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What is wrong with micromanagement: economic view

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Abstract

Purpose – It is well known that micromanagement — excessive control of employees — is detrimental to the employees' morale and thus, decreases their productivity. But what if the managers keep people happy — will there still be negative consequences of micromanagement? This is the problem analyzed in this paper.
Design/methodology/approach – To analyze our problem, we use general — but simplified — mathematical models of how productivity depends on the working rate.
Findings – We show that even in the absence of psychological discomfort, micromanagement is still detrimental to productivity. Interestingly, the negative effect of micromanagement increases as the population becomes more diverse.
Originality/value – This is the first paper in which the purely economic consequences of micromanagement — separate from its psychological consequences — are studied in precise mathematical terms, and is the first paper that analyzes the relation between these consequences and diversity of the population.

Keywords Micromanagement, Optimal working rate, Diversity, Productivity loss
Paper type Research paper

1. Formulation of the problem

1.1 What is micromanagement

As part of their general activities, people give each other different tasks:

(1) a manager (e.g. a contractor) tells the employees what they need to do,

(2) an instructor tells the students what problems to solve,

(3) an accreditation agency tells the instructors what to teach, etc.

This is all part of the normal activity.

At certain time intervals, the person who gave the task checks the results:

(1) sometimes he/she checks only the final results,

(2) sometimes intermediate results are also checked.

For example:

(1) the instructor may simply collect and grade the homeworks when they are due,

(2) sometimes, the instructor also sets up an intermediate due date for submitting preliminary results — and grades these results too.

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In all these cases, people can usually decide what exactly to do at each moment — as long as the job is done by the required deadline:

(1) A student may start working on the homework the day when it is assigned — this is what all instructors recommend.

(2) A student can also relax for a day or two — if the resulting homework is correct, the student will still get the full credit.

Similarly, an instructor may teach more materials some days and less other days — depending on how well the students understand the corresponding material. Some instructors may spend more time on one of the topics, some on other topics — as long as at the end students show good knowledge of all the topics, everyone is happy.

However, some managers, some instructors, some accrediting agencies check much more frequently than others. For example, a school district sometimes dictates to the teachers what to teach each day — and checks that this schedule is followed verbatim.

Such an unusually detailed management, where not only reasonable chunks of time are regulated, but also small ("micro") time periods are scheduled by the manager, is known as *micromanagement*.

1.2 Psychological problems of micromanagement

It is known that micromanagement is not good for the workers' morale: it reduces their autonomy and prevents them from being inventive in how to perform the given task. As a result, under micromanagement, people do not feel good — and thus, often, do not perform well; see, e.g. (Dixit, 1998), (Qu *et al.*, 2009), (Snow and Williamson, 2015), and (Mishra *et al.*, 2019).

1.3 What about economic aspects?

But what if the manager somehow keeps the employees happy? What are the pure economic consequences of micromanagement?

This is what we will study in the paper — and we will show that even if everyone is happy, micromanagement is still detrimental to economic productivity.

2. Analysis of the problem

2.1 Every person has an optimal working rate

For each task, if a person works too slowly, his/her productivity is low. As the person starts working faster, his/her productivity increases. However, if a person starts working too fast, he/she makes mistakes and needs to redo them:

(1) A student needs time to carefully check the results of the homework.

(2) A worker needs time to make sure that a part he is working on is well-done, etc.

There is a working rate in between these two too slow and too fast extremes at which the person's productivity is the largest.

2.2 Let us describe this in precise terms

Let us describe how for each person and for each task, productivity y depends on the working rate x: $y = f(x)$. Let m be the optimal working rate. Then, in a small vicinity of this optimal working rate — i.e. for $x \approx m$ — we can use the usual way of analyzing real-life phenomena [see, e.g. (Feynman *et al.*, 2005) and (Thorne and Blandford, 2017)]: expand the dependence $y = f(x)$ in Taylor series

$$f(x) = f(m) + f'(m)\cdot(x-m) + \frac{1}{2}\cdot f''(m)\cdot(x-m)^2 + \ldots \quad (1)$$

and keep only a few first terms in this expansion.

The simplest idea is to keep only linear terms, i.e. to take

$$f(x) \approx f(m) + f'(m)\cdot(x-m). \quad (2)$$

The problem with this idea is that, according to calculus, at the point m at which the function $f(x)$ attains its largest value, the derivative $f'(m)$ is equal to 0. So, formula (2) would simply mean that we are approximating the desired dependence $f(x)$ by a constant $f(m)$ — thus leaving us no idea on how productivity depends on the working rate.

So, to have a meaningful description, it is not sufficient to take only linear terms into account, we need to take into account at least the next (quadratic) term. If we take into account linear and quadratic terms (and also take into account that $f'(m) = 0$), then we get the following approximate dependence:

$$f(x) \approx f(m) + \frac{1}{2}\cdot f''(m)\cdot(x-m)^2. \quad (3)$$

Since the function $f(x)$ attains its maximum for $x = m$, this means that the value $f(x)$ of this function for $x \neq m$ should be smaller than $f(m)$. For the expression (3), this means that we must have $f''(m) < 0$. Thus, the dependence (3) can be represented as

$$f(x) \approx f(m) - A\cdot(x-m)^2, \quad (4)$$

where we denoted $A \stackrel{\text{def}}{=} -(1/2)\cdot f''(m) > 0$.

2.3 Different people have different working rates

People are different. This means, in particular, that different people have, in general, different optimal working rates m and different coefficients A describing how the productivity decreases when we use non-optimal working rates. In general, for the i-th person, his/her productivity $y_i = f_i(x)$ has the form

$$f_i(x) \approx f_i(m_i) - A_i\cdot(x-m_i)^2, \quad (5)$$

where m_i and A_i are the values of m and A characterizing the i-th person.

The overall productivity Y of all the people in the group can be obtained by adding all individual productivities:

$$Y \approx \sum_{i=1}^{n} f_i(m_i) - \sum_{i=1}^{n} A_i\cdot(x_i-m_i)^2, \quad (6)$$

where n denotes the overall number of people in the group, and x_i is the actual working rate of the i-th person.

2.4 What happens when there is no micromanagement

When there is no micromanagement — and everyone is interested in the maximal productivity — then every person selects the working rate that is optimal for him/her, i.e. selects $x_i = m_i$. In this case, according to formula (6), the overall productivity takes the form

$$Y \approx \sum_{i=1}^{n} f_i(m_i). \quad (7)$$

2.5 What happens when there is micromanagement

What happens when the manager determines the working rate? The manager cannot know each worker as thoroughly as the workers know themselves. As a result, instead of assigning individual optimal working rates $x_i = m_i$ to each person, the manager assigns, to all of them, the exact same working rate $x_1 = \ldots = x_m = m$. This exactly is what happens, e.g. when school districts dictate what exactly to teach at every lesson.

In this case, according to formula (6), the overall productivity takes the different form:

$$Y \approx \sum_{i=1}^{n} f_i(m_i) - \sum_{i=1}^{n} A_i \cdot (m - m_i)^2. \tag{8}$$

This value is clearly smaller than the overall productivity (7) the no-micromanagement case.

2.6 So how harmful is micromanagement: analysis

Thus, we have shown that micromanagement is indeed harmful. How harmful is it?

Based on formulas (7) and (8), we can conclude that, because of the micromanagement, the overall productivity decreases by the amount

$$D = \sum_{i=1}^{n} A_i \cdot (m - m_i)^2. \tag{9}$$

Let us estimate this value.

The manager does not know the individual characteristics of each worker — otherwise, he/she would simply assign to each of them, their optimal working rate. What he/she knows is the average value $\overline{m}$ of these values m_i. It is therefore reasonable for the manager to assign this average optimal working rate as the recommended value, i.e. to take $m = \overline{m}$. In this case, the expression (9) takes the form

$$D = \sum_{i=1}^{n} A_i \cdot (\overline{m} - m_i)^2. \tag{10}$$

Thus, the average productivity loss d per person takes the form

$$d = \frac{1}{n} \cdot \sum_{i=1}^{n} A_i \cdot (\overline{m} - m_i)^2. \tag{11}$$

In other words, this loss d is the mean value of the product $A_i \cdot (\overline{m} - m_i)^2$.

Intuitively, there seems to be no reason why the values A_i and m_i should be correlated. Thus, it makes sense to assume that they are independent. For independent quantities, the mean value of the product is equal to the product of the mean values (see, e.g. Sheskin, 2011):

$$d = \overline{A} \cdot \left(\frac{1}{n} \cdot \sum_{i=1}^{n} (\overline{m} - m_i)^2 \right), \tag{12}$$

where $\overline{A}$ denotes the average value of the coefficients A_i. The second factor in formula (12) is nothing else but the variance $V[m]$. Thus, $d = \overline{A} \cdot V[m]$, and we arrive at the following conclusion.

2.7 So how harmful is micromanagement: resulting formula

For each person i, there is an optimal working rate m_i at which this person's productivity is the largest. When the i-th person works at a different working rate $x \neq m_i$, his/her productivity decrease by a term $A_i \cdot (x - m_i)^2$.

In these terms, micromanagement decreases per-person productivity by the value

$$d = \overline{A} \cdot V[m], \tag{13}$$

where

$$\overline{A} = \frac{1}{n} \cdot \sum_{i=1}^{n} A_i \tag{14}$$

is the average value of the coefficients A_i, and

$$V[m] = \sum_{i=1}^{n} (\overline{m} - m_i)^2, \tag{15}$$

is the variance of the optimal working rate values m_i, where, by $\overline{m}$, we denote the average optimal working rate

$$\overline{m} = \frac{1}{n} \cdot \sum_{i=1}^{n} m_i. \tag{16}$$

2.8 Conclusions

The variance describes the diversity of the population. So, for a homogeneous population, the harmful economic effect of micromanagement may be smaller. However, the more diverse the population, the larger the harmful effect of micromanagement. From this viewpoint, we should pay special attention to situations when we manage diverse populations.

References

Dixit, A.K. (1998), *The Making of Economic Policy: A Transaction Cost Politics Perspective*, MIT Press, Cambridge, MA.

Feynman, R., Leighton, R. and Sands, M. (2005), *The Feynman Lectures on Physics*, Addison Wesley, Boston, MA.

Mishra, N., Rajkumar, M. and Mishra, R. (2019), "Micromanagement: an employers' perspective", *International Journal of Scientific and Technology Research*, Vol. 8 No. 10, pp. 2949-2952.

Qu, J., Zhou, F. and Xing, Y. (2009), "From macro-management to micro-management: reflections on China's thirty years of reform from the sociological perspective", *Social Sciences in China*, Vol. 6, pp. 104-127 (in Chinese).

Sheskin, D.J. (2011), *Handbook of Parametric and Non-parametric Statistical Procedures*, Chapman & Hall/CRC, London.

Snow, D. and Williamson, A. (2015), "Accountability and micromanagement: decentralized budgeting in Massachusetts school districts", *Public Administration Quarterly*, Vol. 39 No. 2, pp. 220-258.

Thorne, K.S. and Blandford, R.D. (2017), *Modern Classical Physics: Optics,/Fluids, Plasmas, Elasticity, Relativity, and Statistical Physics*, Princeton University Press, Princeton, NJ.

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