

The economics of energy land use and innovations-lessons for AB32

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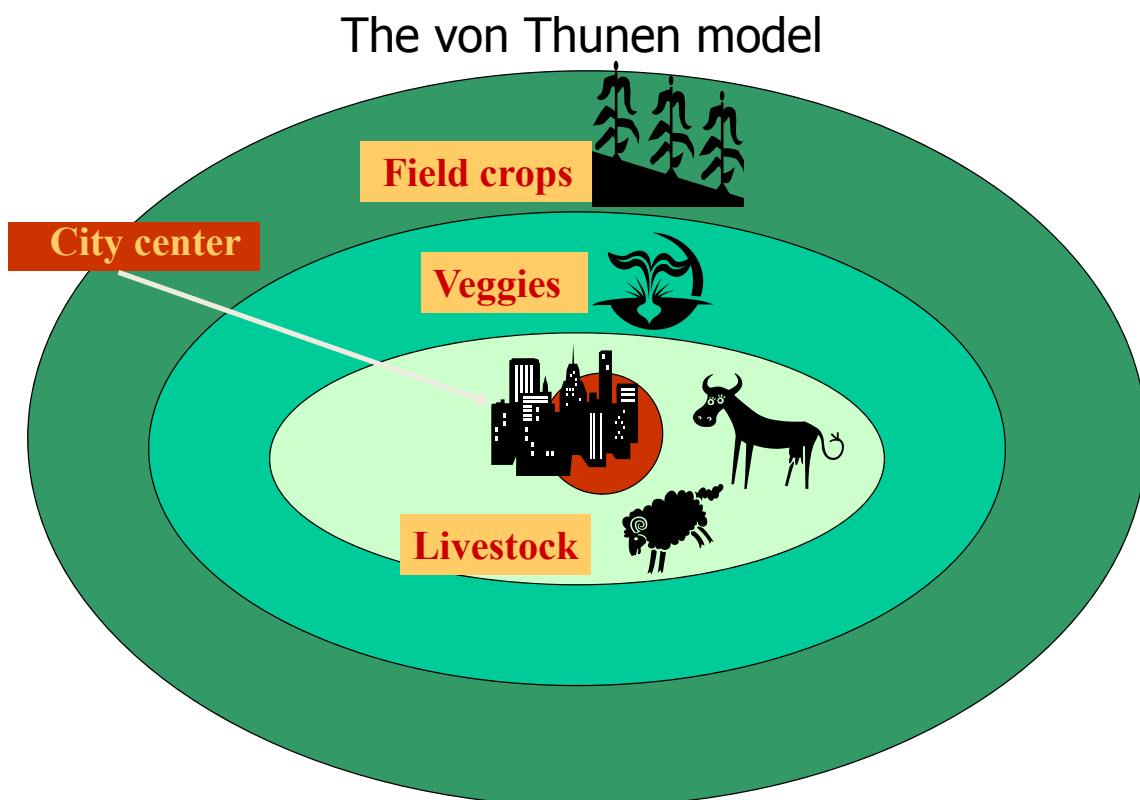
Outline: Some of the lessons of economic research

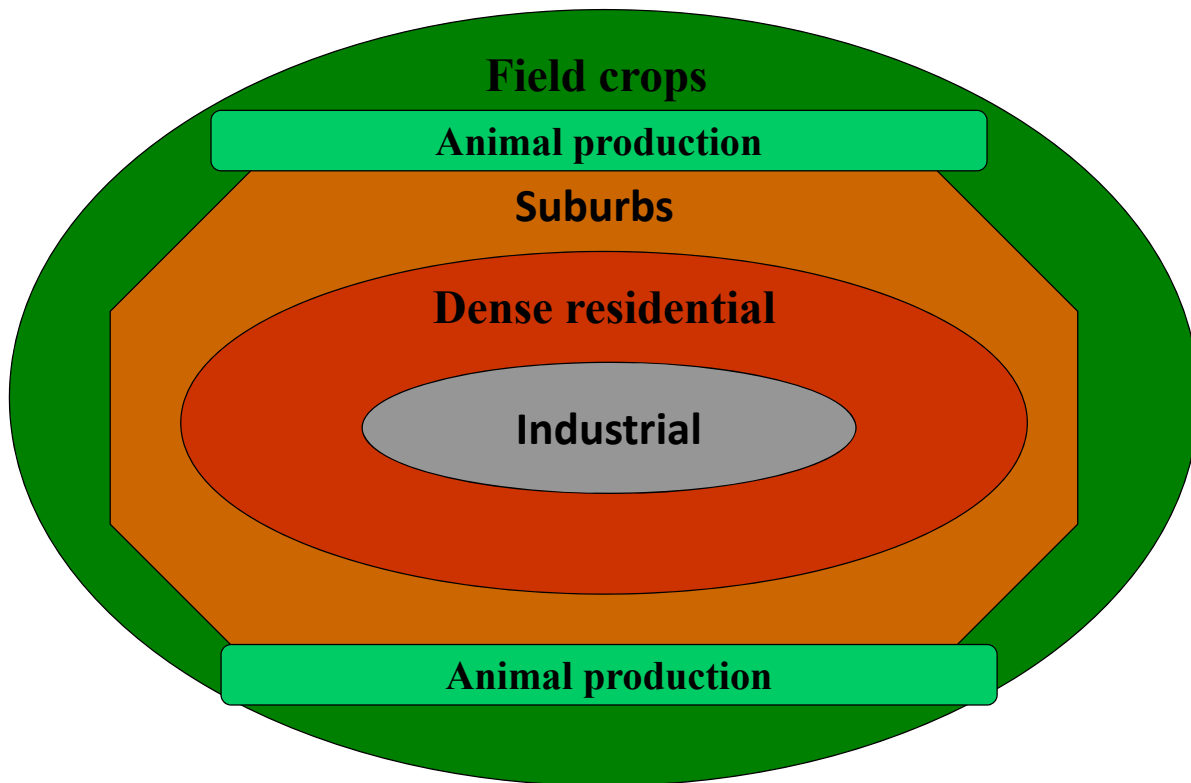
- Energy prices, land use and financial well being
 - Energy prices and housing value
 - Energy prices and the financial prices (work with Jun Jie Wu and Steve Sexton- interpretation is mine)
- Adoption of green technologies
 - Irrigation technologies
 - Documentation of pesticides applications

On the evolution of land use analysis

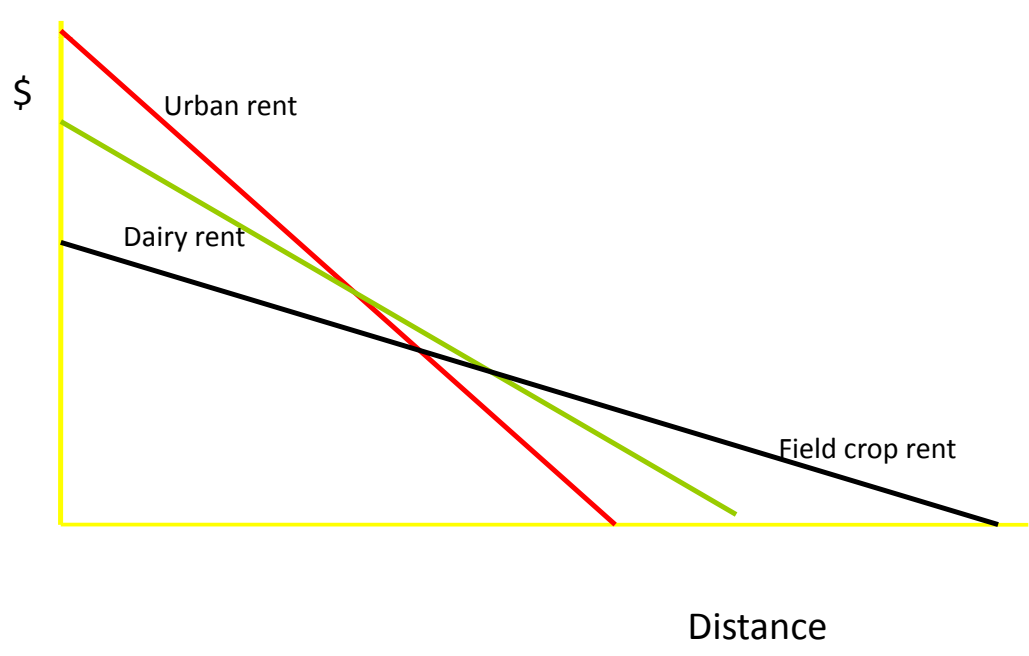
Johann Heinrich von Thünen(1783-1850)

- Principles to understand land use patterns.
 - land will be used in the activity in which it generates the most value.
 - land is heterogeneous: varies by location, amenities.
 - One source of heterogeneity is distance from the city
 - Value is determined by net value of production, which varies across location because of transportation costs.
 - Activities that have relatively low value added and high transportation cost will be farther away from the cities.





Land rents-the actual rent is of the highest value activity

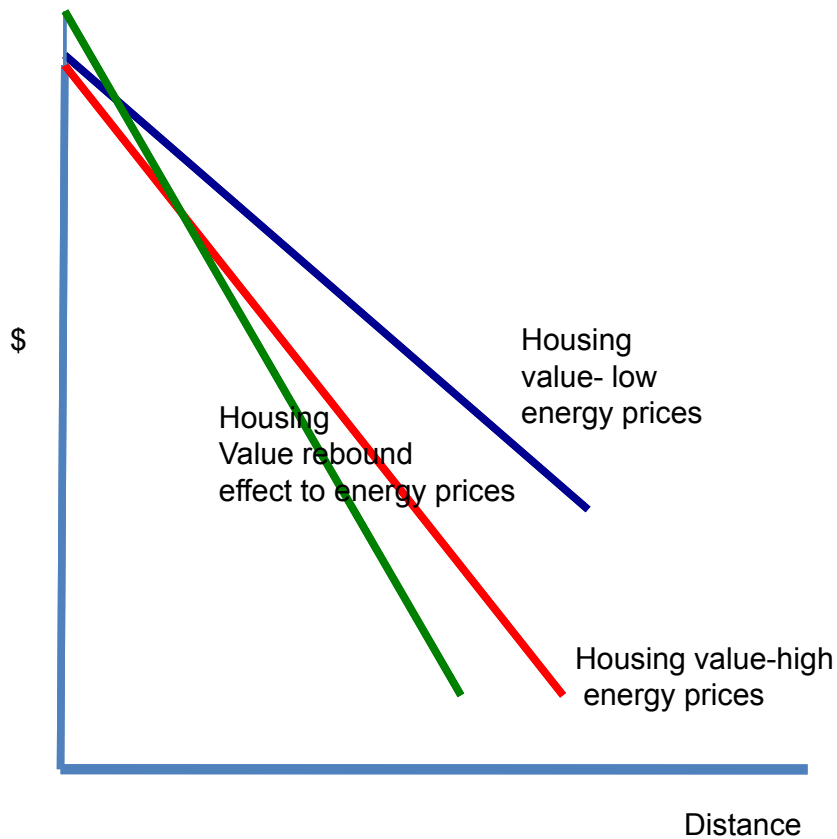


Economics of Housing

- Modern urban economics builds on von Thunen's work- investigating land value within urban zones
- Housing value derived from size and physical amenities, location, environmental amenities
- They also reflect future price expectation and interest rate

Location income and prices

- If we consider houses of the same size and environmental amenities, a house will be more expensive the closer it is to the urban center and richer people will live there.
- Increased energy prices will have a stronger negative effect on house price farther from cities



Other considerations

- When one considers both environmental amenities and distance- higher rent locations and higher income people will live closer to the city and places with high appeal
 - Consider income in Marin, Napa, Solano counties
- Low income people may elect to live in cities at less appealing houses (neighborhood) to save transport cost



<https://www.ppic.org/web/mapplets/MapPI-022>

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Impacts of higher energy prices

- Increase in energy prices will have stronger negative effect on housing farther from the center and less affluent individuals
- Higher energy prices may lead to people to relocate closer to cities
- Higher energy prices or expectation of higher energy prices should change land use patterns-

basic economics of mortgages

- Economics suggests consumers are more likely to take a mortgage as the difference between
 - Benefits from new residence+ price appreciation
 - And
 - Transport cost + Interest payments
 - Is larger
- Similarly consumers are more likely to default as
 - Benefits from new residence+ price appreciation
 - And
 - Transport cost + Interest payments
 - Is becoming more negative

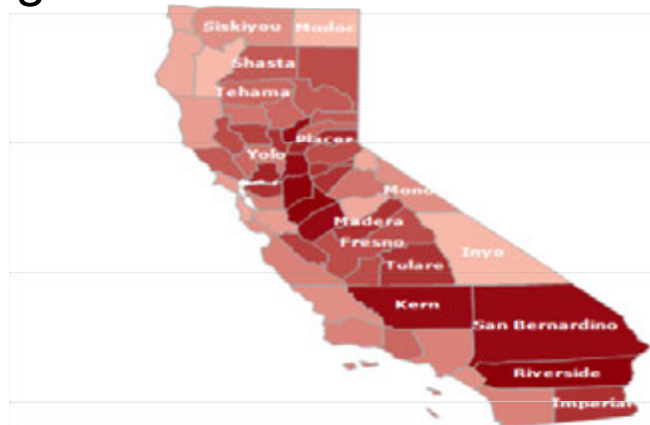
Cash flow and other considerations

- Taking mortgage is more likely if
 - Earning
 - Other debt
 - Expenditure (excluding travel)
 - Travel cost
 - Mortgage
 - Is positive
- A negative cash flow (with positive SF elsewhere)
- House value Under water
- May increase the likelihood of default

Energy prices & the financial crisis

- In the early 2000s many received mortgages with low down payments
- Under existing conditions cash flows were positive (in many cases)
- Higher energy prices
 - Worsened cash flows
 - Reduced home values
 - Especially in locations farther from cities and work where poorer people are more likely to
 - (Add balloon payments etc)
- **Net effect increased default rate**

August 2010 foreclosure rate



The hot spots are in the valley and bad room communities

Source: Realty Trac

California cities among the 50 cities with **negative equity** shares (2009)

- **#1 Las Vegas** Negative equity share **70%**
- #2 Merced 67%
- #3 Stockton 66%
- #4 Modesto 65%
- #5 Vallejo-Fairfield 64%
- #6 Yuba City, 63%
- #8 Riverside-San Bernardino-Ontario 60%
- #9 Bakersfield 56%
- #16 Fresno 56%
- Source first America core logic

Lessons

- Obvious: Higher energy prices causes pain
- More profound: if you do not expect future conditions and provide the wrong signals
 - You end up with the wrong infrastructure
 - You are more vulnerable to (or trigger) severe crisis

In agriculture we study input use efficiency when input use efficiency was not cool

- Case of irrigation
 - Input Price matters-yield increases. Early adopters:
 - farmers in San Diego with deep wells were early adopters of drip
 - Farmers in the west side (of SJ valley)
 - Fruits and veggies
 - Adoption was gradual as cost of the technology decreased and its design improved
 - High adoption rates during crisis periods
 - Even with distortions we produce more with less water

Pesticides application registration

- California introduced a complex set of regulatory requirements for pesticides use – including reporting of application of toxic chemicals
 - They were not accepted enthusiastically by farmers
 - They served as models to other regions
- Over the years several firms have developed software and hardware that reduce the cost of pesticide reporting
 - These technologies are contributors to improved of tracing in the supply chain and labor movement documentation- all supplied by the same companies.
- More research is needed on emergence of “green” industries as a result of regulation and incentives.
 - Incentives and regulations led to:
 - Reduction or increased control of polluting activities
 - Industries survived and prospered
 - the emergence of “green” industries
 - but they were not “shovel ready”
 - took time
 - Not guaranteed

Climate change in perspective

- Even if climate change will occur at 50% we should prepare
- Especially- addressing climate change will address other major problems-
 - fuel cost, security
 - Balancing growth and the environment
- Too much talk – not enough action

Some action

- More flexible environmental regulations
 - Adaptation requires capacity to modify land use
 - De-emphasize preserving the present but building a robust future in an evolving environment (we believe in evolution)
 - Land use and building regulations that balance flexibility with environmental protection
- Pricing carbon -
 - Fuel tax that will allow revenue reform (lower sales tax)
 - Some proceeds may go to allow transitional adjustment
 - Alternatively, a floor on the price of gasoline
 - Pricing other resources (e.g. water) right
- Invest in research and encourage initiatives that will enable California to take advantage of its capacity to innovate.