National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Exemplar for Internal Assessment Resource

Economics Level 3

Resource title: Dairy Boom

This exemplar supports assessment against:

Achievement Standard 91401

Demonstrate understanding of micro-economic concepts

Student and grade boundary specific exemplar

The material has been gathered from student material specific to an A or B assessment resource.

Date version published by Ministry of Education: December 2012
To support internal assessment from 2013

	Grade Boundary: Low Excellence
1.	The student demonstrates a comprehensive understanding of micro-economic concepts, which is required for Excellence. The Merit requirements have been covered, and for Excellence the standard also requires justification of the implications for consumers, producers and/or government, supported by models and data. The student mentioned the circular flow model in Report 1, but did not present the model and explain how it supports the justification. Also the statement "*A consequence of this could be a decrease of consumer spending in other parts of the economy*", was not explained giving likely examples. Refer to parts A. The student has justified the implications for consumers in Report 1 using a secondary source, but has not used data or information to support the implications for producers. Refer to part B. One model has been presented and used to justify a detailed explanation of the implication to consumers in Report 2. Refer to part C. A more secure Excellence would be attained if the circular flow model was presented and used to support the explanations provided in Report 1 of implications for consumers and producers, and additional data or information was used to support the explanation of implications for producers in both reports.

Student 1: Low Excellence

Report1-Impact of high milk prices on consumer demand (elasticity of Demand)
Implications:

Consumers

An implication of the price of milk increasing in price and it being an inelastic good is that even though consumers will be consuming fewer cows' milk in relation to its higher price, households will still be spending more in total. As milk is considered a necessity, consumers will continue to buy cow's milk and thus a higher percentage of the household's disposable income will be spent on purchasing cow's milk. Therefore households in New Zealand will have smaller disposable income to spend on other goods and services including luxury goods. A consequence of this could be a decrease of consumer spending in other parts of the economy. A

With an increase in the price of cow's milk, consumers are likely to switch to substitute goods such as soy milk. This will result in an increase in the demand for soy milk and other substitute goods. However these substitute goods would not provide the same levels of calcium that cow's milk does and this could lead to consumers having to get their recommended calcium intake by other means – either a different food high in calcium such as yoghurt or from calcium pills.
With an increase in the price of milk, an implication of less cow's milk being demanded is that households will consume less milk. In the short term there may be no immediate health concerns but in the long term there may be repercussions on the health of New Zealand households. This could be due to a lack of calcium in people, leading to brittle bones, bad teeth and even osteoporosis in extreme cases.[1] Although cow's milk is an inelastic good, meaning that households are not likely to change their demand for cow's milk significantly, this is a foreseeable consequence of New Zealanders consuming less milk. In the long term, this could put more pressure on government spending on the health sector. B

Producers

An implication of less cow's milk being demanded is that supply of cow's milk from New Zealand producers will have to decrease in the domestic market. Therefore suppliers will either have to cut down their production significantly or find another market overseas where demand is higher.
In order to allow most households in New Zealand to afford cow's milk the Government may have to put a limit on the price of cow's milk if it continues to increase – a price ceiling. This might force firms to focus their resources and production to exporting cow's milk. There is a high global demand for cow's milk in the international market and firms would be able to charge prices that local consumers cannot afford. This would result in firms slashing their supplies to the domestic market.
However if cow's milk suppliers were increasing their exports of cow's milk, their production (total output) would increase, which could lead to an increase in total revenue. This will mean that they have a larger demand for their product and this could lead to an increase in employment in New Zealand households, with the total disposable income for households in New Zealand increasing. This could lead to consumers being able to afford to buy cow's milk at higher prices so demand in the domestic market increasing. The circular flow model is used to see these foreseeable consequences. A
If the price of cows' milk increases and more consumers switch to soy milk, this will result in an increase in the demand for soy milk. This will result in firms that produce soy milk increasing their supply to the domestic market. This could lead to an increase in output and thus an increase in the firm's total revenue and profit. This can result in firms increasing their investment and employing more workers. This could result in higher household income levels and thus a higher disposable income. However this could result negatively on soy milk producers as with higher disposable incomes consumers will be able to afford to pay a higher price for cow's milk and thus may switch their consumption back to cow's milk and decrease their demand for soy milk.

[1] http://www.webmd.com/osteoporosis/guide/strong-bones

Report 2-Impact of high milk prices on milk fat production over time (elasticity of Supply)

Implications:

Producers

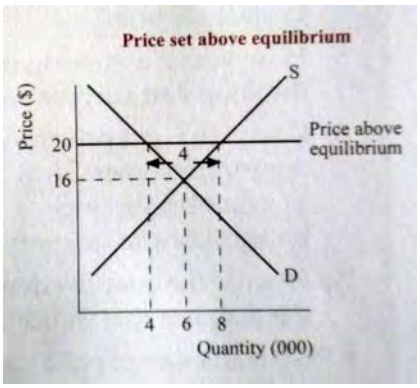
When there is an increase in price, producers increase their quantity supplied. This leads to increased revenue for producers. This results in increased profit which can in turn lead to increased investment and increased business confidence. With increased investment, firms are likely to expand their business and production output, meaning supply of cow's milk will increase.

If the dairy boom continues, with high prices for milk, producers of other goods that use the same resources to produce them may look at switching their production to cow's milk. For example sheep farmers who are farming sheep for wool may decide to move their production to cow's milk as it is a more profitable good. Sheep farmers would use much the same capital and raw materials in the production of wool so it would be likely that they will convert their resources to producing cow's milk.

Consumers

If producers are supplying more cows' milk at higher prices, receiving more revenue and therefore increasing investment – especially for human labour, there may be an increase in employment. This will result in employment rates increasing and overall household income will increase.

When there is an increase in quantity supplied there will be a resulting change in quantity demanded. At a higher price consumers are less likely to buy as much cow's milk as at a higher price milk is less affordable. Therefore both the quantity supplied will increase and the quantity demanded will decrease. This is shown by movements up the supply curve and the demand curve. This results in a surplus – where the quantity supplied exceeds the quantity demanded and thus the market price is above the equilibrium price.[2] As a result of the excess supply of milk, there will be strong market pressure to reduce the market price of cow's milk as producers try to get rid of unsold stock. When the price decreases, there will then be a decrease in quantity supplied but an increase in quantity demanded. This will continue until QS=QD, returning the market back to equilibrium.



C

Government

When the price of milk increases, there is a resulting increase in quantity supplied hence increased revenue and firms' profits. This means there will be an increase in tax revenue received by the government. With an increase in overall consumer spending, there will also be an increase in GST, the indirect tax paid to the government. This increase in government revenue will allow the government to increase spending in the economy.

[2] Geoff Evans, Senior Economics

	Grade Boundary: High Merit
2.	The student demonstrates an in-depth understanding of micro-economic concepts, which is required for Merit. The Merit requirements have been covered, and for Excellence the standard also requires justification of the implications for consumers, producers and/or government, supported by models and data. The student has used numerical information in Report 1 to justify the explanation of the implications for consumers. However, the student has not used a model showing an inelastic demand curve and changes to P and QD to support the justification. Refer to parts D. The student has not used a supply and demand model and data or information to support the explanation of implications for producers in Report 1. Refer to part E. In Report 2 the student has not provided a detailed explanation of implications for consumers, producers, and government supported by models and data or information. Refer to part F. To reach Excellence the student would need to justify the implications for consumers, producers and government with a detailed explanation rather than bullet points (Report 2). Additionally, the student would need to use models and data or information to justify the implications, which is required for Excellence.

Student 2: High Merit

Report1-Impact of high milk prices on consumer demand (elasticity of Demand)

Implications: Consumers

-For those consumers that consider milk to be an elastic good, a dairy boom is likely to cause a switch to the use of a substitute good such as Soy Milk (indicated as the most likely substitute by the survey). According to countdown online 2L of soy milk from the cheapest brand; signature range costs $6 while 2L of signature range Cow's milk currently costs $3.75. This means that it would take a price increase of more than $2.25 or 60% to make Cow's milk more expensive than soy milk. Therefore whether the price increased by this much or not, the consumer would still suffer a significant rise in their grocery costs per week. This means that consumers would experience a decrease in their disposable income and are likely to need to decrease their demand for luxury goods. D

- For those consumers that consider milk to be an inelastic good, a dairy boom is likely to cause no change to their quantity demanded. This means that consumers will still be able to consume the same amount of milk, however, they will have to pay a higher price for it. This will mean a decrease in their disposable income and therefore their ability to purchase luxuries. This could result in a slight decrease in consumers' standard of living overtime. D

- If consumers were to decrease their quantity demanded for milk, their consumption of milk will also decrease. As milk is high in nutrients, this loss of consumption could lead to a calcium deficiency which could lead to significant health issues such as osteoporosis in the longer term. These health issues could lead to a need for government intervention in the health sector (see government implications).

- Consumers may also experience increases in the price of milk products. Goods like milk shakes and coffees use milk in production therefore firms' costs of production will increase. This is likely to cause an increase in the price of these final goods as firms will have to increase the price to offset the change in their costs of production.

Producers

-An implication of high milk prices on producers of milk products such as milk shakes and coffees will experience increased costs of production. This will cause them to decrease their supply and therefore experience lower revenue and incomes. This may cause them to diversify or switch to the use of a substitute good such as soy milk. E

-Producers of cows' milk are likely to gain increased profits. This is because they will sell the same amount of production at the higher price to consumers here and overseas. This may mean that producers will try to increase production and therefore may need to employ extra workers. (See government implications)

-Those consumers that treat milk as an elastic good will switch their demand to soy milk. This will lead to increased sales for producers of soy milk and therefore cause increased revenue and profits. This may cause these producers to invest in order to increase their production.

Government

-Whether consumers choose to retain their demand for cow's milk or switch to the consumption of a substitute good such as soy milk, they will be increasing their spending on goods and services as to consume either good is now relatively more expensive. This will lead to increased earnings through goods and services tax for the government.

-The production of cows' milk is based in New Zealand. This means that when firms choose to increase production due to increased sales (demand) they are likely to hire workers. This will mean increased employment and therefore lower costs for the government as less people are on the unemployment benefit.

Report 2-Impact of high milk prices on milk fat production over time (elasticity of Supply)

Implications:

Producers

-more profit

-invest more and expand business

-economies of scale

-shift resources to the production of milk (runs risk by not diversifying in the event of bad weather for example)

F

Consumers

-more employment

-more income so can increase spending on goods and services, and savings

-consume less- calcium, calcium deficiency levels decrease – long term health risk

Government

-more revenue through tax

	Grade Boundary: Low Merit
3.	The student demonstrates an in-depth understanding of micro-economic concepts, which is required for Merit. The Achieved requirements have been covered, and for Merit the standard also requires detailed explanations of the micro-economic concepts supported by models and data. The student has covered the theory of elasticity of demand and has used secondary sources of information, survey results, mid-point method and TR method calculations to support detailed explanations of the theory of elasticity of demand, and has applied this information to the dairy market. However, the student has not used a model and income and cross elasticity of demand coefficients from the survey to support these explanations. Refer to parts G. Models and secondary sources of information have been used to support explanation of the theory of elasticity of supply, and a detailed explanation of its application to the dairy market. However, the PPF model was not directly referenced in the explanation. Refer to parts H. A more secure Merit would be attained if a model and income and cross elasticity of demand coefficients from the survey were used to support the explanation of elasticity of demand, and all models incorporated into the detailed explanations of elasticity of demand and supply.

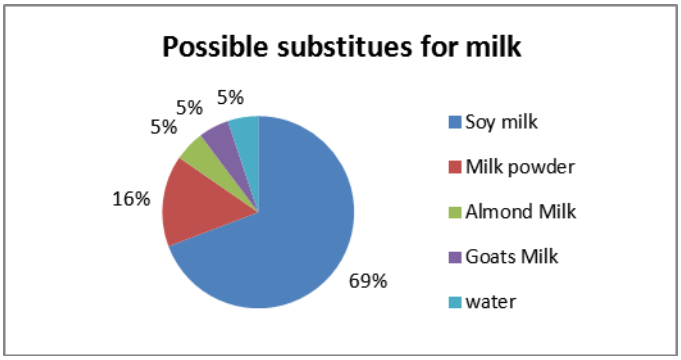
Elasticity of Demand

Availability of Substitutes

If a good has many substitutes, it would mean that consumers who buy this good would have plenty of alternative goods (substitutes) to switch to if the price of the good increases. Substitute goods are goods that can be used in place of each other, i.e. margarine and butter. Therefore a product with few or no substitutes would be inelastic. "Inelastic demand includes products that tend to have no or few close substitutes and are often considered necessities such as; bread, milk, medical services. The products may be addictive such as cigarettes or alcohol. When the relative cost of the commodity is a small fraction of total outlay then the demand will be inelastic; for example a newspaper." In relation to graph (*student did a graph*) from my class survey, 54% surveyed consider milk to not have many substitutes; therefore since there are few substitutes' milk might be inelastic.

G

In relation to the class survey and the good; Milk (2L), to having substitutes, from the survey I found that there were five substitutes; Soy Milk, Milk powder, Almond Milk, Goat Milk and water. From the results in my survey milk has five possible substitutes, therefore it has quite a few, and for a good to be elastic, there will be plenty of substitute goods such as; soy milk, milk powder, almond milk, goats milk and water, which consumers can choose from. Therefore the evidence from my survey is suggesting that 2L milk is an elastic good. This is because there are plenty of substitute goods for 2L milk, therefore in reference to Dan Rennie "Inelastic demand includes products that tend to have no or few close substitutes." Since there are five substitutes, evidence suggests that 2L milk is an elastic good. In relation to milk in general I can say that milk is elastic.



Proportion of Income Spent on the Good

If a good takes up a very small fraction of consumers' income, it is likely that an increase in price is unlikely to cause a significant decrease in the quantity demanded of that good, so it is likely to be inelastic. In relation to the class survey, we asked how much of the consumers' income was spent on their weekly demand for 2L milk. From the survey results I found that approximately 54% of the people spent less than 1% of their income on 2L milk. From this I determined that over half the people I survey spent a small fraction of income on 2L milk. In relation to the evidence form my survey which shows that 56% of the people, so over half the people I surveyed, spend less than 1% of their income on 2L milk. I can conclude that the price elasticity of demand for 2L milk is inelastic. In relation to milk, I can say that milk is inelastic based on this evidence.

Nature of the Good

A necessity good is a good that we consume in order to survive, as we cannot live without because it is so essential. These are essential resources in order for survival. Luxury goods are things we do without when we don't have the income to support the purchase. "If the price of a necessity good increases, the proportion of decrease in quantity demanded for the good will be small in comparison to the price increase, because consumers will continue to buy the good. If they reduce their quantity demanded, the drop in quantity demanded is proportionally smaller than the increase in price. Therefore necessities are inelastic, luxuries are elastic." "Milk is a product of nature starting with green grass, clear water and healthy cows. Milk has all the building blocks for a vital and healthy life. Dairy foods such as milk are the major source of calcium in our diet and also provide other essential nutrients important for growth and development. New Zealand Dietary Guidelines recommend two or three servings of dairy every day." This source gives evidence that milk is an essential because it provides us with nutrition and is a major source of calcium. Also the source says that two or three servings of dairy are recommend daily. This suggests milk is a necessity. In relation to my survey I found that 83% of the people I surveyed found milk to be a necessity good, therefore this means that for them, if the price of milk increased they would continue to buy milk and if they did reduce their quantity demanded it is likely to be proportionally smaller than the increase in price. "I think milk is a necessity good. This is why I find that when the price of 2L milk does increase we don't find a significant or concerning decrease in the demand for 2L milk. I find that mostly all customers continue to buy 2L milk, even when the price has increased. That is why I find milk a necessity, as most people continue to buy milk, even when the price increases, because they too find it a necessity. I find that the demand for 2L Milk is continuous and on-going. We have daily orders and deliveries, for milk in our store. We stock our fridges every 2 hours, with 2L milk. So we find that we have a fairly high demand for milk."

G

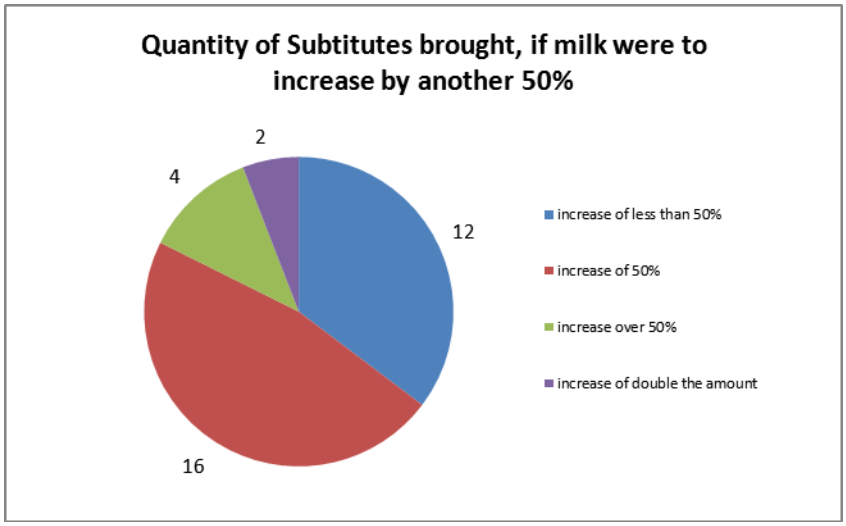
In my survey I also asked consumers what they would do if the price of 2L milk doubled (*student did a graph*). Approximately 93% of the people I surveyed said that they would continue to buy 2L milk even if the price of milk doubled. This shows that if the price did double approximately 40% of the people would reduce their quantity demanded by half their original amount. Approximately 30% of the people said that they would marginally reduce their quantity demanded of 2Lmilk. Approximately 17% of the people said that they would still continue to demand the same amount of 2L milk. From the results of my survey and the evidence from class notes and Dan Rennie, the evidence is claiming that that the price elasticity of demand is elastic. This is because from the results in my survey milk has six possible substitutes, therefore it has quite a few, and for a good to be elastic, there are plenty of substitute goods such as; soy milk, oat milk, coconut milk, almond milk etc., which consumers can choose from. Therefore evidence from my survey is suggesting that 2L milk is an elastic good. This is because there are plenty of substitute goods for 2L milk, therefore in reference to Dan Rennie "Inelastic demand includes products that tend to have no or few close substitutes." Since there are five-six substitutes, evidence suggests that 2L milk could also be an elastic good.

Therefore with the given evidence from the market demand schedule (*student did include tables*), using the mid-point method calculation, I can assume by looking at the degrees of elasticity that the price elasticity of 2L milk is inelastic as it is less than one (*student calculated 0.6618)*. Therefore in accordance with the evidence in the determinants of demand and the concept; elasticity of demand and from my class and individual survey, I can say, that an increase in its price is likely to cause a less than proportionate decrease in quantity demanded. In relation to the boom in the dairy industry resulting in higher milk prices having an

G

impact on consumer demand, from my gathered evidence I can say overall that milk is an inelastic good. There are many factors such as; availability of substitutes, proportion of the income and nature of the good which contribute to whether milk is an inelastic or elastic good. I believe that milk is an inelastic good. In relation to the concept; elasticity of demand, milk is an inelastic good therefore an increase in its price due to the boom in the dairy industry, is likely to cause a less than proportionate change (or decrease) in quantity demanded. In relation to Cross Elasticity of Demand, "Cross elasticity of demand measures the responsiveness of the demand for one good, as a result of a price change in another good." The coefficient of the calculation determines whether it is a substitute or complement good. In this instance there will be a positive coefficient as the relationship is positive. The cross elasticity of demand coefficient is calculated by: percentage change in quantity demanded of X divided by the percentage change in the price Y. This calculation is relevant as it indicates that if milk increases in price then the coefficient will be positive and the quantity of substitutes demanded will increase. Therefore an implication for consumers of an increase in the price of milk is that consumers will switch to other options such as; soy milk, milk powder, almond milk, goats' milk etc., rather than buy cow's milk as a result of an increase in the price of milk.

G



From my results I am able to see that approximately 47% of the people surveyed would increase their quantity of substitutes by exactly half the amount if the price of milk were to increase by another 50 percent. This means that consumers will decrease their consumption of milk (cows) by half the original amount. This means that they will spend proportionally less income on cow's milk and will use this in another way. In relation to my survey and cross elasticity of demand I am able to see that if the price of milk increased by another 50 percent, then the demand for substitutes would increase by exactly half the amount in relation to my survey results which say that 47% of those survey would choose that option. This backs the fact that an increase in price of a good results in an increase in the demand for the substitute.

Producers

Since the dairy market is booming the impact of higher milk prices on consumer demand in relation to producers is likely to result in a less than proportionate change (or decrease) in quantity demanded in comparison to the increase in price of milk. An increase in price will mean that the quantity demanded for milk will decrease as a result of the price increase due to dairy market booms, but milk is an inelastic good. Therefore this means that when the price increases, the change in quantity demanded is proportionally less than the change in price. In relation to the concept; elasticity of demand, milk is an inelastic good therefore an increase in its price due to the boom in the dairy industry, is likely to cause a less than proportionate change (or decrease) in quantity demanded. Therefore in relevance to producers this is likely to cause an increase in profits and revenue. Since the price of milk will increase, but since milk is an inelastic good, in theory producers profits and revenue are likely to increase their quantity supplied. This is because Q1 x P1 will be less than Q2 X P2., therefore resulting in an increase in revenue, as milk is inelastic. In an example from my survey results, using the Total Revenue method. An example of the total revenue method from my market demand schedule (**TR= P X Q)** *$3.70 X 117 TR= $432.90*; *$3.90 X 113 TR =$440.70*

G

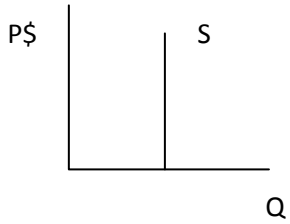
From the total revenue method calculation, it shows that as the price increases from $3.70-$3.90, the total revenue also increases, from $432.90-$440.70. Therefore from the calculation of the total revenue method I can determine that since an increase in price resulted to an increase in total revenue, the price elasticity of demand for 2L milk must be inelastic. Therefore in relation to producers if the price of milk increases due to a boom in dairy market, the producers are likely to cause an increase in total revenue method for price elasticity of demand since milk is an inelastic good.

Elasticity of Supply

Elasticity of supply is defined as the responsiveness of the quantity supplied of a good or service, to the change in price. In this context I am referring to milk as my good, therefore if the price of milk increases, producers tend to generally increase their quantity supplied. The degree in which the quantity supplied changes in response to the increase in price is dependent on the time period and other factors that may have an effect on the elasticity of supply. Elasticity of supply is calculated by the percentage change in quantity supplied, over the percentage change in the price, using the percentage change method, to calculate the degree of elasticity of supply of milk. From these calculations I am able to determine if milk supply is inelastic or elastic. If milk supply is inelastic then the change in the quantity supplied is proportionally less than the change in price. So this means that in the situation of an increase in price of milk, the change in the quantity supplied will be proportionally less than the increase in the price of milk. If milk is elastic than the quantity supplied is proportionally greater than the change in price. So this means that in the context of an increase in the price of milk, the quantity supplied of milk will be proportionally greater than the increase in the price of milk.

Market/Momentary time period

"Momentary supply is supply at this moment in time and is sometimes referred to as supply on a given day when quantity supplied is fixed regardless of price" If the price of milk increases, in the market time period, the supply of milk is completely inelastic. This can be illustrated by the inelastic supply curve, drawn in a vertical line.



The vertical Supply Curve reflects milk producers are unable to increase their quantity supplied at the present point in time, to meet the demand as it takes time to produce milk and supply more milk. It also shows that there is no responsiveness in the quantity supplied, to a change in price and the coefficient of elasticity of supply equals zero.

H

Short-run

The short term supply of milk will be inelastic. This is because in a short term factors of production cannot be altered to increase or decrease supply. Some possible examples are; there are only certain number of milking cows in a particular farm, so breeding stock, size or area of the farm, milking sheds, capital machinery and pasture all have a limited capacity. Therefore the quantity supplied cannot easily be increased to respond to higher prices. At least one input is kept fixed; due to this fixed input(s), the firm's ability to increase their quantity supplied of milk is restricted. Supply in the short run will be more inelastic and less elastic.

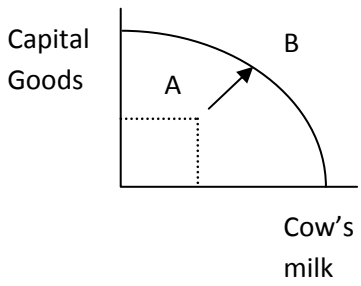
In relation to the production of milk a fixed input may be the capital machinery. Since at least one factor is fixed, this means that the other resources are able to be changed. Nevertheless the ratio of, output per input will gradually begin to decrease, as each new input is not resulting in as much output. This again relates to the fixed input(s), because of the fixed resource(s), is unable to be increased if production is to increase. There are limitations as to how quickly the number of capital machinery can be increased therefore in the short run; the quantity supplied will not be very responsive to changes in price, i.e. inelastic supply. Therefore in relation to the production of milk, with the example of capital machinery as a fixed input, this means that the producer is unable to increase their capital machinery therefore restricting themselves from increased production and increasing their quantity supplied. Therefore supply will be inelastic in the short-term period as production of milk cannot be increased as much to respond to higher prices.

Long-run

In the long run all inputs are variable. This allows for the supplier to be more adaptable and efficient. Therefore enabling the ability to change production in response to a change in price is, so the change in quantity supplied is achieved in a more efficient manner. Supply becomes more elastic and less inelastic in the long run. Over time all resources are able to be changed. Increasing the scale of the production of milk will result in a decrease in the average cost of production resulting in the economies of scale taking place. This means by increasing the scale of production that it will become possible to get discounts on bulk purchases such as purchasing production equipment such as; machinery and tractors. Increasing the scale of production will mean it is possible to get discounts with bulk purchases such as; buying milk production machinery or equipment. It is relatively easier to increase the total output of milk in the long-run time period to respond to increase in price due to economies of scale.

There are also other factors which affect the price elasticity of supply. If the good is durable in terms of storage, then the supply is more elastic and the supply can be increased more readily. Milk is a non-durable good, as you cannot store milk for a long-period of time as it has an expiry date of around 4-5 days, therefore since milk cannot be stored milk is inelastic. Soy milk which is a strong substitute for cow's milk can last longer, therefore making it elastic; however cow's milk, which is produced in New Zealand can only be stored and refrigerated for 4-5days. This means that Soy milk is relatively more elastic in comparison to cow's milk, as it cannot be stored for as long as soy milk. This is because milk is a non-durable good, making it inelastic.

If firms have excess capacity then it is relatively easy to increase quantity supplied, therefore the good must be elastic. If a dairy farm had excess land space they were not using, they then have the resources available to potentially increase their production. If the firm has excess capacity it is then producing below its maximum output. If they have excess capacity, suppliers do not have to put in more resources as they already have spare or idle resources available. This means that it would be relatively cheaper to convert the spare/idle resources into production and also the resources would be able to be converted at a faster rate.



H

The type of good or service depending on whether it is easier or harder to produce contributes to a goods elasticity of supply. Soy milk is relatively more harder to produce as there is more time involved as the soy beans need to be harvested first therefore this can take up to weeks, to just produce the beans itself, therefore there is a more longer time process involved. Cow's milk on the other hand, is a relatively easier process, "Traditionally, milking was done twice daily, but a number of farmers now milk their cows only once a day. They report a slight reduction in milk production, but say that this is offset by lower labour and operational costs." Both cow and soy milk, have strict manufacturing specifications, in order to kill the bacteria. Therefore they both have to meet specified standards of production. Cow's milk tends to have a relatively more stricter standard to follow , therefore the production cow's milk, is relatively more inelastic to soy milk, which is more elastic in relation to cow's milk.

(Quotes footnoted and student did a bibliography)

	Grade Boundary: High Achieved
4.	The student demonstrates understanding of micro-economic concepts, which is required for Achieved. The Achieved requirements have been covered, and for Merit the standard also requires detailed explanations of the micro-economic concepts supported by models and data. The student has presented the survey data and a model, calculated the co-efficient of price elasticity of demand and a TR method calculation, and the explanations link price elasticity of demand and TR to the dairy market. Refer to parts I. However, the student has made an error in interpreting the results from the survey so has incorrectly calculated the income elasticity of demand coefficients. Additionally, the student has not explained how or why "*I can assume that relative to income elasticity of demand, cows' milk is relatively elastic*". Refer to parts J. The student has explained substitutes and elasticity of demand using some surveyed information, however cross elasticity of demand and the calculated coefficient(s) have not been used to add support to this explanation. Refer to part K. The student has explained the theory of elasticity of supply using models and information to support the explanations, but in places has shown some confusion around revenue versus profits in the costs of production section, and the reason for a higher milk price in the introduction. Refer to parts L. To reach Merit the student would need to fully address the errors outlined above, and add more detail and the cross elasticity of demand coefficient to the explanations to demonstrate an in-depth understanding.

Student 4: High Achieved

THE DAIRY BOOM

The dairy boom is being experienced right across the global economy. Generally speaking, it is an increase in the price of New Zealand's cow's milk in response to an increase in the global demand for it. This price increase has meant that producers are willing and able to export their milk at higher prices, resulting in the milk that producers sell in New Zealand becoming more expensive as well (because the 'risk' of increasing the price has lessened globally). This therefore means that a rise in the global economy's demand for New Zealand's cow's milk has resulted in the price of milk in New Zealand rising. This will hence affect New Zealand's consumers and producers.

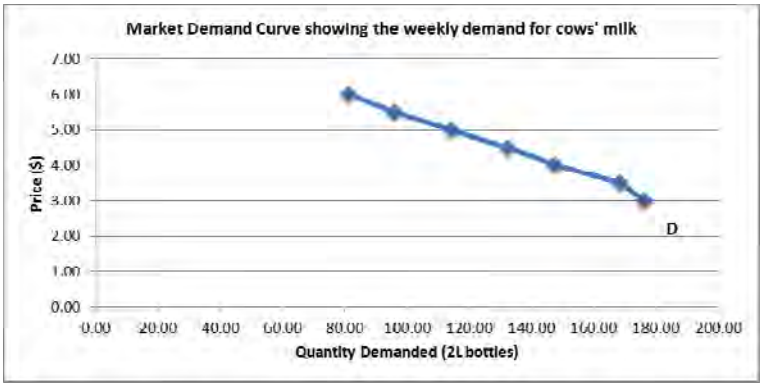
This report will investigate whether cows' milk is elastic or inelastic, and discuss the impact of rising milk prices in relation to its elasticity from the dairy boom on consumers and producers. Elasticity of demand is defined as a measurement of the responsiveness of quantity demanded of a good compared to a change in its price. If cows' milk were deemed elastic, an increase in its price would cause a proportionally larger decrease in quantity demanded. If cows' milk is said to be inelastic, then an increase in its price will lead to a proportionally smaller decrease in quantity demanded. There are a number of factors to consider, and a range of different techniques used when determining the elasticity of cows' milk such as price elasticity, income elasticity and the effect of substitutes. I will investigate these different techniques, and from this, discuss whether cows' milk is elastic or inelastic, and then evaluate these findings in relation to consumers and producers.

Price Elasticity of Demand

Price elasticity of demand measures the extent of change in quantity demanded as a response to a price change of the good. Below is a table showing the price elasticity of cows' milk as price increases (derived using both the midpoint method, and the total revenue method)

Market Demand for cows' milk (2L) per week			
Price ($)	**Quantity Demanded (2L Bottle)**	**Price Elasticity (Total Revenue Method)**	**Price Elasticity (Midpoint Method)**
3.00	176.50	529.50	
3.50	168.50	589.75	-0.3014
4.00	147.50	590.00	-0.9968
4.50	132.50	596.25	-0.9107
5.00	114.50	572.50	-1.3846
5.50	96.00	528.00	-1.8456
6.00	81.50	489.00	-1.8789

I



According to the values I calculated for price elasticity of demand using the midpoint method, cows' milk starts off relatively inelastic from $3.00 to $4.50 with values of price elasticity ranging from 0.3014, to 0.9968, and 0.9107. According to economic theory, when the value of price elasticity (derived from the midpoint method) is less than one, the good or service is deemed inelastic. These values indicate that the increase in the price of cows' milk is proportionally more than the decrease in quantity demanded. However, when price exceeds $4.50, cows' milk then becomes elastic as the values for price elasticity are greater than 1. This means at the new prices (of above $4.50), the decrease in quantity demanded is proportionally more than the increase in price. This suggests that consumers will likely demand significantly less cows' milk as price increases from $4.50 per 2L onwards. Although the price elasticity of cows' milk starts off inelastic, the values from $3.50 to $4.00 and $4.00 to $4.50 are both very close to 1. This infers that although it is relatively inelastic at these prices, it is not acutely inelastic. I can therefore conclude that relative to price elasticity of demand taken from the midpoint method, cows' milk is relatively elastic overall.

I

As well as using the midpoint method to calculate price elasticity of demand, we can use the total revenue method. This method determines the elasticity of a good or service relative to its total revenue at different prices. These values indicate that cows' milk is relatively inelastic right up to $4.50 shown by the increase in price causing a corresponding increase in total revenue. For example as price increases from $3.00 to $4.50, total revenue increases from $529.50 to $596.25. From here, the increase in price leads to a decrease in total revenue which indicates that at prices that exceed $4.50, cows' milk becomes relatively elastic. Overall, using the total revenue method I conclude that the price elasticity of cows' milk is relatively inelastic till price increases greater than $4.50 where it becomes relatively elastic.

Relative to the price elasticity of demand, increasing the price of milk to $4.50 per 2L bottle due to the dairy boom results in milk being relatively inelastic, until the price exceeds $4.50, where the increase in price is proportionally smaller than the decrease in quantity demanded, and milk becomes relatively elastic.

Income Elasticity of Demand

Income elasticity of demand measures the responsiveness of demand for a good or service (in this case cows' milk) relative to an income change.

Market Demand for cows' milk (2L) per week

Price ($)	Quantity Demanded (2L bottle)	Percentage change in QD	Income Elasticity (Percentage Change Method)
3.00	176.50		
3.50	168.50	-4.64	-0.46
4.00	147.50	-13.29	-1.33
4.50	132.50	-10.71	-1.07
5.00	114.50	-14.57	-1.46
5.50	96.00	-17.58	-1.76
6.00	81.50	-16.34	-1.63

J

Income Elasticity = Percentage Change in Quantity Demanded / Percentage Change in Income

From analyzing the above values for income elasticity of demand, I can suggest that cows' milk is an inferior good (because the values for income elasticity are all negative). An inferior good is a good or service for which the quantity demanded and income changes move in opposite directions, which means that generally consumers purchase less inferior goods as their income level rises. Therefore, since according to the above figures cows' milk is an inferior good, I can assume that relative to income elasticity of demand, cows' milk is relatively elastic.

J

The proportion of a consumers' income spent on a good also affects its elasticity. Generally, if a good takes up only a small portion of a consumers' income, an increase in the price of the good is not likely to cause a significant decrease in the quantity demanded of the good, and the good therefore tends to be relatively inelastic.

In the context of cows' milk, approximately 93% of consumers surveyed said that they spent 3% or less of their weekly income on cows' milk. This is a very small proportion of a consumers' weekly income, therefore an increase in price isn't likely to cause a proportionally larger decrease in quantity demanded, so in relation to income proportion, cows' milk is a relatively inelastic good.

Substitutes and Elasticity of Demand

If a good or service has many substitutes, it generally means that consumers have plenty of alternatives to move to if the price of the original product increases, therefore an increase in the price of the original good (which has a number of substitutes) will be proportionally smaller than the decrease in the quantity demanded for the product. Hence, a good or service with many substitutes is generally elastic.

K

In the context of cows' milk, 54% of consumers surveyed said that they didn't think cows' milk had many substitutes. This means that overall, since milk is deemed to have not many substitutes it can be regarded as a relatively inelastic good.

However, of the 46% of consumers who thought that milk did in fact have a number of substitutes (such as soy milk, milk powder, goats milk, almond milk, and water), 99% of them said that they would consider actually foregoing cows' milk for a cheaper substitute if the price of milk reached or exceeded $5.00. This means that although it is valid to say that cows' milk is relatively inelastic to a point, it still becomes relatively elastic at around the $5.00 mark as consumers demand for cows' milk will decrease significantly as a response to an increase in price (above $5.00) and potentially result in an increase in the demand for its substitutes.

Elasticity of Supply

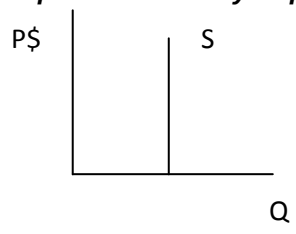
L

The dairy boom is being experienced right across the global economy. Generally speaking, it is an increase in the price of New Zealand's cow's milk in response to an increase in the global supply for it. This price increase has meant that producers are willing and able to export their milk at higher prices, resulting in the milk that producers sell in New Zealand becoming more expensive as well (because the 'risk' of increasing the price has lessened globally). This therefore means that a rise in the global economy's demand for New Zealand's cow's milk has resulted in the price of milk in New Zealand rising. This will hence affect New Zealand's consumers and producers.

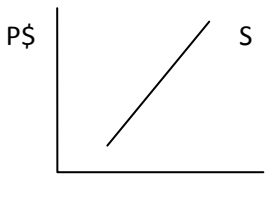
This report will focus on elasticity of supply. Price elasticity of supply is defined as the responsiveness of the quantity supplied of a good or service due to a change in price. If the price of milk increases, producers generally increase their quantity supplied, however the degree at which quantity supplied changes in response to a price increase depends on the time period, among other things.

Time Periods

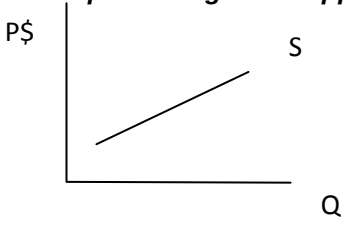
Graph A-Momentary Supply



Graph B-Short Run Supply



Graph C-Long Run Supply



Monetary Supply: The monetary supply is supply at a specific moment in time, and is sometimes referred to as supply on a given day when quantity supplied is fixed regardless of price. This is shown by a perfectly inelastic supply curve, which reflects the idea

that firms have only a fixed amount of milk available to meet the demand for it, and aren't able to alter any of this amount in response to other factors. There will be no corresponding change in quantity supplied of milk to a change in price.
Short Run: In the short run, supply is relatively unresponsive to price changes and is therefore inelastic. During this time, at least one resource, such as the number of cows in the farm, is fixed and therefore the producers are restricted in their ability to change their output. The supply of milk is inelastic because the quantity supplied is limited to the quantity of goods available. Short run is more elastic than the monetary time period because all though there are a number of fixed resources, there are also some resources which can be altered in response to a price change, though the change in price is proportionally larger than the change in quantity supplied.
Long Run: Supply in the long run tends to be relatively more responsive to price changes than in the short run, and is hence elastic. This is because firms are able to better utilise their resources as they all become variable. As this time period lengthens, supply will become more responsive to price changes as producers are able to change the amount of inputs such as purchasing more land and more cows in order to increase output, or improve the milking technology. During the long run time period, the supply of milk is said to be elastic.

Cost of Production

Cost of production can greatly affect quantity supplied as generally speaking if the costs of production increases producers increase their price. This is because producers will pass on the burden of the increased cost of production to the consumers so that they don't lose any revenue. An increase in the cost of production can be due to a general price increase (inflation) shifting the price of all (or most) inputs upwards, or an increase in one particular variable. This would occur for instance if firms were to hire more workers to work in the milking sheds. The money spend on these new wages would increase the cost of production, however it is also likely to increase the quantity supplied, so ideally, an increase in the cost of production due to increased investment should cause a corresponding increase in quantity supplied.

L

Land Prices

The dairy boom has meant that more and more farms are being purchased and converted in to dairy farms. The rush of dairy property transactions in December of last year caused general increase in the price of farms in New Zealand. This rush of sales has had a very positive influence on the dairy farming industry, and "marks a return to confidence in dairy farming which is more than justified by the positive returns being achieved", says Real Estate Institute of New Zealand (REINZ) rural market spokesman Peter McDonald. This indicates that the increase in land prices due to an increase in the demand for them has meant that the supply of milk products has also increased (due to the fact that more milk is being produced). This increase in supply has corresponded with an increase in price as well, as the increased land prices are offset by an increase in price.

REFERENCES

December rural dairy farm sales revive rural property market (Thursday 0 January 2011). Scoop Independent News. Retrieved from: http://www.scoop.co.nz/stories/BU1101/S00238/december-dairy-farm-sales-revive-rural-property-market.htm

Countdown – Shop smarter (2012). Retrieved from: http://shop.countdown.co.nz/?banner=www#url=/Shop/SearchProducts%3Fsearch%3D2l%2Bmilk

Survey (Survey attached, conducted by Year 13 Economics Class)

Dan Rennie. Understanding Economics NCEA Level Three. (2006). Published by Cengage Learning

	Grade Boundary: Low Achieved
5.	The student demonstrates understanding of micro-economic concepts, which is required for Achieved. The student has processed some survey data, used a model, calculated the co-efficients of price elasticity of demand, and linked some of the concepts of elasticity of demand to the dairy market in their explanation. Refer to parts M. However, there was an error in one calculation of PED, and the student has not calculated the coefficient(s) of income elasticity of demand from the survey. Refer to parts N. Models were used to illustrate elasticity of supply and secondary sources of information were included in the explanation. However, the student has stated rather than explained this concept in places, and the links to the dairy market were not well explained. Refer to parts O. A more secure Achieved would be attained if the income elasticity of demand coefficient(s) was calculated, and more explanation given of elasticity of demand and supply in relation to the milk market.

Student 5: Low Achieved

Elasticity of demand

Elasticity of demand "measures the responsiveness of quantity demanded of a good or service to changes in its price" I believe that milk is an inelastic good. If I am correct, this would mean that the change in quantity demanded is proportionally less than the change in price.

There are several determinants of elasticity. These are availability of substitutes, proportion of income spent on the good, goods of habitual or addictive nature and the time it takes to switch to an alternative. A good that has many substitutes is seen as an elastic good. In the case of milk, I would say that generally it is inelastic because there is no good that is exactly the same or very close (direct substitute e.g. butter and margarine can easily be substituted for each other). However some consumers would disagree as 28 of 50 consumers surveyed in my consumer questionnaire said that there were many other substitutes for milk. For example Soy Milk, Milk powder, almond milk, goats milk and water. So consumers feel that there are many substitutes for milk, would say that milk is an elastic good.

M

If a good only takes up a small fraction of household income and an increase in price would not affect their quantity demanded greatly tends to be inelastic. In the case of milk, the respondents told me that 32 of 50 people surveyed use less than 1% of their income on milk weekly, 19 of 50 use 1-3% and only 4 of 50 use 3-5%. So this is definitely only a small portion of income, which tells us that milk is seen as inelastic in relation to this factor.

The next factor is the nature of the good. A necessity is inelastic, a luxury is elastic, a durable good is elastic (as consumers are able to stock up on the product when the price falls) and a non-durable good is inelastic. Milk is a non-durable good; which means milk in inelastic and milk is definitely more of a necessity than a luxury. So would be seen as an inelastic good overall for the nature of good factor.

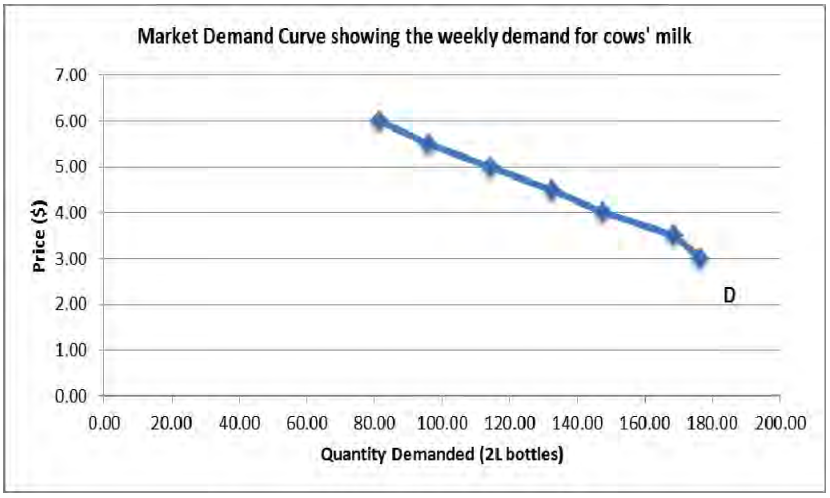
Goods of addictive or habitual nature are seen as inelastic. Milk has no addictive nature associated with it therefore in this case it would be seen as an elastic good.

The last factor is the time it takes to switch to an alternative. For example; switching from electricity heating to gas heating would make a good inelastic. However swapping from cows' milk to soy milk take a matter of seconds as you just purchase a different product at the supermarket, so milk would be seen as elastic in this case. But this factor is not very relevant to milk, as from observing these factors in relation to milk I would believe that as I said earlier, elasticity of demand for milk is inelastic as the main factors that determine the elasticity of a product are inelastic.

M

However, the midpoint elasticity calculations made from the data collected in my consumer questionnaire tend to show that milk is both elastic and inelastic. However, these calculations show that milk seems to be more elastic.

There are several ways of determining price elasticity of demand with market demand data. There is the midpoint method, cross elasticity and income elasticity, with a market demand schedule, these elasticities can be calculated using these different methods.



The midpoint method is done using this formula: PED = $\frac{\Delta QD}{Qmp} \times \frac{Pmp}{\Delta P}$.

From this equation we will discover the elasticity between two prices and their quantity demanded in a demand schedule. If PED=0, is completely inelastic, PED<1, is inelastic, PED>1, is elastic and PED=∞, is completely elastic.

Income elasticity of demand (YED) measures the responsiveness of demand for a good or service relative to an income change.

The way to work out income elasticity is: YED $= \frac{(Q1 \quad Q0)/Qmp}{(Y1 \quad Y0)/Ymp}$

N

The Impact of high milk prices on consumer demand

From my consumer questionnaire and the market demand schedule and curve I have created I can see that if the price of a 2L milk bottle rose to $6.00 the quantity demanded (81.50) is quite low as milk is now relatively less affordable at that price. Whereas say the price was $3.00 for a 2L bottle of milk, quantity demanded was 176.50. So this supports the fact that the main impact of high milk prices is that quantity demanded is lower, as milk is relatively less affordable.

Price (per 2 litre bottle)	quantity demanded (2 L bottles)	midpoint elasticity
3.00	176.50	-
3.50	168.50	-3.0144
4.00	147.50	-0.9968
4.50	132.50	-0.9107

5.00	114.50	-1.3846
5.50	96.00	-1.8500 (-1.8456)
6.00	81.50	-1.8788

N

Elasticity of Supply

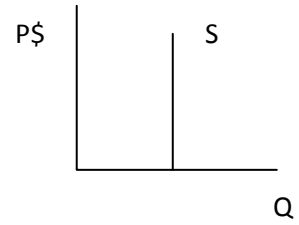
Price elasticity of supply measures the responsiveness of quantity supplied of a good or service relative to a change in price. Generally if the price of milk was to increase, this would mean that the quantity supplied of milk would increase, however the extent of this increase in quantity supplied depends on the time period and other factors that influence elasticity of supply. To work out Price Elasticity of Supply these are two main formulas used; the percentage change method, midpoint method.

The formula for midpoint method : Es = $\frac{\text{change in quantity supplied}}{\text{midpoint of quantity supplied}} \Big/ \frac{\text{change in price}}{\text{midpoint of the price included}}$

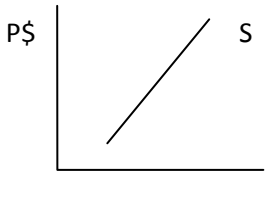
For the percentage change method the formula is : Es = $\frac{\%\Delta QS}{\%\Delta P}$

The co-efficient that come as a result from these formulas, determine the elasticity of supply of the good or service. If Es is less than one, this means that the elasticity of supply is inelastic; if Es is more than one this means that the elasticity of supply is elastic.

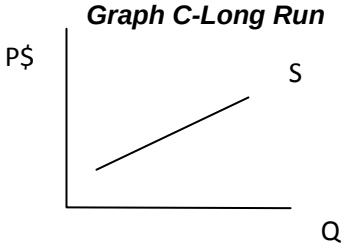
Graph A-Momentary Supply



Graph B-Short Run



Graph C-Long Run



O

Momentary (market) time period

Momentary supply is "supply at this moment in time and is sometimes referred to as supply on a given day when quantity supplied is fixed regardless of price." During this period, Price Elasticity of demand is completely inelastic for any good or service. This is displayed by a vertical line on the supply curve, which shows that "the quantity supplied is fixed and cannot respond to changes in price..." Firms are unable to change any inputs (factors). During this period, the quantity supplied of milk will remain the same even if the prices change meaning that producers can only make more money if they increase their prices since they cannot increase their quantity supplied.

Short Run

During the short run period, price elasticity of supply is inelastic. This is displayed by a steep upward sloping supply curve and means that "at least one input is fixed and therefore the firm is restricted in its ability to change supply/output levels. Supply in the short run will be more inelastic and less elastic." During this period, perhaps if the milk produced by the cows is fixed, this means that it would be very difficult for producers to increase their production. In fact, it would not be possible.

O

Long Run

During the long run period, price elasticity of supply is elastic this is displayed by a gradual upward sloping supply curve which means that "all inputs are variable therefore the firm can be more adaptable and more efficient. Supply is more elastic and less inelastic in the long run". During this period, in the production of milk, the products involved in the production process (cows, feed, milking machinery, workers) are in use and being used efficiently so that production of milk can increase, therefore producers quantity supplied is increasing. If the price of milk was to increase due to increased production costs, this would mean that dairy farmers would be likely to supply more milk because more revenue can be gained from milk sold at a higher price.

(Quotes footnoted)

	Grade Boundary: High Not Achieved
6.	The student has not adequately demonstrated an understanding of micro-economic concepts, which is required for Achieved. The student has processed some survey data, presented a model, used secondary information, and linked some of the concepts of elasticity of demand to the dairy market in their explanation. Refer to part P. However, the student's model has Price and Quantity on the wrong axes, the coefficients of PED have not been calculated and presented in the table, and there is only one coefficient stated without the calculation shown. Refer to parts Q. The student has explained the concept of elasticity of supply, using models and secondary sources of information to link some of this micro-economic concept to the dairy market. However, the graph used for the short run time period shows a unitary supply curve not an inelastic supply curve. Refer to parts R. To reach Achieved level the student would need to include the calculations for PED coefficient(s) and cross and income elasticity coefficients from the survey, label models correctly and use the appropriate model illustrating short run inelastic supply.

Student 6: High Not Achieved

Elasticity of Demand

Is milk elastic or inelastic? Elasticity of demand is the measurement of the responsiveness of quantity demanded of a good or service as a result of a price change. The price of milk rose by 15% due to the national median farm sale 2010. If milk is said to be inelastic, a decrease in its price would cause a more than proportionate decrease in quantity demanded. Many factors must be considered when deciding whether milk is elastic or inelastic. I think milk is inelastic, so if the price increases, consumer's quantity demand for milk will increase by a smaller proportionate amount. The factors that affect price elasticity of demand include, the availability of substitutes, whether the good is a necessity or not, if the good is addictive and the proportion of income spent on the good. I think that milk does not have any substitute goods, but according to the survey collected, consumers think that milk has substitute goods like Soy milk, milk powder, almond milk, goat's milk and water meaning demand for milk is elastic but according to the survey given, it showed that most of the people said that milk does not have any substitute goods. Therefore milk will then be inelastic. I think milk is a necessity not a luxury because this is an important part of a child's diet. So if the price of milk increases, the proportion of decrease in quantity demand for the milk will be small in comparison to the price increase because consumers will continue to buy milk. If they reduce their quantity demand, this drop in QD is proportionally smaller than the price increase. Therefore milk is inelastic. Addictive goods are inelastic and milk is not an addictive good, so demand for milk is elastic. Household's spending depends on the their income receive each week, so if their income increases, their consumption will also increase but if their income decreases, their consumption spending will decrease. Therefore if the price of milk increases by 15% (taking up a larger proportion of income) household's spending on milk will decrease, therefore milk will be elastic. People would not be able to afford to purchase the milk when its price increases as it now takes up a larger proportion of income and budgeted food spending, so demand will decrease by a more than proportionate amount.

P

Price $ (per 2Litre bottle)	Quantity demanded (2L bottles)
3.00	176.5
3.50	168.5
4.00	147.5
4.50	132.5
5.00	114.5
5.50	96
6.00	81.5

Q

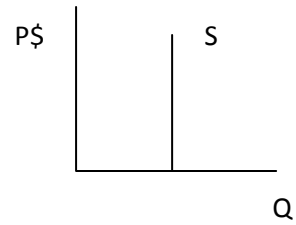
Milk is an inelastic type of good because household still purchase it even though the price has increased, but the households' QD of milk has decreased but not as usual. According to the survey, most of the respondents would not switch to the substitute good if the price of milk increases by 50% (half the amount again). So this tells us that households will still purchase milk even though the price has increased. Milk is an inelastic good and this is when the change in QD is proportionally greater than the change in price (PED > 1). From the survey taken on 50 people and using the percentage change method, I found out that milk has a negative coefficient of -16 which tells us that milk is inelastic.

Q

Elasticity of Supply

Price elasticity of supply measures the responsiveness of quantity supplied of a good or service relative to a change in price. If the price of milk increases, producer's quantity supply for milk will also increase according to the law of supply, as price increases, quantity supply also increases. Elasticity of supply is also calculated using two methods, mid-point method and percentage change method which will result in a coefficient whether it is negative or positive, less than 1 or more than 1. So when the answer is more than one, this means that supply for milk is elastic. If it is less than one, then supply is inelastic and if the outcome equals one then this will tell us that supply for milk is unitary. There are also three time periods that are the main influence of how elasticity of supply is.

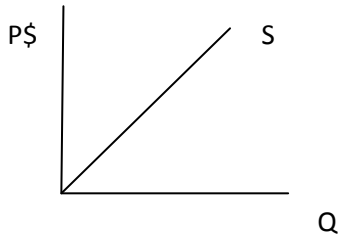
Momentary or Market Time Period



If the price of milk increases, the market time period will show that supply for milk is completely inelastic. Therefore producers for Soy milk and milk powder will not be able to increase their supply because producers for milk will have to take their time to produce and supply more milk. Another example of a fixed resource was before the milking machines were invented in 1894, farmers could only milk about six cows per hour but today, the farmers could now use the milking machines to milk more than 200 cows per hour. This shows that suppliers could not supply more milk because they did not have milking machines so they had to take their time to produce milk, until the milking machines were invented in 1894. In the curve, it reflects that firms have only a fixed amount of stock on hand available to meet demand and are unable to alter any factors, for example there is not enough land for cows to live so that they could produce more milk.

R

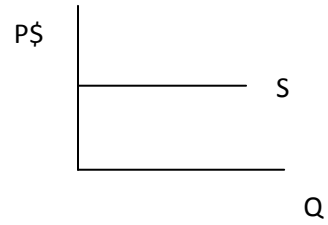
Short Run



During the short run period, at least one input is fixed so even when price increases, the producer's ability to increase QS is limited because he/she is restricted by the amount for variable inputs he/she can increase, so the increase in QS will be proportionally less than the change in price. Therefore price elasticity of supply is inelastic. According to the production of milk, the fixed resource may be land space because their might be more cows than the land to survive and produce milk. However output per input will eventually begin to fall as each new input is not resulting in as much output due to the one or more fixed resource which is unable to be increased if production is to increase. The curve shows that one input is fixed so even when price increases, the producer's ability to increase QS is limited because he/she is restricted by the amount for variable inputs he/she can increase.

R

Long Run



This is when all resources can be varied, i.e. none is fixed so that when the price increases, the producer has greater ability to increase QS (than when at least one resource is fixed). This means that the QS is able to increase proportionally more than the increase in price. Shortages and profits will attract more firms to the industry, which will increase total market supply. Over time, supply will be more responsive to price (elastic) as existing producers are able to increase production levels, new producers can enter the market, and improvements in technology increase productivity. Elasticity is then said to be higher. Therefore price elasticity of supply is elastic.
There are also other factors that affect the price elasticity of supply. If the good is able to be stored then the supply is more elastic and the supply can be increased easily. Soy milk can be stored for like a month whereas milk can only be stored easily because it is produced in New Zealand and it can only be stored in the fridge for like 2-3 weeks. This means that soy milk is elastic because it can be stored for a month whereas milk is only stored for the maximum of 2-3 weeks.

R