



# ASSIGNMENT COVER SHEET

**THIS FORM MUST BE AT THE FRONT OF EACH ASSIGNMENT  
CANDIDATES MUST KEEP A COPY OF THEIR ASSIGNMENT**

Candidate to complete the following section (and update details in header):

<b>Member ID:</b>	Sample
<b>Subject:</b>	<div><input checked="" type="checkbox"/> Asset Liability Management</div> <div><input type="checkbox"/> Communication, Modelling and Professionalism</div> <div><input type="checkbox"/> Banking</div> <div><input type="checkbox"/> Enterprise Risk Management</div> <div><input type="checkbox"/> General Insurance and Health Pricing and Portfolio Analytics</div> <div><input type="checkbox"/> General Insurance and Health Valuation</div> <div><input type="checkbox"/> Investment</div> <div><input type="checkbox"/> Life Insurance and Retirement Product Development</div> <div><input type="checkbox"/> Life Insurance and Retirement Valuation</div> <div><input type="checkbox"/> Data Science Applications</div> <div><input type="checkbox"/> General Insurance Applications</div> <div><input type="checkbox"/> Life Insurance Applications</div> <div><input type="checkbox"/> Superannuation and Retirement Applications</div>
<b>Due Date:</b>	Tuesday, 27 August 2024 at 11am – 1pm AEST (Sydney time)

## PLAGIARISM

By submitting your assignment, you are implicitly stating that the work is your own.

Remember that an important aspect of being a professional actuary is to always act with integrity. Committing plagiarism by copying another person's work or not properly referencing other sources used in your assignment is a breach of the Integrity principle under the Actuaries Institute's Code of Conduct.

Any suspected plagiarism will be referred to the Institute's Executive General Manager, Education for review. Depending on findings, a complaint regarding the member may be made to the Institute's Conduct Committee. Subject marks may not be released until the matter is resolved.

Be aware that your assignment may be vetted using Turnitin.

**QUESTION 1****(10 Marks)****Question background.**

A Japanese financial services company owns two subsidiaries, both operating in the United States of America:

1. A **regional bank** with assets that comprise mainly home loans denominated in US Dollars;
2. A **life insurance company** with a portfolio of term life insurance and annuity policies, backed by a diversified asset portfolio which includes an allocation to global listed equities.

The yen is currently trading at its lowest level in 34 years versus the US dollar. This is mainly because the US economy has been growing strongly and inflation has been high, so that the US central bank has been maintaining its short term interest rate at a level well above that set by the Japanese central bank.

More recently both countries have reported declining inflation rates.

In the 2024/25 financial year, the regional bank is expected to return a \$1 million USD profit while the life insurance company is not expected to return a profit.

Assume all figures apply as at 30 June 2024.

Country	Japan	USA
Inflation target	2.0%pa	2.0%pa
Inflation (last 12 months)	2.8%pa	3.3%pa
Cash Rate 30 June 2024	0.10%pa	5.25%pa
Exchange Rate 30 June 2024	160 JPY	1 USD
Exchange Rate forecast for 30 June 2025	125 JPY	1 USD

USD: United States Dollar

JPY: Japanese Yen



**Question**

- a) Explain how, in the current economic conditions, the US central bank is influencing the rate of money creation and the impact on profit (in USD) of the regional bank. (3 marks)
- b) Demonstrate how the profit (in JPY) of the Japanese parent company is affected by exchange rates. (2 marks)
- c) Describe how leverage drives the returns and the volatility of returns of the listed equity component of the life insurance company's asset portfolio. (2 marks)
- d) Outline three methods for stabilising the profitability of the US subsidiaries, when reported in JPY, against a depreciation of the USD versus the JPY. (3 marks).

**END OF ASSESSMENT**

**Answer:**

- a) Money creation occurs when a bank makes a new loan and thus simultaneously creates a matching deposit in the borrower's bank account. Thus, money is essentially created through lending.

Since the economy in the US has been growing a lot, this may imply that there is a lot of money in circulation. However, this has also led to high inflation. Thus, the US central bank is increasing interest rates significantly to reduce those inflationary pressures. It set the cash rate to 5.25% which is very high. This is working as the US have reported lower inflation rates.

The higher cash rate set is set to reduce the rate of money creation in the economy. A higher cash rate would mean that commercial banks have to pay higher interest rates on their borrowings from the central bank. Thus, they will pass on these extra costs to borrowers (households and companies), who are less likely to borrow. Thus, reducing money creation.

Similarly, since the cash rate is high, commercial banks will want to avoid borrowing from the central bank. Thus, they will keep higher reserves and again reduce borrowing. This also dampens money creation in the market.

They would also rather keep reserves at the central bank to benefit from the higher returns, rather than lend to the economy.



Impact on profits of the regional bank:

As mentioned before, the higher cash rate will increase the cost of borrowing to customers. If the higher cash rate can be passed on to the borrowers, then profits are unlikely to reduce.

This higher cash rate may also imply that some of it can be passed on to customers as well. This may encourage them to deposit more money and consequently the bank can put that money at the central bank to gain higher returns. Given that the inflation rate is quite high though, still at 3.3%, the customers will need a higher return on their deposits. Thus, this will reduce the margin of profits that the regional bank can make.

- b) If the Japanese Yen (JPY) is weak compared to the US dollar, this will mean that the Japanese company will yield higher profits in JPY. This is because the value of 1 US dollar will equate a higher amount of JPY.

For example, if the bank is making a profit of \$1million dollar and the exchange rate is 1 US dollar = 160 JPY, this will mean a profit of 160 million JPY. Whereas if the Japanese Yen appreciates and we only now need 125 JPY to get 1 US dollar, the profit would reduce to 125 million JPY. Thus, the profit in JPY increases as the Japanese dollar weakens against the US dollar.

- c) Life insurance companies mainly invest their assets in debt and equity. The returns and volatility of listed equities can be heavily impacted by leverage.

Leverage can be classified as operating and financial. Financial leverage would in this imply the amount of gearing a company has or the proportion of debt in a company. If the company relies heavily on debt, it would have a high financial leverage. Operating leverage would mean higher risks taken in managing operations.

When the revenue of a company increases at a faster rate than the operating or financing costs, the net return to the equity investor is magnified. This leads to higher returns to the company. However, if the revenue increases at a lower rate, the net return to equity reduces significantly. If traded on an exchange, this would mean equity holders selling their shares as soon as possible, bringing the share price down further. This volatility can be so high that it causes negative net income for the equity. Capital may be exhausted and the equity value becomes zero. Thus, higher leverage increases the volatility of returns.

Higher leverage would impact the security of the equity. It will become less safe as the credit risk (risk of defaulting) increases. The reduction in security would mean that this asset would need a higher spread over the risk-free rate (more risky investment). Hence, this causes the



yield of the equity to be higher to compensate for the extra risk and attract investors.

Leverage thus increases both the returns and volatility of returns.

d)

Given that the exchange rate fluctuates a lot, the profits of the Japanese company will also vary a lot.

**Three methods for stabilising the profitability of the US subsidiaries, when reported in JPY, against a depreciation of the USD versus the JPY would be:**

1. Entering a currency hedging contract.

This may be a forward contract which forces both the Japanese company and the dealer to trade the Japanese currency against the US dollar at a pre-agreed rate. This will likely be an OTC contract. The Japanese company may however lose from US dollar appreciation as it will be forced to trade at the agreed rate.

2. Buying a call option against the JPY

The Japanese company could also pay a small premium to give them the right but not the obligation to buy the Japanese currency at a pre-agreed rate. If the US dollar depreciates against the JPY, the company can then exercise its right to buy the Japanese rate at the rate specified. If the US dollar appreciates, it need not use the right and can trade to receive higher profits in JPY. This limits the downside currency risks for the company.

3. Swap contract

The company can also enter a swap contract to mitigate the currency risks. This will ensure the company receives fixed amounts of income from the US subsidiaries while providing varying payments to the dealer based on the profits in JPY. This contract may be implied to only a percentage of the profits to limit the downside risks of the US currency depreciating significantly. Swap options are highly customisable which will help in this case as they are traded over the counter.