Filtering in Housing Markets

Economic Geography
Dr. Gordon Winder

Mark Uwe Loew
(Mat.nr.: 2239753)
April 2008
Outline

1. The Concept of Filtering
   1.1 Definition
   1.2 Most controversial and policy-relevant questions

2. Literature Review
   2.1 Introduction
   2.2 Theoretical models

3. The Hong Kong Housing Market
   3.1 Introduction
   3.2 Policy changes on the housing market
   3.3 Model of Ho/Haurin/Wong
   3.4 Data and empirical tests
1. The Concept of Filtering

1.1 Definition

Filtering begins when an exogenous factor (e.g. increase in income, reduction in construction costs) generates construction of new housing.

Individuals moving into the new units leave their former housing vacant. This lowers the demand for the housing that they occupied formerly, reducing its price and permitting individuals with lower income to buy or rent it.

In turn, these individuals vacate housing of even lower quality. At the bottom of the quality distribution, some households move out of the worst housing, which then drops out of the stock.
1. The Concept of Filtering

1.2 Most controversial and policy-relevant questions

- Decline prices for a given quality of housing provided by the existing stock when demand for that quality declines, particularly in the response to new construction?
- Do shocks to one quality segment of the housing market create ripple effects in house prices and transactions throughout the housing quality continuum?
- Is the housing market interconnected?
2. Literature Review

2.1 Introduction

housing dynamic models of neighborhood change, filtering, search, equity effects, urban growth, housing chains and the effects of policy changes

Problems of theoretic models and empirical analysis:

• a lot of differences in methodology and in the detail of conclusion

• but also a fundamental similarity: construction of high-quality housing increases the welfare of low-income households and reduces the price and the quantity of low-quality housing

• models are very complex and there is a lack of data

• individual housing units deteriorate over time and become relatively less desirable as they age
  => given unit is likely to be occupied by successively lower income households over time

• prices of existing units may decline, holding quality constant (= filtering)
  => price of standard quality housing falls when new homes are built and low-income households benefit from subsidies

• controversy if filtering can ever occur in the long run (only in the short run)

• all studies have been purely theoretical (no systematic empirical investigation of filtering up to now)
  => short run models from Sweeney and Ohls
  => long run models from Braid and Schall
2. Literature Review

2.2 Theoretical models

Sweeney (1974):

housing market is separated into different quality levels
households differ in terms of income
the housing market is a continuum linked through prices
housing of one quality level is a substitute for housing of the next quality level
  => if a group’s income rises, its demand for higher quality properties increases too
  => the demand for homes in the next higher quality level rises causing price to rise
the durability of housing is a central part of this model
  => depreciation causes higher quality units to “filter down” to lower income households until eventually demolition becomes more economical than maintenance
after a shock, equilibrium is reestablished when supply equals demand at each quality level
  => households have no incentive to move to some other quality of housing
low-income households benefit from public housing
the number of households occupying the lowest quality of housing declines
  => but: lowest-income households are harmed by moderate-income subsidies, paying higher rents and living in lower-quality housing then they would otherwise

CRITIQUE: - spatial location is not included
  - search and matching processes of buyers and sellers are not modeled

Arnott (1999):
incorporates space into a general equilibrium model of an urban area with durable capital and endogenous maintenance
Conclusion: the price of a housing unit at a particular location is time invariant (except when quality changes)
Stein (1995):
• explains the large price swings observed in some housing markets and the positive correlation of transactions volume with house price changes
• if house prices are rising, current owners’ home equity rises, increasing their wealth
  => this allows them to make a larger downpayment on another more expensive home
  => increasing house prices facilitate trading-up and should increase transaction volume
• if house prices are falling, a household’s equity falls and this household’s ability to purchase another house is greatly reduced
  => transaction volume should fall at the same time that house prices are falling

Prediction: - positive correlation of the trading volume of residential properties with changes in house prices
  - time-on-market for houses is negatively correlated with house price changes
  - house prices react more sensitive to shocks the greater the percentage of constrained homeowners in the area

Rosenthal (1997):
• housing chain model
• existing homeowner who wishes to move into a unit cannot complete the transaction until the household’s current home is sold
• potential first-time homeowners enter the market each period, searching for a dwelling
• space is introduced
  => homeowners search for housing only in their own and nearby submarkets (housing chain)

Conclusion:
• existing owner-occupiers’ duration of market time is longer than the search time of first-time buyers of
  the time-on-market of the houses owned by sellers who exit the housing market
• potential sellers reduce their reservation price if a transaction is not completed
• first-time buyers increase their offer price if they must wait for a transaction to be completed
Meen (1999):
• ripple effects are caused by: migration, equity transfer, spatial arbitrage, spatial differences
• migration:
  could cause house price ripples if households relocate in response to changes in the spatial distribution in house prices (house prices need not equalize among regions because there are long lasting differences in regional or metropolitan area fixed endowments or scale economies => but: an exogenous shock to a region may disrupt local house price levels causing migration that spreads the impact of the shock throughout a region or country)
• equity transfer:
  - changes in house prices change homeowners’ equity (increase in equity relaxes downpayment constraints, permitting additional mobility)
  - in contrast, falling nominal house prices reduce equity and constrain mobility
• spatial arbitrage:
  search costs or the diffusion of information and news throughout a region can also affect house prices
• spatial differences:
  all regions react to shocks with different speeds (house prices change first in the fastest reacting region)

Hort (2000):
• changes in the turnover rate in housing are linked with changes in housing prices
  => reason: - sellers establish list prices based on their expectations of sales prices
    - buyers’ offers are influenced by recent prices but also are subject to demand shocks
• the distribution of buyers’ offers moves before that of sellers’ reservation prices
  => the result is a rapid change in the turnover rate as the market quickly clears in up-markets and houses remain unsold in down-markets
• in the end sellers become aware of the change in the expected marketing time for a home and adjust their list prices
  => positive correlation between the turnover rate and the house price changes
3. The Hong Kong Housing Market

3.1 Introduction

• population of 6.7 million in 2000 (7.3 million in 2007)
• 70% of all housing units belong to public rental housing
• significant incentive for households to remain in the public rental sector
  => reason: individuals could remain in the housing unit regardless of changes in
  their financial conditions
  => households remain in the public rental sector even though they had the
  resources to become homeowners
• homeownership in Hong Kong is tax-advantaged because homeowners do not pay
  a capital gains tax on their home’s appreciation in value
• properties that are vacant and sold beyond 2 years may still be subject to profits
  tax if the owner cannot give a satisfactory reason why it is not rented or occupied
3. The Hong Kong Housing Market

3.2 Policy changes on the housing market

- April 1987: tenants who had been living for over 10 years in the public housing and who had income exceeding twice that of the Waiting List Income Limit (WLIL), had to pay double rent => that decreased the incentives for households to remain in public rental housing (this encouraged households to buy residential properties and to become home owners)

- April 1996: tenants mentioned above had to pay now the market rent

- December 1997: Tenants Purchase Scheme (TPS) is introduced
  => tenants of public housing can acquire their own public flats at up to an 88% discount from the estimated market price within a certain period

↓↓↓

this policy reversed the previous incentive of tenants in public rental housing to leave their houses and move into the ownership market

---

Figure 1: Property Transaction Volume in Hong Kong (1984Q1 – 2001Q4)

Notes:
1) Property transaction volume is measured by the “Agreement for sale and purchase of a building unit”.
2) Source: Monthly Digest of Statistics, various issues, Hong Kong Census and Statistics Department.
3. The Hong Kong Housing Market

3.3 Model of Ho/Haurin/Wong

• hierarchy of housing ranging in quality from low to high

• if a household’s wealth is not sufficient to pay the desired quality, it cannot purchase at that level of quality and must select a lower unit in the quality distribution

• all households have the sufficient income to purchase a higher quality unit, but they lack the needed wealth

• there is a continual movement of first-time homeowners into the ownership market

• short run price depends by equating supply and demand at each level

• short run equilibrium is characterized by a constant price at each quality level
3. The Hong Kong Housing Market

3.3 Data and empirical tests

house price data from the period 1987-2000
4 different classes of housing (measured according to the size of the housing unit)
5 different house price categories
Tests: - standard Granger test
     - Augmented Dickey Fuller test
     - F-Test

RESULTS:

• prices changes in low quality properties lead those of higher quality properties (no reverse causality)

• changes in the transaction volume of Home Ownership Scheme Housing caused changes in transaction volume in ALL higher valued housing
  => there is no evidence of reverse causality from higher to lower quality levels

• booms in the submarket for low quality housing are passed on with a lag to the next highest quality housing and subsequently from this level to higher valued levels

• the TPS (Tenants Purchase Scheme) had a significant and large negative effect on the volume of residential property transactions
References:

- Fisch, O., (April 1977), „Dynamics of the Housing Market“, Journal of Economics 1977/Nr. 4
- No author found, (no year found), „Modeling the Housing Market: Demand Allocation, Filtering, Supply and Market-Clearing Submodels“, no release found