PBL Netherlands Environmental Assessment Agency

"Houdini"
Housing markets, reforms and system dynamics

Contents
Housing market modeling
Housing market or policy?
Implicit SD models

July 26th 2011, Martijn Eskinasi

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Housing and system dynamics

- Stock and flow nature: housing production pipeline
- Causal loop nature: market or state governing loops
- A messy problem
- Many actors:
  - households, companies, governments, ngo's, banks
- Many different views:
  - Housing: market good or merit good
  - Greenfield or urban transformation
  - Housing quantity or quality, prices, affordability, tenure...
  - Housing and the labor market
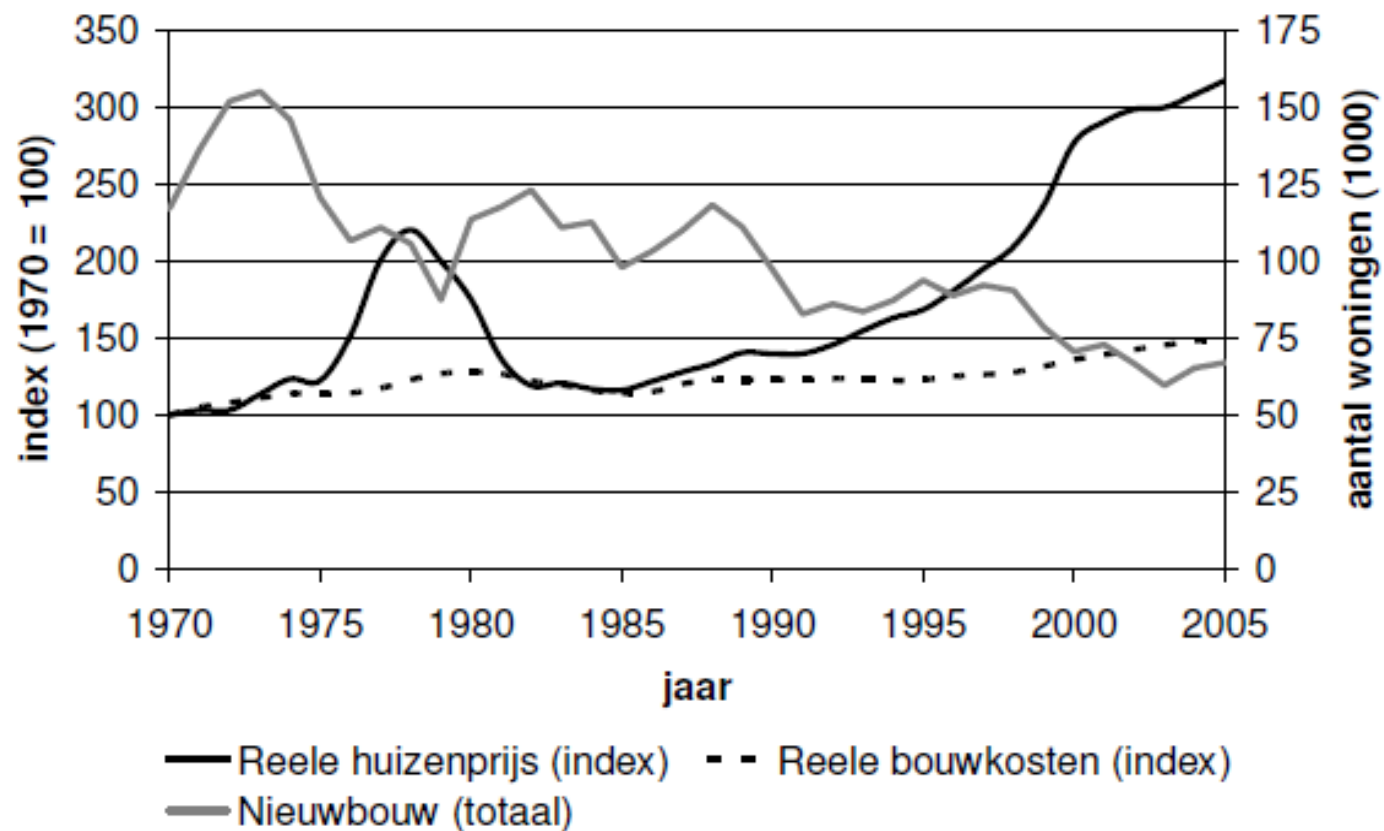 - Housing and urban development / decay

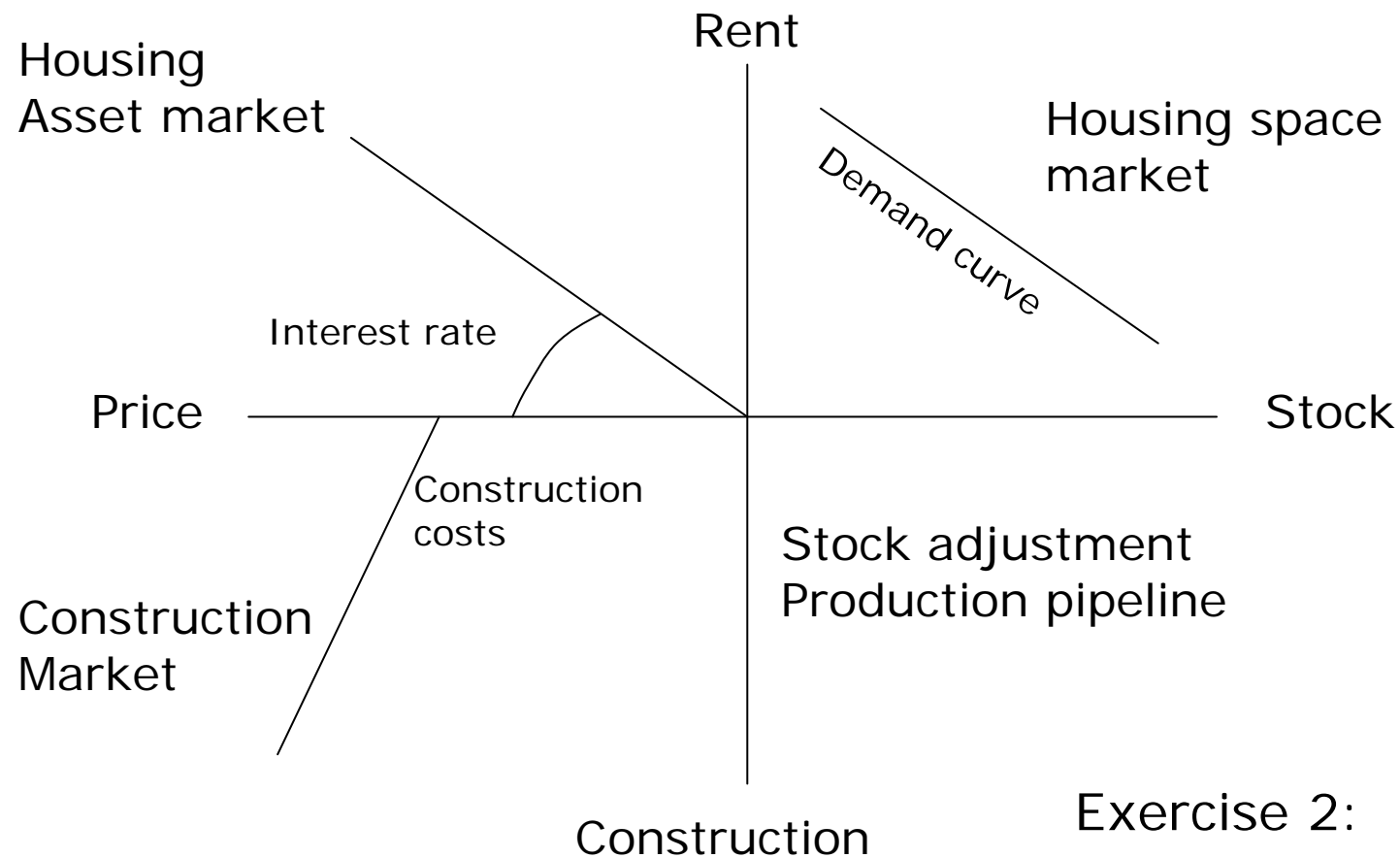# Houdini: housing economics & policy reforms

- Dutch housing: market or merit good?
  - Traditionally merit good approach: government interventions
  - Rent regulation, mortgage tax reduction, land use planning
  - Criticisms: interventions damages welfare!
  - Effects: reference mode of behavior
- Houdini model: effects of policy reforms
  - diPasquale and Wheaton (1996) core model
  - Institutional layer: government interventions
  - Behavioral layer: companies, housing associations, households

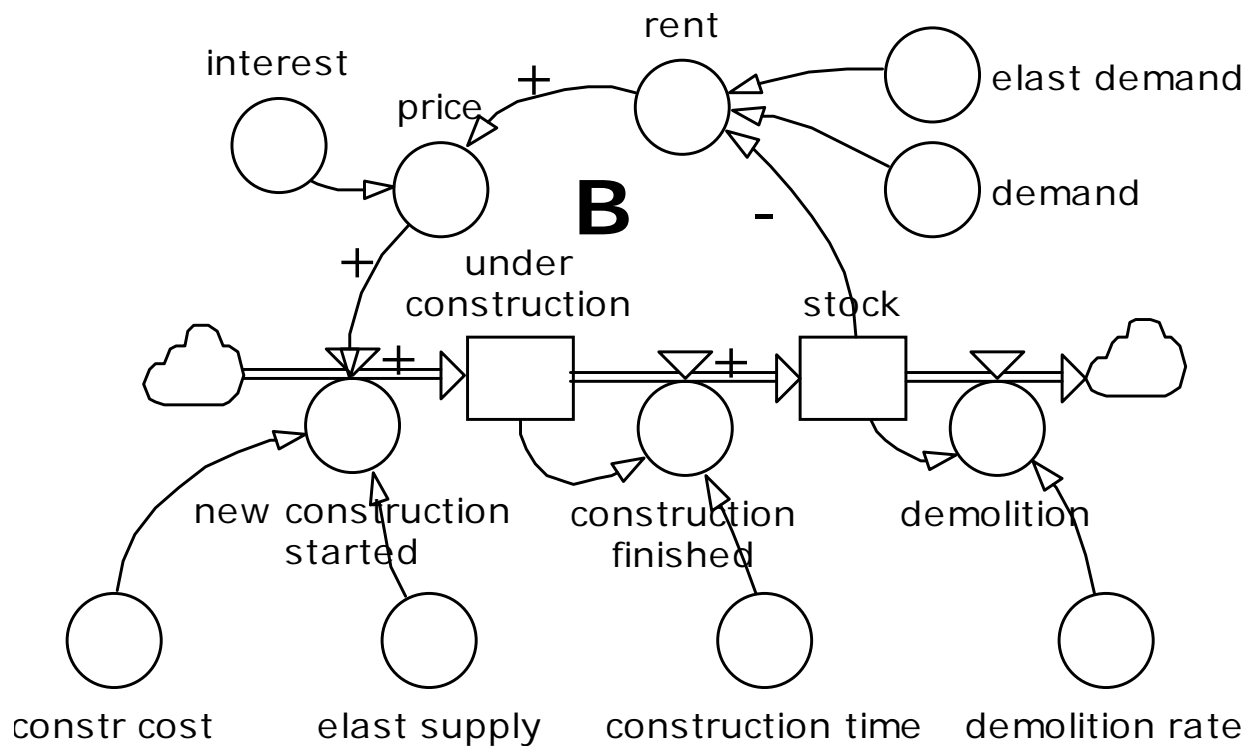# The reference mode of behavior

Figuur 2.1: Huizenprijzen en nieuwbouw

diPasquale & Wheaton core model

Housing
Asset market

Rent

Housing space
market

Demand curve

Interest rate

Price

Stock

Construction
costs

Stock adjustment
Production pipeline

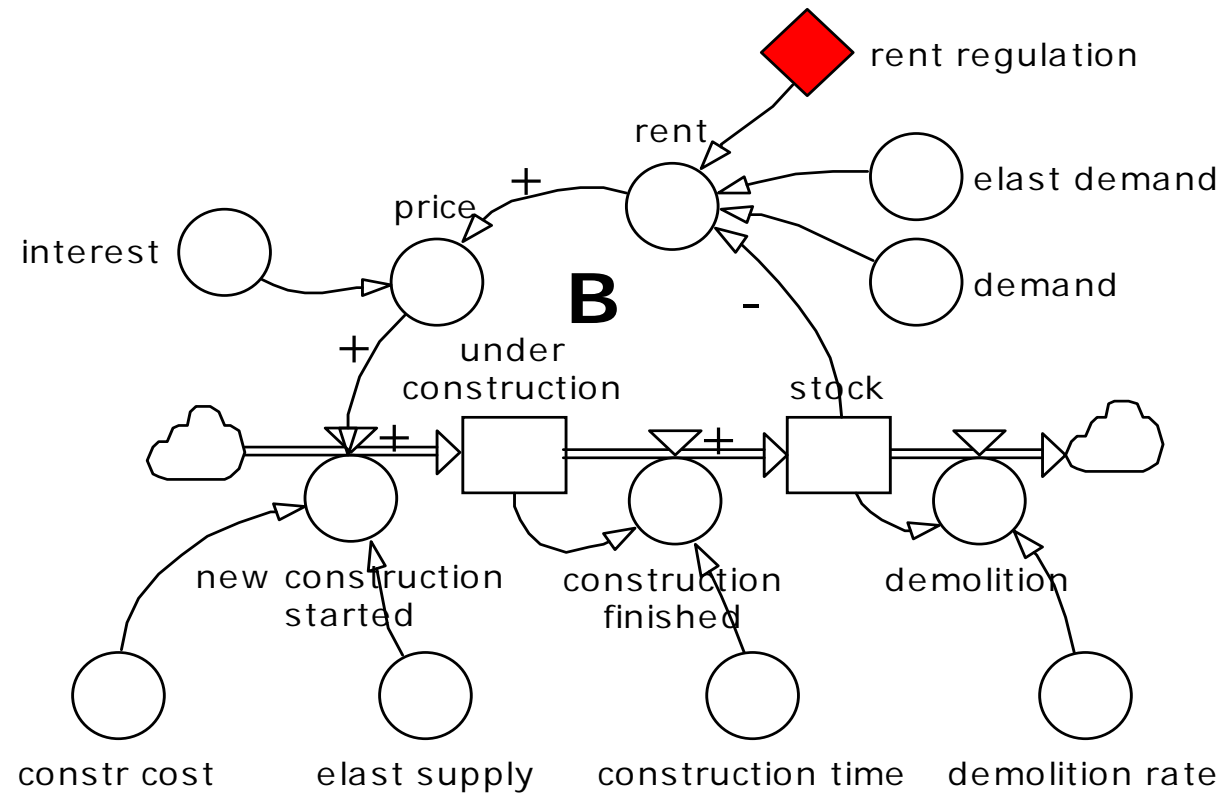Construction
Market

Construction

Exercise 2: model this!

DiPasquale & Wheaton in SD form
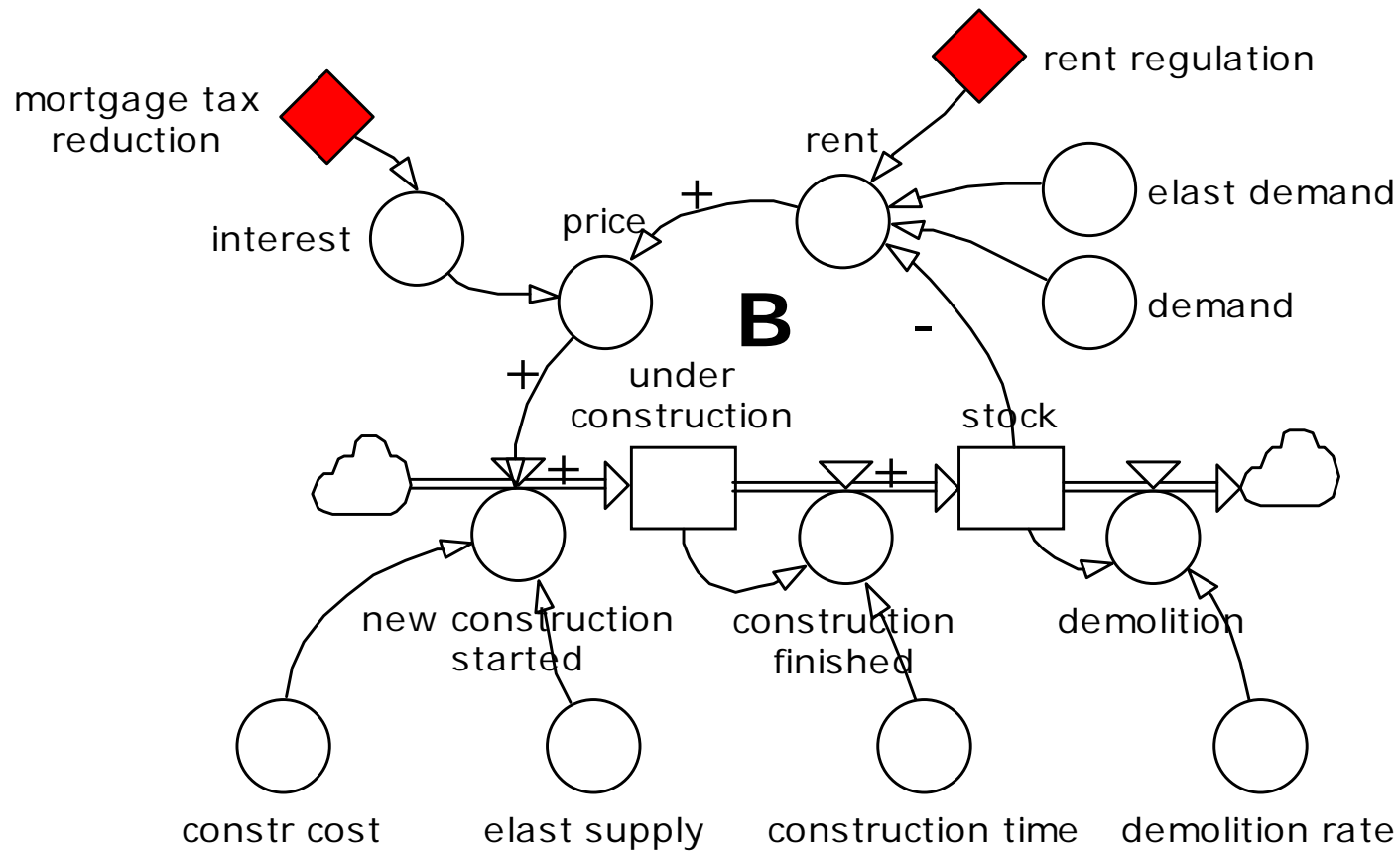
Modeling the Dutch housing market (1)

- Model commonly criticized policy instruments

- Rents regulation
- Mortgage interest tax reduction
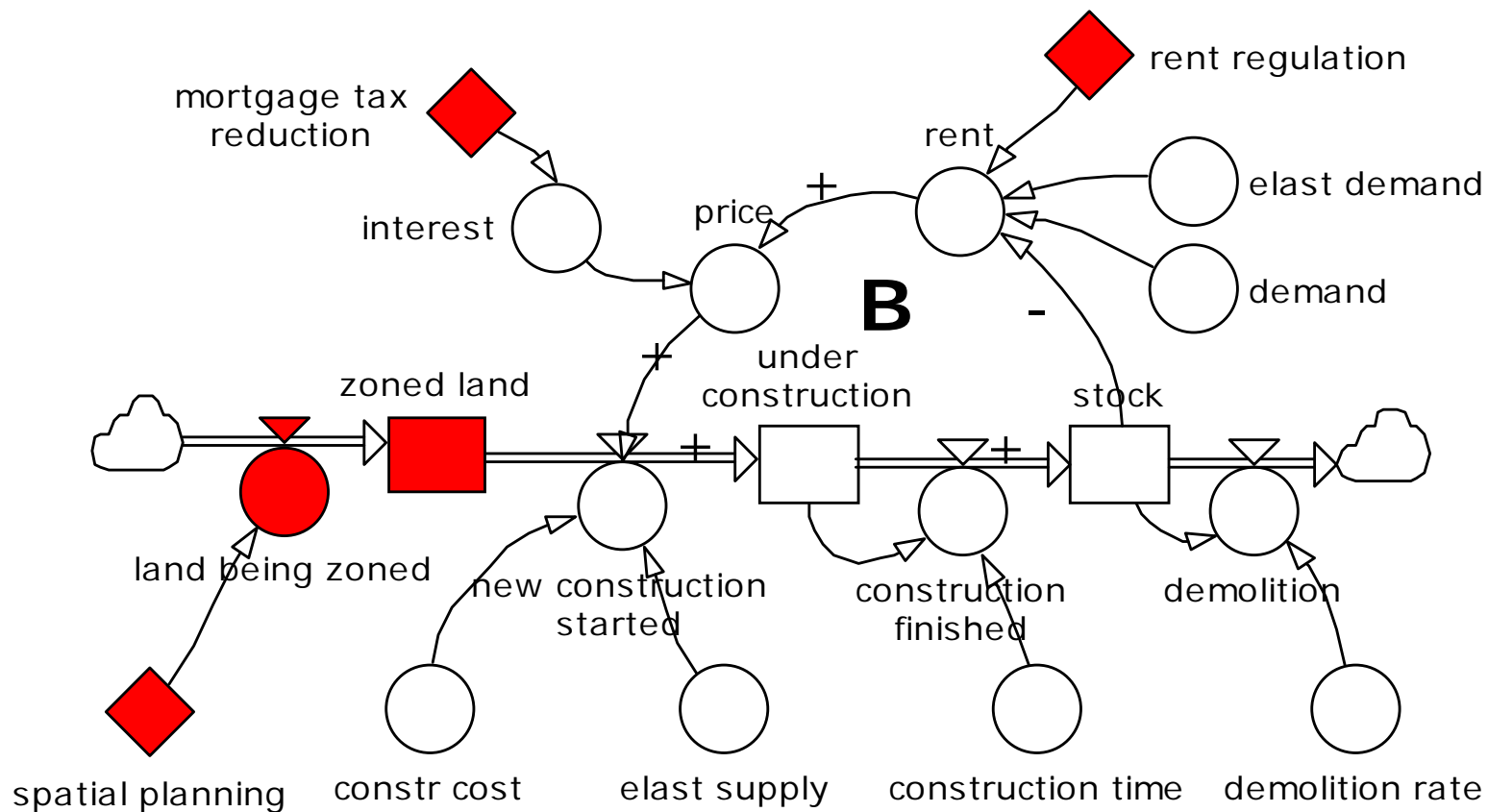- Spatial planning regulates land use

dP&W with rent regulation

# dP&W with mortgage tax reduction

dP&W with spatial planning added

Modeling the Dutch housing market (2)

- Less common but more dynamic culprits..

- Model adaptive price expectations
  - Historic price increases feed back into the discount rate i
- Model residual land pricing
  - Construction costs adapt to house prices.
- Model oligopolic supply market
  - Profitability determines construction starts, not price!
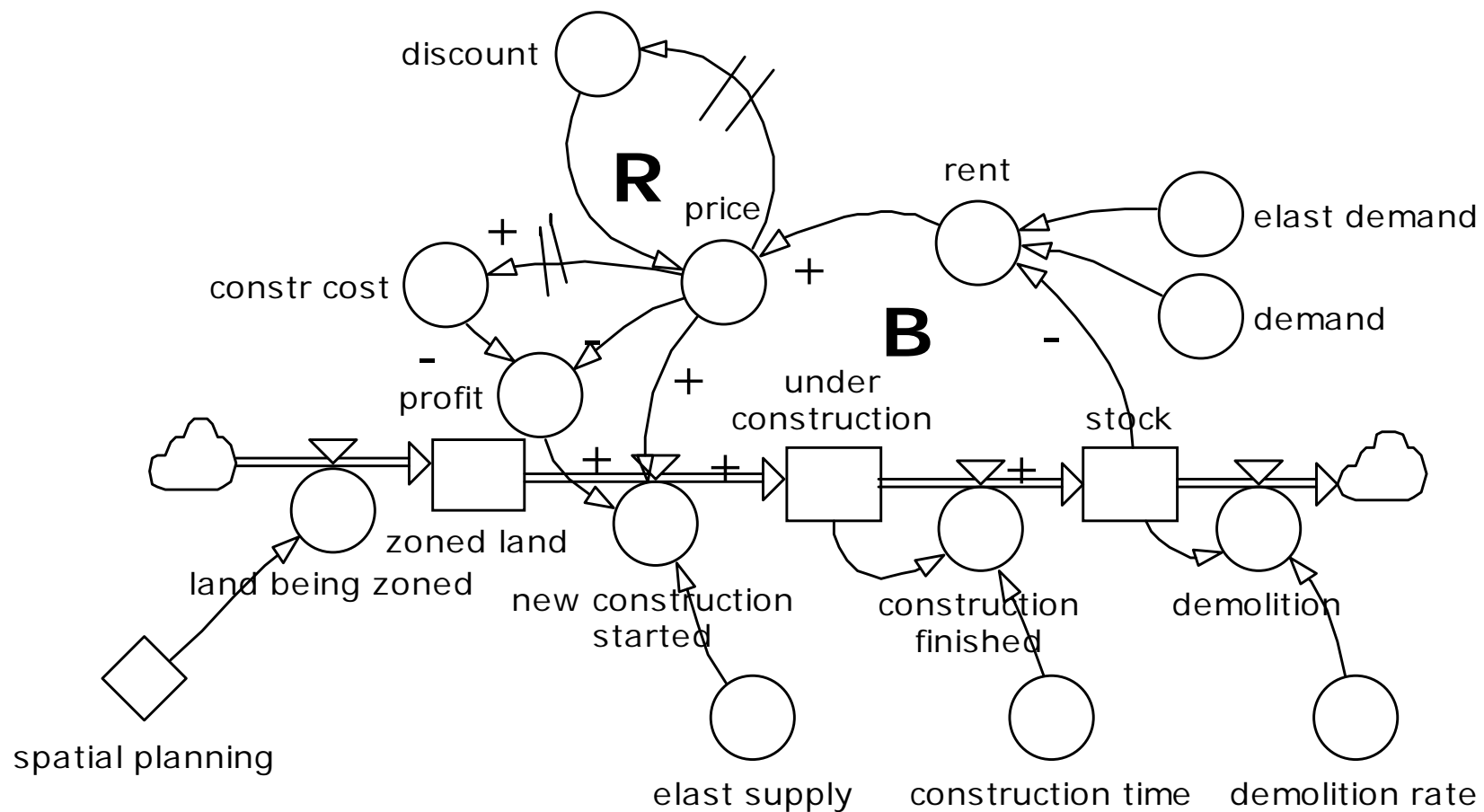 - Developers regulate construction, collusion or not.
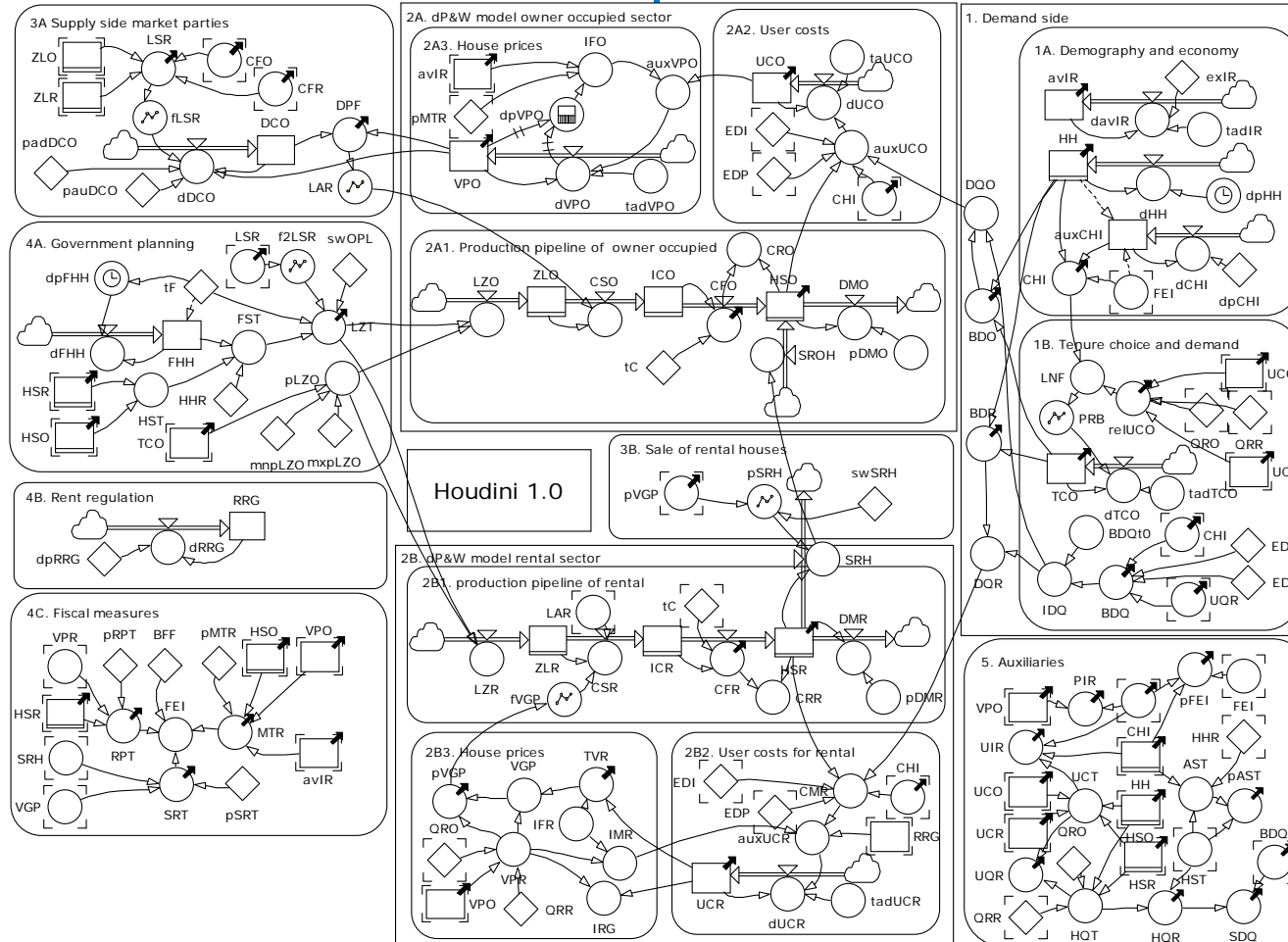
dP&W with adaptive price expectations
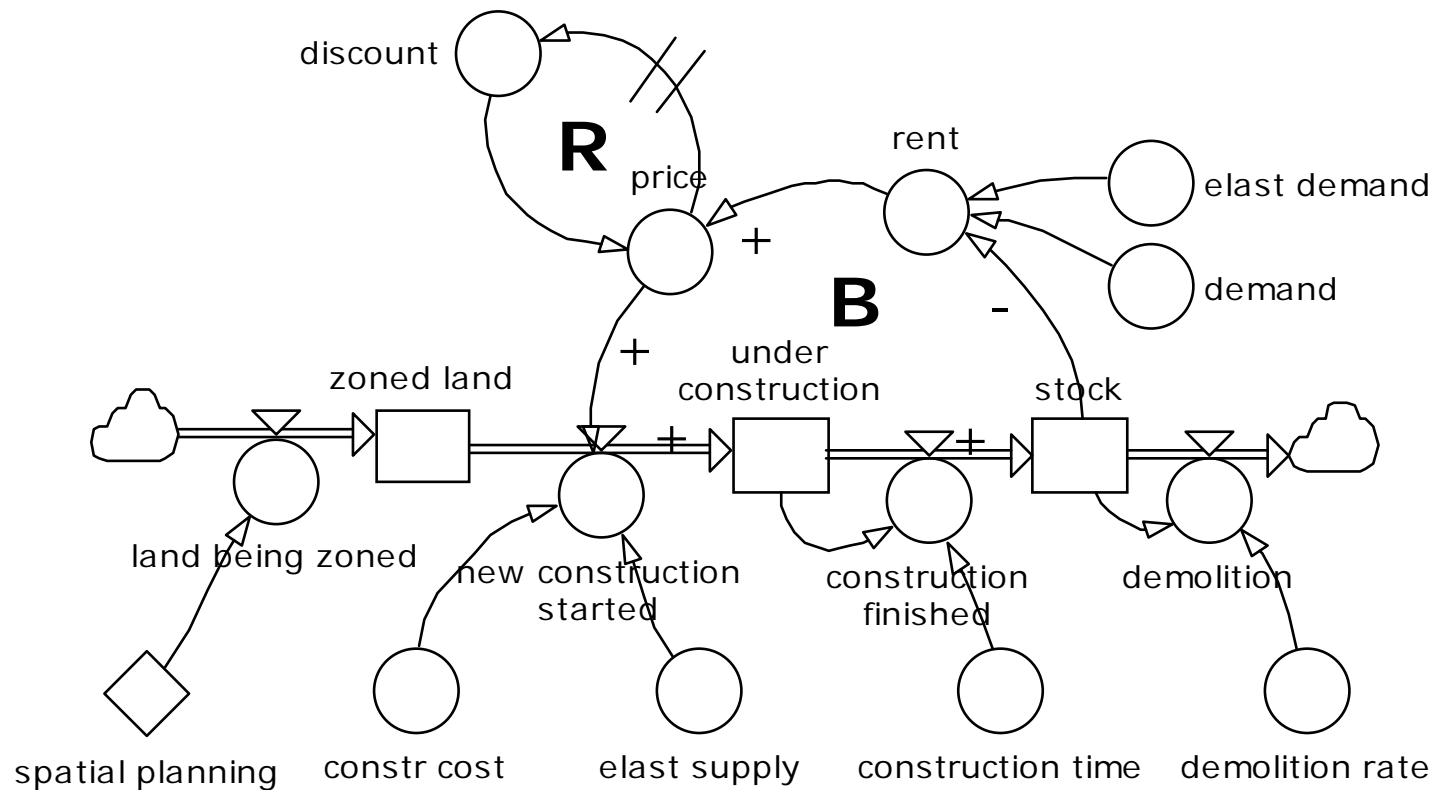
dP&W with residual land pricing
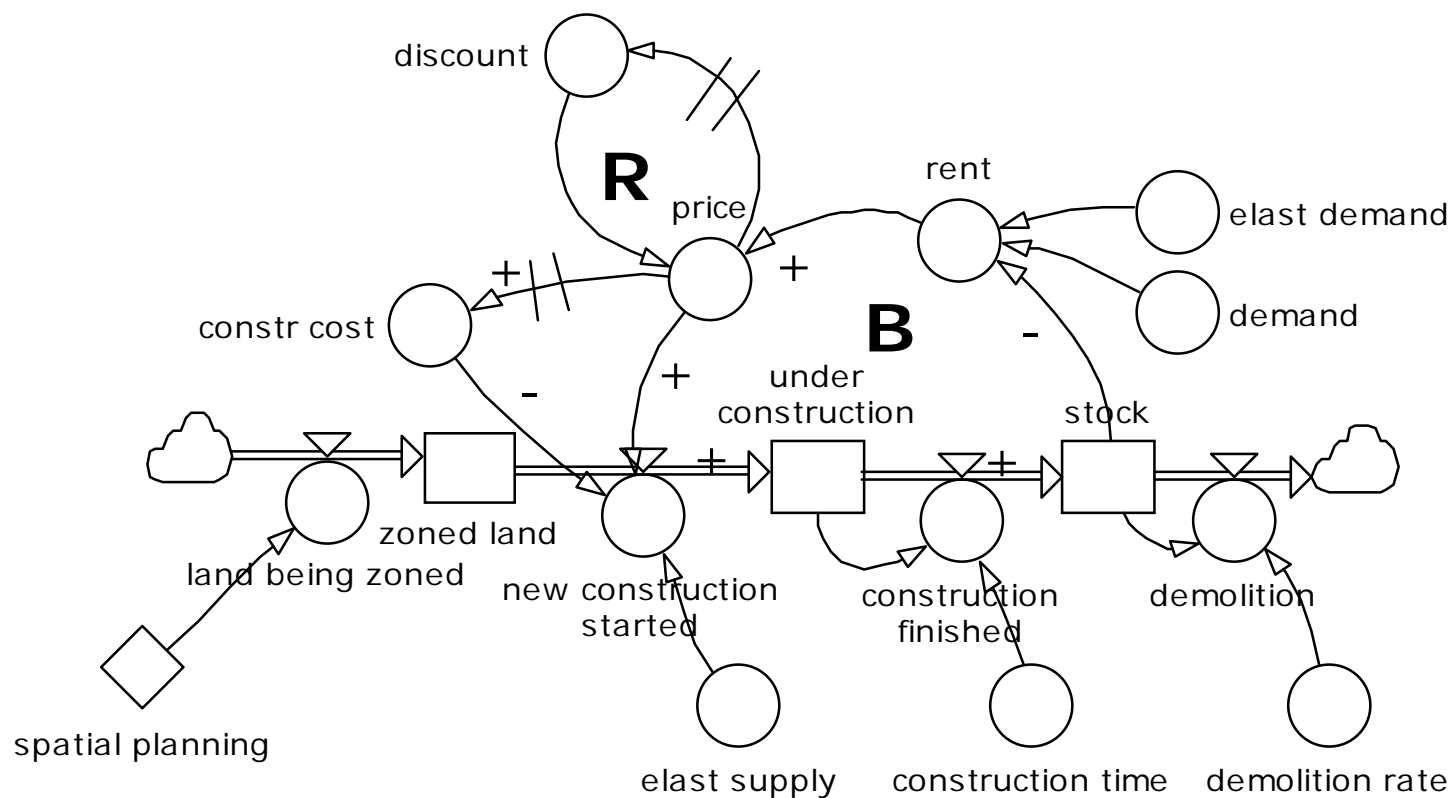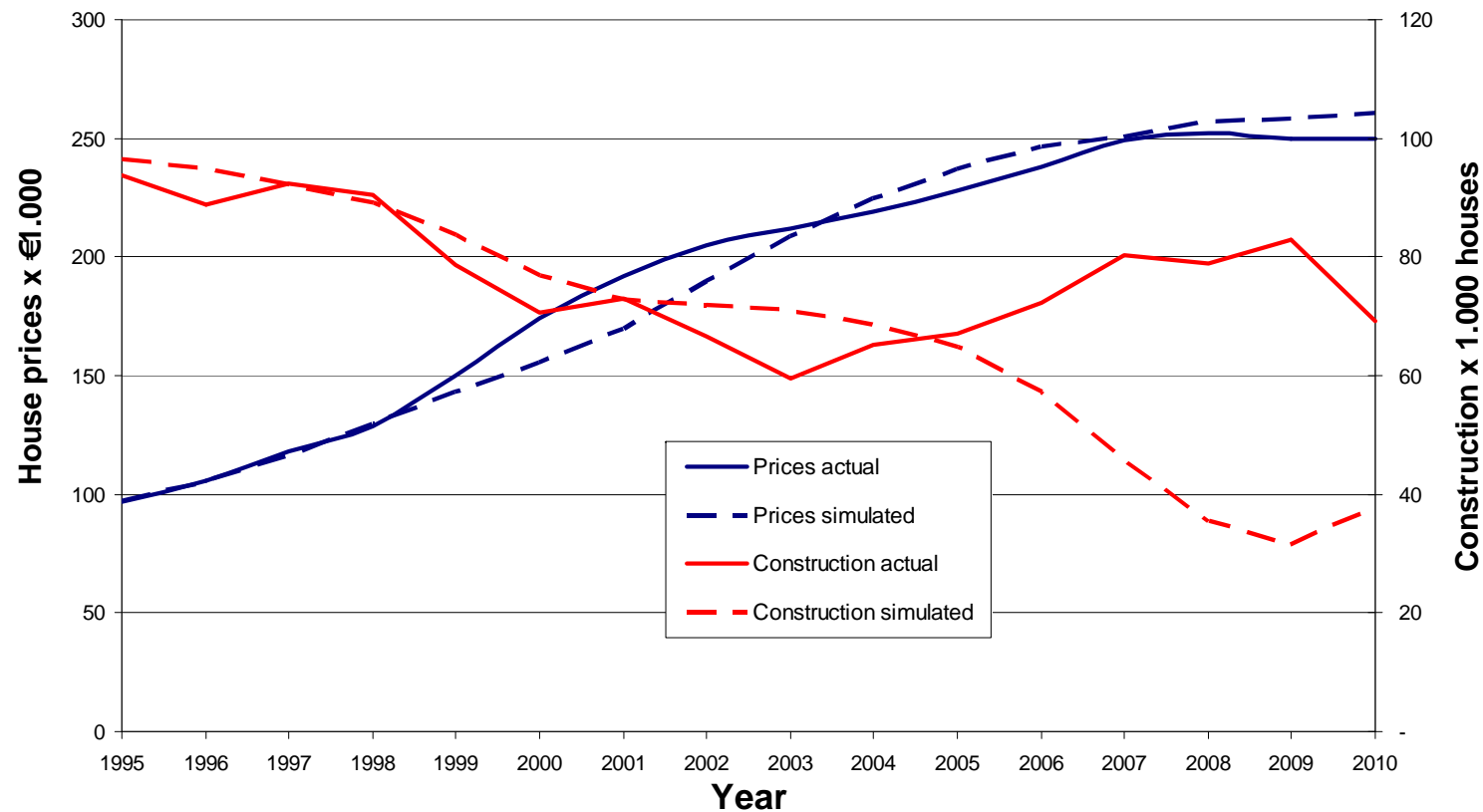
dP&W with residual land prices & oligopoly

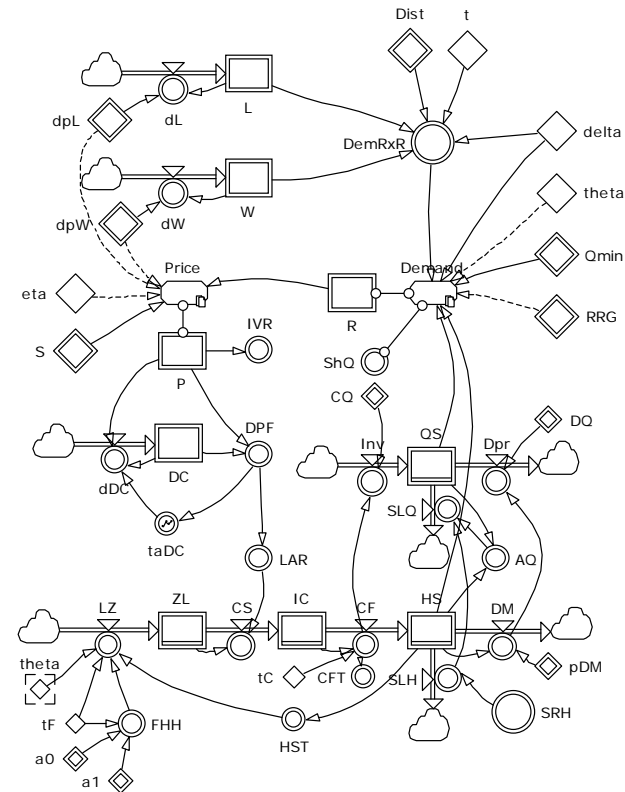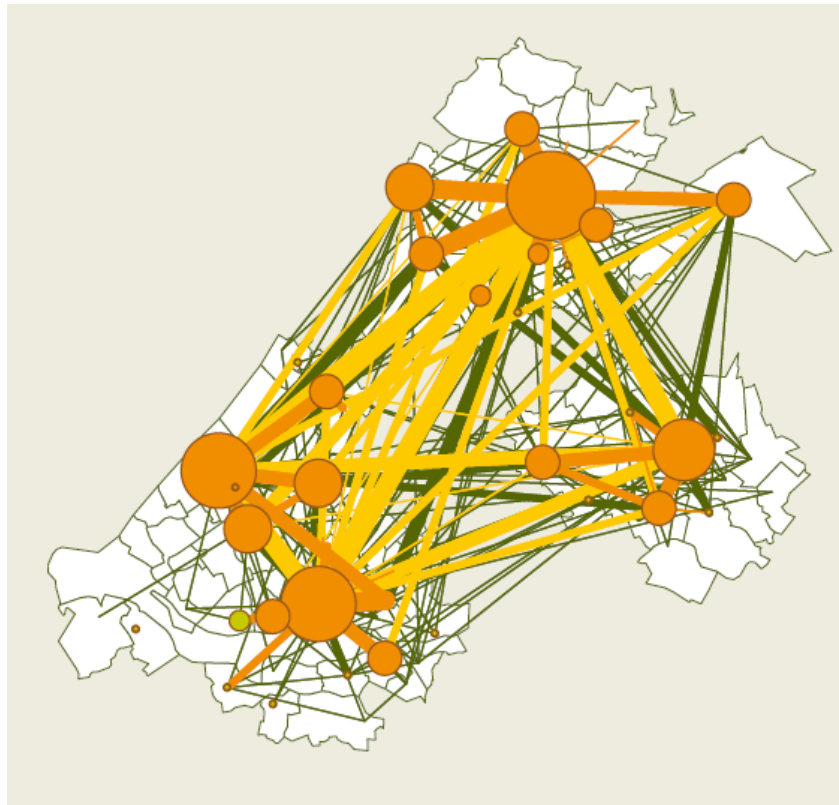# Houdini 1.0 full model print

Does it reproduce problem behavior?

Reference mode of behavior

Move towards Houdini 2.0

- Add spatial feedback between regions

Summary

- Housing is great for sd modeling:
  - Stock, flows and feedback loops
  - Messy problems
- Housing models: production pipeline and governing loops
  - dP&W Core model: Rent, price, interest and elasticity
  - Core model, institutional and behavioral layers
- dP&W core model & modifications
- Thank you!