Management Control
(2321)

Bachelor Semester 3

January-May 2022

IESEG School of Management

Session 3.

Variance analysis

1. Review questions
2. An overview of variance analysis
3. Analysing variances: an example
4. Exercises

1. Review questions

2. An overview of variance analysis
3. Analysing variances: an example
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1. Budgeted overheads

Arlo Company uses an annual cost formula for overhead of £72,000 + £1.60 for each direct labour hour worked. For the upcoming month, Arlo plans to manufacture 96,000 units. Each unit requires five minutes of direct labour. Arlo's budgeted overhead for the month is

a. £12,800

b. £18,800

c. £84,800

d. £225,600

1. Budgeted overheads

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d. £225,600

SUPPORTING CALCULATIONS:

96,000 units x 5 minutes per unit = 480,000 minutes or 8,000 hours

Variable costs: 8,000 hours x £1.60 =	£12,800
Fixed costs: £72,000/12 months =	6,000
	£18,800

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2. Which of the following is true about organizational structure?

a) Organizational structure refers to the combination of financial and non-financial reports

b) Organizational structure refers to financial accounting principles based on historic and current information

c) Organizational structure is an arrangement of lines of responsibility within the entity

d) Organizational structure measures the difference between current assets and current liabilities

2. Which of the following is true about organizational structure?

a) Organizational structure refers to the combination of financial and non-financial reports

b) Organizational structure refers to financial accounting principles based on historic and current information

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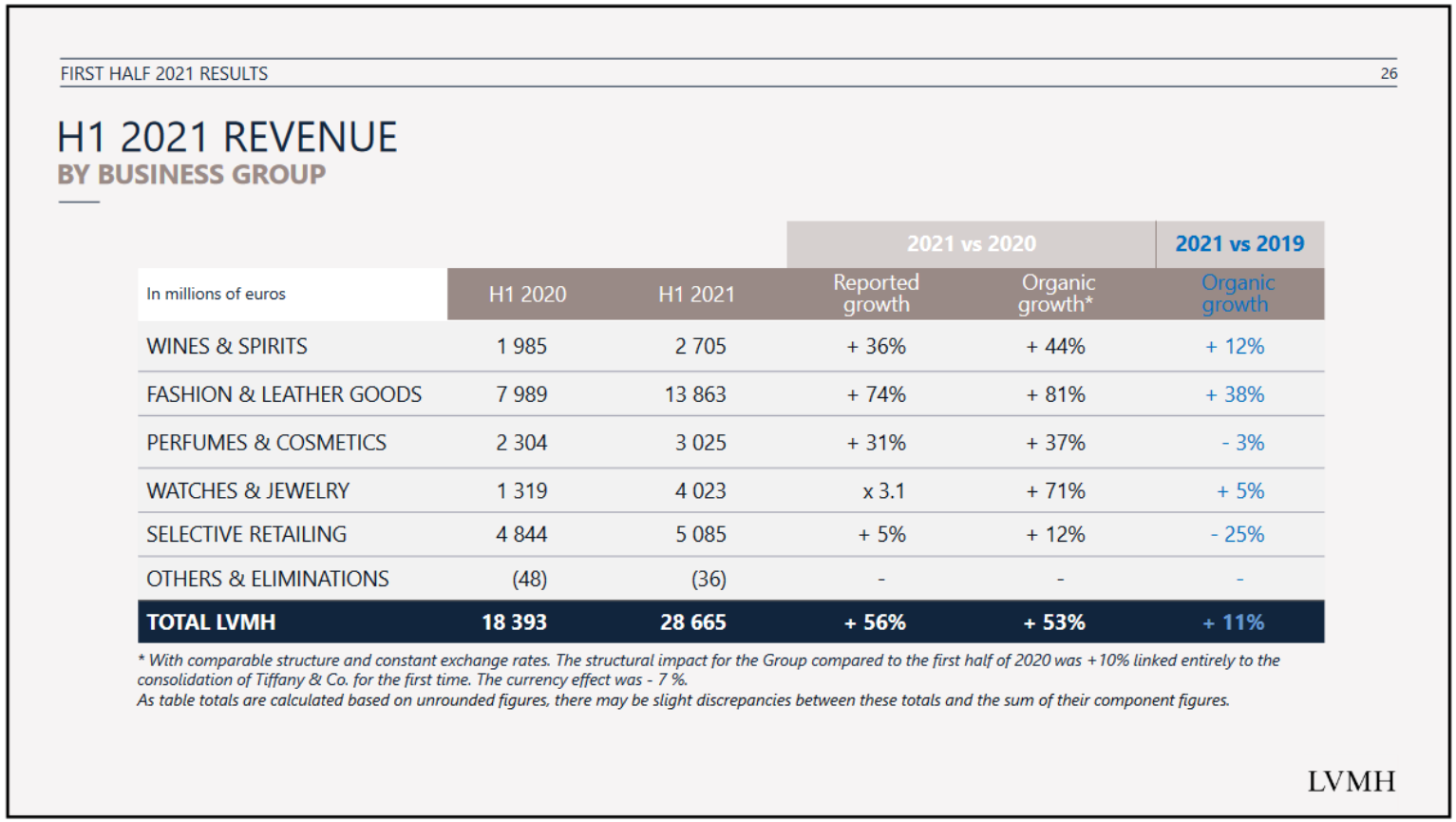
d) Organizational structure measures the difference between current assets and current liabilities

3. This is LVMH's consolidated half-year results. What is LVMH's organizational structure?



FIRST HALF 2021 RESULTS 26

H1 2021 REVENUE
BY BUSINESS GROUP

In millions of euros	H1 2020	H1 2021	2021 vs 2020 Reported growth	2021 vs 2020 Organic growth*	2021 vs 2019 Organic growth
WINES & SPIRITS	1 985	2 705	+ 36%	+ 44%	+ 12%
FASHION & LEATHER GOODS	7 989	13 863	+ 74%	+ 81%	+ 38%
PERFUMES & COSMETICS	2 304	3 025	+ 31%	+ 37%	- 3%
WATCHES & JEWELRY	1 319	4 023	x 3.1	+ 71%	+ 5%
SELECTIVE RETAILING	4 844	5 085	+ 5%	+ 12%	- 25%
OTHERS & ELIMINATIONS	(48)	(36)	-	-	-
TOTAL LVMH	**18 393**	**28 665**	**+ 56%**	**+ 53%**	**+ 11%**

** With comparable structure and constant exchange rates. The structural impact for the Group compared to the first half of 2020 was +10% linked entirely to the consolidation of Tiffany & Co. for the first time. The currency effect was - 7 %.*
As table totals are calculated based on unrounded figures, there may be slight discrepancies between these totals and the sum of their component figures.

LVMH

a) By product

b) By geography

c) By customer

d) By function

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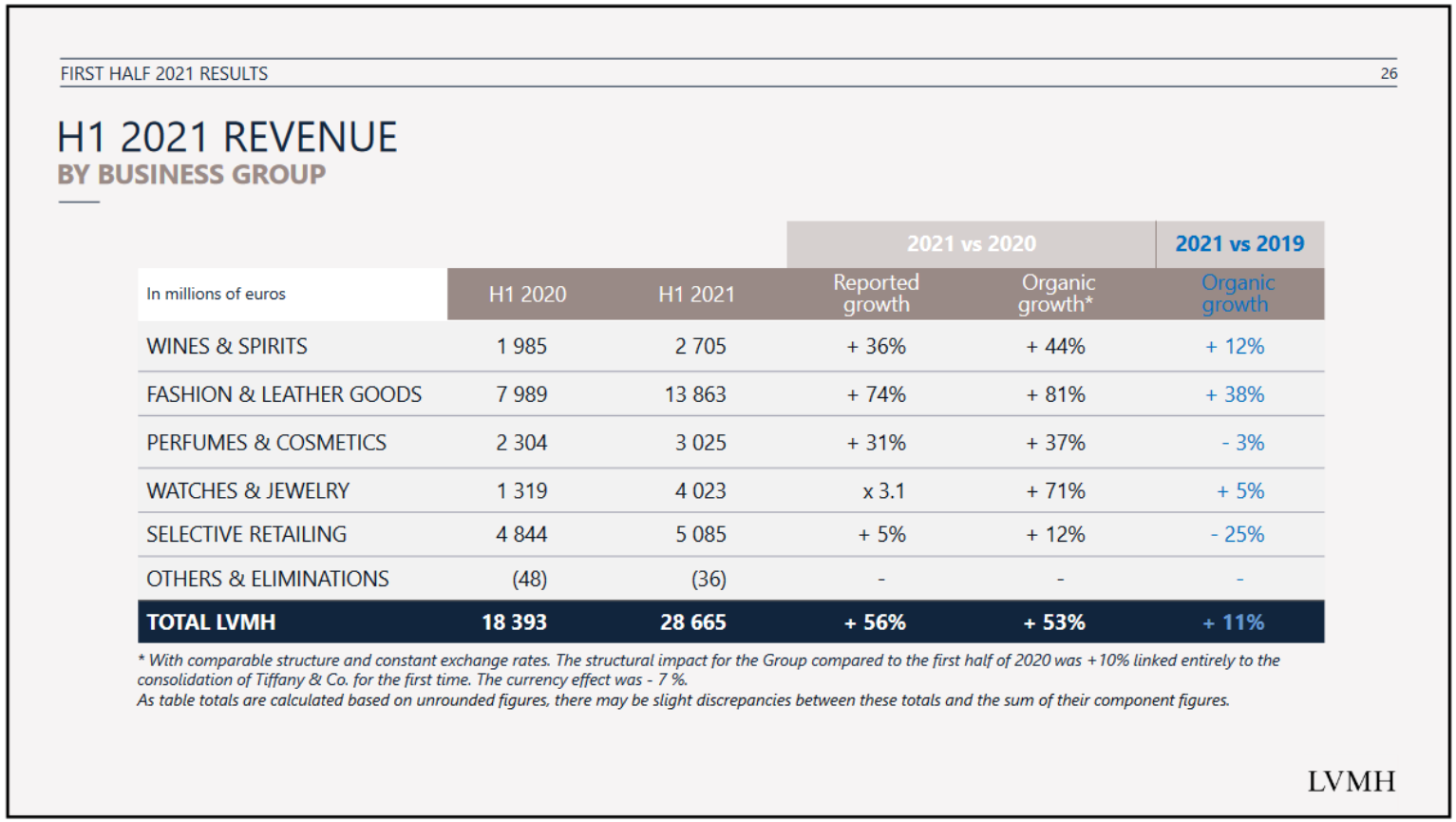

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LVMH

a) By product

b) By geography

c) By customer

d) By function

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4. What is a standard cost?

a) The budgeted cost of production;

b) The expected cost for one unit of activity;

c) The measured cost for one unit of activity;

d) The average cost of producing one unit.

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1. Review questions

2. An overview of variance analysis

3. Analysing variances: an example

4. Exercises

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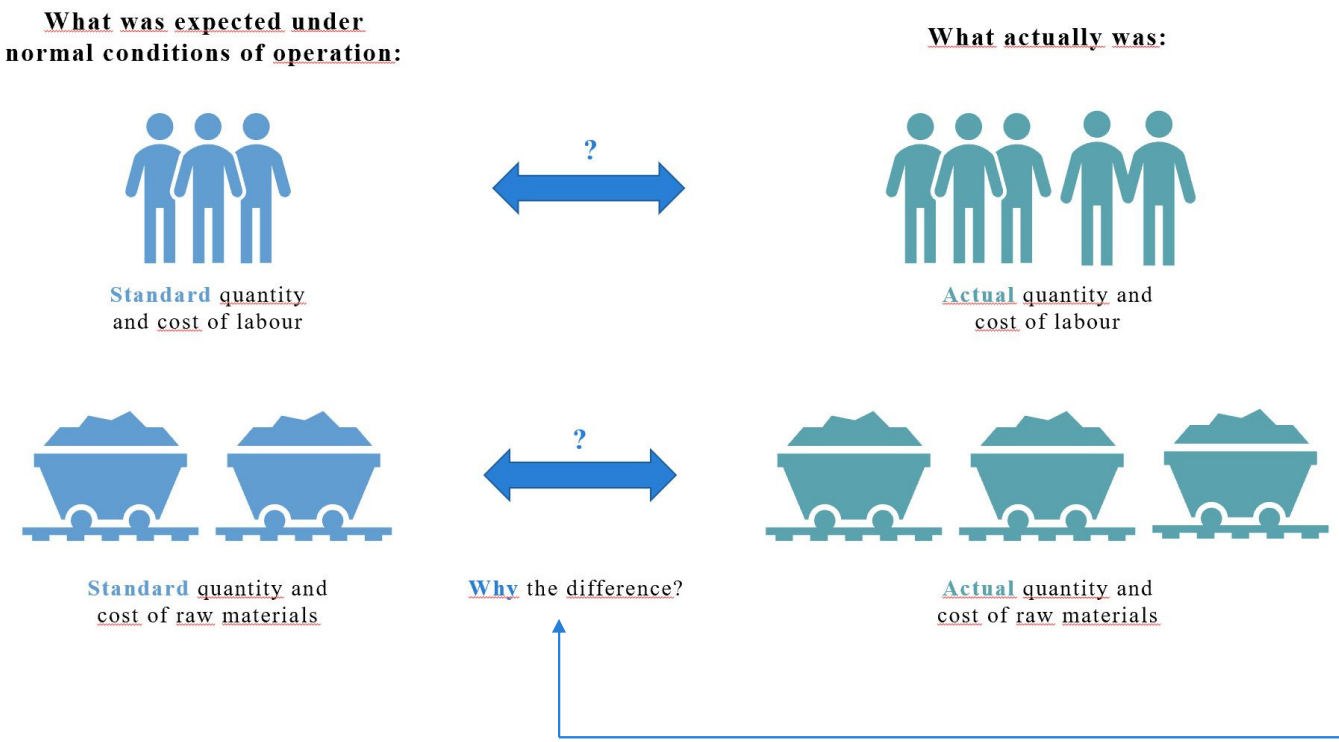
Remember that…

Variance analysis consists in comparing planned (budgeted) and actual results in order to explain the differences.



The idea of variance analysis is

to point out the **deviances from the plan (budget)** and

to **explain what caused them.**

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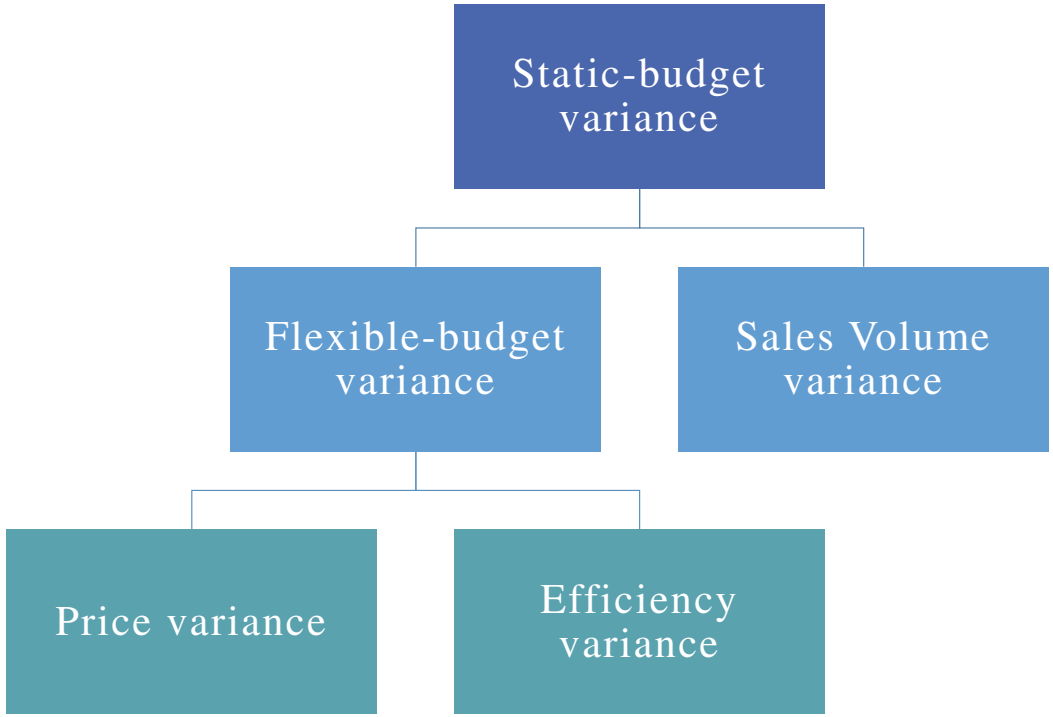
An overview of variance analysis: from global to specific

It is an investigation that starts from **global variances** and increasingly focuses on specific, **micro variances**.



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The Rock n' Roll company

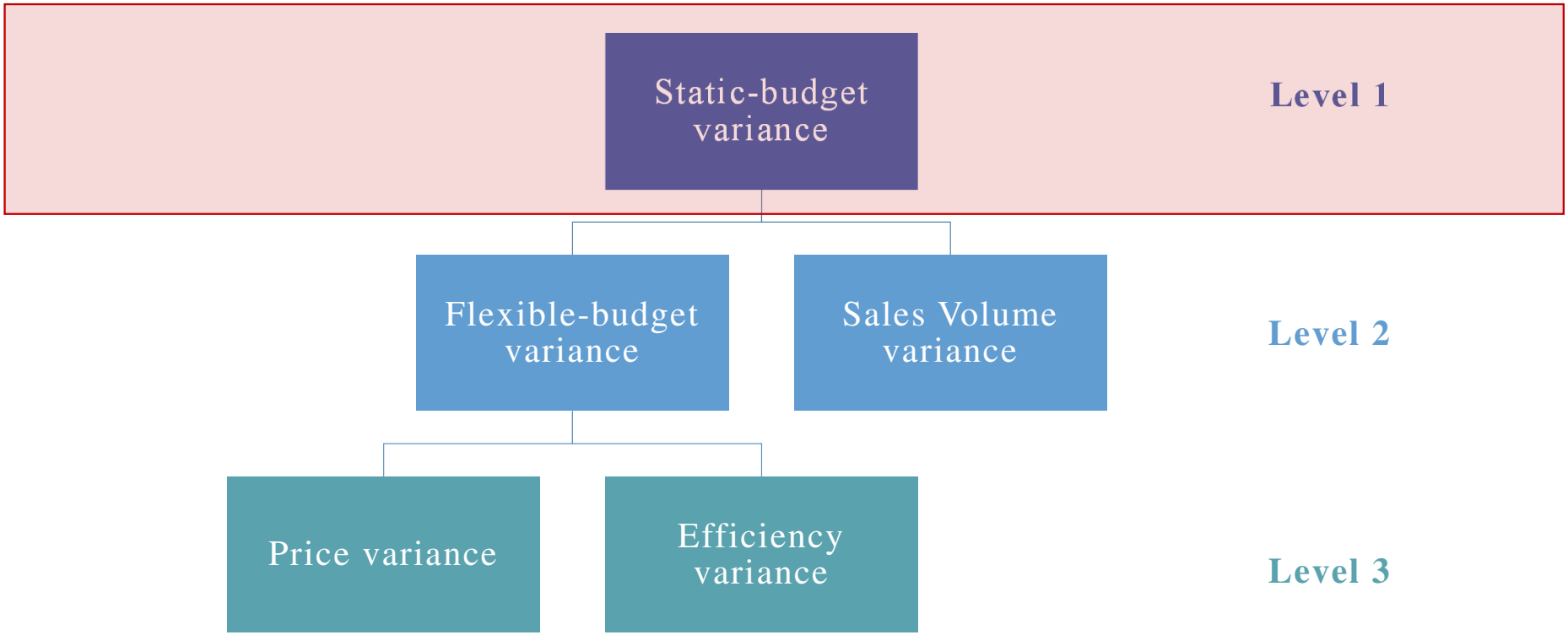
Case « Rock n' Roll », now let's focus on Part 2

- Founded in the 19th century by the inventor of the roller skate.
- Has maintained its leadership position through many innovations.
- In 2021, offers 50 different models of roller skates, both line and quad.
- The case focuses on two products:

The Rocker

The Roller

Level-1 variances



Level 1 analysis: Static-budget variances

« Rock n' Roll » Table 10

« Rock n' Roll » Table 12

Variances are the difference between Actual and Budget

	Actual results (1)	**Static budget (2)**	**Static-budget variances (3) = (1)-(2)**
Units sold	8 850	8 500	350 F
Revenues	3 274 500	3 400 000	125 500 U
Manufacturing variable costs	2 914 216,5	2 584 000	330 217 U
Contribution margin	360 283,5	816 000	455 717 U
Fixed costs	525 411	517 877	7 534 U
Operating profit	- 165 128	298 123	463 251 U

F = Favorable
increases operating profit

U = Unfavorable
decreases operating profit

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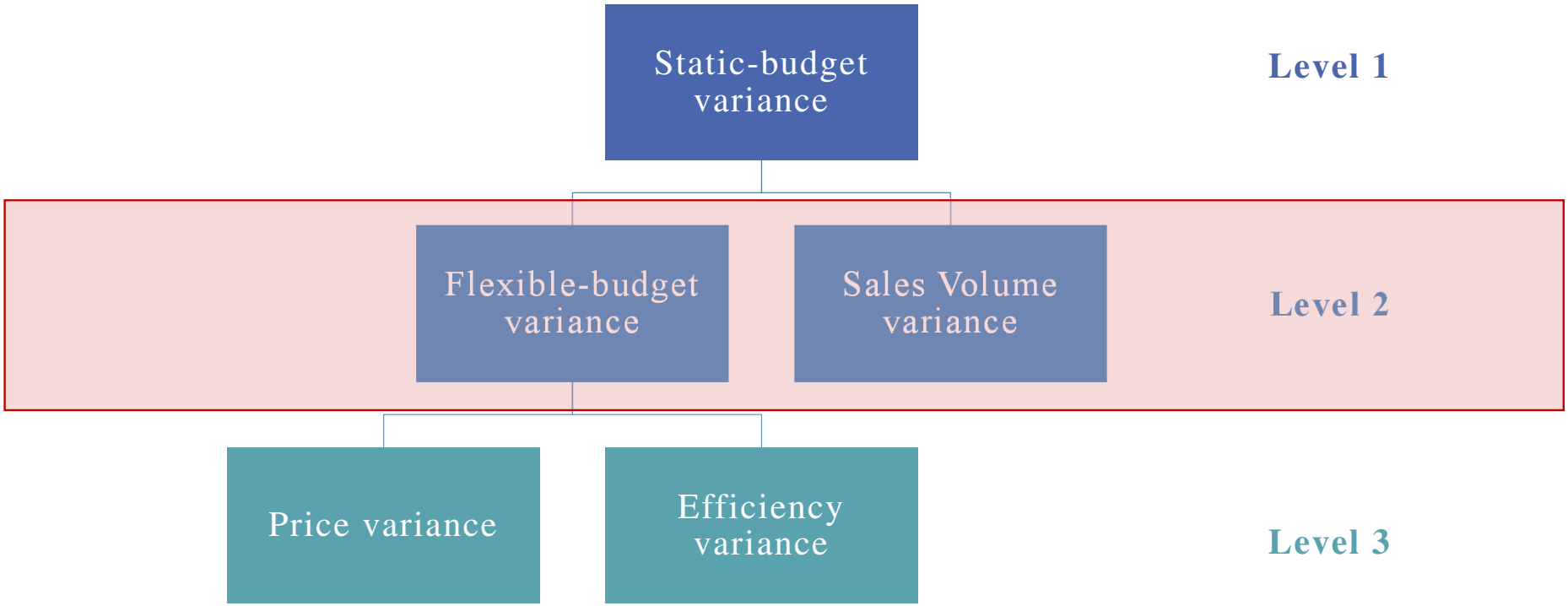
Level-2 variances



Level-2 analysis: the Flexible Budget

The next step is to **isolate the effects of the change in sales volume**.

This is done by calculating a **flexible budget**. The flexible budget is an adjusted budget based on actual levels of output.

Flexible budget revenue = Standard selling price x Actual volume

Flexible budget cost = Standard cost x Actual volume

It uses the **same standard costs/quantities** that were used to prepare the initial static budget.

It multiplies them by the **actual sales volume** (vs the planned ones in the static budget).

The Rocker's flexible budget

Revenues

	Per unit	Volume	Total (€)
Revenues	400	8 850	3 540 000

Standard selling price

« Rock n' Roll » Table 12 and Table 3

Actual sales volume

« Rock n' Roll » Table 10

400 x 8 850

The Rocker's flexible budget

Manufacturing variable costs

	Per unit	Volume	Total (€)
Polyurethane	10 x 7,20 = 72	8 850	637 200

Standard cost per unit

=

Standard quantity of PUR

x

Standard price of PUR

« Rock n' Roll » Table 2

« Rock n' Roll » Table 1

Actual sales volume

72 x 8 850

The Rocker's flexible budget

Manufacturing variable costs

	Per unit	Volume	Total (€)
Polyurethane	10 x 7,20 = 72	8 850	637 200
Steel			?
Labour			?
Overheads:			
Indirect materials			?
Indirect labour			106 200
Power (Var. portion)			?
Maintenance (Var. portion)			17 700
Total manufaturing costs			?

Remember that overheads are allocated based on Direct Labour hours.

The Rocker's flexible budget

Manufacturing variable costs

	Per unit	Volume	Total (€)
Polyurethane	10 x 7,20 = 72	8 850	637 200
Steel	5 x 16 = 80	8 850	708 000
Labour	10 x 12 = 120	8 850	1 062 000
Overheads:			
Indirect materials	1,20 x 10 = 12	8 850	106 200
Indirect labour			106 200
Power (Var. portion)	0,60 x 10 = 6	8 850	53 100
Maintenance (Var. portion)			17 700
Total manufaturing costs			2 690 400

Remember that overheads are allocated based on Direct Labour hours.

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The Rocker's flexible budget

Fixed costs

Fixed costs do not change with the level of activity! They should remain the same as in the static budget.

« Rock n' Roll » Table 12

	Total (€)
Manufacturing fixed overheads	
Depreciation	100 000
Supervision	100 000
Power (fixed portion)	40 000
Maintenance (fixed portion)	45 600
Selling and administration overheads	
Selling	198 614
Administration	33 663
Total fixed costs	517 877

The Rocker's flexible budget

	Per unit	Volume	Total (€)
Revenues	400	8 850	3 540 000
Manufacturing variable costs			
Polyurethane	72		637 200
Steel	80		708 000
Labour	120		1 062 000
Overheads:			
Indirect materials	12		106 200
Indirect labour	12		106 200
Power (Var. portion)	6		53 100
Maintenance (Var. portion)	2		17 700
Total variable costs			2 690 400
Contribution margin			849 600
Fixed costs			
Manufacturing overheads			285 600
Selling costs			198 614
Administration costs			33 663
Total fixed costs			517 877
Operating profit			331 723

Now that we have the flexible budget…

… we can calculate the sales-volume variance.

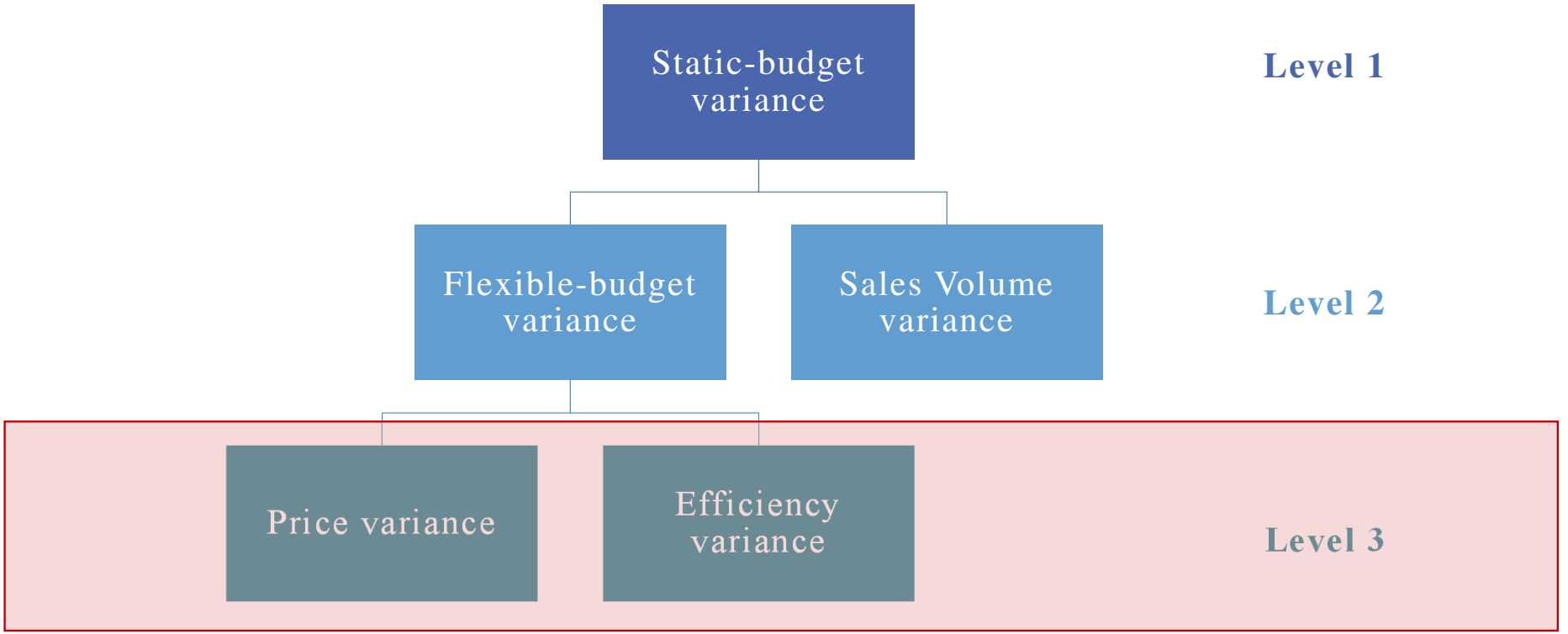
Sales-volume variance = Flexible-budget profit – Static-budget profit

	Actual results	Flexible budget	Static budget
Units sold	8 850	8 850	8 500
Revenues	3 274 500	3 540 000	3 400 000
Manufacturing variable costs	2 914 216,5	2 690 400	2 584 000
Contribution margin	360 283,5	849 600	816 000
Fixed costs	525 411	517 877	517 877
Operating profit	- 165 128	331 723	298 123

Level-3 variances | Sales-volume variances

Total SV variance: 33 600 F

Level-3 variances



Level-3 variances

Revenues

	Actual results	Flexible budget	Static budget
Units sold	8 850	8 850	8 500
Revenues	3 274 500	3 540 000	3 400 000

Selling-price variance

Sales-volume variance
33 600 F

Selling-price variance = (Actual selling price – Standard selling price) x Actual volume

$$\text{Selling price variance} = \left(\frac{3\ 274\ 500}{8\ 850} - 400\right) \times 8\ 850$$

$$= 265\ 500\ \text{U}$$

Level-3 variances

Manufacturing variable costs

Let's look at polyurethane:

Total cost of polyurethane = Standard price x Quantity used

Price variance

Did we pay +/- than we planned?

Efficiency variance

Did we use +/- material than we planned?

Level-3 variances

Manufacturing variable costs

Polyurethane **price variance**:

Price variance = (Actual price – Standard price) x Actual quantity

Polyurethane price variance = $(\frac{680\ 034}{100\ 005}$ - 7,20) x 100 005

= (6,80 – 7,20) x 100 005 = 40 002 F

We paid polyurethane to our suppliers less than we planned in our initial budget, which increases our profit by €40 002.

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Level-3 variances

Manufacturing variable costs

Polyurethane **efficiency variance**:

> **Efficiency variance** = (Actual quantity – Flexible-budget quantity) x Standard price

Polyurethane efficiency variance = (100 005 – (10 x 8 850)) x 7,20

= (100 005 – 88 500) x 7,20 = 82 836 U

« Rock n' Roll » Table 11

We used more polyurethane than we planned in our initial budget, which decreases our profit by €82 836.

Level-3 variances

Manufacturing variable costs

Let's now calculate the Steel **price variance**:

Price variance = (Actual price – Standard price) x Actual quantity

Steel price variance = ?

Level-3 variances

Manufacturing variable costs

Let's now calculate the Steel **price variance**:

Price variance = (Actual price – Standard price) x Actual quantity

Steel price variance = $\left(\frac{657\ 112,5}{39\ 825} - 16\right) \times 39\ 825$

= (16,5 – 16) x 39 825 = 19 912,5

We paid steel to our suppliers more than we planned in our initial budget, which decreases our profit by €19 912,5.

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Level-3 variances

Manufacturing variable costs

Steel **efficiency variance**:

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

Steel efficiency variance = ?

Level-3 variances

Manufacturing variable costs

Steel **efficiency variance**:

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

Steel efficiency variance = (39 825 – (5 x 8 850)) x 16

= (39 825 – 44 250) x 16 = 70 800 F

« Rock n' Roll » Table 11

We used less steel than we planned in our initial budget, which increases our profit by €70 800.

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Level-3 variances

Manufacturing variable costs

Let's now calculate the Labour **price variance** (also called the rate variance):

Rate variance = (Actual rate – Standard rate) x Actual quantity

Labour rate variance = ?

Level-3 variances

Manufacturing variable costs

Let's now calculate the Labour **price variance** (also called the rate variance):

Rate variance = (Actual rate – Standard rate) x Actual quantity

Labour rate variance = $\left(\frac{1\ 265\ 550}{97\ 350} - 12\right) \times 97\ 350$

= (13 – 12) x 97 350 = 97 350 U

We paid our workers more than we planned in our initial budget, which decreases our profit by €97 350.

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Level-3 variances

Manufacturing variable costs

Labour **efficiency variance**:

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

Labour efficiency variance = ?

Level-3 variances

Manufacturing variable costs

Labour **efficiency variance**:

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

Labour efficiency variance = (97 350 – 10 x 8 850) x 12

= (97 350 – 88 500) x 12 = 106 200 U

Our employeed worked more hours than we planned, which decreased our profit by €106 200.

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Level-3 variances

Manufacturing variable costs

So what now? The numbers are only the beginning! Now that we have a better understanding of the financial impact of variances on profit, we need **to know why** these variances occur.

Possible explanations of material and labour variances:

Variance	Favourable	Adverse
Material price	Unforeseen discounts received Greater care in purchasing Change in material standard	Price increase Careless purchasing Change in material standard
Material usage	Material used of higher quality than standard More efficient use of material Errors in allocating material to jobs	Defective material Excessive waste or theft Stricter quality control Errors in allocating material to jobs
Labour rate	Use of workers at a rate of pay lower than standard	Wage rate increase
Labour efficiency	Output produced more quickly than expected because of worker motivation, better quality materials etc Errors in allocating time to jobs	Output lower than standard set because of lack of training, sub-standard materials etc Errors in allocating time to jobs

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Level-3 variances

Manufacturing variable costs

The same applies to manufacturing overheads!

- **Price (expenditure) variance.** Possible causes:
  - Have the overheads increased?
  - Has wastage increased?
  - We need to look at each cost in more details.

- **Efficiency variance.** Possible causes:
  - Since overheads are allocated based on direct labour hours, the possible causes for their variance are similar to those for a labour efficiency variance.

Level-3 variances

Fixed costs

Fixed costs do not change with the level of activity!

	Actual results	Flexible budget	Variances
Manufacturing fixed overheads	285 600	285 600	0
Selling overheads	205 446	198 614	6 832 U
Administration	34 365	33 663	702 F

Variance formulae

For the exams, the variance formulae will be provided.

BUT you need to learn:

- What the variances are at each level.
- How to build a **flexible budget** (these formulae won't be provided)
- How to **interpret** the variances.

1. Review questions
2. An overview of variance analysis
3. Analysing variances: an example

4. Exercise

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Am Stram Gram

The company Am Stram Gram manufactures pipes for the nuclear industry. The following table shows the previsions for October (Column A). By the end of October, it appears that actual results are a bit different than expected (see Column B).

	Budget for October		**Actual results for October**	
		K€		K€
Sales Revenue	100 000 pipes x €300	30 000	120 000 pipes x €290	34 800
Direct materials	100 000 x 2 000kg x €0,05	10 000	120 000 x 2 400kg x €0,06	17 280
Direct labour	100 000 x 1h x €12	1 200	120 000 x 1,3h x €15	2 340
Manufacturing overheads		6 000		7 000
Administrative overheads		2 000		4 000
Profit/(Loss)		10 800		4 180

Source: Cavelius et al. (1st ed.), 2016, Pearson.

Am Stram Gram

Required:

1. Calculate level-1 variances. What do you observe?
2. Prepare level-2 variances:
    a. Prepare the flexible budget
    b. Calculate the sales-volume variance
3. Compute the following level-3 variances:
    a. The selling price variance
    b. The materials variances: Price variance and Efficiency variance
    c. The direct labour variances: Price variance and Efficiency variance.

What could be the possible cause(s) for each variance?

Am Stram Gram: Correction

Question 1. Level-1 variances

	Actual	Budget	Variances	
Sales revenue	34 800	30 000	4 800	FAV
Direct materials	17 280	10 000	7 280	UNFAV
Direct labour	2 340	1 200	1 140	UNFAV
Manufacturing overheads	7 000	6 000	1 000	UNFAV
Administrative overheads	4 000	2 000	2 000	UNFAV
Profit/(Loss)	4 180	10 800	-6 620	UNFAV

We observe that the actual profit is much lower that our previsions, i.e. there is an unfavorable variance. Looking at other variances, we observe that this is due that the fact that although our sales revenue is greater than expected (favorable sales variance), we have unfavorable variances for all our costs. The favorable sales variance cannot compensate for the unfavorable cost variances.

Am Stram Gram: Correction

Question 2. a. Flexible budget

	in k€	
Sales revenue	36 000	Actual sales (120 000) x standard selling price (300)
Direct materials	12 000	Actual sales (120 000) x standard quantity (2 000) and price (0,05) of materials
Direct labour	1 440	Actual sales (120 000) x standard quantity (1h) and price (12) of labour
Manufacturing overheads	6 000	Budgeted overheads
Administrative overheads	2 000	Budgeted overheads
Profit/(Loss)	14 560	

Am Stram Gram: Correction

Question 2. b. Sales-volume variances

Total sales volume variance = 14 560 (flexible budget profit) – 10 800 (static budget profit)

= 3 760 FAV

Detailed variances:

	Budget	Flexible budget	Volume Variances	
Sales revenue	30000	36000	6000	FAV
Direct materials	10000	12000	2000	UNFAV
Direct labour	1200	1440	240	UNFAV
Manufacturing overheads	6000	6000	0	
Administrative overheads	2000	2000	0	
Profit/(Loss)	10800	14560	3760	FAV

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Am Stram Gram: Correction

Question 3. Level-3 variances

	Flexible budget	Actual	Variances		
Sales revenue	36 000	34 800	*Total variance*	*-1 200*	*FAV*
			Selling price variance	1 200	UNFAV
Direct materials	12 000	17 280	*Total variance*	*5 280*	*UNFAV*
			Efficiency variance	2 400	UNFAV
			Price variance	2 880	UNFAV
Direct labour	1 440	2 340	*Total variance*	*900*	*UNFAV*
			Efficiency variance	432	UNFAV
			Price variance	468	UNFAV
Manufacturing overheads	6 000	7 000	Variance	1 000	UNFAV
Administrative overheads	2 000	4 000	Variance	2 000	UNFAV

Am Stram Gram: Correction

Question 3. Level-3 variances

Selling-price variance = (Actual selling price – Budgeted selling price) x Actual volume

= (290 – 300) x 120 000

= 1 200 UNFAV

Am Stram Gram: Correction

Question 3. Level-3 variances

Direct materials:

Price variance = (Actual price – Standard price) x Actual quantity

= (0,06 – 0,05) x 120 000 x 2 400

= 2 880 UNFAV

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

= (2 400 x 120 000 – 2 000 x 120 000) x 0,05

= 2 400 UNFAV

Am Stram Gram: Correction

Question 3. Level-3 variances

Direct labour:

Price variance = (Actual price – Standard price) x Actual quantity

= (15 – 12) x 120 000 x 1

= 468 UNFAV

Efficiency variance = (Actual quantity – Flexible-budget quantity) x Standard price

= (1,3 x 120 000 – 1 x 120 000) x 12

= 432 UNFAV

Am Stram Gram: Correction

Question 3. Level-3 variances

Possible causes:

Variance	Favourable	Adverse
Material price	Unforeseen discounts received Greater care in purchasing Change in material standard	Price increase Careless purchasing Change in material standard
Material usage	Material used of higher quality than standard More efficient use of material Errors in allocating material to jobs	Defective material Excessive waste or theft Stricter quality control Errors in allocating material to jobs
Labour rate	Use of workers at a rate of pay lower than standard	Wage rate increase
Labour efficiency	Output produced more quickly than expected because of worker motivation, better quality materials etc Errors in allocating time to jobs	Output lower than standard set because of lack of training, sub-standard materials etc Errors in allocating time to jobs

Homeworks

For next session (Session 4), you need to do:

To assimilate what we discussed in Session 3:

- Review the slides

To prepare for Session 4:

- Group work: complete the case « Konnected ».
  - Groups of 4 or 5 students (no more than 5)
  - Both parts of the case have to be completed before Session 4
  - **Send your work to your teacher before Session 4.**

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