a) Economists in the ministry of agriculture in Kwale County have estimated the following market model for fertilizer based on annual time series data on price and quantity in thousands.

\[ Q_d = 36 - \frac{1}{3} p \]
\[ Q_s = -9 + \frac{1}{2} p \]

At equilibrium \( Q_d = Q_s \)

\[ 36 - \frac{1}{3} p - 9 + \frac{1}{2} p = 0.833 P \]
\[ P = 54 \]

The government intends to reduce the market price by 20% per bag as requested by the farmers.

New price as requested \( 0.8 * 54 = 43 \)

Quantity \( Q_d = 36 - 0.333 * 43 \)

\( Q_d = 22 \)
Quantity

\[ Q_s = 13 \]

Excess demand = \((24 - 13) = 11\)

Alternatively a new plant costing 20 million with a life time of five years, producing 5 million worth of fertilizer annually can be constructed. Assuming a 10% market rate of return.

\[
\begin{align*}
\text{Annual return} &= 5 \text{ million} \\
\text{Initial investment} &= 20 \text{ million} \\
\text{Market rate of return} &= 10\% \\
\text{NPV} &= 5 \times 3.791 - 20 \\
\text{NPV} &= (1.045) \text{ (negative)}
\end{align*}
\]

Investing in a fertilizer plant will result into a negative. The government would rather reduce the price by 20%.

b. The telecommunication industry in Kenya today forms an oligopolistic market structure where few firms operate in the economy and can easily collude to fix prices. An oligopoly is a market structure in which a few firms dominate. When a market is shared between a few firms, it is said to be highly concentrated. Although only a few firms dominate, it is possible that many small firms may also operate in the market.
Price stickiness in oligopoly

The theory of oligopoly suggests that, once a price has been determined, it will stick at this price. This is largely because firms cannot pursue independent strategies. For example, if a service provider raises the price of its calling rates, rivals will not follow suit and the mobile operator will lose revenue – the demand curve for the price increase is relatively elastic. Rivals have no advantage to keep their prices as they are. However, if the operator lowers its price, rivals would be forced to follow suit and drop their prices in response. Again, the operator will lose sales revenue and market share. The demand curve is relatively inelastic in this context.

A game theory approach to price stickiness

Pricing strategies can also be looked at in terms of game theory, that is in terms of strategies and payoffs. There are three possible price strategies, with different pay-offs and risks:

- Raise price
- Lower price
- Keep price constant
The choice of strategy will depend upon the pay-offs, which depends upon the actions of competitors. Raising price or lowering price could lead to a beneficial pay-off, but both strategies can lead to losses, which could be potentially disastrous. In short, changing price is too risky to undertake. Therefore, although keeping price constant will not lead to the single best outcome, it may be the least risky strategy for an oligopolist.

Game theory also predicts that:

There is a tendency for firms to form because co-operation is likely to be highly remunerative. Co-operation reduces the uncertainty associated with the mutual interdependence of rivals in an oligopolistic market. While cartels are 'illegal' in most countries, they may still operate, with members concealing their unlawful behaviour.

Cartels are designed to protect the interests of members, and the interests of consumers may suffer because of:

1. Higher prices or hidden prices, such as the hidden charges in credit card transactions
2. Lower output
3. Restricted choice or other limiting conditions associated with the transaction
A classic game called the **Prisoner's Dilemma** is often used to demonstrate the interdependence of oligopolists.

c.

The government has two options, either to levy a direct tax (income tax) or an indirect tax (V.A.T.)

a) **Direct tax**

This kind of levy is payable directly by the individual or company, whose obligation it is to pay. It can't be transferred to anyone else. The most common form of direct tax is income tax, which has to be paid by individuals, cooperative societies, and trusts on the total income they earn. This can include income from salary, income from house property, business and professional income, capital gains and income from other sources such as interest. The tax liability depends on the residential status and gender of the person being taxed.

b) **Indirect tax**

Indirect tax is levied by the government and collected by an intermediary from the person who bears the ultimate economic burden of the tax. What this means is that if you are purchasing goods or services from anywhere and you are the final consumer, then the tax levied on the manufacturer will ultimately get passed on to you. This kind of tax increases the total amount you pay for something. Sometimes it may be represented separately from the price of the item or may be shown together with the cost of the product itself. For example, the service tax paid on a food bill is shown separately.
When a direct tax is levied, it has a direct impact on the individual income of households in the economy which will have an adverse effect on consumption and saving since it reduces the nominal wage. This will cause an outcry among citizens of the country.

The best alternative is to use indirect taxes. This is because indirect taxation does not have a direct impact on the nominal income of households in an economy but reduces demand pull inflation by reducing the real wage. Secondly, one advantage of indirect taxes is that they can be used explicitly to correct for market failure caused by environmental damage. Indeed, governments across the world are coming to the view that indirect taxes can be made more intensively to meet environmental objectives. The use of indirect taxation is one solution to the problem of externality: the producer or consumer is charged the full social cost and demand will respond accordingly. Environmental economists agree that the most effective way to protect the environment from action disable and other energy-related pollutants is to tax the polluter. Indirect tax increases will push up prices, decrease consumption and hence reduce the effects of negative externalities such as damage to the environment. However, there is a danger that using green taxation to influence demand will damage specific industries.

c. Discuss the cobweb model and its significance in maize market regulation in Kenya.

The cobweb model or cobweb theory is an economic model that explains why prices might be subject to periodic fluctuations in certain types of markets. It describes cyclical supply and demand in a market where the amount produced must be chosen before prices are observed.

Producers’ expectations about prices are assumed to be based on observations of previous prices.
The cobweb model is based on a time lag between supply and demand decisions. Agricultural markets are a context where the cobweb model might apply, since there is a lag between planting and harvesting. Suppose, for example, that as a result of unexpectedly bad weather, farmers go to market with an unusually small crop of strawberries. This shortage, equivalent to a leftward shift in the market's supply curve, results in high prices. If farmers expect these high price conditions to continue, then in the following year, they will raise their production of strawberries relative to other crops. Therefore, when they go to market the supply will be high, resulting in low prices. If they then expect low prices to continue, they will decrease their production of maize for the next year, resulting in high prices again. As this process repeats itself, oscillating between periods of low supply with high prices and then high supply with low prices, the price and quantity trace out a spiral. They may spiral inwards, as in the top figure, in which case the economy converges to the equilibrium where supply and demand cross; or they may spiral outwards, with the fluctuations increasing in magnitude.
References
