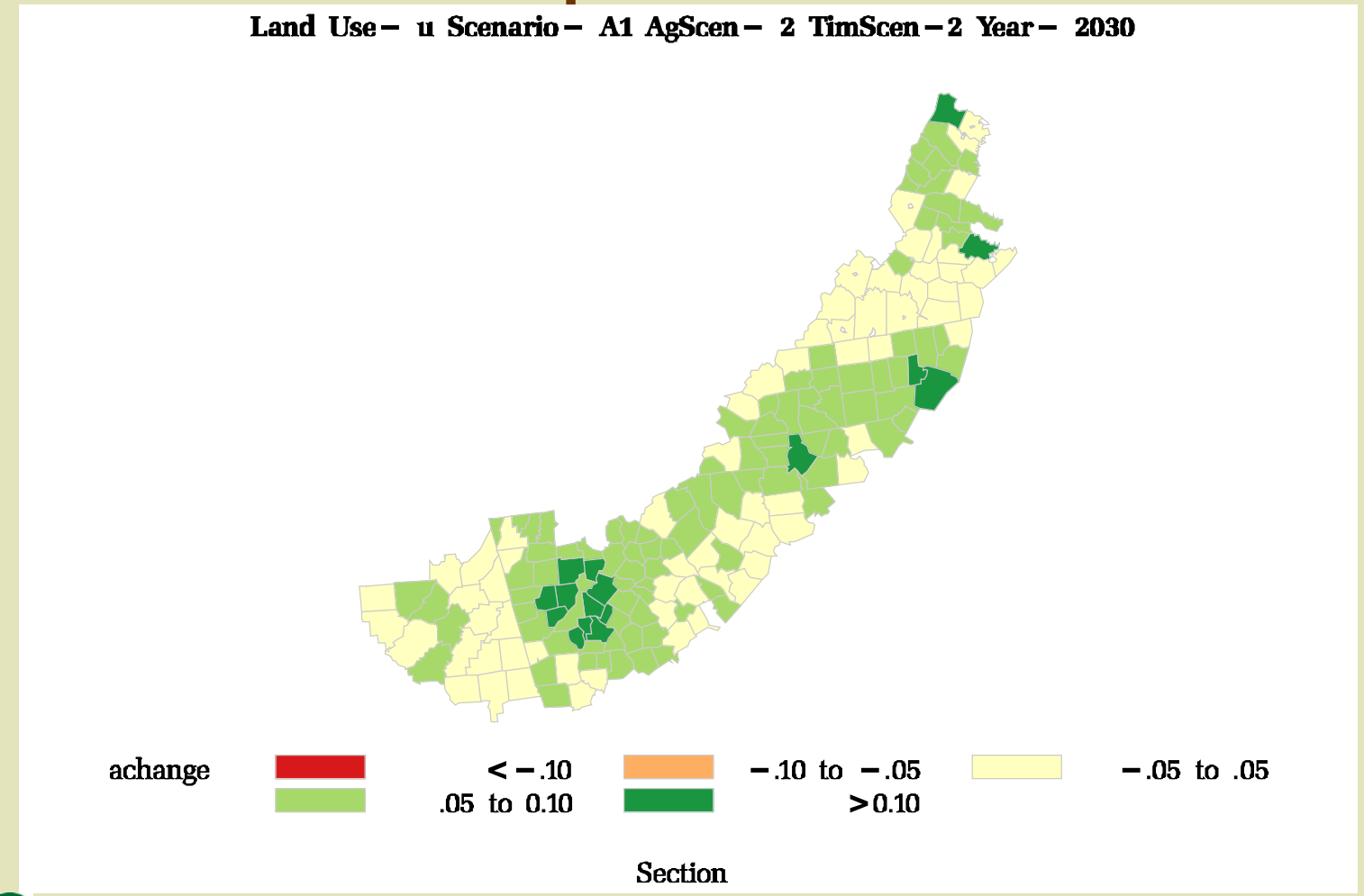


- Shifts in supply reflect, land use change due to urbanization, forest investment, and age dynamics.



10 percent increase in harvest with a 25 percent reduction in price

Development will restrict expansion



Conclusions

- **Short run supply**
  - **Highly inelastic pulpwood supply, price increases expected in the short run**
  - **Highly variable hardwood pulpwood supply—linked to come-along harvesting**
  - **All products are complements in the short**
- **Supply of any timber product is not independent of supply of other products**
  - **Supply of pulpwood is especially influenced by markets for higher valued products—weak sawtimber markets will limit supply of woody biomass**
  - **Emerging market will have implications for competing markets**

Conclusions

- **Long run supply**
  - **Supply is substantially more elastic in the long run**
  - **Products are substitutes in the long run**
  - **Forecasts indicate expansionary trajectory linked to investments in intensive forest management through 2000**

Conclusions

- **Long run supply**
  - **Urbanization will decrease area within which product markets can grow but in specific places**
    - **Key strategic consideration**
    - **Focused in Piedmont and along coasts**

Conclusions

- **New demands for woody biomass could provide a "replacement" for reduced demands from the pulp and paper sector.**
  - **between 1997 and 2006 harvest reduced by 0.9 billion cubic feet or about 10.8 million dry tons of biomass.**
  - **Pulpwood prices (softwood) were 50 to 75 percent higher in the late 1990s, indicating that capturing this material would involve price increases for the feedstock.**

Key uncertainties

- **Information is minimal for unknown products**
  - **Merchandizing algorithms for logging residues**
  - **Structure of new treatments/management regimes**
- **Ownership—behavioral foundation**
  - **Effects of industrial land base divestiture**
  - **Effects of changes in small landowner demographics**

Thanks for listening...