Standard Costs and Variances

Learning Objectives

- Explain standard costs and how they are set
- Compute the direct materials price and quantity variances and explain their significance
- Compute the direct labor rate and efficiency variances and explain their significance
- Compute the variable overhead rate and efficiency variances and explain their significance
- Compute and interpret budget and volume variances
- Understand the advantages of and the potential problems with using standard costs
- Understand how a balanced scorecard supports strategy

Standard Costs

- Standard costs are benchmarks or norms used for accounting and/or measuring performance.
- They are the same as budgets, except that standard costs are a unit concept.
- Like budgets, standard costs are used for planning and control.
- The planning stage involves developing a standard cost (card) for each product or service.
- Control involves comparing actual with standard costs and investigating the differences (variances).

Setting Standard Costs

- Since the cost of a product/service is affected by quantity and price of materials, labor and overhead, managers have to set both quantity and cost standards for these cost elements.
  - Quantity standards indicate how much of a cost element should be used.
  - Cost standards indicate what the cost should be.
- Like budgets, standards usually allow for normal inefficiencies – they are practical.

Standard Cost Card – An Example

A standard cost card for one unit of product might look like this:

Inputs	A Standard Quantity or Hours	B Standard Price or Rate	A x B Standard Cost per Unit
Direct materials	3.0 lbs.	$ 4.00 per lb.	$ 12.00
Direct labor	2.5 hours	14.00 per hour	35.00
Variable mfg. overhead	2.5 hours	3.00 per hour	7.50
Total standard unit cost			$ 54.50

Using Standards in Flexible Budgets

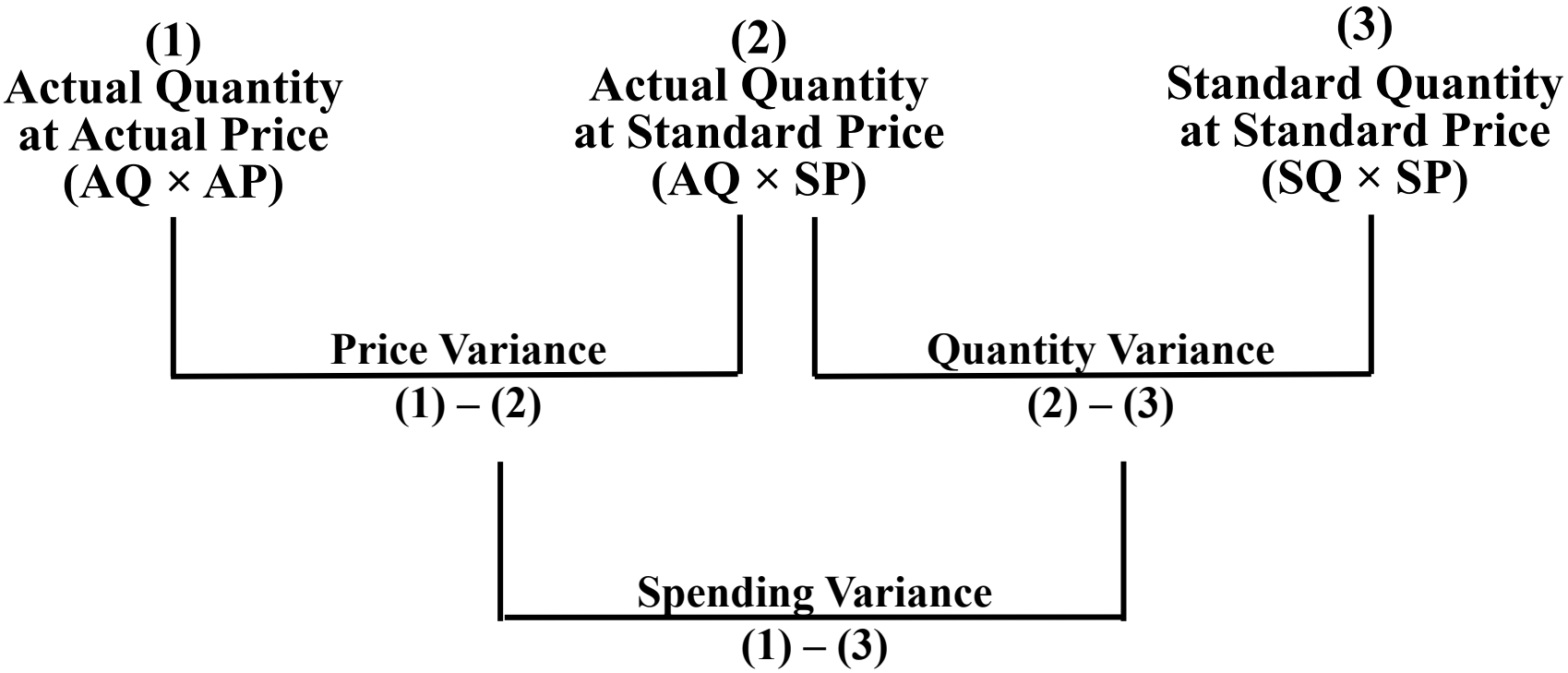
Standard costs per unit for direct materials, direct labor, and variable manufacturing overhead can be used to compute **activity** and **spending** variances.

Spending variances become more useful by breaking them down into price and quantity variances.

Standard Cost Variances

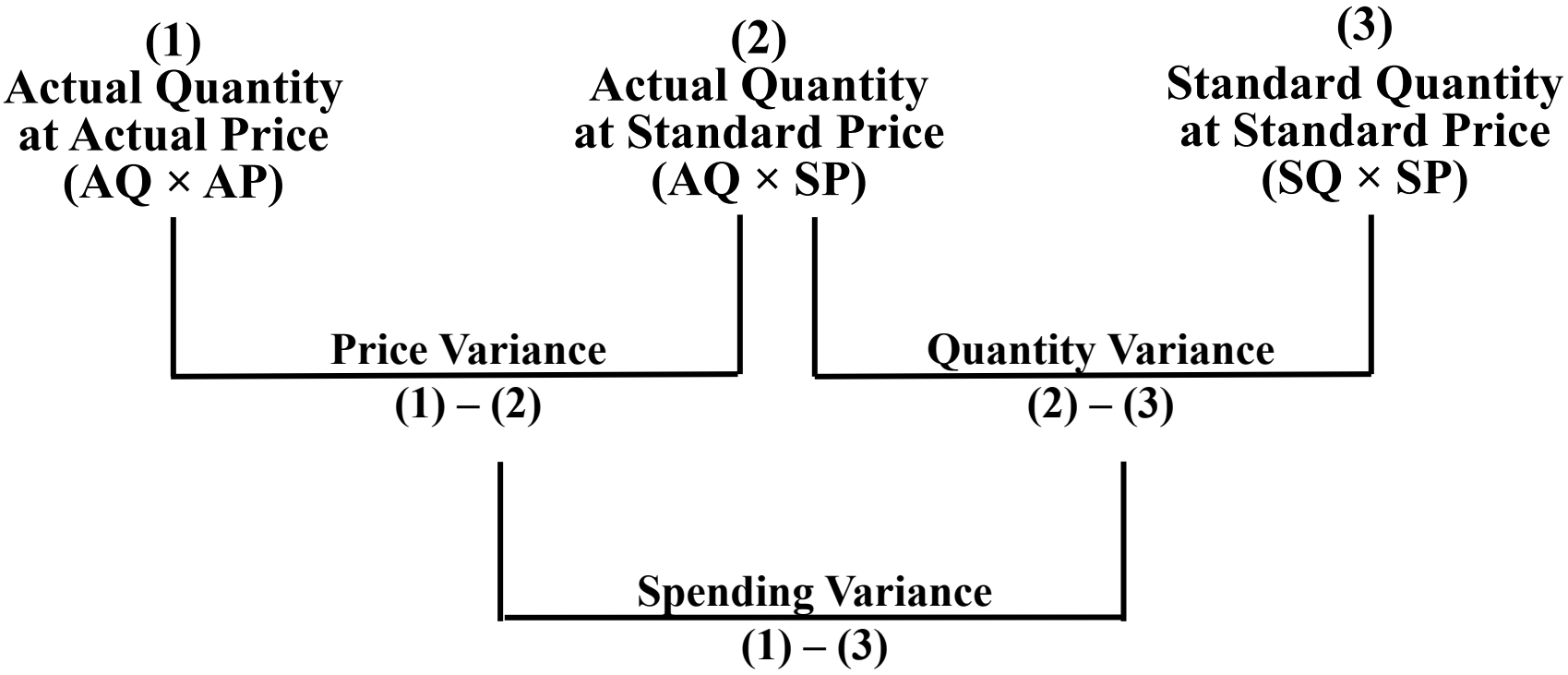
- A (standard cost) variance is the amount by which an actual cost differs from the standard cost.
- Two types of spending variances are normally computed and investigated: quantity and price
  - the cost of a product/service is affected by quantity and price of materials, labor and overhead
  - quantity and price variances are normally the responsibility of two different managers

A General Model for Variance Analysis



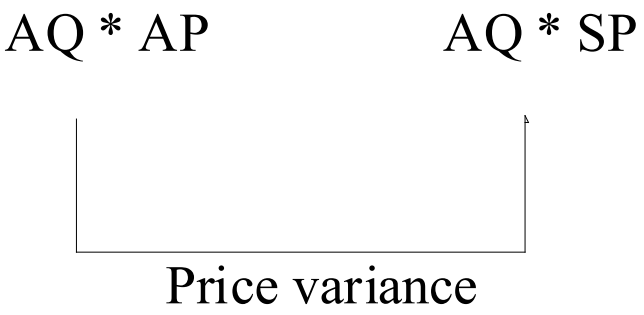
AQ x SP is the flexible budget at the actual input level.
SQ x SP is the flexible budget at the actual output level.
SQ is the standard quantity of input allowed for actual output.

A General Model for Variance Analysis



AQ (AP - SP)	SP (AQ - SQ)
AQ = Actual Quantity	SP = Standard Price
AP = Actual Price	SQ = Standard Quantity

Exception to the General Framework for Direct Materials



Caculated when purchased
AQ is the quantity purchased

Caculated periodically
AQ is the quantity used

Material Variances Example

- Hanson Inc. has the following direct material standard to manufacture one Zippy:

  1.5 pounds per Zippy at $4.00 per pound

- Last week 1,700 pounds of material were purchased and used to make 1,000 Zippies. The material cost a total of $6,630.

Material Variances Example

AQ x AP	AQ x SP	SQ × SP
1,700 lbs.	1,700 lbs.	1,500 lbs.
×	×	×
$3.90 per lb.	$4.00 per lb.	$4.00 per lb.
= $6,630	= $ 6,800	= $6,000

Price variance
$170 favorable

Quantity variance
$800 unfavorable

Material Variances

Hanson purchased and used 1,700 pounds.

How are the variances computed if the amount purchased differs from the amount used?

The price variance is computed on the entire quantity purchased.

The quantity variance is computed only on the quantity used.

Material Variances Example

- Hanson Inc. has the following material standard to manufacture one Zippy:

  1.5 pounds per Zippy at $4.00 per pound

- Last week 2,800 pounds of material were purchased at a total cost of $10,920, and 1,700 pounds were used to make 1,000 Zippies.

Material Variances Example

AQ x AP	AQ x SP
2,800 lbs.	2,800 lbs.
×	×
$3.90 per lb.	$4.00 per lb.
= $10,920	= $11,200

Price variance
$280 favorable

Price variance increased because quantity purchased increased.

Material Variances Example

AQ x SP	SQ x SP
1,700 lbs.	1,500 lbs.
×	×
$4.00 per lb.	$4.00 per lb.
= $6,800	= $6,000

Quantity variance is unchanged because actual and standard quantities are unchanged.

Quantity variance
$800 unfavorable

DM Price Variance – Possible Reasons

- Quality of material
- Quantity discount
- Unexpected change in price (based on demand for and supply of material)
- Negotiation
- Mode of transportation
- Change of vendors

DM Quantity Variance – Possible Reasons

- Quality of material
- Skill of labor
- Condition of equipment
- Employee morale
- Supervision

Labor Variances Example

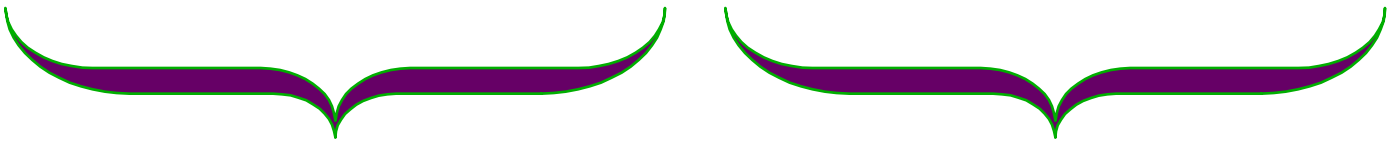
- Hanson Inc. has the following direct labor standard to manufacture one Zippy:

  1.5 standard hours per Zippy at $6.00 per direct labor hour

- Last week 1,550 direct labor hours were worked at a total labor cost of $9,610 to make 1,000 Zippies.

Labor Variances Example

AQ x AP (AH x AR)	AQ x SP (AH x SR)	SQ x SP (SH x SR)
1,550 hours	1,550 hours	1,500 hours
×	×	×
$6.20 per hour	$6.00 per hour	$6.00 per hour
= $9,610	= $9,300	= $9,000



Rate variance
$310 unfavorable

Efficiency variance
$300 unfavorable

Labor Rate Variance – Possible Reasons

- Unexpected rate change
- Composition of labor

Labor Efficiency Variance – Possible Reasons

- Quality of material
- Skill of labor
- Condition of equipment
- Employee morale
- Supervision
- Productivity change

Variable Manufacturing Overhead Variances Example

- Hanson Inc. has the following variable manufacturing overhead standard to manufacture one Zippy:

  1.5 standard hours per Zippy at $3.00 per direct labor hour

- Last week 1,550 hours were worked to make 1,000 Zippies, and $5,115 was spent for variable manufacturing overhead.

Variable Manufacturing Overhead Variances Example

AQ x AP (AH x AR)	AQ x SP (AH × SR)	SQ × SP (SH × SR)
1,550 hours × $3.30 per hour	1,550 hours × $3.00 per hour	1,500 hours × $3.00 per hour
= $5,115	= $4,650	= $4,500

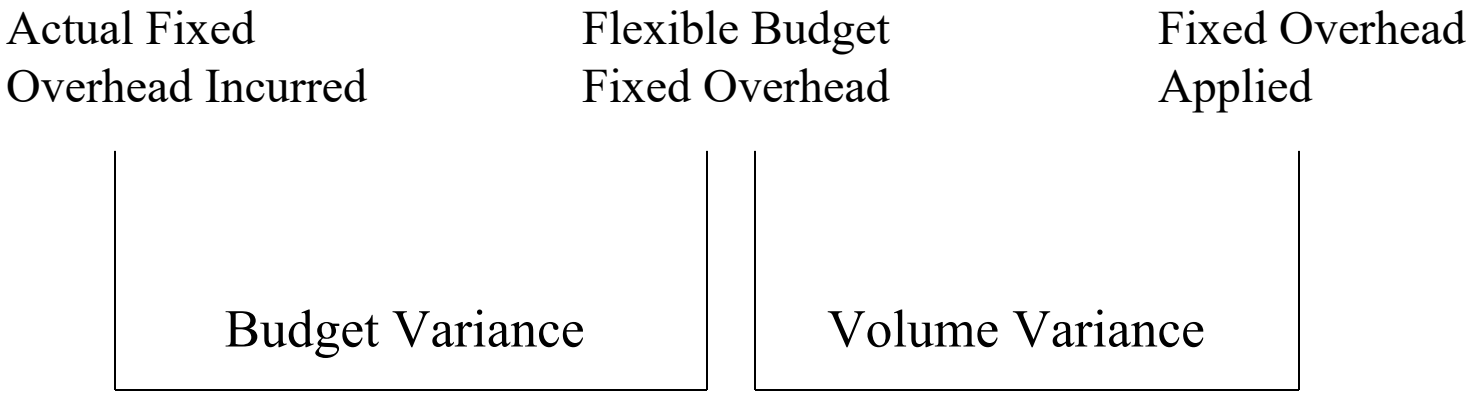
Rate variance
$465 unfavorable

Efficiency variance
$150 unfavorable

Variable Overhead Variances

- Rate variance results from price and usage variances.
  - Recall that rate variance is AA - AS.
  - AA is affected by both price and usage.
- Efficiency variance is a function of the selected cost driver. It measures the efficiency/inefficiency in the use of the overhead basis (e.g., machine hours), and not of the overhead.
- Many companies analyze only rate variance.

Fixed Overhead Variances



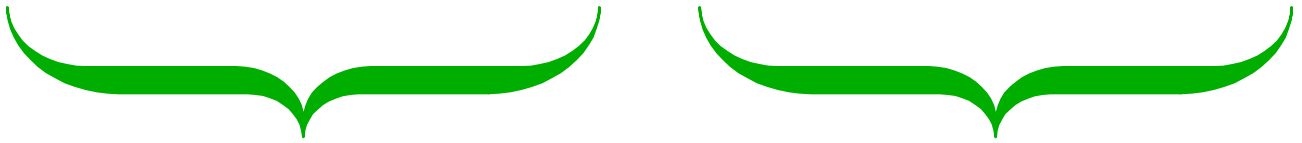
Fixed overhead applied = (Standard quantity, e.g., LH, allowed for the output of the period) * (Predetermined overhead rate)

Fixed Overhead Variances Example

- Cola Company's actual production required 3,200 standard machine hours. The predetermined fixed overhead rate was $3 per machine hour. Budgeted fixed overhead was $9,000. Actual fixed overhead was $8,450.

Fixed Overhead Variances Example

Actual Fixed Overhead Incurred	Budgeted Fixed Overhead	Fixed Overhead Applied
		SH × FR
		3,200 hours
		×
		$3.00 per hour
$8,450	$9,000	$9,600



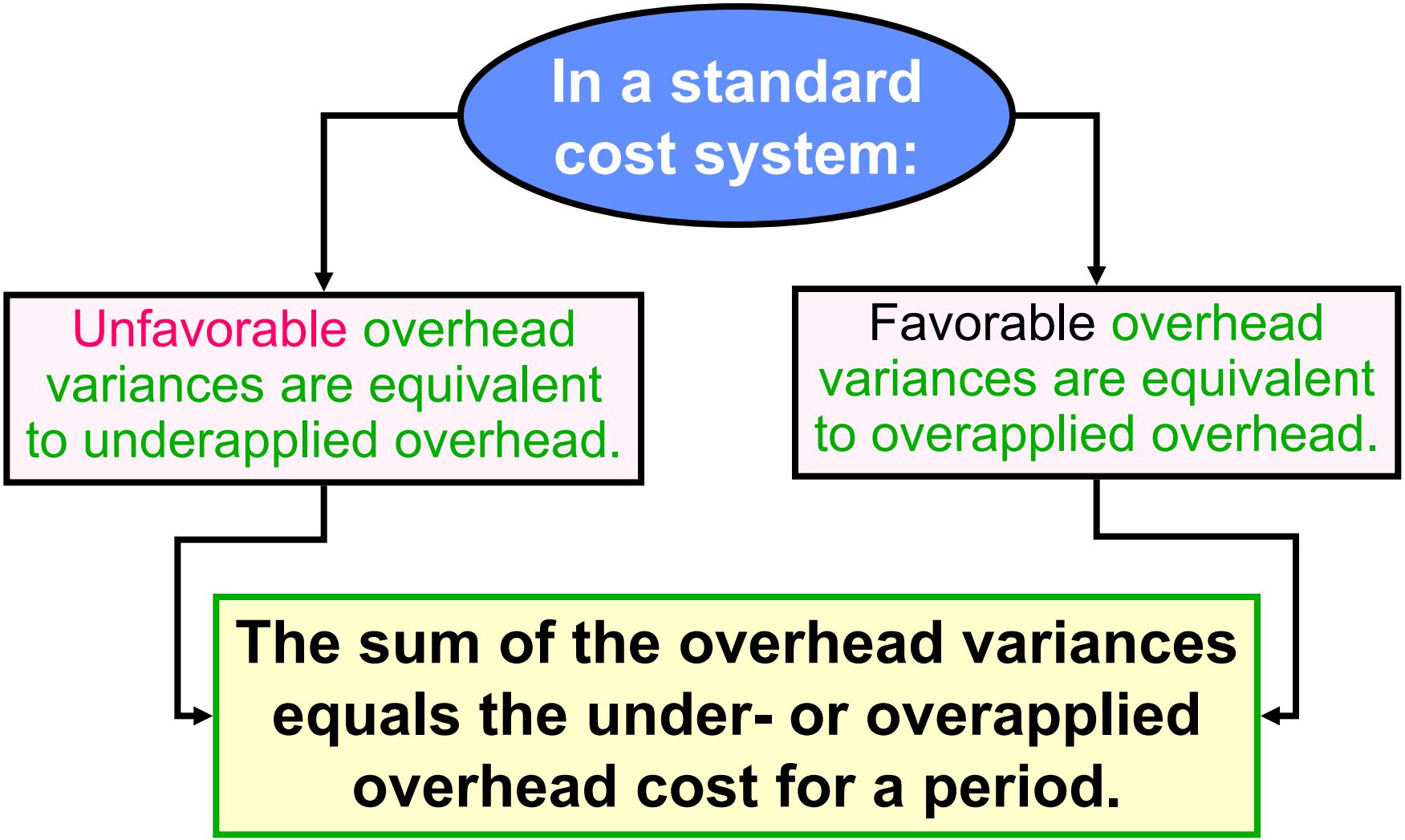
Budget variance
$550 favorable

Volume variance
$600 favorable

Fixed Overhead Variances

- Budget variance results from paying more or less than expected for fixed overhead items.
  - This is normally small and non-controllable (e.g., unexpected changes in property taxes or insurance).
- Volume variance results from operating at an activity level different from that planned for the period, i.e., over- or under-utilization of facilities.
  - This has no significance for cost control.

Overhead Variances and Under- or Overapplied Overhead Cost



Criteria for Variance Investigation

- Significance ($, in % or in statistical term) – investigate significant variances
- Persistence – investigate a variance that is continuously favorable or unfavorable
- The nature of the item – always investigate the variance for cost items that affect future profitability , e.g., labor efficiency variance
- Non-controllability – do not investigate the variance for cost items that are non-controllable

Disposition of Variances

- If the net variance is insignificant, close variances to cost of goods sold (CGS).
- If the net variance is significant, then:
  - Prorate the material price variance among direct materials, work-in-process (WIP), finished-goods (FG) inventory, and CGS, based on their ending balances.
  - Prorate all other variances among WIP, FG inventory, and CGS, based on their ending balances.

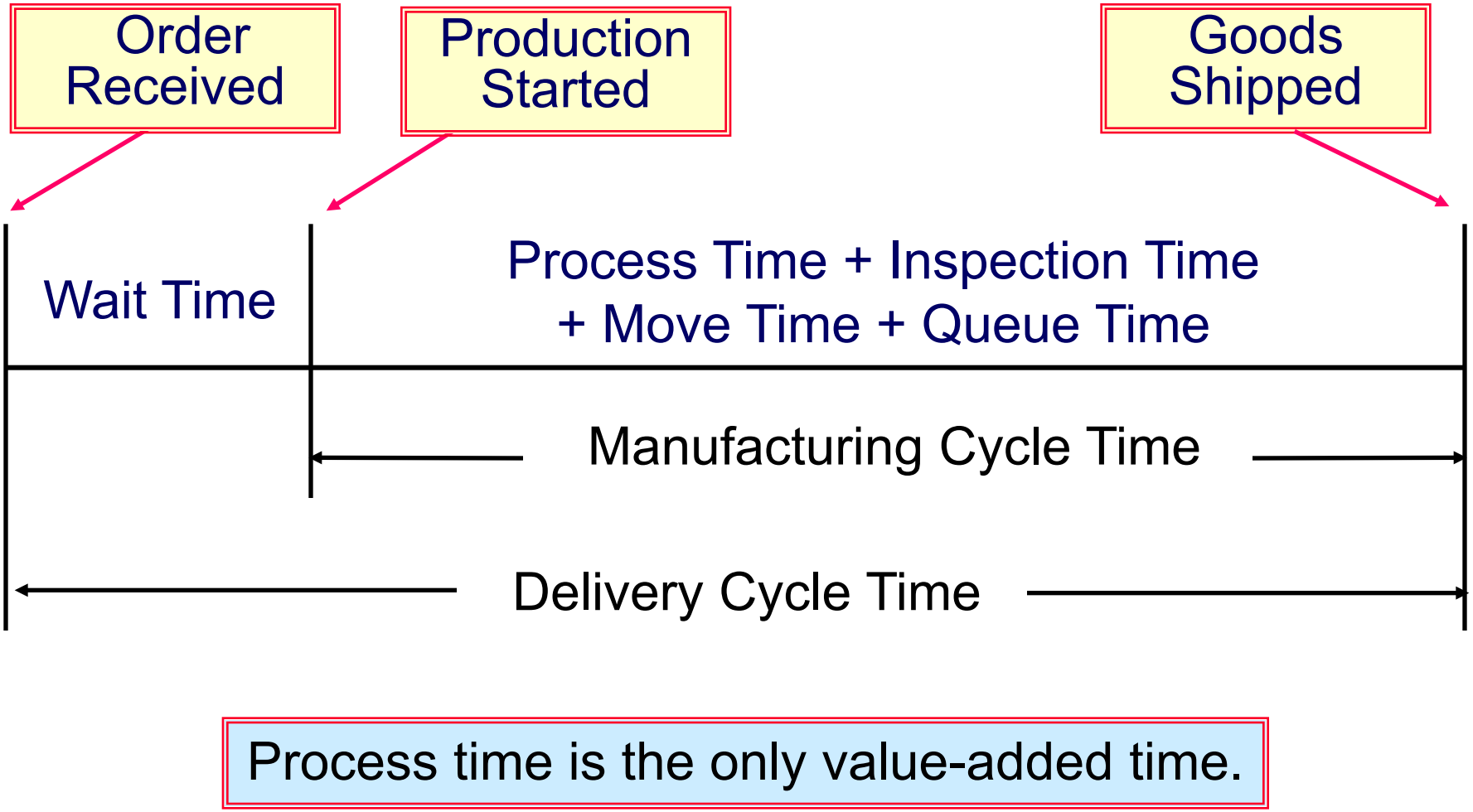
Advantages/Disadvantages of Standard Costing

- Standard costing makes the concept of management by exception possible.
- It facilitates cash and inventory planning.
- If standards are set practically, standard costing promotes economy and efficiency, i.e., it is a source of motivation.
- Standard costing can assist in implementing responsibility accounting.
- By focusing on material variances, trends may not be noticed at an early stage.
- Improper use of standard costs (e.g., emphasis on negative) can lead to behavioral problems.
- Emphasis on meeting standards could result in problems.

Operating Performance Measures

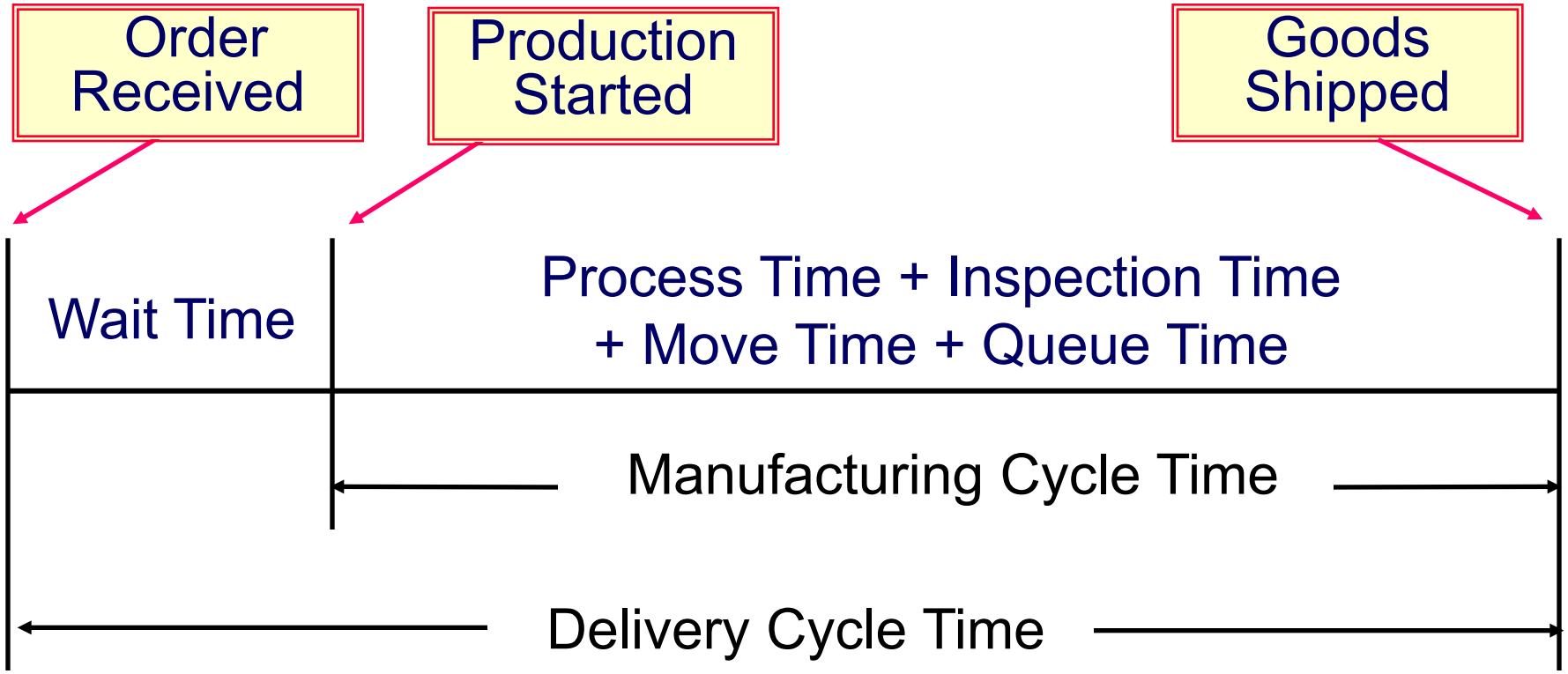
- Managers use several operating performance measures to supplement or replace standard costs. These measures include:
  - quality control, e.g., percentage defects
  - material control, e.g., lead time, scrap loss
  - inventory control, e.g., turnover
  - machine performance, e.g., percentage of downtime
  - delivery performance, e.g., percentage of on-time deliveries, manufacturing cycle efficiency

Delivery Performance Measures



Process time is the only value-added time.

Delivery Performance Measures



$$\text{Manufacturing Cycle Efficiency} = \frac{\text{Value-added time}}{\text{Manufacturing cycle time}}$$