

Tobacco Town

Computational Modeling for Studying Retailer Density Reduction Strategies

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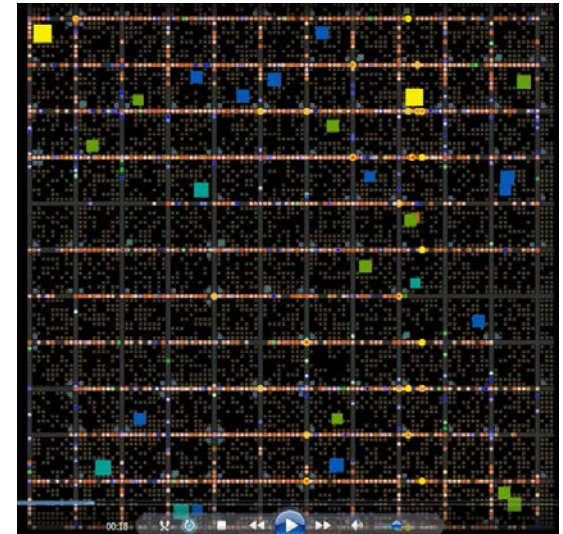
Ross Hammond (Brookings Institution)



Utility of agent-based modeling to study retail policy implementation and effects

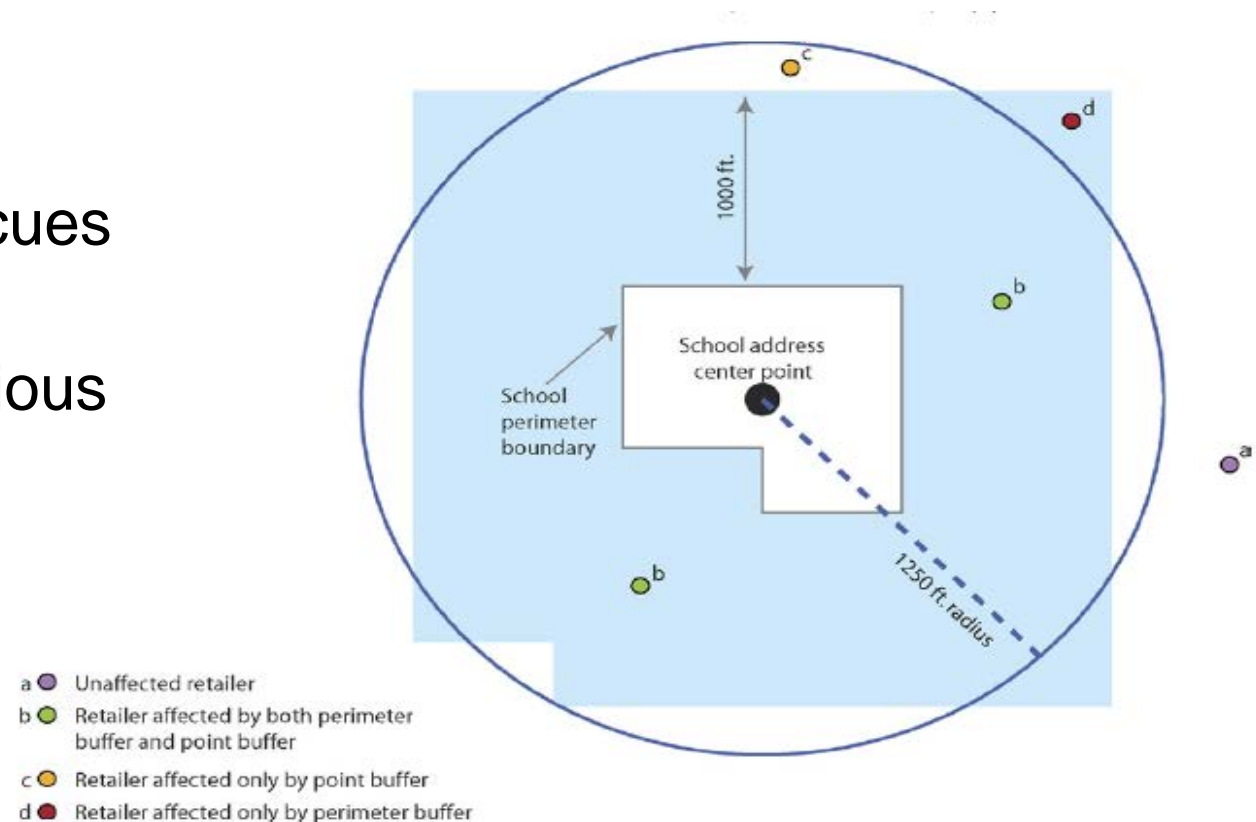
Agent-based modeling for tobacco control policies

- Agent-based models (ABMs)
 - Computational modeling to study dynamics of complex systems, such as public health policy implementation in communities
 - ABMs have been used in public health extensively to study infectious diseases, and the best way to mitigate against epidemics, pandemics
- *Tobacco Town*
 - Retailer density reduction policies and impacts on consumer costs
 - Able to identify possible non-linearities, threshold effects
 - Able to identify underlying mechanics of how policies affect behavior
 - Able to study impacts of multiple policies
 - Able to study how policies effects vary across different social, physical, political contexts (*i.e.*, town types)



How might reducing density help?

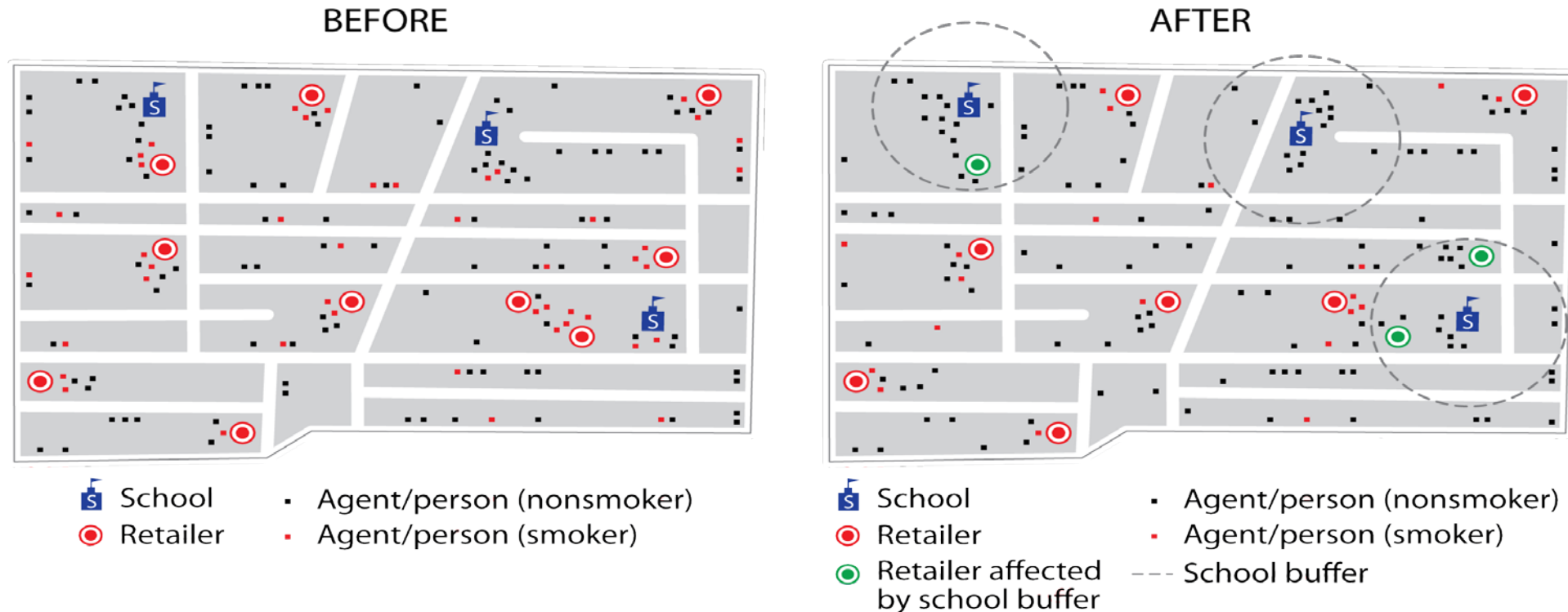
- Decrease availability
- Increase search cost of obtaining
- Decreases visibility of environmental cues to smoke
- Changes social norms, reduces “insidious ordinariness” of tobacco
- Reduces “Tobacco Swamps”



From Luke, et al, 2011, *Am J Prev Med*

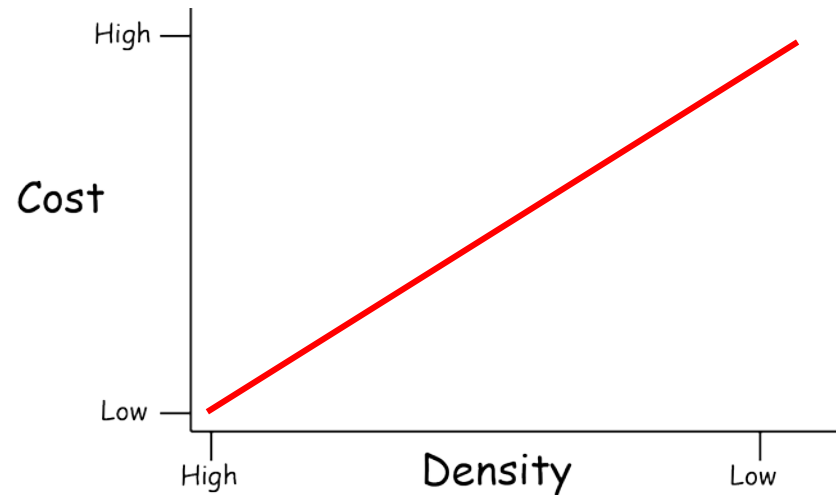
Tobacco Town

- Use agent-based modeling to study tobacco retailer density and individual tobacco purchasing
- May be used as a retail policy laboratory to explore and compare the potential effects of various policy approaches such as location based policies

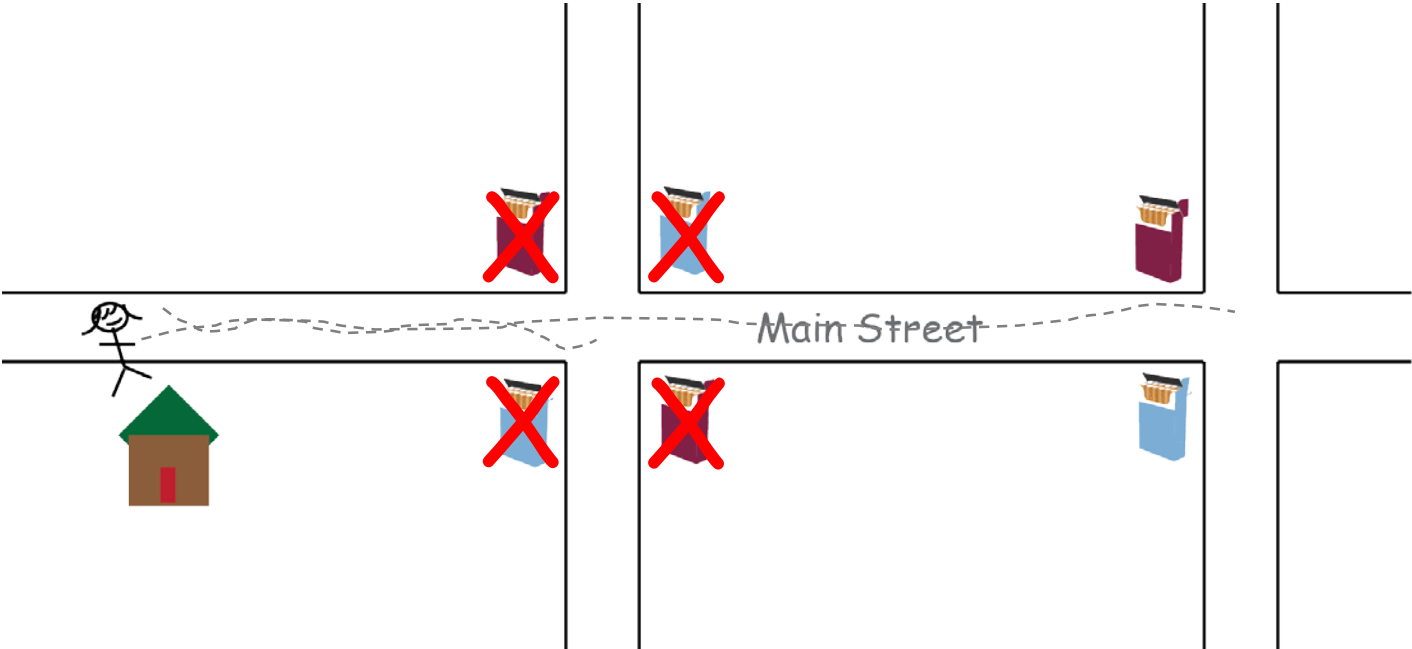


What is the relationship of density & cost?

- We might assume

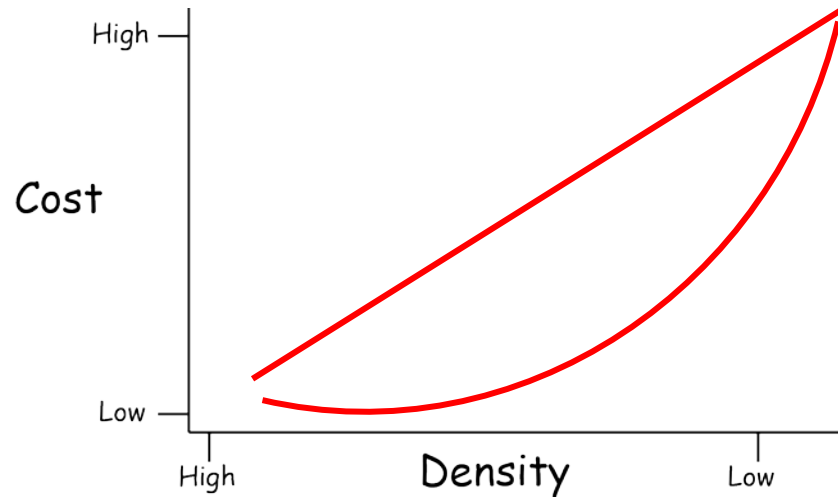


Thought experiment

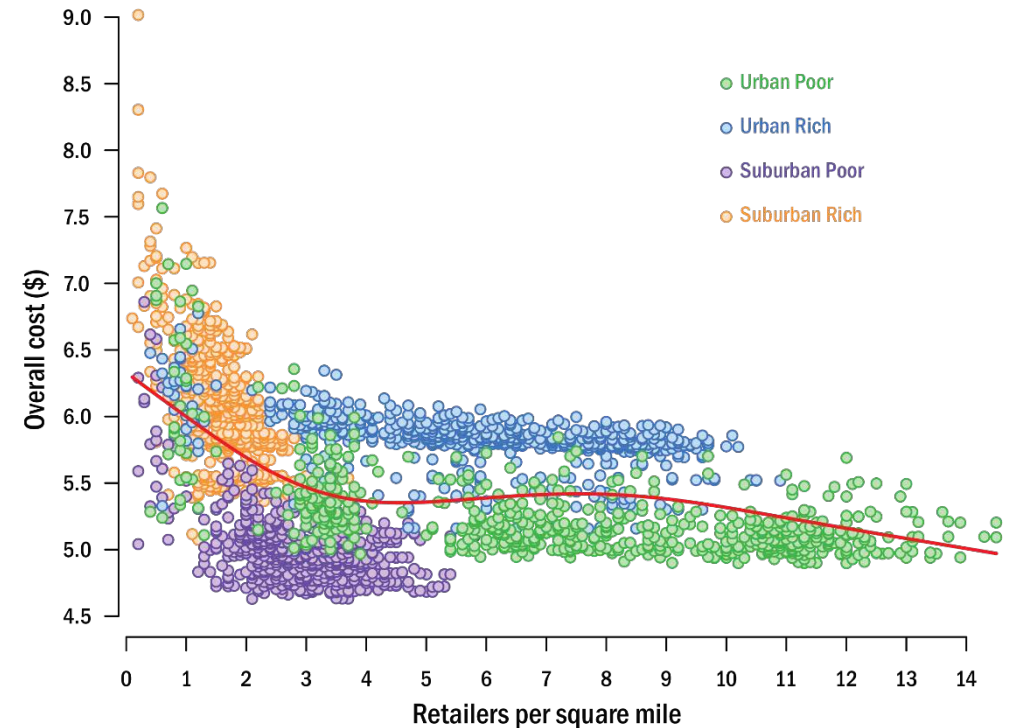


Relationship of retailer density and cost may not be simple...

- So really...

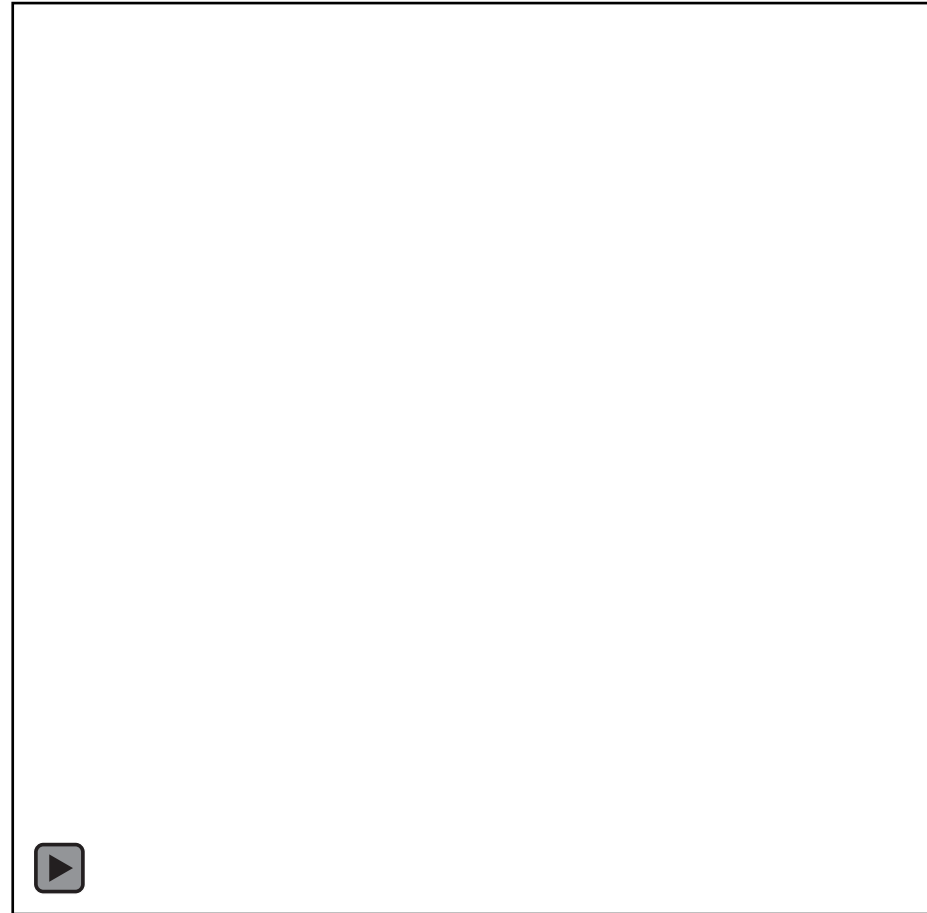


- From Tobacco Town



Tobacco Town model visualization

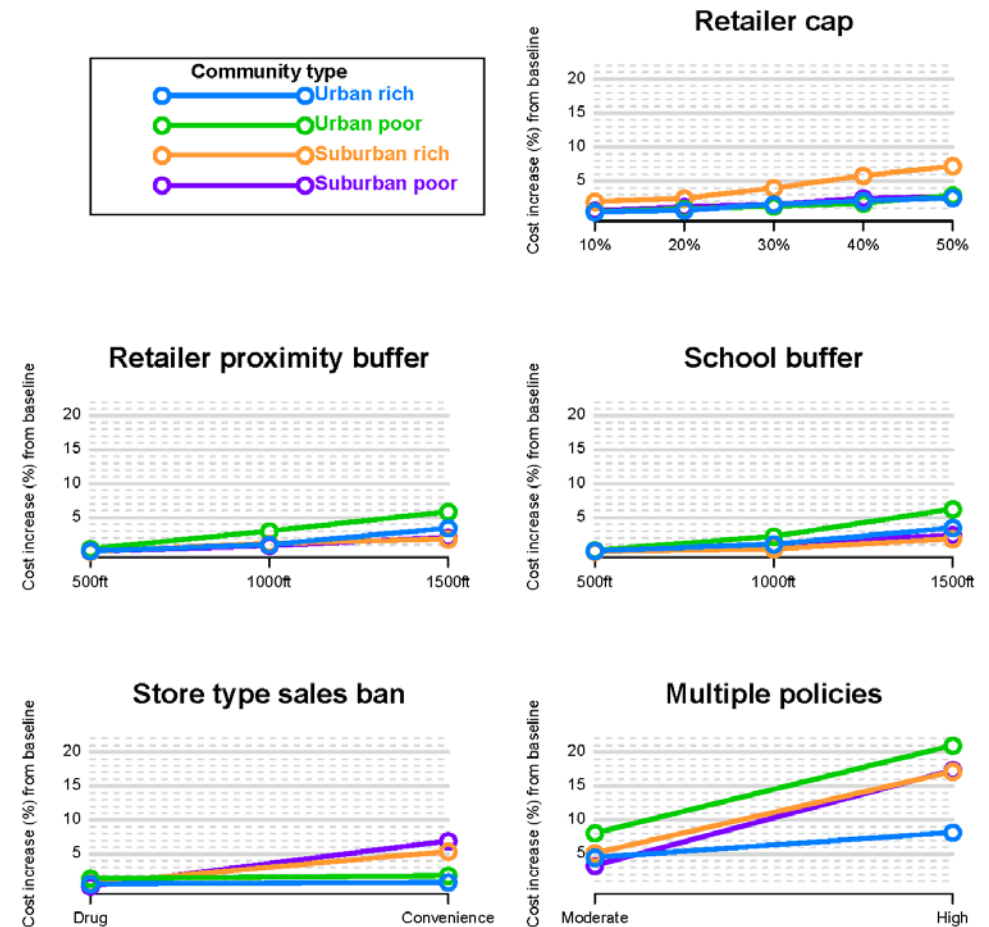
- Agent color = transportation type
- Box color = retailer type
- Box size = cigarette price
- Box flashes when agent purchases cigarettes



Effects of multiple policies and their combinations

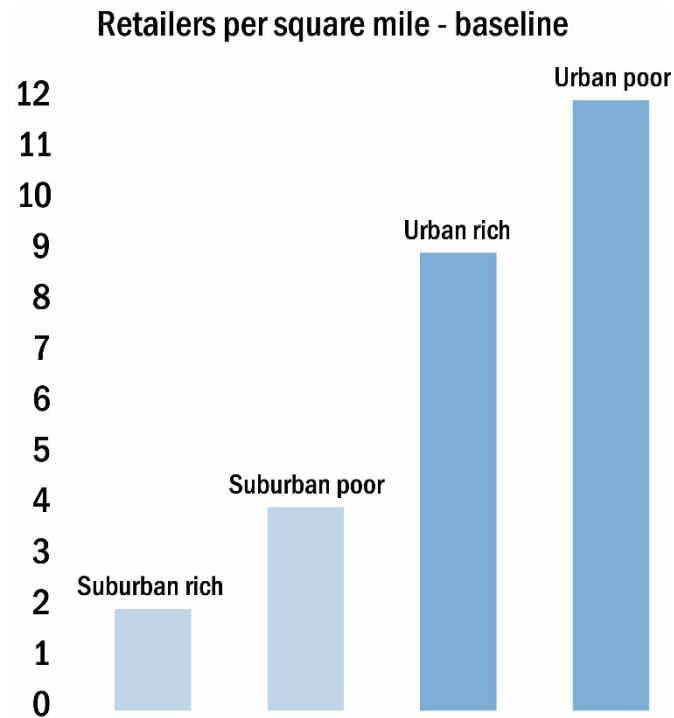
- Four policies with varying intensities
 - Retailer cap (90-50% of baseline)
 - Retailer proximity buffer (500, 1000, 1500 feet)
 - School buffer (500, 1000, 1500 feet)
 - Store type sales ban (pharmacy, convenience)
- Combined policies

Increases in cost (%)



ABM: impact of policy depends on community

- Four archetypal town types in *Tobacco Town* based on observed US data



	Urban Poor	Urban Rich	Suburban Poor	Suburban Rich
Retailer cap			+	++
Store type			++	+
School buffer	++	+		
Proximity buffer	++	+		
Multiple policies	++	++	++	++

Questions?