

China has implemented a policy to reduce production of rare earth metals which are important materials used in the production of X-ray machines, iPhones and light bulbs. Incomes have also risen in recent years, especially in the emerging economies.

Discuss the relative impacts on consumers and producers due to the above changes. (25m)

Introduction

- [Nature of main good] Rare earth metals are a primary product that is used in the manufacture of various goods such as iPhones and light bulbs.
- The burden of China's move to cut SS of rare earth metals will lead to impacts on producers and consumers of the market and its related markets.

Development 1: Impact on the market for rare earth metals

DD for metal increases, SS for metal falls → at original price P_1 , there is a shortage of $Q_s Q_d$ → upward pressure on price → as price increases, qty ss increases, qty dd decreases → continues until new equilibrium reached at E_2 where $qty\ ss = qty\ dd$ → price increases from P_1 to P_2 , impact on quantity is dependent on extent of shift.

Evaluation: The increase in demand may be to a smaller extent as compared to shift in supply. While there is rising income, these may only be limited to certain emerging economies only, therefore impact on world demand for these rare earth metals may not be very significant. On the other hand, China being one of the largest producers of rare earth metals, will result in a larger decrease in SS due to the policy being implemented. Overall an increase in DD, c.p., will result in an increase in price; a fall in SS, c.p., will result in an increase in price → both shifts lead to a reinforced effect on prices → price increases by a large extent

Evaluation: An increase in demand along a SS curve that is price inelastic will result in a more than proportionate increase in price compared to fall in qty dd. Also, A fall in SS along a DD curve that is price inelastic will result in a more than proportionate increase in price compared to increase in qty SS → together, because of the relatively price inelastic DD and SS curves, the large increase in price is exacerbated.

Evaluation: However, in the long run, it is likely that both DD and SS are likely to be more price elastic. However, it is more likely for PED to change as consumers are more likely to find more substitutes for rare earth metals. For SS, it is really dependent on the future actions of China's government and their reasons for implementing this policy in the first place. If the policy is implemented due to concerns such as main sources of rare earth metals running out, the improvement in technology and discovery of more mining areas in future may lead the government into relaxing this policy → in the LR, it is likely that changes in price will be less than in the SR.

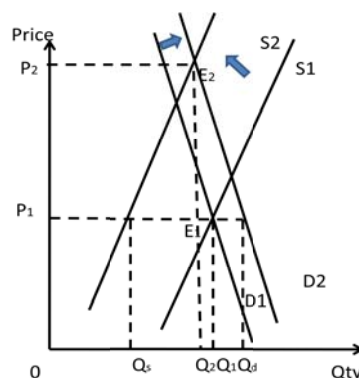


Figure 1. Market for rare earth metals

Development 2: Impact of changes in price on producers and consumers of market for rare earth metals

- **Consumers:** Firms that use rare earth metals as a FOP (e.g. producers of X-ray machines, iphones, light bulbs)
- **Producers:** rare earth metal producers
- **Impact of increase in DD** → consumers likely to bear the full burden of an increase in price as the price increase has nothing to do with the increase in the costs of producers
- **Impact of fall in SS** → A fall in supply will result in higher prices in the market → when SS changes, depending on the relative elasticities of demand and supply → producer may or may not be able to raise the price by a small or large extent

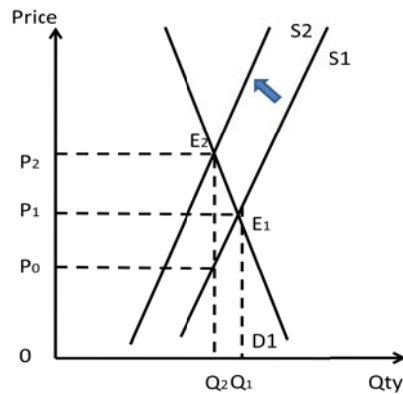


Figure 2

- In this case, the **total burden per unit** of rare earth metals is $P_2 - P_0$ due to a change in SS → consumers' share of the burden is $P_2 - P_1$, which is the increase in price due to the change in SS → producers burden is the $P_1 - P_0$, which is the rest of the burden that producers could not transfer to consumers
- In the case of the market for oil, we can assume that both demand and supply are of the same relative elasticity i.e. both price inelastic → burden of SS shift is shared equally ($P_2 - P_1 = P_1 - P_0$)
- **Combining both impacts** → the combined effect of both an increase in DD and a fall in SS is that although the burden is shared equally due to fall in SS, the increase in DD shifts more burden to the consumer → **overall, consumers of oil will bear a greater burden in the market for oil**

Development 3: Impact on consumers and producers of X-ray Machines

- **Consumers:** hospitals, researchers etc. who buy x-ray machines that require rare earth metals as a FOP
- **Producers:** Firms who produce x-ray machines that require rare earth metals as a FOP
- Higher rare earth metal prices → increase in cost of production → at every price, less qty SS by producers → **fall in SS of final g&s**
- However, whether consumers or producers in the final g&s market will bear the cost depend on:
 - PED**
 - The more price elastic the dd for final g & s is relative to SS, the less consumers would bear the cost and the more producers would bear the higher cost.
 - PED for x-ray machine < 1 as x-ray machines are goods bought more due to necessity → required in hospitals and research centres for work. Any attempt by the producer to pass on the higher cost of rare earth metals by increasing price of the x-ray machine will result in less than proportionate fall in qty dd → revenue increases → profits increases, ceteris paribus → hence producers are more likely to let consumers bear the higher cost
 - In this case, the total unit burden is equal to the increase in unit COP (equal to $P_2 - P_0$) Consumers' share of the total burden is $P_2 - P_1$ > producer's burden of $P_1 - P_0$.

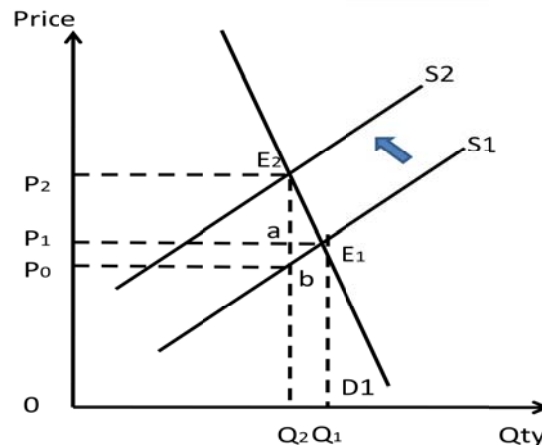


Figure 3 Burden of increase in COP for X-ray machines

- **Increase in demand:** Increasing incomes may lead to increase in demand for X-ray machines. Rising affluence, especially in emerging economies may lead to more households demanding for better healthcare services. As these economies continue to develop and grow, governments may raise living standards by improving the medical services and increasing the number of medical institutions → increase demand for x-ray machines → consumers' burden likely to be even larger.

Development 4: Impact on consumers and producers of iPhones

- **Consumers:** people etc. who buy iPhones that require rare earth metals as a FOP
- **Producers:** Apple company who has some monopoly power in the smartphone industry
- Higher rare earth metal prices → increase in cost of production → at every price, less qty SS by producers → **fall in SS of iPhones**
- Whether producers or consumers will bear the cost also depends on: **Ability of firms to pass on the higher cost of to consumers which depends on the degree of competition in the market**
 - ➔ The more competitive the market is for smartphones, the weaker the ability for Apple company to pass on the higher rare earth metal prices to consumers. Hence producers would more likely bear the cost of higher oil prices rather than consumers.
 - ➔ Even though Apple has had a large head-start in this industry with the production of its first iPhone, recent years have seen other companies like Samsung and HTC, producing android phones that provide similar features and also have classy designs.
 - ➔ The degree of competition faced by Apple is likely to be high. There are several close substitutes available → $PED > 1$.
 - ➔ Apple would not be able to easily pass on higher cost to consumers as consumers may switch to cheaper alternatives. Hence producers would bear a greater burden of the increase in COP.

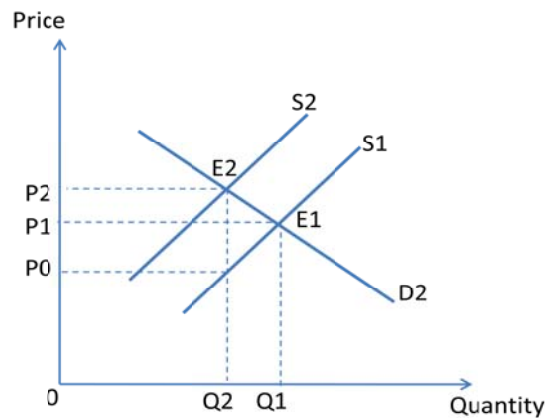


Figure 4 Burden of increase in COP for iPhones

- **Increase in demand:** Increasing incomes may lead to increase in demand for iPhones. iPhones are considered a luxury good, where it takes up a substantial proportion of income ($YED > 1$). Hence, rise in income will lead to a rise in demand by a large extent $>$ extent of decrease in SS. **This exacerbates the increase in price.** Overall, burden per unit for consumers is higher at P_1P_3 relative to producer burden per unit of P_0P_1 .

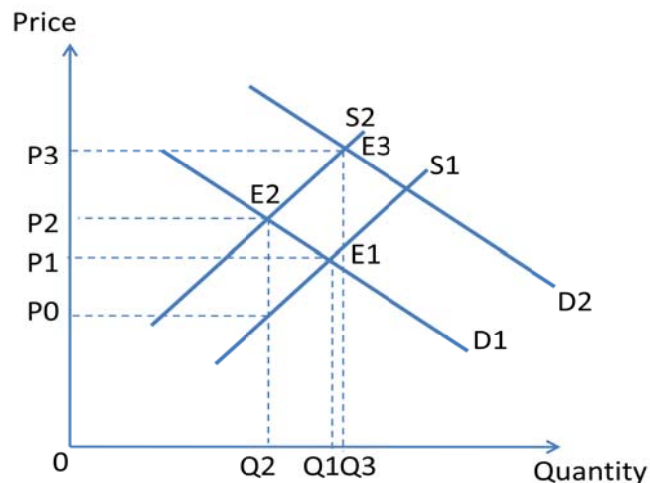


Figure 5 Overall burden on consumers and producers

Development 5: Impact of rising price of rare metals on the market for light bulbs

- **Consumers:** firms making lamps/torches etc. and households who need to change lightbulbs
- **Producers:** producers who sell light bulbs that require rare earth metals as a FOP
- Higher rare earth metal prices \rightarrow increase in cost of production \rightarrow at every price, less qty SS by producers \rightarrow **fall in SS of light bulbs**
- Extent of the burden borne by consumers and producers depends on: **PED of light bulbs**
 - The demand for light bulbs is considered relatively price inelastic due to it being intermediate goods used in the production of lamps and torches etc with very little close substitutes available. This would mean that any changes in price would lead to a less than proportionate change in qty dd. Hence consumers would bear a greater share of the cost.
- Producer's burden per unit is P_1P_3 while consumer's burden per unit is P_1P_3 .

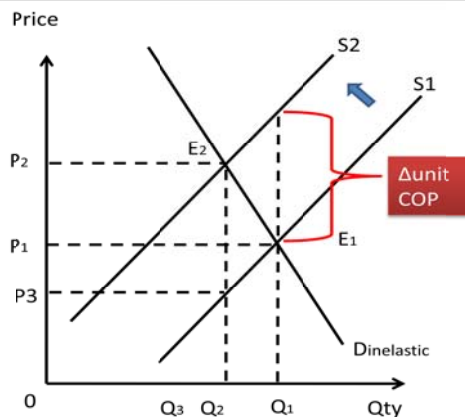


Figure 6 Burden of increase in COP for Market for light bulbs

- **Increase in demand:** As light bulbs are largely necessities and hence any increase in income is likely to lead to small increase in demand for it ($YED < 1$) → increase demand for light bulbs → consumers' burden likely to be even larger.

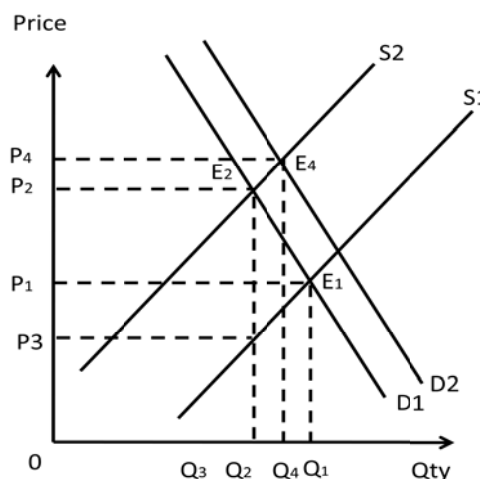


Figure 7 Overall burden on consumers and producers

Conclusion/Synthesis:

Determinants of whether consumer or producer bears the costs is dependent on:

- Relative PED/PES
- if there are any changes in DD
- type of market structure

In this case, relative PED/PES is the most important determinant in the market for final goods and services. This is because most market structures are usually competitive. In the market for rare earth metals, since generally both demand and supply are relatively price inelastic, the most important determinant would be any changes in demand which will affect how much consumers bear the costs.

As suggested by the signpost, rising incomes are observed especially in emerging economies. Slower growth in developing economies in recent years suggests that demand for luxury items like iPhones are likely to have increase by a small extent and hence consumers in such countries are likely to bear a smaller burden relative to other consumers in countries like China, where demand is likely to have increased by a large extent. In addition, developed economies are likely to already have sound medical care system in place, and hence any increase in incomes may not necessarily increase the

demand for goods such as X-ray machines.

In the LR, changes in the demand and supply are likely to change the relative impact on producers and consumers.

Marking Scheme		
L3	Well-developed answer with a competent analysis and explanations on the relative impacts on producers and consumers in the various markets. Clear demonstration of elasticity concepts, with evaluation.	15-21
L2	Underdeveloped explanations on the relative impacts on producers and consumers in limited number of markets, with limited use of PED, PES and YED in the analysis.	9-14
L1	Descriptive answer that shows some basic knowledge elasticity concept. Answers focus on only one market. Answers contain inaccuracies.	1-8
Evaluation Marks		
E2	Evaluative judgement supported by appropriate analysis	3-4
E1	Unexplained judgement	1-2