## 2024 JPJC JC2 Prelim H1 P1 Suggested Answer

#### **Question 1: Rice and Food Security**

(a) (i) With reference to Figure 1, describe the changes in the world food price for [2] the period from January 2020 to January 2023.

#### Suggested answer:

Overall, world food price has risen for the period from January 2020 to January 2023. However, the data shows a reversal of trend after March 2021 (food price falls after March 2022).

(a) (ii) With the aid of a diagram, account for the extent of the change in world price [5] food in March 2022.

## Suggested answer:

Version 1:

The extent of the rise in world food prices in 2022 is attributed to (i) a fall in supply (ii) a rise in demand and (iii) demand for food is price inelastic.

Supply factor: Russia and Ukraine are key exporters of wheat, corn, barley, and sunflower oil, which are crucial food commodities globally. The invasion disrupted the production and export of these goods, especially through the Black Sea, a major route for global trade. The stalling of Ukrainian exports significantly reduced

the global supply of these essential food items [] rise in cost of production []

reduces profits of food producers [] fall in market supply.

Demand factor: As the conflict between Russia and Ukraine heightened fears of sustained supply disruptions, expectations of rising prices may have triggered an increase in demand for these commodities, driven by panic buying and stockpiling behaviour.

A fall in market supply with a rise in market demand [] a shortage at the initial

market equilibrium price I upward pressure in market price. Thus, the extent of the rise in world food price in 2022 is due to reinforcing effect of a fall in supply and rise in demand for food as seen in Figure 1.



Figure 1

Version 2:

The extent of the rise in world food prices in 2022 is attributed to (i) a fall in supply and (iii) demand for food is price inelastic.

Supply factor: Russia and Ukraine are key exporters of wheat, corn, barley, and sunflower oil, which are crucial food commodities globally. The invasion disrupted

the production and export of these goods, especially through the Black Sea, a major route for global trade. The stalling of Ukrainian exports significantly reduced the global supply of these essential food items  $\Box$  rise in cost of production  $\Box$  reduces profits of food producers  $\Box$  fall in market supply.

At the original market equilibrium price, there will be a shortage arising from the fall in market supply  $\Box$  upward pressure on market price. Demand for food is price inelastic due to (i) it is a necessity (ii) a broadly defined good which lacks substitutes. Due to a fall in market supply, coupled with a price inelastic demand for food, market price will rise by a large extent as shown in Figure 1a.





(b) Using the concept of Production Possibility Curve (PPC), explain the likely impact [4] of 'severe flooding' (Extract 4) on the Pakistan economy.

#### Suggested answer:

Production Possibility Curve (PPC) shows the maximum combination of two goods or services which the economy can produce with a given quantity and quality of resources, assuming all resources are fully and efficiently utilised, and a particular state of technology.



The severe flooding in Pakistan has destroyed rice fields, land and infrastructure, affecting most parts of the country. This causes a fall in quantity of land and capital, resulting in a fall in productive capacity and an inward shift of the PPC from  $PPC_1$  to  $PPC_2$  as shown in Figure 2.

As Pakistan represents 7.6% of global rice trade, the severe flooding affecting rice yields will cause a fall in export revenue and hence net exports. Together with the fall in business activities (investment

expenditure), there will be lesser production of goods and services, lowering the derived demand for resources. There is higher unemployment, representing lesser utilisation of Pakistan's resources. The country moves from a point within the PPC (Point a) to a point further away (Point b) where there is higher unemployment as shown in Figure 2.

(c) Extract 2 mentions that Thailand and Vietnam are in talks on a pact to raise the [6] price of their rice exports to improve farmer incomes (profits).

Comment on the effect of an increase in prices of rice exports on farmer incomes, taking into account the rising costs of production and the implications of price elasticity of demand.

<u>Suggested answer</u>: Farmer income = Profit = TR - TC

An increase in the prices of rice exports, as mentioned in Extract 2, would likely have a positive effect on farmers' profit, assuming other factors remain constant. If we <u>assume</u> that demand for Vietnam's rice exports in the world market is price inelastic, an increase in rice export price results in less than proportionate fall in quantity demand, leading to a rise in total revenue. Assume that total revenue rises by a larger extent that the rise in cost of production, Vietnamese farmers experience a rise in profit (Total Revenue – Total Cost).

However, farmer incomes is also affected by the extent of rising cost of production. If total revenue rises by a larger extent than the rise in cost of production, farmer income (profit) will rise. Hence, farmers in Thailand and Vietnam will also need to consider how to reduce the extent of rising cost in addition to raising price of their rice exports.

The extent to which Vietnamese rice farmers will realize an increase in profit depends on two key factors: (i) the value of price elasticity of demand and (ii) the relative changes in total revenue and total costs for Vietnamese rice farmers.

- (d) Rice cultivation is one of the main crops grown in Vietnam, which is one of the world's top rice producing countries. With reference to Extract 5:
  - (i) Explain why there is an inefficient allocation of scarce resources in the [5] market for rice.

#### Suggested answer:

Inefficient allocation of resources occurred when the marginal social cost is greater than the marginal social benefits and the greater marginal social cost in the rice market is due to the presence of negative externalities in the cultivation of rice.

In the free market, producers will aim to maximise its profits by producing at the level of output where the marginal private cost (MPC) is equal to the marginal private benefits (MPB), (MPC = MPB) at Qm as shown in Figure 3 below. The MPC is the additional costs incurred in producing an additional unit of output (rice) such as wages of the farmers, utilities (water usage) and other operational costs and the MPB is the additional revenue gained from producing an additional unit of rice.

The producers do not take into account the presence of negative externalities give rise to external costs incurred by 3<sup>rd</sup> parties who are not directly involved in the production of rice and these external costs are not reflected in the price of the rice. One of the negative externalities that arise is due to high levels of methane that are generated by bacteria that grow in flooded rice paddies when the leftover rice straw are left to rots in the fields after harvest. The methane traps heat in the atmosphere causing erratic climatic changes which disrupts economic activities and results in loss of income to 3<sup>rd</sup> parties such as other non-rice farmers whose crops are being destroyed or other workers not being able to report for work due to the unpredictable weather.

The socially optimal level of output requires that the rice farmers take into accounts the external costs and produce at the socially optimal level of output where the marginal social costs (MSC) is equal to the marginal social benefits (MSB) at Qs as shown in Figure 3 below. The MSC is equal to MPC + MEC. However, at the free market level of output at Qm, the MSC of rice production is greater than the MSB (MSC > MSB) which give rise to a deadweight loss equal to the shaded area as shown in Figure 3. There is an

over production of rice (Qm > Qs) and hence there is inefficiency in the allocation of scarce resources in the market for rice.

Thus, the inefficient allocation of resources in the market for rice necessitates the adoption of appropriate policies by the government to correct the market failure that is deemed to have occurred in the market for rice.



(ii) Discuss whether the government should support the proposed method of [8] climate-friendly straw management by the private research institute.

#### Suggested answer:

Due to the presence negative externalities and the external costs that arise from the methane emission as a result of the improper disposal of the rice straw, a climate friendly straw management has been introduced to the rice farmers. Whether the government should support the proposal would depend on its benefits, effectiveness, costs, constraints and any unintended consequences of the proposed method.

The climate friendly straw management method requires rice farmers in Vietnam to upon harvesting to soak the straw bales and laid out to grow and sold the straw mushrooms before putting the straw bales into a composting machine. The rice straw after harvesting are thus being put into good use instead of leaving it to rot in the rice fields for bacteria to thrive and releasing methane into the atmosphere. This helps to reduce the negative externalities and hence external costs associated with rice cultivation. As shown in Figure 4 below, a reduction in the marginal external costs from MEC<sub>0</sub> to MEC<sub>1</sub> will reduce the divergence between MSC and MPC and a reduction in deadweight loss from the shaded area AEm<sub>0</sub>Es to BEm<sub>0</sub>Es<sub>1</sub>, allowing a higher socially optimal level of rice cultivation and reducing the inefficiency in the allocation of resources.



With the reduction of the negative externalities by recycling of the rice straw after harvest for growing mushrooms, it not only enables a more sustainable method of rice cultivation as the by-product of rice straw are being re-used to grow mushrooms. It also provides an additional source of income for the farmers. And as this method is initiated and organised by the International Rice Research Institute (IRRI), the government may not incur heavy costs nor face any financial budget constraints.

However, the success of the proposed method of rice straw management is limited as it has not been widely adopted by the rice farmers. As stated in Extract 5, 80% of the straw in the Mekong Delta is still burned in the fields after harvest. This may be due to imperfect information on the part of the farmers on the presence of negative externalities in rice cultivation. As such, solely depending on the climate friendly method of straw management may not be sufficient to reduce the negative externalities to achieve an efficient allocation of resources in rice cultivation. The government may have to adopt other policies such as moral suasion or public education to inform farmers of the true benefits and encourage the rice farmers to adopt the climate friendly method of straw management.

In view of the benefits of the proposed climate-friendly straw management method, the government should support such a method as it would not only reduce the negative externalities associated with rice cultivation, it also enables a more sustainable method of rice cultivation and the benefits of increasing the income of farmers from growing mushrooms. However, as the farmers may not be fully aware of the benefits of the method, the government may have to adopt policies such as moral suasion and education to provide the farmers with the necessary information for the method to be more widely adopted and reaping the full benefits of the intended consequences of the proposed method of straw disposal.

(e) Achieving food security is among the objectives of the Singapore government. [10]

Discuss the view that achieving food security should be the priority of the Singapore government.

## Suggested answer:

As evident in Extract 6, food security is fundamental for ensuring reliable access to affordable, nutritious food, which is crucial for public health, economic stability, and social harmony. Singapore, which imports over 90% of its food, is highly vulnerable to global supply disruptions, making food security a significant concern. The government's "30 by 30" goal aims to produce 30% of Singapore's nutritional needs locally by 2030, highlighting the importance placed on food security.

Singapore is heavily dependent on food imports and is vulnerable to external shocks such as unfavourable weather conditions in food-producing nations, trade restrictions and geopolitical tensions. These include climate change, COVID-19 pandemic and Russia's invasion of Ukraine (Extract 1). These will lead to a fall in global food supply that causes a rise in global food price. As Singapore imports over 90% of its food commodities, there will be rise in cost of production and fall in short-run AS due to falling profits and incentives to produce. This results in rising GPL (imported cost-push inflation) and falling real GDP (falling actual growth).

To achieve food security and mitigate these risks, diversifying food imports, enhancing local production, and maintaining adequate stockpiles of essential food items are crucial (Extract 6). Reliable access to nutritious food is essential for public health, as food shortages and price spikes can lead to malnutrition and health issues, particularly among lower-income households, thereby worsening inequality. Food shortages and high prices

can also lead to social unrest and instability, negatively impacting the non-material standard of living in Singapore. Hence achieving food security should be the priority of the Singapore government.

Prioritising Singapore's food security through investments in high-tech farming solutions promotes innovation in the economy, increasing both actual and potential growth by boosting aggregate demand (AD) and aggregate supply (AS). This approach also creates new industries and job opportunities, reducing cyclical unemployment. Moreover, local food production designed to be sustainable can reduce the carbon footprint associated with importing food, promoting sustainable growth.

However, there are certain costs, constraints and unintended consequences that arise from prioritising the achievement of food security in Singapore. Achieving food security through high-tech farming and local production requires significant investments in research, infrastructure, and technology. These resources might be better allocated to other pressing issues such as healthcare, education, or housing, thus incurring opportunity costs. Singapore's small geographical size and limited labor force also pose challenges to expanding local food production, potentially leading to inefficient use of scarce resources. Specialising in capital and knowledge-intensive sectors such as finance and services, and relying on global markets for food imports, allows Singapore to benefit from the efficiencies of international trade.

The Singapore government faces other economic priorities. During the COVID-19 pandemic, the priority was to spur growth and preserve jobs amidst a global recession. Expansionary policies, including fiscal stimulus, zero appreciation of the SGD, and short-run supply-side policies (subsidies), were adopted to boost AD and SRAS, increasing real GDP and employment.

Addressing the internal challenge of an ageing population that has different needs is another priority. Such a demographic change also results in high labour costs that may deter FDI. The government focuses on developing active ageing, preventive and rehabilitative healthcare, and enhancing human capital through a quality education system and lifelong learning programmes. These measures help boost productivity and the productive capacity of the economy, increasing AS and potential growth.

While achieving food security is critical for Singapore's stability and resilience, it should not be the sole priority of the government. The government must balance this with other economic priorities, including efficiency, equity, strong growth, employment, and price stability.

The government must weigh the benefits of local food production against its costs. Fiscal prudence and a healthy budget mean the opportunity cost of achieving food security may not be prohibitively high. However, priorities should be based on Singapore's needs given the state of the global economy and changing demographics.

A diversified approach, combining local production with robust international trade strategies and technological advancements, can provide a comprehensive solution to ensuring food security without compromising other essential microeconomic and macroeconomic objectives.

[Total: 40]

#### Question 2: Navigating Economic Turbulence

(a) With reference to Figure 2, which country showed the greatest variation in [1] growth rate?

Suggested answer: India

# (b) With reference to Table 1 and Figure 2, what can you conclude about the [4] economic performance of Russia in 2022?

#### Suggested answer:

Figure 1 shows that Russia experienced a fall in real GDP in 2022, with a negative growth rate indicating a period of economic recession. This negative growth reflects a reduction in the production of goods and services in the economy, resulting in a decrease in overall economic output for the year.

From Table 2, inflation rates rose from 5% to 7.2% indicating high inflation. High inflation could bring about higher cost of living and economic uncertainty, deterring investments in Russia. [1] Unemployment rate remained high at 5% in 2022, indicative of a high degree of an underutilisation of labour resources.

Overall, the economic performance of Russia was negative due to falling real GDP, rising inflation and unemployment remained high at 5%.

# (c) With reference to Extract 8 and using an AD/AS diagram, explain how [5] international sanctions and supply chain disruptions can affect Russia's growth rate in 2022.

#### Suggested answer:

In response to Russian invasion of Ukraine, many countries and international organisations have imposed sanctions on Russia. These sanctions included restrictions on trade (X-M) and investment (I). This led to a fall in export demand for Russian exports and foreign direct investments. Sanctions and the resultant economic instability have also affected the consumers' confidence, which in turn reduces consumption (C). Together, a fall in C, I and X leads to a fall in AD and through the reverse multiplier process, leads to a multiplied fall in Russia's real GDP.

International sanctions and geopolitical tensions also disrupted global supply chains, making it harder for Russian firms to import necessary raw materials, technology, and equipment. The difficulties in accessing imports led to higher production costs which reduces short-run aggregate supply (SRAS). Restrictions on high-tech exports limited Russia's access to advanced technologies needed for various industries, further constraining the economy's productive capabilities. This leads to a shift in both SRAS and LRAS curve to the left.

Together a fall in AD from  $AD_1$  to  $AD_2$  and AS from  $AS_1$  to  $AS_2$ , it will lead to a fall in real GDP from  $Y_1$  to  $Y_2$  and hence explaining the negative growth in 2022 for Russia.



Figure 1: Russia Economy

- (d) Extract 9 states that as automation and artificial intelligence adoption picks up pace, many roles in IT are becoming redundant - a phenomenon that's not restricted to India.
- (i) Explain why automation and artificial intelligence in India may benefit some [4] groups of workers more than others.

#### Suggested answer:

High-skilled workers with high-level skills in technology, data analysis, and software development are likely to benefit the most. This is because automation and AI create new opportunities in tech-driven sectors, causing an increase in demand for high-skilled workers, offering higher wages and advanced career prospects for these professionals.

Low-skilled workers on the other hand are disadvantaged. Low-skilled workers, especially those in manual and routine jobs, are at risk of displacement due to automation. Jobs in sectors like manufacturing, retail, and agriculture might be particularly vulnerable as they are easier to automate, and these workers may have fewer opportunities to transition into new roles without additional training or education. The fall in demand for low-skilled workers causes a fall in wages.

# (ii) Explain <u>one</u> negative impact of increased youth unemployment in a country [2] such as India.

#### Suggested answer

Increased youth unemployment increases underutilization of labour resources, represented an inward movement of a point on the production possibility curve to a point inside the PPC. This worsens the problem of scarcity.

## Alternative answer

Increased unemployment puts additional pressure on government finances due to higher spending on support programs. This shift in expenditure incurs an opportunity cost: the funds allocated to unemployment support cannot be used for other critical areas such as education or healthcare. As a result, the potential benefits from investing in these other sectors are lost, leading to a trade-off between immediate support and long-term economic growth.

Or Crime rates increase reducing non-material standard of living / Increased government spending will lead to budget deficit/debt assuming tax unchanged.

## e Comment on the view that India's living standards has risen over time

[6]

#### Suggested answer:

Standard of living refers to the quantitative and qualitative aspect of life.

India experienced net positive economic growth over the period. As her growth exceeds population growth, she experienced an increase in real GDP per capita. This indicates an increase in value of output produce available for consumption per person, increasing her material standard of living. Both her life expectancy at birth and literacy rate has also increased over time. This reflects an increase in accessibility to better healthcare, sanitation and education, increasing her non-material standard of living.

However, her unemployment rate in particular youth unemployment has increased since 2019. This reflects that despite positive growth, India is not able to create enough jobs for her youth. An increase in youth unemployment reflects an increasing number of youths not able to secure jobs after they graduate. Many were forced to take up low pay and low skill jobs which greatly affect their ability to consume and hence experience a lower standard of living.

In conclusion, based on conflicting data given, it is impossible to conclude that India standard of living has increased. As standard of living encompasses both the material and non-material aspect of life, more data such as Gini coefficient (which measure income distributions) are needed before one can come to a conclusion. This is because though real GDP has increase, the increase in GDP may be concentrated in the hands of the minority rich (high skilled workers commanding high pay in the industries using technology) and not the majority low skilled workers displaced by automation. SOL hence may not have increased for the majority population.

# f Using Extract 10 and AD/AS analysis, assess the extent to which monetary [8] policy centered on exchange rate would dampen price pressures from domestic and external sources in Singapore.

#### Suggested answer

As mentioned in Extract 10, for Singapore to brace itself for the 'troubled environment' of persistently high inflation she must tighten her exchange rate. The extent monetary policy centered on exchange rate can dampen price pressure depends on the root cause of price pressure.

Adopting a tight monetary policy in Extract 10, which leads to an appreciation of the Singapore dollar, can have significant economic effects. As the Singapore dollar strengthens, the price of exports in foreign currency rises, making Singapore's goods and services more expensive for foreign buyers. Conversely, the price of imports in domestic currency falls, making foreign goods cheaper.

Assuming both the price elasticity of demand (PED) for exports and imports are elastic, this appreciation will likely result in decreased export revenue and increased import expenditure. Consequently, net exports will fall, which reduces aggregate demand (AD). If the economy is near or at full employment, this reduction in AD can help mitigate demand-pull inflation originating from external sources.

However, given the current global economic context, including weaker global growth, the primary focus of a tight exchange rate policy should be on addressing imported cost-push inflation. This is due to the ongoing global energy crisis and disruptions in food supplies. A stronger Singapore dollar will lower the cost of imports in local currency, thereby reducing the cost of imported raw materials. This reduction in input costs decreases production expenses for domestic firms, leading to an increase in short-run aggregate supply (SRAS) and a subsequent reduction in general price levels (GPL).

Given Singapore's heavy reliance on imported raw materials due to its lack of natural resources, a strong exchange rate is particularly effective in alleviating inflationary pressures from external sources.

However, an exchange rate (ER) policy cannot address price pressures stemming from domestic sources, such as increases in consumer spending (C) and business investment (I), since it primarily targets net exports (X). Additionally, the ER policy cannot mitigate domestic cost-push inflation caused by rising wages and rental costs. In addition, while a strong exchange rate can help reduce the impact of imported inflation by making foreign goods cheaper, it does not resolve underlying global supply constraints or fully counteract global price increases, such as those resulting from the Ukraine-Russia conflict.

In conclusion, while the exchange rate can help manage inflation from external sources, it has limitations in addressing other types of inflation. Effective inflation management typically requires a mix of policies to comprehensively tackle various sources of inflation. Therefore, it is only to a small extent that the exchange rate alone can dampen inflationary pressures from both domestic and external sources.

# g Discuss how fiscal measures can be used to achieve inclusive growth in light [10] of the 'troubled environment' faced by Singapore (Extract 10).

#### Suggested answer

In light of 'troubled environment' (Extract 10) such as the Russia-Ukraine crisis, high inflation, and tightening global monetary policies, Singapore faces significant economic pressures such as rising cost of living and weakening economic growth. The rising cost of living, exacerbated by global disruptions to energy and food supplies, and weakening growth, require robust fiscal measures to achieve inclusive growth. Inclusive growth indicates a rate of growth that is sustained over a period of time, is broad-based across economic sectors, and creates productive employment opportunities for the majority of the country's population.

Given the global energy crunch and disruption to food supplies, the Singapore government can increase government investments in local food production and energy efficiency programs. Fiscal measures could include government spending on subsidies for energy projects and incentives for firms to adopt energy-efficient practices. This will lead to an increase in G and I, increasing aggregate demand (AD), leading to a rightwards shift of AD from AD1 to AD2 and via the multiplier effect, real GDP rises, achieving actual growth.

In addition, the Singapore government can implement fiscal measures focused on skills development (Extract 10), particularly targeting low- and middle-income workers. By investing in training programs, providing incentives for companies to upskill Singapore's workforce, and supporting technological adoption in businesses, the government can better adapt to a rapidly transforming economy. These fiscal measures can enhance labour productivity, which in turn reduces the unit cost of production and increases the economy's productive capacity. This will in turn increase in aggregate supply (AS), leading to a rightward shift of AS from  $AS_1$  to  $AS_2$ , achieving potential growth in the long-term.

With higher actual and potential growth as seen in the diagram below, this allows the Singapore economy to achieve non-inflationary sustained economic growth, reducing GPL from  $P_2$  to  $P_3$ , lowering cost of living and increasing real GDP from  $Y_1$  to  $Y_2$ , strengthening economic growth in Singapore.



As mentioned in Extract 10, the Singapore government's implementation of the Cost-of-Living (COL) Special Payment, along with Public Transport Vouchers and Community Development Council (CDC) vouchers, serves as a strategic fiscal response to persistent inflation, targeting lower- to middle-income households. It is particularly important for the lower-income households as these measures not only provide immediate financial relief but also play a critical role in addressing income inequality, lowering cost of living and fostering inclusive economic growth in Singapore.

The reliance on such fiscal support can lead to budget constraints. As the Singapore government spending increases to provide these subsidies and payments, the opportunity costs increase for other critical investments such as infrastructure, education, and healthcare. Over time, sustaining these expenditures without corresponding increases in revenue or economic growth could lead to higher deficits or require cuts in other essential services, potentially undermining inclusive growth in Singapore.

Moreover, as mentioned in Extract 10, while fiscal measures like the Cost-of-Living (COL) Special Payment and vouchers provide immediate relief to lower and middle-income households, their effectiveness may be limited in the long term. These short-term interventions address the symptoms of rising prices but do not tackle the underlying structural issues driving inflation, such as higher energy and food prices.

In conclusion, while fiscal measures are essential for providing support to achieve inclusive growth, however they must be balanced against the risks caused by the 'troubled environment' due to Singapore's nature of being small and open.

Unlike larger countries that can rely on domestic markets to mitigate external shocks, Singapore's small, open economy necessitates a different approach. Singapore must also remain globally competitive by staying open to trade and investment, continuously developing new capabilities, and enhancing economic resilience through strengthening their free trade agreements in other economies in times of 'troubled environment'.

However, it is still important while achieving inclusive growth in Singapore, the Singapore government continues to build a stronger, more resilient labour force that can thrive in an increasingly volatile global landscape. By improving the labour force through retraining of skills, it can allow the economy to achieve a broad-based economic growth with employment opportunities for the majority.

[Total: 40]