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JÁNOS KORNAI and ÁGNES MATITS (HUNGARY)

The Softness of Budgetary Constraints—An Analysis of Enterprise Data*

One of the authors of this article, Janos Kornai, demonstrated in his book *The Economics of Shortage*¹ that in socialist economies the budgetary constraints placed on state-owned firms are “soft.” This article attempts to examine, based on the statistical analysis of fiscal data supplied by Hungarian state-owned firms, the validity of the hypotheses concerning the softness of budgetary constraints.

A firm earns an income by selling its products or services. Its budgetary constraints are hard if, in the final analysis, it is compelled to cover its expenses out of these earnings; if its activities become loss-producing and it has no further fiscal reserves to cover the losses, sooner or later it will become bankrupt. The investment activities of a firm heavily depend on how profitable it was in the past and how much profit it can hope for in the future. Consequently, the firm has more than just a material or moral incentive to maintain its earnings; profits and losses are crucial issues that decide whether or not the firm will survive or grow.

The hardness of budgetary constraints does not conflict with the fact that the firm pays taxes to the state, as long as the tax regulations and compliance with tax obligations do not consti-

*Hungarian text © 1983 by Lapkiadó Vállalat, Budapest. “A költségvetési korlát puhaságáról—vállalati adatok alapján,” *Gazdaság*, vol. 16 (1983), no. 4, pp. 7–29.

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tute a subject of negotiation between the authorities and the firm.

Nor does the hardness of budgetary constraints conflict with the fact that the firm accepts loans from banks, from other firms, or otherwise augments its fiscal resources from the money market. Naturally, its balance sheet will indicate these: under “assets” the loans will be listed next to income earned through the sale of products, while under “liabilities” the repayment and servicing of loans will join the expenses associated with the production and administration processes. However, *in the final analysis* (and these emphatic words appear in the above definition of “hardness”) a firm cannot survive on credit for long. Indebtedness, if it grows faster than the rate at which earnings increase, as well as frequent and serious problems with solvency, will undermine the creditworthiness of a firm. Financial bankruptcy takes place when the firm is no longer able to fulfill its obligations in repaying and servicing its loans, cannot pay its bills, and its creditors are no longer willing to tolerate this. Thus, hard limitations on the budgetary activities of the firm, the strictness of the credit system, the threat of bankruptcy, and the sense of vulnerability felt by chronically loss-producing firms—these are closely interrelated and mutually supporting phenomena.

Limitations on the budgetary practices of an enterprise can “become soft” as a result of four processes which can operate independently as well as in combination with each other:

- 1) The firm receives state subsidies in order to compensate for its losses or for increases in operating costs. These subsidies can be occasional or systematically recurring; they can be connected to a specific product or be applicable for the entire operation of the firm or group of firms.

- 2) The firm receives tax breaks in order to compensate for its losses or cost increases. The pre-established regulations are perhaps already “tailor-made,” or breaks, exemptions, and deferments in enforcement of financial obligations which are due can be granted in retrospect.

- 3) The credit system is “soft.” This is not reflected in the level of the interest rate, but in the rules of the credit game that actually

prevail (and that are not just declared on paper). An important indicator is the existence of principles according to which the selection is made in practice. Do those firms having a promising profits outlook in the past enjoy an advantage? Or is the opposite true, meaning that extra consideration will go to those firms that are in the greatest trouble and are compelled to seek the help of the bank? The second indicator for measuring the hardness or softness of the credit system is the following: To what extent does the bank comply with the provisions of the credit agreement? Are they accommodating with those who cannot meet their installment and interest payments?

4) State authorities determine some of the prices, or they determine an upper limit to any price increase. This has a “softening” influence if the firm is not obligated to adjust its expenses to prices established from the outside, but rather the opposite is true, *i. e.*, the state pricing authority adjusts prices to the existing expenses. Therefore, it does not matter if this adjustment is accomplished in the form of an open or hidden price increase. The essence of the matter is that the firm—with the approval of the state pricing authority—charges its losses or increased expenses to the buyer.

It follows from all of the above that the “hardness or softness” of the budgetary constraints cannot be described for each individual firm by saying that we will consider the temporary financial situation of the firm in question. It is completely meaningless to talk about the fact that the budgetary constraints of firm “A” were soft in 1978, while those of firm “B” were hard in 1980. The “hardness or softness” of budgetary constraints is an allegorical expression which alludes to a well-defined *behavioral pattern*. This behavior does not originate in individual firms nor is it based on the most recent experiences of the firm in question, but rather it is shaped and set on the basis of the *mass and enduring* experiences. Its most important element is the expectation of the consequences from deficit and profitability. It is one type of subjective indicator of the probability of what kind of risk a loss entails and what kinds of advantages go with profit. The more a

firm counts on the fact that its existence and growth depend on this (as well as on luck in the market), the harder the constraints. And vice versa, the more it sees that the proportion of profit-deficit plays a small role in its survival and growth, because they tend to depend on what the state gives them or what it takes away from them, the more the budgetary constraints become soft.

At the same time, it also follows that the budgetary constraints of an enterprise not only softens from the fact that the state gets the “weak” out of difficulties, but also from the fact that it skims off the extra profits of the “strong”; perhaps it liquidates firms which are quite profitable or amalgamates them into firms that are less profitable. Loss is not a great adversity but neither is profit a great blessing.

A brief description of our examination

Our article is based on the initial, partial results of a larger project.²

In the course of our research, we fed into a computer a large number of data³ from the balance sheet reports of every *state enterprise*. Out of these basic data we have come up with a uniform system of indicators the inter-temporal and cross-section characteristics of which are comparable. For the purposes of economic evaluation of the raw data, we formulated 49 special aggregates and called these *absolute indicators*. Out of a portion of the absolute statistics we made up a total of 28 proportional indicators, and these we called *relative indicators*.

Therefore, our own system of indicators⁴ consists of 77 components per firm and per year. In the section of the research which has just been completed, we compiled data pertaining to the six years between 1975 and 1980.

We consider the confronting of economic theory with practice as the main goal of this investigation. One of the characteristic features of our undertaking is that—even though millions of data go through our hands—we basically strive to make qualitative conclusions. We do not criticize other researchers for working

out econometric models suitable for making quantitative predictions; we merely want to make it clear that this is not what we attempted to do within the scope of this project.

Our task—making qualitative conclusions with the help of numbers—presents many kinds of methodological problems. These problems are not unknown in international literature, especially if we go beyond economics and also utilize the achievements made in the scientific theory and methodology of other sciences. Nor is this problem a new area in Hungarian economic literature either.⁵ What is certain, however, is that in Hungary relatively little research has been undertaken in this regard. Therefore, we also consider it our important duty to make progress from a methodological point of view with the testing of economic hypotheses by using mathematical-statistical methods.

In this article we do not deal with all aspects of our research. As we already indicated in our introductory remarks, we wish only to examine a number of hypotheses pertaining to budgetary constraints on enterprises based on the Hungarian experience.

The indicators utilized

We do not wish to present every detail of the entire system of indicators. However, a summary and explanation of the most important indicators referred to in the article are necessary. These indicators are the following⁶:

1. Original profit
1. Original profitability
2. Profits after general withholdings and allocations
2. Profitability after general withholdings and allocations
[i.e., profit tax and subsidies from the state budget—*Ed.*]
3. Profit based on balance
3. Profitability based on balance
4. Profit after redistribution
4. Profitability after redistribution
32. Profitability in proportion with resources
11. Redistribution proportion
8. Investment activity

The various profit indicators, and the profitability indicators that they help to comprise, occupy a central role in our analyses. Let us proceed in order and find out what points 1 through 4, or rather indicators 1 through 4 mean.

Let us assume—just for the sake of argument—that in a given year the state would decide not to effect any kind of redistribution of income, a year when an accounting of all the income and expenditures of a firm occurred at the prices in effect, when no income would be taken from it, and when the firm would be reimbursed for the sum of payments made during the year. At the same time, the state would not under any circumstances give the firm money and also would pay back the amounts corresponding to benefits and exemptions. We termed this hypothetical sum as *original profit* (indicator 1).

Actually, indicator 1 does not eliminate every influence of redistribution. In this part of our examination, we have not figured out the nature of withholding and support which are “total” and hidden in the costs of the manufactured goods and in returns from sales, or which are “accumulated” and may also take into account the calculations previously made. (In the previous sentence we used the adjectives “total” and “accumulated” in the way that we formerly referred to the total expended labor and hard currency, figured with the aid of the Leontief tables and having considerable secondary effect.) We did not compose a price system exempt from state redistribution, so that then we could once again figure out the production costs with the help of this system. In developing indicator 1, we “negated” redistribution only during the last stage, when considering the issuing firm.

We emphasize that for our part we do not attach any positive value judgment to original profit; we do not want to suggest that this is the “genuine” indicator which reflects economic efficiency well. This question cannot even be raised when we simply take the existing price system as a given, together with all of its well-known deficiencies. We do not regard as a subject of our examination how the profit accounted for in money, profitability, and production efficiency relate to each other. We will

return to this problem at the end of our article.

Indicator 2 differs from indicator 1 in the sense that the *general* withholdings have already been deducted from it and the *general* allocations have already been added to it. Additional withholdings and allocations that have been "earmarked" for the branch or firm are reflected in indicator 3. But there is even a further stage of redistribution, which leads to indicator 4.

Obviously, here we are not talking about actual chronological order. We do not assert that in practice indicator 1 is formed first, then—in chronological order—indicator 2 comes into existence, and so on. This is merely a logical "sequence." Indicator 1 is "virgin" profit which has not yet been affected by redistribution and out of which—separable only on an abstract level—profit 3 and 4 will be formed through a series of steps.⁷ (Since the latter already are part of the usual financial statement of accounts, we will call these "actual" profits.)

Therefore, in our analysis we differentiate three degrees (1 → 2, 2 → 3, and 3 → 4) of redistribution affecting profit. One study prepared in 1982 in the Ministry of Finance differentiates 228 types of redistribution elements which affect formation, distribution, or utilization of profit.⁸ Study of the most minute details of redistribution is illuminating. We, however, have consciously assumed a more aggregate perspective so that we may reach conclusions which are comprehensive in nature. We avoided individually dealing with the justifications and "ideologies" of the various steps involved in redistribution, because we were looking for an answer to the following: Regardless of the justification for the application of these steps, what is the *combined* influence they exercise on the *entities* of enterprises?

The relative indicators 1, 2, 3, and 4 are the ratio of the corresponding absolute indicator and the total value of equipment (indicator 48). We regard these indicators as categories related to "profit rate."

The fifth utilized profitability indicator is one that considers the proportion of profitability to resources utilized (indicator 32). This indicator is a fraction whose numerator is profit based on the

balance and whose denominator is the sum of all resources and wages expended. With regard to its economic content, this indicator approximates the traditional profitability categories.

We used the redistributive ratio indicator **11** for characterizing the size of redistribution. It is calculated this way: profit after redistribution minus original profit per value of all matériel.⁹ If there is no redistribution, then the value of indicator **11** is zero; if they divert more from the firm than the amount they allocate to them, then this indicator has a negative value; in the opposite case it is positive. The larger the absolute value of this indicator, the larger the difference between the original profit and actual profit, or the larger the influence of redistribution.

Investment activity is what we called the ratio between the value of investment-type expenditures carried out in a given year at the firm and the value of matériel; in our system of indicators this received the number **8**. This ratio indicates approximately how investment activity conducted in the interest of "capital growth" is related to "capital."

We clearly realize that our system of indicators is disputable in many regards; in our future analyses we are considering the use of additional indicators alongside those we now have.

In the remaining section of the article we will examine six hypotheses which we regard as fundamental to our present topic.¹⁰ We will also present a portion of the calculations that serve as checks for our hypotheses.

Large-scale redistribution, a break between original and actual profitability

*Hypothesis 1. Central redistribution of income from state enterprises is very widespread. As a result of this, a discrepancy occurs between original and actual profitability.*¹¹

Our system of indicators provided the opportunity for a multifaceted empirical testing of the above hypothesis. We can assert that our calculations unequivocally justify the hypothesis.¹² As an illustration, we will present several of the results.

Table 1

Redistribution Proportion (in %)

Branch of national economy*	1975	1976	...	1979	1980
Manufacturing	-7.34	-6.10		-5.77	-7.17
Construction industry	-8.95	-7.61		-13.41	-5.72
Agriculture and forestry	0.01	-0.41		-0.62	-0.25
Transport and communications	-0.45	0.76		0.61	4.06
Commerce	-17.06	-8.30		-12.29	-12.02
Health care and social services	7.74	0.51		5.73	8.50
In entire national economy	-5.36	-3.76		-3.58	-5.15
Original profitability, Indicator 1,					
For entire national economy	7.64	6.34		5.68	5.15

*For the sake of brevity, we have not provided data on several smaller branches.

In Table 1 we show redistribution proportions in several branches of the national economy in the first two and last two years of the time period examined. Among the major branches of the national economy, agriculture is the only one in which the redistribution proportion is small—falling very close to zero—while among the rest it is generally very large. We can describe the value of the redistribution proportion as large if the absolute value is larger than the average size of the profitability indicators. Under such circumstances the deflecting influence of profitability affected by redistribution is already greater than 100 percent. For comparison purposes, we have provided the average values of original profitability for indicator 1 during the years mentioned based on Table 1. Even with the distorting influence of averaging and aggregates combined, we can describe as significant the values of the redistribution proportion, i.e., the extent of redistribution.

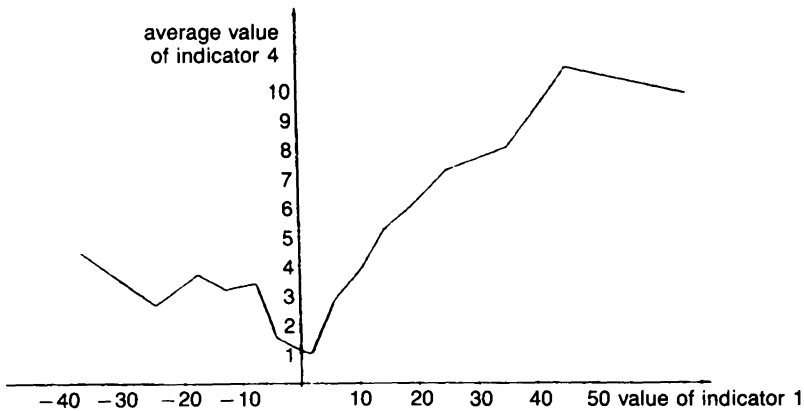
In our calculations we also determined the ratio between the total benefits received by the enterprises and their original profits. Based on 1980 statistics, the result is 1.09. In other words, the numbers show that if the enterprises had only received, but had not had anything withheld from them, their profits would have doubled. On the opposite side, the ratio of total withholdings and

original profits is 1.28. These numbers also indicate the extent of redistribution: the volume of profits affected by it—allocated or withheld by the state—is about twice as big as the original profits.

Finally, we present a third calculation. We figured out the correlation coefficients between indicator 1, original profitability, and indicator 4, profitability after redistribution. Taking the many state enterprises in the national economy into consideration, the value of the coefficient was very low: 0.23 in 1978, 0.22 in 1979, and 0.22 in 1980. Within manufacturing the correlation is much weaker: 0.12 in 1978, 0.07 in 1979, and altogether -0.01 in 1980. This also reflects the separation of profitability after redistribution from original profitability.

There may be various types of hidden actual ties behind the low correlation coefficients and among the variables examined. However, in this survey we only searched for an answer to the following question: Does a tendency exist in which if the original profitability of one firm is greater than that of another, then its actual profitability is also proportionately greater? If such a tendency would occur, then this would be shown in a high-value correlational coefficient, which would also represent one type of refutation of our hypothesis. Based on our calculations, we can assert that in relationship to all of the enterprises we cannot speak about the success of the above tendency: original and actual profitability do not follow each other in a proportional manner.

For elucidation of the actual relationship between the two variables, help is offered by the determination of empirical regressions. To serve as an illustration, we present Figure 1—based on all of the enterprises of the national economy—which shows the size of average indicator 4, actual profitability, belonging to the individual values of indicator 1, original profitability. It may be determined from the figure that the loose relationship between indicators 1 and 4 is caused by the redistributive factors which, based on original profitability, show up either at *loss-producing* or at *highly profitable* enterprises. It can be clearly seen that there actually is no clear-cut relationship between the variables



Labels: 1 is original profitability; 4 is actual profitability.

Figure 1. Relationship Between Original and Actual Profitability (Entire National Economy, 1980)

examined. (We note that on the lower aggregate levels the established regression curves were similar.) A phenomenon which is also notable in Figure 1 leads us to another topic to be discussed below: the problem of leveling off.

Hypothesis 2. The effect of redistribution is much stronger within industry than within agriculture.

Among the many kinds of tests, we will point out only two. One is presented in Table 2, which shows that while the linear relationship between original and actual profitability is quite loose in industry, it is rather tight in agriculture.

Presented in conjunction with the previous hypothesis, Table 1 also indicates that a much larger scale redistribution is taking place in industry than in agriculture.

At this point we want to remind the reader that when talking about agriculture, we are always talking about the *state* sector of agriculture. As we can see, in this branch of the national economy the profit principle asserts itself more consistently (even in the

Table 2

Correlational Coefficients Between Profitability Indicators

Designation	Industry		Agriculture	
	1979	1980	1979	1980
Correlation between original profitability and that contained in balance (between indicators 1 and 3)	0.29	0.28	0.88	0.75
Correlation between original and post-distribution profitability (between indicators 1 and 4)	0.07	-0.01	0.86	0.73

state sector) than it does in industry and other branches of the national economy, and inter-enterprise redistribution intervenes less with the formation of profitability. What also may play a role here is that in industry the state sector is dominant, while this is not the case in agriculture. In agriculture, even the behavior of state enterprises, and central actions taken in conjunction with state enterprises, becomes assimilated, to a certain degree, with the environment and with the conditions dictated by the dominant sectors—production cooperatives, private plots, and auxiliary enterprises. It has become evident that profit-oriented behavior is increasingly manifested in the non-state sector.

Leveling

What are the criteria that control the process of redistribution? Is there chronic favoritism in redistribution? To whom does inter-enterprise redistribution give preference and for whom does it represent drawbacks? In the Hungarian economic literature several kinds of hypotheses are raised in conjunction with these questions.¹³ Among these, the most frequent speculations are that a firm has a greater chance for receiving preferential treatment, if *a*) it belongs to a “preferred branch”; *b*) it is a large enterprise; *c*) it belongs among the 40–50 large enterprises which the higher organs “placed in a preferred category” at the beginning of the

1970s; or *d*) it has friends in high places through personal contacts. These groups of privileged entities—as defined by criteria *a* through *d*—overlap each other to some extent. There are quite a few enterprises which are eligible for such status on the bases of two, three, or perhaps all four of the criteria listed above.

Relying on our own body of data we undertook to examine this question, but our results are inconclusive. As of now, we can neither support with adequate force nor refute the hypotheses pertaining to the effectiveness of any of criteria *a* through *d*. We are continuing research on this problem.

We have found only one criterion of redistribution, the practical manifestation of which was unequivocally supported by our own calculations.

Hypothesis 3. The leveling of profit and profitability is accomplished by means of inter-enterprise redistribution.

The results of our calculations show that the direction—preference or its opposite, disadvantageous treatment—and scale of redistribution very strongly depend on the scale of profitability. Interpretation of Figure 2 is very instructive. If the original profitability of an enterprise is negative, redistribution favorable to it may be observed; as a matter of fact, the greater the loss, the greater the scale of preference, and the redistribution quotient has all the more positive value. With the growth in profitability, the scale of receiving preferential treatment decreases proportionately. When there is no more loss, the value of the redistribution quotient becomes negative, and the value of the redistribution decreases in proportion to the growth in profitability. This observed tendency inevitably results in a leveling of income.

A comparison between the distribution of various profit and profitability indicators is also a good indication of leveling. By the distribution of a variable we mean what is the probability that a variable will be included in various class intervals of its potential values. In this case, this means, for example, that we examined the probability that the profit of an enterprise will be between 0

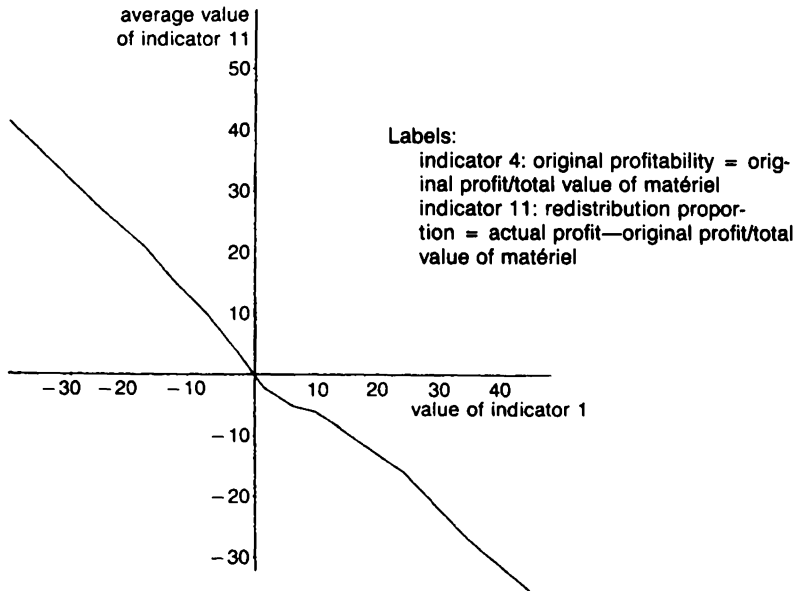


Figure 2. Redistribution Quotient Trends as a Function of Original Profitability (Entire National Economy, 1980)

and 100,000 forints. If we calculate the probability for each class interval, then these together form the distribution of the examined variable.¹⁴ If there was no redistribution, then the distributions of the absolute indicators 1, 2, 3, and 4 would be identical, and the distributions of the relative indicators 1, 2, 3, and 4 would correspond with each other. Let us look at Figure 3 and Figure 4. These present profit indicators for 1980 relating to industry, and a schematic picture of the distribution of profitability indicators (more precisely: the empirical density functions). What is shown in both figures is that certain distributions differ sharply from each other. This is also another confirmation for hypothesis 1: the effect of redistribution is very strong; it distorts to a considerable extent the distribution of actual profits and profitability from distribution of original profit and profitability. But we can also conclude more from the figures. Proceeding from indicator 1 toward 4 (or from indicator 1 toward 4 in the other figure) we see that distribution becomes more densely concentrated and “peaks out.” While, for example, the values of indicator 1

fall into the -15 to $+27$ percent zone, the values of indicator 4 are massed into a much narrower zone, between 0 and 12 percent.

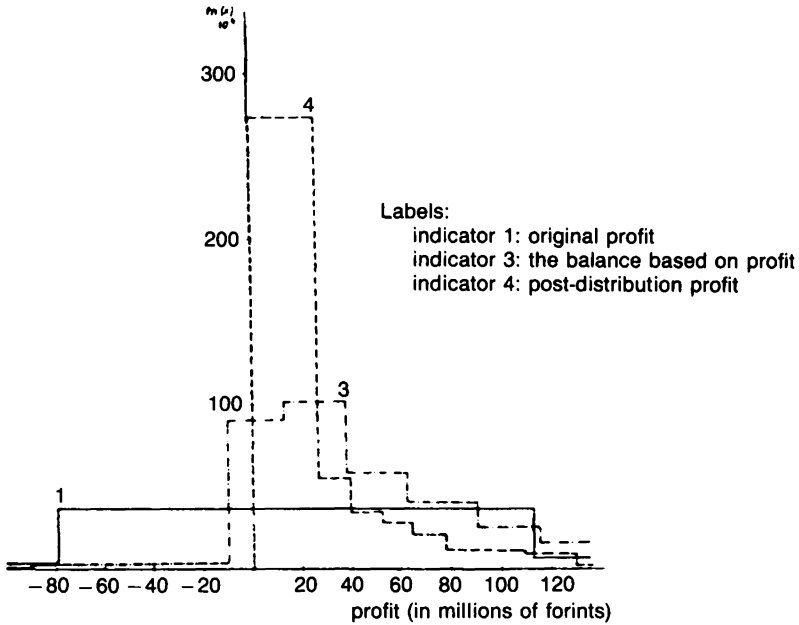


Figure 3. Distribution of Values of Profit Indicators (Industry, 1980)

The two figures clearly present both results of leveling: the removal of profits from areas where an excess of it been formed, and compensating those areas that have incurred losses. Table 3 and Table 4 illustrate the same thing. Parallel with the various degrees of distribution, the number of enterprises which have unusually high profitability becomes smaller. On the other hand, proceeding in the reverse direction results in the gradual “disappearance” of losses. The last entry line in Table 4 is astounding: for all practical purpose, according to indicator 4 there no longer exist any losing enterprises! Redistribution guarantees that practically every enterprise can create the illusion of operating “loss-free.”

We present another test: one that examines the standard deviation of profitability indicators (see Table 5). With the exception

Table 3

Number of Highly Profitable Enterprises in 1980 (Entire National Economy)

Profitability indicator	Value of indicator (in %)			
	Total over 30	30-50	50-70	over 70
1 Original profitability	168	70	54	44
3 Profitability based on balance	68	62	6	0
4 Post-redistribution profitability	8	7	1	0

Table 4

Proportion of Enterprises With Losses in 1980 (Entire National Economy, Based on Number of Enterprises)

Profit indicator	Proportion of loss-producing enterprises (in %)
1 Original profit	24.02
3 Profit based on balance	2.32
4 Post-redistribution profit	0.18

of the construction industry, in every branch of the national economy and in every year the standard deviation of indicator 3 (profitability based on balance) is much smaller than that of indicator 1 (original profitability). In most of the branches and in most years the standard deviation of indicator 4 (post-redistribution profitability) continues to decline, although there are exceptions in this case.

Separating "profit-sharing" from profit

. . . I will tell you how the Dodo managed it. . . . And then all the party were placed along the course, here and there. . . . There was no "one, two, three, and away!", but they began

running when they liked and left the course when they liked. . . . However, when they had been running half an hour or so, . . . the Dodo suddenly called out "The race is over!", and they all crowded around, panting and asking "But who has won?" . . . This question the Dodo could not answer without a great deal of thought, and it sat for a long time with one finger pressed upon its forehead (the position in which you usually see Shakespeare in pictures), while the rest waited in silence. At last the Dodo said "Everybody has won, and all must have prizes."¹⁵

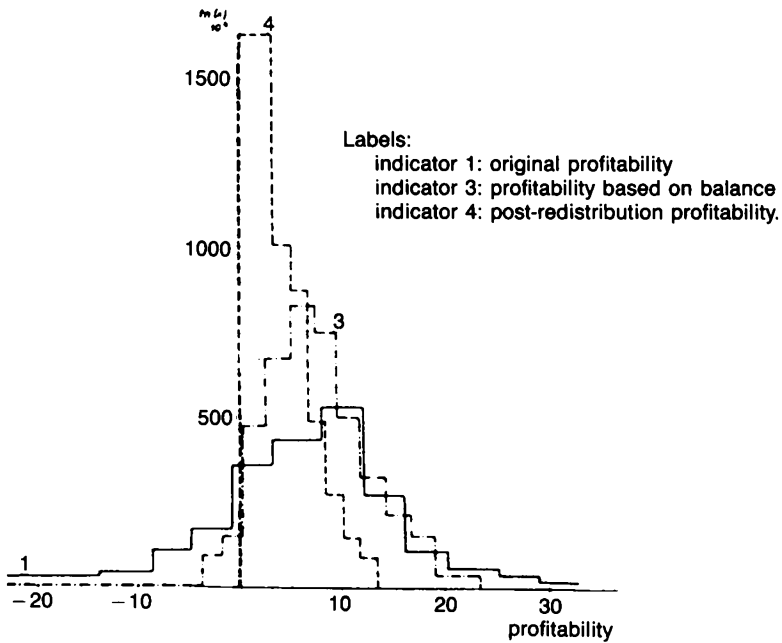


Figure 4. Distribution of Profitability Indicators (Industry, 1980)

Some of the incomes earned by employees of state firms are referred to as "profit-sharing." When the economic mechanism was being reformed, the intended purpose of this income source was to give the entire enterprise collective an interest in profit growth. The profit-sharing principle would clearly be effective if:

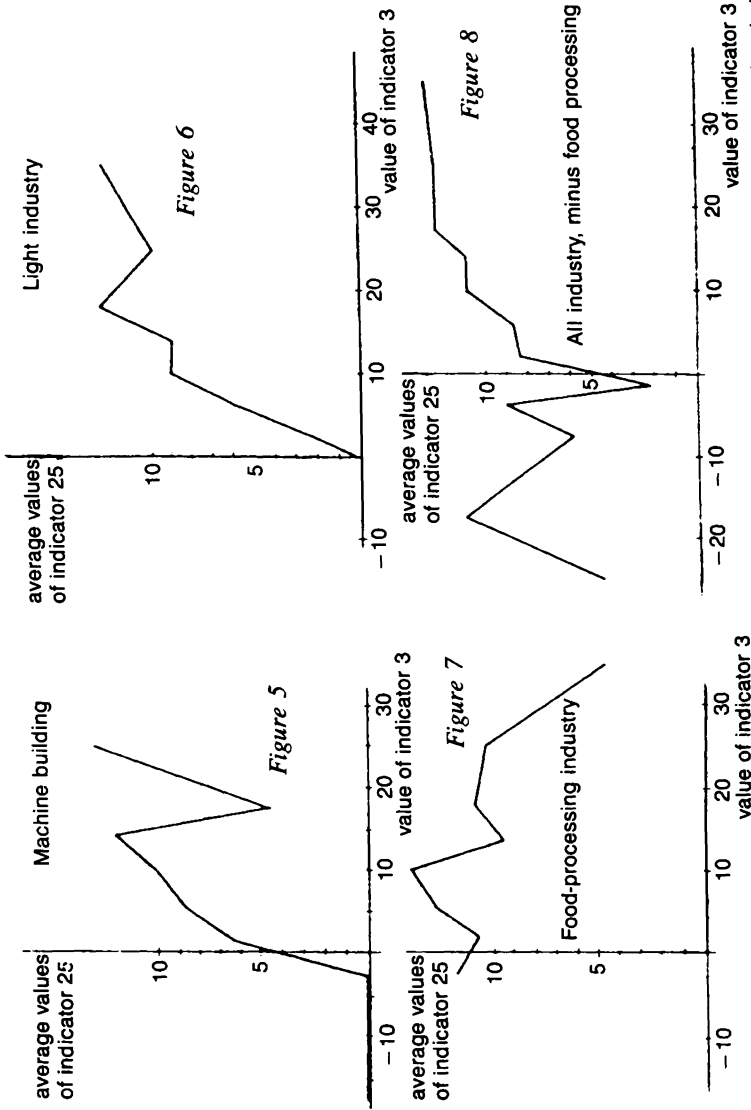
Table 5

Standard Deviation of Profitability Indicators

Branch of national economy	Original profitability	Profitability based on on balance	Post-redistribution profitability
1978			
Industry	32.85	7.80	8.68
Construction	15.15	16.00	7.58
Agriculture and forestry	6.18	3.95	2.39
Transport and communications	12.22	6.49	7.90
Commerce	41.86	8.22	6.08
<i>Entire national economy</i>	30.30	10.59	7.45
1979			
Industry	33.56	8.04	7.25
Construction	14.75	15.63	7.33
Agriculture and forestry	6.14	3.93	2.14
Transport and communications	11.91	6.19	6.52
Commerce	45.23	8.19	5.41
<i>Entire national economy</i>	31.31	10.39	6.48
1980			
Industry	32.30	7.51	4.77
Construction	24.31	14.46	6.22
Agriculture and forestry	7.45	3.91	2.11
Transport and communications	15.09	7.03	6.46
Commerce	37.49	9.46	4.89
<i>Entire national economy</i>	29.35	9.59	5.06

*For the sake of brevity, we have selected only the largest branches.

1) an enterprise suffering from a loss would not pay profit-sharing; 2) at profitable enterprises there was a uniformly growing relationship between profit-sharing and profitability; 3) this relationship was identical in the various branches and sections of the national economy. Our calculations prove that all three conditions are negated on a mass scale.



Labels: indicator 25: profit-sharing in days (calculated on the basis of annual wages); indicator 3: profitability based on balance.

Figures 5, 6, 7, 8. Relationship Between Profit-Sharing and Profitability Based On Balance In Industry, 1980

Hypothesis 4. Enterprises suffering losses also pay profit-sharing. There is no effective identical, monotone, and increasing relationship between profit-sharing, on the one hand, and original and actual profitability, on the other.

The theory would be refuted if correlations significantly varying from zero would show up between the various indicators for profit-sharing (or the usual indicator: “profit share is equal to how many days’ wages?”) on the one hand, and profit and profitability on the other. We found such a tighter correlation—i.e., one refuting the hypothesis—in no more than a few enterprise groups operating at a low level of aggregation. Aside from these exceptions, in most years and in most cases we did not find correlations significantly exceeding zero between the indicators for profit-sharing and profit or profitability. On the other hand, the relationship between profit-sharing and wages is quite close. Basically, profit-sharing conforms to wage proportions; in fact, it is nothing other than a simple wage supplement, in close relationship with actual wages.

An examination of linear correlation is not sufficient to test the hypothesis, since the consistent validity of the three conditions mentioned above could coincide with the existence of such a non-linear relationship that would imply low linear correlation. As an additional check, we would like to introduce several empirical regressions between profit-sharing and profitability based on balance (see figures 5–11). These clearly illustrate: in many branches of the economy (although not in every one), workers in enterprises suffering from losses also participate in profit-sharing. In most areas the connection between the two is not uniform: even if the direction of the general relationship is suitable (more profit—more profitability), here and there it is sharply broken or turned inside out. There is even a branch, the food-processing industry, in which even the general direction is anomalous: larger profitability means smaller profit-sharing. On the other hand, there is also a branch, light industry, in which the connection corresponds to conditions 1 and 2. In any event, the branch

deviations themselves are also indicative of violations against condition 3—uniformity.

In the final analysis, the calculations reinforce the claim that, as concerns the entire state sector of the national economy, hypothesis 3 accurately describes the situation.

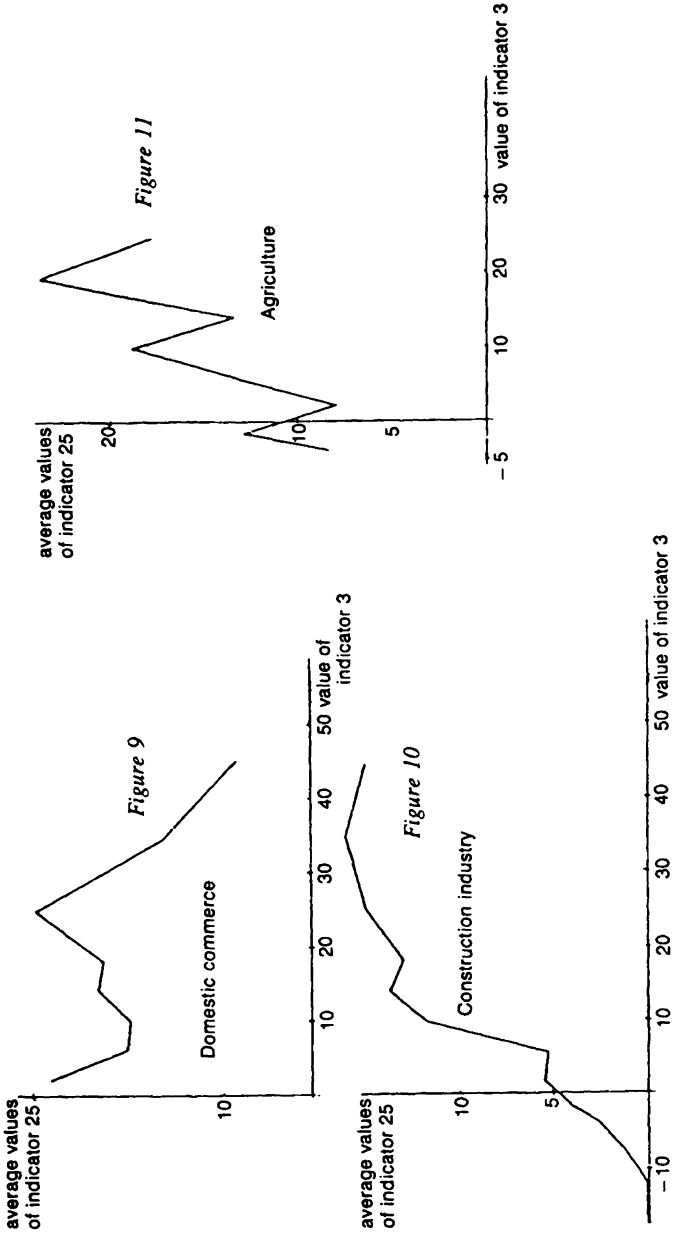
So far we have not analyzed the relationship between wages and profit, or profitability. We are planning to examine this question.

Survival does not depend on profitability

*Hypothesis 5. Survival of enterprises is almost guaranteed. The liquidation or amalgamation of an enterprise does not depend on profitability.*¹⁶

Let us consider as 100 percent the number of state enterprises in operation throughout the entire five-year period under examination. Thus posited, the number of all of those enterprises which were liquidated during those five years or were incorporated into other enterprises is 6.5 percent. Let us compare this with the following data: original profitability at more than 20 percent of the enterprises was *consistently* negative. From the outset this acknowledges the fact that consistent loss is not a “life and death” question. But even after all of this, one question remained unanswered: From the point of view of profitability, what distinguishes the liquidated 6.5 percent of the firms?

The second half of our hypothesis would be refuted if it were possible to show that the profitability of liquidated or amalgamated enterprises, at least in the largest portion of the cases, was lower than that at enterprises continuing to exist. However, the data do not show this; on the contrary, they actually give evidence of the opposite. Let us look at Table 6. Here we examine two years—1978 and 1979—and this time only in industry. On the scale for each year, the average original profitability of those enterprises which existed throughout the five-year period under examination can be found in the left-hand column, while in the



Labels: indicator 25: profit-sharing in days (calculated on the basis of annual wages); indicator 3: profitability based on balance
 Figures 9, 10, 11. The Relationship Between Profit-Sharing and Profitability Based On Balance In Several Branches of the National Economy, 1980

Table 6

Original Profitability of Continuously Operating and Liquidated Enterprises (In %)

Industrial branch	1978		1979	
	Continuously operating enterprises	Enterprises liquidated/ amalgamated in 1979	Continuously operating enterprises	Enterprises liquidated/ amalgamated in 1980
Mining	18.10	12.92		
Electric power	7.26	8.12		
Machine building	17.43	30.50		
Construction materials industry	8.20	16.42		
Chemicals	13.02	18.52		
Light industry	8.76	21.47	9.13	12.02
Food-processing industry	1.26	4.82	6.19	-3.45

*Only those branches are included in this table in which liquidation or amalgamation occurred during the years discussed.

right-hand column is indicated the average original profitability of those enterprises which were liquidated or amalgamated in the following year. This, therefore, is the "pre-death profitability." Aside from two exceptions (mining, 1978 and food processing, 1979), the right-hand number is larger than the left-hand one.¹⁷ In other words, in the vast number of cases, the original profitability of liquidated or amalgamated enterprises was greater than that of those consistent survivors. The latter enterprises were not "ruined," in the financial sense of the word, but rather their operation was ended at an administrative level.

Occasionally, the "softness" of budgetary constraints is interpreted to mean that they give every enterprise a one-hundred-percent guarantee of survival. This is a misunderstanding.¹⁸ Obviously, some of the enterprises will eventually cease to operate—the question is only *why*. Hypothesis 5, as well as the corroborating observations discussed above, do not weaken, but rather

strengthen observations pertaining to the “softness” of budgetary constraints. They give new proof of how small is the effect of budgetary constraints and the role of profit and loss. The authorities, if they want, can keep alive an enterprise which continuously shows losses or liquidate units that are more profitable than others. The life and death of an enterprise is dependent on the authorities and not on the market.

Investment does not depend on profitability

Hypothesis 6. Investment activity depends upon neither the original, nor the actual profitability of previous years.

During the course of one of our tests, we examined the relationship between profitability and investment activity in the deepest disaggregation, i.e., at the enterprise level. We assume that profitability, if it influences investment activity at all, can only do so with delays. Therefore, what we looked at, for example, was how strong is the correlation between indicator 1—the values of original profitability for the year 1975, and indicator 8—the values of investment activity for the year 1976, taking into consideration the sum total of state enterprises. This number can be found in the first line of column one of Table 7: the correlational coefficient here is -0.03 . The data following this shows that -0.03 is the correlational coefficient between the 1975 annual values of indicator 1 and the 1976 annual values of indicator 8, and so forth.

If at any place in our table, using any profitability number as a starting point and with any kind of retarding structure, we would get high correlational coefficients, this would mean refutation of hypothesis 6. However, the table unequivocally shows that nowhere are there any correlations which differ significantly from zero.

We performed another check of our hypothesis on a more aggregate level. We know the *average values* of indicators pertaining to a total of 16 enterprise groups, including the 9 sectors into which industry is broken down and the 6 other branches of

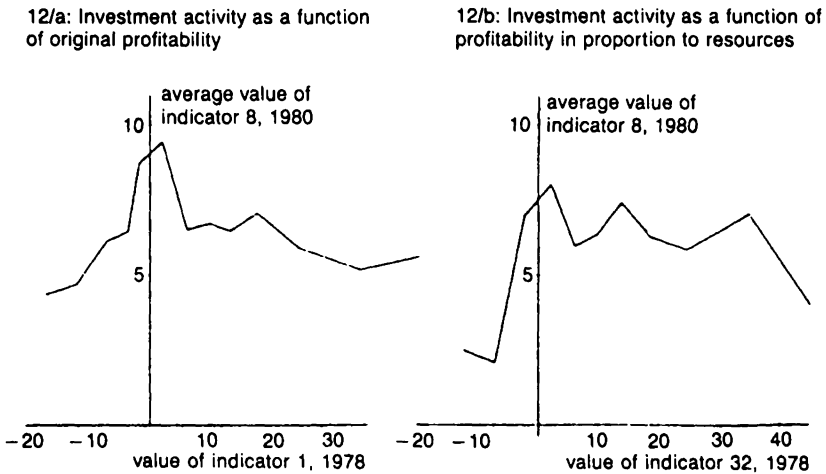
Table 7

Delayed Correlation Between Profitability and Investment Activity

Profitability indicator in following years	Correlational coefficient together with 8 indicators for investment activity				
	1976	1977	1978	1979	1980
1 Original profitability					
1975	-0.03	-0.03	-0.04	-0.04	-0.02
1976		-0.03	-0.07	-0.04	-0.08
1977			-0.04	-0.01	-0.07
1978				-0.03	-0.11
1979					-0.08
3 Profitability based on balance					
1975	-0.07	-0.07	-0.03	-0.03	-0.03
1976		-0.07	-0.04	-0.03	0.01
1977			-0.04	-0.03	0.01
1978				-0.04	0.00
1979					
4 Post-redistribution profitability					
1975	-0.07	-0.07	0.04	0.02	0.06
1976		-0.04	0.26	0.23	0.13
1977			0.30	0.27	0.14
1978				0.12	0.13
1979					0.09

the national economy. We examined how close was the correlation between average profitability and average investment activity of the enterprise groups, namely, with a two-year delay between profitability and investment activity.¹⁹ With regard to the effect of original profitability: the value of the correlational coefficient is +0.15, while in conjunction with post-redistribution profitability the value of the correlational coefficient is altogether +0.05. Therefore, this calculation made on the enterprise group level does not disprove the hypothesis.

Further analysis of the relationship between profitability and investment activity was also served by the calculation of delayed empirical regressions in the various branches of the economy. To



Indicators—1: original profitability; 32: profitability in proportion to resources; 8: investment/total value of matériel

Figure 12. Relationship Between Investment Activity and Profitability

illustrate this, we present graphs (see Figure 12) compiled on the basis of data from all industrial enterprises. We can see that in the spheres showing positive profitability there is essentially no relationship between investment activity and profitability. There is one kind of tendency in enterprises suffering losses: the bigger the loss in a given year, the smaller are investment activities two years later. But the investment activity of enterprises suffering the greatest deficits is barely smaller than that of the most profitable.

We planned several additional analyses. Initial calculations indicate that investment activity is strongly dependent upon outside sources and is practically independent from its own sources; this supposition, however, still requires more thorough proof. We would also like to analyze sometime in the future the relationship of enterprise *growth* to profit and profitability, when we can use various indicators (the growth of production, fixed capital, total capital, personnel, etc.) to measure growth.

General conclusions

Our examination did not reveal any unexpected results, particularly in view of the fact that we merely wanted to check known hypotheses in practical cases. Let us honestly admit: in discussions among ourselves in Hungary, we have gotten used to feeling that the validity of one statement or another should be "self-evident," and we have a tendency to forget about the fact that it is the obligation of a scientific researcher to accept with scepticism "bits of evidence" and to confront them with practical facts.

We feel that the *six hypotheses listed are acceptable* and that they provide a sufficient basis for the deduction of more general conclusions. We will proceed to this shortly. First, however, an emphatic methodological comment seems to be in order. We do not want to suggest that, supported by a large mass of data, we have now *proven* the validity of the above hypotheses or that of our conclusions derived from them. This is not to be expected from this type of practical check.²⁰ The validity of an assertion seeking broader applicability can only be termed *proven in the strictest sense* after the use of logical methods. With the appropriate modifications, we can deduce theorems and conclusions from given premises. Then we can answer unequivocally the question of whether—based on the given premises—the conclusion is valid. In contrast, a theoretical hypothesis having a generalizing character cannot be proven unequivocally, not even if we utilize mathematical-statistical methods for this purpose. We can, however, examine under these circumstances a much more modest question: how "close" or "distant" a hypothesis is from the germ of truth we have observed. "Proximity" confirms and strengthens the original hypothesis, while "distance" weakens it. The latter case prompts theoreticians to try to construct a better hypothesis. We cannot expect outright proof or refutation, if only because the hypothesis itself may be inaccurate; because the practical definition of the indicators utilized in the calculations and the conclusion derived from the given body of statistics always presents problems; because application of the utilized mathemati-

cal-statistical procedure is tied to certain suppositions, and the actual observation does not totally satisfy their suppositions; because the procedure itself is based on heavily simplified suppositions; because the favorable or unfavorable effects of the exogenous circumstances on the observed variables may have influenced, from a procedural point of view, the final result of the analysis, and so forth.

All of this urges us to refrain from two kinds of definitive stances. One is overestimation of the power of numbers, and especially of mathematical-statistical analysis. Therefore, we do not "prove" a claim; at best we corroborate one thesis or another. The other extreme is "over-justification." Doubts and misgivings can be brought up against any kind of mathematical-statistical analysis, if only because of the considerations given a few lines above. This is why every empirical corroboration should be supplemented with better and better calculations. We want to refrain from this type of perfectionism. If the validity of a hypothesis based on a theoretical-logical method seems reasonable and if the calculations strongly support it, then it is not worthwhile to continue the search for additional corroborating results. Rather, it is necessary to accept the fact that some doubts or misgivings will remain. Of course, arbitrariness and subjectivity necessarily play a role in where we draw the line beyond which we feel the hypothesis is "strongly" supported. What is reassuring is that in the final analysis the opportunity for testing is open to others. Even if a theory is acceptable to us, another researcher can at any time appear, conduct additional checks, perhaps using a different data bank, and perhaps come across results which compel science to reject that hypothesis and to establish other hypotheses.

Having underlined these reservations, we reserve the right to deduce several general conclusions without cautionary wording and in an incisive form.

In the Hungarian economy, the budgetary constraints of state enterprises are soft. As we emphasized at the beginning of the article, this is first of all measurable *in the results*, primarily in the extent to which survival of the enterprise and investment

activity carried out in the interest of growth are dependent on profitability. In our view, with the testing of hypotheses 5 and 6, we sufficiently corroborated this claim, although it will still be expedient to further examine the relationship between growth and profitability.

The softness of budgetary constraints may also be approached from the side of "*softening methods.*" At the beginning of the article we listed four main methods. Our research dealt with the first two of these (the allocations and withholdings introduced by the state), the third (credit system) and fourth (central pricing) fall outside the scope of our research. In our judgment, our examination suitably corroborates the supposition that *the type of redistribution which is predominant in Hungary is in itself enough to soften enterprise budgetary constraints.* We do not claim that the other two factors do not play an important role. If *in addition* even the credit system and the actual practice involved in state price determination is "soft" (and we strongly suspect that this is indeed the case), then it is *a fortiori* true that the four factors together would assure the chronic softness of budgetary constraints. But we feel that the opposite supposition is also valid: even if the credit system and state price determination were "hard," the behavioral regularities which dominate Hungarian fiscal redistribution would be capable of counterbalancing them and softening budgetary constraints.

We now return to a question already mentioned in this article, that of the relationship between redistribution and prices. Two courses of action exist: in the one, determination of output price is the primary function, and the policies of allocations and withholdings, or at least certain elements thereof, are adjusted accordingly. In order to accommodate certain established precepts (in the area of social policies, or to influence supply and demand, etc.), state authorities establish prices at a level that is either significantly lower or significantly higher than the sum of expenses, average-sized profit, and taxes. Through special redistribution procedures, the same authorities divert the resulting excess profits or create a reserve for extra expenses. The other

tendency is for certain withholding and allocating forms to exist, reinforced by habit if nothing else. Prices are established in such a manner that, in the course of repeated open price-modifications or hidden increases, these withholdings and allocations are already “figured in.” We did not undertake to trace or break down this interrelationship: for one thing, from the the point of view of our topic—the hardness-softness of budgetary constraints—this has no significance. In this article we are not dealing with whether this or that tax or subsidy is “expedient” or “desirable.” Whatever the case may be, the many different kinds (justified or unjustified) of redistributive processes *together* exert a certain influence, and it is this influence which we wanted to trace.

We feel that a system of inter-enterprise redistribution, occurring on a small scale and in accordance with clear-cut and firmly set ground rules, may not necessarily loosen budgetary constraints. We suspect that in this regard critical boundaries and boundary zones do exist. However, it appears that *the Hungarian national economy has far exceeded these critical boundary zones of redistribution with regard to its proportions, good organization, and stability.* The proportions of redistribution are enormous, and it is composed of a hundred kinds of unusually intricate and confusing withholdings and allocations. The ground rules are continuously changing, not least of all as a result of negotiations, pressure tactics, and “lobbying” exerted by those concerned. The only practice that is constant is that the profits are repeatedly “chewed into bits and pieces.” They take a lot away from units that have a lot; those that have little can in all likelihood count on being compensated for this. Under such circumstances, the quality of the relationship between firms and the higher authorities is much more important than how the market responds to their products.

From one point of view, this examination provided some surprises, at least for the authors. The budgetary constraints proved to be even softer than what we had counted on. We thought that as a consequence of the 1968 reforms they may have hardened somewhat.²¹ It is true that we did not conduct an examination,

with statistical methods, comparing the pre- and post-1968 situation. In any case, *we found no tangible sign for the hardening of budgetary constraints*. This is not to say that state-operated enterprises are entirely indifferent to profit or prices. But even if they have a certain degree of interest in income and expenditure development, which is manifested in several of their recent actions, they can always find a way to escape the consequences of deficits; and, from the point of view of our topic, this is indeed a crucial consideration.

At the end of the 1970s it was often emphasized in official pronouncements that the conditions regulating financial management must be made firmer. Various measures aimed at the realization of this goal have been introduced. Were these declared intentions realized?

In the analyses we have completed so far, germane data were available only for a single year. We can state that *we did not notice any change, radical transformation, or "qualitative jump" during 1980*. (After comparing the 1980 data in our tables with earlier ones, our readers may also notice that no significant change in trends has taken place.²²) In our forthcoming research studies we wish to extend the period covered to 1982: then we can once again discuss the same problem.

We are hoping that the continuation of our research can provide answers not only to the question posed above, but also illuminate the relationship between our fiscal system and our political life, as well as other important aspects of enterprise behavior.

Notes

1. See Chapter 13 of János Kornai, *A hiány*, Budapest: Közgazdasági és Jogi Könyvkiadó, 1980; for a summary, see also János Kornai, "Kemény" és 'puha' költségvetési korlát" ["Hard" and "soft" budgetary constraints], *Gazdaság* (Budapest), no. 4, 1984.

2. The research is being conducted on behalf of the Ministry of Industry; its preparatory portion was carried out under the auspices of the State Development Bank. János Kornai is in charge of the research, and his present staff consists of Anna Ferge, Miklós Locsmándi, and Ágnes Matits. During the

earlier portion of the work, Andrea Deák, Mária Fényszarusy-Simek, Klára Szatchó, and Péter Wellisch also collaborated.

We summarized the initial results of the research in photo-duplicated form, under the title "Az állami vállalatok jövedelmének redistribúciója—Első beszámoló" [The redistribution of the profit of state enterprises—first report], Budapest: Ministry of Industry, 1983. Much of the material in the present article was borrowed from this report, which, by the way, contained many more results based on the calculations and more detailed analysis. Henceforth, we will refer to the more detailed report of Kornai, Matits, and Ferge under the title "Első beszámoló" [First report].

We would also like to express thanks to the others who collaborated in the research, as well as to those who commented on the "First Report" and helped in the analysis of the material with their valuable observations, including Mária Csanádi, József Gálik, István Hetényi, Mihály Kupa, and Erzsébet Szalai.

3. We can describe the size of our undertaking with a few numbers: for example, in 1980 we collected 113 items of data concerning the balance in each enterprise. In that year, 1,636 state enterprises were in operation; therefore, we utilized 190,000 pieces of raw data—i.e. those directly taken over from the balance report—for just one year.

4. A detailed description and derivation of our system of indicators can be found in the appendix to the "First Report."

5. See, for example, Ágnes Matits, Márta Pap-Sulyok, and József Temesi, "A költségvetési elemek rövidtávú előrejelzésének lehetőségei makro-ökonomiai összefüggések alapján" [Possibilities for the short-range forecasting of budgetary elements, based on macroeconomic relationships], photo-duplicated study, Budapest: Karl Marx University of Economic Sciences and Hungarian Bureau of Standards, 1981.

6. The numbering of the indicators corresponds to the numbering utilized in the "First Report." The logical sequence of the discussion requires that we diverge from following the numerical order. In our tables and in our analyses, as well as in the explanations to the figures, we represented relative indicators with bold numbers—1, 2, 3, 4, . . .—to distinguish them from the numbers in standard roman type representing the absolute indicators. In the figures, we circled the order number of the relative indicators.

7. With regard to the procurement of data, we also did not begin with indicator 1. The starting point for our data processing work was, as is customary, the category of profit, which bears the number 3 in our system of indicators. Starting at this point, we proceeded, in a logical sense, "backwards": we "gave back" to the enterprise the taxes and other withholdings which had been taken away, and we "took away" allocations and other benefits. This is how we arrived at original profit.

8. See Chief Control Department of the Ministry of Finances, "A normatívitással kapcsolatos értelmezések és kísérlet a normatívitás érvényesülésének körvonalazására" [Interpretations of standardization and an experimental outline for effective standardization], photo-reproduced study (Budapest) 1982.

9. It follows from the definition that indicator 11, a redistribution quotient, is equal to indicator 4, post-profitability redistribution, minus indicator

1, original profitability.

10. The "First Report" contains a total of 34 hypotheses, some of which require further substantiation or readjustment.

11. Henceforth, we will use "actual profitability" as a collective term in cases where we make a qualitative observation applicable to both indicators 3 and 4. In a similar sense, we will use the designation "actual profit" as a collective term for jointly labeling the absolute indicators 3 and 4.

12. As early as the preparatory stages of the 1968 reform, concerns were voiced that redistribution is generally very large-scale, especially the proportion of state subsidies. See Andrea Deák, "A reformot előkészítő pénzügyi számítások néhány tapasztalata" [Some lessons of the financial calculations made in preparation for the reform], *Közgazdasági Szemle*, no. 7-8, 1968, pp. 854-868.

13. Especially noteworthy, because of their richness of ideas and detailed documentation, are two articles by Mária Csanádi, "A vállalatnagyság, a jövedelmezőség és a preferenciák néhány összefüggése" [Several connections between enterprise size, profitability, and preferential treatment], *Pénzügyi Szemle*, no. 2, 1979, pp. 105-120, and "Beavatkozás, szelekció, kölcsönös alkalmazkodás (Munkaanyag)" [Interference, selection, mutual accommodation (working papers)], Institute for Financial Research, February 1983; as well as a study by Erzsébet Szalai, "A reformfolyamat és a nagyvállalatok" [Reform procedure and large enterprises], *Valóság*, no. 5, 1982.

14. We can characterize the distribution by providing the so-called empirical density function $f_n(x)$. Its definition is: $f_n(x) = k/n\Delta x$, where n is the number of recurring motifs, Δx is the size of the "i" class interval, and k_i is the number of motifs belonging to the "i" class interval.

15. The authors first came across this cited passage, although in a somewhat different economic context, in one of Milton Friedman's works. [The translator has cited the original English-language text rather than the Hungarian translation by Dezső Kosztolányi and Tibor Szobotka quoted by the authors: Lewis Carroll, "A Caucus-Race and a Long Tale," chapter 3 from *Alice's Adventures in Wonderland*, New York: The New American Library of World Literature, Inc., 1960, p. 33.]

16. This idea was essentially proposed by Mihály Laki, "Megszűnés és összevonás" [Liquidation and consolidation], *Gazdaság* (Budapest), no. 1, 1982. Our calculations corroborate his conclusions.

17. There is only one case which contradicts the hypothesis: the liquidated/amalgamated food-processing enterprises ended with deficits in 1979, while the survivors were profitable. The situation was different in mining in 1978: it is true that the number in the right-hand column is lower than the one in the left, but even this way the numbers reveal high original profitability.

18. It is possible that the misinterpretable wording of one or another publication or lecture relating to *A hiány* also contributed to this error.

19. We regard the following to be interconnected data pairs: the value of indicator 1 for 1976 and of indicator 8 for 1978, the value of indicator 4 for 1977 and indicator 8 for 1979, and finally the value of indicator 1 for 1978 and indicator 8 for 1980. This is a total of $3 \times 16 = 18$ data pairs. In a similar

manner, we have 48 data pairs at our disposal for the examination of the relationship between indicators 4 and 8.

20. The set of problems which we only very briefly touched upon here is dealt with in a large body of philosophical-theoretical literature. Among others, we can cite the works of Popper, Lakatos, and Altrichter.

21. See subsection 6 of chapter 13 in *A hiány*.

22. One of the authors of this article, Ágnes Matits, collaborated with József Temesi in examining similar problems within the scope of another research project separate from the present one, and with a data base and methodology in part differing from that used in this article. They reached the conclusion that in the 1980–1981 time period there was a continuation of the earlier tendencies present in the financial indicators of the enterprises. See Ágnes Matits and József Temesi, “Szabályozóváltozások és vállalati reakciók” [Regulatory changes and enterprise reactions], *Közgazdasági Szemle* (Budapest), no. 6, 1983.