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Bachelor of Commerce (B2001) | Level 2 • Part B Major | Monash University

Introduction to Management Accounting

Course Code: ACC2200 • Module 4 Notes

Chapter 1: Organisational Budgeting Systems and the Master Budget

1.1 Strategic Roles and Governance of Budgeting

A **budget** is a quantitative expression of a proposed plan of action by management for a specified future period, serving as an operational and financial blueprint for coordinating organisational resources. Within Australian corporations, ASX-listed groups, and public-sector agencies operating under the *Public Governance, Performance and Accountability Act 2013 (Cth)*, budgeting performs five essential governance functions: (1) compelling forward-looking strategic planning rather than reactive crisis management; (2) coordinating workflows across sales, procurement, manufacturing, and treasury; (3) communicating executive targets clearly across business units; (4) providing formal benchmarks for performance evaluation and incentive compensation; and (5) safeguarding liquidity through proactive working-capital and bank-covenant monitoring.

Budgeting Methodologies Compared

Organisations tailor their budgeting architecture to match industry volatility, cost structure, and strategic maturity:

Budgeting Methodology	Core Mechanics	Primary Strengths	Limitations & Australian Context
Incremental Budgeting	Uses prior year's actuals or budget as a baseline, adjusting line items by CPI inflation or volume growth rates.	Fast, inexpensive, and preserves institutional stability across routine operations.	Carries forward historical inefficiencies and discourages critical scrutiny of legacy overheads.
Zero-Based Budgeting (ZBB)	Every discretionary cost centre must justify its entire expenditure from a zero base each cycle via decision packages.	Eliminates obsolete programmes; aligns overhead funding strictly with current strategic priorities.	Time-intensive and costly; best applied selectively to administrative, IT, and marketing departments.
Activity-Based Budgeting (ABB)	Works backward from forecasted output to required activity driver volumes (setups, shipments) and resource capacity.	Exposes capacity bottlenecks and resource surpluses before the operating year begins.	Requires mature ABC/TDABC driver data and integrated ERP process mapping.
Rolling (Continuous) Budgets	Continuously drops the completed quarter (or month) and adds a new future period, maintaining a constant 12-month horizon.	Prevents end-of-year myopia and keeps forecasts responsive to RBA cash-rate or FX shifts.	Creates continuous forecasting workload unless automated through driver-based ERP software.

Participative Budgeting, Behavioural Dynamics and Ethics

How budgets are negotiated shapes managerial motivation and ethical integrity:

- **Participative (Bottom-Up) vs Authoritative (Top-Down) Budgeting:** Top-down budgets imposed by senior executives ensure rapid strategic alignment and prevent slack, yet they risk demotivation when targets ignore local plant constraints. Participative budgeting engages frontline supervisors in setting targets, harnessing local operational knowledge and strengthening goal commitment; however, when bonuses depend on beating budget, managers may introduce **budgetary slack** (padding)—deliberately underestimating revenues or overestimating unit input requirements to secure easily achievable targets.
- **The Ratchet Effect and Myopia:** When senior management routinely sets next year's target by ratcheting up this year's actual performance, high-performing divisions face a perverse incentive to withhold productivity improvements late in the year. Similarly, excessive reliance on fixed annual targets provokes dysfunctional **budget gaming**, such as deferring essential preventative maintenance or offering steep June channel discounts to pull forward next year's revenue.
- **Ethical Governance under APES 110:** Under the APESB *Code of Ethics for Professional Accountants*, management accountants must uphold objectivity and integrity by challenging artificial revenue shifting, exposing hidden slack through engineered standards, and designing balanced performance scorecards combining financial outcomes with quality, safety, and customer-retention metrics.

Kaizen Budgeting and Sustainability Integration

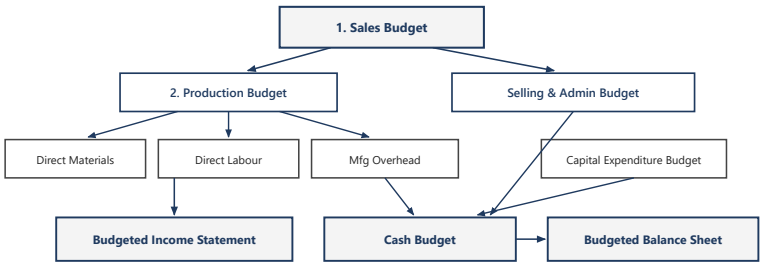
Beyond static annual cost ceilings, contemporary Australian manufacturers integrate **Kaizen budgeting**—explicitly incorporating continuous, incremental cost-reduction targets (for example, a 1.5% quarterly reduction in assembly hours per unit via workflow improvements) directly into future budget periods. Unlike traditional standard costing, which freezes benchmarks for 12 months, Kaizen budgets compel ongoing process engineering. Simultaneously, large Australian entities subject to mandatory climate-related financial disclosures under **AASB S2 Climate-related Disclosures** increasingly embed physical resource budgets—tracking Scope 1 and Scope 2 kilowatt-hours, natural gas gigajoules, and packaging waste alongside dollar operating budgets to price carbon-abatement initiatives accurately.

1.2 Architecture of the Master Budget

The **Master Budget** integrates all interdependent departmental budgets into a cohesive corporate financial plan, partitioned into two halves:

1. **Operating Budgets:** Focus on the income-generating activities of the firm, flowing sequentially from the Sales Budget (the foundational forecast driving every downstream schedule) through Production, Direct Materials Purchases, Direct Labour, Manufacturing Overhead, Ending Finished Goods, Cost of Goods Sold, and Selling & Administration Budgets, culminating in the **Budgeted Statement of Profit or Loss**.
2. **Financial Budgets:** Focus on the cash and balance-sheet impacts of operations and capital investments, comprising the Capital Expenditure (Capex) Budget, the **Cash Budget**, the Budgeted Balance Sheet, and the Budgeted Statement of Cash Flows.

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Chapter 2: Master Budget and Cash Budget Construction

2.1 Production and Direct Materials Purchases Equations

Manufacturing firms buffer demand fluctuations using inventory policies. Consequently, budgeted production units rarely match budgeted sales units in any single quarter:

$$\text{Required Production}_t = \text{Budgeted Sales}_t + \text{Target Ending FG}_t - \text{Beginning FG}_t$$

Where:

- $\text{Required Production}_t$: Physical units to be manufactured during period t.
- Budgeted Sales_t: Forecasted unit sales volume in period t.
- $\text{Target Ending FG}_t$: Desired Finished Goods buffer at the end of period t (commonly set as a percentage of period $t+1$ sales).
- Beginning FG_t: Finished Goods units carried in from the close of period $t-1$.

Once physical production is known, direct material usage is multiplied by standard material requirements per unit (m), and raw material purchases are adjusted for target raw material inventory buffers:

$$\text{DM Purchases}_t = (\text{Required Production}_t \times m) + \text{Target Ending RM}_t - \text{Beginning RM}_t$$

Where:

- DM Purchases_t: Quantity of raw materials to be ordered and received in period t.
- m: Standard quantity of raw materials required per finished unit.
- $\text{Target Ending RM}_t$ and Beginning RM_t: Desired ending and opening Raw Materials inventory quantities.

2.2 Worked Example 4.1: Complete Multi-Quarter Master & Cash Budget

Southern Cross Furniture Pty Ltd manufactures ergonomic timber office desks in Melbourne, selling at $400 per desk. Management prepares budgets for Quarter 1 (July–September) and Quarter 2 (October–December) of the Australian financial year:

- **Sales Forecast (Units):** Q1 = 1,200 desks ($480,000); Q2 = 1,500 desks ($600,000); Q3 = 1,400 desks ($560,000).
- **Inventory Policies:** Target Ending FG = 20% of next quarter's sales (Beginning FG on 1 July = 240 desks). Each desk requires 5 m^2 of Victorian ash timber at $16.00 per m^2. Target Ending RM = 10% of next quarter's production needs (Beginning RM on 1 July = 630 m^2; Q3 production is assumed at 1,420 desks).
- **Conversion & Operating Costs:** Direct labour = 2.0 hours per desk at $35.00/hr (paid in quarter incurred). Variable MOH = $18.00 per desk; Fixed MOH = $54,000 per quarter (including $14,000 non-cash depreciation). Fixed MOH is applied to inventory using a budgeted quarterly denominator of 2,700 DLH (1,350 desks × 2.0 DLH) → $20.00/DLH ($40.00 per desk), giving a standard absorption cost per desk of $80 (DM) + $70 (DL) + $18 (VMOH) + $40 (FMOH) = $208.00 per desk (1 July FG carried at $208.00/desk = $49,920). Selling & Admin expenses = $65,000 fixed per quarter (including $5,000 depreciation) plus 5% sales commission (paid in quarter incurred).
- **Cash Flow Timing & Financing:** Sales are 30% cash and 70% credit; credit sales are collected 60% in the quarter of sale and 40% in the following quarter (1 July Accounts Receivable = $112,000, fully collected in Q1). Timber purchases are paid 50% in the quarter of purchase and 50% in the following quarter (1 July Accounts Payable = $48,000, paid in Q1). Equipment capex of $85,000 is paid in Q2. Minimum desired cash balance is $40,000 (1 July cash = $52,000).

Schedule 1: Production and Direct Materials Purchases Budgets

Line Item	Q1 (Jul–Sep)	Q2 (Oct–Dec)	Notes / Formula
Budgeted Unit Sales	1,200	1,500	Given forecast

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Line Item	Q1 (Jul–Sep)	Q2 (Oct–Dec)	Notes / Formula
Add: Target Ending FG (20% of next Q)	300	280	Q1: 0.20 × 1,500; Q2: 0.20 × 1,400
Less: Beginning FG	(240)	(300)	Prior quarter ending FG
Required Production (Desks)	**1,260**	**1,480**	—
Timber Needed for Production (× 5 m^2)	6,300 m^2	7,400 m^2	Q3 need = 1,420 × 5 = 7,100 m^2
Add: Target Ending RM (10% of next Q)	740 m^2	710 m^2	Q1: 0.10 × 7,400; Q2: 0.10 × 7,100
Less: Beginning RM	(630 m^2)	(740 m^2)	—
Timber Purchases Required (m^2)	**6,410 m^2**	**7,370 m^2**	—
Cost of Timber Purchases (@ \$16 per m^2)	**\$102,560**	**\$117,920**	—

Schedule 2: Direct Labour, Manufacturing Overhead & Budgeted Income Statement

Operating Budget Line Item	Q1 (Jul–Sep)	Q2 (Oct–Dec)	6-Month Total
Direct Labour Hours Required (Production × 2.0 hrs)	2,520 DLH	2,960 DLH	5,480 DLH
Direct Labour Cost (@ \$35.00/hr)	\$88,200	\$103,600	\$191,800
Variable Manufacturing Overhead (@ \$18.00/desk)	\$22,680	\$26,640	\$49,320
Fixed Manufacturing Overhead (\$40,000 cash + \$14,000 depr.)	\$54,000	\$54,000	\$108,000
Total Manufacturing Overhead Budgeted	**\$76,680**	**\$80,640**	**\$157,320**
Less: Non-Cash Depreciation	(\$14,000)	(\$14,000)	(\$28,000)
Cash Manufacturing Overhead Disbursements	**\$62,680**	**\$66,640**	**\$129,320**

From these manufacturing schedules, Southern Cross prepares its **Budgeted Statement of Profit or Loss** (noting COGS at standard absorption cost of \$208.00/desk plus any quarterly fixed overhead volume variance, or equivalently Direct Materials Used + DL + Total MOH + Beginning FG − Ending FG):

Budgeted Statement of Profit or Loss (AUD)	Q1 (Jul–Sep)	Q2 (Oct–Dec)	6-Month Total
Sales Revenue (Q1: 1,200; Q2: 1,500 @ \$400)	\$480,000	\$600,000	\$1,080,000
Standard Cost of Goods Sold (@ \$208/desk)	(\$249,600)	(\$312,000)	(\$561,600)
Fixed Overhead Volume Variance (Under/Over-Applied)*	(\$3,600)	\$5,200	\$1,600
Gross Profit	**\$226,800**	**\$293,200**	**\$520,000**
Selling & Admin Variable Commission (5% of Sales)	(\$24,000)	(\$30,000)	(\$54,000)
Selling & Admin Fixed (\$60,000 cash + \$5,000 depr.)	(\$65,000)	(\$65,000)	(\$130,000)
Budgeted Operating Profit (EBIT)	**\$137,800**	**\$198,200**	**\$336,000**

**Note:* In Q1, applied fixed overhead is 1,260 × \$40 = \$50,400 vs budgeted \$54,000 (\$3,600 under-applied); in Q2, applied fixed overhead is 1,480 × \$40 = \$59,200 vs \$54,000 (\$5,200 over-applied).

Schedule 3: Cash Collections, Disbursements and Cash Budget

- **Q1 Collections:** Prior AR (\$112,000) + Q1 Cash Sales (30% × \$480,000 = \$144,000) + Q1 Credit Collected in Q1 (60% × 70% × \$480,000 = 0.42 × \$480,000 = \$201,600) = **\$457,600**.
- **Q2 Collections:** Remaining Q1 Credit (40% × 70% × \$480,000 = 0.28 × \$480,000 = \$134,400) + Q2 Cash Sales (30% × \$600,000 = \$180,000) + Q2 Credit Collected in Q2 (0.42 × \$600,000 = \$252,000) = **\$566,400**.
- **Q1 Timber Payments:** Prior AP (\$48,000) + 50% of Q1 Purchases (0.50 × \$102,560 = \$51,280) = **\$99,280**.
- **Q2 Timber Payments:** 50% of Q1 Purchases (\$51,280) + 50% of Q2 Purchases (0.50 × \$117,920 = \$58,960) = **\$110,240**.

Cash Budget Line Item	Q1 (Jul–Sep)	Q2 (Oct–Dec)
Beginning Cash Balance	\$52,000	\$175,440
Add: Cash Collections from Customers	\$457,600	\$566,400

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Cash Budget Line Item	Q1 (Jul–Sep)	Q2 (Oct–Dec)
Total Cash Available	**$509,600**	**$741,840**
Less: Timber Purchases Paid	($99,280)	($110,240)
Less: Direct Labour Paid	($88,200)	($103,600)
Less: Cash Manufacturing Overhead	($62,680)	($66,640)
Less: Cash Selling & Admin Expenses ($60,000 + 5% Sales)	($84,000)	($90,000)
Less: Equipment Capital Expenditure	$0	($85,000)
Total Cash Disbursements	**($334,160)**	**($455,480)**
Excess (Deficiency) Before Financing	$175,440	$286,360
Financing (Borrowings / Repayments)	$0	$0
Ending Cash Balance	**$175,440**	**$286,360**

Worked Example 4.1B: Short-Term Line of Credit Financing & Australian BAS Timing

Suppose instead that Southern Cross must acquire a $200,000 automated CNC router in Q1 (raising Q1 cash disbursements to $534,160) while maintaining a strict $40,000 minimum cash balance. Its Q1 cash excess before financing would fall to $509,600 − $534,160 = ($24,560) deficit. To restore ending cash to at least $40,000, the shortfall equals $40,000 − (−$24,560) = $64,560. Borrowing in $1,000 increments at the start of Q1 requires drawing **$65,000** from the bank overdraft facility, leaving Q1 ending cash of ($24,560) + $65,000 = $40,440.

If Q2 produces a pre-financing cash surplus of $195,000 (well above $40,000) and the facility carries 8% p.a. simple interest (2% per quarter), Southern Cross repays the full $65,000 principal at the end of Q2 together with two quarters of interest ($65,000 × 2% × 2 quarters = $2,600), leaving Q2 ending cash of $195,000 − $67,600 = $127,400. In Australian treasury practice, cash budgets must also incorporate quarterly ATO Business Activity Statement (BAS) cash flows—remitting 10% GST collected on taxable Australian sales less 10% GST input tax credits on purchases, alongside PAYG corporate income tax instalments.

Schedule 4: Closing the Master Budget — Budgeted Balance Sheet Mechanics

The Master Budget closes with the **Budgeted Statement of Financial Position (Balance Sheet)**, which verifies internal accounting articulation across every operating and financial schedule. Each closing balance-sheet account at 31 December (end of Q2) is derived directly from opening 1 July balances plus budgeted transactions:

- **Cash:** Carried directly from the Q2 ending Cash Budget balance ($286,360).
- **Accounts Receivable:** Equals uncollected Q2 credit sales (40% × 70% × $600,000 = $168,000).
- **Raw Materials Inventory:** Target Q2 ending timber (710 m^2 × $16.00 = $11,360).
- **Finished Goods Inventory:** Target Q2 ending desks (280 desks × $208.00 standard absorption cost = $58,240).
- **Property, Plant & Equipment (Net):** Opening net PPE plus Q2 capex ($85,000) less 6 months' total depreciation ($28,000 manufacturing + $10,000 S&A = $38,000).
- **Accounts Payable (Timber Suppliers):** Unpaid 50% of Q2 timber purchases (0.50 × $117,920 = $58,960).
- **Retained Earnings:** Opening Retained Earnings plus 6-month Budgeted Operating Profit ($336,000) less budgeted income taxes and declared dividends.

Assuming opening 1 July balances of Net PPE $420,000, Contributed Share Capital $350,000, and Retained Earnings $246,000 (with nil tax and dividends for illustration, matching opening assets of $644,000 against Accounts Payable of $48,000 plus Equity of $596,000), the articulated 31 December Balance Sheet reconciles as follows:

Budgeted Balance Sheet Account	1 July (Opening, AUD)	31 December (Closing, AUD)	Derivation
Cash and Cash Equivalents	$52,000	$286,360	From Q2 Cash Budget
Accounts Receivable	$112,000	$168,000	40% × 70% × $600,000 Q2 Sales
Raw Materials Inventory (@ $16/$m^2$)	$10,080	$11,360	710 m^2 ending RM
Finished Goods Inventory (@ $208/desk)	$49,920	$58,240	280 desks ending FG
Property, Plant & Equipment (Net)	$420,000	$467,000	$420,000 + $85,000 capex − $38,000 depr.
Total Assets	**$644,000**	**$990,960**	—
Accounts Payable (Timber)	$48,000	$58,960	50% × $117,920 Q2 Purchases
Contributed Share Capital	$350,000	$350,000	Unchanged
Retained Earnings	$246,000	$582,000	$246,000 + $336,000 6-Month EBIT

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Budgeted Balance Sheet Account	1 July (Opening, AUD)	31 December (Closing, AUD)	Derivation
Total Liabilities & Equity	**$644,000**	**$990,960**	**Articulates exactly**

Chapter 3: Responsibility Accounting, Flexible Budgets and Variance Decomposition

3.1 Responsibility Centres and the Controllability Principle

As organisations decentralise operations, managers are evaluated through **responsibility accounting**—assigning accountability strictly for financial outcomes within each manager's sphere of decision authority:

Centre Type	Managerial Decision Authority	Primary Financial KPIs	Typical Organisational Unit
Cost Centre	Input quantities, scheduling, and operational efficiency; no pricing or sales control.	Standard cost variances (price & efficiency), flexible budget cost variance.	Factory assembly line, maintenance workshop, payroll processing team.
Revenue Centre	Sales volume mix and pricing discounts within approved bands; minimal cost control.	Sales revenue variance, sales volume & mix variances, customer acquisition targets.	Regional sales branch, export desk, e-commerce marketing team.
Profit Centre	Both revenues (pricing/mix) and operating costs (production/procurement); no capex authority.	Segment contribution margin, controllable segment profit, flexible budget profit variance.	Individual retail store, autonomous product division, consulting practice.
Investment Centre	Revenues, operating costs, plus working capital and capital expenditure deployment.	Return on Investment (ROI), Residual Income (RI), Economic Value Added (EVA).	Subsidiary company, Australasian geographic division (e.g., Bunnings within Wesfarmers).

Under the **controllability principle**, managers should be held accountable only for variances they can materially influence. Evaluating a factory manager on a static master budget when actual sales demand jumps or drops by 20% violates controllability by confounding production efficiency with external sales volume shifts.

3.2 Static Budgets Versus Flexible Budgets

A **Static (Master) Budget** is prepared for a single planned output level (Q_B). Comparing actual costs incurred at actual output (Q_A) directly against the static budget at Q_B produces a misleading **Level 1 Static Budget Variance** whenever $Q_A \neq Q_B$. A **Flexible Budget (FB)** removes this distortion by recalculating budgeted revenues and budgeted variable costs at the *actual output level achieved* (Q_A), using standard selling prices (P_B), standard variable costs per unit (V_B), and budgeted fixed costs (F_B):

$$FB(Q_A) = (P_B - V_B)\,Q_A - F_B$$

Where:

- $FB(Q_A)$: Flexible-budget operating profit adjusted to actual output volume Q_A.
- P_B: Budgeted (standard) selling price per unit.
- V_B: Budgeted (standard) variable cost per unit.
- Q_A: Actual physical units produced and sold.
- F_B: Budgeted total fixed costs (unchanged within the relevant range).

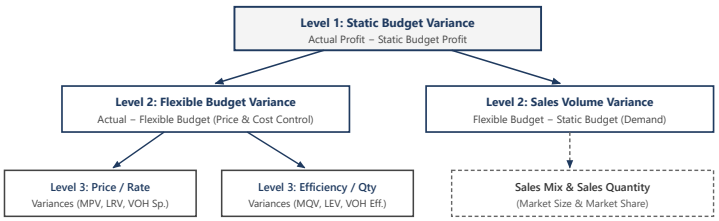
Inserting the Flexible Budget between Actual Results and the Static Budget decomposes the total variance into two distinct managerial responsibilities (**Level 2 Analysis**):

$$\text{Static Budget Variance} = \text{Actual} - \text{Static Budget} = \underbrace{(\text{Actual} - \text{Flexible Budget})}_{\text{Flexible Budget Variance (Price and Efficiency)}} + \underbrace{(\text{Flexible Budget} - \text{Static Budget})}_{\text{Sales Volume Variance}}$$

Where:

- Flexible Budget Variance: Measures operational efficiency, selling price realisation, and cost control at actual volume Q_A.
- Sales Volume Variance: Measures the profit impact solely attributable to selling more or fewer units than planned: $(Q_A - Q_B) \times CM_{u,B}$.

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3.3 Worked Example 4.2: Level 1 and Level 2 Flexible Budget Report

Victoria Bottling Co Pty Ltd budgeted to produce and sell 10,000 cases of sparkling spring water in October (P_B = \$25.00, V_B = \$13.00, F_B = \$72,000, budgeted profit = \$48,000). Actual output and sales reached 11,500 cases at \$24.50 per case (\$281,750 revenue), with actual variable costs of \$156,400 and actual fixed costs of \$74,500. Standard sign convention labels a variance **Favourable (F)** if it increases operating profit and **Unfavourable (U)** if it decreases operating profit.

Line Item	Actual Results (11,500)	Flexible Budget Variance	Flexible Budget (11,500)	Sales Volume Variance	Static Budget (10,000)
Sales Revenue (@ \$25 std)	\$281,750	\$5,750 U	\$287,500	\$37,500 F	\$250,000
Variable Costs (@ \$13 std)	\$156,400	\$6,900 U	\$149,500	\$19,500 U	\$130,000
Contribution Margin	**\$125,350**	**\$12,650 U**	**\$138,000**	**\$18,000 F**	**\$120,000**
Fixed Costs	\$74,500	\$2,500 U	\$72,000	\$0	\$72,000
Operating Profit	**\$50,850**	**\$15,150 U**	**\$66,000**	**\$18,000 F**	**\$48,000**

Interpretation: A naive Level 1 comparison shows profit beat the static budget by \$2,850 F (\$50,850 − \$48,000), masking severe operational problems. Level 2 analysis reveals that strong volume growth generated \$18,000 F (1,500 extra cases × \$12.00 std CM_u), yet price discounting (\$5,750 U), variable cost overruns (\$6,900 U), and fixed cost overspending (\$2,500 U) eroded \$15,150 U of expected profit.

3.4 Multi-Product Sales Mix and Sales Quantity Variances

In multi-product enterprises, the Level 2 Sales Volume Variance can be decomposed further into two Level 3 marketing variances: the **Sales Mix Variance** (profit impact from selling a different proportion of high-margin versus low-margin products) and the **Sales Quantity Variance** (profit impact from selling more or fewer total composite units at the budgeted mix):

$$\text{Sales Mix Variance}_i = (w_{A,i} - w_{B,i}) \times Q_{A,\text{total}} \times CM_{B,i}$$

$$\text{Sales Quantity Variance}_i = (Q_{A,\text{total}} - Q_{B,\text{total}}) \times w_{B,i} \times CM_{B,i}$$

Where:

- $w_{A,i}$ and $w_{B,i}$: Actual and budgeted unit sales mix proportions for product i.
- $Q_{A,\text{total}}$ and $Q_{B,\text{total}}$: Actual and budgeted combined unit sales across all products.
- $CM_{B,i}$: Budgeted unit contribution margin of product i.

Worked Example 4.2B: Sales Mix and Quantity Variances

Suppose Victoria Bottling Co sells two lines: 750 mL Glass Bottles ($CM_{B,1}$ = \$18.00, budgeted 4,000 units = 40% mix) and 1 L PET Packs ($CM_{B,2}$ = \$8.00, budgeted 6,000 units = 60% mix; $Q_{B,\text{total}} = 10{,}000$). Actual total sales reach $Q_{A,\text{total}} = 11{,}500$ units, comprising 3,450 Glass Bottles ($w_{A,1} = 30\%$) and 8,050 PET Packs ($w_{A,2} = 70\%$).

- **Sales Mix Variance:** Glass: (0.30 − 0.40) × 11,500 × \$18.00 = −\$20,700 U; PET: (0.70 − 0.60) × 11,500 × \$8.00 = +\$9,200 F. Net Sales Mix Variance = **\$11,500 U** (due to shifting 10% of volume toward lower-margin PET).
- **Sales Quantity Variance:** Glass: (11,500 − 10,000) × 0.40 × \$18.00 = +\$10,800 F; PET: (11,500 − 10,000) × 0.60 × \$8.00 = +\$7,200 F. Net Sales Quantity Variance = **\$18,000 F**.
- **Total Sales Volume Variance:** −\$11,500 U + \$18,000 F = **+\$6,500 F**.

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Market-Size and Market-Share Variance Decomposition

Senior commercial executives often decompose the Sales Quantity Variance one step further to distinguish macroeconomic industry demand growth (uncontrollable by sales managers) from competitive market-share gains (controllable via merchandising and service execution):

$$\text{Market-Size Variance} = (M_A - M_B) \times s_B \times WACM_B$$

$$\text{Market-Share Variance} = (s_A - s_B) \times M_A \times WACM_B$$

Where:

- M_A and M_B: Actual and budgeted total industry market volume in units.
- $s_A = Q_{A,\text{total}}/M_A$ and $s_B = Q_{B,\text{total}}/M_B$: Actual and budgeted firm market share proportions.
- $WACM_B$: Budgeted weighted-average contribution margin per unit across all product lines.

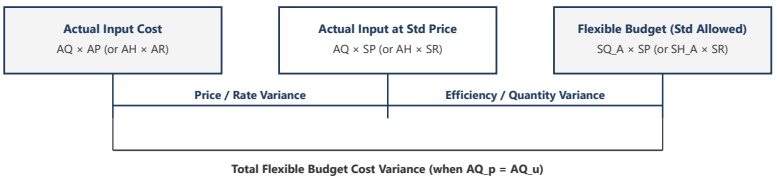
Worked Extension: Continuing Example 4.2B, $WACM_B$ = (0.40 × \$18) + (0.60 × \$8) = \$12.00. Suppose Victoria Bottling Co budgeted a $s_B = 10\%$ share of a $M_B = 100{,}000$-unit regional market, while actual regional market demand expanded to $M_A = 125{,}000$ units (giving actual share $s_A = 11{,}500/125{,}000 = 9.2\%$). Then:

- Market-Size Variance = (125,000 − 100,000) × 0.10 × \$12.00 = +\$30,000 F.
- Market-Share Variance = (0.092 − 0.100) × 125,000 × \$12.00 = −\$12,000 U.
- Check Sum: +\$30,000 F − \$12,000 U = +\$18,000 F (exact Sales Quantity Variance). Although unit sales grew by 15%, the firm actually lost market share during an industry boom—an insight completely invisible without Level 3 market decomposition.

Chapter 4: Standard Costing and Full Variance Reconciliation

4.1 Setting Standards and the Standard Cost Card

A **standard cost** is a carefully predetermined unit benchmark representing what a single unit of product *should* cost under efficient operating conditions. Standards are set either through **engineering studies** (time-and-motion observation, bills of materials) or **adjusted historical analysis**. Management generally sets **currently attainable standards**—achievable by well-trained workers operating under normal allowance for unavoidable setups and rest breaks—rather than **ideal (perfection) standards**, which assume zero scrap or downtime and frequently demoralise staff.



4.2 Level 3 Variance Formulas (DM, DL, VOH and FOH)

Direct Materials Variances

When the quantity of raw materials purchased (AQ_p) differs from the quantity placed into production (AQ_u), best practice isolates the **Materials Price Variance (MPV)** at the *point of purchase* so purchasing managers receive immediate feedback, while the **Materials Quantity (Efficiency) Variance (MQV)** is measured at the *point of usage*:

$$MPV = (AP - SP) \times AQ_p \qquad \text{and} \qquad MQV = (AQ_u - SQ_A) \times SP$$

Where:

- AP: Actual purchase price paid per unit of direct material; SP: Standard price per unit.
- AQ_p: Actual quantity of direct material purchased during the period.
- AQ_u: Actual quantity of direct material used in production.
- $SQ_A = Q_A \times SQ_{\text{unit}}$: Standard quantity of material allowed for the *actual* good output Q_A achieved.

If $AP < SP$ or $AQ_u < SQ_A$, the resulting negative cost difference is **Favourable (F)**; if positive, it is **Unfavourable (U)**. Note that when $AQ_p \neq AQ_u$, $MPV + MQV$ does not sum directly to the usage-only Flexible Budget Variance because the price variance on unissued inventory sits inside Raw Materials Inventory (carried at standard cost).

Direct Labour Variances

Because labour cannot be inventoried, hours paid equal hours worked (AH):

$$LRV = (AR - SR) \times AH \qquad \text{and} \qquad LEV = (AH - SH_A) \times SR$$

Where:

- AR: Actual hourly wage rate (inclusive of on-costs); SR: Standard hourly wage rate.
- AH: Actual direct labour hours worked.
- $SH_A = Q_A \times SH_{\text{unit}}$: Standard direct labour hours allowed for the actual output Q_A achieved.

Variable Manufacturing Overhead Variances

Assuming Variable Overhead (VOH) is applied on a driver such as direct labour hours or machine hours:

$$VOH \text{ Spending} = \text{Actual } VOH - (AH \times SVOR) \qquad \text{and} \qquad VOH \text{ Efficiency} = (AH - SH_A) \times SVOR$$

Where:

- Actual VOH: Actual variable overhead incurred during the period.
- $SVOR$: Standard Variable Overhead Rate per driver hour.
- AH and SH_A: Actual driver hours worked and standard driver hours allowed for actual output Q_A.

Critically, the VOH Efficiency Variance does not measure how efficiently electricity or lubricants were conserved per machine hour; it measures the incremental variable overhead incurred solely because workers used more or fewer driver hours ($AH - SH_A$) than standard.

Fixed Manufacturing Overhead Variances

Under absorption standard costing, Fixed Overhead (FOH) is budgeted as a lump sum (FOH_B) at denominator capacity (SH_B), yielding a Standard Fixed Overhead Rate $SFOR = FOH_B / SH_B$. Because fixed overhead does not flex with actual output, its two variances behave differently:

$$FOH \text{ Spending (Budget)} = \text{Actual } FOH - FOH_B \qquad \text{and} \qquad FOH \text{ Volume} = FOH_B - (SH_A \times SFOR) = (SH_B - SH_A) \times SFOR$$

Where:

- Actual FOH: Actual fixed manufacturing overhead incurred; FOH_B: Static budgeted fixed overhead.
- $SFOR$: Standard Fixed Overhead Rate per driver hour (FOH_B / SH_B).
- SH_B: Budgeted denominator driver hours at planned capacity; SH_A: Standard hours allowed for actual output Q_A.

Note that FOH Applied $= SH_A \times SFOR$. Whenever $Q_A > Q_B$ (meaning $SH_A > SH_B$), applied fixed overhead exceeds budgeted fixed overhead, yielding a **Favourable Production-Volume Variance**—reflecting higher-than-planned capacity utilisation (and vice versa). Under pure variable costing, there is no FOH Volume Variance because fixed overhead is never unitised into inventory.

4.3 Worked Example 4.3: End-to-End Variance Reconciliation

Brisbane Industrial Valves Pty Ltd manufactures heavy-duty pressure valves under a standard absorption costing system (treating $AQ_p = AQ_u$ and zero beginning/ending WIP or FG inventories for clean reconciliation). Its Standard Cost Card per valve specifies:

- Direct Materials: 4.0 kg @ \$12.00/kg = \$48.00.
- Direct Labour: 1.5 DLH @ \$40.00/DLH = \$60.00.
- Variable Overhead: 1.5 DLH @ \$14.00/DLH = \$21.00.
- Fixed Overhead (based on Static Budget of $Q_B = 4{,}000$ valves, $SH_B = 6{,}000$ DLH, FOH_B = \$144,000): 1.5 DLH @ \$24.00/DLH = \$36.00.
- Total Standard Absorption Cost = \$165.00 per valve. Standard Selling Price P_B = \$230.00. Budgeted Fixed S&A = \$90,000 (actual = \$90,000, zero variance).

Actual Results for October ($Q_A = 4{,}400$ valves produced and sold):

- Actual Sales Revenue: 4,400 × \$226.00 = \$994,400 (Selling Price Variance = (\$226 − \$230) × 4,400 = \$17,600 U).
- Direct Materials purchased & used: 18,400 kg @ \$11.50/kg = \$211,600.
- Direct Labour worked: 6,300 DLH @ \$41.50/DLH = \$261,450.
- Actual Variable Overhead: \$91,350.
- Actual Fixed Overhead: \$148,200.
- Actual Fixed S&A: \$90,000.

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Step 1: Compute Standard Inputs Allowed for Actual Output ($Q_A = 4{,}400$)

- $SQ_A = 4{,}400 \times 4.0$ kg $= 17{,}600$ kg.
- $SH_A = 4{,}400 \times 1.5$ DLH $= 6{,}600$ DLH.

Step 2: Compute All Eight Manufacturing Cost Variances

Cost Element	Variance Component	Formula Substitution	Amount	Status
Direct Materials	Price (MPV)	($11.50 – $12.00) × 18,400	$9,200	**Favourable (F)**
Direct Materials	Quantity (MQV)	(18,400 – 17,600) × $12.00	$9,600	**Unfavourable (U)**
Direct Labour	Rate (LRV)	($41.50 – $40.00) × 6,300	$9,450	**Unfavourable (U)**
Direct Labour	Efficiency (LEV)	(6,300 – 6,600) × $40.00	$12,000	**Favourable (F)**
Variable Overhead	Spending	$91,350 – (6,300 × $14.00)	$3,150	**Unfavourable (U)**
Variable Overhead	Efficiency	(6,300 – 6,600) × $14.00	$4,200	**Favourable (F)**
Fixed Overhead	Spending (Budget)	$148,200 – $144,000	$4,200	**Unfavourable (U)**
Fixed Overhead	Production-Volume	(6,000 – 6,600) × $24.00	$14,400	**Favourable (F)**

Step 3: Full Operating Profit Reconciliation (Static Budget → Flexible Budget → Actual)

- **Static Budget Operating Profit ($Q_B = 4{,}000$):** Revenue (4,000 × $230 = $920,000) – Standard COGS (4,000 × $165 = $660,000) – Fixed S&A ($90,000) = **$170,000**.
- **Sales Volume Variance (Contribution Margin basis):** (4,400 – 4,000) × ($230 – $129 std variable cost) = 400 × $101.00 = **+$40,400 F**. (Under absorption costing, the standard gross margin volume variance is 400 × ($230 – $165) = $26,000 F, and adding the $14,400 F Fixed Overhead Production-Volume Variance yields $26,000 + $14,400 = $40,400 F.)
- **Flexible Budget Operating Profit ($Q_A = 4{,}400$, excluding volume variance):** $170,000 + $40,400 = **$210,400**. (Check: 4,400 × $101.00 – $144,000 FOH – $90,000 S&A = $444,400 – $234,000 = $210,400.)
- **Net Flexible Budget Variances (Price, Rate, Efficiency & Spending):**
  - Selling Price Variance: –$17,600 U
  - DM Variances: +$9,200 F – $9,600 U = –$400 U
  - DL Variances: –$9,450 U + $12,000 F = +$2,550 F
  - VOH Variances: –$3,150 U + $4,200 F = +$1,050 F
  - FOH Spending Variance: –$4,200 U
  - Total Flexible Budget Profit Variance = –$17,600 – $400 + $2,550 + $1,050 – $4,200 = **–$18,600 U**.
- **Reconciled Actual Operating Profit:** $210,400 – $18,600 = **$191,800**.
- **Direct Income Statement Verification:** Actual Revenue ($994,400) – Actual DM ($211,600) – Actual DL ($261,450) – Actual VOH ($91,350) – Actual FOH ($148,200) – Actual S&A ($90,000) = **$191,800** (100% exact reconciliation).

4.4 Standard Costing General Ledger Journal Entries

In a standard costing ledger, Work in Process, Finished Goods, and Standard COGS are carried strictly at *standard cost*, while unfavourable variances are recorded as debits and favourable variances as credits:

Transaction (Brisbane Industrial Valves — October)	Account Debited	Debit (AUD)	Account Credited	Credit (AUD)
1. Purchase DM (18,400 kg @ $12 std vs $11.50 act)	Raw Materials Inventory	$220,800	Accounts Payable DM Price Variance (F)	$211,600 $9,200
2. Issue DM to WIP (17,600 std kg vs 18,400 act)	Work in Process Inventory DM Quantity Variance (U)	$211,200 $9,600	Raw Materials Inventory	$220,800
3. Incur & Apply DL (6,600 std DLH vs 6,300 act)	Work in Process Inventory DL Rate Variance (U)	$264,000 $9,450	Wages Payable DL Efficiency Variance (F)	$261,450 $12,000
4. Apply VOH ($14 × 6,600) & FOH ($24 × 6,600)	Work in Process Inventory	$250,800	VOH Applied FOH Applied	$92,400 $158,400
5. Close VOH & FOH Control vs Applied	VOH Applied VOH Spending Var. (U) FOH Applied FOH Spending Var. (U)	$92,400 $3,150 $158,400 $4,200	VOH Control VOH Efficiency Var. (F) FOH Control FOH Volume Var. (F)	$91,350 $4,200 $148,200 $14,400
6. Transfer Completed Valves & Record Standard COGS	Cost of Goods Sold (Std)	$726,000	Work in Process / FG	$726,000

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Transaction (Brisbane Industrial Valves — October)	Account Debited	Debit (AUD)	Account Credited	Credit (AUD)
7. Close Net Favourable Mfg Variances ($13,400 F) to COGS	Favourable Variances (Total)	$39,800	Unfavourable Variances Cost of Goods Sold	$26,400 $13,400

Notice that Standard COGS ($726,000 = 4,400 × $165) minus Net Favourable Manufacturing Variances ($13,400) equals $712,600—matching exact actual manufacturing outlays ($211,600 + $261,450 + $91,350 + $148,200 = $712,600).

4.5 Variance Interdependencies, Investigation Thresholds and AASB 102 Disposition

Managers must never evaluate individual variances in isolation because operational decisions routinely trigger offsetting cross-variances:

- **Purchasing vs Production Trade-Off:** In Brisbane Industrial Valves' October results, buying cheaper alloy castings generated a $9,200 F Material Price Variance, yet inferior material tolerances likely caused elevated scrap and rework, triggering a $9,600 U Material Quantity Variance (a net loss of $400 U).
- **Skill Mix Trade-Off:** Deploying higher-paid senior technicians created an Unfavourable Labour Rate Variance ($9,450 U), yet their faster execution saved 300 labour hours, generating a $12,000 F Labour Efficiency Variance plus $4,200 F in Variable Overhead Efficiency—a net operational gain of $6,750 F.

Alternative Overhead Variance Groupings (4-Way, 3-Way and 2-Way Analysis)

When companies combine Variable and Fixed Manufacturing Overhead into a single Manufacturing Overhead Control account rather than tracking separate pools, the four individual overhead variances map cleanly into 3-variance and 2-variance formats:

4-Variance Method (Full Detail)	3-Variance Method	2-Variance Method	Brisbane Valves October Totals
VOH Spending ($3,150 U) FOH Spending ($4,200 U)	Combined Spending Variance ($7,350 U)	Controllable (Budget) Variance ($3,150 U)	$7,350 U − $4,200 F = $3,150 U
VOH Efficiency ($4,200 F)	Efficiency Variance ($4,200 F)		
FOH Production-Volume ($14,400 F)	Volume Variance ($14,400 F)	Volume Variance ($14,400 F)	$14,400 F

Management by Exception and Investigation Decision Rule

Under **management by exception**, executives establish statistical materiality thresholds (for example, investigating variances exceeding both 5% of standard cost and $5,000 AUD) so managerial attention focuses exclusively on non-random, actionable anomalies. Formally, investigating an unfavourable variance is economically justified whenever the expected present-value savings from correcting an out-of-control process exceed investigation costs:

$$p \cdot (B - C_R) > C_I \implies p^* = \frac{C_I}{B - C_R}$$

Where:

- p: Estimated probability that the production process is genuinely out of control (assignable cause rather than random noise).
- B: Present value of future cost savings if the out-of-control condition is detected and corrected.
- C_R: Direct cost of executing the corrective repair or retraining intervention; C_I: Cost of investigating the variance.
- p^*: Break-even threshold probability above which management should launch a formal root-cause audit.

Worked Investigation Example: Suppose investigating a $9,600 U Material Quantity Variance costs C_I = $1,800 in engineering time, repairing the CNC lathe alignment costs C_R = $2,200, and fixing the fault prevents B = $18,200 of recurring scrap over the next quarter. The net correction benefit is $18,200 − $2,200 = $16,000, yielding a break-even probability $p^* = \frac{1,800}{16,000} = 0.1125$ (11.25%). If the plant supervisor judges there is at least an 11.25% chance of an assignable mechanical fault, investigation creates positive expected value.

End-of-Period Disposition under AASB 102 and Absorption vs Variable Costing

For statutory reporting under **AASB 102 Inventories**, standard costs are permitted only if they closely approximate actual costs. Whenever net manufacturing variances are *immaterial*, closing them directly to Cost of Goods Sold (Entry 7 above) is acceptable. However, if significant price inflation or abnormal capacity under-utilisation produces *material* variances, AASB 102 requires prorating controllable price and efficiency variances proportionally across ending Raw Materials (for MPV on unissued stock), Work in Process, Finished Goods, and Cost of Goods Sold—and expensing abnormal idle-capacity shortfalls immediately as period losses.

Finally, note how inventory changes link standard absorption costing to standard variable costing. When production volume (Q_P) equals sales volume (Q_S), both systems report identical operating profit because all fixed overhead incurred is expensed. Whenever $Q_P \neq Q_S$, operating profit differs strictly by the fixed manufacturing overhead deferred inside or released from inventory:

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$$\pi_{\text{Absorption}} - \pi_{\text{Variable}} = (Q_P - Q_S) \times FOH_{\text{unit}}$$

Where:

- $\pi_{\text{Absorption}}$ and π_{Variable}: Standard-costing operating profits under absorption and variable costing respectively.
- Q_P and Q_S: Physical units produced and sold during the period.
- FOH_{unit}: Standard fixed manufacturing overhead rate per finished unit ($SH_{\text{unit}} \times SFOR$).

Evaluating divisional managers under variable costing eliminates the perverse incentive to overbuild inventory merely to generate a favourable Fixed Overhead Production-Volume Variance.

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