

The effect of turnover on the rate of profit

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Consider a technical improvement which doubles labour productivity (i.e. halves the number of worker hours required to produce one unit of physical output) and simultaneously cuts the “calendar time of production” in half. This improvement may raise profitability by two channels: an increase in the rate of exploitation and a reduction in turnover time. We’re interested in the question, how to decompose the increase in the rate of profit into its two component parts.

We express the annual rate of profit as s/K , where s denotes the surplus value produced annually and K denotes the stock of capital. We can write:

$$r = \frac{s}{K} = \frac{s}{v} \times \frac{v}{K} = \frac{s}{v} \div \frac{K}{v}$$

where s/v is the rate of surplus value and K/v is a measure of the organic composition of capital, the ratio of capital stock to the annual wage bill. The rate of profit will increase (a) if the rate of surplus value increases and/or (b) if organic composition falls.

Let the capital stock, K , be divided into two parts, a fixed portion K_f and a circulating portion K_c . Let’s say that the technical improvement leaves K_f unaltered, but it reduces K_c . Assume that K_c is proportional to the calendar time of production: in that case it will be reduced by half.

Assume the total annual labour time performed ($= s + v$) remains unchanged, and denote this by H . Then $s = H - v$ and the rate of surplus value can be written as $(H - v)/v$. Using subscript 0 to refer to the initial state, the rate of profit prior to the technical improvement is

$$r_0 = \frac{H - v_0}{v_0} \frac{v_0}{K_f + K_c} = \frac{H - v_0}{K_f + K_c}$$

After the improvement, which halves both the labour time required to produce wage goods and the value of the circulating capital, the profit rate becomes

$$r_1 = \frac{H - v_0/2}{v_0/2} \frac{v_0/2}{K_f + K_c/2} = \frac{H - v_0/2}{K_f + K_c/2}$$

The increase here incorporates both a rise in the rate of surplus value and a fall in organic composition. To isolate the turnover effect we raise the wage just sufficiently to prevent any rise in the rate of exploitation. That is, we hold v at its original level. The new profit rate, purged of the effect of an increase in the rate of exploitation, is then

$$r_2 = \frac{H - v_0}{v_0} \frac{v_0}{K_f + K_c/2} = \frac{H - v_0}{K_f + K_c/2}$$

To illustrate, let’s suppose the original rate of surplus value is 100 percent (that is, $H = 2v_0$) and the original value of K_c equals K_f . In that case the original rate of profit is

$$r_0 = \frac{2v_0 - v_0}{2K_f} = \frac{1}{2} \frac{v_0}{K_f},$$

the new rate of profit (accounting for both the increase in the rate of exploitation and the fall in organic composition) is

$$r_1 = \frac{2v_0 - v_0/2}{K_f + K_f/2} = \frac{v_0}{K_f}$$

and the new rate of profit with s/v held constant is

$$r_2 = \frac{2v_0 - v_0}{K_f + k_f/2} = \frac{2}{3} \frac{v_0}{K_f}$$

Therefore $r_1 = 2r_0$ and $r_2 = \frac{4}{3}r_0$.

Suppose the initial rate of profit, r_0 , were 0.15. Then under the stated assumptions the technical improvement would raise the rate of profit to 0.30 (r_1) if the real wage remained constant (and v fell by half). If the rate of surplus value remained constant, the rate of profit would rise to 0.20 (r_2). Out of the increase in 15 percentage points in the rate of profit from r_0 to r_1 , we can say that 5 percentage points (that is, the difference between r_2 and r_0) are attributable to the fall in production time or increase in turnover and the other 10 percentage points are due to increase in exploitation. The relative sizes of these effects will obviously differ depending on the starting values of the variables.