

Technology and economic change

Competition, price and revenue

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2 Technology and Economic Change

2.1 In what ways might government contribute to improving the knowledge networks within an economy?

A number of economists such as Garfield (1988) argue that technological knowledge is a driver of long term economic growth. According to Mankiw (2003), technological knowledge is the understanding of the best ways to produce goods and services (page 535). As a result of this, some governments such as the South Korean government, (which will be discussed in more detail in 2.2 below), choose to invest heavily in facilitating technological growth within the economy. On a country wide basis, a knowledge network is a means of facilitating the sharing of knowledge within a country. The motivation of such a network is increase productivity for the country through knowledge sharing, resulting in a shift to the right of the production possibility possibilities frontier (explained in 2.3).

Cooke (2002) argues that “*knowledge is in the networks*” (page 2) implying that networks are essential to the dissemination and growth of knowledge within an economy. Governments may improve knowledge networks by providing facilities through which companies can gain and share knowledge which will help them to become more productive. Because governments are involved this can increase the perceived level of trust in the knowledge sharing which is essential (Neef, Siesfeld and Cefola, 2003). Within the UK, ‘Business Link’ is an initiative started by the government to help and encourage the development of, and co-operation between small and medium sized businesses. In contrast, Minatec based in Grenoble is a research centre specialising in the development of micro and nano technologies. Minatec is a partnership between numerous organisations including the French atomic energy commission (Graff, 2004).

The British and French Government are two examples of Governments which have facilitated the growth in knowledge sharing through organisations which are funded by the government. Consequently, it can be seen that Governments such as the British government with Business Link can contribute to knowledge networks by setting up and funding partnerships linking companies with each other and sharing general expertise to help businesses become more productive. Minatec is an initiative which goes beyond merely linking companies in similar fields; it also links companies with Universities. The fundamental driver behind this initiative is maximising technological knowledge and mutual gains derived from cooperation and knowledge sharing. These mutual gains can be reached through government sponsored organisations that help businesses and Universities link together. Safford (2006) when reviewing how knowledge networks developed in two cities in America noted that the most successful cities had an increase in collaboration between local organizations and a significant increase in partnerships between local multinational companies and universities, among tech firms and local universities. Governments should therefore seek to improve the collaboration between local businesses and universities through organisations that can act as intermediaries connecting these parties.

Whilst the two examples from France and England demonstrate that governments can contribute to the sharing of knowledge through networks within its economy, discussing this issue raises a fundamentally important discussion about the value of government intervention. Economists such as the late Milton Friedman argue that government intervention within the marketplace results in lower rates of economic growth (Smith,

1994). Adam Smith argues that the “invisible hand” of the free market leads buyers and sellers to maximise total benefit to society (Mankiw, 2003). However the free market does many things well but economists such as Mankiw argue that government can sometimes improve market outcomes because the free market has many imperfections as there is imperfect knowledge (Sloman, 2004). Consequently governments can and should attempt to increase technology spill over that is gained in the creation of new knowledge networks (Wessner, 2003).

2.2 Critically review the proposition that in the future, those countries that set the standards within IT development will be the countries that wield economic power.

Information Technology is related to economic power because technology forms an important part of the production function. The productivity function shows the relationship between the quantity of inputs used to make a good and the quantity of outputs (Mankiw, 2003):

Productivity function: Where F is the function that shows how the inputs are combined
 L – Quantity of labour
 $Y = A F(L, K, H, N)$ K – Physical capital
 H – Human capital
 N – Natural resources
 A – Technological knowledge

As it can be seen from the production function, as technology improves this has a direct effect upon the level of productivity. It is for this reason that the South Korean government chose to invest in building up IT infrastructure as strengthening its technological knowledge would boost its economy by making it more efficient. South Korea has the highest standards for IT development in the world, and it has emerged as a technology superpower (Kelly, 2006). With regards to technology, South Korea is years ahead of the west, for example the South Korean government estimate that by 2020 everyone within their country will have their own personal robot (New York Times, 2006). This technological frenzy has come from a governmental drive where they invested billions of dollars into IT infrastructure following a major financial crisis in the 1990s. It is a result of these high standards set in IT that over 75% of South Koreans have broadband internet access (the highest percentage in the world). Economically the effect of this push in technology has resulted in high levels of FDI, rapid international trade growth and a growth in the service sector (The Economist, 2003).

Consequently, using the example of South Korea and the production function, it can be seen that countries that set high standards in IT developments are likely to wield economic power in the future. Nevertheless, the productivity function also shows that technological knowledge is just one of the factors that will increase a countries productivity; the quantity of labour, physical capital, human capital and natural resources are also factors that determine a countries potential power. For this reason, countries like Russia which are rich in natural resources or China which has an abundance of labour are likely to yield increasing economic power. Indeed China is already yielding its economic power, and when it begins to develop its technological capabilities it will likely become one of the worlds leading economic powers.

Additionally, it can be seen that standards set in IT by companies such as Microsoft in Silicon Valley have helped the USA become the worlds leading nation which wields huge economic power. Silicon Valley in Northern California has been a focus point for IT development over recent years and the US has ridden on the success of companies such as Microsoft. When a country has global leaders in technology such as Microsoft with products like Windows and Internet Explorer (which are global monopolies), the economy of the country in which these companies are based benefit greatly.

In conclusion therefore, countries which are setting standards in IT development do seem to be those which are growing rapidly (for example South Korea) and those which already wield huge economic power (for example the USA). Nevertheless this does not discount the impact and importance of other factors of the production function such as the quantity of labour which also helps a nation become hugely successful (as has been seen with the recent development of China).

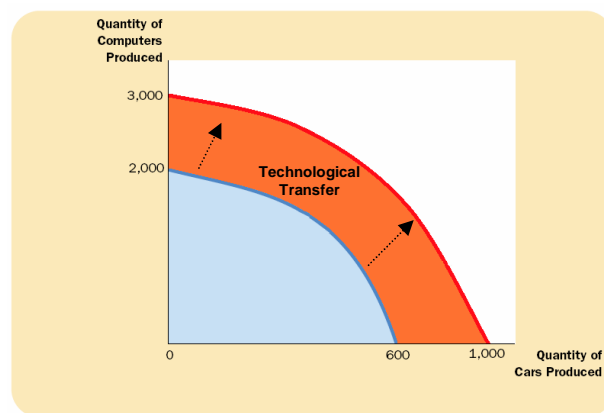
2.3 What role has technology transfer played in the development of emerging nations? Use examples.

Technology has played an important role in the development of emerging nations such as India where technology has been transferred from multinational companies working within the country to the local employees. An old example of technology being transferred is that of colonialism, whereby nations such as the UK took over countries such as South Africa or Hong Kong and consequently used British manufacturing expertise to build up the countries infrastructure. Whilst colonialisation was barbaric and should not be condoned, it can be a useful way of demonstrating the effect of technology transfer on a nation (Gebremedhin, 1996).

As has been demonstrated, when technology transfer takes place, essentially there is a transfer of know how and expertise. In Africa for example, knowledge about farming methods provided from western NGO's has helped farmers increase production. However, more recently, the issue of technology transfer has been discussed in relation to foreign direct investment (FDI). Less developed countries such as China offer very attractive incentives for inward investment from foreign companies because they anticipate spill over benefits (Torlak, 2004). When foreign companies invest in building factories in countries like China, manufacturing techniques and expertise enter the society's pool of technological knowledge; technology spill over (Mankiw, 2003).

The importance of this technological transfer is difficult to quantify, however research conducted by (Damijan et al., 2003) concluded that that FDI had significant effects on the productivity of local firms because of technology spill over. When technology is transferred to another country through FDI (or any other means), the production possibilities frontier of the country shifts outwards, as is shown below:

Figure 1: Production Frontier curve

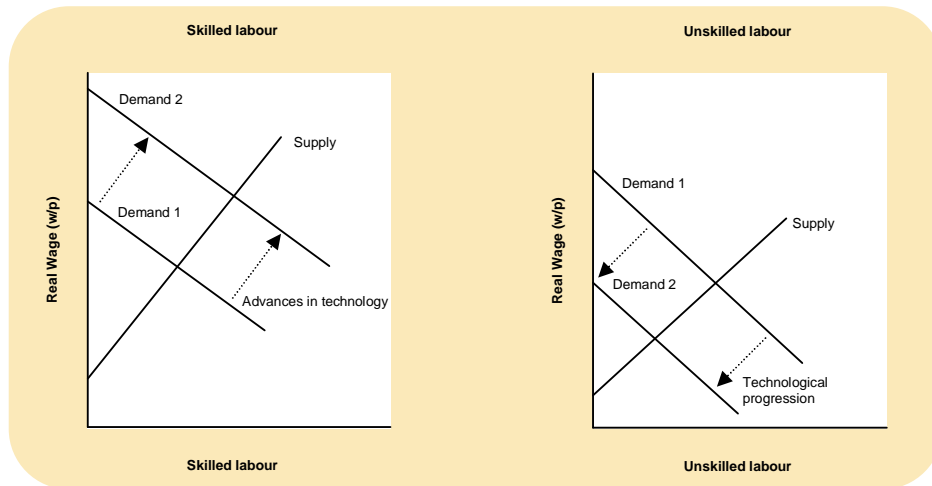


Mankiw, G. (2003) Principles of Economics. Page 25

This graph demonstrates that the combination of output that the economy can produce is increased as a result of technological gains. In addition to the production frontier curve shifting outwards, technology transfer has also seen the demand for unskilled employees on a global scale decreasing. This is as a result of robots being used in manufacturing and more efficient production methods being used, all of which can be learnt by emerging nations from the technology spill over that takes place from FDI. As can be seen in figure

two below, advances in technology decreases the demand for unskilled labour whilst at the same time increasing the demand for skilled labour.

Figure 2: Supply and demand of labour before and after technological transfer



In conclusion therefore technology transfer has helped developing nations grow in their global economic importance as technology spill over to local businesses has taken place. This spill over has mean that emerging nations such as India have been able to start up their own businesses such as Force Motors Ltd, using the same technology as western car manufacturers.

3 Competition, price and revenue

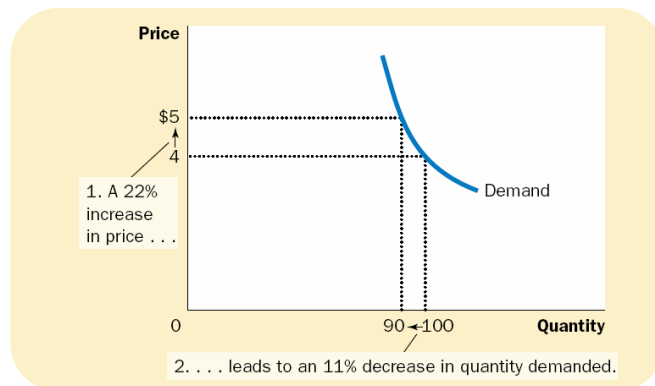
3.1 Why might a restaurant charge very high prices for wine and bottled water and yet quite reasonable prices for food?

Although one of the assumptions of much economic theory is perfect knowledge within the marketplace, this is rarely the reality. When a customer goes into a restaurant to buy a meal, the customer does not always remember to check the prices of the drinks in addition to the price of the food. Once an individual is inside the restaurant and has ordered his meal, the customer is in effect locked into buying drinks from within the restaurant. The reason the customer is locked into buying drinks from the restaurant is because there is a lack of alternative substitutes to buying a drink and buying a drink is a necessity. It is not normally possible to take beverages into restaurants and it would be unlikely that the customer would have taken a drink in with him, and thus if the customer would like to drink something with his meal, he is obliged to buy from the restaurant.

This example of expensive drinks inside a restaurant is a common pricing strategy used by businesses. Similar pricing policies are used by companies who want to get the client 'locked in' (Kangas, 2003, page 161) to a service provision. This is done by an attractive initial price for the service and it is the 'additional extras' that businesses make their profits on. This pricing tactic has been used in the interactive gaming industry for many years. Sony recently launched its new Playstation 3 and it is estimated that Sony will lose over \$240 on every unit sold (Fortt, 2006). Nevertheless, Sony expects to make millions of dollars from selling games and online services associated with the gaming device. Consequently this pricing strategy has been adopted by more industries than just the catering industry and therefore it is relevant for the wider business community to understand why businesses price in this manner. Essentially the reason why this pricing strategy can be used relates to the lack of substitutions which makes firms the price setter as opposed to the price taker (Sloman, 2004).

Within a free market perfect competition model, businesses are price takers, forced to sell their products where demand meets supply. However with the example of drinks in a restaurant, because there are very few alternatives to buying a drink, the customer's demand for beverages is inelastic. This is demonstrated in figure 3 below:

Figure 3: Inelastic demand



Mankiw, G. (2003) Principles of Economics. Page 94

As can be seen from the diagram, as the price of drinks in the restaurant increased by 22%, the quantity consumed only reduces by 11%. This is because price and the quantity consumed are not directly related.

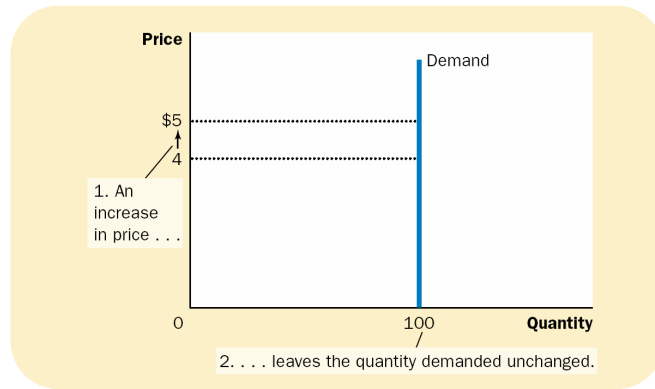
As has already been discussed, the only reason restaurants can charge this price premium on beverages is because of the lack of substitutes within the restaurant.

In conclusion therefore, because the restaurant business is so competitive and often restaurants compete on the face value of a meal, restaurants may choose to make its money from charging high prices for beverages. According to Sloman (2004) products with close substitutes tend to have a more elastic demand because customers can easily switch. With the case of restaurants and the other sectors such as the interactive gaming industry, buyers are without substitutes once they have purchased the first offering and thus at the mercy of the supplier to set the price for additional services.

3.2 Why are clothes with designer labels so much more expensive than similar 'own brand' clothes from a chain store, even though they may cost a similar amount to produce?

Fundamental to the understanding pricing strategy and demand is the fact that buyers all make their buying decisions for different reasons and gain different utility from buying a product. Whilst commodities such as water (as discussed previously) and petrol have inelastic demand, other products such as luxury goods are perceived to be elastic. When a product is price elastic, the seller will sell more units the lower the selling price is. Whilst designer labels such as Louis Vuitton and Gucci are clearly not commodities, through various means they have enabled their brands to become highly desirable and as a result, according to research completed by Ait-Sahalia et al. (2004), the high-end luxury brands have become perfectly inelastic for its buyers.

Figure 4: Perfectly inelastic demand



Mankiw, G. (2003) Principles of Economics. Page 94

Essentially, what Ait-Sahalia et al. (2004) argues in their research paper '*Luxury Goods and the Equity Premium*' is that the demand for luxury products such as Louis Vuitton does not change with price. Whilst this may be the case, the reason some high-end luxury brands have become price inelastic is because they have invested in influencing its customers through branding and advertising. (De Chernatony, 2001)

Consumers who buy high-end designer labels receive high amounts of utility from owning such products. The reason buyers get utility from these products relates to consumer buying behaviour. When buyers purchase products they are influenced by cultural, social, psychological and motivational factors. Through marketing, some brands such as Gucci are able to influence people to purchase its products because some people derive emotional value from owning such products. Because of the success of these high-end luxury products, so great is value gained from these buying luxury products, buyers can be numb to price changes.

Although it may be possible that some individuals see high-end luxury products as inelastic, the majority are more price sensitive. Essentially this means that they would be price elastic, so as the designer products became less expensive, more people would buy them. Even if designer companies would sell a larger quantity of its products if it were to lower its price for its good, this would not be profit maximising as it would reduce the firms surplus.

In conclusion therefore, the cost to produce an item does not determine the price of the item. When competition is low, substitutes are low and buyer power is weak firms can effectively maximise profits (Porters five forces analysis, Porter, 1980). In order to create a competitive advantage, designer labels pursue a differentiation strategy, and it is this

differentiation strategy which has helped businesses create products which are inelastic and even as Ait-Sahalia et al. (2004) argue, completely inelastic

3.3 Using the example of the bus sector, explain what is meant by price and non-price competition. If you were the Chief executive of a bus company which of the two alternatives would you adopt? Give reasons for your choice.

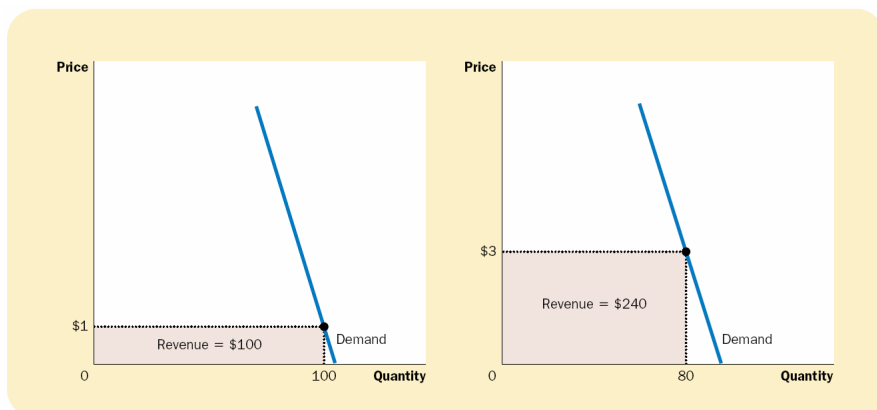
Non-price competition within the bus industry is where a bus company seeks to increase its market share through competing in the market place on issues other than price. Examples of this could include a friendly service, a greater number of bus stops, a larger number of buses operating on the roads, dropping off customers at their homes or loyalty cards with awards or discounts. There are lots of possibilities of how a bus firm could compete on issues other than price, however whatever strategy they adopt would have to differentiate the bus company from its competitors because the basis of non-price competition is that of differentiation.

In contrast to non-price competition, price competition is where a business chooses to compete on the basis of price. Within the bus sector rival services may get involved in a price war during which the companies will seek to undercut the other until one of the companies is driven out of business (or sense is seen and an overt or tacit agreement is reached). A strategy based upon competing on price would be a dangerous strategy to adopt, particularly as bus services normally operate in oligopoly markets. According to Mankiw (2003) an oligopoly is a market structure in which only a few sellers offer similar product.

If I was the Chief executive of a company, the strategy I would adopt would be dependent upon the competition. If there were only a few competitors (a market oligopoly), it would be within the bus companies interests to collude with its competitors and ensure that price was not the basis of competition. Whilst overt collusion is often illegal, Baumol and Blinder (2004) suggest that tacit collusion is common among markets with oligopolies. Tacit collusion is where companies compete in a way they would like their competitors to compete with them. Essentially this means avoiding entering into a price war which would erode pure profits (Ogden, 1989).

Although bus companies often operate in oligopolies, in rural areas bus companies can sometimes operate near monopolies as substitutes can be nearly impossible to find. If the example of holiday makers in a rural area like the Lake District is considered, the only alternative to taking a bus would be to hire a car (which would be very expensive) or hire a taxi (which would be expensive and may require booking in advance) or to walk. In a situation like this where competition is poor and the threat of substitutes is weak, then a bus service can charge a price premium until competition enters the market. Consequently it can be seen that it is important to have detailed knowledge of the market and the customers' price sensitivity before deciding upon a strategy. If buyer power was weak and there were few substitutes then prices would be relatively inelastic, thus as can be seen in figure 5, total revenue could be maximised through having high prices. As the Chief executive one of the objectives of the company would be maximising wealth, thus charging a high price in this situation might be appropriate.

Figure 5: Maximising total revenue under inelastic demand



Mankiw, G. (2003) Principles of Economics. Page 99

Nevertheless, in the long run if a bus company charged too high prices, it would encourage competition to enter the market, either as a direct competitor providing a bus service or a substitute such as group taxi services or rail transport. Therefore as Chief executive of the company, I would almost certainly, pursue a strategy non-price strategy aiming to differentiate the bus service through offering more utility to the user in comparison to other bus services and other modes of transport.

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