Term 3 Intensive Revision

**CSQ – Demand and Supply Q1A**

**Bottled Water and Clean Water**

**Figure 1: U.S. per capita beverage consumption**



 Actual: 2000-2014

 Projected: 2015-2017

Source: Wall Street Journal

**Extract 1: Bottled water sales volume to increase in the U.S.**

Building on last year’s growth of 4.7 percent, bottled water that includes sparkling, mineral, distilled and pure water, will again post large increases in both sales and consumption for 2014, according to preliminary data from the Beverage Marketing Corporation. Sales volume of bottled water in 2014 is expected to grow to $13 billion, an increase of 6.1 percent from 2013.

The liquid refreshment beverage market in the U.S. consists of soda, energy drinks, sports drinks, bottled water, and other non-carbonated beverages. The rise in the consumption of bottled water has been driven by the shift in consumer preference for healthier beverages. Soda has often been criticised for its high sugar content and caffeine. The alleged health impacts include high blood pressure, diabetes, and obesity. Many consumers know that convenient and refreshing bottled water has zero calories and is the healthiest option on the shelf, as compared to soda. Nevertheless, the overall rise in obesity rates in the U.S. shows that consumers may be less willing to give up on soda and other sugary beverages. Positive growth rate in the U.S. has also played an imperative role in the growth of the bottled water industry.

The bottled water industry is appealing with an increasing number of players every year, primarily due to positive sales revenue. The main type of plastic used for plastic bottles, polyethylene terephthalate, as well as the main type of mineral used for glass bottles, silica sand have been experiencing fall in prices. These plastic and mineral made up a relatively large proportion of the production of bottled water, and U.S. being the one of leading producers has sufficient stocks available. The other costs of making bottled water such as fuel, electricity and labour are also obtained easily with ease.

 Source: *The Economist*, 15 November 2014

**Extract 2: Competition in the U.S. bottled water industry**

Nestle Waters North America is the market leader of the U.S. bottled water industry. Aside from the other major market players PepsiCo’s Aquafina and Coca-Cola’s Dasani, Nestle also competes with the bottled water brands of private players. The firms in the bottled water industry are interdependent as they consider their rivals’ reactions when setting prices, output, advertising budgets and other business models.

Coca-Cola’s Dasani broadcasted a new ad campaign featuring actress Jennifer Aniston touting its vapor-distilled, electrolyte-enhanced Smartwater and launched an unsweetened, zero-calorie sparkling water beverage in lime, lemon, apple, and berry flavors in early 2014, whereas PepsiCo this summer ran its first ad campaign for Aquafina since 2008. Dozens of smaller, high-end specialty-water brands with names like Real Water, People Water and Happy Water have also came up with new bottle designs and exotic minerals to attract consumers. Firms also continue to invest in the exploration of technologies and recovery systems that enable more energy-efficient and cost-effective production of bottled water.

Source: *Wall Street Journal*, 19 August 2015

**Extract 3: Consumption of clean water**

Water is a basic necessity for life and drinking clean water reduces the number of episodes of diarrhea for an individual, making him healthier and more productive. Apart from the benefits to the individual, consuming clean water also leads to healthier populations as the spread of water-borne diseases is lowered, increased productivity and growing economies. Despite this overwhelmingly clear evidence, millions of people still struggle to access clean drinking water, and more than 840,000 people die each year from consuming unclean water and sanitation.

The most commonly used definition of “access” is defined as having a source of safe water within 1 kilometer of the dwelling. It is estimated that in 2015, 663 million people still lacked access to “improved” drinking water sources. Improved sources are those deemed to be relatively protected from contamination and, therefore likely to provide clean water for human consumption and household use, such as piped water supplies into the house or protected wells or springs. For the high number of poor households living in urban slums and in rural areas, there is insufficient access to clean water or sanitation, highlighting the inequality issue in most developing countries.

Poverty and local power inequalities can exacerbate inequalities of access to water. For example, in areas where informal providers are the only source of water delivery to poor households, without regulation to ensure fair pricing, extortion and bribery can inflate the cost of this essential service, such that the poorest households can in fact be paying the most for their water.

 Source: Global Water Partnership and World Health Organisation

**Extract 4: Towards a way to improve the situation**

Water should be recognised as a great priority. One of the main objectives of the World Water Council is to increase awareness of the water issue, and decision-makers at all levels must be implicated. One of the Millennium Development Goals is to halve, by 2015, the proportion of poor people without sustainable access to clean water and increase its consumption. To achieve that aim, several measures should be taken.

Firstly, the subsidising of production of clean water that requires the use of sophisticated technology. This makes clean water affordable for the poor, yet may be costly for countries with weak fiscal position as spending on welfare programmes has to be cut. Secondly, the deregulation of the control of water supplies to private companies creates a more efficient system and allows more people access to clean water, and hence consume them. Yet, while water companies are able to update water systems, making them more efficient and more accountable to consumers, they can also make water more costly to the poor once market power is consolidated. Thirdly, educating citizens on the responsible use and benefits of consuming clean water, which may be difficult to implement and monitor. Lastly, the signing of water treaties to import clean water supplies provides a structure for nations to address their differences in managing and monitoring shared resources, as well as increases the access to clean water especially for third-world countries. However, these countries may not have sufficient capital and/or resources available for exchange.

Source: World Water Council

**Questions**

1. Using Figure 1, compare the trend between U.S. per capita soda consumption and U.S. per capita bottled water consumption. [2]
2. Discuss the view that supply factors are likely to be more important than demand factors in explaining the extent of the change in sales volume of bottled water in the U.S. [8]
3. (i) Explain the price elasticity of demand for drinking bottled water. [3]

(ii) Explain if the price elasticity of supply for drinking bottled water [3]

1. Discuss how the producer of drinking bottled water will raise the total revenue with the appropriate price strategy. [4]

 [Total: 30 marks]

**Suggested Answers**

**(a) Using Figure 1, compare the trend between U.S. per capita soda consumption and U.S. per capita bottled water consumption. [2]**

U.S. per capita soda consumption has a continuously falling trend whereas the general rising trend of U.S. per capita water consumption has a falling trend between 2007 and 2009. The rate of increase in U.S. per capita bottled water consumption is faster than the rate of decrease in U.S. per capita soda consumption.

**(b) Discuss the view that supply factors are likely to be more important than demand factors in explaining the extent of the change in sales volume of bottled water in the U.S. [8]**

According to Extract 1, there is a large increase in the sales volume of bottled water in the U.S. by about 4.7% from 2012 to 2013, and an expected 6.1% from 2013 to 2014.

Explain change in supply of bottled water

The bottled water industry has become increasingly profitable for potential entrants over the years as shown by its positive sales revenue (Extract 1), holding cost constant. This results in an increase in the number of sellers, hence increasing the supply of bottled water.

There is also a fall in prices of factor inputs, such as polyethylene terephthalate used to make plastics bottles as well as silica used to make glass bottles. These lead to a fall in cost of production and rise in profits. Profit-maximising producers then have more incentives to produce, increasing the supply of bottled water.

Explain change in demand for bottled water

The positive growth rate in the U.S. (Extract 1) implies that national income is increasing. Holding price and population constant, real GDP per capita increases and the purchasing power of an average consumer increases. Hence demand for normal goods such as bottled water increases.

Tastes and preferences of health-conscious consumers change in favour of healthier bottled water compared to unhealthy soda that causes high blood pressure, diabetes and obesity (Extract 1). This increases demand for bottled water.

Explain supply factors are more important than demand factors

Supply factors are more important than demand factors in explaining the large increase in sales volume of bottled water in the U.S. The increase in supply is likely to be more significant than the increase in demand. The overall rising obesity rate in the U.S. (Extract 1) implies that it takes time to change the mindsets, hence the taste and preferences of consumers to consume the healthier bottled water as there is still a large group of consumers who are inclined to consume soda and other sugary beverages.

The increase in supply is likely to be more significant because the fall in prices of major factor inputs (plastic and mineral) used in bottled water production contribute to a substantial fall in cost of production. This is coupled with the increasingly profitable sunrise industry that results in the increased number of smaller private players to enter and increase the supply of bottled water (Extract 1).

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 Figure 2

As shown in Figure 2, both the less significant increase in demand for bottled water from D0 to D1 and the more significant increase in supply of bottled water from S0 to S1 have a mutually reinforcing effect in the increase in equilibrium quantity from OQ0 to OQ1. This explains the large rise in sales volume of bottled water in the U.S.

Explain extent of change in sales volume using PES and how PES is more important than demand

The supply of bottled water is likely to be price elastic in the U.S. This is because the main factor inputs, of polyethylene terephthalate and silica sand in producing plastic and glass bottles that are largely produced in the U.S., have sufficient stocks available (Extract 1), indicating existence of spare capacity. Also the other factor inputs such as fuel, electricity can also be obtained with ease (Extract 1). Hence quantity supplied of bottled water is likely to be sensitive to price changes.



Figure 3

As shown in Figure 3, the increase in demand for bottled water from D0 to D1 leads to a more significant increase in equilibrium quantity from OQ0 to OQe with supply of bottled water being price elastic (Se), as compared to a less significant increase from OQ0 to OQi if the supply is price inelastic (Si). This explains the large increase in sales volume of bottled water in the U.S.

Given a highly price elastic supply (considered as a supply factor), the relatively small increase in demand is sufficient to result in a large increase in sales volume, hence the elasticity of supply is more important to explain the increase in sales volume.

Explain extent of change in sales volume using PED and how supply is less important than PED

The demand for bottled water is likely to be price elastic in the U.S. due to the availability of substitutes as a liquid refreshment beverage, such as energy drinks, sports drinks and other non-carbonated beverages (Extract 1). As the obesity rate in U.S. has been increasing (Extract 1), it can be implied that bottled water and the other sugary beverages are considered to be close substitutes for the majority of U.S. consumers. Hence quantity demanded for bottled water is likely to be sensitive to price changes.



 Figure 4

As shown in Figure 4, the increase in supply of bottled water from S1 to S2 leads to a more significant increase in equilibrium quantity from OQ0 to OQe with demand for bottled water being price elastic (De), as compared to a less significant increase from OQ0 to OQi if the demand is price inelastic (Di). This explains the large increase in sales volume of bottled water in the U.S. Hence the price elastic demand is relatively more important than the increase in supply to explain the large increase in sales volume.

**Conclusion**

Hence overall, the supply factors are more important than demand factors the U.S. bottled water industry. In addition, the price elastic supply of bottled water is more important than the increase in demand to explain the large increase in sales volume. Comparatively, the price elastic demand for bottled water is more important than the increase in supply to explain the large increase in sales volume.

**(e)(i) Explain the price elasticity of demand for drinking bottled water. [3]**

The demand for drinking bottled water is price-inelastic.

One of the factors affecting the price elasticity of demand (PED) for drinking bottled water is the high degree of necessity of demand. As water is an essential resource for survival, consumers will be less price-sensitive to changes in the price of drinking bottled water. This can be explained by the notion that “water is a basic necessity for life”, as stated in Extract 3.

Another factor to explain why the PED for drinking bottled water is price inelastic is the small proportion of income spent on the good. Given that drinking water is a daily activity that is fairly affordable, consumers are less price-sensitive as their purchasing power is not compromised significantly.

**(e)(ii) Explain the price elasticity of supply for drinking bottled water. [3]**

The supply for drinking bottled water is price-elastic.

One of the factors affecting the price elasticity of supply (PES) for drinking bottled water is the large number of firms in the bottled water industry. The presence of many firms will mean that production capacity can be increased easily when there is an increase in the price of drinking bottled water. This can be observed in Extract 1, which states that there is “an increasing number of players every year, primarily due to positive sales revenue”.

The second factor to explain why PES for drinking bottled water is elastic is the low cost of resources. As the unit cost of resources for the production of drinking bottled water is low, the industry can raise production capacity easily. Therefore, a smaller percentage increase in price of drinking bottled water is needed to raise a percentage increase in quantity supplied, contributing to a price-elastic supply. This is evidenced by Extract 1, which states that the “costs of making bottled water such as fuel, electricity and labour are also obtained easily with ease”.

**(f) Discuss how the producer of drinking bottled water will raise the total revenue with the appropriate price strategy. [4]**

Given that the demand for drinking bottled water is price-inelastic, the producer should raise price to increase total revenue. The increase in price of drinking bottled water will lead to an increase in total revenue as the gain in revenue due to the increase in price of drinking bottled water is greater than the loss in revenue due to a reduction in the quantity demanded.



As seen in the diagram, the rise in price of bottled water will lead to a less than proportional decrease in quantity demanded for bottled water. As a result,

 the gain in revenue due to the increase in price of drinking bottled water from P0 to P1 is greater than the loss of revenue due to the fall in quantity demanded from Q0 to Q1. Hence, the producer will increase total revenue when price of drinking water increases.