

Price uncertainty principle

——Why the price mechanism is not the invisible hand

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Introduction:

In modern economy science, there are many theories that discuss the equilibrium. This convention was originally come from two famous economists Walras and Alfred Marshall. Walras firstly finished the general equilibrium theory in 1874 in the book *the mere economics to iustice*. While Alfred Marshall put forward the partial equilibrium in 1920. However, by observance, there was never the evidence for the existence of equilibrium.

In this paper, I will put forward a new theory, which is named Price Uncertainty Principle. I will point out the flaws of these two equilibrium theories and discuss why the price mechanism is not the invisible hand, then further discuss why partial equilibrium and general equilibrium are not existent. I will prove that there is no equilibrium point for the price and prices are always fluctuant in the market.

1. Background

In 1874, the French economist Walras put forward the general equilibrium theory. In his theory, he argued that in a free market, the supply and demand interacted with each other, finally they would reach a state that was called equilibrium.

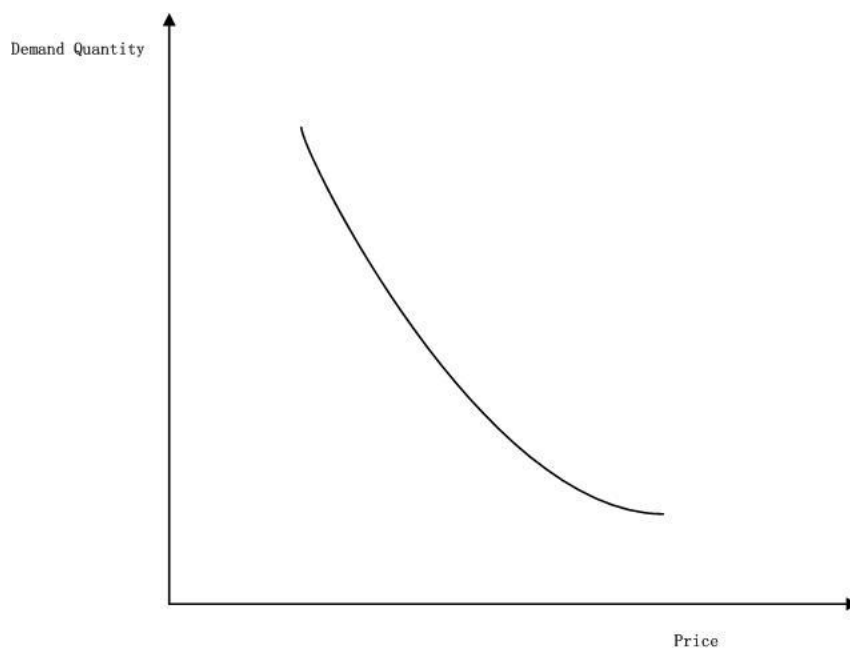
At the same age, another economist Alfred Marshall put forward partial equilibrium and price mechanism. He thought that in a partial market, under the effect of price mechanism, there would be a partial equilibrium where supply quantity equals demand quantity.

The sad thing is that both of these two equilibrium theories could not explain the real world, there is never evidence for the existence of these two kinds of equilibrium, they are just good math models but not science. Science can describe the real world. So we need to make our mind jump out of the old thoughts.

2. Partial Equilibrium Theory

Firstly I will briefly introduce how the theory of partial equilibrium explains price change.

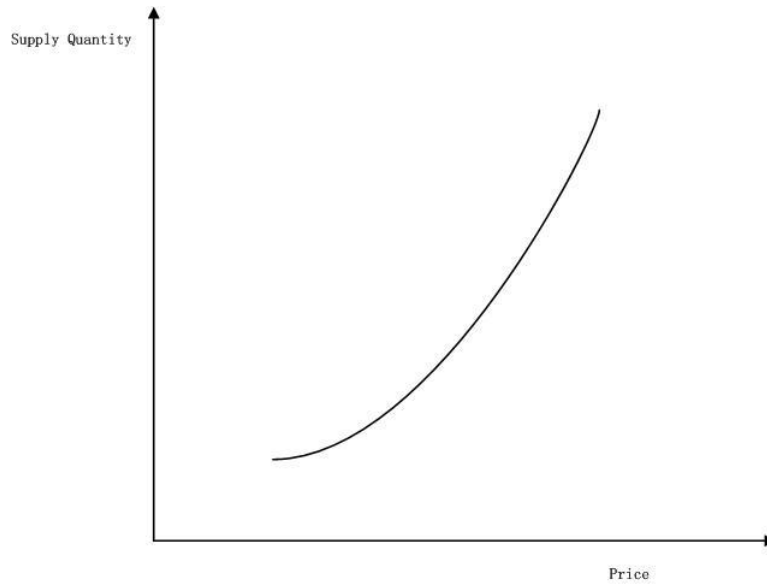
Figure 1. Demand curve



Here is the demand curve.

From the picture we could know that toward one commodity when the price is increasing, the quantity demand is going down. And vice versa.[1]

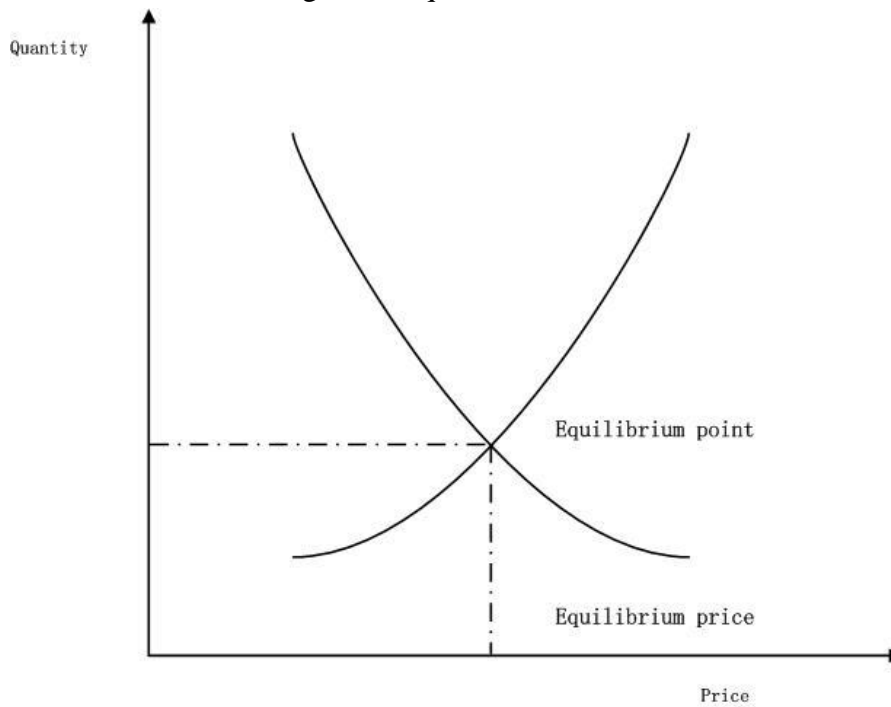
Figure 2. Supply curve



Here is the supply curve.

From the picture we could know that toward one commodity if the price goes up, the quantity of supply will go up. And vice versa.[1]

Figure 3. Equilibrium curve



Here is the Equilibrium curve.

From the picture we could know that Equilibrium Point is the intersection of demand curve and supply curve for the same commodity. At this point, the supply quantity will equal the demand quantity. And the price for this intersection is called the Equilibrium Price. In the partial equilibrium theory, it argues that whenever the price leaves the Equilibrium Point, there will be a mechanism that try to pull it back to the Equilibrium Point.[1]

3. Discussion toward the price

In a competitive local market, one seller could not determine the price. We can prove this by using the following example:

Assume there are three sellers A, B and C selling the same product in a local market. At the beginning, they sell the same product using the same market price. *Ceteris paribus*.

Then if A raises the price, people will choose to buy commodities and services from B and C. Then A will not be able to sell his or her products. In order to avoid loss, A has to lower the price to compete with B and C.

Then we prove that one single seller could not determine the market price if there is competition in the local market.

So we reach a conclusion that in a competitive market, the price is a dependent variable. The price could not determine the supply curve and demand curve.

4. Relation between supply quantity and demand quantity

We all know three terms in the economy:

Supply exceeding demand, supply equaling demand, supply falling short of demand.

Assume the total demand is a constant variable, we assume it to be constant N . Besides, one concept I need to clarify is that in my theory demand is not the demand quantity. In my theory demand is in a moment the whole demand, which is the demand of all the people in a local market to buy certain commodities or services in that market. Demand quantity is the transaction quantity really happened in the moment, it is an instantaneous value.

Because the price is a dependent variable. I will analyze the relationship between two other variables, supply quantity and demand quantity. (Supply quantity is the quantity of commodities that are being sold in the market in the moment)

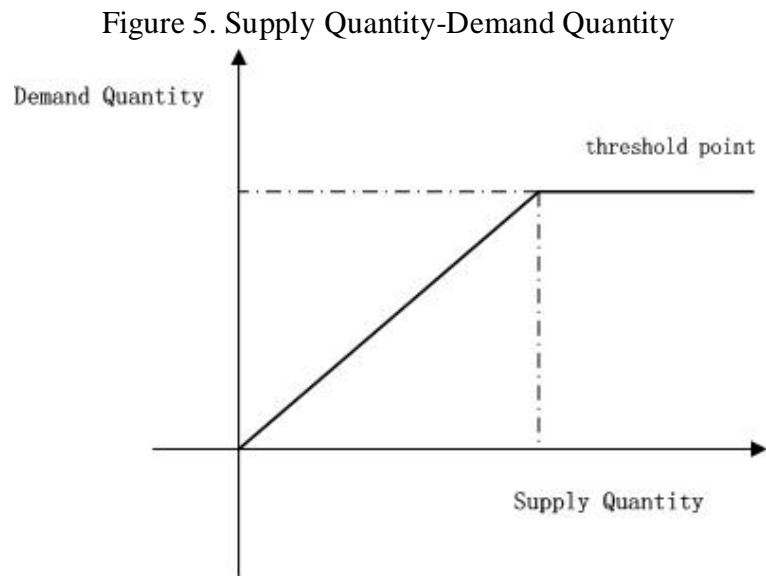
We assume the demand N is a value above 0 and N remains the same all the time (It is better for our discussion). *Ceteris paribus*.

1) We have that when supply exceeds demand, if we increase the supply quantity, the demand quantity will not increase because all demand has been met.

2) When supply equals demand, this is a threshold value.

3) When supply is below the demand, we know that all our commodity supply will be sold out. We have that the supply quantity will determine the real demand quantity. Here I mean that in the moment the transaction quantity equals supply quantity as well as demand quantity. Whenever a commodity is produced, it will be sold out as

soon as possible. Just like the Say's Law, which claims "supply creates its own demand"[2]. So we could draw curve like following:



From the picture we know that under the threshold, the supply quantity is the same as the demand quantity. Above the threshold, if the supply quantity increases, the demand quantity will not increase.

5. Relation between supply quantity and demand

In a monopoly market, assume that there is just one seller A selling one product. We assume the demand for the same product remains the same all the time and is value N ($N > 0$). *Ceteris paribus*.

As we discuss previously, we know that below the threshold, the demand quantity is the same as the supply quantity. So when the demand quantity is below threshold, according to Marshall partial equilibrium, if A raises the price, the supply(demand) quantity will go down; if A lowers the price, the supply(demand) quantity will go up.

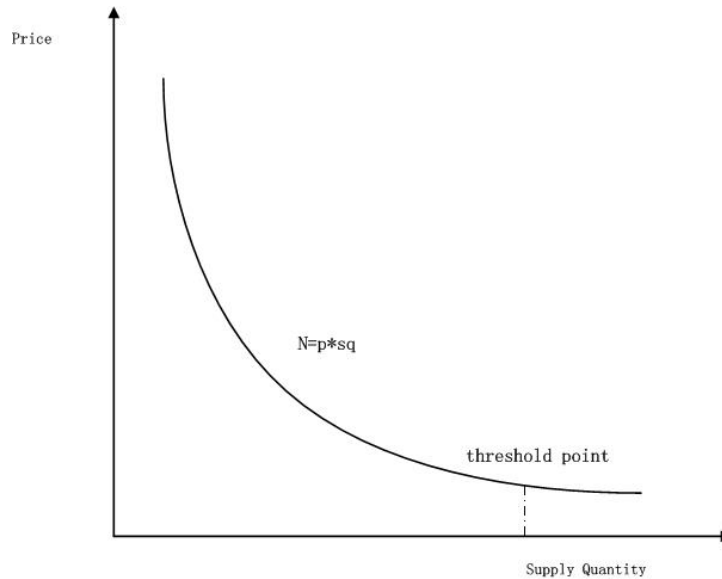
Likewise, we can say that, if A raises the supply quantity, the price will go down. If A lower the supply quantity, the price will go up. That is what happen in the real life. We can use the power function to describe this. Assume the p is the price, sq is the supply quantity, we have that

$$N = p * sq \text{ or } p = N / sq$$

By using the price as independent variable, we use the market money value to evaluate the demand, so we ignore the impact of inflation and other facts.

So we have curve like following.

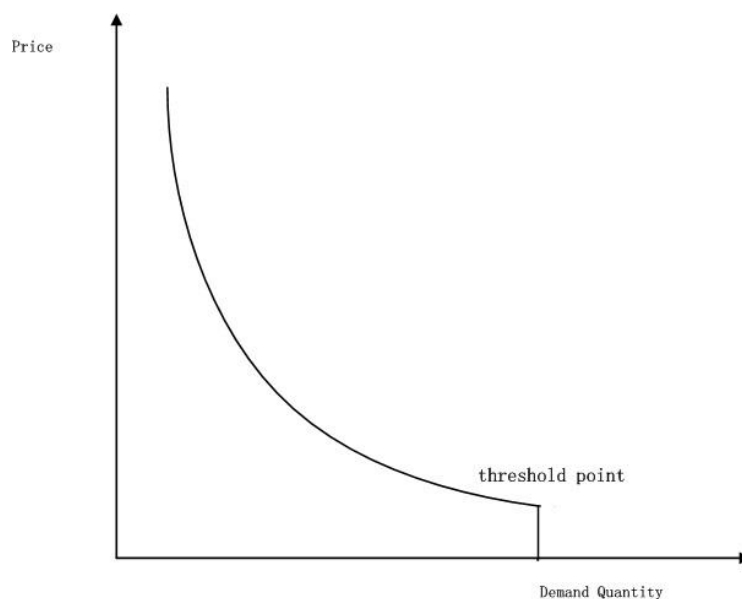
Figure 6. Price-Supply quantity



From the picture, we know that if the supply goes into unlimited, the price will be near 0. We could find evidence for this in real life. Like oxygen, the price for oxygen is 0. While everyone has demand for it. And the demand quantity for it is dependent on the number of the whole animals and plants on the earth instead of the supply quantity. The supply quantity is beyond the demand quantity. This proves that if the supply quantity is far beyond the demand, the demand will determine the real transaction quantity.

If we use d_q to represent demand quantity, we can infer the relationship between demand quantity and price:

Figure 7. Price-Demand quantity



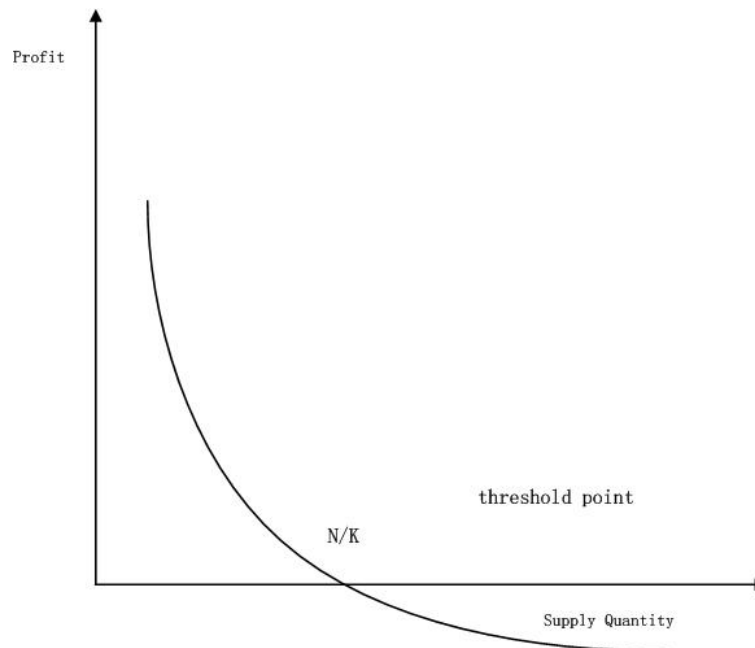
6. Bring in the concept of cost

Assume there is just one commodity, the cost for each commodity in the market is K , we will have profit S for one commodity is:

$$S = p - K = \frac{N}{sq} - K$$

We can draw following graph:

Figure 7. Profit-Supply quantity



If $S=0$, $sq=N/K$.

We have that if $sq < N/K$, there will be profit, so the sellers can earn money. If the $sq > N/K$, there will be loss, then sellers will lose money.

Considering the fact that the sellers in the market they want to earn money, they are selfish (This is the basic assumption of modern economy).

If the total demand N is constant value, *Ceteris paribus*. We have that the supply quantity moves like this:

- 1) The initial supply quantity is 0. We could conclude that the this commodity is very profitable, then the sellers will enlarge the supply quantity of this commodity, so the supply quantity will increase.
- 2) The supply quantity is increasing, during the process, the profit for one of this commodity is decreasing. The price of this commodity is decreasing.
- 3) After the supply quantity is above N/K , we have that the profit of this commodity is negative, the price is very low. Then sellers who produce this commodity will lose money. So sellers will reduce manufacturing this commodity. The supply quantity will go down.
- 4) Then the supply quantity will decrease to some value below N/K .
- 5) When the quantity decreases to some vey low value, the profit for each

commodity is very high. Producing this commodity is very profitable. Then sellers will enlarge the supply quantity of this commodity.

The conclusion is that the supply quantity will fluctuate along the horizontal axis.

In real life, it is more common that when the supply quantity is large enough (but not above N/K), the supply quantity will go down. As the profit of this commodity is too low then nobody wants to produce it.

To clarify here is that the N/K is not the equilibrium point. The supply quantity will not stop at N/K . If the increase of supply quantity is too rapid, the supply quantity will naturally exceed this point N/K . If the supply quantity stop at this point. As there is no profit for this commodity, some people will reduce producing this commodity, then the supply quantity will decrease.

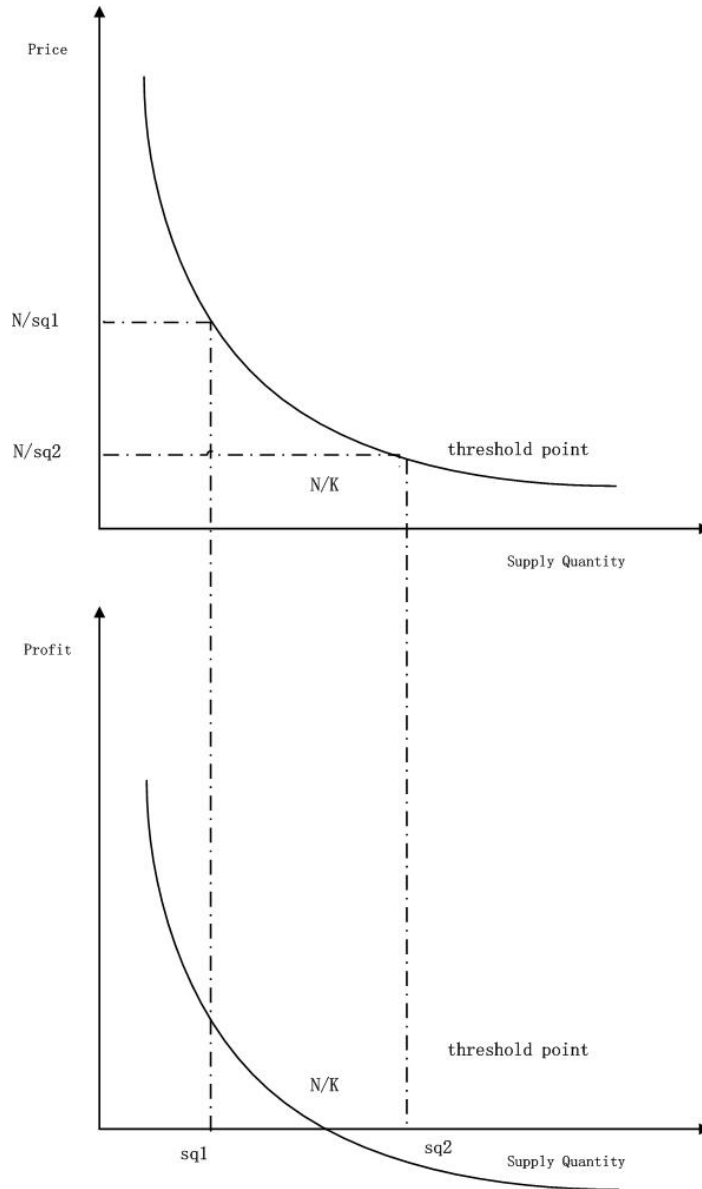
There is no order for this movement. The real supply quantity is uncertain, it is totally determined by the judge of sellers toward demand. Or we can say it is totally determined by the judge of the entrepreneurs.

If the entrepreneurs think that producing this commodity can make them earn a lot of money, they will produce a lot.

From the equation $p=N/sq$, we know that sq is vibrating randomly, so the price is vibrating randomly, too.

Assume sq is vibrating between sq_1 and sq_2 , then the price p is vibrating between N/sq_2 and N/sq_1 . It seems just like there is an equilibrium point but in fact there is no equilibrium point. It is just a kind of unordered fluctuation.

Figure 7. Price fluctuation Interval



We can also infer that if sq (supply quantity) is too large, we enlarge the supply quantity from qs to $(qs+d)$, we have that:

$$p = N / (qs + d)$$

d is supply quantity addition.

Here qs is too large, $d \ll qs$, we can know that d has little impact toward the price. That is the reason why we see the price in the real world is sometimes stable. Because the number of commodities are extremely large.

Apart from that, in the real market, the demand is also changing all the time. That means the N is also changing all the time. So the price is further changing randomly.

7. Discussion why general equilibrium is wrong

Toward the price of one commodity, I have prove that there is no equilibrium.

Toward the whole market. The supply quantity toward each commodity is always changing. The demand for each commodity is also changing. So the price for each commodity in the market is always changing. The supply quantity is sometimes above the demand. Sometimes the supply quantity will determine the demand quantity.

So the general equilibrium theory is wrong. The market is always fluctuating. When an overproduction occurs, it will recover because people in the market they want to avoid loss, so they decrease supply quantity of the commodity that is under overproduction. There is no price mechanism in the real world.

8. Example

Assume there is a competitive market. There are five commodities in the market. Assume at first the demand for each commodities is 2 and all the demands are constants.

There are many sellers selling different commodities. Assume the supply quantity for each commodity is initially 2.

We have that all price is initially 1.

s1)Based on sellers' judge toward the market, some sellers begin to sell more products A. Assume the quantity supply for A becomes the value 3.

We have that A's price will become the number $2/3$. Other remains 1. The supply quantity of A has exceeding the demand. An overproduction occurs. So sellers who produce A will have less profit, they will not produce A.

s2)Based on sellers' judge, some sellers begin to sell more products B. Assume the quantity supply for B become the value 4.

We have that B's price will become $1/2$. People will produce less B because B is not profitable

Assume there is just 1 quantity of A in the market. The price for A is 2. All other prices will be 1.

s3)Based on sellers' judge, some sellers begin to sell more products C. Assume the quantity supply for C become the value 3.

We have that C's price will become the number $2/3$. Assume the supply quantities of A is 0.5 and the supply quantities of B is 1, We have A's price is 4 and B's price is 2. So A and B become profitable, more people devoted themselves to produce A and B.

s4)Assume A's supply value becomes 1.5 and B becomes 2. C's supply quantity becomes 2.

We have that B's price will become the number 1. C has 2 in the market, C's price

will be 1. A's price will be $\frac{4}{3}$. All other prices will remain 1.

Table 1. Price Variation Table

Price	s0	s1	s2	s3	s4
A	1	$\frac{2}{3}$	2	4	$\frac{4}{3}$
B	1	1	$\frac{1}{2}$	2	1
C	1	1	1	$\frac{2}{3}$	1
D	1	1	1	1	1
E	1	1	1	1	1

From this analysis, we could know that there is no equilibrium point in the market. The price is changing randomly. And there is no equilibrium state for surplus supply and surplus demand to equal each other. there is a state that supply quantity will equal demand, but it is not a stable state and the market will not stop there.

9. Conclusion

Based on the judge of entrepreneurs toward the market, entrepreneurs will determine the supply quantity. this is an unpredictable variable. Besides, the demand is changing all the time in the market, it is an unpredictable variable. So the price is always fluctuating. The price is uncertainty.

Citation:

[1] Principles of microeconomics Mankiw N.G, 2ed 2001

[2] The general theory of employment, interest and money Keynes