

SA422: HOUSING ECONOMICS AND FINANCE 2008/2009
Handout 2: Housing Demand, Supply and Price

Objective

1. The objective of this note is to provide a framework for understanding what determines the demand for housing; how we measure the responsiveness of demand; and how market demand and housing need relate to one another. It then clarifies the nature of supply and house price determination in the short run.

Determinants of Demand for Housing

2. The demand for housing (D_H), like other goods, depends upon:
 - income (Y),
 - the price of housing relative to the price of other goods ($P_H/P_{\text{other goods}}$),
 - tastes (T), and
 - the numbers of households in the market (N).
3. Changes in these variables shift the demand curve – either increasing the quantity demanded at every price or decreasing it (figure 1). As a result of the shift equilibrium price changes – depending on the slope of the supply curve (figure 2).

Measuring Responsiveness: Price Elasticity of Demand

4. Elasticity measures the responsiveness of one variable to another. It is measured in relative terms – e.g. if x changes by 1% does y change by more than 1% (>1); less than 1% (<1); or by exactly the same proportion (1).
5. The price elasticity of demand measures the responsiveness of the quantity demanded with respect to a change in the price of the good - i.e. measures slope of demand curve.

Because the demand curve slopes down the relationship is negative.

$$\eta_D = \frac{\% \text{ change } (\Delta) \text{ in } Q_D}{\% \text{ change } (\Delta) \text{ in } P}$$

$\eta_D > |1|$ | elastic; $\eta_D < |1|$ | inelastic; $\eta_D = |1|$ | unit elasticity

6. Normally elasticity varies with price (figure 3(i)). At the extremes it is a straight line – vertical for zero responsiveness (figure 3(ii)) and horizontal for infinite responsiveness (figure 3(iii)). Special case of straight line demand curve (figure 3(iv)).

Income

7. Most goods are 'normal' goods – i.e. if income (Y) increases the demand for the good increases. Many are "superior" goods – i.e. if income increases by 1% demand increases by more than 1%. Some are inferior – as income increases, demand declines.
8. Measure of responsiveness - income elasticity of demand η_Y . It is defined as

$$\eta_Y = \frac{\% \text{ change } (\Delta) \text{ in } Q_D}{\% \text{ change } (\Delta) \text{ in } Y}$$

If $\eta_Y > 1$, spend increasing % of income on housing as income rises.

9. Because the decision to consume housing is irregular, the decision-maker usually takes account of 'permanent' rather than current income, especially in the case of owner-occupation.
10. Problems in measuring η_Y for housing include:
 - i) slow adjustment;
 - ii) rationing, and imperfect finance markets so that people cannot adjust quantity demanded fully to expected long-term income;
 - iii) different dwelling attributes have different income elasticities.
11. Most important distinction is between tenants and owner-occupiers. Tenants buy consumption attributes; owner-occupiers buy these but also buying assets, control etc.
12. Evidence that in the UK $\eta_Y < 1$, perhaps 0.6 for tenants, 0.7+ for owner-occupiers. Fully adjusted, unrationed measure nearer 1?
13. Some basic attributes such as structure, number of rooms and basic amenities, have relatively low income elasticities. Additional attributes (more luxurious?) such as external space, central heating appear to have higher income elasticities. Implications for future demand over lifetime of dwellings: difficulties of adjusting existing dwelling to meet future demands.

The Price of Housing and Other Goods

14. Measuring the impact of relative prices is complex both in terms of the nature of housing price and what is the relevant relativity, i.e. the relevant opportunity foregone. Most important distinction here whether demand from tenant, in which case compare with other consumption goods; landlord in which case other assets; or owner-occupier who compares with both consumption goods and asset values. When comparing with assets, in particular, problem of capital market imperfections. Companies and individuals have very different opportunities as do those with wealth and those without. Also, difference in interest rates between borrowers and lenders.
15. Price elasticity measures usually suggest that the quantity demanded is relatively inelastic with respect to its own current price i.e. $\eta_D < |1|$. Thus if prices or rents increase

total expenditure on housing increases leaving less for the necessities of life.

16. Problems in measurement include:
 - slow adjustment
 - information/uncertainty
 - rationing
 - relationship to finance market.
17. The price of a dwelling can be broken down into implicit prices for the attributes which make up the dwelling (known as hedonic prices). Individuals will maximise utility by ensuring

$$\frac{\mu_1}{p_1} = \frac{\mu_2}{p_2} = \dots = \frac{\mu_n}{p_n} \quad \text{for all } n \text{ attributes}$$

The marginal house price is then, in equilibrium, equal to the sum of the implicit prices of the attributes multiplied by the quantities of these attributes included in the dwelling. (These prices can then in principle be compared to the marginal cost of producing these attributes such that in equilibrium $p_1 = mc_1$; $p_2 = mc_2$... $p_n = mc_n$). There are many problems with this approach such as supply gaps, information non-linearity, interdependence etc.

18. Evidence suggests price elasticities vary across attributes: “necessities” (rooms, basic structure); “luxuries” (garden, environment?). Capacity to adjust also varies - when easy replicability reasonably easy to expand in response to price but some attributes unique?
19. The cross elasticity of demand measures the impact on one good of the change in the price of another

$$\eta_c = \frac{\% \text{ change } (\Delta) \text{ in } Q_x}{\% \text{ change } (\Delta) \text{ in } P_y}$$

When η_c positive the goods are substitutes for one another; if η_c negative they are complements. When the price of another good changes the demand curve for x shifts (figure 4).

20. The most important relationships in housing are between close substitutes e.g. owning v. renting, but also between housing and all other expenditures because housing is a least proportion of total expenditure in terms of complements the demand for some attributes are positively related to one another.
21. Tastes/Preferences - different household types demand different dwelling types, locations, levels of security of tenure, involvement, management, control, extent of savings, asset ownership. For example: compare young single people with elderly.
22. Extent to which these differences linked with tenure choice - different tenures provide different attributes and lifestyles. Essential jointness of ownership with consumption in owner-occupation. Benefits, costs and responsibilities differ.

Population/Number of Households

23. Again the relationships are not straightforward.

Affected by:

- i) demographic attributes;
- ii) social factors - age of independence, role of family, separation/divorce, cohabitation etc.;
- iii) economic aspects - income, wealth, relative prices etc. General pressure towards housing fission;
- iv) housing market attributes; price and availability of housing;
- v) policy aspects - which link with all other elements: social security, provision of housing, allocation rules, pricing etc.

24. Generally, very high proportion wish to live separately among married; lower levels but still very high among cohabittees, widowed, divorced etc., lower for single people. Continuing trend towards smaller households and increasing number of households from given population.

Housing Need

25. Need is a social concept defining what society regards as adequate housing for the population. This estimate may or may not be associated with the availability of resources. Often related to aspirations rather than feasibility.

26. Demand is what individuals are prepared to demand given income and relative prices etc. If need is to be a relevant concept it perhaps needs to be defined as social demand - i.e. what society is prepared to pay for given other priorities (figure 5).

Supply of housing in the short run

27. Supply is usually measured either in numbers or value terms. In any period (t) the total supply in time t (S_t), defined in numbers terms, is made up of:

$S_t = S_{t-1} - Do_t = Co_t + C_t$ where Do = demolitions; Co = conversions; and C = completions.

28. In value terms the supply is the capital stock of housing (K_t) and is defined as:

$$K_t = K_{t-1} - Dp_t + I_t$$

where Dp = depreciation and I = investment (I includes investment in both the new and existing stock).

29. The supply of housing depends upon the costs of production and putting the dwellings on the market as compared to the price the supplier can obtain. As the price goes up it becomes worthwhile to increase supply (figure 6).

30. The vast majority of supply at any given time is already built. It cannot be varied easily. New building is usually only a small proportion of total supply. Similarly annual

investment rates are a tiny part of the overall capital stock – although investment in the existing stock and in change of use is growing.

31. As a result the supply of housing in the short run (defined as

$$\eta_s = \frac{\% \text{ change } (\Delta) \text{ in } Q_s}{\% \text{ change } (\Delta) \text{ in price}}$$

is extremely inelastic with respect to price. The extent of elasticity depends on flexibility of the stock and construction industry.

House Price Determination in the short run

32. Equilibrium price is determined where demand equals supply. If demand changes (i.e. the demand curve shifts as in figure 7 where demand increases) the impact is almost entirely on price. As incomes, interest rates and demographic factors change prices will also change – often by large amounts because of the relative inelasticity of demand. As these factors can themselves vary quite quickly the result is that the market price can be very volatile. Equally changes in government policy can have very large impacts.
33. The effects of expectations. Expectations of changes in fundamental variables, including policy change, impact heavily on house prices. If in addition demand depends upon the observed change in price, or especially the rate of change in price, the effect can be to generate ‘overshooting’ or a bubble. This process will ultimately be reversed – usually by a sudden change in expectations with respect to more fundamental variables (figure 8).
34. There tends to be asymmetry in response, in that upward changes lead to further changes in price and rapid increases in the numbers of transactions. Downward changes usually result mainly in reductions in transactions - but this makes it difficult for those who are in debt problems to sell themselves out of trouble. Problems of negative equity and possessions also grow.

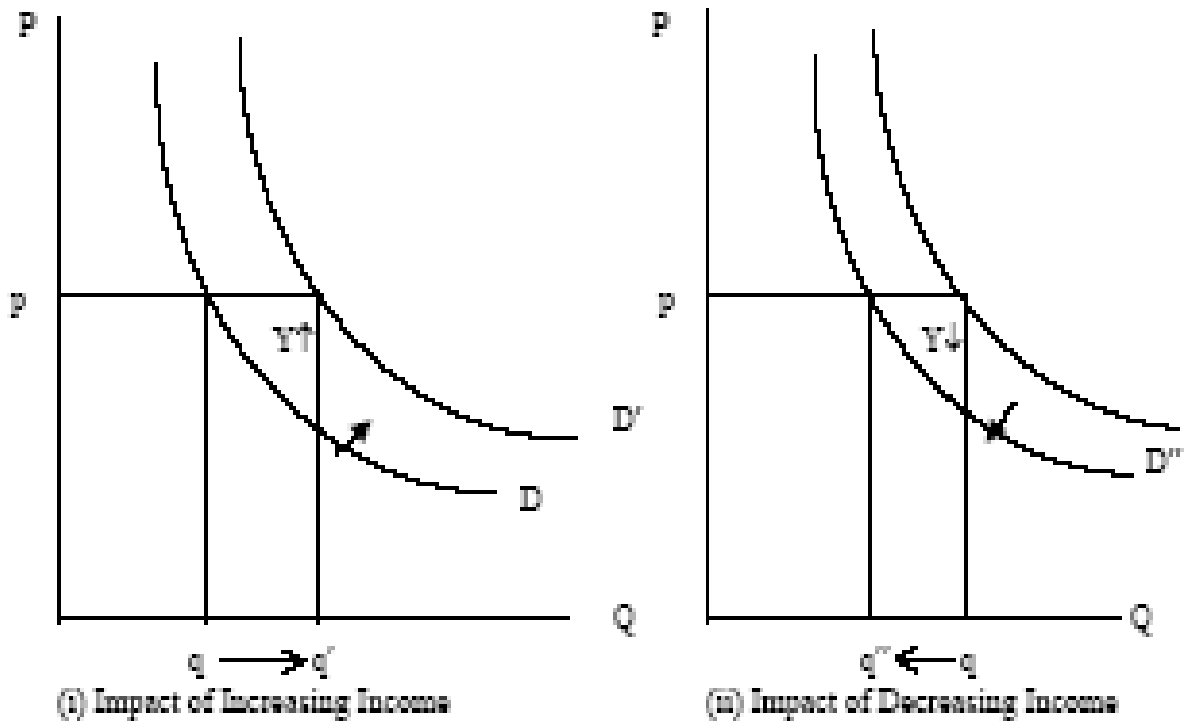


Figure 1: Example of Shifting Demand Curves

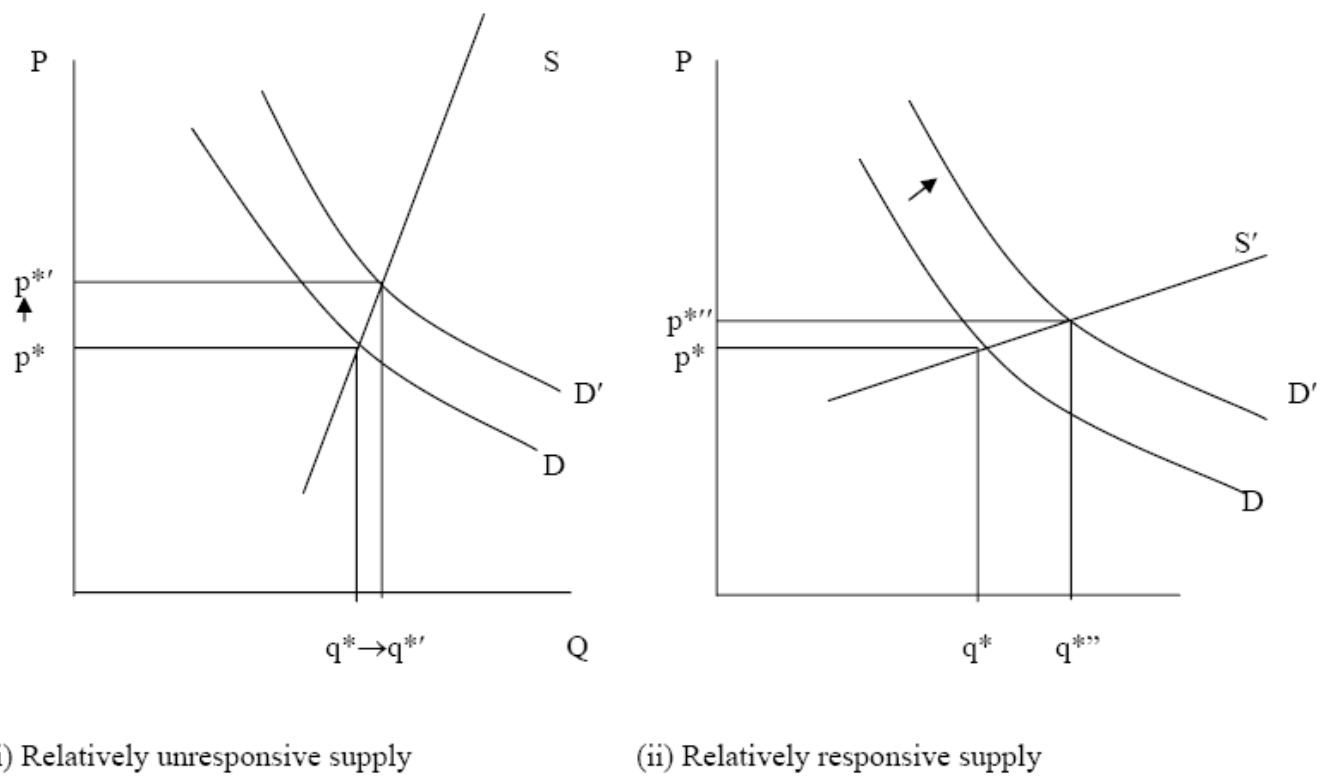
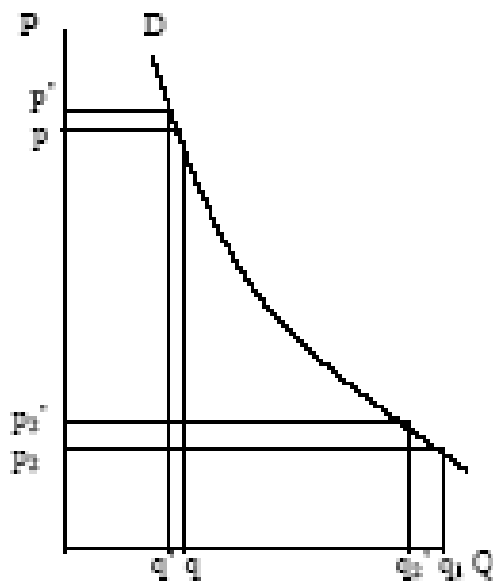
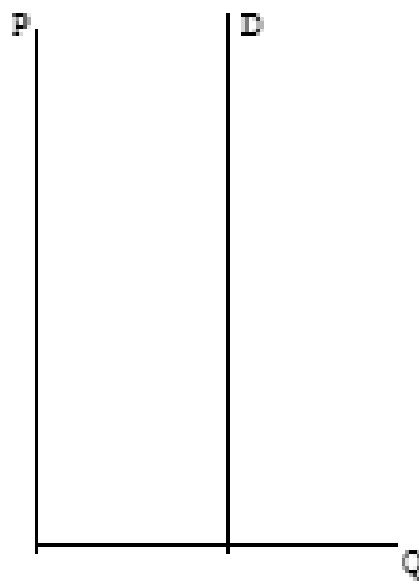


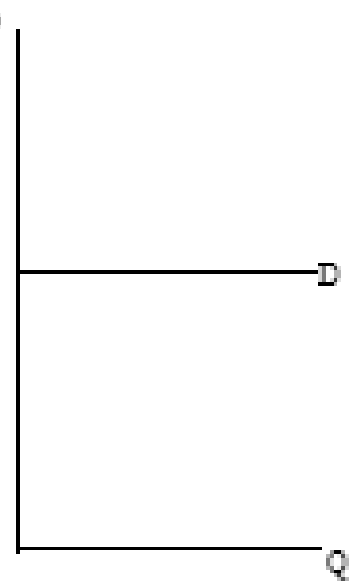
Figure 2: Impact of shifts in Demand Curve on Equilibrium Price



(i) Demand schedule: elasticity varying with price



(ii) Demand completely inelastic (zero elasticity) (0)



(iii) Demand completely (infinitely) elastic (∞)

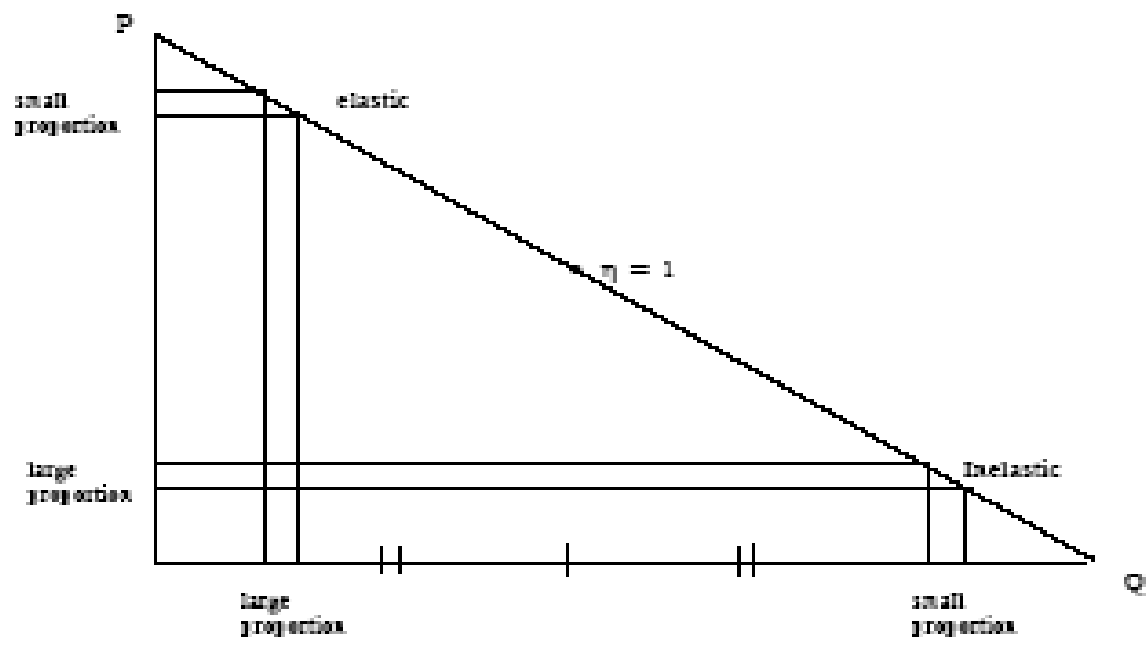
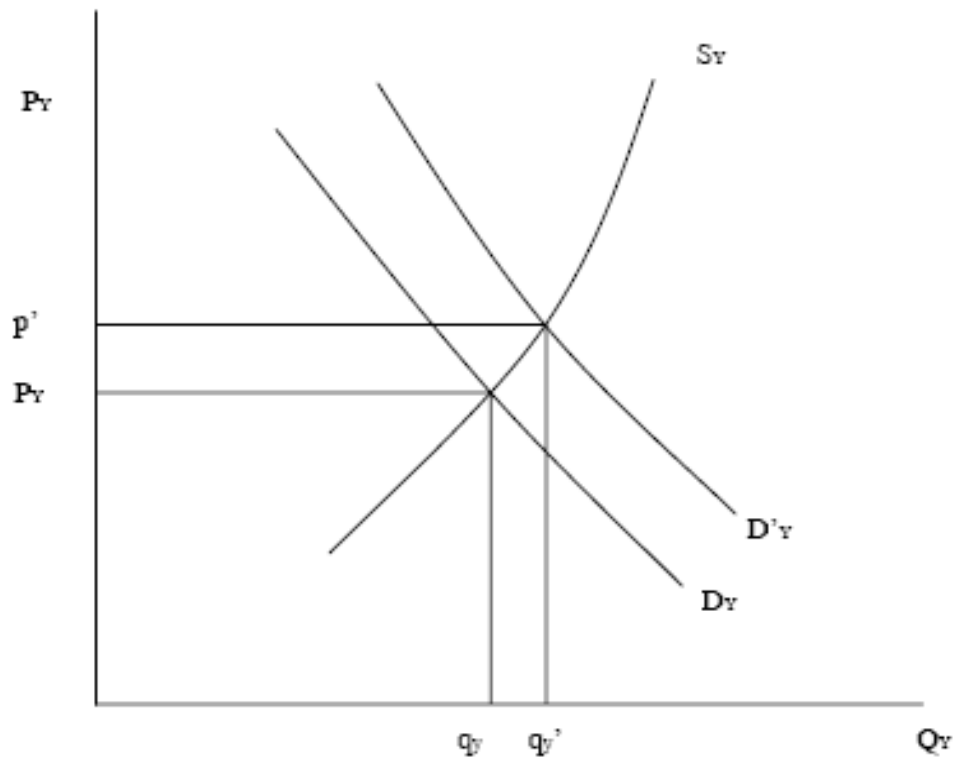
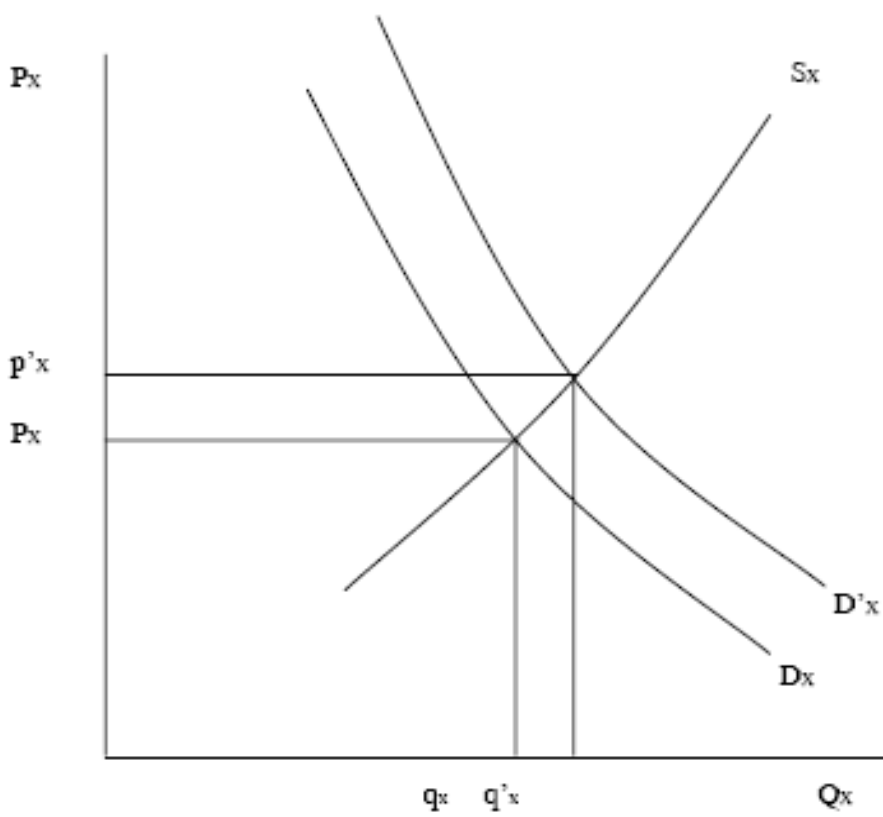


Figure 3(iv) Elasticity on a straight line demand curve

Figure 3: Elasticity of Demand



(i) Price of substitute good Y increases



(ii) Demand curve shifts in market for good X

Figure 4: The Impact of Changes in the Market for a Substitute

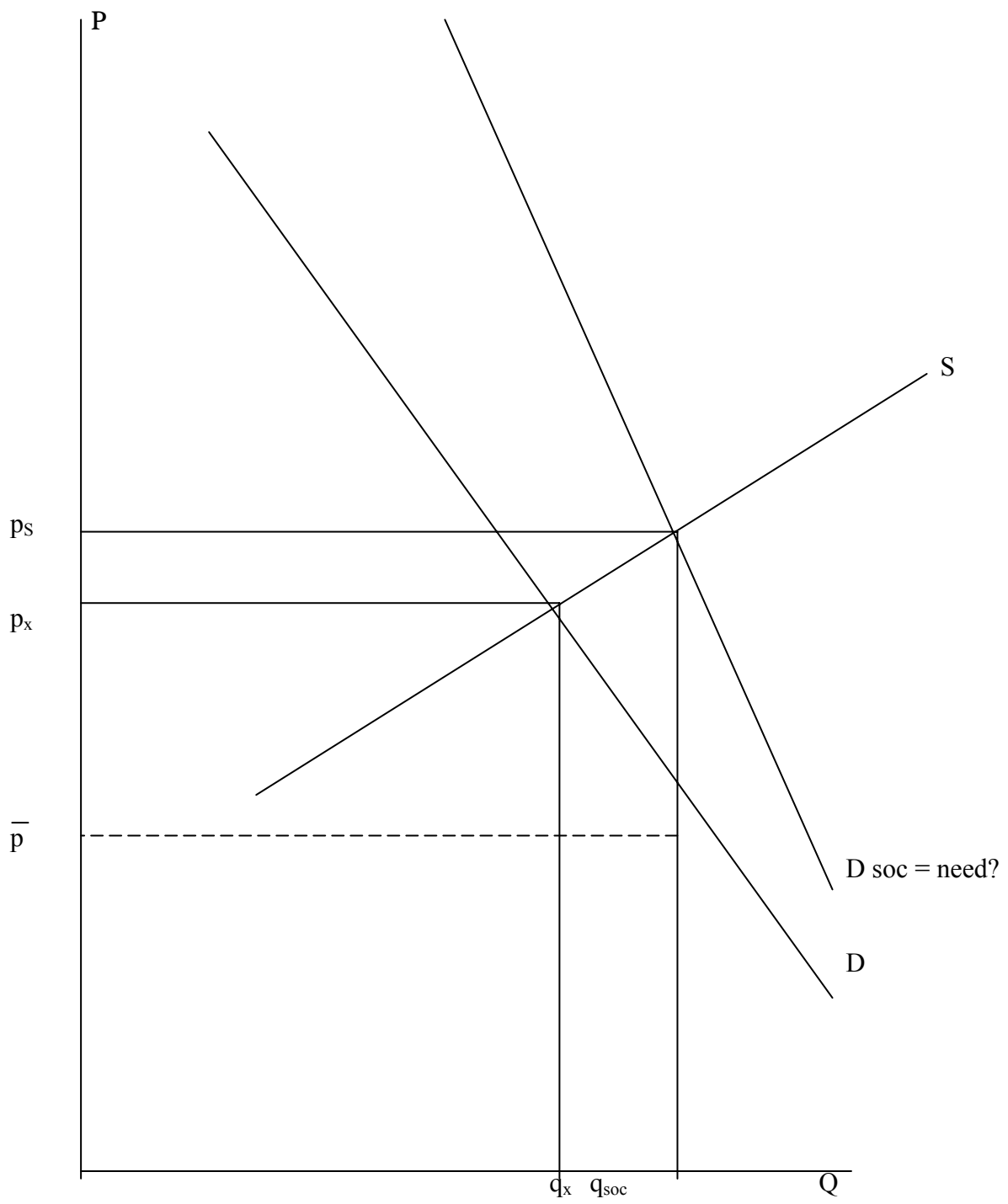


Figure 5: Demand and Need

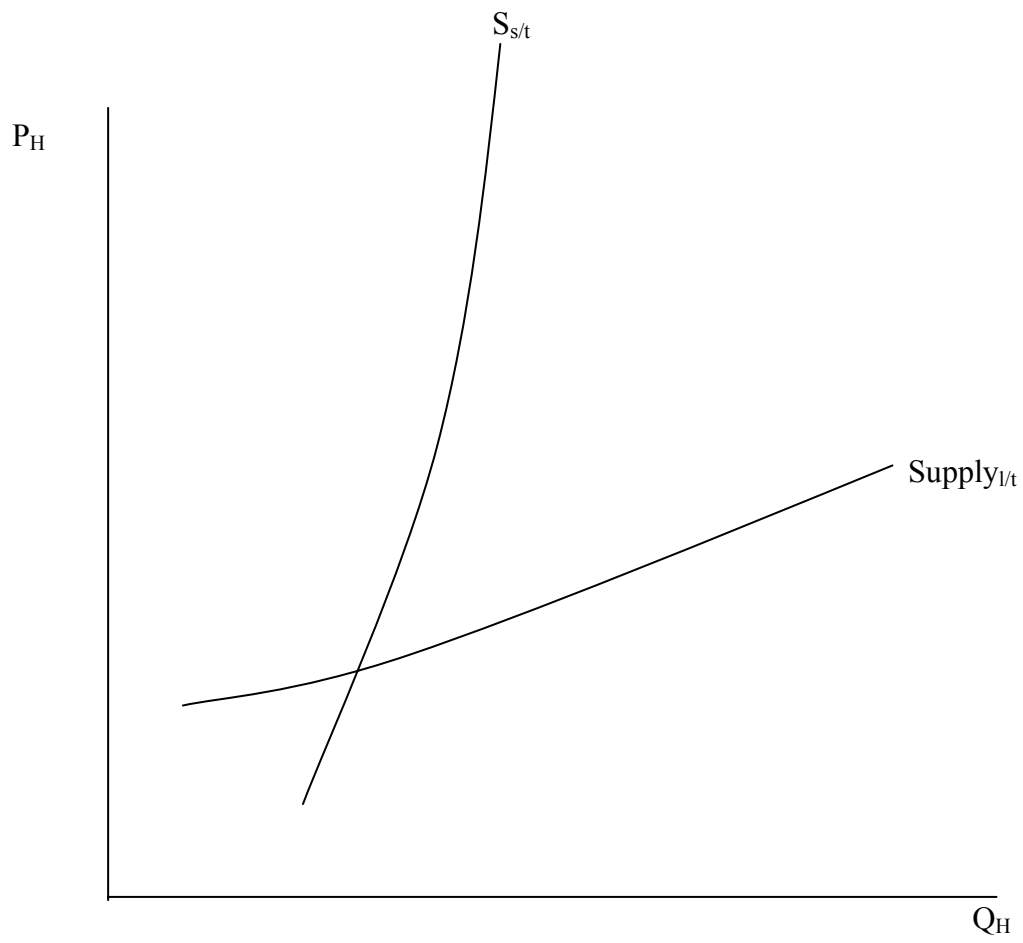


Figure 6: Supply Schedules for housing

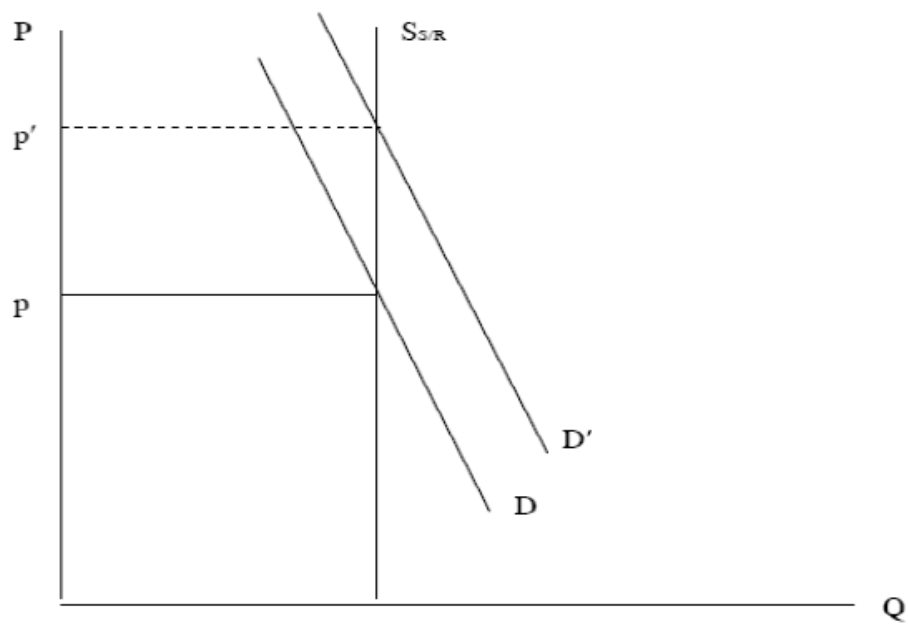


Figure 7: Inelastic Supply and its Impact on Price

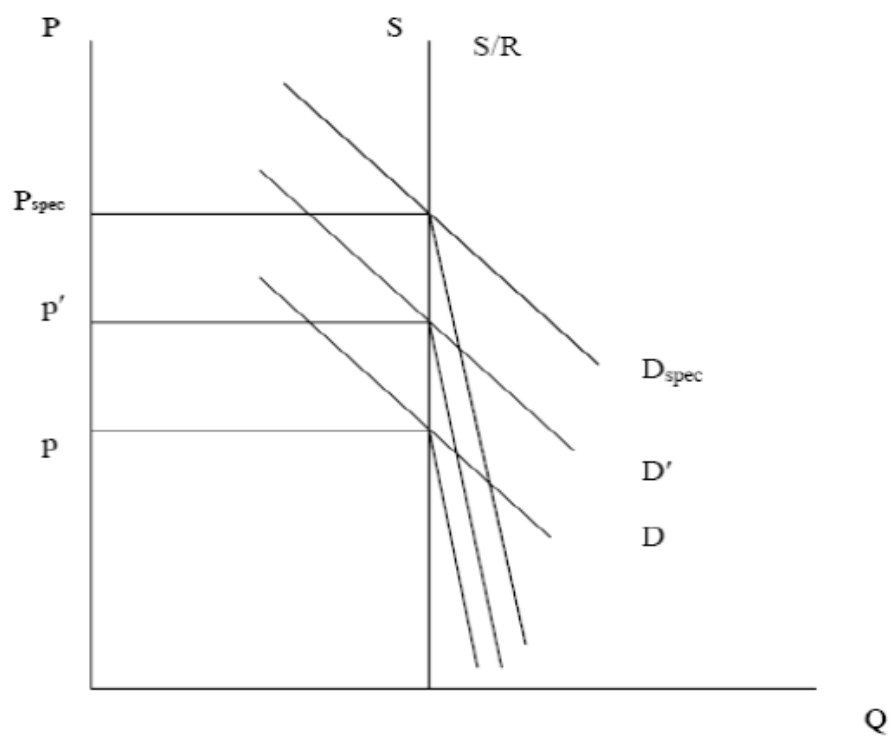


Figure 8: Price Volatility