<u>CSQ 1</u>

(a) (i)

The price of oil relative to the price of natural gas is significantly higher in 2012 than in 1993.

(a) (ii)

According to Extract 1, the practice of fracking has led to a substantial increase in the supply of both oil and natural gas. However, the price of oil has increased relative to the price of gas. This is due to differences in the change in demand.

The demand for both oil and gas is expected to increase due to economic growth and improvement in standard of living. However, the demand for oil is expected to increase more than the increase in demand for gas. The extensive applications of oil, including transportation fuel, electricity generation, and manufacturing of chemicals and synthetic materials, compared to natural gas will lead to a stronger increase in demand for oil from economic growth. Also, possible oil hoarding due Middle East turmoil will lead to countries stockpiling oil in speculation of possible decrease in supply in the future. Hence, countries will choose to buy oil now in anticipation of possible shortages in the future, increasing the demand for oil.

Assuming that the increase in demand for oil is dominates the increase in supply of it, the price of oil will increase from P0 to P1 according to the diagram below.



On the other hand, it is expected that the increase in demand for gas will only marginally dominate the increase in supply of gas. Hence, the price of gas will increase by a smaller extent from P0 to P1 according to the diagram below.



This divergence will lead to the increase in the price of oil relative to the price of gas.

(b)

The fracking boom in the US has led to a large increase in the supply of US oil and positioned it to potentially be the largest oil producer in the world (Extract 1). Assuming that OPEC does not increase its oil production or only marginally, the proportion of the supply of US oil in the world market will increase relative to that of the OPEC, as OPEC forecast that non-OPEC oil supply would grow significantly according to Extract 2. Under the same pricing of oil, US will gain a larger market share while OPEC's market share will be reduced. Due to availability of substitutes from other countries, this reduces the world's dependency on OPEC oil.

Traditionally, OPEC is able to cut back on production of oil in order to drive prices up to increase their revenue as the demand for oil is price inelastic. However, if OPEC's market share of 40% (Extract 2) continues to decline, it may find itself losing market power and the cartel losing its effectiveness. This is because it will be increasingly difficult for them to influence the price of oil given that their oil supply is now a smaller proportion of the world's output. As such, any decision to reduce oil production will not significantly affect the world's supply and will thus cause only minimal change in price. In fact, this will only serve to further reduce their market share.

In the worst scenario for OPEC, the cartel may lose its traditional advantage as coordinated efforts to manipulate the market for their gain loses its effectiveness.

With an increase in oil supply, all OPEC members will suffer a fall in export revenue due to a fall in demand as some consumers switch from consuming OPEC oil to US oil. This worsens balance of trade and current account, hence negatively affecting balance of payments. If balance of payments is in a deficit, it indicates an erosion of foreign reserves, which may pose a problem for future generations.

Furthermore, with a reduction in export revenue, aggregate demand will decrease according to the diagram below.



As illustrated in the diagram above, a fall in AD from AD0 to AD1 will lead to a multiple decrease from national income from Y0 to Y1. This indicates a reduction in people's purchasing power and their ability to afford goods and services, an indication of a decline in material standard of living. Furthermore, it will result in higher unemployment.

Due to their high dependency on oil revenue, OPEC members may experience a reduction in ability to fund developmental projects including construction of transport networks and housing and improvement in healthcare and education. This can negatively affect the standard of living of the people and also lead to a budget deficit.

OPEC members with a lower cost of production will be expected to suffer less than their counterparts. They will likely experience only a reduction in profits from the price fall as opposed to incurring losses for members with high cost of production. As this reduction in profits is global, OPEC members can hope for non-OPEC manufacturers to exit the industry due to oil price being too low in order for them to regain back their market share. Members with lower cost of production will be better positioned to weather through this period of low oil price.

(C)

Barriers to entry refer to obstacles that restrict potential entrants from entering the industry. Potential entrants to guar farming will likely face significantly lower barriers

to entry compared with those to oil production by fracking.

The increasing number of guar farms in India, Pakistan, Africa, Australia, and Texas (Extract 3) is a strong indication of the low barriers to entry. The availability of land for guar farming appears to be the most significant barrier to entry. However, this will not pose a strong deterrence to most potential entrants as existing farmers can easily switch from producing other crops to guar without incurring much cost as guar seeds are not expected to be very expensive. This is compounded by the large amount of guar seeds given away to encourage increased production of guar (Extract 3).

In contrast, potential entrants to oil production by fracking will face high barriers to entry due to the high initial capital outlay required. This includes the rights to drill, and high equipment and skilled labour costs (Extract 2). It is also difficult for potential entrants to compete with existing firms who are reaping extensive economies of scale. The relatively higher cost of production of potential entrants will make it difficult for them to compete with incumbent firms.

(d)

The fracking boom has led to an exponential increase in demand for guar as it is a crucial ingredient to successful fracking. This has led to a sharp price increase (Extract 3) which will increase the profits of guar farmers assuming that cost of production remains constant. This can lead to improvement in the standard of living of guar farmers in India in both quantitative and qualitative aspects.

With an increase in profits, guar farmers will experience an increase in income and hence higher purchasing power. This will allow them to increase consumption of material goods including buying better house and food, travel abroad or buy gold (Extract 3). This improves the quantitative aspects of their standard of living

Furthermore, guar farmers can also invest their higher income in areas such as education and healthcare. This improves the qualitative aspects of their standard of living as they will have higher education level and better health condition.

If most of the increase in income is channelled into material goods consumption, the long-term sustainability of such improvement in the standard of living will be dependent on guar's high price and derived demand from the growth of fracking and lack of competition. Guar farmers will only be able to enjoy long-term improvement in the standard of living if current trend persist. However, this is unlikely as the high profits of guar together with low barriers to entry will encourage more producers to enter the market, as evident from Extract 3 where guar farms have sprouted all over the world, increasing the supply of guar. Furthermore, the demand for guar is expected to decrease in the future as fracking companies are developing synthetic alternatives due to guar's volatile price, as the price went up and down between US\$8 and US\$25 (Extract 3). Moreover, Extract 2 also identified increasing challenges of oil production by fracking, such as rising costs and environmental concerns, leading to a decrease in demand for guar.



Assuming that the increase in supply is more significant than the decrease in demand, as it is unlikely that close substitutes to guar can be discovered or developed in a short period of time, the demand curve will shift from D0 to D1 by a smaller extent compared to the increase in supply from S0 to S1. This will decrease the price significantly from P0 to P1 while the quantity demanded increases from Q0 to Q1. This will lower revenue and hence profits assuming that cost of production remains constant leading to a fall in income. As such, India guar farmers' standard of living might not see long term improvement since guar's price is unlikely to remain high perpetually and may in fact experience a decline in income once guar's price fall.

Furthermore, with a fall from near 100% to only 20% of exports to food companies (Extract 3), India guar farmers' standard of living might also be compromised as the price of food increases. This is due to the rise in cost of production of food due to sharp rise in guar's price. Hence, the production and supply of food is likely to decrease. As the demand for food is expected to be price inelastic since it is a necessity, a fall in supply will lead to a sharp increase in price and a less than proportionate decrease in quantity demanded. This will increase India guar farmers' expenditure on food.

The improvement in the standard of living is only sustainable in the long run if they use this opportunity to channel their windfall into healthcare and education. This allows them to improve their productivity and employability and reduce their dependency on guar farming. Hence, in the predictable future where guar's price falls, they will be able to use their acquired knowledge and skills to move on to alternative and better employment. Consistent upgrading of skills and maintaining good health will enable them to improve their qualitative aspects of standard of living; while sustained increase in income will allow them to increase material goods consumption and improve their quantitative aspects of standard of living.

In conclusion, the fracking boom will only likely lead to a long-term improvement in the standard of living of guar farmers in India only if they choose to invest their higher income for self-development and skills acquisition, allowing them more employment opportunities. Otherwise, with imminent price fall of guar in the foreseeable future, the improvement in the standard of living is expected to be temporary.

(e)

The increased extraction of fossil fuels does not achieve allocative efficiency due to presence of negative externalities. Negative externalities are cost borne by third parties not related to the production and consumption of the good. In the case of fossil fuel extractions, negative externalities arise from global warming and environmental degradation (Extract 1) leading to extinction of species and dangerous changes to weather patterns. This leads to the divergence of marginal private cost (MPC) and marginal social cost (MSC) as there will be marginal external cost (MEC) due to negative externalities. When left to the free market, producers will produce at the level Qp where MPB = MPC as shown in the diagram below, assuming that there is no positive externalities.



However, the socially optimal level of production occurs at Qs where MSB = MSC. As Qp is greater than Qs, there is an overproduction of fossil fuel leading to inefficiency in resource allocation. Market failure thus occurs and it is crucial for government to implement appropriate policies to minimise the welfare loss as indicated by the shaded area.

Government can reduce subsidies given to producers, cutting back on the US\$523 billion of subsidies provided (Extract 1). By reducing subsidies given, this will increase the cost of production to the producers. This reduces profits and decreases the incentive to produce. Ideally, the cut in subsidies should lead to an increase in the cost of production coinciding with the MEC. This will shift the MPC leftward to coincide with MSC. This will lead to producers reducing production from Qp to Qs, which achieves an efficient allocation of resources.

This will be most effective if the government if the cut in subsidies reflects accurately the MEC as it forces firms to internalise the negative externalities generated. The government can then use this additional fund to invest in research and development in order to find cleaner ways of extracting fossil fuels with lower external cost. However, it is difficult for government to estimate the exact amount of subsidies to reduce since external costs are difficult to define in monetary terms. Furthermore, with the reduction in subsidies, the price of fossil fuel will rise from Pp to Ps. This will lead to problems for populations in Middle East and North Africa to purchase petrol and heating oil (Extract 1), reducing standard of living.

As inferred from Extract 1 whereby the emission of carbon dioxide is a major

contributor to climate change, government can also adopt an emission trading system to achieve an efficient allocation of resources. This can be done by first deciding on the amount of carbon dioxide emission permitted per year based on the socially optimal level to achieve an efficient allocation of resources. The government can then divide the quantity into a fixed number of tradable permits and allocate them to individual firms. This gives producers the right to pollute up to the desired set limit. Producers who are able to reduce pollution will be able to sell their extra permits and firms who are unable to cut emissions will have to buy the extra permits.

This offers firms the financial incentive to reduce pollution by adopting a cleaner method to produce as they are able to sell excess permits in the market. It also forces less efficient firms to internalise the external costs. Furthermore, government can set precise levels of carbon emission permitted. However, it is difficult to estimate the desire emission level and expensive to develop a monitoring and enforcement system, Also, this again risks pushing up the price level of fossil fuel affecting people's ability to purchase energy staples which are crucial for daily usage.

The government can also encourage and invest in research and development to look for alternative sources of energy that are less harmful, and hence with lower external cost, to the environment. This will reduce dependency on fossil fuels and achieve an efficient allocation of resources, as demand for fuel fall when consumers switch to cleaner alternatives.

The benefits upon successful discovery and innovation are numerous. People will be able to enjoy a larger quantity of energy at potentially lower prices. Furthermore, countries will be able to sell the new energy generated for profits. However, it is costly and the success of new discovery is not guaranteed. Furthermore, it may take a long time in order to discover alternative sources of energy suitable for low cost and mass production.

In conclusion, a combination of all above policies is required in order to reduce extraction of fossil fuels by fracking and achieve an efficient allocation of resources. Comparing between the possible policies, reduction in subsidies may be the one most appropriate policy as it can be implemented swiftly with immediate impact. Furthermore, it also allows the government to save funds for alternative uses. However, the cut in subsidies and restriction of carbon dioxide emission should be carried out in a gradual manner so as not to lead to a sharp increase in the price of energy as this is an important commodity which will affect the standard of living of the people. Meanwhile, constant efforts should be channelled towards discovery of a more sustainable form of energy so that an efficient allocation of resources and increasing standard of living can be achieved.

<u>CSQ 2</u>

(a)

Singapore

(b)

When the level of productivity in a country is high, the rates of returned obtained by investments will be correspondingly high. This will attract investment to the economy, improving economic growth leading to higher real national income, which increases people's purchasing power and ability to afford more and better goods and services. Furthermore, some investment may improve the infrastructure of the country or entails retraining of workers. Both improve the living standards of the people, quantitatively and qualitatively respectively.

(c)

A cut in interest rates will help countries such as India who is facing low investment and exports (Extract 4) achieve economic growth.

This is because a decrease in interest rates will lead to some marginal projects becoming profitable due to lower cost of borrowing. As a result, investment (I) will increase. Furthermore, the lower cost of borrowing will also reduce the opportunity cost of consumption. This leads to consumers spending more, increasing consumption expenditure (C).

Furthermore, a fall in interest rate may cause capital flight leading to depreciation of the currency as people move their finances to other countries to earn higher interest rates. This causes the price of exports to be relatively cheaper in terms of foreign currency and the price of imports to be more expensive in terms of local currency. Assuming that Marshall-Lerner condition holds, net export (X-M) will increase.

Hence, aggregate demand (AD) increases as C, I, and (X-M) increases. This shifts the AD curve from AD1 to AD2 as shown in the diagram below. Real national income will thus increase from Y1 to Y2 via the multiplier effect, leading to economic growth.



(d)

Infrastructure, level of education and training, and technological innovation will affect the productivity of an economy.

An economy with well-developed infrastructures will likely have higher productivity due to improved efficiency. This is because well-connected transport network will allow goods and services and labour to move timely and efficiently. Also, low level of power outage will also minimise disruptions to production and operation. This allows more goods and services to be produced with the same amount of time.

Also, a higher educated workforce that is constantly undergoing retraining and skills upgrading will also be more productive. This is because the economy will be able to move towards a knowledge-based economy from labour-intensive economy, through improvement in their quality in terms of knowledge, skills, and efficiency. More or better quality goods and services will be able to be produced with the same amount of resources.

Furthermore, an economy with high level of investment into research and development will also correspondingly see higher productivity. This is because technological innovation can lead to a improved capital efficiency or better methods of production. It also enables higher quality products to be developed. (e)

India and China has been achieving high growth rate in real GDP averaging 7.68% and 10.54% from 2007 to 2011 respectively (Table 1) despite low standing in the GCI at 29 and 59 in year 2012/2013 respectively (Table 2). A high growth rate is achieved through a combination of increasing actual growth and potential growth.

A low standing in the GCI indicates low productivity possibly due to poorly educated workforce, low quality infrastructure and unstable political climate. This will decrease investment as it creates an unfavourable investment climate and lowers investor confidence as resources vital to investors are unavailable and government policies are not encouraging for investment. This is especially so as China and India's GCI ranking both decreases from 2011/2012 to 2012/2013. Furthermore, in the case of India, the lack of key reforms and corruption scandals has decreased investment in India by 78% in 2012. Ceteris paribus, a fall in investment level should decrease AD, leading to a multiple fall in national income and decreased economic growth.

However, investors may not only rely on GCI ranking when deciding on which country to invest in. A poor GCI ranking may only indicate deficiencies in certain areas of productivity. China and India may still be productive in other areas that have appeal to investors. Also, the GCI of India and China, while low, may be comparatively better than many other countries. Furthermore, investors may still invest in China and India due to the size of their market (Extract 5) which allows them to exploit economies of scale and lower their cost of production, thereby increasing their profits. They may also benefit from the low cost of labour which is essential for labour-intensive industry. This is unlikely to be found in countries with high GCI since most countries with high GCI have developed a knowledge-based economy with high cost of labour. Moreover, cuts in interest rates in India (Extract 4) will also lead to an increase in investment, as explained in part (c). Hence, considering all factors affecting investment, investment may still ultimately rise in China and India.

Moreover, there are other factors affecting the growth of the economy. This includes both aggregate demand (AD) and aggregate supply factors (AS). Investment (I) is only one of the AD factors, others include consumption (C), government expenditure (G), and net exports (X-M).

China and India can be curbing inflation to increase growth. According to Extract 4, India has lowered inflation rate gradually. A decrease in inflation rate will lead to China and India's exports becoming less expensive. Assuming that the demand for China and India's exports to be price elastic due to availability of substitutes, a decrease in price will lead to a more than proportionate increase in the quantity demanded. This will increase the export revenue. On the other hand, imports from overseas will be relatively more expensive than local goods. This will lead to a fall in demand of imports as consumers will choose to purchase the relatively cheaper local goods instead, reducing import expenditure. With an increase in export revenue and decrease in import expenditure, net export (X-M) increases.

The cuts in interest rates described previously will also lead to an increase in consumption as explained in part (C).

Furthermore, if the government is increasing its spending on infrastructure development projects or in areas such as education and healthcare in order to advance the economy and improve people's quality of life, government expenditure will increase.

The increase in C, G, (X-M), and potential increase in I will lead to an overall increase in AD.

Furthermore, if the government of China and India is actively engaged in supply side policy by increasing education level, improving infrastructure, and encouraging R&D, AS will increase as the economy becomes more efficient and productive.



(f)

As highlighted in Extract 5, competitiveness is crucial to sustainable economic growth. The level of competitiveness can be identified through the twelve pillars of

competitiveness. The effectiveness of adopting free market policies or government intervention to improve competitiveness can be assessed by the impact and extent of impact.

Government can adopt free market policies by reducing labour legislation and income tax. The labour market can become more flexible by abolishing or lowering minimum wage and decreasing the power of labour union to encourage employers to hire. Government can also reduce income tax to increase disposable income and increases incentive for greater work effort. This will improve competitiveness through Pillar 7 – labour market efficiency (Extract 5). Government can also encourage greater private sector participation through deregulation and privatisation. Both introduce more competition to existing industry through the removal of monopoly rights and transfer of state firms to private hands respectively. The increased in competition will force firms to maximise utilisation of current technology to improve cost efficiency and invest in technological innovation in order to stay ahead of their rivals. This improves competitiveness through Pillar 9 and 12 – extent of technological readiness and technological innovation.

Government can further adopt free market policies by reducing protectionist measures in place. This can be done by reducing trade barriers and signing of Free Trade Agreements. This increases size of market – Pillar 10 – for firms as they can tap into markets abroad easier and improves goods market efficiency – Pillar 6 – as goods can flow between countries easier. Global competition will also likely lead to an increase in efficiency and productivity. FDI will possibly increase due to less restrictive regulations. This is compounded by deregulation of financial markets by removing capital controls allowing financial transactions to be undertaken more efficiently. This improves efficiency of the financial sector, Pillar 8, and allows firms to operate globally easier.

Under free market policies, producers themselves will also play a crucial role in strengthening the pillars of competitiveness in order to stay ahead in face of increased competition. They will invest in research and development in order to achieve lower cost of production or development higher quality or new products. They will also send employees for further education and retraining in order to meet the needs of the dynamic economy. They may also offer medical benefits to improve the health of their employees so that they can function to their maximum potential. These efforts strengthen Pillars 4, 5, and 11 respectively.

However, free market policies may be most effective only for the increase in competitiveness for the production of private good. In the case of public good, such as defence, which is not possible to privatise, free market policies will have limited impact on the competitiveness of such an industry. Productivity in such industry will require government intervention to improve. Furthermore, producers will only consider their private cost and not the social cost when producing a good. If left to the free market entirely, competitiveness in the short term may come at the expense of labour rights and environmental degradation. This can have dire consequences in the long run and reduce competitiveness. In the case of education and retraining, producers may only have the incentive to improve their capabilities of their employees up to but not beyond the skill level required. This is again a short term improvement in competitiveness.

Hence, government intervention is also necessary to improve the competitiveness of an economy. Government can invest in essential infrastructure developments such as developing new or better transportation system, commercial developments, and telecommunication services. The government should also implement appropriate economic policies in order to achieve stability of the macroeconomic environment. For instance, India should adopt suitable measures to address its high level of inflation (Extract 4) in order to allow firms to operate efficiently. These strengthen Pillars 1 to 3, offering the fundamental stability required to encourage productivity and increase competitiveness.

The government can also increase spending on education and training (Pillar 5), with the foresight on important sectors that the economy wishes to advance into. For instance, if the economy has the intention to become a financial hub, government can invest in offering more schools, courses, and programmes to equip the population with financial knowledge. This increases competitiveness tremendously as the economy is already adequately prepared before entering the industry. This can only be achieved by government's effort as firms are usually only capable to tap on and improve the current level of education but unable to steer a significant portion of the economy towards the direction of emerging industries significantly. Government is also better able to improve health of the workforce (Pillar 4) through construction and upgrading of hospitals with improved facilities and technology, improving accessibility to healthcare and increasing subsidies to people. Furthermore, for industries deemed important by the government but are not investing sufficiently into research and development, the government can intervene to encourage more R&D in those industries (Pillar 12). These will increase competitiveness of the economy.

However, government intervention risks distorting market forces leading to inefficient allocation of resources and hence reduction in competitiveness. Government failure may occur leading to channelling of resources into inefficient sectors that do not yield much productivity gains and inhibits the proper function of the free market which could have achieved a more efficient allocation of resources. Furthermore, it generates dependency for the private sector to depend on government funds for research and development. This is not sustainable for long term competitiveness improvement.

In conclusion, free market policies should be the main driving force for competitiveness improvement as it is able to address most of the twelve pillars of competitiveness effectively. Government's intervention should take a more passive role in the pursuit of competitiveness, mainly by offering a stable environment for free market policies to thrive