

Weight of Commercial Sector and Reproduction Scheme

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Japanese Tradition of Mathematical Marxism

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Reproduction Scheme with Commercial Sector

$$W_1 = c_1 + v_1 + m_1$$

$$W_2 = c_2 + v_2 + m_2$$

$$W_c = c_c + v_c + m_c$$

In this case,

- total supply = demand of the means of production

$$c_1 + v_1 + m_1 = c_1 + c_2 + c_c$$

$$\Rightarrow v_1 + m_1 = c_2 + c_c$$

- total supply = demand of the means of consumption

$$c_2 + v_2 + m_2 = v_1 + m_1 + v_2 + m_2 + v_c + m_c$$

$$\Rightarrow c_2 = v_1 + m_1 + v_c + m_c$$

commercial sector is not productive

- substituting the above 2nd equation for the 1st equation leads

$$\underline{v_1 + m_1} = c_2 + c_c = \underline{v_1 + m_1} + v_c + m_c + c_c$$

$$\Rightarrow 0 = c_c + v_c + m_c = W_c$$

It means commercial sector is not productive at all.

In the case of Extended Reproduction Scheme

$$W_1 = c_1 + v_1 + m_1(c) + m_1(v) + m_1(k)$$

$$W_2 = c_2 + v_2 + m_2(c) + m_2(v) + m_2(k)$$

$$W_c = c_c + v_c + m_c(c) + m_c(v) + m_c(k)$$

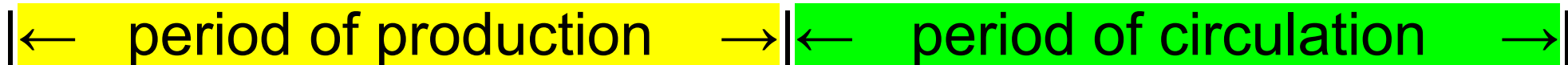
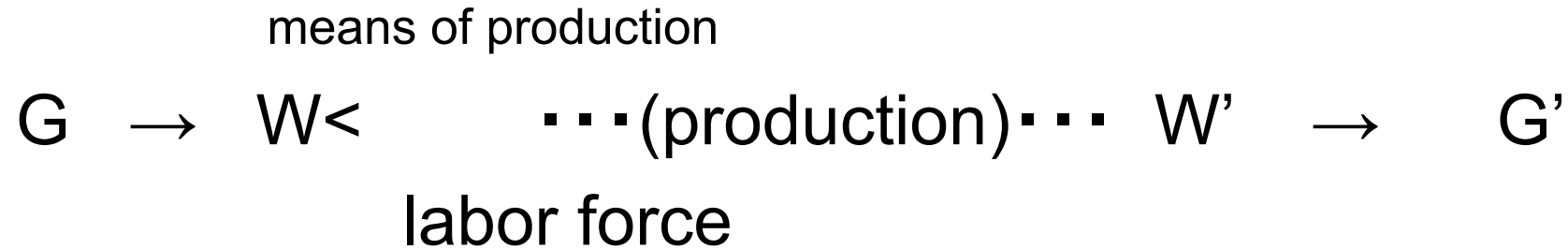
In this case, also

$$W_c = c_c + v_c + m_c(c) + m_c(v) + m_c(k) = 0$$

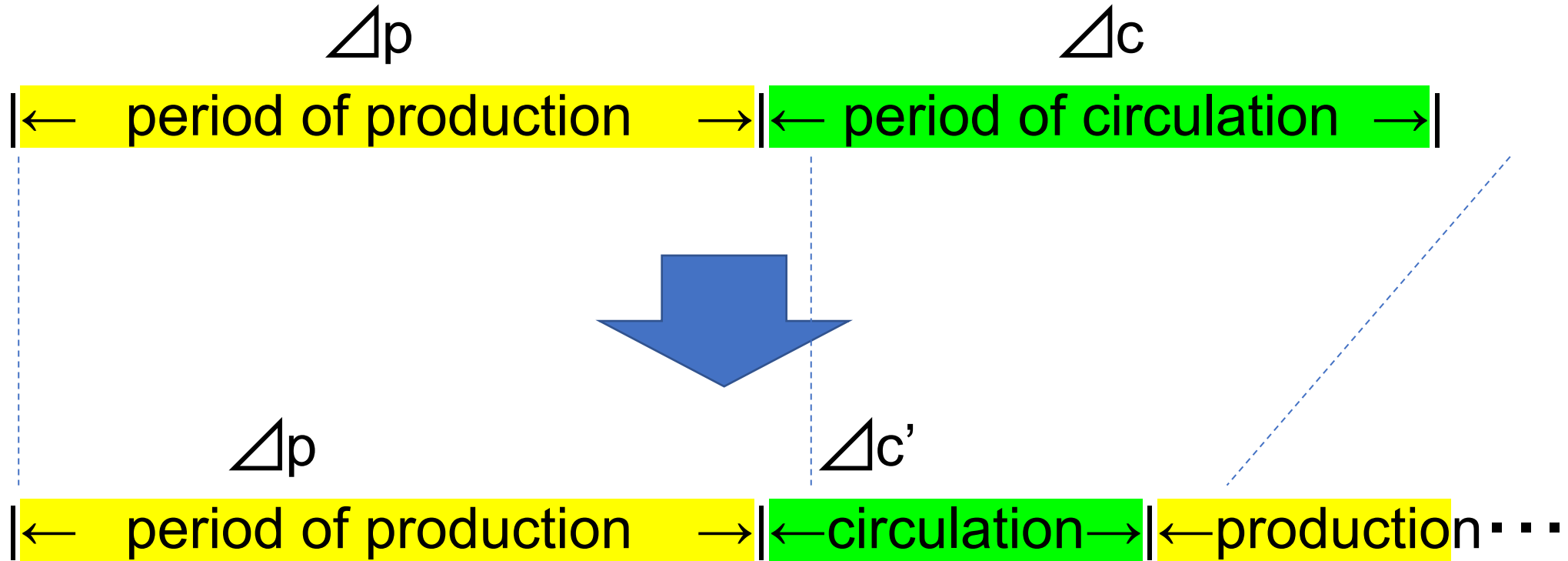
period of production and period of circulation

invest

Get money



Role of the Commercial Capital



$$\text{Additional surplus value} = \frac{\Delta c - \Delta c'}{\Delta p} m$$

additional surplus value > cost and transferred surplus of commercial sector

$$\frac{\Delta c - \Delta c'}{\Delta p} m > c_c + v_c + m_c$$

$$\frac{\Delta c - \Delta c'}{\Delta p} (c_p + v_p) \times \text{annual rate of profit} > (c_c + v_c) \{1 + \text{annual rate of profit}\}.$$

$$\frac{\Delta c - \Delta c'}{\Delta p} (c_p + v_p) r \left(\frac{1}{\Delta p + \Delta c} \right) > (c_c + v_c) \left\{ 1 + r \left(\frac{1}{\Delta p + \Delta c} \right) \right\}$$

Where **r** is the profit rate of one turnover.

Ratio of $(C_c+V_c)/(C_p+V_p)$

Just a transform from the above inequality leads

$$\frac{\Delta c - \Delta c'}{\Delta p} \cdot \frac{r}{(\Delta p + \Delta c) + r} > \frac{c_c + v_c}{c_p + v_p}$$

On the equilibrium

$$\frac{\Delta c - \Delta c'}{\Delta p} \cdot \frac{r}{(\Delta p + \Delta c) + r} = \frac{c_c + v_c}{c_p + v_p}$$

Ratio of $Wc/(W_1+W_2)$

• If we set $z = \frac{\Delta c - \Delta c'}{\Delta p}$,

and profit rate is equalized between both sectors,

$$Wc = z \frac{r}{(\Delta p + \Delta c) + r} (W_1 + W_2) = z \frac{r}{(\Delta p + \Delta c) + r} (c_1 + c_2 + v_1 + v_2 + m_1 + m_2)$$

But, how can we determine average profit rate r ?

For this question, we need to solve the transformation problem.

Iterative Method of Transformation from Value to Price of Production

$$W_1 = c_1 + v_1 + m_1$$

$$W_2 = c_2 + v_2 + m_2$$



$$W_1^* = (c_1 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2})(1 + r^*)$$

$$W_2^* = (c_2 \frac{W_1^*}{W_1} + v_2 \frac{W_2^*}{W_2})(1 + r^*)$$

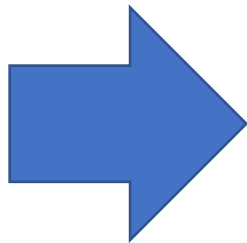
transform 3 equation system in the same way

$$(W_1^* + W_2^* = W_1 + W_2)$$

$$W_1 = c_1 + v_1 + m_1$$

$$W_2 = c_2 + v_2 + m_2$$

$$W_c = z \frac{r}{(\Delta p + \Delta c) + r} (c_1 + c_2 + v_1 + v_2 + m_1 + m_2)$$



$$W_1^* = \left(c_1 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2} \right) \left(1 + \frac{r^*}{\Delta p + \Delta c} \right)$$

$$W_2^* = \left(c_2 \frac{W_1^*}{W_1} + v_2 \frac{W_2^*}{W_2} \right) \left(1 + \frac{r^*}{\Delta p + \Delta c} \right)$$


$$W_c^* = z \left(c_1 \frac{W_1^*}{W_1} + c_2 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2} + v_2 \frac{W_2^*}{W_2} \right) \frac{r^*}{\Delta p + \Delta c}$$

Implications of the that equation system


- ① The first two equations and $W_1^* + W_2^* = W_1 + W_2$ can determine three variables: W_1^* , W_2^* and r^* independently from the commercial sector.
- ② Sale and Profit in the commercial sector W_c^* are $z \frac{r^*}{(\Delta p + \Delta c) + r^*}$ times larger than in the industrial sectors.
- ③ $z \frac{r^*}{(\Delta p + \Delta c) + r^*}$ is determined by the technologies Δp , Δc and $\Delta c'$ and by r^* which is determined by the industrial sectors.

Final Form of 3 sector reproduction scheme

- $W_1^* = c_1 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2} + \left(c_1 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2} \right) \frac{r^*}{\Delta p + \Delta c}$
- $W_2^* = c_2 \frac{W_1^*}{W_1} + v_2 \frac{W_2^*}{W_2} + \left(c_2 \frac{W_1^*}{W_1} + v_2 \frac{W_2^*}{W_2} \right) \frac{r^*}{\Delta p + \Delta c}$
- $W_c^* = c_c \frac{W_1^*}{W_1} + v_c \frac{W_2^*}{W_2} + \left\{ z \left(c_1 \frac{W_1^*}{W_1} + c_2 \frac{W_1^*}{W_1} + v_1 \frac{W_2^*}{W_2} + v_2 \frac{W_2^*}{W_2} \right) \frac{r^*}{\Delta p + \Delta c} - \left(c_c \frac{W_1^*}{W_1} + v_c \frac{W_2^*}{W_2} \right) \right\}$


C part


V part


M part