**J2 H2 Economics CSQ – Market Failures – Q1 (Aging Population)**

# Aging population: Burden or opportunity?

**Figure 1: Health Spending in Japan**

Source: *OECD*



Health Spending in Japan (Total, % of GDP)

12

10

8

6

4

2

0

# Extract 1: Japan’s demographic time bomb is getting more dire, and it’s a bad omen for the country

An aging population like Japan’s poses numerous problems. The government will have to spend more on healthcare, and that, coupled with a shrinking workforce and tax base, is a recipe for economic stagnation. It also means, among other things, that there will not be enough young people to care for the elderly.

“An aging population will mean higher costs for the government, a shortage of pension and social-security-type funds, a shortage of people to care for the very aged, slow economic growth, and a shortage of young workers,” Mary Brinton, a Harvard sociologist, told Business Insider last year.

Source: *Business Insider*, 6 June 2018

# Extract 2: Nursing care workers hard to find but in demand in aging Japan

As the nation’s population rapidly greys, ensuring there are enough nursing care workers to meet growing demand has become a pressing issue. There has actually been a rise in nursing care workers. However, this has failed to keep pace with the rapidly growing demand, resulting in a nursing care industry with a chronic shortage of manpower. Considering Japan’s declining workforce, the labour shortage in the industry is expected to worsen over time.

The government seeks to add 250,000 more nursing care workers to the system from 2017 by improving their working conditions and increasing their average monthly pay by 10,000 yen. But the state has not made clear how it will finance this The government also plans to create new nursing care facilities to accommodate 500,000 more users by the beginning of 2020. This, however, has been questioned by industry experts who argue that in densely populated urban areas, the lack of workers is more acute than the shortage of facilities.

The increasing difficulty in finding enough workers has led more facilities to rely on temporary staff dispatched from agencies, and some have reduced services. To lessen the burden on staff, some nursing care facilities are starting to use robotics, including wearable units for elderly people and care workers.

Source: *Japan Times*, 27 June 2016

# Extract 3: Japan's shrinking population not burden but incentive

Prime Minister Shinzo Abe said Japan’s aging, shrinking population was not a burden, but an incentive to boost productivity through innovations. Abe’s comments on Wednesday came days after official data showed that Japan has 34.6 million people aged 65 and older, or 27.3% of the population - the highest proportion among advanced nations.

“I have absolutely no worries about Japan’s demography,” Abe said at a Reuters Newsmaker event, noting that nominal gross domestic product had grown despite losing 3 million working- age people over the last three years. “Japan may be aging. Japan may be losing its population. But these are incentives for us,” he said. “Why? Because we will continue to be motivated to grow our productivity,” Abe added, citing robots, wireless sensors, and artificial intelligence as among the tools to do so. “So, Japan’s demography, paradoxically, is not an onus, but a bonus.”

Abe has focused on mobilising women and the elderly to compensate for a shrinking workforce rather than tackle head-on the politically touchy topic of immigration, although some changes are being considered on that front.

Source: *Reuters*, 21 September 2016

# Extract 4: Aging Japan: Robots may have role in future of elder care

Robots have the run of Tokyo’s Shin-tomi nursing home, which uses 20 different models to care for its residents. The Japanese government hopes it will be a model for harnessing the country’s robotics expertise to help cope with a swelling elderly population and dwindling workforce. Allowing robots to help care for the elderly - a job typically seen as requiring a human touch - may be a jarring idea in the West. But many Japanese see them positively, largely because they are depicted in popular media as friendly and helpful. Plenty of obstacles may still hinder a rapid proliferation of elder care robots: high costs, safety issues and doubts about how useful and user-friendly they will be.

The Japanese government has been funding development of elder care robots to help fill a projected shortfall of 380,000 specialised workers by 2025. Authorities and companies in Japan are also eyeing a larger prize: a potentially lucrative export industry supplying robots to places such as Germany, China and Italy, which face similar demographic challenges now or in the near future. A few products are trickling out as exports: Panasonic Corp has started shipping its robotic bed, which transforms into a wheelchair, to Taiwan.

Source: *Reuters*, 28 March 2018

**Extract 5: A home from home for Japan's elderly**

There are some key ways in which the nursing care sector in Japan has evolved to preserve its quality of care even as the hyper-ageing society ramps up its eldercare facilities. A quarter of its people are 65 or older now. By 2040, this group will make up more than a third of its population. Growing in tandem is the number and types of long-term senior care facilities available in Japan.

The most common is the tokuyo, a publicly funded facility that provides nursing care to seniors who have serious physical or mental disabilities. There were 566,600 beds in these facilities last year, up from around 300,000 in 2000.

Family members have traditionally cared for the elderly but nursing homes became affordable with the introduction of Japan’s long-term care insurance (LTCI). Such a system is designed to shift the responsibility of supporting the elderly away from the family and into the public domain. This is key as more of the elderly requiring long-term care, and for longer periods. Yet, there was a lack of adequate caregiver support. The principles of this system include: supporting the independence of the elderly rather than just providing care and allowing users to benefit from a range of services from institutions of their choice. This has led to a competitive market of service providers, mostly private players, springing up in the last decade.

Source: Straits Times, 31 July 2016

**Questions**

(a) From Extract 1, identify and explain a factor that could be responsible for the upward trend in Japan’s health spending shown in Figure 1. [2]

(b) With reference to data, discuss the likely effects of a shrinking workforce in Japan and technological advancement on the robotics market. [8]

(c) Explain two possible changes that may occur to the demand curve of healthcare workers given the introduction of robots. [4]

(d) What is the main characteristic of a normative economic statement? Identify

one example of such a statement from Extract 3. [2]

(e) Is a publicly funded nursing facility an example of a public good? Provide reasons for your answer. [4]

(f) Discuss the factors that the Japanese government should consider in allocating resources towards the development of elder care robots. [10]

[Total: 30]

**Suggested Answers**

**(a) From Extract 1, identify and explain a factor that could be responsible for the upward trend in Japan’s health spending shown in Figure 1. [2]**

Aging population (Ext 1)  rise in number of chronic illness - increase in demand  increase in P and Q increase in total health spending

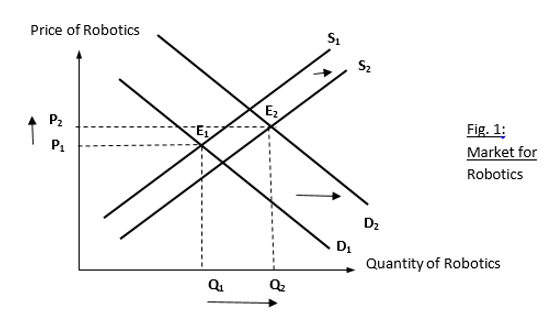
**(b) With reference to data, discuss the likely effects of a shrinking workforce in Japan and technological advancement on the robotics market. [8]**

Shrinking workforce (Ext 1) 🡪 fall in supply of labour 🡪 wages increase 🡪 thus, demand for robotics which are substitute for labour will increase (Ext 4: funding development of elder care robots to help fill a projected shortfall of specialised workers) 🡪 shift DD curve to the right

Tech advancement 🡪 fall in unit COP 🡪 more profitable 🡪 increase in SS 🡪 shift SS curve to the right

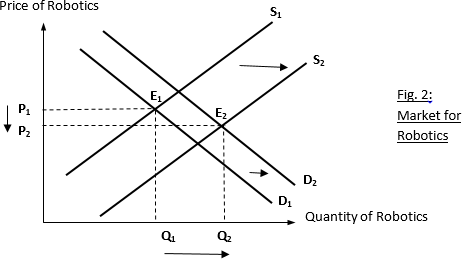
Increase in DD > increase in SS – equilibrium P and Q increase

It takes time to develop and create robotics suitable for different types of healthcare services, coupled with the aging population. It is likely that increase in demand will outweigh the increase in supply in the SR. Hence, equilibrium price and quantity will increase (Fig 1).



Increase in DD < increase in SS – equilibrium P falls, Q increases

Once the technology is fully developed, they may be able to produce more robotics. Hence it is likely that increase in supply will outweigh the increase in demand in the LR. Hence, equilibrium price will decrease while equilibrium quantity will increase (Fig 2).



Evaluation

Ext 2: With the rapidly aging population and, as the robotics are seen as a close substitute to the workers, demand for the robotics will increase significantly. However, given the existing technology, supply of robotics is unlikely to increase significantly. Hence the increase in demand is still likely to persist and outweigh the increase in supply. Hence, equilibrium price and quantity will increase.

Price elasticity of supply inelastic – long time period for production of robots

Price elasticity of demand elastic – high degree of substitution

**(c) Explain two possible changes that may occur to the demand curve of healthcare workers given the introduction of robots. [4]**

**Impact on the change in demand and the impact on the price elasticity of demand**

Robots are deemed as substitutes for healthcare workers (Ext 4: development of elder care robots to help fill a projected shortfall of 380,000 specialised workers) 🡪 increase in supply of robots causes fall in price of robots 🡪 increase in quantity demanded of the robots 🡪 fall in demand for the healthcare workers 🡪 leftward shift of the demand curve.

With the introduction of robots, there are now more substitutes available, therefore demand for healthcare workers also becomes more price elastic/less price inelastic 🡪 demand curve becomes gentler / less steep.

**(d) What is the main characteristic of a normative economic statement? Identify one example of such a statement from Extract 3. [2]**

A normative economic statement expresses value judgements (opinions) about economic fairness or what the outcome of the economy and policy measure(s) ought to be.

One example is “So, Japan’s demography, paradoxically, is not an onus, but a bonus”.

Other accepted statements:

- “Prime Minister Shinzo Abe said Japan’s aging, shrinking population was not a burden, but an incentive to boost productivity through innovations.”

- “I have absolutely no worries about Japan’s demography.”

**(e) Is a publicly funded nursing facility an example of a public good? Provide reasons for your answer. [4]**

Public goods exhibit both characteristics of non-excludability (NE) and non- rivalry (NR) in consumption.

Excludability 🡪 an elderly’s consumption of the nursing facility is made contingent on payment, while other individuals who do not pay for the nursing facility can be effectively excluded from enjoying the benefits 🡪 can exclude non-payer from staying in the public nursing home

AND

Rivalry in consumption 🡪 the consumption of the nursing facility by one elderly reduces the amount of benefit that is available to others.

Concluding statement 🡪 since publicly funded nursing facilities do not fulfil characteristics of NE and NR, they are not an example of public good.

**(f) Discuss the factors that the Japanese government should consider in allocating resources towards the development of elder care robots. [10]**

The objective of a government is to maximise social welfare, which is achieved when production takes place up to the quantity where marginal social benefits (MSB) is equal to marginal social cost (MSC).

In deciding how to allocate its resources towards development of robots for elder care, the Japanese government would consider various factors such as its constraints, the benefits and costs from allocating additional units, as well as gather information and consider the perspectives of relevant stakeholders.

One factor that the Japanese government needs to consider is the constraints it faces, as the constraints will limit the available choices and their associated benefits and costs. These constraints include the budget constraint and the priority of economic aims. For example, if Japan is facing budget deficit, the amount of resources that they can allocate to the development of elder care robots will be limited. Moreover, it also depends if they have other pressing issue such as worsening of growth which would require them to allocate resources towards, hence fewer resources available for the development of elder care robots.

Another factor that the Japanese government needs to consider will be the benefits from the development of elder care robots such as achieving efficiency and equity in the economy. Positive externality could arise due to the consumption of elder care robots such as easing the manpower shortage and promoting higher rates of economic growth as the younger generation would be more able to focus better at work and be more productive once their parents are cared for by these robots, (Ext 4: “robotics expertise to help cope), resulting in under-consumption of elder care robots. Hence, allocating recourse to the development of elder care robots would help to achieve allocative efficiency. In addition, the development of elder care robots by the government would also ensure that people who require it will be able to access it such as the lower-income elderly, hence achieving equity.

Another factor that the Japanese government needs to consider will be the benefits from the development of elder care robots such as achieving economic growth. The government could generate export revenue from the sale of elder care robots (Ext 4: potentially lucrative export industry). With increasing export revenue, net exports will increase, ceteris paribus. Hence aggregate demand will increase, leading to multiplied increase in real national income, hence achieving actual growth.

Another factor that the Japanese government needs to consider will be the costs from the development of elder care robots such as the cost of development (Ext 4: high costs, safety issues and doubts). Development of elder care robots will incur high costs such as recruiting the professionals and purchase of high technology material such as microchips. They will also need to spend on research and development to ensure that the robots are safe for usage. Moreover, they will need to increase production for the rapidly aging population. Hence production cost is likely to increase significantly which will be a strain of the budget.

In addition, the government will need to consider the opportunity cost incurred. If they were to allocate the resources to the development of elder care robots, it will mean that they have fewer resources available for other areas such as education and healthcare, hence worsening the efficiency in other markets like education.

Another factor that the Japanese government needs to consider will be the perspectives of others such as the consumers who are the elderly in this case. Elder care is typically seen as a job which requires a human element (Ext 4: a job typically seen as requiring human touch), and if the consumers are not receptive to this idea, there may be low demand for such elder care robots. In this way, the government should not allocate much resources to this development. On the other hand, there is generally warm reception to robots by many Japanese (Ext 4: “many Japanese see them positively). There may be an increase in demand, and hence the government should be allocating more resources towards the development.

Finally, after determining the MSB and MSC, the Japanese government would weigh them to make its decision. It would allocate resources towards developing more robots if the marginal social benefit is greater or at least equal to the marginal social cost as the addition to total benefit is greater than or at least equal to the addition to total cost. This would then allow it to maximise social welfare.

In conclusion, the Japanese government makes decisions by considering the factors that affect their costs and benefits and then weigh MSB and MSC to allocate resources to maximise social welfare. The most significant factor may be constraint that the Japanese government has implemented other policies to improve the economy concurrently. It is very likely that the government may be looking at other macroeconomic stabilisation and growth policies while addressing the issue of an aging population and promoting elder care. This being the case, the most significant factor to consider would then be the perception of the public towards elder care robots or the direct benefits that elder care robots might have on the healthcare sector, rather than unintended positive impacts on the wider economy (because the latter would not be obvious).

Should the government provide nursing home?

1. Cost of financing
2. Price of nursing home
   1. issue of equity in pricing
   2. issue of sustainability
3. Moral Concern 7 level of satisfaction
4. Quality of services and capabilities in the provision

Should the government subsidize?

1. Contribution by the section and cost given to them – net private benefit gain to the DWL ( level of dwl – small as the loss of gain the elderly can reap is minimal as they contribute little to the society – dwl is measured in terms of damage to social fabric to the society)
2. Cost of financing
3. Subsidy will encourage misuse of the subsidy as rich may try to apply for subsidy.
4. To over inequity – help lower income group