Determinants of Surplus Value

Assumptions:

1. P = value (P proportional to value if value measured in labor hours)
2. Value of LP taken as given
3. No means of production are used

V_{LP} = 5 hours

Value created by a worker in a day = L_D

Suppose L_D = 10 hours

Then $S_D = L_D - V_{LP}$ = 10 hrs – 5 hrs = 5 hrs

Determinants of Surplus Value

Conclusion: The capitalist gets surplus value because the value created by a day's labor is greater than the value of a day's labor power.

Division of the Workday

Necessary labor (L_n): The part of the workday required to create an amount of value equal to the value of a day's labor power. [Alternatively: labor required to create value equal to the value of a day's labor power.]

Surplus labor (L_S): The part of the workday in excess of the necessary labor.

Determinants of Surplus Value

Rate of Exploitation (e)

$$e = L_s/L_n$$

What is wrong with the following: “Necessary labor is the hours required by a worker to produce her/his own subsistence.”

Capitalism has division of labor and specialization – one worker does not produce her/his own subsistence basket of goods.

Hence, it is necessary to use the value category to define the necessary labor time.

Determinants of Surplus Value

Assume a worker consumes a set of n commodities.

Define λ_i = value per unit of commodity i.

Define b_i = number of units of commodity i consumed per worker per day to reproduce labor power.

That is, $\{b_1, ..., b_n\}$ is the worker's consumption basket per day (or "living standard" or "real wage.")

Given above definitions, the value of labor power (V_{LP}) can be expressed as

$$V_{LP} = \Sigma \lambda_i b_i$$

Determinants of Surplus Value (con't.)

Therefore, surplus value per worker per day is

$$S_D = L_D - V_{LP} = L_D - \Sigma\lambda_i b_i$$

Thus, S_D depends on three variables:

1) the length of the workday, L_D
2) workers' living standard, $\{b_i\}$
3) the productivity of labor in the production of wage goods, which is the inverse of $\{\lambda_i\}$

Determinants of Surplus Value (con't.)

Thus, S_D is greater than zero as a result of the relation among the above three variables. One can think of S_D being positive as a result of any of the following:

1) L_D is long relative to $V_{LP.}$
2) Living standard of workers is low relative to the length of the workday and the productivity of labor
3) Productivity of labor in wage goods production is high relative to workers' living standard and the length of the workday.

Determinants of Surplus Value (con't.)

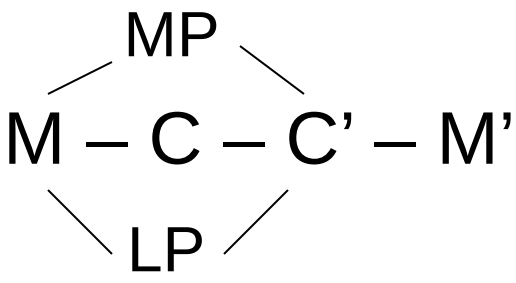
What are the determinants of the determinants of S_D?

1) Length of the workday
power, custom

2) Workers' living standard
power, technology, biology, nature, custom

3) Productivity of labor in wage goods industries
technology, power, nature

Origin of S with Means of Production Used



Origin of S with Means of Production Used (cont)

Value of MP is transferred to final product.

Two types of capital:

1) Circulating capital: capital invested in CDs that disappear as the final CD is produced or become part of the final CD.
   Examples: energy, materials

2) Fixed capital: capital invested in CDs that retain their physical form during production.
   Examples: machines, tools, structures

Example with Means of Production Used (cont)

Suppose producing 1 ton of steel requires

1) 10 hours direct labor time
2) 1.5 tons pig iron
3) 1 furnace-day
4) 100 pounds of coal
5) 1 overhead crane-day

The value of 2 through 5 are transferred to the ton of steel – they add “embodied” or “dead” or “indirect” labor.

Suppose indirect labor = 20 hours.

Value 1 ton steel = 20 hrs + 10 hrs = 30 hrs

Determination of the Values of Commodities

Assume

1. Economy has n commodities.
2. Input-output coefficients are independent of the scale of production.

Define

λ_j = value per unit of commodity j.

a_{ij} = quantity of commodity i required to produce one unit of commodity j.

L_j = quantity of direct labor required to produce one unit of commodity j.

Determination of the Values of Commodities (con't.)

λ_j = value per unit of commodity j.
a_{ij} = quantity of commodity i required to produce one unit of commodity j.
L_j = quantity of direct labor required to produce one unit of commodity j.

Then the value of one unit of CD j is

$$\lambda_j = \Sigma_i \lambda_i a_{ij} + L_j$$

Thus, we have a set of n linear equations in n unknowns, which can be solved for the values of the n commodities, λ_j, in terms of the physical input-out coefficients, a_{ij}, and the direct labor requirements, L_j.

The Production of Surplus Value with MP in Use

Example of production of 1 ton of steel measuring value in money units.

Assume:

1. 1 hour of labor creates $10 of value.
2. Requires 5 hours of labor to reproduce a day's labor-power.
   Then value of 1 day's LP = $50.
3. Value of MP used up to produce 1 ton of steel is $200 (20 hours indirect labor)
4. One 10-hour day's direct labor is required to produce 1 ton of steel.

The Production of Surplus Value with MP in Use (con't.)

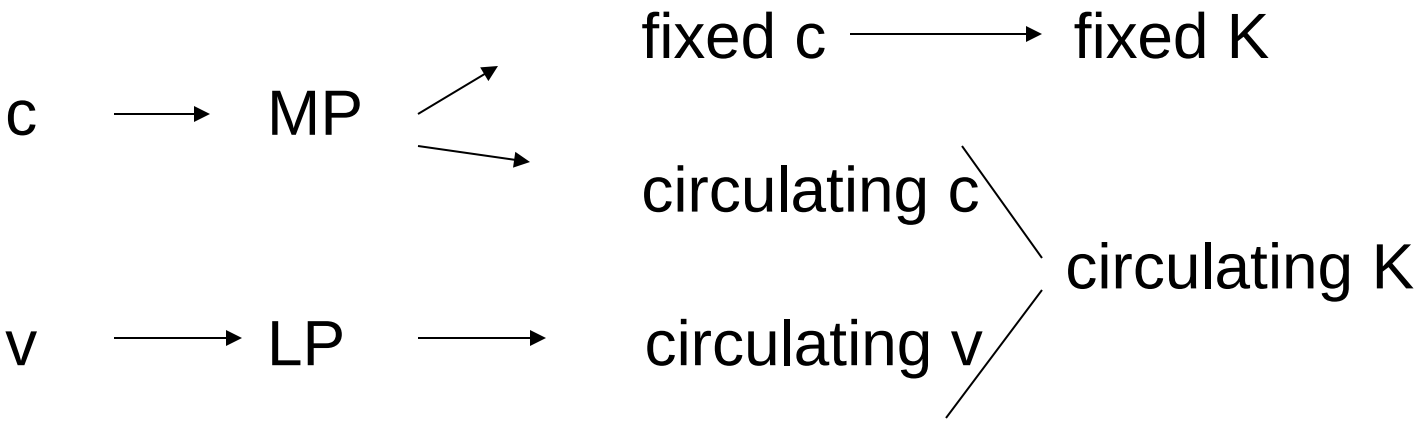
M	C	C'	M'
	MP $200 (20 hours)	Transferred value = $200	Replace value of MP = $200
	LP $50 (5 hours)	New value = $100	Replace value of LP = $50
			Surplus value = $50
$250	$250	$300	$300

Conclusion: MP transfer previously created value to the product while direct labor creates new value. The direct labor reproduces the value of the labor power consumed and also produces surplus value.

Constant and Variable Capital

Constant capital (c): The portion of the capital invested in means of production.

Variable capital (v): The portion of the capital invested in labor power.



The Rate of Surplus Value

What is wrong with the following:

“The workday is divided into three parts, not two:
1) A part in which the value of labor power is replaced.
2) A part in which the value of MP is replaced
3) A part in which surplus value is produced.”

The worker need not create new value to replace the value of MP used up, since the value of MP used up does not disappear in production – it is transferred to the final product.

The Rate of Surplus Value

Rate of surplus value: $s' = s/v$

$v = V_{LP}$ x number of worker-days per period

$s = (L_D - V_{LP})$ x number of worker-days per period

Therefore,

$s' = (L_D - V_{LP})/ V_{LP}$

The Rate of Surplus Value (con't.)

Relation between e and s': $e = L_s/L_n$ $s' = s/v$

We found that $s' = (L_D - V_{LP})/ V_{LP}$

$L_n = V_{LP}$ and $L_s = (L_D - V_{LP})$

[Note: L_n refers to a part of one representative worker's workday, whereas V_{LP} refers to the labor performed by the many workers who participate in producing the wage basket.]

Therefore, $e = L_s/L_n = s/v = s'$

The Rate of Surplus Value (con't.)

Distinctions between e and s':

1. The rate of exploitation, e, applies to any class society, whereas s' applies only to value-creating society.

2. The rate of surplus value, s', is the ratio of aggregate surplus value to aggregate variable capital, whereas e is the ratio for a single worker-day.

The Rate of Surplus Value (con't.)

Determinants of s':

$s' = (L_D - V_{LP})/V_{LP} = (L_D/V_{LP}) - 1 = [L_D/(\Sigma\lambda_i b_i)] - 1$

1. Length of workday
2. Living standard of workers
3. Productivity of labor in the production of wage goods.

What underlies the productivity of labor in the production of wage goods:

$\{\lambda_j\}$, the (reciprocal of the) labor productivity in wage goods industries.

$\lambda_j = \Sigma_i \lambda_i a_{ij} + L_j$

The Rate of Surplus Value (con't.)

$\lambda_j = \Sigma_i \lambda_i a_{ij} + L_j$

Thus, this resolves down to

1) direct labor required, L_j

2) physical production coefficients, a_{ij}

3) labor productivity in industries that supply means of production to the wage goods industries, λ_i, which in turn depend on the direct labor required and the physical production coefficients in those supplier industries, as well as the labor productivity in their supplier industries .....

The Rate of Surplus Value (con't.)

Summary: The $\{\lambda_j\}$ in the wage goods industries depend on the L_j and a_{ij} in all industries that produce goods that eventually enter into the production of wage goods.

Composition of Capital (from *Capital* vol. I ch. 25)

Technical Composition of Capital (TCC): The relation between the mass of means of production employed and the mass of labor necessary for their employment

Value Composition of Capital (VCC): The ratio of the value of means of production to the value of labor power, c/v

Organic Composition of Capital (OCC): “The value composition of capital in so far as it is determined by its technical composition and mirrors the changes of the latter”.

Composition of Capital (from *Capital* vol. I ch. 25)

Three definitions of the OCC:

1) $q = c/v$ traditional definition

2) $q = c/(c + v)$ Sweezy

3) $q = c/(v + s)$ some contemporary analysts

#3 measures ratio of indirect to direct labor.