

MATH157.

5.1 Elasticity (弹性) of Demand

We begin by analyzing a real example from the air travel industry (范围), and have a detailed (详细的) look at how the cost of air plane tickets impact the revenue of ticket sold. A simplistic (简单化的) view may lead one to (误导) believe that a decrease in the cost for an airplane ticket would cause the revenue to increase and vice versa (反之亦然). In economics, this particular relationship between unit price and revenue is referred (被称为) to as elastic demand as we will learn later. Particularly (特别是) in Canada, start up (开始) airlines can collapse (瓦解) more readily (迅速地) under this condition. The Department of Finance in Canada studied the aforementioned (上述的) relationship and published the research result in Air Travel Demand Elasticities: Concept, Issues and Measurement (测量结果). 1. by differentiating (区分) between six types of air travel that are associated (关联的) (成对发生的): business and leisure (休闲), long-haul (旅行距离长) and short haul, and international long-haul and North American long haul air travel. The result of the study corroborate (证实) that the demand for business air travel is less than that for leisure air travel. This finding does not come as a surprise, since even a costly (昂贵的) vacation can be more readily moved to different dates than business travels. The other two results of the study are that the demand for long-haul flight is less elastic than that for short-haul flights, and similarly (同样) the demand for international flights is less elastic than that for North American flights. This makes sense, because the further the destination, the less likely (可能性) it is that an alternative (可替代的) mode of transport can be found as a substitute for an expensive flight.

We now derive (获得) the mathematical model that help us to analyze (对...进行分析) the relationship between unit price and revenue, and determines the elasticity of demand of a particular economic situation when the demand function is given.

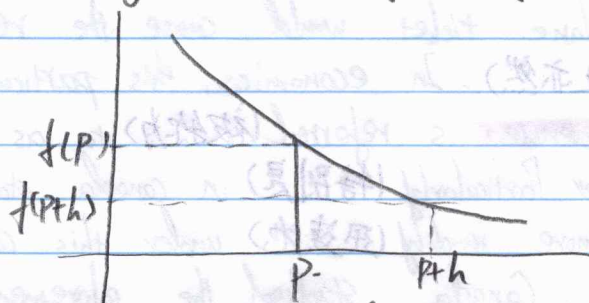
In order to (为...帮助) our analysis, it will be more convenient to write the demand function f in the form $q = f(p)$. In other

words, we will think of the quantity demanded q of a certain (某种) product as a function of its unit price p .

需求量越高, 价格越低.

需求量越低, 价格越高

As is shown in Figure 5.1, the function f is usually a decreasing function of p .



the associated (相关的) quantity demanded changes from $f(p)$ units to $f(p+h)$ units with an overall (总的) decrease of $f(p) - f(p+h)$ units.

We can now calculate the percentage (百分比) change in the unit price to be

$$\frac{\text{change in unit price}}{\text{price } p} \times 100 = \frac{h}{p} (100)$$

and the corresponding (相应的) percentage change in the quantity demand to be

$$\frac{\text{change in quantity demanded}}{\text{Quantity demanded at price } p} \times 100 = \frac{f(p) - f(p+h)}{f(p)} (100)$$

ratio (比率) of the percentage change in the quantity demanded to the percentage change in price

$$\frac{\text{percentage change in the quantity demanded}}{\text{percentage change in the unit price}} = \frac{100 \frac{f(p) - f(p+h)}{f(p)}}{100 \frac{h}{p}} = \frac{f(p) - f(p+h)}{h} \cdot \frac{p}{f(p)}$$