FA Module 19: Foreign currency translation – practice problems

(The attached PDF file has better formatting.)

Exercise 19.1: Retained earnings

ABC, whose presentation currency is the U.S. dollar, owns XYZ, whose functional currency is the euro.

- XYZ's retained earnings are €500 (translated to $700) at December 31, 20X0.
- XYZ's 20X1 net income is €200 (translated to $300), and it paid shareholder dividends of €50 in 20X1 (translated to $80).

What are XYZ's December 31, 20X1, retained earnings in euros and dollars?

Solution 19.1: We compute retained earnings:

- The euro retained earnings are €500 + €200 – €50 = €650.
- The dollar retained earnings are $700 + $300 – $80 = $920.

Question: What should we remember from this practice problem?

Answer: Retained earnings do not use a single exchange rate. Each contribution to retained earnings uses its own exchange rate. Other balance sheet entries have a different exchange rate each year for the current rate method. Retained earnings use the appropriate income statement rate and is then frozen.

Exercise 19.2: Inventory

ABC, whose presentation currency is the U.S. dollar, owns XYZ, whose local currency is the euro.

- XYZ buys 10 units of inventory each month for €1 per unit and sells them for €3 a unit.
- XYZ holds six months of inventory throughout the year and it uses the FIFO accounting method.

The U.S. dollar to European euro exchange rate is 1 to 1 at the end of 20X0. The euro appreciates by $0.10 each month. Below are exchange rates at end-of-quarter dates.

- 12/31/20X0: $1.00 = €1.00
- 3/31/20X1: $1.30 = €1.00
- 6/30/20X1: $1.60 = €1.00
- 9/30/20X1: $1.90 = €1.00
- 12/31/20X1: $2.20 = €1.00

A. What is XYZ's inventory in dollars at December 31, 20X1, using the current rate method?
B. What is XYZ's inventory in dollars at December 31, 20X1, using the temporal method?

Part A: The current rate method translates the inventory at the 12/31/20X1 exchange rate of $2.20/€1.00.

$$€60 \times \$2.20/€1.00 = \$132.$$

Part B: The temporal method translates the inventory at the exchange rate on the purchase date.

The inventory at 20X1 is six months of purchases. For the LIFO inventory accounting method, the inventory was bought during the previous six months, so the average exchange rate for inventory is

$$(\$1.65 + \$1.75 + \$1.85 + \$1.95 + \$2.05 + \$2.15) / 6 = \$1.90/€1.00$$

The translated inventory is

$$€60 \times \$1.90/€1.00 = \$114.$$

Exercise 19.3: Inventory

ABC, whose presentation currency is the U.S. dollar ($), owns XYZ, whose local currency is the euro (€).

The U.S. dollar to European euro exchange rate is 1 to 1 at the end of 20X0. The euro appreciates by $0.10 each month. Below are exchange rates at end-of-quarter dates.

- 12/31/20X0: $1.00 = €1.00
- 3/31/20X1: $1.30 = €1.00
- 6/30/20X1: $1.60 = €1.00
- 9/30/20X1: $1.90 = €1.00
- 12/31/20X1: $2.20 = €1.00

- XYZ buys 10 units of inventory each month for €1 per unit and sells them for €3 a unit.
- XYZ holds three months of inventory throughout the year and it uses the FIFO accounting method.

A. What is XYZ's inventory in dollars at December 31, 20X1, using the current rate method?
B. What is XYZ's inventory in dollars at December 31, 20X1, using the temporal method?

Part A: The current rate method translates the inventory at the 12/31/20X1 exchange rate of $2.20/€1.00.

$$€30 \times \$2.20/€1.00 = \$66.$$

Part B: The temporal method translates the inventory at the exchange rate on the purchase date.

The inventory at 20X1 is six months of purchases. For the LIFO inventory accounting method, the inventory was bought during the previous six months, so the average exchange rate for inventory is

$$(\$1.95 + \$2.05 + \$2.15) / 3 = \$2.05/€1.00$$

The translated inventory is

$$€30 \times \$2.05/€1.00 = \$61.5$$

Exercise 19.4: Foreign currency translation with no income statement transactions

On December 31, 20X0, ABC, a U.S. based firm, forms XYZ, a subsidiary in Europe, investing €400 for all its shares. XYZ issues long-term debt for €500 and buys land for €700, leaving it with €200 in cash.

ABC's presentation currency is the U.S. dollar ($), and XYZ's local currency is the European euro (€).

The U.S. dollar to European euro exchange rate is 1 to 1 at the end of 20X0. The euro appreciates by $0.10 each month. Below are exchange rates at end-of-quarter dates.

- 12/31/20X0: $1.00 = €1.00
- 3/31/20X1: $1.30 = €1.00
- 6/30/20X1: $1.60 = €1.00
- 9/30/20X1: $1.90 = €1.00
- 12/31/20X1: $2.20 = €1.00

XYZ has no income statement transactions in 20X1 and no changes to its balance sheet. To focus on the foreign currency translation items, assume the long-term debt has a zero interest rate and no dividends are paid to shareholders. Subsequent practice problems add income statement transactions in 20X1.

A. What is XYZ's net asset exposure at 12/31/20X0 and 12/31/20X1?
B. What is XYZ's net monetary asset exposure at 12/31/20X0 and 12/31/20X1?
C. If XYZ's functional currency is the European euro, what is the translation adjustment for December 31, 20X1, on ABC's financial statements?
D. If XYZ's functional currency is the U.S. dollar, what is remeasurement gain or loss for December 31, 20X1, on ABC's financial statements?

Part A: XYZ's assets and liabilities are the same at 12/31/20X0 and 12/31/20X1.

The net asset exposure is total assets minus total liabilities, which equals shareholders' equity:

700 (land) + 200 (cash) – 500 (debt) = 400 net asset exposure.

Part B: The net monetary asset exposure is monetary assets minus monetary liabilities:

200 (cash) – 500 (debt) = –300, or a 300 net monetary liability exposure.

Question: What assets and liabilities are monetary?

Answer: Items whose balance sheet value is the receipt or payment of money is a monetary item. Items whose balance sheet values are book values based on past transactions are non-monetary items.

- Almost all liabilities are monetary items, since they are obligations to pay money at a future time.
  - Deferred revenue is a liability that has already been paid for, so it is a non-monetary liability.
- Most fixed assets are non-monetary items, since they are based on historical cost (or depreciated cost or amortized cost).
  - Inventory is a non-monetary item, since it is based on a past purchase cost
  - Prepaid expenses are already paid for, so they are non-monetary assets.
- Most quick assets (cash, marketable securities, and accounts receivable) are monetary items.

Question: Is the unearned premium reserve (for general insurance) a monetary or non-monetary liability?

Answer: The unearned premium reserve (UEPR) is a deferred revenue. Before IFRS 17, many insurers treated the UEPR as a non-monetary liability. IFRS 17 changes the accounting for insurance contracts, and the UEPR is treated the same as loss reserves, as monetary liabilities.

Question: This practice problem has a positive net asset exposure and a negative net monetary asset exposure. Is the scenario typical?

Answer: Unless shareholders' equity is negative, a firm has a positive net asset exposure. Most industrial firms and retail firms have negative net monetary asset exposures (that is, net monetary liability exposures), since they use debt to buy fixed assets. Most insurers have positive net monetary asset exposure, since they have few fixed assets (just office buildings) and little or no debt.

Part C: If XYZ's functional currency is its local currency (the European euro), ABC uses the current rate method to translate XYZ's accounting entries. All assets and liabilities are translated using the exchange rate at the valuation date (December 31, 20X1). Common stock and additional paid-in capital are translated at the exchange rate on the stock issue date.

- Assets are €900 × 2.2 = $1980
- Liabilities are €500 × 2.2 = $1100
- Common stock is €400 × 1.0 = $400

The current rate method views the subsidiary as an investment in its net assets. For this practice problem, the investment is in land that is partly funded by debt.

- The land was worth $900 at the beginning of the year and $1980 at the end of the year.
- The debt cost ABC $500 at the beginning of the year and costs $1100 to settle at the end of the year.
- The net investment was worth $400 at the beginning of the year and $880 at the end of the year.

ABC's investment has an unrealized capital gain of $480 during the year equal to the net assets times the change in the foreign currency exchange rate: 400 × (2.2 – 1.0) = 480.

Question: Are the 400 and the 480 (from the equation) in euros or dollars? What are the units of measurement for the 2.2 and the 1.0?

Answer: The exchange rate is shown as dollars per euro, so the equation in the paragraph above is €400 × ($2.2/€ – $1.0/€) = $480.

ABC's wealth increases in dollar, but the gain is not realized (ABC receives no cash), so it shows a translation adjustment as part of accumulated other comprehensive income. The translation adjustment is added to ABC's shareholders' equity; it does not flow through ABC's income statement.

Question: The textbook says to translate the income statement first for the current rate method. This practice problem derives the translation adjustment directly from the balance sheet entries.

Answer: We are following the textbook procedure, but we show the problems in steps to keep them simple. The textbook computes net income minus shareholder dividends in the foreign currency, which is the change in retained earnings. We add this change to shareholders' equity to derive the translation adjustment. This practice problem has no net income or shareholder dividends, so the change to retained earnings is zero.

Part D: If XYZ's functional currency is the U.S. dollar, ABC uses the temporal method for the translation.

- Land is a non-monetary asset, so it is translated at the exchange rate when it was bought.
- Debt is a monetary liability, so it is translated at the current exchange rate.
- Common stock is translated at the exchange rate when it was bought.

The net monetary asset exposure is 200 (cash) – 500 (debt) = –300, or a 300 net monetary liability exposure. We conceive of the temporal method as though ABC must settle XYZ's liabilities and it will receive XYZ's euro inflows. Real assets (property, plant, equipment, land, inventory) owned by XYZ do not affect the translation.

The change in the exchange rate causes a –€300 × ($2.2/€ – $1.0/€) = –$360 remeasurement gain, or a $360 remeasurement loss. ABC reports the $360 remeasurement loss on its income statement.

Question: We computed a $360 deficit on the balance sheet, but the only result is remeasurement gain or loss on the income statement. Does shareholders' equity also change with the temporal method?

Answer: The remeasurement loss is part of net income, which causes a change in retained earnings, which become –$360 at December 31, 20X1. Shareholders' equity decreases by $360.

Question: No cash changes hands when exchange rates change. The translation adjustment for the current rate method is like an unrealized gain or loss and does not flow through the income statement. Why does the remeasurement gain or loss for the temporal rate method flow through the income statement?

Answer: The change in foreign currency payables, obligations, receivables, and inflows are estimates when viewed from the presentation currency perspective.

Illustration: A firm estimates its accounts receivable to determine net revenue. If the estimate of accounts receivable declines, net income declines. An insurer estimates loss reserves to determine net income. If the estimate of loss reserves declines, net income increases.

- If a firm's accounts payable increase, it reports a debit on its income statement.
- If a firm's accounts receivable increase, it reports a credit on its income statement.

The temporal method views the euro entries by the subsidiary (XYZ) as estimates of what the parent (ABC) must pay in dollars to settle the liabilities of what the parent (ABC) will collect in dollars. The estimate depends on the exchange rate. If the exchange rate changes, the estimate changes, and the parent recognizes the change as part of net income.

Illustration: A foreign subsidiary has accounts payable of €100 or accounts receivable of €100 due in one year. From the foreign currency perspective, the asset or liability may not be an estimate. But from the presentation currency perspective, the exchange rate at the settlement date may be 0.80 or 1.20 (or another figure), and the accounts payable or receivable would be $80 or $120. The accounts payable or receivable affects the subsidiary's income statement, so the change in the estimate affects the parent's income statement.

Question: Did the U.S. dollar appreciate or depreciate against the European euro in this practice problem?

Answer: The dollars needed to buy one euro increased from 1.00 at 12/31/20X0 to 2.20 at 12/31/20X1. The dollar's value in euros declined; the euro's value in dollars rose. The dollar depreciated; the euro appreciated.

This practice problem focuses on net asset exposure vs net monetary asset exposure.

- Current rate method: ABC has a positive net investment (positive net asset exposure) in euros. The euro appreciates, so the investment increases in value. The investment is not realized, so ABC reports a translation adjustment in other comprehensive income.

- Temporal rate method: ABC has assumed more euro liabilities that it may pay in the future than euro monetary assets that it will collect in the future. The euro appreciates, so ABC's estimated liability increases more than its estimated asset. ABC reports a remeasurement loss on its income statement.

Question: How does translation differ from remeasurement?

Answer: GAAP speaks of a translation adjustment to the balance sheet and remeasurement gains or losses to the income statement.

- Translation adjustments to the balance sheet are used for the current rate method.
    - Translation adjustments are other comprehensive income and do not affect net income.

- Remeasurement gains or losses to the income statement are used for the temporal method.
  - Remeasurement gains or losses affect net income.

Exercise for foreign currency translation with income statement transactions

We add transactions one by one. Simpler transactions, such as interest expense and depreciation expense, are discussed first. More complex transactions, such as buying inventory and computing cost of goods sold, are discussed next.

Some expenses accrue steadily through the year, often pro-rata, and are translated at the average exchange rate during the year. Interest expense, tax expense, wages, rent, and utilities are examples.

The exchange rates for amortization and depreciation correspond to the rates for the underlying assets.

	Current Rate Method	*Temporal Method*
underlying asset	balance sheet date	date of purchase of asset
amortization / depreciation	average income statement date	date of purchase of asset

- Current rate (balance sheet date for underlying asset and average income statement date for depreciation and amortization) for the current rate method.
- Historical rate (date of purchase of underlying asset) for the temporal method.

We make two changes to the practice problem:

- XYZ buys €700 of equipment (not land), which depreciates (straight line) over ten years.
- XYZ's debt has an annual interest rate of 6%, payable each December 31.

Exercise 19.5: Foreign currency translation with income statement transactions

On December 31, 20X0, ABC, a U.S. based firm, forms XYZ, a subsidiary in Europe, by investing €400 for all its shares. XYZ issues long-term debt for €500 and buys equipment for €700, leaving it with €200 in cash. The debt has 5% annual coupons due each December 31. The corporate tax rate is zero.

ABC's presentation currency is the U.S. dollar ($), and XYZ's local currency is the European euro (€).

The U.S. dollar to European euro exchange rate is 1 to 1 at the end of 20X0. The euro appreciates by $0.10 each month. Below are exchange rates at end-of-quarter dates.

- 12/31/20X0: $1.00 = €1.00
- 3/31/20X1: $1.30 = €1.00
- 6/30/20X1: $1.60 = €1.00
- 9/30/20X1: $1.90 = €1.00
- 12/31/20X1: $2.20 = €1.00

A. What is XYZ's net income in 20X1?
B. What is XYZ's net asset exposure at 12/31/20X0 and 12/31/20X1?
C. What is XYZ's net monetary asset exposure at 12/31/20X0 and 12/31/20X1?
D. If XYZ's functional currency is the European euro, what is the translation adjustment for December 31, 20X1, on ABC's financial statements?
E. If XYZ's functional currency is the U.S. dollar, what is remeasurement gain or loss for December 31, 20X1, on ABC's financial statements?
F. How are other revenues and expenses treated?

Part A: Two items affect net income: interest expense and depreciation expense.

- Depreciation expense = €700 × 10% = €70.
- Interest expense = €500 × 6% = €30.
- Net income = –€70 – €30 = –€100.

Part B: The balance sheet has corresponding entries:

- Depreciation expense: the net carrying value of the equipment decreases from €700 to €630.
- Interest expense: cash decreases from €200 to €170.
- Total assets decrease from €900 to €800.
- Shareholders' equity decreases from €400 to €300.

The net asset exposure on December 31, 20X1, is €800 – €500 = €300.

Part C: The net monetary asset exposure on December 31, 20X1, is €170 – €500 = –€330.

Part D: The translation adjustment brings the translated balance sheet back into balance: assets = liabilities + equity.

To simplify the arithmetic, we translate the income statement first for the current rate method and the balance sheet first for the temporal method. The arithmetic is not complex in this practice problem with just two income statement entries, but it is confusing in more detailed scenarios.

The current rate method does not change the income statement but adds a translation adjustment to the balance sheet. We translate the income statement using current rates, and then add a translation adjustment that balances the retained earnings on the balance sheet to net income minus shareholder dividends.

The temporal method does not change the balance sheet but adds a remeasurement gain or loss to the income statement. We translate the balance sheet using the appropriate temporal rates, and then add a remeasurement gain or loss that balances net income minus shareholder dividends to the change in retained earnings on the balance sheet.

Current rate method: Net income is –€100. Both depreciation expense and interest expense are translated at the average rate in 20X1 of \$1.60 = €1.00. Translated net income is –€160. Retained earnings are –€100 in euros and translated to –\$160 in dollars.

Question: Shouldn't we use the current rate of \$2.20 = €1.00 on the balance sheet?

Answer: Retained earnings are shareholders' equity. We use the historical rate for retained earnings, which is the average date the income was earned.

At December 31, 20X1, XYZ has

- €170 (cash) + €630 (equipment) = €800 (assets) translated at \$2.20 / €1.00 to \$1,760.
- €500 (debt = liabilities) translated at \$2.20 / €1.00 to \$1,100.
- –€100 (retained earnings) translated at \$1.60 / €1.00 to –\$160.
- €400 (common stock) translated at \$1.00 / €1.00 to \$400.

The euro balance sheet has total assets = total liabilities + shareholders' equity: 800 = 500 – 100 + 400.

The dollar balance sheet does not balance: 1,760 ≠ 1,100 – 160 + 400. Let Z be the translation adjustment:

1,760 = 1,100 – 160 + 400 + Z ⇛
Z = 1,760 – 1,100 + 160 – 400 = \$420.

Question: The previous practice problem has a translation adjustment of \$480. Why is the translation adjustment only \$420 in this problem?

Answer: The net income of –€100 reduces the net asset exposure from €400 to €300.

Question: The exchange rate at the end of the year is \$2.20 = €1.00, a reduction from \$1.00 = €1.00 at the beginning of the year. The \$1.20 reduction should change the translation adjustment by \$120.

Answer: The net income occurs (on average) in the middle of the year, and it uses the average exchange rate during the year, which is \$1.60 = €1.00. The change to the end of the year is

(\$2.20 – \$1.60) × €100 = \$0.60 × €100 = \$60.

Part E: If the subsidiary's functional currency is the parent's presentation currency, we use the temporal method. Monetary assets are remeasured at the current exchange rate; non-monetary assets are remeasured at their historical exchange rates. The dollar balance sheet has

- cash = €170 × \$2.20/€1.00 = \$374
- equipment = €630 × \$1.10/€1.00 = \$630
- debt = €500 × \$2.20/€1.00 = \$1100
- common stock = €400 × \$1.10/€1.00 = \$400

We compare assets with liabilities + equity:

- total assets = \$1004
- total liabilities + equity = \$1500

The temporal method shows no translation adjustment on the balance sheet. Any discrepancy between the two sides of the balance sheet is corrected by a remeasurement gain or loss on the income statement.

We deduce that net income must be $1004 – $1500 = –$496.

The net income on the euro income statement is depreciation expense of –€70 = –$70 and interest expense of –€30 × €1.60/$1.00 = –$48, for a total of –$118. We must add a remeasurement loss of –$378.

Question: The previous problem has a $360 remeasurement loss. What changed?

Answer: The depreciation expense uses the historical exchange rate so it does not change the remeasurement loss. The interest expense uses the average exchange rate for the calendar year. It reduces monetary assets by €30, so it adds €30 × $0.60/€1.00 = $18 to the remeasurement loss.

Part F: Many continuous expenses are like interest expense or depreciation expense.

Tax expense is like interest expense. The tax expense accrues steadily over the year and it reduces cash, a monetary asset. Wages, rent, utilities, general expenses, administrative expenses are similar.

Question: If the exam problem gives a tax rate, are taxes equal to pre-tax income times the tax rate?

Answer: The taxes *in the local currency* are pre-tax income times the tax rate. The income statement entries are translated at different exchange rates.

- The temporal method uses historical exchange rates for some items.
- The current exchange rate is at the transaction date for the income statement entry, which is a specific date for gains or losses on sales of fixed assets and is a weighted average based on volume of business for seasonal sales.

Taxes in the presentation currency at the taxes in the local currency translated at the average exchange rate.

Amortization is like depreciation. The subsidiary may have bought an intangible asset (or acquired it through a business combination). The amortization is translated or remeasured to the parent's financial statements.

Income statement scenarios

Income statement entries are translated at the exchange rate for the transaction date for both the current rate method and the temporal method.

- The current rate for an asset or liability is the exchange rate at the valuation date (the end of the year).
- The current rate for a revenue or an expense is the transaction date.

Current rate method:

- Assets and liabilities use the exchange rate at the valuation date (the balance sheet date).
- Common stock and additional paid-in capital use the exchange rate at the stock issue date.

Translating retained earnings

Shareholders' equity is the sum of stock, additional paid-in capital, retained earnings, and accumulated other comprehensive income. The cumulative translation adjustment is part of accumulated other comprehensive income.

Retained earnings = Σ net income – Σ shareholder dividends, where the sums are over all past years.

- For unconsolidated financial statements, net income is summed for all years, regardless of the worth of the currency in each year.
  - Retained earnings are the sum of net income – shareholder dividends, regardless of the worth of the currency in each year.
- For consolidated financial statements with foreign subsidiaries, the exchange rates differ each year.
  - The translated income statement shows the most recent year's income in the presentation currency.
  - We translate shareholder dividends at the exchange rate on the declaration date.
  - We add (translated net income – translated shareholder dividends) to translated retained earnings at the beginning of the year.

For the temporal method, some balance sheet entries have parts with different exchange rates.

- Property, plant, and equipment may have dozens of fixed assets, bought at different times and translated at different exchange rates.
- If common stock was issued several times, each issue has a different exchange rate for both the current rate method and the temporal method.

Translating retained earnings is more complex than translating fixed assets and common stock.

Any fixed asset has one historical exchange rate. Firms keep track of the date each asset was bought so they can convert property, plant, and equipment using the exchange rate for each asset. Stock issues use the exchange rate at the issue date. Firms have the issue date for each set of shares.

Net income has no single exchange rate. Some expenses are spread evenly over the year, so they are translated at the average exchange rate for the year. Gains and losses occur on specific dates, so separate exchange rates are used for them. Sales and cost of goods sold depend on the volume of business, especially for seasonal industries. For the temporal method, cost of goods sold depends on the inventory accounting method and depreciation expense depends on the dates the fixed assets were bought.

The exchange rate for retained earnings is the rate is for the date the pieces of retained earnings accrued. We use the following procedure to translate the retained earnings at the end of the year:

Step #1: Take the translated retained earnings from the beginning of the year. Retained earnings use the historical exchange rates, so the translated retained earnings from the beginning of the year do not change.

Step #2: Add the translated net income from the most recent income statement. This translated net income uses the appropriate exchange rate for each element.

Step #3: Subtract the translated shareholder dividends at the exchange rate when the dividends are declared.

The income statement contribution

We examine how one unit of income (in the local currency) affects the translation adjustment (on the balance sheet) and the remeasurement gain or loss (on the income statement) in the presentation currency.

Each entry on the income statement contributes to the translation adjustment or the remeasurement gain or loss as income × (the exchange rate at the balance sheet date – the exchange rate at the transaction date).

Question: What determines the sign of the translation adjustment?

Answer: The textbook uses an arithmetic algorithm for the translation adjustment or the remeasurement gain or loss. We explain the intuition

- for assets or liabilities retained through the year
- net income during the year.

The sign of the translation adjustment depends on

- whether the income statement element is positive (a revenue) or negative (an expense).
- whether the foreign currency appreciates or depreciates between the transaction date and the balance sheet date.

Scenario #1: Suppose the foreign currency appreciates during the year, the functional currency is the local currency (the foreign currency), and the asset or liability is retained through the year.

- The asset has a higher value in the presentation currency at the end of the year than at the beginning of the year, so the parent firm has a positive translation adjustment (an addition to shareholders' equity).
- The liability has a higher value in the presentation currency at the end of the year than at the beginning of the year, so the parent firm has a negative translation adjustment (subtract from shareholders' equity).

If the foreign currency depreciates during the year, the opposite relations hold.

For balance sheet items held through the year, if the functional currency is the local currency (the foreign currency), the addition to the cumulative translation adjustment is the net asset exposure times the amount the foreign currency appreciates during the year.

Income statement entries (revenues and expenses) cause changes to balance sheet items. If the functional currency is the local currency (the foreign currency):

- *Revenues:* the addition to the cumulative translation adjustment is the revenue times the amount the foreign currency appreciates from the transaction date to the balance sheet date (end of the year).
- *Expenses:* the subtraction from the cumulative translation adjustment is the expense times the amount the foreign currency appreciates from the transaction date to the balance sheet date (end of the year).

Question: Why not speak of net income (not revenue and expenses), like net asset exposure?

Answer: The transaction date may differ for each revenue or expense. Only if the revenue or expense accrues evenly over the year do we use the average exchange rate during the year.

Question: How are shareholder dividends treated?

Answer: Shareholder dividends are treated like expenses. Dividends reduce cash, just as other expenses do. Dividends are not shown on the income statement and they are usually in financing cash flows, not operating cash flows.

Question: What are the rules for remeasurement gains or losses?

Answer: If the functional currency is the presentation currency, the parent uses the temporal method, and the result is a remeasurement gain or loss on the income statement, not a translation adjustment on the balance sheet. The principles are the same, except that only monetary assets and liabilities are remeasured and the remeasurement gain or loss is included in income.

Question: Depreciation and amortization do not have transaction dates.

Answer: At the end of an asset's estimated useful life, its carrying value must equal its salvage value estimated at inception.

- If an asset has zero salvage value, the accumulated depreciation at the end of the asset's life should equal its purchase price and the final carrying value should be zero.
- If an asset has a salvage value, the accumulated depreciation at the end of its life should equal its purchase price minus its estimated salvage value and the final carrying value should be the salvage value.

The exchange rate for the depreciation must be the same as the exchange rate for the asset's carrying value.

- The current rate method uses the current rate for the balance sheet and the income statement.
- The temporal method uses the historical rate for the balance sheet so it uses the historical rate for the income statement as well.

Algorithms for foreign currency translation

The textbook gives algorithms to compute the translation adjustment for the current rate method.and the remeasurement gain or loss for the temporal method.

- Assets and liabilities are translated at the current exchange rate or the historical exchange rate.
- Common stock and additional paid-in capital are translated at the stock issue date.
- Income statement entries are translated at the transaction date.
- Shareholder dividends are translated at the declaration date.

The algorithms use the following sequence:

- The algorithm for the current rate method gives the cumulative translation adjustment at the end of the year. Subtracting the cumulative translation adjustment at the beginning of the year gives the translation adjustment in other comprehensive income.
- The algorithm for the temporal method gives the translated net income for the year. Subtracting the translated net income from the unadjusted income statement gives the remeasurement gain or loss.

The sequence of steps and the presentation of the final result differ between the current rate method and the temporal method, but the reasoning the same.

- We adjust the income statement and the balance sheet separately.
- The translation adjustment or remeasurement gain or loss bring them into balance.

For the current rate method translation adjustment, the steps are

Step #1: Translate the income statement

- Translate revenue and expenses with specific transaction dates at the exchange rate for that date.
  - Examples: gain or loss on sale of property, plant, and equipment
- Translate continual revenue and expenses at the average exchange rate.
  - Examples: interest expense, depreciation, wages, tax expense
- Translate seasonal revenue and expenses at the computed average exchange rate for that item.
  - Examples: net revenue, cost of goods sold

The transaction date is the accrual date, not the payment date. For example, interest expense for debt is paid on one or two days each year, but the interest expense accrues evenly through the year.

The average exchange rate for net revenue and cost of goods sold for seasonal business is weighted by the sales volume.

Translating the cost of goods sold

The cost of goods sold in the local currency depends on the inventory accounting method (FIFO vs LIFO vs weighted average).

- For the current rate method, the average exchange rate for cost of goods sold does not depend on the inventory accounting method, since the transaction date is the sales date.
- For the temporal method, the average exchange rate for cost of goods sold depends on the inventory accounting method, since remeasurement of non-monetary assets uses historical exchange rates.

For the temporal method, the balance sheet is usually translated before the income statement, but the logic is the same.

Step #2: Translate shareholder dividends using the exchange rate at the dividend declaration date.

Some firms pay shareholder dividends quarterly. One can translate each quarterly payment separately or translate the total at a weighted average exchange rate.

The temporal method is the same as the current rate method for shareholder dividends.

Step #3: Derive the change in retained earnings

- Each item of net income uses its appropriate exchange rate.
- Shareholder dividends uses the exchange rate at the declaration date.
- The change in retained earnings is net income minus shareholder dividends in the presentation currency.

The worksheet does not show an exchange rate for the change in retained earnings. The same composite exchange rate is used for the income statement and the statement of retained earnings.

For the temporal method, we derive net income and the change in retained earnings with no remeasurement gain or loss. The final step computes the remeasurement gain or loss, which is included in net income.

Step #4: Translate assets and liabilities on the balance sheet at the appropriate exchange rates

- Current rate method: all assets and liabilities use the current exchange rate.
- Temporal method: monetary assets and liabilities use the current exchange rate; non-monetary assets and liabilities use the historical exchange rates.

The sequence of steps in the textbook differs for the current rate method and the temporal method:

- Current rate method: translate first the income statement.
- Temporal method: translate first the balsh.

This sequence eases the arithmetic; the accounting logic has no sequence of steps.

Step #5: Translate common stock and additional paid-in capital at the historical exchange rate

- If the firm has more than one issue of common stock, use separate exchange rates for each.
- All shareholders' equity is translated at the historical exchange rate.

The translation is the same for the current rate method and the temporal method.

Step #6: Copy translated retained earnings

- Beginning of the year retained earnings are from last year's balance sheet
- Copy the change in retained earnings from the income statement analysis
- End of the year retained earnings = the sum of the two items above.

Step #7: Compute translation adjustment for the current rate method

- The current rate method has a cumulative translation adjustment and uses this step.
- The temporal method has remeasurement gains or losses that accumulate in retained earnings.

Before computing the translation adjustment, compare the foreign currency vs translated balance sheets.

- The foreign currency balance sheet has total assets = total liabilities + equity.
- Unless exchange rates are constant, the two sides of the translated balance sheet do not equal.

The implied cumulative translation adjustment =

Total assets

– Total liabilities
– Common stock and additional paid-in capital
– Retained earnings

The formula above assumes that the cumulative translation adjustment is the only part of the cumulative other comprehensive income. Other parts of other comprehensive income are treated like retained earnings.

Question: The formula above gives the cumulative translation adjustment at the end of the year. How do we derive the translation adjustment in this year's other comprehensive income?

Answer: The translation adjustment in this year's other comprehensive income = the cumulative translation adjustment at the end of the year minus the cumulative translation adjustment at the beginning of the year.

Question: When translating the balance sheet, assets and liabilities are translated at the current exchange rate. What rate do we use for the cumulative translation adjustment at the beginning of the year?

Answer: We copy this entry from last year's translated balance sheet, just as we copy the retained earnings at the beginning of the year.

Exercise 19.6: Foreign currency translation with sales

Some transaction dates are hard to specify. The temporal method uses the date that inventory was bought. This date depends on the inventory accounting method: LIFO, FIFO, or weighted average. The accounting method used for inventory determines the transaction dates for the cost of goods sold.

Sales of goods and purchases of inventory follow the same remeasurement and translation principles. The practice problem shows the specific inventory bought or sold using first-in first-out (FIFO) inventory accounting method. In practice, many firms separate inventory and cost of goods sold into beginning inventory, cost of goods sold, and ending inventory, with average transaction dates for each.

On December 31, 20X0, ABC, a U.S. based firm, forms XYZ, a subsidiary in Europe, by investing €400 for all its shares. XYZ issues long-term debt for €500 and buys equipment for €700, leaving it with €200 in cash.

ABC's presentation currency is the U.S. dollar ($), and XYZ's local currency is the European euro (€).

The U.S. dollar to European euro exchange rate is 1 to 1 at the end of 20X0. The euro appreciates by $0.10 each month, as shown below for end-of-quarter dates.

- 12/31/20X0: $1.00 = €1.00
- 3/31/20X1: $1.30 = €1.00
- 6/30/20X1: $1.60 = €1.00
- 9/30/20X1: $1.90 = €1.00
- 12/31/20X1: $2.20 = €1.00

- The long-term debt has an annual coupon rate of 6%, paid each December 31.
- The equipment has a ten year estimated useful life, no salvage value, and straight line depreciation.
- XYZ buys 30 units of inventory on December 31, 20X0, and 10 units more each month, at a cost of €1 per unit.
- XYZ sells 10 units of inventory each month, at a price of €3 per unit.
- All purchases and sales are on 60 days credit. The cash is paid or collected 60 days after the transaction.
- XYZ pays taxes equal to 20% of pre-tax income.
- XYZ declares shareholder dividends of 50 on October 31, 20X1, and pays them on November 30, 20X1.

Provide three answers for each question except those specific to a translation method:

- the value in the local currency
- the value in the presentation currency using the current rate method
- the value in the presentation currency using the temporal method

The entries for common stock, long-term debt, fixed assets, depreciation, and interest expense are the same as for the previous practice problem and are not further explained here.

A. What are the accounting transactions and the related assets and liabilities at December 31, 20X0?
B. What are the transactions in 20X1 and their effects on the cash asset at December 31, 20X1?
C. What is net revenue for 20X1 and accounts receivable at December 31, 20X1?
D. What is the cost of goods sold for 20X1 and inventory at December 31, 20X1?
E. What is depreciation expense in 20X1 and fixed assets at December 31, 20X1?
F. What are interest expense and tax expense for 20X1 and their effects on cash at December 31, 20X1?
G. What is net income in 20X1?
H. What are shareholder dividends in 20X1?
I. What is the change in retained earnings for 20X1?
J. What is the translated assets and liabilities at December 31, 20X1?
K. If XYZ's functional currency is the European euro, what is the translation adjustment for December 31, 20X1, on ABC's financial statements?

L. If XYZ's functional currency is the U.S. dollar, what is remeasurement gain or loss for December 31, 20X1, on ABC's financial statements?

We derive the translation adjustment for the current rate method and the remeasurement gain or loss for the temporal rate method by comparing the translated income statement and balance sheet. We form the 20X1 income statement and the 12/31/20X1 balance sheet from the transactions in the practice problem, translate them by the appropriate method, and derive the adjustment needed to bring them into balance.

		Current Rate	*Method*	*Temporal Method*	
Income Statement	*Euros*	*Exchange Rate*	*Dollars*	*Exchange*	*Dollars*
Net revenue	360.00	1.60	576.00	1.60	576.00
Cost of goods sold	-120.00	1.60	-192.00	1.3375	-160.50
Gross profit	240.00		384.00		415.50
Depreciation expense	-70.00	1.60	-112.00	1.00	-70.00
Interest expense	-30.00	1.60	-48.00	1.60	-48.00
Pre-tax income	140.00		224.00		297.50
Corporate tax rate	0.20				
Tax expense	-28.00	1.60	-44.80	1.60	-44.80
Net income pre-trans					252.70
Translation gain/loss					-296.80
Net income	112.00		179.20		-44.10
Shareholder dividends	-50.00	2.00	-100.00	2.00	-100.00
Δ(retained earnings)	62.00		79.20		-144.10
Cash	262.00	2.20	576.40	2.20	576.40
accounts receivable	60.00	2.20	132.00	2.20	132.00
inventory	30.00	2.20	66.00	2.05	61.50
current assets	352.00		774.40		769.90
property & equipment	700.00	2.20	1540.00	1.00	700.00
accum depreciation	-70.00	2.20	-154.00	1.00	-70.00
total assets	982.00		2160.40		1399.90
accounts payable	20.00	2.20	44.00	2.20	44.00
current liabilities	20.00		44.00		44.00
long-term debt	500.00	2.20	1100.00	2.20	1100.00
total liabilities	520.00		1144.00		1144.00
common stock	400.00	1.00	400.00	1.00	400.00
additional paid-in capital	0.00	1.00	0.00	1.00	0.00
retained earnings	62.00		79.20		-144.10
translation adjustment			537.20		
total equity	462.00		479.20		255.90
total liabilities + equity	982.00		2160.40		1399.90

Solution 19.6: We derive two entries for translation problems:

- The remeasurement gain or loss on the income statement exhibit for the temporal method column.
  - The remeasurement gain or loss is blank for the local currency and the current rate method.
- The translation adjustment on the balance sheet exhibit for the current rate method column.
  - The translation adjustment is blank for the local currency and the temporal method.

These values are derived by comparing the income statement and the balance sheet.

- *Current rate method:* translate the income statement to the presentation currency, add the translated net income minus shareholder dividends to retained earnings at the beginning of the year on the balance sheet to derive retained earnings at the end of the year.
  - The cumulative translation adjustment = total assets – (total liabilities + equity).
- *Temporal method:* translate the balance sheet to the presentation currency, except for retained earnings. Retained earnings at the end of the year = total assets – (total liabilities + other equity).
  - Required net income = shareholder dividends + retained earnings at the end of the year – retained earnings at the beginning of the year.
  - Remeasurement gain = required net income – translated net income

We translate all the balance sheet and income statement entries at appropriate exchange rates. The practice problem shows all the transactions and translations, describing the accounting methods.

The exhibit below shows the balance sheet and income statement at December 31, 20X1, in three forms: the local currency, the presentation currency at the current rate method (including the translation adjustment), and the presentation currency with the temporal method (including the remeasurement gain or loss).

- Column 1 shows the income statement or balance sheet item.
- Column 2 shows the value in the local currency.
- Column 3 shows the exchange rate for the current rate method.
- Column 4 shows the translated value using the current rate method.
- Column 5 shows the exchange rate for the temporal method.
- Column 6 shows the translated value using the temporal method.

The exhibit here shows shareholder dividends on the income statement. They actually are on the statement of changes in equity, but they are treated similarly to income statement items.

The translated values are derived one of three ways, depending on the entry:

- The value in the local currency times the exchange rate.
  - Examples: sales, cost of goods sold, depreciation expense, interest expense, tax expense, most individual assets and liabilities (not subtotals or totals)
  - exchange rates may differ between the current rate method and the temporal method.
- The sum of other values in the presentation currency.
  - Examples: gross profit, pre-tax income, net income, current assets, total assets, current liabilities, total liabilities, total equity, total liabilities + equity
- The value that brings the balance sheet and income statement into balance.
  - Examples: translation adjustment; remeasurement gain or loss

Format of the explanations

The textbook says to translate the income statement first for the current rate method and the balance sheet first for the temporal method. The solution to the practice problem uses this sequence, but the explanations often cover both the balance sheet and the income statement for related entries. The cost of goods sold is related to the inventory values, so we explain both items together.

The explanations here repeat many items discussed in other modules. Rules for inventory valuations, fixed asset depreciation, or changes in retained earnings are hard to recall, so the solution to the practice problem explains each step.

The parent firm consolidating financial statements of subsidiaries begins with the figures in the local currency. We compute local currency figures from the local currency transactions.

Accounting transactions have offsetting credits and debits. Income statement transactions have one credit or debit on the income statement and the offsetting debit or credit on the balance sheet.

- An income statement credit (revenue) has a balance sheet debit (higher asset or lower liability).
- An income statement debit (expense) has a balance sheet credit (lower asset or higher liability).

Most income statement transactions increase or decrease a balance sheet entry: cash, accounts receivable, accounts payable, or accumulated depreciation. These transactions affect the translation adjustment or the remeasurement gain or loss.

Part A: The December 31, 20X0, transactions are

- Credit common stock 400 ⇛ debit cash 400
- Credit long-term debt 500 ⇛ debit cash 500
- Debit fixed assets 700 ⇛ credit cash 700
- Debit inventory 30 ⇛ credit accounts payable 30

Cash at 12/31/20X0 is 400 + 500 – 700 = 200.

The December 31, 20X0, transactions are explained in the previous practice problems.

Part B: The 20X1 transactions are

- Credit net revenue 360 ⇛ debit cash 300 and debit accounts receivable 60
- Debit cost of goods sold 120 ⇛ credit cash 130 and debit accounts payable 10
- Debit depreciation expense 70 ⇛ credit accumulated depreciation 70
- Debit interest expense 30 ⇛ credit cash 30
- Debit tax expense 28 ⇛ credit cash 28
- Pay shareholder dividends 50 ⇛ credit cash 50

The change to cash is +300 - 130 - 30 - 28 - 50 = 62

Cash held at 12/31/20X1 is 200 + 62 = €262. Cash is a monetary asset, so it is translated at the current exchange rate on the balance sheet date of $2.20/€1.00.

Question: Do we compute cash first for translation problems?

Answer: If the final exam problem gives the accounting transactions, computing cash first helps you avoid errors. The cash flows are often clearer than the accruals on the income statement.

Part C: Sales increase net revenue and cost of goods sold. The net revenue increases cash and accounts receivable; the cost of goods sold decreases inventory.

If sales occur evenly through the year, as in this problem, we use the average exchange rate during the year.

Net revenue = 12 months × 10 units × €3 = €360. We translate at the average exchange rate of $1.60 = €1.00:

$$€360 \times \$1.60 / €1.00 = \$576$$

Net revenue does not differ between the current rate method and the temporal method.

Accounts receivable is two months of sales = 2 × 10 × €3 = €60. Accounts receivable is a monetary asset, so it is translated at the current exchange rate on the balance sheet date of $2.20/€1.00.

The balance sheet shows cash from sales of €300 and accounts receivable of €60.

Question: How do credit sales differ from cash sales for foreign currency translation problems?

Answer: Accounts receivable is a monetary asset, so it is the same as cash for foreign currency translation.

Whether sales are cash or credit doesn't affect the translation adjustment or the remeasurement gain or loss.

Part D: We can work out inventory at 12/31/20X0 and at 12/31/20X1 and cost of goods sold in 20X1 directly from the data. The relation that cost of goods sold = purchases of inventory – Δ(inventory held from beginning to end of the year) allows us to verify the figures or to derive one figure from the others.

- Inventory is three months of purchases at 12/31/20X0 = 3 × 10 × €1 = €30.
- Sales and purchases are ten units every month of 20X1, so inventory at 12/31/20X1 is €30.

Inventory is a non-monetary asset, so it is translated at the current exchange rate on the balance sheet date of $2.20/€1.00 for the current rate method and at the historical exchange rate for the temporal method.

For the first-in first-out inventory accounting method, the purchase date for the end of the year inventory is the last three months of 20X1, so the average exchange rate is

¼ × ($1.90 + $2.00 + $2.20 + $2.20)/€1.00 = $2.05/€1.00

For the last-in first-out inventory accounting method, the purchase date for the end of the year inventory is the three months of inventory bought on 12/31/20X0, so the exchange rate is $1.00/€1.00.

The cost of goods sold in the local currency is 12 months × 10 units/month × €1 per unit = €120.

The cost of goods sold normally depends on the inventory accounting method. In this practice problem, the cost per unit does not vary over the year, so the cost of goods sold *in the local currency* does not depend on the inventory accounting method.

The current rate method uses the exchange rate at the transaction date, not the historical exchange rate when the inventory was bought. The inventory accounting method (FIFO vs LIFO vs weighted average cost) affects the assumed purchase date of the inventory, the cost of goods sold in euros, and the average exchange rate for the temporal method, but not the average exchange rate for the current rate method.

Cost of goods sold = 12 months × 10 units × €1 = €120. This practice problem has a constant inventory cost per unit, so the cost of goods sold in euros does not depend on the inventory accounting method.

The current rate method translates the cost of goods sold at the transaction date, which is the date of sale. The exchange rate is a linear function of time in this practice problem and the sales are constant through the year, so the weighted average exchange rate for the inventory is the rate at mid-year: $1.60 = €1.00. The cost of goods sold in the presentation currency is €120 × $1.60 / €1.00 = $192.

Accounts payable are two months of inventory: 2 × 10 × €1 = €20. The December 31, 20X1, balance sheet shows cash paid of €100 and accounts payable of €20, but the classification as cash purchases or credit purchases doesn't affect the translation. Accounts payable and long-term debt are monetary assets, so they are translated at the current exchange rate on the balance sheet date of $2.20/€1.00.

The temporal method for the cost of goods sold is more involved. The cost of goods sold uses the historical exchange rate, which depends on the assumed purchase date, which depends on the investment accounting method (FIFO vs LIFO vs weighted average).

FIFO: the inventory sold in 20X1 was bought 30 units on 12/31/20X0 and 10 units each month from 1/1/20X1 through 9/30/20X1. The translated cost of goods sold is

€30 × ($1.00 / €1.00) = $30
\+ €90 × (½ × ($1.00 + $1.90) / €1.00) = $90 × 1.45 = $130.50
= $160.50

The average exchange rate is 160.50 / 120 = 1.3375, as shown on the exhibit.

If the inventory were bought on the last day of each month, the translated cost of goods sold is

30 * 1.00 + 10 * (1.10 + 1.20 + 1.30 + 1.40 + 1.50 + 1.60 + 1.70 + 1.80 + 1.90) = $165.00

If the subsidiary uses LIFO accounting, the inventory sold in 20X1 was bought evenly through 20X1. The average exchange rate is $1.60 / €1.00. European firms subject to IFRS do not use LIFO, but a non-U.S. firm may have a U.S. subsidiary that uses LIFO.

We can compute the inventory at December 31, 20X1, from the accounting transactions. The arithmetic is similar to that for the cost of goods sold. The inventory stays 30 units throughout the year.

XYZ uses FIFO, so the inventory remaining is the last 30 units bought. The 12/31/20X0 inventory is bought on 12/31/20X0; the 12/31/20X1 inventory is bought in the last three months of 20X1. The translated value of the inventory use the exchange rates at the dates shown below.

Inventory	*Current Rate Method*	*Temporal Rate Method*
December 31, 20X0	12/31/20X0	12/31/20X0
December 31, 20X1	12/31/20X1	November 15, 20X1

The appropriate date for the temporal method is a weighted average of all purchases implied by the inventory accounting method.

The cost of goods sold is €1 × 10 = €10 a month, translated at the transaction date. The current rate method uses the date of sale; the temporal method uses the date the inventory is deemed to have been bought. In this practice problem:

- Current rate method: the transaction date is the sales date, sales are even through the year, and the exchange rate changes linearly through the year, so the average exchange rate is $1.60 = €1.00.
- Temporal rate method: the inventory sold is the €30 from 12/31/20X0 and the €10 from the first nine months of 20X1.

The cost of goods sold is the cost of purchases + beginning inventory – ending inventory. If purchases occur evenly through the year, and the purchase dates for beginning inventory and ending inventory are known, we can derive the cost of goods sold.

- The first-in first-out method gives the earliest average purchase date.
- The last-in first-out method gives the latest average purchase date.
- The weighted average method gives an intermediate average purchase date.

The last-in first-out method's average purchase date for the last 12 months worth of inventory is July 1, 20X1 (the same date as for net revenue, depreciation expense, interest expense, and tax expense).

The average dates for the weighted average method depends on how frequently the weighted average is computed. We do not show the weighted average method for this practice problem.

Current assets are cash, accounts receivable, and inventory: €262 + €60 + €30 = €352. The translated values for subtotals and totals are the sums of the individual translated items.

Question: Do firms keep track of the dates inventory is bought and the exchange rates on each day?

Answer: Approximations are used for inventory, sales, supplies, and expenses that recur throughout the year. The illustrations in the textbook give an average date for inventory, specific dates for one-time events (such as sale of fixed assets or declaration of shareholder dividends), and average rate for the year for most steady expenses. Some firms keep track of all material non-monetary assets if they use the temporal method.

Question: How do most firms compute the translated cost of goods sold?

Answer: In practice, firms translate the inventory at the beginning and end of the year and the purchases made in the year. The cost of goods sold = the purchases + beginning inventory – ending inventory.

Part E: Depreciation expense is 10% × 700 = 70. No fixed assets are bought or sold in 20X1, so the gross carrying value remains €700, the accumulated depreciation is now €70, and the net carrying value is €630. Fixed assets are non-monetary assets, so they are translated at the current exchange rate on the balance sheet date of $2.20/€1.00 for the current rate method and at the historical exchange rate of $1.00/€1.00 for the temporal method.

- Depreciation expense accrues continually over the year.
  - The current rate method uses the average exchange rate during the year.
  - The temporal method uses the historical exchange rate when the asset was bought.

The fixed assets of €700 at 12/31/20X0 decrease for depreciation to €630 at 12/31/20X1.

- The temporal method translates at the 12/31/20X0 exchange rate for both the asset and the depreciation.
- The current rate method translates at
  - the 12/31/20X0 rate for the 12/31/20X0 asset ($1.00 = €1.00)
  - the 12/31/20X1 rate for the 12/31/20X1 asset ($2.20 = €1.00)
  - the average 20X1 rate for the 20X1 depreciation ($1.60 = €1.00)

Question: For firms with much property, plant, and equipment, does the current rate method create more volatility than the temporal method if exchange rates change every year?

Answer: The volatility created by the current rate method is part of other comprehensive income. The volatility does not affect the income statement. Some publicly-traded multi-national firms choose local currencies as the functional currency to reduce income statement volatility.

- The current rate method creates more volatility in total comprehensive income.
- The temporal method creates more volatility in net income.

Part F: We use accrual dates for income statement expenses:

- Interest expense accrues evenly over the term of the loan or bond, not at coupon payment dates.
- Tax expense accrues as income is earned, regardless when the tax is paid. Some firms use the average exchange rate for the year. Seasonal firms weight the exchange rates by seasonal business volumes.

The interest expense of €30 is paid on 12/31/20X1 but accrues evenly over 20X1. It is translated at the average exchange rate for both the current rate method and the temporal method.

Each euro of tax reduces cash one euro, so it reduces the net asset exposure one euro and the net monetary asset exposure one euro. Net income also declines one euro.

Taxes are based on the subsidiary's pre-tax income, not the translated pre-tax income. Translate the pre-tax income in the local currency to the presentation currency; do not use the tax rate times pre-tax income in the presentation currency.

Tax expense uses the average exchange rate over the year, or $1.60 = €1.00 here. The contribution of one euro of tax to the translation adjustment is –€1 × ($2.20 – $1.60) / €1.00 = –$0.60.

Pre-tax income = net revenue – cost of goods sold – depreciation expense – interest expense =

$$€360 – €120 – €70 – €30 = €140$$

In this practice problem, pre-tax income is €140 and the corporate tax rate is 20%, so tax expense is €28. Translated at the average exchange rate of $1.60 = €1.00 gives

$$€28 × \$1.60 / €1.00 = \$44.80$$

Taxes do not differ between the current rate method and the temporal method.

Part G: Net income is net revenue – cost of goods sold – depreciation – interest expense.

- Net revenue = 10 × 12 × €3 = €360.
- Cost of goods sold = 10 × 12 × €1 = €120.
- Depreciation expense = €700 × 10% = €70.
- Interest expense = €500 × 6% = €30.

- Pre-tax income is € (360 – 120 – 70 – 30) = €140.
- Tax expense is €140 × 20% = €28.
- Net income is €140 – €28 = €112.

The appropriate exchange rate for each item is explained above. The translated net income (not including the remeasurement gain or loss for the temporal method) is the sum of the translated items.

Question: Does net income depend on the accounting method?

Answer: Cost of goods sold depends on the inventory accounting method. If the cost of inventory varies during the year, the cost of goods sold differs for FIFO vs LIFO. The inventory cost is constant here in euros, so the cost of goods sold in the local currency does not depend on the inventory accounting method.

The translation of cost of goods sold into dollars differs for the current rate method and the temporal method.

- *Current rate method:* the transaction date for the cost of goods sold is the accrual date, which is the date of sale, regardless of the inventory accounting method.
- *Temporal method:* the transaction date for the cost of goods sold is the purchase date, which depends on the inventory accounting method.

Net income in euros is the same for the current rate method and the temporal method. The exchange rates for non-monetary assets differ for the two methods. Fixed assets (property, plant, and equipment), inventory, land, and intangible assets are non-monetary assets.

Part H: Shareholder dividends decrease cash, just as other expenses do. They are similar to gains and losses on sale of property, plant, and equipment which have a specific transaction date, so they are translated or remeasured at the dividend declaration date (October 31, 20X1), which is $2.00 = €1.00 here.

Shareholder dividends are translated at the exchange rate when they are declared (not when they are paid). The payment date is usually soon after the declaration date, but exchange rates may move in a few days.

The contribution of one euro of shareholder dividends to the translation adjustment is

$$–€1 \times (\$2.20 – \$2.00) / €1.00 = –\$0.20.$$

In this practice problem, shareholder dividends are €50 × $2.00 / €1.00 = $100.

Shareholder dividends do not differ between the current rate method and the temporal method.

Part I: The change in retained earnings = net income – shareholder dividends:

Net income = €112 and shareholder dividends = €50, so the change in retained earnings = €112 – €50 = €62.

Shareholder dividends are translated at the exchange rate on the declaration date for both the current rate method and the temporal method.

Question: Is the relation between retained earnings, net income, and shareholder dividends true only for the local currency or also for the translated amounts?

Answer: The relation differs for the two translation methods:

- Current rate method: translate first the income statement and compute the change in retained earnings, so the relation of net income, shareholder dividends, and Δ(retained earnings) still holds. To make total assets = total liabilities + shareholders' equity, we derive a translation adjustment.
- Temporal method: we derive retained earnings by translating first the balance sheet. To make the change in retained earnings = net income – shareholder dividends, we derive a remeasurement gain or loss and add it to net income.

Part J: We sum the translated assets and liabilities.

Total assets are €352 + €630 = €982.

Long-term debt remains €500, so total liabilities are €520

Common stock remains €400. It is translated at the historical exchange rate for both the current rate method and the temporal method.

The change in retained earnings is computed from the income statement as €62.

- Current rate method: The translated values of retained earnings are copied from the income statement.
- Temporal method: The translated values of retained earnings are derived from the balance sheet as

retained earnings = total assets – (total liabilities + stock)

Total liabilities + equity = €520 + €400 + €62 = €982.

Total liabilities + equity (in euros) = total assets (in euros). If the balance sheet does not balance (in euros), you have omitted transactions or have made an arithmetic error, and the computed translation adjustment or remeasurement gain or loss will not be correct.

Part K: We compute the cumulative translation adjustment to equate assets with liabilities + equity:

	$2160.40	total assets
–	$1144	total liability
–	$400	equity
–	$79.20	retained earnings
=	$537.20	cumulative translation adjustment

2160.40 - 1144 - 400 - 79.20 = 537.20

The cumulative translation adjustment at the end of the year minus the cumulative translation adjustment at the beginning of the year is the contribution to the year's other comprehensive income. This practice problem has no cumulative translation adjustment at the beginning of the year.

Part L: To derive the remeasurement gain or loss (on the income statement) for the temporal method, we copy the change in retained earnings (–$144.10) from the balance sheet, which is computed as

total assets = total liabilities + common stock + Δ(retained earnings) ⇛

Δ(retained earnings) = total assets – total liabilities – common stock =

1,399.90 – 1,144.00 – 400 = -144.10

We then compute the remeasurement gain or loss from the income statement as

net income excluding the remeasurement gain or loss
\+ the remeasurement gain or loss
– shareholder dividends
= change in retained earnings

⇛ remeasurement gain or loss =

Δ(retained earnings) + shareholder dividends – net income excluding the remeasurement gain or loss =

$$– 144.10 + 100 – 252.70 = -296.80$$

- The remeasurement gain or loss becomes part of net income.
- The net income shown on the 20X1 income statement is 252.70 – 296.80 = -44.10.

Question: Why might the translation adjustment for the current rate method differ from the remeasurement gain or loss for the temporal method?

Answer: Non-monetary assets cause the translation adjustment for the current rate method to differ from the remeasurement gain or loss for the temporal method. This practice problem has a high percentage of non-monetary assets and a rapid appreciation of the local currency, so the difference between the translation adjustment and the remeasurement gain or loss is great.

This practice problem has two non-monetary assets: inventory of €30 and fixed assets of €700, with different exchange rates for the current rate method vs the temporal method. The corresponding income statement entries (cost of goods sold and depreciation expense) also have different exchange rates.

For the simpler practice problems, we show how the differing exchange rates affect the translation adjustment and the remeasurement gain or loss. The same principles apply to more complex problems.

Credit sales and purchases

Question: For translation problems, how do credit sales and purchases differ from cash sales and purchases?

Answer: Translation adjustments and remeasurement gains and losses are on an accrual basis, not payment basis. Accounts receivables are monetary assets, like cash, and accounts payable are monetary liabilities.

Question: How do credit sales and credit purchases affect the income statement?

Answer: The income statement uses accrual accounting, so credit transactions are like cash transactions. Accounts receivable and accounts payable are monetary assets and liabilities, so they use the same exchange rates as cash for both the current rate method and the temporal method.

The transaction date is the date of sale or purchase, not the date of payment. The illustrations in the textbook and these practice problems show cash, accounts receivable, and accounts payable as they are shown on the balance sheet. Foreign currency translation and remeasurement are not affected by cash vs receivables.

Accounts receivable at 12/31/20X1 are 2 months × 10 units × €3 = €60. The translation adjustment and the remeasurement gain or loss are the same if accounts receivable are zero and cash is €60 higher.

Average exchange rate

Question: Is the average exchange rate the rate on June 30 (that is, at mid-year)?

Answer: Exchange rates fluctuate, so the rate at mid-year is not the average rate during the year. This practice problem uses a steadily changing exchange rate, so the average rates is the rate at mid-year: $1.60 = €1.00

Part D: The 12/31/20X0 balance sheet and the 20X1 income statement determine the assets and liabilities at 12/31/20X1. The assets in this problem are cash, equipment, inventory, and accounts receivable.

Equipment: €700 (cost) – €70 (accumulated depreciation) = €630. The translation date is 12/31/20X1 for the current rate method and 12/31/20X0 for the temporal method for both the gross asset and the accumulated depreciation.

Accounts receivable: €2 × 10 units × 2 months = €40. The translation date is 12/31/20X1 for both the current rate method and the temporal method.

Inventory: €1 × 10 units × 3 months = €30. The translation date is 12/31/20X1 for the current rate method and November 30, 20X1 for the temporal rate method.

Cash: We compute cash on December 31, 20X1. We first ignore accounts receivable and accounts payable and then adjust for these credit sales and purchases:

Net revenue – cost of goods sold – interest expense – tax expense = €360 – €120 – €30 – €28 = €182, which is net income + depreciation expense (a non-cash expense).

- We adjust for credit sales by subtracting the accounts receivable at the end of the year (€60) and adding the accounts receivable at the beginning of the year (€0).
- We adjust for credit purchases by adding accounts payable at the end of the year (€20) and subtracting accounts payable at the beginning of the year (€0).

The cash at December 31, 20X1 is €182 – €60 + €20 = €142.

For this practice problem, the non-monetary asset of cash + accounts receivable – accounts payable = €182.

Question: The textbook translates the income statement first for the current rate method and the balance sheet first for the temporal method. Does the result depend on which statement is translated first?

Answer: Either financial statement can be translated first; the textbook recommends the easier method.

- The current rate method adjusts the balance sheet, not the income statement, so we translate first the income statement and derive the corresponding translation adjustment for the balance sheet.
- The temporal method adjusts the income statement, not the balance sheet, so we re-measure first the balance sheet and derive the corresponding remeasurement gain or loss for the income statement.

Exchange rate conventions

Question: Is the exchange rate the dollars needed to buy one euro or the euros needed to buy one dollar?

Answer: For most countries and currencies, the exchange rate is the units of the home currency needed to buy one unit of the foreign currency. If $1.60 = €1.00, the dollar/euro exchange rate in the U.S. is 1.60 and the euro/dollar exchange rate in Europe is 1/1.60 = 0.6250.

The final exam problems may give the exchange rate from the parent firm's perspective or the subsidiary's perspective. Whichever form is given, you convert the foreign currency into the presentation currency.

Illustration: If the 12/31/20X1 exchange rate is €$2.20 = $1.00, then €700 = 700 / 2.2 = $318.18.