

Identities and Equations in Macroeconomics

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Identity - Definition

- Identities are mathematical statements or equations that are true in definitional form. It represents an equality between functions that are differently defined.
- When an equation is satisfied for all values of variable forming the expressions, it is termed as an identity. Thus it is a special case of an equation. In other words all identities are equations but not all equations are identities.
- Identities are also called ‘accounting relationship’ and represented with ‘triple bar’ (\equiv).

Equations - Definition

- Equations are mathematical statements that emphasises the equality between two mathematical expressions. An equation is true only for particular values of the variables in the equation.
- Unlike identities, variables cannot take any values to keep the equation true. The values of these variables are found out by solving the equation.
- Equations are also called ‘behavioural relationships’ and it relates two expressions by an equality sign (=).

Identity - Example

- Consider the simple macroeconomic model: $Y = C + I + G + (X-M)$
- This model becomes a true representation of the economy because of its definitional correctness. As such it is also called as the national income identity and is represented as:

$$Y \equiv C + I + G + (X-M)$$

- The true numerical values of the variables in the right hand side of the identity may or may not be equal to the left hand side of the equation in a numerical sense and there can be small discrepancies. But definitionally the right hand side is equal to the left hand side and hence called as identity.

Equation - Example

- Consider the following equations:

$$\rightarrow 28 = 2z + 10$$

Here the equation is true only for a particular value of z (ie, $z = 9$).

$$\rightarrow C = C_0 + bY$$

Where, C is the magnitude of consumption spending, C_0 is the autonomous consumption spending corresponding to a zero level of income, b is the consumption-income ratio and Y is the level of income. This equation is based on the empirical observation of the consumption behaviour.

Suggested Readings:

1. Diwedi DN: Macroeconomics Theory and Policy|| Tata McGraw-Hill
2. Edward Shapiro: Macroeconomics - Oxford University press.
3. Gregory Mankiw: Macroeconomics – 6th Edn. Tata McGraw Hill.
4. www.soas.ac.uk/cedep-demos/000_P542_EP_K3736-Demo/unit1/page_25.htm