

# ECONOMIC AND SOCIAL QUESTIONS — WIRTSCHAFTSWISSENSCHAFT UND PHILOSOPHIE

## ON THE PROBLEM OF INCOMPLETE INVESTMENTS<sup>1</sup>

By

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The guiding principles for the elaboration of the Second Five Year Plan adopted at the Seventh Congress of the Hungarian Socialist Worker's Party made the raising of productivity, the further transformation of the economic structure and the acceleration of the rate of development, the central problems of our economic development. The solution of all three tasks is closely connected with investments and their appropriate direction. The present paper proposes to deal with the relations between incomplete investments and the problems just enumerated.

### Definition

Though the discussion among the economists of the Socialist countries on the economy of investments has now proceeded for some ten years, only a few newspaper articles<sup>2</sup> and the studies by MIKLÓS AJTAI and M. KALECZKY<sup>3</sup> have in recent years treated the problems of incomplete investments. The reason for this must be sought in the fact that the discussion was *in the first place* concerned with the method of calculating the economy of the different investment variants for fulfilling one particular task, and the majority of authors investigated the method of calculating the economy of installations that *had been put into operation* or were *about to be operated*. They did not examine the *process of investment* as an organic part of the overall economic activity of the country.

<sup>1</sup> Investments everywhere in this paper are understood to mean productive investments.

<sup>2</sup> S. BALÁZSI: More, and effective investments in 1959 (in Hungarian). *Népszabadság*, 1st March, 1959.

"The shortening of construction times can prevent increases in incomplete investments." In Hungarian. *Figyelő*, May 26, 1959.

<sup>3</sup> M. AJTAI: The concentration of investments (in Hungarian). *Közgazdasági Szemle*, No. 8—9, 1958. p. 816.

M. KALECZKY: The influence of construction time on the mutual relations between the investment and the organization's income and the freezing coefficient. *Ekonomista*, 1957, No. 1, rough translation by the National Planning Bureau.

Present-day bourgeois economics have achieved noteworthy results in the investigation of the quantitative relations of economic processes and several interesting development models of overall economic processes have been set up. The problem of incomplete investments has, however, not even been raised.<sup>4</sup>

Investment activity is a *productive activity aimed at creating instruments of production* for which — as for all production — *time* is needed. Investments which have *already* begun but have *not yet* been put into operation are *incomplete investments*, whose magnitude is equal to the expenditure that took place.

In the case of a *single* installation the following figures are necessary to determine the magnitude of incomplete investments: 1. the planned value of the investment, denoted by  $B$ , 2. the time in years necessary for its completion, denoted by  $t_i$  and 3. the expenditure that took place each year, denoted by  $b_i$ .

On the basis of the quotient

$$\frac{b_i}{B} = f_i$$

of the annual expenditure and the planned value of the investment, the progress of the investment may be symbolized by the series

$$f_1 B + f_2 B + f_3 B + \dots + f_n B = B.$$

The quotient  $f_i$  is a series of relative frequencies, whose sum is 1.

Applying the accumulated series

$$\begin{aligned} F_1 &= f_1 \\ F_2 &= f_1 + f_2 \\ F_3 &= f_1 + f_2 + f_3 \\ &\vdots \\ &\vdots \\ &\vdots \\ F_n &= f_1 + f_2 + f_3 + \dots + f_n = 1 \end{aligned}$$

<sup>4</sup> In proof of this, may the reader be reminded of the input-output method, the Harrod and F. Abb model, where not even a trace can be found of the problem of incomplete investments. Perhaps the only theoretically acceptable part of the Matolesy—Varga method of calculating the national income is the scheme of the production of material goods which does, it is true, separate the part of the national income which “solidifies as capital”, but goes no further than this.

of relative frequencies, the level of the incomplete investment, say  $B_i$ , at the end of any period of the time of completion  $t_i$  may be determined:<sup>5</sup> for

$$B_i = B \cdot F_i \quad (1)$$

For economic considerations and decisions it is necessary to know not only the momentary level of incomplete investments. It is at least as important also to know *how long* the funds invested in the project will be immobilized, in the course of the realization of the investment. The dimension of the immobilization of incomplete stocks is therefore: Money unit times years.

On the basis of relation (1) the level of incomplete investments at the end of the successive periods of the time  $t_i$  may be described by the following series:

End of period	Incomplete stock
$t_0$	0
$t_1$	$F_1 \cdot B$
$t_2$	$F_2 \cdot B$
$t_3$	$F_3 \cdot B$
.	
.	
.	
.	
$t_{n-1}$	$F_{n-1} \cdot B$
$t_n$	$F_n \cdot B$

The average stock of each period is the arithmetical mean at the beginning and at the end of the period (the initial stock of one period is equal to the closing stock of the previous one) and average stock for  $t_i$  periods is the arithmetical mean of the averages of the periods. The average incomplete stock, say  $K$ , is then<sup>6</sup>

$$K = \frac{1}{t_n} \left( \frac{0 + F_1 \cdot B}{2} + \frac{F_1 \cdot B + F_2 \cdot B}{2} + \frac{F_2 \cdot B + F_3 \cdot B}{2} + \dots \right. \\ \left. \dots + \frac{F_{n-1} \cdot B + F_n \cdot B}{2} \right) = \frac{1}{t_n} (F_1 B + F_2 \cdot B + F_3 \cdot B + \dots + \frac{1}{2} F_n B)$$

<sup>5</sup> The accumulated series of relative frequencies provide the degree of completion of the investment, from which it obviously follows that the level of the incomplete investment at a particular time is equal to the product of the planned value of the investment and its degree of completion.

<sup>6</sup> This is a chronological average, which is obviously only an *approximation*, since it presumes that costs within the period increase proportionately with time. Economic statistics frequently use chronological averages, because very many of the figures of the economy are only available in respect to the reporting times.

Rearranging this expression

$$K = \frac{B \left( \sum_{i=1}^{n-1} F_i + \frac{1}{2} F_n \right)}{t_n} \quad (2)$$

The immobilization of incomplete stock, say  $A$ , is

$$A = t_n K = B \left( \sum_{i=1}^{n-1} F_i + \frac{1}{2} F_n \right) \quad (3)$$

It follows from the definition given in the relations (1), (2) and (3) that the level of the incomplete investment and the magnitude of the immobilization of incomplete stocks are determined by the value of the investment, the time needed for its completion and the magnitude of the expenditure per unit of time.

M. Kaleczky, in his cited work, attempts to establish the relation between the annual investment expenditure, incomplete investments, the investments put into operation during the year, and the increase in national income. The result which he achieves in his investigation of annual research expenditure and of incomplete investments, agrees with the relation on the level of incomplete production, which is known from the literature of factory management. It is, in fact, a simplified form of that relation.<sup>7</sup> This expression is, on account of its initial premises, of no use for practical planning. Kaleczky's premises are the following: 1. The value of the investments to be carried out and the time required for their completion is identical; 2. Work on the construction of the various installations, over the units of time, is begun evenly, and 3. the rate of construction is identical for all installations.

It does not require proof to state that an investment is a productive activity of *individual character*, where assumptions such as these cannot even accidentally be true.

Actual computing of relations (1), (2) and (3) and their summation makes it possible to plan and to survey the level of incomplete investments at any particular time, the annual average stock and the immobilization of incomplete stocks. These calculations can, in fact, be carried out, for some 70 per cent of the investment plans are approved individually, and investment expenditure is also determined in annual analysis.

Miklós Ajtai, in an already-cited work illustrates the process of investment, also in the case of a single investment, as follows:<sup>8</sup>

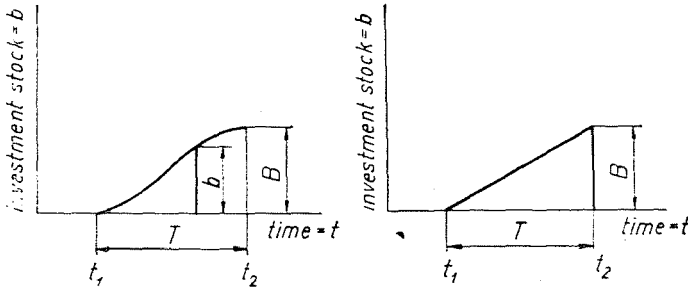
Here  $t$  is the time in years,  $t_1$  the time of the commencement,  $t_2$  the time of completion of the investment, so that the duration of the investment is

<sup>7</sup> Kaleczky's conclusion is, that incomplete investments are equal to the product of the annual investment expenditure, the processing time and the average degree of completion.

<sup>8</sup> M. AJTAI: op. cit., p. 817.

$t_2 - t_1 = T$ .  $B$  is the full value of the investment and  $b$  the level of the incomplete investment at various periods.

From the figure — as Ajtai correctly points out — it may be seen that an incomplete investment can be expressed in two dimensions. We may determine the immobilization of incomplete stocks, whose dimension is money unit times years (i. e. in Fig. 1 the area under the curve, in Fig. 2 the area of the triangle) and the level of the incomplete investment at the given moment, in money units.



The magnitude  $A$  of the immobilization of incomplete stocks may, if the investment proceeds according to Fig. 1, be found by integration. If — says Ajtai — we presume that the incomplete investment increases *proportionately* to time, then the investment proceeds according to Fig. 2 and the immobilization of incomplete stocks is equal to the area of the triangle, so that

$$A = \frac{T \cdot B}{2} \quad (4)$$

The advantage of expression (3) against Ajtai's expression (4) is that it only presumes that investment expenditures increase proportionately with time periods of one interval of time each. Ajtai, himself, points out that during the First Five Year Plan investment expenditure by investment objects developed according to Fig. 1. Expression (3) permits a closer approximation to actual conditions.

### The immobilization of incomplete stocks and the economy of investments

One of the basic problems of the calculation of the economy of investments is the comparison of *unique expenditure* (investment costs of the installation once it is operated). The general trend is that production costs (continu-

ous expenditure) in the plant to be operated could be decreased by increasing the investment costs (unique expenditure), and *vice versa*.

The problem to be decided, therefore, is how many Forints per year of production costs could be saved through every Forint of investment, or the other way round: how many Forints of investment does it take, to achieve an annual saving in production costs of 1 Forint? MIKLÓS TURÁNSZKY<sup>9</sup> reduces the continuous expenditure to terms of one single expenditure, while EUGENE VARGA<sup>10</sup> recommends a method for expressing one single expenditure in terms of continuous expenditure.

When authors treating the economy of investments present investment costs as single expenditures, they neglect the fact that an investment is a *process in time* and fail to pay attention to the considerable resources of the economy that investment activity immobilizes — frequently for lengthy periods.

The problem of the comparison of single and continuous expenditures has been solved, but with the exception of Ajtai, Varga and Kaleczky no one has broached the possibility of comparing investments of various durations and rates of execution.

In calculations of economy the investment, considered as expenditure, must be twice considered. First the value  $B$  of the investment must be considered and secondly the magnitude  $A$  of the immobilization of incomplete stocks. For instruments of production immobilized in the form of incomplete investments do not — unlike instruments of production which are in operation — contribute to the increase of national income. If the quotient of the annual national income and the instruments of production in operation in that year be symbolized by  $k$ , then the falling out of national income caused by immobilizing incomplete stocks may be determined by

$$V = A \cdot k, \quad (5)$$

where  $V$  = is the fall out of national income due to the immobilization of incomplete stocks

$A$  = is the amount of incomplete stocks immobilized

$k$  = is the quotient of national income and instruments of production in operation.

On the basis of expression (5) the expenditure which has to be taken into account in calculations of the economy of investments is

$$R = B + V \quad (6)$$

<sup>9</sup> Problems of the economy of investments (in Hungarian). Közgazdasági és Jogi Kiadó, 1959.

<sup>10</sup> Accumulation and economy (in Hungarian). Közgazdasági Szemle, 1959, No. 5, p. 522.

Ajtai, in his investigation on the concentration of investments, has found that the increase in actual construction times over those planned, causes losses to the economy. In the first group of losses he includes the costs incurred, due to the prolongation of construction, in the second the losses caused to economy by immobilizing funds for a longer period than planned.

“Let us examine the magnitude of these losses. The magnitude of the losses will in this case be proportionate to *the superfluous over the necessary amount*, of the immobilization of incomplete stocks. The value of the constant of proportionality has for other purposes already been calculated by estimation. Estimates have shown that the *improductive immobilization of 1 Forint of investments* for a year, causes the economy an average loss of 0.2 Forint.<sup>11</sup> The factor of proportionality is, therefore, 0.2.”<sup>12</sup> (My italics. A. M.)

The magnitude of the loss is, therefore:

$$V = B_1 - B_0 + \frac{B_1 \cdot T_1 - B_0 \cdot T_0}{2} \cdot 0.2 \quad (7)$$

where

$T_0$  = is the optimum duration,<sup>13</sup>

$T_1$  = is the actual duration,

$B_0$  = is the investment cost belonging to the optimum duration,

$B_1$  = is the investment cost belonging to the actual duration.

Ajtai thus calls an immobilization of incomplete stock larger than that planned, an improductive immobilization by the investment and, using the factor of effectiveness, calculates the loss thus caused.

Eugene Varga formulates the problem precisely and sharply, when he poses the question — which is otherwise not the subject of his paper and, therefore, remains unanswered — of how investment alternatives which can be completed over various periods of time could be compared to each other. This posing of the question also point to the weaknesses of Ajtai's position. For an immobilization of funds *always* involves loss to the economy (not only beyond the optimal duration for completion), the funds used in investments are from beginning to end of the project, improductively immobilized funds, which do not contribute to the increase of the national income!

Nor is Eugene Varga's posing of the question absolutely irreproachable, for he touches on the possibility of comparing investments which take different periods to complete, but does not mention the possibility of comparing investments of identical duration, but with differing rates of construction.

<sup>11</sup> This is the factor used by the National Planning Bureau for the effectiveness of investments. Its economic meaning is that due to an immobilization of 1 Forint of funds, the fall-out in the annual increase of national income is 0.2 Forint.

<sup>12</sup> AJTAI: op. cit. pp. 818—819.

<sup>13</sup> AJTAI considered that the optimum duration is given by the constructional time norms used in Soviet practice and now being worked out in this country. In the case of single installations it is the duration of the organizational plan, if it was drawn up with adequate care.

### The level of incomplete investments and the development of the people's economy

The level of incomplete investments is a highly important index of the development of the people's economy. With given possibilities for investment and given construction times for installations, the magnitude of the investments which can be put into operation over the next period depends on the momentary level of the incomplete investments. This, moreover, determines that part of the increase in the national income which arises from putting the new installations into operation, and also the amount of the investments possible in the next period which can and must be devoted to the completion of incomplete investments. It, thus, determines the amount available for new installations and hence the opportunities for changing the composition of the fixed goods of the people's economy and through them, the productive structure. Despite the fact that the level of incomplete investments plays a very important part in the development of the people's economy and that — as was above pointed out — the necessary conditions for this exist, neither the National Planning Bureau, nor the ministries plan the level of their incomplete investments, as a result of which the decisively-important relations already mentioned, are not exposed.

When approving of the three year investment plan projects in 1958 the Hungarian Investment Bank on a single occasion collected the figures on the level of incomplete investments and of its expected development during the Three Year Plan 1958—1960. The results, published in the report of October, 1958, threw light on the part played by investments incomplete by December 31st, 1957 in the Three Year Plan.<sup>14</sup>

Table I

Investments by the ministries above the value limit in 1958—60.<sup>15</sup>

Total of investments above the value limit = 100

	Investments		Total
	Under way on January 1st, 1958	Begun in 1958—60	
Completed by December 31st, 1960	20.1	19.9	40
Completed after December 31st, 1960	43.3	16.7	60
Total	63.4	36.6	100

<sup>14</sup> The figures elaborated in the report are not complete, for they embrace some 56 per cent of the investments above the value limit of the ministries. It is nevertheless suitable for gauging trends.

<sup>15</sup> Figures calculated from the report of the Investment Bank.



Table II

Investments in progress on January 1st, 1958 in millions of Forint

	Overall target	Incomplete investments on Dec. 31st, 1957	Target of the Three Year Plan	Requirement after Dec. 31st, 1960
Investments to be completed by Dec. 31st, 1960	6 302	3770	2532	—
Investments to be completed after Dec. 31st, 1960	15 222	5481	5687	4054
Total	21 524	9251	8219	4054

Table III

Investments begun in 1958—60 in millions of Forint

	Overall target	Target of the Three Year Plan	Requirement after December 31st, 1960
Investments to be completed by Dec. 31st, 1960	2660	2660	—
Investments to be completed after Dec. 31st, 1960	7039	2252	4787
Total	9699	4912	4787

From Table I it can be seen that investment activity in the years 1958—60 was decisively influenced by incomplete investments. 63.4 per cent of the targets of the ministries were devoted to investments that were under way on January 1st, 1958 and only 36.6 per cent covered the requirements of newly-initiated investments. 40 per cent of the project sums were devoted to investments to be completed in the Three Year Plan and 60 per cent to those to be completed after December 31st, 1960.

It can be seen from Tables II and III that these relations apply to investment activity to the tune of 13.1 thousand millions, provided for in the Three Year Plan.

What statements can be made on the basis of the figures of Tables II and III?

1. On December 31st, 1957 investments with an overall target of 21.5 thousand millions were in progress and the level of incomplete investments was 9.2 thousand millions. 12.3 thousand million Forint was needed to finish the incomplete investments.

2. Despite the fact that the Three Year Plan provides for a sum greater than that needed to complete the investments under way, the latter will not be completed. As a result of the projected expenditure of 8.2 thousand millions, investments to the value of 6.3 thousand millions are to become operative, while the level of incomplete investments will be 11.1 thousand million Forint.
3. As a result, 4.9 thousand millions of the projected 13.1 thousand millions worth of investments over 1958—60 can be devoted to new investments, with a total requirements of 9.6 thousand millions.
4. Of the 4.9 thousand millions to be devoted to the investments with total requirements of 9.6 thousand millions to begin in 1958—60, 2.6 thousand millions will become operative in the Three Year Plan, while 2.2 thousand millions will increase the level of incomplete investments on December 31st, 1960.
5. According to the targets the level of incomplete investments on December 31st, 1960 will be 13.4 thousand millions, as opposed to 9.2 thousand millions on December 31st, 1957. Nevertheless, the investment requirement to finish the incomplete investments will be less: Only 8.7 thousand millions on December 31st, 1960, as opposed to 12.3 thousand millions on December 31st, 1957.
6. Of the overall target of 21.3 thousand millions set at the beginning of the Three Year Plan, 6.3 thousand millions will become operative in the period 1958—60, but 15.2 thousand millions only in the years 1961—65 of the Second Five Year Plan.
7. Of the overall projected investments of 9.6 thousand millions decided on 2.5 thousand millions will become operative by 1958—60, and 7 thousand millions by 1961.
8. During the period of 1961—65 7 thousand millions worth of investments will become operative that were decided on in 1958—60, and 15.2 thousand millions that were decided on 31st December, 1957.

### Some conclusions

Some conclusions may be drawn from the above that are not only of theoretical significance, but may also prove useful in matters of economic policy.

It is desirable to plan the immobilization through incomplete investments, their average stock and level, in order to correctly decide on the economy of investments, to be able to determine the rate of development of the economy and survey the possibilities of transforming the structure of production.

The concentration of investments means that the investments of the given period must in the first place be devoted to completing the investments.

in progress, and that it is desirable to begin new investments only if the investment funds available in the given period cannot, in their entirety, be devoted to completion of the investments which are under way.

From the point of view of the people's economy it is not the investment level of a particular period that is significant, but the investments put into operation. The magnitude of the investments which can be put into operation depends on the value of the installations, the time and rate of construction and the level of investment. The time and rate of construction must especially be emphasized in this context. While in industry with fixed location the effects of our economic mechanism are fairly clear, they are utterly obscure in the building industry. It would seem desirable to undertake a systematic study of the planning, bonus, wages, supply and financial systems of the building industry and their effect on construction times and rates.

The increase in the level of incomplete investments is, in itself, not unfavourable. In so far as the degree of completion is high, so that full completion requires relatively smaller sums, it is a favourable phenomenon, because it means that the investments may, within a short time, be made operative at the cost of smaller expenditures.

An analysis of the investments and the level of incomplete investments of the Three Year Plan has shown that the concept according to which annual plans are operative, and five year plans are long-range plans, must be cast aside. In order to make economic policies consistent and continuous, the five year plans must be regarded as operative, and ten or fifteen year plans may be regarded as long-range plans, the elaboration of which must speedily be begun.

### Summary

The paper is concerned with the economic effects of incomplete investments. The first part contains definitions of the level and the average stock of incomplete investments and the immobilization of incomplete stocks. Next, the effect of the immobilization of incomplete stocks on the economy of investments is investigated. In the third part, the author discusses the relations between the level of incomplete investments and the development of the people's economy. There is an analysis, based on statistics, of the part played by incomplete investments in the Three Year Plan for 1958—60 and some conclusions, useful for the economic administration, are drawn.

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